

Department of Homeland Security (DHS)

United States Coast Guard (USCG)

**Cutter Boat Over-the-Horizon Fifth Generation
(CB-OTH V)**

70Z02320RACB00700

SPECIFICATION

10 SEPTEMBER 2020

Revision A

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RECORD OF CONTRACT CHANGES

70Z02320RACB00700		
Version	Date	Purpose
Orig.	12 August 2020	Published for the RFP.
A00001	10 September 2020	041-5.4: Updated engineering change requirement based on prospective offeror feedback.
		051-1.3: Updated parent craft overall beam requirement based on prospective offeror feedback.
		051-6.1: Updated towing requirement based on prospective offeror feedback.
		075-1.2: Added key-locking thread insert as an option based on prospective offeror feedback.
		078-7: Clarified use of Adhesives and Coating Systems
		079-1.1.1: Renamed "flotation" bags as "inflated" bags for clarity.
		079-1.1.2: Renamed "flotation" bags as "inflated" bags for clarity.
		079-1.1.2.1: Added to clarify applicability of ISO 12217-1 Annex F.4.4.
		079-1.1.2.2: Renumbered to accommodate addition of 079-1.1.2.1.
		079-1.1.2.3: Renumbered to accommodate addition of 079-1.1.2.1.
		079-2.2: Clarified heel requirement based on prospective offeror feedback.
		256-1.4: Clerical edit.
		424-1.1: Added part number for Depth Transducer.
		Table 581-1: Clarified equipment for Anchor System.
		582-5.2.2: Clarified requirement for dual point lift points.
		582-5.2.3: Clarified requirement for dual point life points.
		582-5.3.5: Updated to add synthetic rope based on prospective offeror feedback.
		Table 600-1: Updated to specify water rescue throw bag's color and additional line sizes based on prospective offeror feedback.
602-4.4: Updated to allow punched letters on weight label plates based on prospective offeror feedback.		
660-1.7: Clarified conflicting armrest requirements based on prospective offeror feedback.		

		660-1.7.4: Removed conflicting armrest requirements based on prospective offeror feedback.
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040 [Orig] PROJECT MANAGEMENT

040-1 [Orig] General

- 040-1.1 [Orig] This document establishes requirements for the construction, testing, delivery, and logistics support of the fifth generation United States Coast Guard (USCG) Over-the-Horizon Cutter Boat (CB-OTH V).

040-2 [Orig] Meetings

- 040-2.1 [Orig] General: The Contractor shall host meetings or be present at USCG meetings throughout the contract period.
- 040-2.2 [Orig] Routine Status Meetings: The Contractor shall participate in routine status meetings with the USCG, starting at the time of the second delivery order, to review and discuss contract administration and technical issues over a USCG-provided teleconference line. These shall occur at the request of either the Contractor or the USCG, but not more frequently than weekly, or less frequently than monthly, unless otherwise agreed.
- 040-2.3 [Orig] Formal Meetings: The Contractor shall deliver a written agenda to the KO at least five working days prior to a formal meeting.
- Logistics Conference – See Section 080-1.
 - Open Hull Inspection – See Section 068-1.

040-3 [Orig] Contract Problems

- 040-3.1 [Orig] The Contractor shall notify the KO within seven days of actual or potential contract problems to establish an early dialogue between the Contractor and USCG. The notification shall include to the extent possible:
- The nature of the contract problem;
 - The date on which the contract problem arose and the date on which the contract problem was identified as such;
 - The anticipated direct and consequential effects of the contract problem upon the delivery schedule or completion of contract performance or the cost of performance of the contract;
 - Identification of any supplies or services which are or may be affected; and
 - The Contractor's recommended solution to the reported contract problem.

040-4 [Orig] Integrated Master Schedule (IMS)

- 040-4.1 [Orig] The Contractor shall develop and maintain an event-based IMS. The IMS shall be used as a primary planning and tracking tool and shall show critical development milestone events and accomplishments for the Contract through the end of the contract performance period. At a minimum the IMS shall reflect the following tasks/activities:
- Delivery orders for hulls;
 - Key meetings; and
 - Contract deliverables identified in Appendix A – CB-OTH V Deliverables.
- 040-4.2 [Orig] Each schedule task/activity shall contain:
- Name of Task/Activity;

- Duration;
- Dependencies;
- Baseline Start/Finish dates; and
- Actual Start/Finish dates.

040-4.3 [Orig] Initial submission of the IMS shall be at the Logistics Conference and an updated IMS shall be delivered monthly for the first year after Logistics Conference, then quarterly thereafter.

040-4.4 [Orig] The IMS shall be delivered electronically in the native digital format (be compatible with Microsoft Project) and in Portable Document Format (PDF).

040-5 [Orig] Data Deliverables

040-5.1 [Orig] The Contractor shall develop, prepare, and submit required data as a contract deliverable. Appendix A provides an index with required delivery dates of the deliverables included in this contract.

040-5.2 [Orig] Incoming data deliverables will be reviewed by the USCG for conformance with contract requirements; unless otherwise stated, allow the USCG 14 days to review each deliverable. The USCG will inform the Contractor with one of two outcomes.

040-5.2.1 [Orig] Accepted: The KO communicates written acceptance of the submittal to the Contractor, meaning that the submittal meets contract requirements for content, quality, and quantity. The combination of the submittal and the KO's written acceptance constitutes the completed deliverable.

040-5.2.2 [Orig] Not Accepted: The KO communicates written non-acceptance of the submittal to the Contractor, along with the rationale. The Contractor must make the necessary changes to address the rationale and resubmit. The Contractor may seek clarification from the KO. If the Contractor does not agree with the rationale for non-acceptance, the Contractor may resubmit the deliverable along with correspondence explaining their reasons for disagreement, and propose suitable alternatives.

040-5.3 [Orig] Each data deliverable shall have a cover sheet that provides the following information;

- Contract Name;
- Contract Number;
- Deliverable Name;
- Revision; and Revision Date
- Signature and date line for USCG Acceptance

040-5.4 [Orig] All data deliverable shall be submitted in accordance with Appendix A

041 [Orig] CONFIGURATION MANAGEMENT (CM)

041-1 [Orig] General

041-1.1 [Orig] The Contractor's CM organization shall be responsible for:

- Sub-Contractor/vendor compliance with the CM requirements of this contract;
- Developing the boats' configuration;
- Documenting the configuration;

- Managing the configuration;
- Identification of changes to the configuration with specific consideration for security impacts to system integrity;
- Documenting physical and logical access restrictions that prevent tampering;
- Protection of software and firmware from unauthorized disclosure and modification;
- Reviews or audits to determine if unauthorized changes have occurred;
- Configuration status accounting; and
- Completion of or participation in verification and audits.

041-2 [Orig] Configuration Status Accounting (CSA)

041-2.1 [Orig] The Contractor shall perform CSA from acceptance of the first boat through the establishment of the Product Configuration Baseline (PCB). With establishment of the PCB the USCG will assume responsibility for maintaining the CSA system.

041-2.1.1 [Orig] The CSA system shall

- Identify the approved baseline and its associated technical documentation;
- Record and report implementation status of authorized changes to:
 - Technical documentation;
 - Effectivity in production; and
 - Implementation on boats already accepted by the USCG.
- Contain results of configuration audits to include status; and
- Track resolution and final disposition of identified discrepancies.

041-2.1.2 [Orig] CSA activities shall meet the intent of Section 7 of MIL-HDBK-61(series) and the CSA program shall address the tasks identified Figure 8 of MIL-HDBK-61(series). The CSA system shall be accessible, viewable, and maintainable by the USCG through a standard USCG workstation.

041-3 [Orig] Configuration Baselines

041-3.1 [Orig] Preliminary-Product Configuration Baseline (p-PCB)

041-3.1.1 [Orig] The p-PCB is established by USCG acceptance of the first CB-OTH V of the second delivery order. The p-PCB will document the configuration of the CB-OTH V during the Operational Test and Evaluation (OT&E) period.

041-3.1.2 [Orig] The p-PCB is under the Contractor's control; however any changes to the p-PCB, including all software or firmware changes (including adjustable parameter changes), shall be shared with the USCG as soon as they are identified and captured in the CSA system. The USCG will review p-PCB changes for compliance with the contract requirements.

041-3.1.3 [Orig] All boats shall be built to conform to the p-PCB until the USCG establishes the Product Configuration Baseline (PCB). Once the PCB is established, all boats shall be built to conform to the PCB. Any changes made to the p-PCB shall be incorporated into all boats unless otherwise agreed to.

041-3.2 [Orig] PCB

041-3.2.1 [Orig] The PCB will be established upon USCG approval of the Physical Configuration Audit (PCA). The PCB will be defined by the approved

product drawings required in Section 085-3. The USCG shall notify the Contractor once the PCB has been established.

- 041-3.2.2 [Orig] Once established, the PCB is under USCG control the Contractor shall not change or modify the configuration, which includes software and firmware, on any boat in production or any boat already in service without approval from the USCG. This includes change or modification during the completion of warranty work, without USCG approval.

041-4 [Orig] Physical Configuration Audit (PCA)

- 041-4.1 [Orig] The USCG will conduct a PCA on a production CB-OTH V to verify conformance with the product drawings.
- 041-4.2 [Orig] The boat for the PCA will be designated by the USCG and will have all changes identified during OT&E incorporated.
- 041-4.3 [Orig] The product drawings used for the PCA will have been submitted to the USCG in accordance with Section 085-3 and reflect any changes incorporated into production as a result of OT&E.
- 041-4.4 [Orig] The USCG will conduct an audit at the delivery location for the designated CB-OTH V after acceptance. The physical boat will be compared to each product drawing and each product drawing will be compared to the physical boat to validate that documented details match. Any discrepancies between the physical boat and the product drawings will be documented in a USCG-generated PCA report.
- 041-4.5 [Orig] The PCA is scheduled to take no more than five days to complete. A Contractor representative is invited, but not required to attend. Contractor attendance and participation would facilitate communication and potentially expedite resolution.
- 041-4.6 [Orig] The Contractor shall resolve all discrepancies.
- 041-4.7 [Orig] The Contractor shall review the report and shall propose a resolution for each discrepancy. Resolution may be in the form of:
- The drawings are correct and the boats, including those already accepted, those in production, and the PCA boat, shall be corrected;
 - The boat is correct and the product drawings need to be revised; or
 - Some other resolution.
- 041-4.8 [Orig] The Contractor shall prepare a PCA Resolution Report that shall identify a corrective action for each discrepancy to include anticipated dates when the actions will be completed.

041-5 [Orig] Configuration Control

- 041-5.1 [Orig] Engineering Change Proposal (ECP) - The Contractor can propose changes to the contract requirements or the PCB by submitting a DD Form 1692 supplied as Government Furnished Information (GFI). The Contractor shall request an ECP number from the USCG Configuration Manager prior to submission of the ECP.
- 041-5.2 [Orig] ECPs shall describe the proposed change and the need for the change in sufficient detail for the USCG to ascertain if it meets the contract requirements. The ECP shall:

- identify “Effectivity (identify the first CB-OTH V in production this change will be implemented on)”;
- provide a recommendation on back fit for previously accepted boats; and
- identify all approved configuration and technical documentation that will require revision by listing them in block 16, “Documents Affected,” of DD Form 1692.

041-5.3 [Orig] If the Contractor recommends the USCG install the ECP, the Contractor shall develop and deliver an Engineering Change Installation Instructions (ECII) (template provided as GFI) that provides parts, consumables, and step by step installation instruction. The Contractor shall supply all the necessary components listed on the ECII for the change to be installed on one boat to enable USCG verification and acceptance of the ECII.

041-5.4 [A00001] If approved, the details for implementation of the change will be established and incorporated through a contract modification.

041-6 [Orig] Diminishing Manufacturing Sources/Material Shortages (DMSMS) and Obsolescence

041-6.1 [Orig] The Contractor shall be responsible for addressing DMSMS and obsolescence throughout the life of the contract. If DMSMS/obsolescence concerns appear to affect the CB-OTH V, the Contractor shall inform the USCG as soon as the Contractor becomes aware of the issue.

041-6.2 [Orig] The Contractor shall be responsible to provide recommended solutions to the USCG which may include, but not be limited to:

- Alternate vendors;
- New sources of supply; or
- Substitute parts.

041-6.3 [Orig] The Contractor shall bear all costs associated with substituting any Configuration Item (CI) where the reason for substitution is that the component is DMSMS/obsolete. The Contractor shall submit an ECP with block 21c, “Cost Impact from ECP,” checked as “NO”. All delivered configuration and technical documentation shall be revised at the Contractor’s expense to document the configuration change.

041-6.4 [Orig] For USCG specified parts, Section 041-6.3 does not apply. The Contractor shall provide recommended solutions consistent with Section 041-6.2.

042 [Orig] GENERAL ADMINISTRATIVE REQUIREMENTS

042-1 [Orig] Definitions

042-1.1 [Orig] Calm Condition – Sea State (SS) 1 with wind speed of not more than 8 knots.

042-1.2 [Orig] Configuration Item (CI) – An essential support component of the boat that is treated as a self-contained unit for the purposes of identification and change control. In most cases, the CI will be a system (e.g., propulsion engine) or individual item piece-part (bilge pump) where the CI will be visible on the list of materials within a drawing. The information within the drawing and the Master Equipment Configuration List (MECL) shall be identical. In other cases, the CI may be a significant part or component of a system which comprises a higher-level CI (e.g. an alternator on the propulsion engine).

- 042-1.3 [Orig] Communication Boundary – System of systems for internal and external communications which contains associated equipment, control systems, and signals. In the case of the CB-OTH V, this includes the tactical radio and antenna, VHF radio and antenna, UHF radio and antenna, crew communication system, loud hailer/siren, horn, and blue force tracking system.
- 042-1.4 [Orig] Faying Surfaces – Contact surfaces or faces of two similar or dissimilar materials placed in tight contact to form a joint that may be able to collect moisture.
- 042-1.5 [Orig] Hull, Mechanical, and Electrical (HM&E) Boundary – System of systems incorporating equipment, control systems, and signals associated with vessel power (mechanical and electrical), stability, and operation. For the CB-OTH V this includes the engine control modules, steering control modules, electrical power generation control module, electrical power storage control module, bilge pumps and alarms, fire suppression systems and alarms, stability control systems, and any other equipment which is not considered part of the navigation or communication boundaries.
- 042-1.6 [Orig] Human Factors Engineering (HFE) – The engineering discipline concerned with applying known information about a human's physical and mental capabilities and limitations to the design of the boat, boat systems, and individual equipment to ensure that they can be efficiently operated and maintained by the boat's crew. HFE minimizes the factors that degrade human performance or increase the chance of error. As applied to the CB-OTH V, HFE influences the arrangement, construction, and testing of the total platform, systems, and individual equipment to ensure that they can be effectively and safely operated and maintained by the crew and support personnel.
- 042-1.7 [Orig] Human Systems Integration (HSI) - The discipline of incorporating the human element into the design process to ensure that the hardware design supports the human in executing required functions to meet mission requirements. Also helps ensure the crew will be of adequate number and skill to perform expected duties in a safe environment that supports a high quality of life. HSI includes the following disciplines: Human Factors Engineering, Manpower, Personnel, Training, Personnel Survivability, Habitability, System Safety, and Environmental Safety and Occupational Health.
- 042-1.8 [Orig] Idle Speed - Observed speed in calm water when the engine is running at the minimum RPM with the waterjet engaged and producing forward thrust.
- 042-1.9 [Orig] Mean Time Between Overhaul (MTBO) – The manufacturer's recommended number of operating/running hours before it requires overhaul.
- 042-1.10 [Orig] Navigation Boundary – System of systems incorporating the equipment, control system, and signals used to accurately ascertain position and for planning/following a route from one place to another. In the case of the CB-OTH V this include the Standard Scalable Integrated Navigation System 2 (SINS-2), automatic identification system (AIS), and global positioning systems (GPS).
- 042-1.11 [Orig] Operate – The ability of the CB-OTH V to transit and maneuver in any direction without damage to the boat's structure or equipment while not causing harm to the crew.
- 042-1.12 [Orig] CB-OTH V and "the boat" – Refers to the U.S. Coast Guard Over-the-Horizon fifth generation Cutter Boat, CB-OTH V as defined in this Specification.
- 042-1.13 [Orig] Parent Cutter - The cutter that a CB-OTH V is deployed from. The following cutter classes will serve as the parent cutter for the CB-OTH V: 270' Medium Endurance

Cutters (WMEC), Fast Response Cutters (FRC), National Security Cutters (NSC), Offshore Patrol Cutters (OPC), and Polar Security Cutters (PSC).

- 042-1.14 [Orig] Propulsion System – System of systems that creates force leading to movement. In the case of the CB-OTH V this includes the marine diesel engine(s), reverse/reduction gear(s), shafting, and waterjet propulsor(s).
- 042-1.15 [Orig] Readily Accessible – Capable of being reached quickly, without difficulty, with minimal interference and without the need for hand tools, in case of an emergency or if used on a regular basis.
- 042-1.16 [Orig] Sea State – The general condition of the surface on a large body of water, ocean, or sea with respect to wind and wave height at a certain location and moment. The requirements for CB-OTH V are derived from the Bretschneider Formulation as shown in the below table. Wave heights are defined as the mean wave height (trough to crest) of the highest third of the waves ($H_{1/3}$).

Sea State	Significant Wave Height (feet)	Modal Wave Periods (seconds)
0-1	<0.3	0
2	0.3 to <1.6	3.0-15.0
3	1.6 to <4.1	5.2-15.5
4	4.1 to <8.2	5.9-15.5
5	8.2 to <13.1	7.2-16.5
6	13.1 to <19.7	9.3-16.5
7	19.7 to <29.5	10.0-17.2
8	29.5 to <45.5	13.0-18.4
Greater than 8	>45.5	20.0

- 042-1.17 [Orig] Extended Ship Work Breakdown Structure (ESWBS) – Provided as GFI, the ESWBS is a method to integrate design, configuration, and logistics through a standard coding of the work breakdown structure for, boat systems. This contract will limit the ESWBS to the first three numerals.
- 042-1.18 [Orig] Watertightness Degree 1 – Shall be in accordance with ISO 12216 section 3.20.1, “protection against effects of continuous immersion in water”.
- 042-1.19 [Orig] Watertightness Degree 2 – Shall be in accordance with ISO 12216 section 3.20.2, “protection against effects of temporary immersion in water”.
- 042-1.20 [Orig] Watertightness Degree 3 – Shall be in accordance with ISO 12216 section 3.20.3, “protection against splashing water”.
- 042-1.21 [Orig] Watertight Enclosure – An enclosure that meets the IP 67 requirements of IEC standard 60529.

042-2 [Orig] Warranty

- 042-2.1 [Orig] The Contractor shall provide a warranty program that covers all warranty labor, material, parts, shipping, and marine chemist certifications required to effect warranty repairs. If warranty work is performed at a Government facility, the Contractor shall follow USCG policy for gas free certification and marine chemist requirements. USCG policy requires marine chemist certification prior to completing hot-work on the boat if the boat is located on a Government facility.

- 042-2.2 [Orig] The workmanship, performance, and operation of each CB-OTH V and all installed systems shall be warranted by the Contractor against any defects or failures, when used for its intended purpose, for a period from acceptance as shown below.
- 042-2.2.1 [Orig] Two years of “stem-to-stern” total boat warranty that includes all equipment, material, and components;
- 042-2.2.2 [Orig] Two years of total trailer warranty;
- 042-2.2.3 [Orig] Three years or 600 hours on propulsion systems; and
- 042-2.2.4 [Orig] Five years on material and structural workmanship for hull, decks, other structures, and fuel tank.
- 042-2.3 [Orig] Contractor shall acknowledge warranty claims with a proposed resolution and timeline within 48 hours of notification.
- 042-2.4 [Orig] Unless otherwise approved by the KO, all warranty claims shall be resolved within 20 days of submission.
- 042-2.5 [Orig] For any warranty claims not expected to be resolved within 20 days of submission, the Contractor shall submit a Warranty Repair Plan prior to the 20 day point that identifies steps, scope, and schedule for resolution.
- 042-2.6 [Orig] For warranty work the Contractor shall cover all costs to complete the warranty repair. This includes any travel required to CONUS and OCONUS locations.
- 042-2.7 [Orig] If correction of defects during the warranty period requires a configuration change before the PCB has been set, the Contractor shall inform the USCG of the change with a recommendation for implementation on all delivered boats and boats in production. If the change is identified after the PCB has been set, the Contractor shall notify and submit an ECP to the USCG for approval.
- 042-2.8 [Orig] Warranties shall not be voided if trained USCG personnel effect repairs to meet mission requirements.
- 042-2.9 [Orig] All commercial component warranties offered shall be passed through to the USCG. Warranties that are passed through to the USCG shall be managed and monitored by the Contractor.

042-3 [Orig] Warranty Management

- 042-3.1 [Orig] The Contractor shall use the Fleet Management Information System (FMIS), or its successor system, to communicate warranty information and to coordinate warranty efforts. The following information is captured in FMIS either by the USCG or the Contractor.
- Date claim submitted (USCG);
 - Date of remediation (USCG);
 - Parts affected (USCG – expanded by Contractor if resolution warrants);
 - Nature of casualty (USCG);
 - Actions taken (USCG and Contractor);
 - Intended action (Contractor);
 - USCG hull number (USCG); and
 - USCG unit (USCG).

044 [Orig] CB-OTH V OPERATIONS

044-1 [Orig] Concept of Operations

- 044-1.1 [Orig] The CB-OTH V is a multi-mission capable boat and will operate on the high seas and in the coastal zone of the United States and its territories, which includes inshore and inland waterways.
- 044-1.2 [Orig] The CB-OTH V will operate with its parent cutter within an architecture of surface, aviation, and shore assets designed to increase the USCG cutters' effectiveness. It will operate primarily in the USCG's offshore Area of Responsibility (AOR). The USCG's offshore AOR is defined as that area beyond the normal operating range of single-crewed shore-based boats where extended on-scene presence, long transit distances, or forward deployment is required to perform the mission.
- 044-1.3 [Orig] The CB-OTH V will be deployed from a USCG parent cutter to support a wide range of missions to include:
- Ports, Waterways, and Coastal Security (PWCS);
 - Search and Rescue (SAR);
 - Drug Interdiction (DRUG);
 - Alien Migrant Interdiction Operations (AMIO);
 - Living Marine Resources (LMR);
 - Other Law Enforcement (OLE); and
 - Defense Readiness (DR) missions.
- 044-1.4 [Orig] Parent cutters employ the CB-OTH V in the day and night. The AOR will subject the parent cutter and the CB-OTH V to a full-spectrum of climate and weather conditions to include tropical, dry, temperate, and cold climates and varying sea conditions.
- 044-1.5 [Orig] The CB-OTH V will employ use of force that includes warning shots and disabling fire against non-compliant vessels, and the application of deadly force against hostile targets using shoulder-fired weapons from a seated position, in order to compel compliance.
- 044-1.6 [Orig] When used in Non-Compliant Vessel Pursuit (NCVP) operations:
- Operations will consist of a five person crew.
 - The CB-OTH V will interdict similarly sized and powered vessels.
 - The CB-OTH V will employ defensive tactics against hostile vessels including shouldering and suppression fire to protect the parent cutter, cutter boat, cutter boat crew, and embarked teams.
- 044-1.7 [Orig] When used as a SAR platform:
- Operations will consist of a three to five-person crew.
 - The CB-OTH V will execute standard search patterns for vessels or persons in the water using installed electronic systems and crew lookouts.
 - The CB-OTH V will transport rescue and assistance equipment (e.g., a P6 dewatering pump).
 - The CB-OTH V will enable a crew of two to reach into the water and safely retrieve a person or object, and enable one crewmember to safely secure a person in the water alongside the boat.

- 044-1.8 [Orig] The CB-OTH V will safely transfer or retrieve boarding parties, other personnel, and equipment. Typical transfers include providing a crewmember for onboard assistance, providing the P6 dewatering pump, or moving an injured person in a Stokes litter with floatation kit assembly and ballast weight from:
- Small recreational craft, commercial fishing vessels, and deep-draft ships (high freeboard) traveling at speeds up to nine knots.
 - Fixed structures such as an aid to navigation or an offshore oil platform to help provide damage control or medical assistance.
- 044-1.9 [Orig] The CB-OTH V will operate with a minimum complement of two crew – a coxswain and boat engineer. Primary operations will include the additional transport of three crewmembers for a total of five crewmembers on board.
- 044-1.10 [Orig] The coxswain is the person responsible for the primary operation of the CB-OTH V. The coxswain's responsibilities include steering, propulsion controls, course keeping, and overall command of the CB-OTH V. The crew assists the coxswain in safe navigation, operating the radios and electronic navigation equipment, and conducting all mission-related activities.
- 044-1.11 [Orig] The CB-OTH V will tow craft of similar displacement and weight, either astern or alongside and may also be towed by another vessel.
- 044-1.12 [Orig] The CB-OTH V will be employed to perform vessel escort missions for up to 8 hours.
- 044-1.13 [Orig] The CB-OTH V will be launched and recovered from its parent cutter using a stern launch and recovery or dual point davit systems. Normally additional crewmembers, other passengers or cargo will be brought aboard after launch and off loaded prior to recovery.
- 044-1.14 [Orig] The CB-OTH V will be relocated aboard the parent cutter using a single point davit system in the Performance Weight condition.
- 044-1.15 [Orig] While the parent cutter is underway, the CB-OTH V will normally be stored in the stern notch or a cradle on deck. Both locations are exposed to the weather. The CB-OTH V will be stored ready-for-operations to include inflated fender (if provided).
- 044-1.16 [Orig] On parent cutters that deploy the CB-OTH V using a dual point davit system and need the capability to deploy the CB-OTH V rapidly, the CB-OTH V will frequently be carried *at the hip*, meaning that for extended periods, the CB-OTH V will be suspended from the davit over the deck edge and held tight against the cutter by means of booming the davit in such that the boat is pressed tightly against the side of the cutter.
- 044-1.17 [Orig] The CB-OTH V will be transported over the road with a dedicated trailer. The CB-OTH V loaded on the trailer as a combined unit will also be transported by air as a composite unit using USCG C-130 aircraft.

050 [Orig] Cutter Boat Integration

050-1 [Orig] General

- 050-1.1 [Orig] The CB-OTH V has a number of requirements that affect the geometry of the cutter boat. Included among these, though not necessarily inclusive, are:
- The Stability and Buoyancy, and Drainage Requirement of Section 079

- The Bow Horn requirements of Section 581-2
 - The Interface requirements of Appendix D
- 050-1.2 [Orig] Meeting these requirements requires a full understanding of the intent and an integrated approach to prevent sacrificing boat performance required to meet the intended purpose as a high speed cutter boat.
- 050-1.3 [Orig] Section 079 Stability and Buoyancy requirements and the standard selected are based on the CB-OTH V operating environment as an open ocean boat expected to be able to operate independently from the cutter, for day or night time operations, in all weather conditions up to the environmental limits specified in Section 051-3. Section 079 Drainage requirements and the standard selected are based on the need to remove any water that enters the cockpit as quickly as possible to minimize the negative impacts of retained water on the stability and performance of the boat.
- 050-1.4 [Orig] Section 581 Bow Horn requirements are specified to provide the maximum allowable height of the bow to support additional freeboard or sheer in the bow to prevent water overtopping the bow during operations (normal and while alongside other vessels).
- 050-1.5 [Orig] The Interface requirements of Appendix D establish constraints based on the geometry of the parent cutters the CB-OTH V is required to deploy from.
- 050-1.6 [Orig] The standards invoked are selected based on an understanding that they will result in a design that meets these intentions. The use of recovery notch, cut-outs, or non- symmetrical (flattened ovals as opposed to round pipe) scuppers, and other allowable configurations may assist in meeting certain elements of these requirements, but must be part of an integrated design to ensure other requirements are not sacrificed.

051 [Orig] CB-OTH V SYSTEM REQUIREMENTS

051-1 [Orig] Parent Craft Requirements

- 051-1.1 [Orig] The CB-OTH V shall be a mature, proven design. A parent craft with modifications in material, arrangements, or dimensions could satisfy the requirement of this Specification. The CB-OTH V design in terms of the hull form shall be directly traceable, at a minimum, to one boat of the same design, or same family of designs, with a minimum of two years of service.
- 051-1.2 [Orig] A parent craft shall not be more than 29 feet or less than 23 feet in overall length.
- 051-1.3 [A00001] A parent craft shall not be more than 9 feet in overall beam, or be reconfigurable without the use of special tools to an overall beam of 8.5 feet.
- 051-1.4 [Orig] A parent craft shall not weigh more than 9300 pounds in a ready for use conditions with full fuel and two crewmembers at 220 pounds each.
- 051-1.5 [Orig] The parent craft's structure does not have to be in accordance with ISO Standard 12215 "Small Craft – Hull Construction and Scantlings".

051-2 [Orig] Speed and Range

- 051-2.1 [Orig] Speed - The CB-OTH V shall be capable of attaining the following speeds in the performance weight condition using diesel fuel:

- 38 knots (full speed) at SS1.
- 25 knots at SS3 (significant wave height of 4.1 ft.)

051-2.2 [Orig] Range - The CB-OTH V shall be capable of traveling 150 nautical miles (NM) in SS1 at the performance weight condition at the most economical planing speed with a 10 percent fuel reserve using diesel fuel.

051-3 [Orig] Operating Environment

051-3.1 [Orig] Operate - The CB-OTH V shall be capable of operating and conducting all missions including launch and recovery through mid SS5 (nine feet). This requires that the boat be able to safely transit in any direction relative to the seas and wind at speeds exceeding 10 knots.

051-3.2 [Orig] Survive - The CB-OTH V shall be have the ability to remain upright, maintaining stability, flotation, structural, and watertight integrity while making progress towards safe haven in mid SS5 (11 feet). This requires that the boat be able to safely make headway in any direction relative to the seas and wind.

051-3.3 [Orig] Water Temperatures - The CB-OTH V shall be capable of being stowed continuously and operated continuously in water temperatures ranging from 27 degrees to 95 degrees Fahrenheit.

051-3.4 [Orig] Air Temperatures - The CB-OTH V shall be capable of being stowed continuously and operated continuously in air temperatures ranging from 20 degrees to 120 degrees Fahrenheit. The boat shall not require any special procedures to prevent freezing of the raw water system or damage to other components prior to being stowed following operation in sub-freezing conditions.

051-3.5 [Orig] Wind - The CB-OTH V shall be capable of operating in sustained true wind speeds up to 35 knots.

051-4 [Orig] Maneuvering and Seakeeping

051-4.1 [Orig] The CB-OTH V shall be dynamically stable in all loading conditions and speeds. It shall not exhibit any oscillatory or non-oscillatory instabilities such as porpoising, chine walking, high speed roll, or bow steering.

051-4.2 [Orig] The CB-OTH V shall be safe and controllable at all speeds up to full speed and under all specified loading conditions. Safe and controllable operation shall constitute operation where boat orientation, motions, and accelerations do not pose a hazard to the crew or passengers and the desired course can be maintained.

051-4.3 [Orig] The CB-OTH V shall have positive course stability. With the CB-OTH V in the performance weight condition, at the most economical planing speed, heading up-wind into the current and with trim devices in the fully retracted position, the CB-OTH V shall be able to maintain a course heading within 3 degrees when the helm is released for a period of 15 seconds.

051-4.4 [Orig] In turns, at all turning rates, at all speeds, and in all loading conditions, the CB-OTH V shall maintain a steady turn rate without skidding. In calm water, at speeds in excess of 12 knots, inboard heel shall be maintained throughout the turns. In exiting a turn, the boat shall respond to the steering command without the need for excessive force.

051-4.5 [Orig] The astern performance in calm conditions shall be such that the CB-OTH V can be maneuvered in reverse at up to one-third of the rated engine horsepower on a straight course and perform backing turns to port and starboard. No evidence of deck or cockpit flooding shall be evident under the conditions of this paragraph. Special platforms used for the recovery of people or material from the water are excluded from this requirement. During this evolution, the steering mechanisms shall be fully operable from hard left to hard right with no damage or necessity for excessive force by the coxswain.

051-5 [Orig] Motion and Acceleration Limits

051-5.1 [Orig] Structure, equipment, machinery, and outfit shall be operable in, and shall not be damaged by, motions and accelerations resulting from operation in all sea states and operating speeds up to the limits defined in the Speed and Range, Section 051-2, and Operating Environment, Section 051-3.

051-5.2 [Orig] Motion and acceleration shall be monitored and displayed by the Shock Monitoring System, Section 436-5.

051-6 [Orig] Towing

051-6.1 [A00001] The CB-OTH V shall be capable of towing a variety of craft of similar displacement and weight, astern and alongside. Alongside tows require the CB-OTH V to have appropriately sized cleats forward and aft to secure the tow.

051-7 [Orig] Damage Control

051-7.1 [Orig] The CB-OTH V shall be capable of controlling onboard fire and flooding.

051-7.1.1 [Orig] Flooding: The CB-OTH V shall have the ability to identify and withstand flooding caused by component failure, hull damage, or hostile fire. This includes an alarm system and a bilge system to remove water, and remain positively buoyant.

051-7.1.2 [Orig] Fire: The CB-OTH V shall have the capability to detect and suppress onboard fires.

051-8 [Orig] Interoperability

051-8.1 [Orig] The CB-OTH V shall be fully interoperable with the parent cutters. Interface requirements are identified in Appendix D. Interoperability includes:

- Physical interface,
- Launch and recovery,
- Secure stowage,
- Fueling,
- Electrical connections, and
- Maintenance support access.

051-9 [Orig] Annual Hours of Operation and Mission Profile

051-9.1 [Orig] The CB-OTH V shall be designed to operate at a planned 150 hours per year.

051-10 [Orig] Air Transportability Test Loading Agency (ATTLA) Requirements

- 051-10.1 [Orig] The CB-OTH V loaded on its trailer as a combined unit shall meet the ATTLA certification requirements for transportation on USCG C-130 aircraft. The design shall be in accordance with MIL-STD-1791C Change 1, Designing for Internal Aerial Delivery in Fixed Wing Air Aircraft. NSWCCD-23-TM-2009/64 Rev C, Small Craft Transportability Design and Certification Process Guidance, may be used to assist in meeting the MIL-STD-1791C requirements.
- 051-10.2 [Orig] The Contractor shall complete an ATTLA Universal Data Sheet, supplied as GFI, and submit the data sheet in accordance with Appendix A. The Contractor is responsible for updating the ATTLA Universal Data Sheet whenever a Contractor generated configuration change is made to the p-PCB and when a Contractor change made to the PCB is approved that changes data within the data sheet.

068 [Orig] OPEN HULL INSPECTION**068-1 [Orig] General**

- 068-1.1 [Orig] For the first CB-OTH V on the second delivery order, the Contractor shall make arrangements for the USCG to conduct an open hull inspection at the site of construction once the hull structure has been completed, including: the transom, all bulkheads, all frames, all longitudinals, engine foundations, the shell plating, and all necessary brackets which will be inaccessible after the deck is installed. This inspection shall be completed before the deck is installed.
- 068-1.2 [Orig] The open hull inspection shall be performed at the construction facility and shall not take more than four consecutive hours in the construction area to complete.
- 068-1.3 [Orig] Hull Structure Construction Documents – The Contractor shall provide documents, drawings or sketches and welding information that are being or have been used to construct the CB-OTH V structure up to this point. This information will be used by the USCG subject matter experts during the open hull inspection to review the structure against the contract requirements.
- 068-1.4 [Orig] The Contracting Officer will relay relevant concerns to the Contractor.
- 068-1.5 [Orig] The open hull inspection does not constitute USCG approval of the design. It represents an opportunity for the USCG to view the construction details that may not be visible when the boat construction is complete.

070 [Orig] GENERAL REQUIREMENTS FOR DESIGN AND CONSTRUCTION**070-1 [Orig] CB-OTH V Construction**

- 070-1.1 [Orig] The Contractor shall construct the CB-OTH V in accordance with the approved configuration baselines and in compliance with the contract requirements. The configuration of all CB-OTH Vs shall be the same unless the change implementation is approved otherwise by the KO.
- 070-1.2 [Orig] All equipment, machinery, and materials shall be suitable for extended exposed stowage and reliable operation in the marine environment.

- 070-1.3 [Orig] The Contractor shall comply with all Original Equipment Manufacturers (OEM) installation instructions of components unless there is a conflict with the CB-OTH V contract requirements, in which case the KO will adjudicate the conflict.
- 070-1.4 [Orig] Unless otherwise provided for in the contract requirements, all supplies, including material, components, outfit, and machinery installed in the CB-OTH V shall be composed of previously unused components, and procured specifically for the CB-OTH V.

070-2 [Orig] Principal Characteristics

- 070-2.1 [Orig] The CB-OTH V shall meet the following principle characteristics:
- 070-2.2 [Orig] Length (overall) - shall not exceed 25 feet 6 inches. Overall length is measured from the forward-most extremity to the aft-most extremity including the propulsion unit in its lengthiest configuration and with fender in its fully deployed condition.
- 070-2.3 [Orig] Weight - shall not exceed 8,720 pounds in the performance weight condition.
- 070-2.4 [Orig] Beam (overall) - shall not exceed 8 feet 6 inches. Overall beam is measured from the outer most extremities of the CB-OTH V with the fender fully deployed, including all appendages and fittings.
- 070-2.5 [Orig] Height - The maximum height of the dual point davit lift points above the keel and the maximum height with appendages (antennas, mast, etc.) lowered are identified in Appendix D. For the single point davit lift arrangement, the slings on the CB-OTH V shall not interfere with appendages or require any appendages to be lowered or collapsed to allow unencumbered access to attach to the davit lift hook.

070-3 [Orig] General Arrangements

- 070-3.1 [Orig] The CB-OTH V working deck space shall be configured to allow adequate passage around the boat without obstacles, tripping hazards, or snag hazards. The working deck space for Section 070-3.1.1 and 3.1.2 may overlap.
- 070-3.1.1 [Orig] The CB-OTH V shall have working deck space to accommodate the treatment of a survivor in a Stokes litter in the performance weight condition.
- 070-3.1.2 [Orig] The CB-OTH V shall have working deck space to accommodate a 36 inch wide x 36 inch deep x 36 inch high 150 lb. container. Four tie down points shall be provided to restrain this container in position.
- 070-3.2 [Orig] The CB-OTH V shall have sufficient working deck space to conduct the following activities:
- Helicopter hoist of a Stokes litter or rescue basket;
 - Transfer two bags of portable law enforcement equipment, bag size is 36 inches x 24 inches x 12 inches;
 - Transfer portable rescue and assistance equipment such as the P6 dewatering pump;
 - Recovery of persons or objects from the water by two crewmembers; and
- 070-3.3 [Orig] The CB-OTH V shall be configured to adequately protect the coxswain and engineer from wind and sea spray in the intended operating environment.

- 070-3.4 [Orig] The CB-OTH V shall be capable of operating with 12 persons onboard: five person crew (coxswain, boat engineer, and three additional crewmembers) and seven passengers.

070-4 [Orig] Service Life

- 070-4.1 [Orig] The CB-OTH V hull and trailer shall be designed for a minimum of 10 years of service life.
- 070-4.2 [Orig] The propulsion system equipment shall have a planned mean time between overhaul (MTBO) greater than 1800 hours.

070-5 [Orig] Workmanship

- 070-5.1 [Orig] Workmanship shall exhibit the quality in fabrication detail and appearance typically produced by a competent and conscientious journeyman.
- 070-5.2 [Orig] Cleaning
- 070-5.2.1 [Orig] All parts, especially those having working surfaces or passages, and all piping shall be kept clean and protected during manufacture and storage, during assembly, and after installation. Chips, shavings, refuse, dirt, and water shall be removed frequently from the boat during construction.
- 070-5.2.2 [Orig] Boat shall be clean upon delivery. All compartments and bilges shall be clean and dry.
- 070-5.3 [Orig] Fillets
- 070-5.3.1 [Orig] The provisions of fillets, rounded corners, and avoidance of stress concentration in general are matters of proper design.
- 070-5.3.2 [Orig] Adequate fillets shall be provided at shoulders, offsets, collars, and other points where change of direction is made.
- 070-5.4 [Orig] Arc Strikes and Weld Spatter
- 070-5.4.1 [Orig] Precaution shall be taken to prevent random arc strikes and weld spatter on boat structure, machined surfaces, equipment, high pressure lines, and pressure containers (such as cylinders, flasks, and vessels).
- 070-5.4.2 [Orig] Similar precautions shall be observed when using an oxyacetylene torch for welding or cutting.
- 070-5.5 [Orig] Inspection and Material Condition
- 070-5.5.1 [Orig] Materials, equipment, and machinery purchased, manufactured, or assembled and all work performed under the contract shall be inspected by the Contractor prior to submission to the Government to verify conformance with the specification.
- 070-5.5.2 [Orig] The Contractor shall offer to the Government only those supplies determined by the Contractor to conform to specification.
- 070-5.5.3 [Orig] The Government will reject defective or improper materials, equipment, machinery, and workmanship. Defects and deficiencies, whether identified by the Government or exposed as a result of tests or trials, shall be corrected in accordance with the provisions of the contract.

- 070-5.6 [Orig] Structure shall be fair and free from buckles or uneven sight edges. Shims shall not be used to correct improper fits.

071 [Orig] ACCESS

071-1 [Orig] General

- 071-1.1 [Orig] Access shall include physical and visual access for personnel to use tools and access while wearing PPE in accordance with ASTM F1166-07, Table 54.
- 071-1.2 [Orig] The CB-OTH V shall have a sufficient number of access points to support routine maintenance.
- Access to compartments containing equipment, machinery, or spare parts shall be provided to facilitate their maintenance and removal with hand tools without disassembling the component.
 - Access shall be arranged to be clear of piping, wire ways, ducts, and other obstructions.
 - Equipment accessed for routine maintenance completed on a daily basis or underway, such as dipsticks and strainers, shall be located so they are readily accessible.
 - Equipment shall be arranged so that each component shall be accessible and removable independent of another component.
- 071-1.3 [Orig] Access shall be provided for engine removal. Access shall be arranged to enable a direct vertical lift without disassembly of the engine.
- 071-1.4 [Orig] The CB-OTH V shall have a sufficient number of accesses to allow compartment inspection for damage control while underway without the use of tools.
- 071-1.5 [Orig] Access shall be provided to bilge areas. Bilge access points shall provide access to the lowest point of the bilge to ensure it can be reached for maintenance, checked for water content, completely dewatered, and wiped clean of any residue.
- 071-1.6 [Orig] Access to fuel tanks, fuel hoses, and fittings shall be provided for repair and maintenance without removing any permanent structural component.
- 071-1.7 [Orig] Access shall be provide to all voids through watertight closure and fasteners that can be opened and re-secured with non-powered hand tools. Such openings shall be sized and placed to allow visual inspection of the interior of the void. The closures shall be sealed with appropriate sealant material.

071-2 [Orig] Console Design

- 071-2.1 [Orig] The console design shall provide for modular replacement of components to mitigate impacts of expected obsolescence, particularly of electronics. This may include incorporation of features such as console faceplates, equipment racks, or bolt-on sub-assemblies.

073 [Orig] NOISE AND VIBRATION

073-1 [Orig] General

- 073-1.1 [Orig] The onboard A-weighted noise level from idle speed to full speed, in SS1 or less, shall be less than 90 decibels (dBA) at head level of the five installed shock mitigating seats.
- 073-1.2 [Orig] The boat and all boat components including outfit items shall be free of vibration that could damage the boat structure, machinery, or systems, endanger boat personnel, or interfere with operation or maintenance of boat machinery and systems. No structural component or equipment shall exhibit a natural frequency between 70 and 140 percent of driving vibrations of the propulsion system, including, but not limited to engine firing rate or waterjet impeller blade rate.
- 073-1.3 [Orig] If materials are used for sound attenuation, they shall:
- Not hinder inspection of the interior hull and hull structure;
 - Be resistant to absorbing liquid or vapors;
 - Not cause corrosion to the hull material; and
 - Be noncombustible.

074 [Orig] WELDING

074-1 [Orig] General

- 074-1.1 [Orig] Weld Procedure Specifications (WPS), Procedure Qualification Records (PQR), and welder qualifications shall be completed and maintained in accordance with American Welding Society (AWS) D1.2 *Structural Welding Code – Aluminum*. This data shall include:
- 074-1.1.1 [Orig] All WPS applicable to the contract, along with a summary list and current revision dates.
- 074-1.1.2 [Orig] Welder certification documentation, including at a minimum welder name and WPS(s) certified to perform.
- 074-1.1.3 [Orig] Welder continuity documentation which provides proof of proper certification maintenance.
- 074-1.1.4 [Orig] Supporting PQRs.
- 074-1.2 [Orig] The Contractor shall perform fabrication/erection inspection and testing as necessary prior to assembly, during assembly, during welding, and after welding to ensure that materials and workmanship meet the requirements of the contract.
- 074-1.3 [Orig] The USCG, at its discretion, will verify that materials, workmanship, and certifications meet the requirements of the contract.

074-2 [Orig] Code

- 074-2.1 [Orig] All welding, brazing, and related procedures (joint design, joint strength calculations, edge preparation, fabrication, and records) shall be in accordance with AWS standards, except as specifically directed herein.

- 074-2.2 [Orig] All recommendations and information in AWS D3.7 (series) Guide for Aluminum Hull Welding shall be followed. AWS recommendations shall supersede those of ISO 12215 in case of conflict.

074-3 [Orig] Nondestructive Inspection

- 074-3.1 [Orig] All individuals performing visual inspections shall be certified to one of the following requirements: AWS Senior Certified Welding Inspector or Certified Welding Inspector program.
- 074-3.2 [Orig] Inspection shall be in accordance with AWS B1.11 – Guide for The Visual Examination of Welds. Lighting requirements shall be in accordance with ASME Boiler & Pressure Vessel Code (BPVC) Section V – Nondestructive Examination.
- 074-3.3 [Orig] Prior to welding, the welder or a qualified inspector shall visually inspect joint preparation, fit-up, and cleanliness.
- 074-3.4 [Orig] Inspection of completed welds shall be accomplished after slag removal and with the weld in the final surface condition.
- 074-3.5 [Orig] The visual inspection standards for acceptance of welds shall be in accordance with AWS D1.2, Structural Welding Code, - Aluminum, Section 5, Part D, Paragraph 5.14.
- 074-3.6 [Orig] All nonconforming welds found through visual welding inspection (VT) shall be repaired.

074-4 [Orig] Restrictions

- 074-4.1 [Orig] The Contractor shall not use Gas Metal-Arc Welding using short circuiting arc transfer technique for welds in structure greater than 0.25 inch material thickness, unless the process and application are specifically approved by the KO.

075 [Orig] MECHANICAL FASTENERS

075-1 [Orig] General

- 075-1.1 [Orig] All mechanical fasteners shall be made of 316 series stainless steel except as otherwise noted. Where 316 stainless steel mechanical fasteners are not strong enough for the application (e.g., securing propulsion machinery to its foundations) higher strength materials may be used. Unique mounting fasteners not made of stainless steel that are provided with OEM equipment may be used when not exposed to saltwater or saltwater spray.
- 075-1.2 [A00001] No mechanical fasteners shall be directly threaded into aluminum alloys. 316 stainless steel helical coil inserts, 316 stainless steel pressed-in threaded inserts, or 316 key-locking threaded inserts shall be used when direct threading is required. Inconel is an acceptable substitute for 316 threaded inserts in wet/exterior environments.
- 075-1.3 [Orig] Direct attachment of alloys containing copper to aluminum is not permitted.
- 075-1.4 [Orig] Where nuts will become inaccessible after assembly, nuts shall be captured to allow re-assembly and prevent loosening of fasteners due to shock and vibration.
- 075-1.5 [Orig] All Contractor supplied nuts shall be self-locking of the plastic insert type or all metal locking nuts of distorted type to prevent loosening of fasteners due to shock and

vibration, except for blind applications. Self-locking mechanical fasteners shall not be used in blind applications.

- 075-1.6 [Orig] All Contractor installed mechanical fasteners with nuts shall extend past the nut by one thread at a minimum but no more than one diameter of the fastener.
- 075-1.7 [Orig] Mechanical fasteners in working deck traffic areas shall be flush to eliminate tripping hazards.
- 075-1.8 [Orig] Rivets shall be limited to non-structural applications that would not need to be removed for routine inspections, bilge access, maintenance, or repair of equipment. Rivet material shall be the same as the material it is being installed into.

076 [Orig] RELIABILITY AND MAINTAINABILITY

076-1 [Orig] General

- 076-1.1 [Orig] Basic maintenance, including engine parts change-out, shall be accomplishable by cutter personnel.
- 076-1.2 [Orig] The Contractor shall consider mean time between failures (MTBF) when selecting and configuring components to improve reliability of the boat as a system.
- 076-1.3 [Orig] When establishing the location and installation of components, the Contractor shall take into consideration access for maintainability and ease of removal and replacement.

077 [Orig] SAFETY

077-1 [Orig] Production Safety and Accident Prevention

- 077-1.1 [Orig] The Contractor shall provide and maintain work environments and procedures which shall safeguard USCG personnel while exposed to Contractor operations and activities.
- 077-1.2 [Orig] The Contractor shall inform USCG personnel of its accident prevention programs, policies, and procedures by submitting a copy of its accident prevention plan or equivalent at the Logistics Conference.

077-2 [Orig] Spray Shields and Protective Covers

- 077-2.1 [Orig] Protective guards or shields shall be installed to prevent the crew from accidentally contacting exposed rotating equipment. Protective guards and shields for exposed rotating equipment shall be removable. Removal shall require the use of hand tools.
- 077-2.2 [Orig] If expanded metal is used as the guard or shield material, the holes shall be no more than 3/8 inch in diameter or 3/8 inch square.
- 077-2.3 [Orig] Protective guards, jacketing, or shielding shall be provided wherever persons or gear might come in contact with exposed high surface temperatures of any equipment or system that exceed 200 degrees Fahrenheit.
- 077-2.4 [Orig] Protective covers and/or shields shall be placed on Contractor installed connections of piping, tubing, and removable hoses that contain flammable fluids under pressure.

077-3 [Orig] Protection of Equipment, Piping and Cabling from Damage

- 077-3.1 [Orig] Protective covers or sheathing shall be provided to protect exposed piping, tubing, hoses, electrical, or electronic cables subject to mechanical damage or physical damage by the crew during operations, inspection, and maintenance.

077-4 [Orig] Hazardous Materials (HAZMAT)

- 077-4.1 [Orig] The Contractor shall provide a Safety Data Sheet (SDS) for each hazardous material used in the CB-OTH V, in accordance with the latest version of FED-STD-313F.
- 077-4.2 [Orig] The Contractor shall also provide a SDS for any other material deemed by the KO as potentially hazardous and requiring safety controls.

078 [Orig] MATERIALS**078-1 [Orig] General**

- 078-1.1 [Orig] This section specifies the minimum material standards and dissimilar metal restrictions. Material requirements stated in other sections of this contract, which are in excess of the requirements of this section, shall have precedence over the requirements of this section.
- 078-1.2 [Orig] Material certifications shall be maintained by the Contractor and available upon request from the KO.
- 078-1.3 [Orig] The CB-OTH V shall be constructed of materials suitable for a marine environment. Particular attention shall be paid to strength, fatigue resistance, impact resistance, ultraviolet light resistance, corrosion resistance, consequences of material failure, and reparability.
- 078-1.4 [Orig] When materials are referred to in this contract without further identification, they shall conform to the following standards, as applicable.

078-2 [Orig] Aluminum

- 078-2.1 [Orig] Pipe or Tube: ASTM B221 (Extruded) 5086-H111 or 5083-H112, ASTM B210 (Drawn) 5086-H32
- 078-2.2 [Orig] Plate and Sheet: ASTM B928-04 Alloy 5086- H116 or H321 or Alloy 5456- H116 or H321 or 5083-H116 or H321
- 078-2.3 [Orig] Shapes: ASTM B221 (Extruded) Alloy 5086-H111 or H112 or 5083-H111 or H112 or Alloy 5456-H111 or H112
- 078-2.4 [Orig] Alloy 5052 of SAE AMS-QQ-A-250/8 may be used for non-welded sheathing, expanded aluminum and trim for a thickness less than 1/8 in.
- 078-2.5 [Orig] Alloy 6061-T6 of ASTM B241 may be used for pipes as structural components. If so used, allowable stresses shall be based on the zero temper condition.
- 078-2.6 [Orig] Items of trim and outfit such as castings and hardware items that are not permanently welded/attached to the exterior of the hull may be alloy 6063 or alloy 6061 of ASTM B221 or alloy 356.1, 356.2 or A356.2 of ASTM B179.

078-3 [Orig] Stainless Steel

078-3.1 [Orig] Wrought: AISI 316, AISI 316L, AISI 302, or AISI 304

078-3.2 [Orig] Pipe or Tubing: ASTM A312 or ASTM A269, Grade 316L, 321 or 347

078-3.3 [Orig] Bars & Shapes: ASTM A276/A276M Grade 316L

078-3.4 [Orig] The following shall be applicable wherever stainless steel is used:

- For welded fittings, couplings, etc. unless stated elsewhere in this contract stainless steel 316L shall be used.
- For non-welded applications where contact with sea water or spray is possible, stainless steel 316 shall be used.
- For interior, non-welded applications where exposure to sea water is not anticipated, including the inside of hatches stainless steel 302 or 304 may be used.

078-3.5 [Orig] For underwater appendages, if an application requires high strength, ASTM A240/A240M S32205 duplex stainless steel may be used.

078-4 [Orig] Flotation Material

078-4.1 [Orig] Flotation material used to meet the buoyancy requirements shall be closed cell resilient foam compliant to all requirements of 33 CFR 183.114 (regardless of where located in the boat) and the flammability requirements of 49 CFR 571.302. Foam may be either expanded and consolidated bead type or continuous type per Commercial Item Description A-A-59135 Class 1 or 2, or Commercial Item Description ID A-A-59136 Class 1 or 2, Grade A and C Type I. Polystyrene and blown in place polyurethane foams do not meet this requirement.

078-5 [Orig] Miscellaneous Requirements

078-5.1 [Orig] Wood in any form shall not be used.

078-5.2 [Orig] Materials that contain asbestos and refractory fiber materials (also termed ceramic fiber and aluminum-silica material) shall not be used.

078-5.3 [Orig] For chemicals listed in NAVSEA Hazardous Material Avoidance Process, T9070-AL-DPC-020/077-2 (provided as GFI):

- Prohibited chemicals listed in Appendix A, Table A-1 shall not be used.
- Restricted chemicals listed in Appendix A, Table A-2 shall be documented to identify quantity, application, and location used on the CB-OTH V. Restricted chemicals listed in Appendix A, A.2 "NAVSEA LIST OF TARGETED CHEMICALS (N-LTC) APPLICATION EXCEPTION NOTES" do not need to be documented.

078-5.4 [Orig] Valves, fittings, and other components containing copper alloys shall not be used, except for electrical wiring or items enclosed within OEM equipment.

078-5.5 [Orig] Bedding compounds such as polysulfide and polyurethane sealants may be used. Where waterproof adhesive bonds are required, a polyurethane compound shall be used.

078-6 [Orig] Electrolytically Dissimilar Metals and Corrosion Protection

- 078-6.1 [Orig] Direct contact of electrolytically dissimilar metals is prohibited. Electrolytic corrosion shall be prevented by insulating dissimilar materials from each other.
- 078-6.2 [Orig] Direct contact between aluminum alloys and porous material, pockets, crevices, and joints that can retain moisture is prohibited. Aluminum alloy surfaces intended for contact with porous material shall be coated in accordance with Section 631.
- 078-6.3 [Orig] Graphite (lead) pencils shall not be used to mark uncoated aluminum. Grease pencils and other possible sources of hydrogen contamination shall not be used on aluminum prior to welding.

078-7 [A00001] Adhesives and Coating Systems

- 078-7.1 [A00001] Paint, insulation, adhesives, or other items containing materials or components that would give off noxious fumes after curing or drying is complete, at any temperature below 203 degrees Fahrenheit, shall not be used.
- 078-7.2 [A00001] One-part polyurethane coating systems, caulking, and adhesive materials (moisture-cured or heat-cured) may be used.
- 078-7.3 [A00001] Two-part systems may be used to provide protection from UV radiation and abrasion, or as coating, insulation, and adhesives. If used, two part systems shall not contain isocyanate compounds (including Toluene Diisocyanate [TDI], Hexamethylene Diisocyanate [HDI] and Diphenylmethane Diisocyanate [MDI]).

078-8 [Orig] Mercury Exclusion

- 078-8.1 [Orig] Mercury, either undiluted or in a solution as low as one part per million, will cause severe corrosion to aluminum. The Contractor shall not install equipment containing mercury on the boat.
- 078-8.2 [Orig] The Contractor shall not use equipment containing mercury, including fluorescent lights, aboard the boat during construction or testing.

079 [Orig] STABILITY AND BUOYANCY**079-1 [Orig] General**

- 079-1.1 [Orig] The CB-OTH V shall meet the stability and buoyancy requirements of ISO 12217-1:2015, *Small craft - Stability and buoyancy assessment and categorization*, Category B, Option 3. This option requires flotation elements in accordance with ISO 12217-1 paragraph 6.8, Annex F, and Annex G.
- 079-1.1.1 [A00001] Intact Stability – Air filled or inflated chambers or inflated bags may be included in the buoyant volume for satisfying ISO 12217-1, paragraphs 6.1 – 6.3.
- 079-1.1.2 [A00001] Flotation – Air filled or inflated chambers or inflated bags shall not be used to satisfy ISO 12217-1 paragraph 6.8 and level flotation tests in Annex F.
- 079-1.1.2.1 [A00001] The buoyant volume requirement of ISO 12217-1, section F.4.4 does not have to be met for the CB-OTH V.
- 079-1.1.2.2 [A00001] Only low density material shall be used to satisfy ISO 12217-1 paragraph 6.8 and level flotation tests in Annex F.

079-1.1.2.3 [A00001] The ISO 6185-3 standard shall not be used to satisfy flotation requirements for the CB-OTH V.

- 079-1.2 [Orig] The use of an inflatable or hybrid system combining air inflated chambers and low density foam is allowable for the CB-OTH V provided that it complies with the requirements of Section 079-1.1.
- 079-1.3 [Orig] The working deck of the CB-OTH V shall be a “quick-draining cockpit or recess” per ISO 11812 Paragraph 3.10 and Paragraph 6.1 (Category B).
- 079-1.4 [Orig] Cockpit drains shall be sized to meet the Category A draining time requirement of ISO 11812 Paragraph 7.2.
- 079-1.5 [Orig] The weight of crew and passengers shall be 220 pounds (100 kg) per person for all ISO requirements. All calculations shall be adjusted to represent 220 lbs per person.
- 079-1.6 [Orig] No surface of the boat except the actual fender shall be excluded from the crew area for the purposes of compliance with ISO 12217-1.

079-2 [Orig] Trim and List Limits

- 079-2.1 [Orig] The CB-OTH V shall not trim down by the bow or list more than one degree in the static condition at the full load weight or at the performance weight. Ballast shall not be used to achieve this requirement.

079-2.2 [A00001] The CB-OTH V shall not heel more than two degrees at all speeds when running straight ahead in calm conditions in the performance weight condition. If equipped, adjustable trim control devices shall be set equally port and starboard when measuring heel.

079-3 [Orig] Operational Requirements for Stability

- 079-3.1 [Orig] The Contractor shall incorporate the following operational requirements for CB-OTH V:
- 079-3.1.1 [Orig] Recovering Person in Water - During the recovery operation, the CB-OTH V shall be stable, having a positive metacentric height, and water shall not enter the cockpit. Three crewmembers will be on board for the recovery operation with two crewmembers reaching into the water to safely retrieve a person in the water, the third crewmember is at the helm in the seated position. For calculations, the weight of a crewmember is 220 pounds each, and the weight of the person in the water is 300 pounds.
- 079-3.1.1.1 [Orig] The person in water’s center of gravity shall be located directly above the outermost edge of the fender and at least 10 inches above the water.
- 079-3.1.1.2 [Orig] The two crewmembers’ center of gravity shall be above the inner edge of the fender and at least 18 inches above the cockpit sole.
- 079-3.1.2 [Orig] Stern Ramp Launch – In the full load weight condition, the CB-OTH V shall remain upright and stable during stern launch from the cutter. During the launch, no water shall enter the engine ventilation or combustion air intakes, and the design of the boat shall minimize the amount of water over-topping the transom and gunwales.
- 079-3.1.3 [Orig] Alongside Cargo Transfer – The CB-OTH V shall meet all stability requirements in the following conditions:

079-3.1.3.1 [Orig] In the full load weight condition when 600 pounds of personnel or cargo are staged for transfer in the forward 30% of the overall length with a center of gravity at least 18 inches above the cockpit sole.

079-3.1.3.2 [Orig] In the performance weight condition when an additional 600 pounds of personnel or cargo are staged for transfer in the forward 30% of the overall length with a center of gravity at least 18 inches above the cockpit sole.

080 [Orig] INTEGRATED LOGISTICS SUPPORT

080-1 [Orig] Logistics Conference

080-1.1 [Orig] The purpose of the Logistics Conference is to review the contract deliverables, the supply support requirements, the development of the Technical Data Package (TDP), discussions of Technical Authority comments, and any questions or concerns the Contractor has with the Specification, or contract.

080-1.2 [Orig] The conference shall be scheduled to occur within 30 days after the second delivery order has been awarded, will be no more than two days long, and hosted by the USCG Program Office at a USCG location at Washington, DC or Baltimore, MD.

080-1.3 [Orig] The Contractor shall notify the KO of how many personnel they request to attend, and coordinate with the KO to obtain location access.

080-1.4 [Orig] The Contractor shall discuss the following sections: 042-2, 076, and 080-090.

080-2 [Orig] Logistics Support

080-2.1 [Orig] The Contractor shall provide technical and supply support upon receipt of a delivery order. Technical support may include analysis, studies, inspections, surveys, parts, on-site casualty response, maintenance, upgrades, software updates, or documentation updates. Supply Support may include items in 083-1. On-site support may include the opportunity for technical representatives, including OEM support, to deploy for short periods with a USCG cutter.

080-2.2 [Orig] When Logistics Support is requested the Contractor shall submit a proposal that includes labor, material, and a travel estimate. Authorization from the KO is required prior to incurring any labor, material, or travel costs.

083 [Orig] SUPPLY SUPPORT

083-1 [Orig] Provisioning

083-1.1 [Orig] The Contractor shall provide maintenance parts and material which includes lube oil, fluids, and special tools necessary to accomplish the maintenance identified on the 300 Hour Maintenance Requirement List. These parts and special tools shall be packaged in accordance with Section 084-2.

083-1.2 [Orig] The Contractor shall make all CB-OTH V parts and components available for purchase.

083-2 [Orig] 300 Hour Maintenance Requirement List (300 MRL)

083-2.1 [Orig] The Contractor shall develop and submit to the KO, in accordance with Appendix A, a 300 Hour MRL which:

- Lists all the equipment and components on the CB-OTH V, either built by the Contractor or purchased for the CB-OTH V, which requires maintenance during the first 300 hours of operation or 2 years of service, and the maintenance tasks associated with the component.
- List all the parts, including lube oil and fluids, the OEM part numbers, and the special tools necessary to perform the maintenance
- Is arranged in ESWBS order identifying the OEM component, the OEM maintenance manual, and the section of the maintenance manual related to that component.

083-3 [Orig] Master Equipment Configuration List (MECL)

- 083-3.1 [Orig] The Contractor shall develop a MECL that represents, in a relational data structure, the configuration of the CB-OTH V. The MECL shall be developed as a hierarchical configuration tree containing all Configuration Items (CI) that are part of the boat.
- 083-3.2 [Orig] The MECL shall be prepared electronically in a spreadsheet compatible with Microsoft Excel. The MECL spreadsheet template is provided as GFI.
- 083-3.3 [Orig] A unique MECL shall be submitted with each CB-OTH V documenting the configuration of the boat and highlighting any configuration changes from the previous boat. The MECL shall be marked with the USCG assigned hull number and delivery date.
- 083-3.4 [Orig] For each CI, the MECL shall contain all the information necessary to fully describe the CI so it can be competitively procured and maintenance protocol can be developed. At a minimum, the associated data shall include the following fields:
- 083-3.4.1 [Orig] ESWBS Number – The spreadsheet shall be sorted by the ESWBS, smallest to largest.
- 083-3.4.2 [Orig] Engineering Change Notice number - This will only be required if the CI is affected by an approved engineering change.
- 083-3.4.3 [Orig] Provisioning Document Control Number (PDCN) - The format for the number is made up of two letters and four numbers. For the CB-OTH V MECL, the PDCN will start with “CB0001” for the first item in the spreadsheet followed by the next sequential number “CB0002.” The PDCN shall be inserted after the MECL has been sorted in accordance with ESWBS smallest to largest.
- 083-3.4.4 [Orig] Configuration Item Functional Description - This will be a functional description of the CI. Items may be grouped together to reduce the number of CIs, indicated by including the word “Group.”
- 083-3.4.5 [Orig] Quantity - The number of components/equipment to be installed per boat.
- 083-3.4.6 [Orig] Unit of Issue - The unit of issue which pertains to the quantity reported.
- 083-3.4.7 [Orig] Price - To the nearest dollar in US currency.
- 083-3.4.8 [Orig] Contractor Commercial And Government Entity (CAGE) Code.
- 083-3.4.9 [Orig] Original Equipment Manufacturer (OEM).
- 083-3.4.10 [Orig] OEM Part Number.

- 083-3.4.11 [Orig] Warranty Duration – This field will be filled with the warranty duration for the CI, unless the OEM warranties their product for a longer period, in which case this duration shall reflect this.
- 083-3.4.12 [Orig] Technical Manuals Available - This field will be either “Y,” indicating technical manuals are available for submission, or “N,” indicating no technical manuals are available.
- 083-3.4.13 [Orig] Preventive Maintenance Required - This field will be either “Y,” indicating maintenance is required, or “N,” indicating preventive is not required.
- 083-3.4.14 [Orig] Day Lead Time - "X" indicates the equipment has a commercial lead-time of over 30 days.
- 083-3.4.15 [Orig] Line Item Deliverable - This column shall be marked with an “X,” indicating that the Contractor would recommend this CI be available within the USCG logistics system as a spare part for the CB-OTH V.
- 083-3.4.16 [Orig] CB-OTH V Source Drawing - The product drawing that has this CI identified in the drawing Material List. The information in the product drawing shall match the corresponding MECL data.
- 083-3.4.17 [Orig] Notes - Amplifying information, as required.
- 083-3.4.18 [Orig] The Contractor may add additional data fields such as Purchase Order (PO) number, PO line item, and PO date activated.

083-4 [Orig] Serial Number Report (SNR)

- 083-4.1 [Orig] The Contractor shall complete a SNR. The report shall list all CIs the USCG will require serial numbers for in order to administer warranty. The USCG will provide the form as GFI to the Contractor before first boat is shipped.
- 083-4.2 [Orig] The report shall be delivered in a PDF file and a hard copy of the report shall be delivered with each boat.

083-5 [Orig] List of Special Tools and Test Equipment

- 083-5.1 [Orig] The Contractor shall develop a list of special tools and test equipment and provide it to the USCG.
- 083-5.2 [Orig] The list shall identify all special tools, the source of supply, and any special test equipment that would be required for maintenance and troubleshooting. A special tool is defined as any tool designed and sold by the Contractor or a component OEM with unique characteristics for a specific maintenance task on a specific piece of equipment that cannot be accomplished with standard hand tools. In the case of engine diagnostic software tools, the Contractor shall provide one copy of the software license per boat.
- 083-5.3 [Orig] If a special tool requires fabrication by the Contractor, the Contractor shall provide the specifications and the associated rights necessary for the USCG or a third party to fabricate the special tool.

083-6 [Orig] Long Lead-Time System Insurance Stock

- 083-6.1 [Orig] Long Lead-Time System Insurance Stock; through the contract period, the Contractor shall allow the USCG to place orders for long lead-time system insurance

stock items including: propulsion engine(s), waterjet(s), marine reverse/reduction gear(s), and fender system.

083-6.2 [Orig] Preservation; all parts ordered under this Contract shall be individually preserved.

- 083-6.2.1 [Orig] Exposed shafting and working machined surfaces, gear-trains, the inside of gearboxes, and other surfaces dependent on lubricant for preservation shall be lubricated or coated with an appropriate preservative suitable for protection of equipment stowed in a non-climate controlled warehouse for up to one year. Preservatives shall be compatible with the intended working lubricants. Special treatments should not be necessary to remove preservatives.
- 083-6.2.2 [Orig] Piping systems and the inside of individual components shall not be exposed to contaminants during shipment. All piping interface points shall be sealed with commercial grade plastic or metallic caps, plastic or metallic plugs, mating blanked covers, or with blank flanges attached with bolts. Plastic bags and duct tape are not acceptable.
- 083-6.2.3 [Orig] Warning tags shall be attached to all gearboxes indicating that they have been drained, preserved with a specific product, and require filling with lubricant before equipment use.
- 083-6.2.4 [Orig] Major components shall be shrink-wrapped or otherwise covered and sealed to prevent water damage. To prevent adhesion between protective coverings and painted surfaces, protective coverings shall not be applied until the paint has cured.
- 083-6.2.5 [Orig] Documents and other enclosures shall be sealed in a waterproof plastic bag, which shall be permanently affixed to the inside of the shipping container in a conspicuous location when the container is opened.

083-6.3 [Orig] Warranty Markings; The Contractor shall stamp or mark the supplies delivered or otherwise furnish notice with the supplies of the existence of the warranty. Markings may be brief but should include:

- A brief statement that a warranty exists;
- The substance of the warranty;
- Its duration (including start, or an end date);
- And who to notify if the supplies are found to be defective.

083-6.4 [Orig] Reports: At the time of delivery for long lead-time system insurance stock, the Contractor shall prepare and furnish to the USCG a properly completed DD Form 250, *Material Inspection and Receiving Report*, and a Commercial Bill of Lading.

- 083-6.4.1 [Orig] A packing slip shall be prepared for each box or shipping container. The packaging slip shall include the following information:
- (1) National Stock Number (NSN) or Activities Control Number (ACN);
 - (2) part number;
 - (3) nomenclature;
 - (4) serial number;
 - (5) contract number
 - (6) delivery order number;
 - (7) line item number;
 - (8) quantity; and
 - (9) USCG Supplied Due-In ID for warehouse Identification upon receipt.

- 083-6.4.1.1 [Orig] Two copies of the packaging slip shall be submitted with the shipment. One shall be attached to the outside of the shipping carton inside a waterproof, clear envelope. The second shall be inside the shipping carton inside a waterproof, clear envelope.
- 083-6.4.1.2 [Orig] Original DD Form 250 shall be sent to the KO upon shipment and shall be clearly marked "Information Only" with a third copy of the packaging slip.
- 083-6.4.1.3 [Orig] A copy of the DD Form 250 shall be attached to the original invoice when submitted to the payment office.
- 083-6.5 [Orig] Markings; Shipments shall be marked in accordance with *MIL-STD-129R Military Marking for Shipment and Storage* dated February 18, 2014.
- 083-6.5.1 [Orig] Each individual part or part container must be marked. Lettering shall be black, applied on a highly contrasting background.
- 083-6.5.2 [Orig] Markings shall consist of the NSN or ACN, the item number, part number, serial number, contract number, Box # of #, shipping weight, condition code, quantity, and unit of issue.
- For example:
- 0000-00-000-0000**
FIRE PUMP
XXXXXXX
DHS-00-00-O-00000, CLIN XX
ABC 2345
BOX # OF #
XX LBS GROSS 'NT
CONDITION "A"
1 EACH
U.S. COAST GUARD
SFLC MATERIAL
- 083-6.5.3 [Orig] Large part shipping container lettering shall be at least ½ inch high or 36 point type. Stenciling is acceptable.
- 083-6.5.4 [Orig] General packaging lettering shall be at least 1/4 inch high or 18 point type.
- 083-6.5.5 [Orig] Plastic bag lettering shall be 12 point font or larger.
- 083-6.6 [Orig] Bar Coding: Each individual part or part container must have a bar code label applied, or incorporated into the packaging label. Bar code labels shall be in accordance with MIL-STD-129R. Each label shall contain encoded data for the NSN or ACN, contract number, and the delivery order number, as applicable. Marking shall be placed on the container top or on one long side (any side if container is square).
- 083-6.6.1 [Orig] The marking shall be formatted as specified below:
- NSN or ACN, item name, and part number (as shipped);
 - Contract/delivery order number;
 - And the words:
SFLC INVENTORY
CONDITION CODE "A"
Quantity

Unit of issue

083-6.7 [Orig] Shipping Address: Unless otherwise specified on the delivery order, the Contractor shall deliver all spares ordered under this contract to the following address:

**SURFACE FORCES LOGISTICS CENTER (NESSS Warehouse)
2401 HAWKINS POINT RD
RECEIVING BLDG 88
BALTIMORE, MD 21226
Receiving Phone: (410) 762-6353**

084 [Orig] PACKAGING, HANDLING, STORAGE, AND TRANSPORTATION**084-1 [Orig] General**

- 084-1.1 [Orig] Prior to being packaged for shipping, the CB-OTH V shall be cleaned, including a fresh water wash down, and with all systems preserved and covered. Bilges shall be dry and free of oil and debris. Batteries shall be fully charged with the battery cables disconnected.
- 084-1.2 [Orig] The Contractor shall be responsible for all arrangements to support the CB-OTH V delivery. The USCG will make arrangements to allow the Contractor access to delivery locations with controlled access.
- 084-1.3 [Orig] The propulsion system shall be preserved in accordance with the OEM's recommendations for transportation and must account for the boat being transported or delayed in transit in areas that may be subject to temperatures below freezing for prolonged periods in excess of 48 hours.
- 084-1.4 [Orig] A durable warning plaque shall be securely attached to the helm indicating that the boat has been preserved for shipping and may not be operated until all machinery and equipment has been inspected and placed in service.
- 084-1.5 [Orig] Vertical appendages may be lowered to meet transportation height restrictions provided the appendage may be returned to its operational position within 10 minutes without the use of power tools or special equipment not carried on the CB-OTH V during normal operations.
- 084-1.6 [Orig] The Contractor shall develop a shipping inventory list of all items shipped with the boat that are not permanently mounted (e.g., boat outfit, items removed for transport, operational spares and materials, covers, loose trailer components, etc.).

084-2 [Orig] Packaging

- 084-2.1 [Orig] The CB-OTH V shall be shrink-wrapped prior to shipping to include wrapping the entire boat down to the chine and the full transom including the waterjet components.
- 084-2.1.1 [Orig] The shrink-wrap shall have vents to prevent moisture and vapor buildup.
- 084-2.1.2 [Orig] The shrink-wrap shall not damage the boat while it is being transported. Chafing gear shall be used to prevent scuffing or damage between the shrink-wrap and components/surfaces on the boat.
- 084-2.2 [Orig] All items shipped with the boat not permanently mounted (e.g. boat outfit, items removed for transport, operational spares and materials, covers, loose trailer

components, etc.) shall be logically packaged in weatherproof totes with latching lids and securely loaded on the boat for transportation.

- 084-2.2.1 [Orig] Each tote shall have a container number on the outside where it can be seen when loaded on the boat for shipping and inside the container there shall be an inventory list for the container contents.
- 084-2.2.2 [Orig] Items too large to fit inside a tote shall be protected and securely loaded on the boat such that they will not be damaged during transport or when the shrink wrap is being installed or removed.

084-3 [Orig] Delivery

- 084-3.1 [Orig] The Contractor shall deliver the CB-OTH V and its trailer (if ordered) to locations as directed by the KO.
- 084-3.2 [Orig] The boat and trailer shall be free of road debris and dirt before it arrives at the delivery location.
- 084-3.3 [Orig] The Contractor is responsible for safely off-loading the boat and trailer to the ground or water, at the location specified by the USCG.
- 084-3.4 [Orig] The boat may be transported over the road on its trailer if the delivery location is no more than 350 miles from the production location. The Contractor shall be responsible for having the appropriate license plate or tag on the trailer while in transit.

085 [Orig] TECHNICAL DATA PACKAGE (TDP) REQUIREMENTS

085-1 [Orig] General Requirements

- 085-1.1 [Orig] This section contains requirements for the development and delivery of a TDP which consist of 3D model, product drawings, diagrams, and calculations.
- 085-1.2 [Orig] The TDP shall provide sufficient information to fully describe the design and construction of the CB-OTH V and the configuration of its systems.
- 085-1.3 [Orig] The Contractor shall prepare the TDP for USCG use, repair, replacement of removable parts, modification of the boat, and to facilitate maintenance throughout the sustainment lifecycle of the boat.
- 085-1.4 [Orig] The TDP shall completely specify unique processes when essential to production, 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. The Contractor shall note required certifications on the related TDP products.
- 085-1.5 [Orig] The TDP shall be self-sufficient and fully describe construction of the boat without reference to other documents. TDP shall show essential fabrication details, including welding procedures and welding sequences if applicable.
- 085-1.6 [Orig] Data Rights; Data within the TDP developed at private expense that embodies trade secrets, contains commercial, financial and confidential, or privileged information shall be delivered with limited rights and shall be treated in accordance with Federal

Acquisition Regulations (FAR) Clause 52.227-14 (Alternatives II, IV, and V). All other data shall be delivered with unlimited rights.

- 085-1.6.1 [Orig] FAR Clause 52.227-14 (Alternative II) shall be clearly identified to denote the Contractor's assertion of limited rights. The following statement shall be included on the first page of each applicable drawing, diagram, calculation, or model (e.g., in the Special Notations block):

"RIGHTS IN DATA

(a) These data are submitted with limited rights under Government Contract No. [To be Inserted at Contract Award]. These data may be reproduced and used by the Government with the express limitation that they will not, without written permission of the Contractor, be used for purposes of manufacture nor disclosed outside the Government; except that the Government may disclose these data outside the Government for the following purposes, if any, provided that the Government makes such disclosure subject to prohibition against further use and disclosure: (1) Use (except for manufacture) by support service Contractors; (2) Use (except for manufacture) by other Contractors participating in the Coast Guard's program of which this specific contract is a part; (3) Repair or overhaul work; and (4) Release to a foreign Government, or its instrumentalities, if required to serve the interests of the U. S. Government, such as in the context of the Foreign Military Sales program, for information or evaluation, or for emergency repair or overhaul work by the foreign Government. See FAR § 27.404(c).

(b) This notice shall be marked on any reproduction of these data, in whole or in part."

- 085-1.7 [Orig] Scientific and Technical Information (STINFO) – A STINFO determination and language will be provided by the KO following USCG review of deliverables. The Contractor shall place or update STINFO markings on all deliverables in accordance with *COMDTINST M5260.6A, Management of Scientific and Technical Information (STINFO)*, 16 SEPT 2015, and *CGTO PG-85-00-290-S, Standardized STINFO Markings Process Guide*, 23 November 2010 (provided as GFI).

- 085-1.8 [Orig] English standard units shall be used for all TDPs required by this section.

- 085-1.9 [Orig] All source document(s) (e.g., Excel spreadsheet, Access database) used in the creation of a drawing, or as a supplemental file for the drawing, shall be provided as part of the TDP for that drawing.

085-2 [Orig] Drawing Number Assignment Report (DNAR)

- 085-2.1 [Orig] The Contractor shall submit a DNAR for acceptance in accordance with Appendix A.

- 085-2.2 [Orig] The DNAR shall be updated and resubmitted when the product drawings are submitted and anytime an approved drawing is revised or new drawing added.

- 085-2.3 [Orig] The DNAR shall be in a spreadsheet format listing the;

- Drawing number - in accordance with COMDTINST M9085.1 (Series);
- Drawing Title;
- Revision Letter;
- Revision Date;
- Drawing Sheet Size – ASME Y14.1 sizes; A, B, C, D etc.; and

- Number of Sheets.

085-2.4 [Orig] Calculations required in Section 085-7 shall have drawing numbers assigned and be included in the DNAR.

085-3 [Orig] Product Drawings

085-3.1 [Orig] The Contractor shall submit product drawings in accordance with these requirements and Appendix A.

085-3.2 [Orig] Product drawings shall be developed and formatted in accordance with the following references:

- USCG Drawing Templates – GFI;
- ESWBS List – GFI;
- *USCG Naval Engineering Computer Aided Design Standards*, COMDTINST M9085.1C; and
- *Technical Data Packages*, MIL-T-31000

085-3.3 [Orig] Product drawings shall be compatible with AutoCAD® 2017.

085-3.4 [Orig] Product drawings shall be prepared in accordance with the following:

085-3.4.1 [Orig] Drawings numbers and drawings shall be organized in accordance with USCG 3-digit ESWBS.

085-3.4.2 [Orig] USCG Standard Drawing Border Templates shall be used on all drawings.

085-3.4.3 [Orig] USCG standard border templates and blocks shall not be modified without prior authorization from the KO, with the exception of STINFO and limited rights markings.

085-3.4.4 [Orig] All sheets of a drawing shall be contained within one AutoCAD compatible file using Layout Tabs.

085-3.4.5 [Orig] All sheets within an individual drawing will be the same size unless authorized by the KO.

085-3.4.6 [Orig] All details and metadata must be contained within an individual drawing. Electronic external references (X-REFs) for any drawing shall not be used.

085-3.4.7 [Orig] Proxy graphics are not permitted. All blocks and details imported from other vendors or drawings shall be converted to be fully editable in AutoCAD® 2017.

085-3.4.8 [Orig] All drawings shall be of sufficient clarity that when they are reduced from original size to 11 inches x 17 inches, they shall be fully legible.

085-3.5 [Orig] The Contractor shall develop product drawings by means of “Model Space”/ “Paper Space” techniques. This may be augmented by special software tools, or other methods that generate conventional orthographic drawings, which include dimensioned orthographic views (including canted or otherwise specially oriented views set normal to a particular component) depicting all geometry and schematics.

085-3.5.1 [Orig] All geometry shall be drawn in “Model Space” and scaled 1:1. Viewports shall be created in Layout Tabs (Paper Space) to present the desired views in an appropriate scale. Text and dimensions including special notes such as weld symbols shall be created in “Paper Space”.

- 085-3.5.2 [Orig] A set of two dimensional multi-sheet PDF extraction files of the “Paper Space” views derived from the drawing layouts shall completely disclose and depict the boat, its components and all dimensions required to disclose the boat geometry. It shall not be necessary to refer to “bend diagrams”, “cut sheets”, “burn sheets” or similar depictions of individual in-process parts to determine dimensions or locations of elements of the final as-built boat.
- 085-3.5.3 [Orig] Each sheet of the resulting PDF file shall be derived from one layout tab unless required to clarify the drawing (such as a view continued across two sheets), and each layout tab shall have the appropriate sheet borders and title blocks.
- 085-3.5.4 [Orig] The PDF files shall be appropriate for use by operators for sustainment, upgrade, and repair functions, when viewed by standard PDF read only software. Isometric or similar perspective views may be included in Product Drawings via viewports, as “key views” or otherwise to improve clarity. Such views shall only be dimensioned when an orthographic view cannot more clearly depict a dimension, such as the relative axial rotations of pipe bends or fittings on a pipe or handrail spool, or as a marked redundant (“Ref ...”) dimension provided for convenience or clarity.
- 085-3.5.5 [Orig] If the boat is designed in a 3-Dimensional CAD program, product drawings shall be distilled from the native 3D model into an AutoCAD compatible, editable 3D DWG file except as noted below for schematic and other specialized views that do not comprise 3D geometry. Appropriate parts of the 3D geometry in the native model shall be retained as 3D geometry and inserted into AutoCAD compatible drawing. Electronic external referencing drawings shall not be used. Each individual drawing file must include all elements intended to be depicted therein. The product drawings created in this manner shall comply with all product drawing requirements set forth in this Specification.
- 085-3.5.6 [Orig] Three dimensional model elements not shown in the viewports shall be removed. As much as possible, in order to minimize file size, each individual drawing should include only the geometry disclosed by the drawing.
- 085-3.5.7 [Orig] The Product Drawing shall comprise one or more AutoCAD compatible 3D or 2D geometry elements in Model Space, and Paper Space views of the geometry with non-geometric elements in paper space. Additional 2D geometry elements required to clarify the 3D model or to convey other information such as flattened views of background geometry, etc., plane views of cut piece parts (i.e. flattened plates without thickness, etc.) may be included in Model Space as appropriate, but shall be controlled by appropriate layering.
- 085-3.5.8 [Orig] The boat shall have a single datum point for all geometry (e.g. “Fr 0, Baseline, Centerline). This point shall be depicted in Paper Space wherever it appears in a viewport. Each element of 3D geometry shall have an appropriate reference to the single datum point such as a named User Coordinate System, a block comprising a point or direction arrows designated as the datum or similar feature, such that the location and orientation of an isolated element of 3D geometry can be located.
- 085-3.5.9 [Orig] Elements of such drawings, such as text, dimensioning, title block metadata, and similar drafting elements not part of the 3D model itself, shall be regenerated by the Contractor in the AutoCAD compatible 2D “Paper Space” renditions.

- 085-3.5.10 [Orig] The revisions column shall be kept clear of any tables, viewports or other material except the individual sheet title block and the elements shown on the sheet 1 of the GFI template.
- 085-3.5.11 [Orig] The drawings may be divided into modules, but each module drawing shall include key views depicting the module in its “in service” position with the rest of the boat, and the module shall be shown in its “in service” orientation (e.g. if built upside down, it shall be depicted right side up) and shall include a note disclosing its location from the single boat datum, which shall also be visible in any view port large enough to include it.
- 085-3.5.12 [Orig] Fractions shall always be displayed as unstacked (e.g., 1/4”) in dimensions, General Notes, and Material List.
- 085-3.6 [Orig] Editable tables and blocks (Materials List, Revision Block, Sheet Index, etc.) shall be populated in accordance with standard USCG Borders and CAD Standards as applicable.
- 085-3.6.1 [Orig] The Contractor shall use GFI blocks for weld symbols, view callouts, section arrows, scales and similar elements.
- 085-3.6.2 [Orig] The block for annotating views, “Callout Table”, shall be populated as follows:
- “View Type and Zone” designates the direction of the view and its location on the drawing sheet. View type “Plan” is looking down, “Profile” or “Elevation” is looking port or starboard, “Section” is looking forward or aft. Other view types are “Detail” (not “Section”), “Isometric” or other special type, such as “Schematic” where shown on a drawing that also includes geometry. Zone is the horizontal (numeric) zone flowed by the vertical (alpha) zone; e.g., “6-B”. In general, it is appropriate to determine the zones based on the location of the callout block.
 - “View Description” is additional information such as the location of the cutting plane and its direction; e.g. “Frame 23 Lkg Aft” or other clarifying information; e.g. “Plating Not Shown”, as appropriate.
 - “View Scale” is the scale of the view; English units are designated as inches per foot and inches vice pure fractions. Metric units are designated as decimal ratios e.g. “1:100”.
 - “View Callout Reference” is the zone from the annotation or cut arrow that this view was derived. This may be omitted in the case where this view is not derived from another view on the same drawing. It is not required to reference views on other drawings, though it is allowed if useful to clarify the view. Note that this means that the block “Sect_Arrow_Text” is filled out with the horizontal (numeric, top arrow) zone and vertical (alpha, bottom arrow) zone where the new derived view is shown, not the location of the “Sect_Arrow_Text” block.
- 085-3.7 [Orig] Material List
- 085-3.7.1 [Orig] The Material List shall disclose the components and materials of the boat and their quantities so as to facilitate such sustainment.
- 085-3.7.2 [Orig] English standard units shall be used in the material list except that characteristics of material purchased in International Systems (SI, metric) standards may be called out in the material list in SI units. Quantities of materials shall be in English units. Standard callouts for materials shall be used; e.g. “PL 1/4”, “3 SCH

40". Gage sheet metal thickness designations shall not be used; sheet metal thickness shall be in decimal English or metric units.

- 085-3.7.3 [Orig] Part or piece numbering systems may be in the Contractor's format and system.
- 085-3.7.4 [Orig] The Material list shall have information sufficient to determine the approximate amount and characteristics of each type of standard material ordered or detailed on the product drawing. Part numbers referring to components made by the Contractor such as CNC cut metal pieces shall have the basic material properties and quantity included, such as metal type and thickness, or shall include a reference to the drawing in the drawing set that they were made in accordance with. Depictions of cut and/or bent parts shall be included in the product drawing set if their geometry and characteristics are not disclosed elsewhere in the product drawing set.
- 085-3.7.5 [Orig] All components that have been listed on a purchase order or invoice for the construction of the CB-OTH V that are installed on or delivered with the boat (e.g., trailer, spare parts) shall be listed on the Material List in the drawing where they are defined or ordered. A component shall only appear on one Material List unless an additional component(s) is required in other drawings.
- 085-3.7.6 [Orig] The Material List shall be one continuous table per drawing. A single Material List can be continued on subsequent sheets if necessary. There shall not be separate material lists on individual sheets that depicts only the materials on that sheet
- 085-3.7.7 [Orig] The Material List shall include at a minimum:
- Item Revision Letter;
 - Drawing Item Number;
 - OEM;
 - OEM description/salient characteristics;
 - OEM part number;
 - Material; and
 - Quantity and Units.
- 085-3.7.8 [Orig] All components used to build the CB-OTH V shall be included on the Material List, including bulk materials such as adhesives. Welding consumables do not need to be listed.
- 085-3.7.9 [Orig] The OEM, component description, and part number for each component shall be provided. Distributors' part numbers such as McMaster-Carr or West Marine may be used but only when the salient characteristics of the component are defined in the component description so it can be competitively procured.
- 085-3.7.10 [Orig] Whenever distributors' part numbers are used, the entry must include the words "or equal" to differentiate it from OEM information.
- 085-3.7.11 [Orig] National Item Identification Number (NIIN) shall be listed if it has been assigned for that item.
- 085-3.8 [Orig] Schematic Diagrams

- 085-3.8.1 [Orig] All piping and electrical systems' product drawings shall have a schematic diagram depicting the functional interconnections between components of the given system.
- 085-3.8.1.1 [Orig] Drawings that include both geometric arrangements of components and schematics shall be appropriately titled as "... Arrangement and Schematic" or similar to inform the user that both depictions are in that drawing. Such diagrams may be included as additional sheets or views of the drawings that physically locate and order the components thereon for clarity.
- 085-3.8.1.2 [Orig] Scaling for symbol size shall be consistent.
- 085-3.8.2 [Orig] All components that provide functional effect on the system shall be depicted in the schematic diagram. This includes valves and piping connections that can be disconnected in the course of normal servicing. This also includes connections, junction boxes, and terminal strips in electrical and electronic systems. Permanent joints such as threaded, welded, or soldered pipe connections need not be depicted.
- 085-3.8.3 [Orig] 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 schematic diagram. Boundaries depicting components co-located in a panel or switchboard and boundaries designating major compartments on the boat shall be included in schematics so that the components or wiring in question can be approximately located.
- 085-3.8.4 [Orig] Components shall be depicted as symbols and all diagrams shall include a symbol list referencing all symbols used.
- 085-3.8.5 [Orig] Hose and pipe shall be distinguished from each other. Where appropriate flow quantities, pressures, directions, nominal pipe, hose sizes and other appropriate characteristics shall be shown as text near or leader to the line depicted.
- 085-3.8.6 [Orig] Any electrical or electronic switch, circuit breaker, fuse, cable connection, or other discrete component shall be depicted, except that terminal connectors and other similar conductors need not be separately depicted from the wire. Cable types, gauges, fuse, and component ratings shall be designated on the diagram.
- 085-3.8.7 [Orig] Schematic diagrams shall not have a Material List. A schematic diagram may include component lists to improve clarity in the Contractor's format. Such lists shall not be designated "Material List" or supersede the requirement that the components appear on an arrangement drawing Material List.
- 085-3.8.8 [Orig] Any component depicted on a schematic diagram shall also be located and depicted on an arrangement drawing and in its Material List. Schematic diagrams shall include the drawings that locate and order the components as references.
- 085-3.8.9 [Orig] If wiring is assembled and installed as combined harnesses, this may be designated on the schematic, but a harness diagram with true lengths of all wires in and out of the harness as produced shall be submitted. This may be combined with an arrangement drawing. An individual harness drawing is considered a true geometric drawing and therefore may have a Material List. In such case, an arrangement drawing shall only include the harness as a single part and reference the harness drawing.
- 085-3.9 [Orig] All components including piping, electrical wiring, and all other purchased components, except minor components such as cable ties, adhesives, or other bulk

materials on the boat, shall be depicted on a drawing in their true size, location, and orientation. Purchased components may be depicted as simple shapes having the same outside dimensions of the component depicted. Spaces included that are used for access, part removal, etc. shall be shown as phantom, as a special layer name or via similar distinguishing depiction. All interfaces of purchased components and those created by the Contractor shall be depicted in a drawing including, but not limited to, pipe joints and terminal strips.

- 085-3.10 [Orig] Drawings shall represent the entire CB-OTH V fleet. Differences between hulls for any given drawing shall be captured within that specific drawing. A separate drawing for each hull shall not be created. A note on each sheet shall identify what hull(s) that sheet is applicable to if the sheet is not applicable to all hulls.
- 085-3.11 [Orig] The drawings shall provide sufficient detail to enable trained USCG personnel to: conduct organizational-level and depot-level maintenance and replacement of systems and components.
- 085-3.12 [Orig] Dimensions
- 085-3.12.1 [Orig] A separate named dimension style shall be produced and retained in the drawing file for each scale or style used. The dimension style name should include a component that indicates the model space to paper space scaling factor, e.g., "P48" would indicate a dimension style with a DIMLFAC setting of 48 (1/4 inches = 1 foot-0 inches). Dimensions shall be associative and not be exploded. Within the GFI templates, CG dimension styles with the suffix of "PS" will automatically scale to the "Paper Space" viewport if the setvar "DIMASSOC" is set to 2.
- 085-3.12.2 [Orig] Non-associative dimensions shall be avoided as much as possible. Redundant dimensions (optionally omitting the notation "Ref."), are allowed provided all dimensions disclosing the same measurement are associative to the same Model Space elements. Other redundant dimensions are allowed if necessary, but shall include the notation "Ref. ..." with the drawing reference number or view notation.
- 085-3.12.3 Structural and arrangement dimensions shall be in inches and fractions for dimensions less than 72" (in the GFI template use CG-FRAC dimension style), and feet, inches and fractions for dimensions 6' and larger (in the GFI templates use CG-ARCH dimension styles). Units shown in a dimension can control the enforced tolerance of the dimension. For this reason, an appropriate type and precision of dimensions shall be used for each dimension.
- 085-3.13 [Orig] Drawing Revision Block
- 085-3.13.1 [Orig] Contractor submissions of product drawings for USCG approval shall have a numerical revision indicator in the revision block of the title sheet of each drawing starting with 1, and increase incrementally with each subsequent submission.
- 085-3.13.2 [Orig] When the USCG approves the drawing(s), the Contractor shall remove all previous numerical revision markings and revision write-ups throughout the drawing, change all sheets to Rev "-" and shall apply the USCG approval signature (format provided by KO with approval) to the drawing identified by the KO.
- 085-3.13.3 [Orig] There shall be no addendum or insert sheets (i.e. 3A, 3B, etc.) contained in the final USCG approved submissions of drawings (Rev "-").

085-3.13.4 [Orig] Once a drawing has been approved by the USCG, subsequent revisions shall be indicated with Alpha Characters, "A", "B", etc., (except for alpha characters I, O, Q, S, X, and Z) and shall increase incrementally with each revision.

085-4 [Orig] Supplemental Requirements for Drawings

085-4.1 [Orig] Lines and offsets; This drawing shall show all the information required to define the hull form and all the frames, decks, and bulkheads listed in the hull structural drawings and their relationship to the single datum. The shaft line shall be shown and dimensioned along with the location of hull appendages to include but not limited to; spray strakes, skegs, trim tabs, etc.

085-4.1.1 [Orig] The nominal molded surface of the watertight envelope of the boat shall be disclosed in "lines drawings" of the hull and superstructure. In addition to the conventional sections, waterlines, chines, and buttocks used in defining the watertight envelope, control lines, and surfaces shall be depicted and dimensioned. These include features such as tangencies and the axis, radii of any bow cones, transom, transom corners, and similar features. The molded surface shall be numerically defined, by a table of offsets, or dimensions on the body of the drawing or some combination. Depicting and dimensioning or providing tables of offsets for typical rulings of developable surfaces is not required, though it is encouraged.

085-4.2 [Orig] Structural Arrangement Drawings

085-4.2.1 [Orig] All structure shall be depicted on structural arrangement drawings.

085-4.2.2 [Orig] Location and configuration of all structural components including holes for fasteners, piping, or wiring shall be dimensioned even if they are numerically cut. Note that this allows components forming the molded surface of the hull to be derived from dimensions disclosed on the lines drawing, so such components need not be separately dimensioned on their structural arrangement drawing.

085-4.2.3 [Orig] Structural drawings shall include welding. All welding in structural drawings or any other drawing that requires welding fabrication shall be represented by welding symbols included in the drawing where the weld occurs.

085-4.3 [Orig] Machinery Arrangements; These drawings shall show the major components of the machinery arrangement in the required detail to show interfaces with other components and systems. Plan views, inboard profiles, and section views shall be used so that all major components are shown in at least two separate views. The drawings shall show the locations of all 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 component shown. The frames and bulkheads shall be clearly shown and labeled in all these drawings.

085-4.4 [Orig] System Diagrams; All piping and electrical systems shall have a diagram depicting the function and interconnections of the components in the system within the plan views of the boat structure. All components that contribute to the functionality of the system shall be depicted.

085-4.5 [Orig] Interface Diagrams; A topology view or functional block diagram noting all interfaces, connections, type of connection, boundaries, physical locations, and all associated functions, ports, protocols, and services.

- 085-4.6 [Orig] Piping and Mechanical Diagrams; Diagrams shall include tables with major component characteristics such as 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.
- 085-4.7 [Orig] Electrical Diagrams; Electrical diagrams shall depict any electrical or electronic switch, fuse or other discrete component. Terminals, terminal connectors, and other similar conductors need not be separately depicted from the wire. Cable types, gauges, circuit protection, and component ratings shall be designated on the diagram.
- 085-4.8 [Orig] General Arrangements; Outboard profile, plan views, inboard profiles, and section views shall be used so that all major components are shown in at least two separate views. The drawings shall identify each piece of equipment shown. On the outboard profile, the full load waterline; label the underwater hull and appendages; and dimension the navigational draft; the heights above the full load waterline of the major structural components shown and the height at the highest point of the boat shall all be shown. The frames and bulkheads locations shall be clearly identified and labeled in all these drawings. It is an appropriate means of organizing the drawing to include other drawings as references on the general arrangement with annotations to the references on the views.

085-5 [Orig] List of Product Drawings

- 085-5.1 [Orig] The product drawings identified in Section 085-5.1.1 through 085-5.1.9 represent the information necessary to describe the PCB of the CB-OTH V. The list may be tailored through consolidation or separation of related drawings provided that all the required information is clearly displayed to describe the PCB of the CB-OTH V.
- 085-5.1.1 **[Orig] 100 Hull Structure**
- 101 Structural Arrangement
 - 110 Hull Shell Plating and Details
 - 114 Fendering System and Details
 - 117 Transverse Frames
 - 120 Bulkheads Details
 - 130 Deck Structural Arrangement and Details
 - 150 Console, Engine Box, Lockers
 - 167 Schedule of Doors and Hatches
 - 180 Foundations
 - 190 Flotation Material Installation Details
- 085-5.1.2 **[Orig] 200 Propulsion System**
- 201 General Arrangement
 - 233 Propulsion System Installation Details
 - 241 Waterjet and Marine Reverse/Reduction Gear System Installation Details
 - 252 Propulsion Control System
 - 256 Cooling Seawater System
 - 259 Exhaust System Installation Details
 - 261 Fuel System
 - 262 Fuel Tank, Fill and Vent **[Orig] 300 Electrical System**
 - 301 General Arrangement
 - 313 Battery Bank Arrangement, Installation and Details
 - 320 12 VDC Electrical One-Line Diagram/Schematic
 - 321 120 VAC Electrical One-Line Diagram/Schematic

324 Distribution Panel, Installation and Details

332 Lighting System, Installation and Details

085-5.1.3 **[Orig] 400 C4I System**

402 Interface Document

405 Antennae Arrangement and Installation

410 Command and Control Arrangements

424 Electrical Navigation Aids

436 Alarm System Diagram

441 Communications Systems

085-5.1.4 **[Orig] 500 Auxiliary Systems**

526 Scupper and Deck Drainage, Installation and Details

529 Bilge System, Installation and Details

555 Fixed and Portable Fire Extinguishing System, Installation and Details

561 Steering System, Installation and Details

581 Anchor Handling System

582 Mooring, Towing and Hoisting Systems

085-5.1.5 **[Orig] 600 Outfitting and Furnishing**

600 Booklet of General Plans

602 Hull and Mechanical Designation and Markings

612 Handrails and Lifelines

613 Rigging Canvas and Curtains

631 Paint and Preservations Schedule

633 Cathodic Protection System

634 Deck Coverings

660 Operator and Crew Seating

670 Stowage Arrangement

085-5.1.6 **[Orig] 700 Armament Stowage**

703 Rifle Stowage Arrangement and Details

085-5.1.7 **[Orig] 800 Lofting**

839 Hull Lines and Offsets

085-5.1.8 **[Orig] 900 Trailer**

910 Trailer General Arrangement

085-6 [Orig] 3-Dimensional Technical Data Package (3D TDP)

085-6.1 [Orig] The Contractor shall develop and submit a 3D TDP in accordance with these requirements and Appendix A.

085-6.2 [Orig] The 3D TDP shall comprise one or more linked 3-dimensional CAD files (3D models) and associated electronic lists reflecting the PCB. Product model data, product drawings, design and technical data, and associated lists submitted as part of the 3D TDP shall be prepared in accordance with MIL-STD-31000B, *Technical Data Packages*. The 3D TDP shall support operational use, logistics support, repair, modification, and maintenance of the boat.

- 3D TDP level shall be production level.
- 3D TDP type shall be 3-D digital models with associated 2D (product) drawings.
- 3D TDP elements shall be product drawings/models and associated lists.

- 085-6.3 [Orig] The product model shall be complete, accurate, fully defined representations of the item, and contain every feature the item being represented is intended to contain. All information necessary to adequately define the item shall be contained in the 3D TDP to include but not limited to:
- Materials,
 - Tolerances,
 - Geometric tolerances,
 - Drawing Notes, and
 - Revision Data.
- 085-6.4 [Orig] 3D models shall be developed in accordance with ISO 10303, *Standard for the Exchange of Product (STEP) Model Data*, and in a native 3D CAD format capable of being exported to ISO 10303 STEP format.
- 085-6.5 [Orig] The 3D TDP shall be fully 3-dimensional and meet the requirements of ISO 10303-242:2014. All physical components shall be depicted or modeled in their true location, shape, and orientation in one or more 3D CAD files.
- 085-6.6 [Orig] The 3D TDP shall be structured as nested CAD files that depict components and which, in turn, are contained within other files as compiled shapes (SHXs) blocks or “external references” drawings which may themselves be nested into a higher layer drawing. Each separable physical component shall be modeled as one drawing entity at the highest (most inclusive) level of nesting so that it may be selected as one item, not a collection of drawing entities (components may be a single entity at any level below the highest level at the Contractor’s option). Depictions of purely geometric entities, such as molded lines, arbitrary datum lines, or planes, or other entities that do not depict actual physical components but add useful information to the model, may be included at the Contractor’s option; because they do not depict physical objects, they are not subject to this limitation. Special entities, such as weld path depictions for subsequent use by robotic equipment, are also not subject to this limitation.
- 085-6.7 [Orig] 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. Multiple occurrences of the same items shall be accomplished by a referencing process that does not unnecessarily increase the file size of the model rather than by copying the same entity repeatedly.
- 085-6.8 [Orig] 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 boat, at the Contractor’s option. This shall not be considered a redundant depiction. 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. 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. In-process parts may also be omitted from the 3D TDP.
- 085-6.9 [Orig] Components shall not have needlessly complicated or data dense depictions. 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 all threads modeled.

085-6.10 [Orig] 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.

085-6.11 [Orig] Validation; The 3D TDP shall be reviewed and validated by the Contractor prior to formal submission to the USCG. All unused geometry, notes, annotations, side studies, or duplications should be removed. If a software or model conversion processes is conducted prior to submission, all geometry, metadata, and content shall be reviewed and validated for completeness and accuracy before submission to the USCG.

085-7 [Orig] Calculations

085-7.1 [Orig] The Contractor shall develop engineering calculations and analyses to demonstrate that the CB-OTH V design conforms to the Specification and invoked references in all areas but not limited to the following:

085-7.1.1 [Orig] A finite element analysis (FEA) model may be provided to demonstrate compliance in accordance with ISO 12215-5 (2019) 11.6 for either the entire boat or parts of it. FEA may also be used to demonstrate compliance with Section 100-1.1.3 requirements on notch impact. Any FEA shall be performed using commercially available code. If FEA methods are used, the following shall be provided at minimum:

- Description of analysis performed.
- Plots of the full FEA model and local details, material properties used, finite element loads and boundary conditions, and mesh size.
- Discussion of the modeling results and acceptance criteria, load assessment, strength resistance assessment, accuracy assessment, and overall assessment.
- The electronic FEA model (including input and results files).
- Proprietary FEA codes or proprietary modifications of commercial or open source codes shall not be used unless the Contractor provides an operating copy of the code and required related runtime files, visualization utilities, and other utilities; manuals; and validation examples, along with appropriate licenses to allow USCG to run the code in the Windows 10 environment.

085-7.1.2 [Orig] Proper performance such as speed, range and dynamic stability (free from porpoising, bow down dynamic instability and broaching);

085-7.1.3 [Orig] Satisfactory selection of the hull structural scantlings and arrangements, and key structural foundations (masts, engine girders, console). Calculations required by ISO 12215 shall be performed for both the performance and full load conditions (using the weight for the subject condition as mass in maximum load condition [MLDC] in each case).

085-7.1.4 [Orig] Windscreen design analysis.

085-7.1.5 [Orig] Proper equipment selection and adequate system component sizing for all main propulsion equipment including, but not limited to the following, main propulsion engine, reduction gear, shafting, and waterjet propulsor.

- 085-7.1.6 [Orig] Proper equipment selection and adequate system component sizing for all auxiliary systems including, but not limited to the following: drainage; fuel service; fire protection; sea water service and machinery cooling; bilge; engine intake and exhaust; hydraulic systems; mooring, towing and anchoring systems; cathodic protection; and steering systems.
- 085-7.1.7 [Orig] Strength calculations for handrail and lifelines: The calculations shall demonstrate that the handrails and stanchions loaded in accordance with ABYC H-41, *Reboarding Means, Ladders, Handholds, Rails, and Lifelines*, do not fail based on not exceeding the nominal tensile rupture stress. An energy-based analysis demonstrating that the handrails do not form a mechanism considering that full plastic hinges formed at the support points may be used. Other calculation methods may be acceptable upon approval by the KO. The calculation shall also demonstrate that the handrails do not exceed nominal yield stress or otherwise permanently deform under a load of 200 pounds in any direction.
- 085-7.1.8 [Orig] Hull Bottom Plate, Structure, and Bow Horn Calculation: The Contractor shall submit a structural analysis demonstrating that the boat can sustain impacts to the bottom and sides resulting from ramp recovery aboard the Fast Response Cutter and National Security Cutter. This analysis shall also include ancillary structures at the bow such as stern launch and recovery bow horn assembly (including the integrated solid pin), bow eye, and mounting of fendering system, and any hull appendages. For the stern launch and recovery bow horn assembly calculation, the Contractor shall verify, by calculation, that the CB-OTH V bow horn assembly and supporting structure is designed to withstand a load equal to the weight of the CB-OTH V in full load weight condition acting in a direction parallel to the baseline of the CB-OTH V.
- 085-7.1.9 [Orig] Weight estimate that provide same content and format as outlined in Section 096.
- 085-7.1.10 [Orig] An Electrical Power Load Analysis (EPLA) shall be developed to address the boats' electrical power generation and consumption requirements under various operating conditions.
- 085-7.1.10.1 [Orig] An EPLA template will be provided as GFI for the Contractor to use in developing the EPLA. This template uses a nominal electrical generation, distribution, and loading arrangement to serve as a template. The Contractor shall modify the arrangement submitted in their completed EPLA to reflect the actual CB-OTH V electrical system design.
- 085-7.1.10.2 [Orig] The EPLA shall be used for sizing of alternators, battery banks, battery chargers, circuit conductors, and associated equipment.
- 085-7.1.10.3 [Orig] Voltage-drop calculations for installed electrical circuits showing proper cable sizing in accordance with *ABYC Project E-11, AC and DC Electrical Systems on Boats*.
- 085-7.1.10.4 [Orig] The Contractor shall use DDS-310-1, *Electric System Load and Power Analysis for Surface Ships*, as guidance in preparing the EPLA.
- 085-7.1.11 [Orig] A stability analysis per Section 079, Stability and Buoyancy.
- 085-7.1.12 [Orig] ATTLA design calculations per Section 051-10, ATTLA Requirements.
- 085-7.1.13 [Orig] Lifting system calculation per Section 582-5.

- 085-7.2 [Orig] The Contractor shall use the “A” size USCG Drawing template as the cover sheet for each calculation. The calculation number shall be treated as if it was a drawing and follow the requirements of Section 085-3.4.1, Technical Data Package Requirements. The calculation number shall be included in the DNAR.
- 085-7.3 [Orig] All calculations shall include sufficient information on the configuration of the CB-OTH V and applicable components to validate assumptions, dimensions, weights, structural properties, component characteristics and other attributes used in or required by the calculations to verify that the CB-OTH V design conforms to the Specifications. Such information shall include:
- Hull geometry and dimensions
 - Geometry, dimensions and location of flotation elements, watertight or weather tight boundaries, fuel tanks, potential down flooding points
 - Actual installed pipe, tube, cable and other component size, specification and materials
 - Scantling dimensions, spacing and similar geometric data required for strength calculations
 - Material properties
 - Weld schedules
 - Characteristics and/or specifications of engines, waterjet propulsors, shafting, gearsets, pumps, fans, anodes, electrical components, hoist components, purchased hatches and other commercial items of hull outfit, and the trailer.
- 085-7.3.1 [Orig] The information listed above may be in Contractor's format and may be illustrations within or appendices to the subject calculations or separate documents. Such information may comprise preliminary drawings and sketches, vendor's cut sheets, lists of standard component specifications, computer models or other documentation that clearly discloses the necessary information.
- 085-7.3.2 [Orig] Calculations shall include references to the provided information and a discussion and explanation of the required standard, methodology and assumptions used.
- 085-7.3.3 [Orig] Calculations shall include limiting values of features such as weight and centers rather than being performed at estimated point values. This shall provide a level of confidence that the boat will conform to the specifications despite having some parameter change from the estimated value. Such values shall be based on an actual limit or on the level of uncertainty in the as-built value of the parameter.

086 [Orig] TECHNICAL MANUALS AND PUBLICATIONS

086-1 [Orig] General

- 086-1.1 [Orig] Technical manuals and publications shall be delivered in electronic format as directed in this Specification.
- 086-1.2 [Orig] Publications prepared for this contract by the Contractor shall be in electronic format that allows imbedded text and graphics and shall be Microsoft® Office Word format or Microsoft® Office Excel format that is compatible with Windows® 10.

- 086-1.3 [Orig] Any Commercial Off-the-Shelf (COTS) manuals from vendors that are not in the Microsoft® Office Word or Excel compatible format shall be delivered in an unlocked PDF file.
- 086-1.4 [Orig] The Contractor shall provide an index of all technical manuals and publications for all equipment, components, and accessories that make up the boat and trailer at the logistics conference.
- 086-1.5 [Orig] The Contractor shall provide an electronic copy via DVD of all technical manuals and publications for all equipment, components, and accessories that make up the boat and trailer.
- 086-1.6 [Orig] Data Rights; Data within the technical manuals and publications developed at private expense that embody trade secrets or are commercial or financial and confidential or privileged shall be delivered with limited rights and shall be treated in accordance with FAR Clause 52.227-14 (Alternatives II, IV, and V). All other data shall be delivered with unlimited rights.
- 086-1.6.1 [Orig] When it is necessary to indicate limited rights in accordance with FAR Clause 52.227-14 (Alternative II), it shall be clearly identified and the following statement shall be included on the first page of each applicable technical manual or publication:
- “RIGHTS IN DATA**
- (a) These data are submitted with limited rights under Government Contract No. [To be Inserted at Contract Award]. These data may be reproduced and used by the Government with the express limitation that they will not, without written permission of the Contractor, be used for purposes of manufacture nor disclosed outside the Government; except that the Government may disclose these data outside the Government for the following purposes, if any; provided that the Government makes such disclosure subject to prohibition against further use and disclosure: (1) Use (except for manufacture) by support service Contractors; (2) Use (except for manufacture) by other Contractors participating in the Coast Guard’s program of which this specific contract is a part; (3) Repair or overhaul work; (4) Release to a foreign Government, or its instrumentalities, if required to serve the interests of the U. S. Government, such as in the context of the Foreign Military Sales program, for information or evaluation, or for emergency repair or overhaul work by the foreign Government. See FAR § 27.404(c).
- (b) This notice shall be marked on any reproduction of these data, in whole or in part.”
- 086-1.7 [Orig] Copyrights and proprietary information credit line; Technical manuals shall not contain copyrighted material except as specified in the FAR and DHS Acquisition Regulations. When copyrighted material is to be included in a technical manual, the developer shall obtain prior written permission from the copyright owner or authorized agent for its use by the USCG. The signed, written permission shall be delivered together with the final technical manuals in accordance with the contract. The written permission shall contain a statement declaring whether or not a copyright credit line is required. When it is necessary to include copyright and proprietary material, it shall be clearly identified and the following warning statement shall be included on the title page:

086-1.7.1 [Orig] "This document contains copyright or proprietary materials. Infringement of copyright or proprietary material may violate existing Federal laws and statutes and result in criminal penalties, imprisonment, or removal from office."

086-1.8 [Orig] STINFO – The STINFO determination and language will be provided by the KO following USCG review of deliverables. The Contractor shall place STINFO markings on all deliverables in accordance with *COMDTINST M5260.6A, Management of Scientific and Technical Information (STINFO)*, 16 SEPT 2015, and *CGTO PG-85-00-290-S, Standardized STINFO Markings Process Guide*, 23 November 2010 (provided as GFI).

086-2 [Orig] OEM Technical Manuals

086-2.1 [Orig] The Contractor shall deliver OEM technical manuals on a DVD with each boat for all the equipment, components, and accessories that make up the boat and trailer.

086-2.2 [Orig] OEM documentation shall be in English.

086-2.3 [Orig] When available, OEM technical manuals shall provide the necessary information and instructions to: install, operate, and maintain the equipment. This includes a description of system start-up, operation, shutdown, safety, and emergency procedures. The manuals shall also contain information concerning inspection, preventive and corrective maintenance, calibration, adjustment, troubleshooting, illustrated parts breakdowns that include OEM part numbers, repair, and required tools and test equipment.

086-2.4 [Orig] If an OEM technical manual contains information on more than one like component, the Contractor shall mark each manual with the component model and part number used on the CB-OTH V to direct the user to only those sections necessary to complete their task.

086-3 [Orig] Technical Publications

086-3.1 [Orig] The following technical publications are required to be delivered with each boat:

086-3.1.1 [Orig] Boat Information Book (BIB) - The BIB shall provide a complete description of the boat's capacities and characteristics, including operating instructions for all systems, equipment, and components installed (to include wiring). System diagrams shall be included to supplement the written description. System working drawings may be used in lieu of the diagrams upon approval from the KO. *ABYC T-24 Owner's Manuals* shall be used as guidance when developing the content of the BIB.

086-3.1.1.1 [Orig] Hull, Mechanical & Electrical (HM&E) Support Section - The Contractor shall develop a HM&E Support Section that provides the following:

086-3.1.1.1.1. [Orig] Physical layout diagrams and descriptions.

086-3.1.1.1.2. [Orig] A list of all embedded electronic control systems within the HM&E boundary

086-3.1.1.1.3. [Orig] Step-by-step flow chart describing each equipment setup and startup processes and settings

086-3.1.1.1.4. [Orig] System corrective maintenance, casualty recovery, and reset procedures

- 086-3.1.1.1.5. [Orig] Software or firmware version numbers for all field-programmable sub-systems
- 086-3.1.1.1.6. [Orig] Firmware support documentation with equipment configuration baselines to recover from all hardware or software malfunctions. The equipment configuration baselines shall include the installation procedures, field-programmable device firmware and software, adjustable parameter settings, network settings and addresses, maintenance tools, and software license information.
- 086-3.1.1.1.7. [Orig] Instructions necessary to remove any component of the CB-OTH V propulsion system (engine, drive train, and waterjet).
- 086-3.1.1.2 [Orig] Command, Control, Communications, Computer, Intelligence, Surveillance and Reconnaissance (C4ISR) System/Network Support Section - The Contractor shall develop a C4ISR System/Network Support Section that provides the following:
 - 086-3.1.1.2.1. [Orig] System overview including a general description of the nature of the system as a whole and the purpose and description of each major sub-system.
 - 086-3.1.1.2.2. [Orig] Physical layout diagrams and descriptions.
 - 086-3.1.1.2.3. [Orig] A list of all C4ISR equipment broken out into navigation and communication (external and internal) functional groups.
 - 086-3.1.1.2.4. [Orig] Step-by-step flow chart describing each equipment setup and startup processes and settings.
 - 086-3.1.1.2.5. [Orig] System corrective maintenance, casualty recovery, and reset procedures.
 - 086-3.1.1.2.6. [Orig] Software or firmware version numbers for all field-programmable sub-systems.
 - 086-3.1.1.2.7. [Orig] Firmware support documentation with equipment configuration baselines to recover from all hardware or software malfunctions. The equipment configuration baselines shall include the installation procedures, field-programmable device firmware and software, adjustable parameter settings, network settings and addresses, maintenance tools, and software license information.
- 086-3.1.1.3 [Orig] Casualty Control Section - The Contractor shall develop a casualty control section that provides description of the emergency systems and action to be taken for the following:
 - 086-3.1.1.3.1. [Orig] Capsizing
 - 086-3.1.1.3.2. [Orig] Charlie Fire
 - 086-3.1.1.3.3. [Orig] Engine High Water Temperature
 - 086-3.1.1.3.4. [Orig] Fire in the Engine Space
 - 086-3.1.1.3.5. [Orig] Loss of Control of Engine RPM
 - 086-3.1.1.3.6. [Orig] Loss of Fuel Pressure

- 086-3.1.1.3.7. [Orig] Loss of Lube Oil Pressure
- 086-3.1.1.3.8. [Orig] Loss of Reverse Bucket Control
- 086-3.1.1.3.9. [Orig] No Power/Insufficient Power to Communications/Navigation Equipment
- 086-3.1.1.3.10. [Orig] Steering Casualty

088 [Orig] HUMAN SYSTEMS INTEGRATION (HSI)

088-1 [Orig] General

- 088-1.1 [Orig] The CB-OTH V, integrated sub-systems, and user/maintainer interfaces shall incorporate relevant HSI design principles, processes, tools, and techniques in accordance with ASTM F1166-07 and shall address issues identified in *High Speed Craft Human Factors Engineering Design Guide (ABCD-TR-08-01v1.0), Part 2 and Supplement (ABCD-TR-15-001)*.

088-2 [Orig] Human Factors Engineering (HFE)

- 088-2.1 [Orig] The CB-OTH V's arrangement shall be in accordance with *Standard Practice for Human Engineering Design for Marine Systems, Equipment and Facilities ASTM F1166-07* for all operations including launch and recovery at all required speeds and sea states. The boat shall be arranged for the 5th percentile female to the 95th percentile male as defined in *ASTM F1166-07, Section 9.2 and Figure 52* with the exception of the following measurement which shall be used instead to account for USCG PPE and law enforcement equipment:
 - 95th Percentile Male Chest Depth – 15 inches;
 - 95th Percentile Male Shoulder Breadth – 24 inches; and
 - 95th Percentile Male Hip/Knee Breadth (seated) – 26 inches.
- 088-2.2 [Orig] Controls and displays shall be placed such that the crew can perform all mission essential tasks from a seated and belted position during all operating conditions.
- 088-2.3 [Orig] Pre and post-launch inspections or activities shall not require awkward lifting, twisting, or unsafe actions that may pose a health hazard or ejection from the boat.
- 088-2.4 [Orig] Heavy lifting of equipment or components over 40 pounds requiring two or more people for safe operation shall be identified and the Contractor shall ensure that space and handles are available for the action or mechanical aid to the task must be provided.
- 088-2.5 [Orig] Visibility for the coxswain shall be in accordance with *Visibility from the Helm Position (ABYC H-1)* except where it conflicts with other requirements of this specification.

089 [Orig] FAMILIARIZATION (FAM) TRAINING

089-1 [Orig] General

- 089-1.1 [Orig] The Contractor shall provide one day of training within two days of the boat being delivered unless otherwise arranged between the Contractor and KO. The training shall be designed so that the crew will be able to operate all controls, navigation, and communication equipment to safely pilot the boat. The training shall concentrate on the

safe use of the boat, basic operation of all boat controls and equipment, and maintenance.

- 089-1.1.1 [Orig] The training shall be provided at the unit location.
- 089-1.1.2 [Orig] There shall be one day of training that covers both operator and maintainer familiarization. Up to 10 operators and up to 10 maintainers shall receive training during each training session. Operator and maintainer training sessions may be run concurrently for time efficiency. The training may include classroom sessions in addition to actual operation of the boat.
- 089-1.1.3 [Orig] Operator and Maintainer FAM Training shall address all topics included in the BIB. The BIB shall be used as a training aid.
- 089-1.2 [Orig] Operator FAM Training: At a minimum, operator FAM training shall include, but is not limited to:
 - 089-1.2.1 [Orig] Basic operation of all CB-OTH V systems, sub-systems, equipment, operational characteristics and parameters such as basic construction features, draft (stationary and on plane), turn radius, stopping distance, maximum sea states, and maximum safe speeds.
 - 089-1.2.2 [Orig] Controls for boat handling, engines, electronics, fuel, bilge, fendering, and propulsion.
 - 089-1.2.3 [Orig] Start-up and shut-down procedures.
 - 089-1.2.4 [Orig] Warnings.
 - 089-1.2.5 [Orig] Casualty control for each action in the BIB as outlined in Section 086-3.1.1.3
 - 089-1.2.6 [Orig] Emergency procedures.
 - 089-1.2.7 [Orig] Safe piloting, to include navigating at speed and slow speed maneuvering alongside a pier or ship.
 - 089-1.2.8 [Orig] Trailer launch and recovery.
 - 089-1.2.9 [Orig] At a minimum two hours underway with the USCG operating the CB-OTH V under Contractor supervision.
- 089-1.3 [Orig] Maintainer FAM Training; At a minimum, maintainer FAM training shall cover, but is not limited to, organizational preventative and corrective maintenance for the following systems: propulsion, engines, electrical, electronics, steering, and trailering system (including hook up of truck and trailer, recovery of boat from water, proper transportation of trailered boat). The Contractor shall demonstrate the use of all special tools provided.
- 089-1.4 [Orig] The Contractor shall provide a training syllabus that includes, at a minimum, the list of topics for both the operator and maintainer FAM training item and agenda identifying the order the FAM topics will be covered with the approximate amount of time to be spent on each item.

090 [Orig] QUALITY MANAGEMENT (QM)

090-1 [Orig] General

- 090-1.1 [Orig] The Contractor shall have quality assurance and quality control systems in place to provide QM during the entire contract period to ensure the boat meets all contract

requirements. The USCG will inspect the boat upon boat delivery to verify all requirements have been met. This inspection does not relieve the Contractor of their responsibility to ensure the boat meets all contract requirements prior to offering for USCG acceptance.

090-1.2 [Orig] As part of the logistics conference, the Contractor shall discuss:

090-1.2.1 [Orig] Planned quality assurance techniques, data collection, process controls, tests, measurements, inspections, documentation and other related activities that will be used in the CB-OTH V contract.

090-1.2.2 [Orig] Identify all the key QM personnel within the Contractor's program.

092 [Orig] ACCEPTANCE TESTING (AT)

092-1 [Orig] General

092-1.1 [Orig] The Contractor shall ensure that the CB-OTH V construction has been completed and all systems have been groomed to verify they perform as intended before ATs are conducted.

092-1.2 [Orig] The Contractor shall develop an AT program to verify that the CB-OTH V meets all the requirements of the contract, and documents the results. The required tests are minimums and are not intended to supplant any controls, examinations, inspections, or tests normally employed by the Contractor to assure the quality of the boat. The CB-OTH V shall successfully complete all testing prior to acceptance.

092-1.3 [Orig] The AT detailed in this section are applicable to all CB-OTH Vs unless stated otherwise.

092-1.4 [Orig] During all AT, the CB-OTH V shall remain under the control of the Contractor. The Contractor shall ensure that the boat and all equipment is operated in a safe manner in accordance with OEM-recommended practices and shall assume responsibility for all operations.

092-1.5 [Orig] The Contractor shall furnish all material, fuel, labor, power, equipment, instruments, and expertise necessary for these ATs unless stated otherwise.

092-1.6 [Orig] All instrumentation and equipment that is necessary to support ATs shall be furnished and installed by the Contractor.

092-1.7 [Orig] Any instruments used shall be calibrated and marked prior to use. The calibration shall be current. Instruments shall be calibrated using standards certified as being traceable to a national standard. Calibration data and certificates shall be available for inspection by USCG representatives. The Contractor shall ensure that each individual AT Report contains copies of calibration data and certificates for the equipment used in that test.

092-1.8 [Orig] At the satisfactory completion of all AT, the Contractor shall remove the testing instrumentation and equipment.

092-1.9 [Orig] When testing equipment, components, or systems; all AT procedures shall be in accordance with component and equipment manufacturers' recommended practices and shall not violate component and equipment operating procedures or the manufacturer's warranty.

- 092-1.10 [Orig] The Contractor shall ensure proper operation of the equipment. Proper operation means that the equipment can be started, operated, interfaced together as required, and demonstrated to function in the designed manner. The Contractor shall conduct all tests regardless of whether the item to be tested is furnished by the USCG or the Contractor.
- 092-1.11 [Orig] The Contractor shall not test or operate the tactical VHF radio at power levels above 25 watts.
- 092-1.12 [Orig] If damage to any component or system occurs during or after any testing, and prior to acceptance of the boat, the damage shall be repaired by the Contractor and previously completed tests of the component or system damaged shall be repeated.
- 092-1.13 [Orig] Unless otherwise agreed to by the KO, ATs shall be conducted at or within the surrounding 60 mile radius of the CB-OTH V production facility.
- 092-1.14 [Orig] The USCG may, at its discretion, observe any AT. The Contractor may limit the number of USCG representatives onboard the boat during underway testing. Underway testing shall not last for more than eight hours without the opportunity to change out USCG observers.
- 092-1.15 [Orig] During ATs, the boat shall be operated in a manner and in waters suitable for collection of data for the accepted test procedure. Underway tests shall be conducted in water depths of at least 21 feet deep and allow for safe and prudent navigation of the boat under its own power at idle through full speed. The underway test shall be postponed or rescheduled if winds and seas are excessive, as determined by mutual agreement between the Contractor and the USCG representative.
- 092-1.16 [Orig] Underway tests shall be conducted in the performance weight condition, unless otherwise specified. The boat may be ballasted temporarily to achieve the required loading condition.

092-2 [Orig] Administration and Conduct

- 092-2.1 [Orig] The Contractor shall notify the KO and COR in writing with the date, time, and ATs location. Notification shall be given during normal working hours (Monday – Friday, 0800 – 1600) no less than five days prior to the events.
- 092-2.2 [Orig] ATs shall be conducted during normal working hours (Monday – Friday, 0800 – 1600) unless specifically required to be conducted during other times or coordinated and agreed to by the KO.
- 092-2.3 [Orig] Notice of AT cancellation shall be provided to the USCG at least 48 hours in advance of the scheduled test date. Cancelled events shall not be restarted without notifying the USCG at least 72 hours in advance unless otherwise approved by the KO.

092-3 [Orig] Test Documentation

- 092-3.1 [Orig] The Contractor shall prepare the following documentation in support of the AT program:
- 092-3.1.1 [Orig] AT Plan - The Contractor shall develop an AT Plan which describes when, where, and how ATs will be conducted to verify that the CB-OTH V performance criteria have been met and all equipment operates properly. The plan will include the traceability between the specification and test procedures. The plan will also describe how each AT procedure will be documented, how results will be recorded, and the format for the final report for each boat. The plan shall include a sample AT

report. The plan shall be in the Contractor's format and submitted in accordance with Appendix A.

092-3.1.2 [Orig] AT Procedures - The Contractor shall prepare AT Procedures for each test to be conducted. The procedures shall fully describe the test, the information to be recorded, any pass/fail criteria, requirements for testing equipment, and the scheduling of events. Procedures shall be in sufficient detail to allow the USCG to duplicate the test and results. ATs shall not be conducted until the AT Procedures are accepted by the KO in accordance with Appendix A. Deviations and changes from an accepted procedure or an accepted AT sequence are prohibited. Except as required by the AT Procedure, adjustments on equipment being tested shall not be made during the testing. Any adjustment shall require a retest. For results to be valid, each test event shall be conducted in its entirety, per the USCG accepted AT Procedures.

092-3.1.3 [Orig] AT Reports - The AT Reports shall document the conduct of the test. The report shall include records of any measurements or data taken during the testing, identify any deficiencies, describe the corrective actions to be taken, indicate the test has passed the criteria, and has been signed by the Contractor administering the AT and the COR, if present.

092-3.2 [Orig] For each underway test the following information shall be recorded in addition to the data collected for the test:

- Fuel - Amount of fuel onboard at the start of the test.
- Personnel - Number of persons onboard and their weights.
- Equipment Weights - Weights and centers of gravity of any equipment carried onboard that is not part of the loading condition outfit.
- Weather and Sea Conditions – Including wind speed and direction; air temperature; water temperature; and wave height and direction.

092-4 [Orig] Minimum Testing On All Boats

092-4.1 [Orig] Watertight integrity testing

092-4.1.1 [Orig] Conduct watertightness test for degree 2 and 3 components in accordance with ISO 12216-D.1.2.

092-4.1.2 [Orig] Conduct watertightness test for degree 1 components via one of the following methods:

092-4.1.2.1 [Orig] After installation by continuous immersion of 1 inch of water for 3 minutes with no leakage. A temporary cofferdam may be used to bound the test area and avoid immersing components not undergoing the test.

092-4.1.2.2 [Orig] A water test conducted in accordance with ISO 12216-D.1.2.2, with the exception that the criteria for a successful test shall consist of no evidence of water on the opposite side of the structure.

092-4.2 [Orig] Propulsion system

092-4.3 [Orig] Propulsion controls

092-4.4 [Orig] Propulsion emergency shutdown system

092-4.5 [Orig] Steering controls

092-4.6 [Orig] Steering system

092-4.7 [Orig] Gauges and alarms

092-4.8 [Orig] Bilge system

092-4.8.1 [Orig] If a sealed bilge is provided, the sealed bilge shall be tested and not leak when subject to three psi for a duration of 10 minutes.

092-4.9 [Orig] Electrical system

092-4.10 [Orig] Starting system

092-4.11 [Orig] Electronic systems

092-4.12 [Orig] Navigation lights

092-4.13 [Orig] Lighting systems

092-4.14 [Orig] Fire suppression system

092-4.14.1 [Orig] The Contractor shall design this test such that the extinguishing agent is not discharged as part of the test.

092-4.15 [Orig] Lifting attachment points and trailer system

092-4.15.1 [Orig] The CB-OTH V lifting attachment points and trailer shall be load/pull tested to the test loads prior to shipment.

092-4.15.1.1 [Orig] Single Point Lift Attachment Points – The test load for the single point lift attachment points is the combined weight of 15,390 lbs.

092-4.15.1.2 [Orig] Dual Point Lift Attachment Points – The test load for the dual point lift attachment points is the combined weight of 15,390 lbs.

092-4.15.1.3 [Orig] Trailer to Boat Rigging System – The test load for the trailer to boat rigging system is 150 percent of the trailer weight.

092-4.15.2 [Orig] Calculations shall be included in the test report demonstrating that the test load was distributed proportionally based on the Longitudinal Center of Gravity (LCG) at the specified test load condition.

092-4.15.3 [Orig] If lifting attachment points are individually pull tested, calculations to determine the test load on the attachment points based on the LCG at the specified test load condition shall be provided in the test report, and the attachment points shall be pull tested to its calculated test load.

092-4.15.4 [Orig] The load/pull test shall be conducted in the normal direction of lift. The test load shall be held for not less than 10 minutes.

092-4.15.5 [Orig] A visual inspection shall be made of all lifting components after the test to ensure that there is no evidence of distortion, cracking, or failure. A certification letter shall be generated by the Contractor indicating the lifting points were tested satisfactorily and included in the AT report.

092-4.16 [Orig] All mooring, towing, and anchoring fittings shall be tested by applying an external force of 2550 pounds for 10 minutes, to demonstrate structural adequacy of the equipment and foundation. The test force shall be applied in the weakest direction identified within the normal arc of loading for each fitting and identified in the test procedure. No part of the equipment, fittings, and structure shall take a permanent set, nor shall degradation to any operating or control function occur as a result of the test.

- 092-4.17 [Orig] Demonstrate Start-Up Procedures – The Contractor shall demonstrate and perform start-up procedures while the boat is at the dock before getting underway.
- 092-4.18 [Orig] Endurance Test – The CB-OTH V shall undergo an endurance test at varying speeds at or above the most economical planing speed for one hour (minimum) in the performance weight. During this test the Contractor shall demonstrate that all parts of the propulsion system, as well as all other equipment and systems are in satisfactory operating condition. The Contractor shall conduct inspections to verify that there are no leaks in any piping system. The Contractor shall record readings on all gauges and meters identified in the test plan in 15 minute intervals. This test shall not precede any required engine break-in requirements.
- 092-4.19 [Orig] Speed Trials – The Contractor shall undergo speed trials to demonstrate the CB-OTH V will achieve the full speed requirement as specified in Section 051-2.1. This speed test may be performed in calm conditions, or above, provided that the full speed can be attained. OEM required break in periods shall be conducted prior to speed tests. The speed tests will be comprised of two runs, in opposite directions over a one nautical mile course, at a minimum, with the speeds for the two runs averaged.
- 092-4.20 [Orig] Range Verification – The Contractor shall provide verification that the CB-OTH V will achieve the range requirement as specified in Section 051-2.2.
- 092-4.21 [Orig] Ahead Performance Testing – The Contractor shall conduct testing to demonstrate the CB-OTH V meets the requirements in Section 051-4.1 thru 051-4.4.
- 092-4.22 [Orig] Astern Performance Testing – The satisfactory operation shall be tested for a period of one minute or more to meet the requirements in Section 051-4.5.
- 092-4.23 [Orig] Post-Underway Maintenance – The Contractor shall perform post-underway shut-down procedures and checks in accordance with the BIB.
- 092-4.24 [Orig] Scale Weighing - A scale weighing shall be conducted on all boats at the defined Lightship Weight. The Contractor shall include in the scale weighing report the procedure used to determine Lightship Weight.
- 092-4.24.1 [Orig] The weight of any follow-on hull cannot vary from the weight of the current configuration baseline by more than 100 pounds. In the event the weight has increased outside the allowable limits, a Failure and Discrepancy Report shall be prepared. The report shall address the following:
- Reason for unsuccessful performance;
 - Any supplemental information related to the failure;
 - Corrective action; and
 - Impact to schedule.
- Any corrective adjustments to the documented weight shall be made in accordance with CM procedures

092-5 [Orig] Acceptance of the Boat

- 092-5.1 [Orig] At delivery, after the boat has been off loaded and un-packaged, the Government will conduct a post-delivery inspection.
- 092-5.2 [Orig] Post-Delivery Inspection
- 092-5.2.1 [Orig] The USCG will inspect all systems and equipment of the CB-OTH V at the designated USCG facility following transportation to verify its condition.

- 092-5.2.2 [Orig] The USCG will conduct an inventory of all items shipped with the boat not permanently mounted. The inspection shall follow the shipping inventory list provided by the Contractor prior to shipping.
- 092-5.2.3 [Orig] Discrepancies found during the post-delivery inspection shall be corrected by the Contractor prior to acceptance unless otherwise agreed to by the KO.
- 092-5.3 [Orig] Upon successful completion of the post-delivery inspection, the COR will recommend acceptance of the boat to the KO.

096 [Orig] WEIGHT CONTROL, REPORTS, SCALE WEIGHING, AND CENTER OF GRAVITY

096-1 [Orig] General

- 096-1.1 [Orig] The Contractor shall verify the operation of equipment used for scale weighing prior to weighing any component or the boat.

096-2 [Orig] Loading Conditions

- 096-2.1 [Orig] Lightship Weight - Weight of the boat and outfit items without fuel or people. Engine and propulsion system lubricants are at normal operating levels. Lightship weight includes the following outfit items from the CB-OTH V contract, which are required to be carried on board to achieve full mission capability:
- 096-2.1.1 [Orig] Outfit items listed in Table 600-1.
- 096-2.1.2 [Orig] Lift systems which must be carried on board (e.g. lifting slings, shackles, etc.) the CB-OTH V to interface with the parent cutter davit system.
- 096-2.2 [Orig] Performance Weight - Lightship Weight + full fuel + five person crew (coxswain, boat engineer, and three additional crewmembers) seated in their shock mitigating seats +150 lbs. of cargo.
- 096-2.3 [Orig] Full Load Weight - Performance Weight + seven additional passengers seated at their respective positions (Total number of people on board equal 12).
- 096-2.4 [Orig] In determining the loading conditions, crewmember's and passenger's weight shall be 220 pounds per person.

096-3 [Orig] Center of Gravity Report

- 096-3.1 [Orig] The Contractor shall determine the center of gravity (longitudinal, transverse, and vertical) of the CB-OTH V for all load conditions defined in Section 096-2.
- 096-3.2 [Orig] The Contractor shall submit a report detailing the center of gravity at all loading conditions, how the center of gravity was determined, and if it was validated.

096-4 [Orig] Product Weight Report

- 096-4.1 [Orig] The Contractor shall prepare and submit the Product Weight Report (PWR) in accordance with Appendix A. The PWR shall be adjudicated with the actual weight and center of gravity from the Scale Weighing of the first production boat (identified by the KO) and any accepted engineering changes.
- 096-4.1.1 [Orig] The weight report shall be in the Contractor's format.

- 096-4.1.2 [Orig] The coordinate system applied in the weight reports shall be clearly defined and consistent throughout the reports.
- 096-4.1.3 [Orig] The overall breakdown of the weights in the report shall be based on ESWBS and should be maintained. The detailed breakdown, below 3 digit ESWBS level, may be modified to suit the proposed CB-OTH V configuration but it shall follow the ESWBS format.
- 096-4.1.4 [Orig] Weights shall be referenced to the product drawings and system diagrams.
- 096-4.1.5 [Orig] Every component over 5 pounds shall be listed separately. Items such as insulation, paint, deck covering, etc., may be listed as a single entry.
- 096-4.1.6 [Orig] Weight report shall provide the calculated weight and calculated center of gravity location for all defined loading conditions noted in Section 096-2. In addition, the weight report shall include the draft and trim for each loading condition.

097 [Orig] ONE-TIME INSPECTIONS AND TESTS

097-1 [Orig] General

- 097-1.1 [Orig] The Post Construction Inspection and one-time tests shall be conducted once on the first boat of the first delivery order and only repeated on an as needed basis.
- 097-1.2 [Orig] Unless otherwise specified, the one-time tests shall be included in the AT plan. These inspection and test procedures shall be developed and results shall be reported as per AT Reports.
- 097-1.3 [Orig] Notice of cancellation of any inspection or test shall be provided to the USCG at least 48 hours in advance of the scheduled date. Cancelled events shall not be restarted without notifying the USCG at least 72 hours in advance unless otherwise approved by the KO.

097-2 [Orig] Post Construction Inspection (PCI)

- 097-2.1 [Orig] After the completion of construction of the first boat, during AT, the Contractor shall have the boat available to the USCG to conduct a PCI of construction, systems, and equipment, to verify that the contract requirements have been met. The Contractor shall have a representative available to activate systems and to answer questions. The PCI shall not take more than a day. The Contractor shall have the boat on its trailer in an area that is covered from the weather and accessible for the inspection. Any discrepancies identified shall be corrected and may be re-verified by the USCG before acceptance.

097-3 [Orig] Flotation Test

- 097-3.1 [Orig] The Contractor shall develop a Flotation Test Procedure that details the method to be used to physically verify compliance to the flotation requirements of ISO 12217-1, 6.8 and Annex F or submit equivalent hydrostatic analysis calculations in accordance with ISO Annex F.1.
 - 097-3.1.1 [Orig] Intact stability energy and righting arm criteria of ISO 12217-1, 6.3.3 Category B (resistance to waves) that are not generally feasible by physical test shall be verified through hydrostatic analysis calculations.

097-3.1.2 [Orig] Hydrostatic analysis calculations shall be performed with recognized available computer software. Such software includes Orca3D, SHCP, GHS, HECSALV, MULTISURF, and MOSES. Other software will be considered on request provided it is readily available to the USCG for verification purposes. The computer model used for analysis and the analysis calculation results in their native format shall be submitted to the KO.

097-3.2 [Orig] Physical tests shall be performed with appropriate metallic weights; persons shall not be used as weights.

097-3.3 [Orig] The flotation test to demonstrate adequate swamped buoyancy and stability shall be performed using a method given in Annex F of ISO 12217-1:2015.

097-3.4 [Orig] The Contractor shall prepare a Flotation Test Report detailing the test performed and its results.

097-4 [Orig] Drainage Test

097-4.1 [Orig] The Contractor shall develop a Drainage Test Procedure consistent with *ABYC Standard H-4, Cockpit Drainage Systems AP4.2*.

097-4.2 [Orig] Drainage Test – The Contractor shall conduct the drainage test on the CB-OTH V following the procedure.

097-4.3 [Orig] The Contractor shall prepare a Drainage Test Report detailing the test performed and the results. The Drainage Test Report shall include:

- calculated volume of water needed to fill the boat per the test procedure.
- time to drain 50% of the volume of water;
- time to drain 75% of the volume of water; and
- time to drain 90% of the volume of water.

097-5 [Orig] Noise Test

097-5.1 [Orig] Noise Test – The Contractor shall conduct a noise test on the CB-OTH V constructed under this contract prior to shipping. The noise test shall be conducted while underway at the performance weight and tested at idle, most economical planing speed, and full speed.

097-5.2 [Orig] Noise levels shall be measured with noise dosimetry Type II equipment at the five forward facing seating positions at head level while in the seated position. Testing at each location shall be over a minimum of 15 minutes in accordance with MIL-STD-1474E and COMDTINST M5100.47.

097-5.3 [Orig] Ambient noise level for noise tests shall be at least 5 dB below the noise being measured.

097-5.4 [Orig] The Contractor shall prepare a Noise Test Report detailing the test performed and its results.

097-6 [Orig] Trim and List Test

097-6.1 [Orig] Trim and List Test – The Contractor shall conduct a Trim and List Test on the CB-OTH V constructed under this contract prior to shipping to demonstrate that the requirements of Section 079-2, Trim and List Limits, have been met.

- 097-6.2 [Orig] The Contractor shall prepare a Trim and List Test Report detailing the test performed and its results.

098 [Orig] DISPLAY MODEL

098-1 [Orig] General

- 098-1.1 [Orig] The Contractor shall furnish a scale model of the CB-OTH V suitable for display.
- 098-1.2 [Orig] The model shall be built to a scale of 1 inch equals one foot.
- 098-1.3 [Orig] The hull, deck arrangement and all components of the model shall conform accurately to the scaled dimensions of the CB-OTH V and its trailer.
- 098-1.4 [Orig] The model shall be constructed and finished using durable materials that are resistant to humid conditions.
- 098-1.5 [Orig] The model shall be of sufficient detail to accurately reflect the CB-OTH V including, but not limited to, the following:
- 098-1.5.1 [Orig] Realistic colors and finishes.
 - 098-1.5.2 [Orig] A hull which is outfitted to accurately reflect the CB-OTH V including: fendering; waterjets; skegs; spray strakes; seawater intakes; and other components that may be provided on the CB-OTH V such as transom platforms and deck gratings.
 - 098-1.5.3 [Orig] Exterior equipment and furnishings including: operator's console; seating; engine cover; deck lockers; masts; hatches; vents; mooring fittings; tow bitt(s); handrails; non-skid; antennas; lights; outfit including life rings, distress marker lights; lift fittings and boat hooks; and anchor if stowed in a visible location. The single point lifting sling does not need to be modeled.
 - 098-1.5.4 [Orig] The operator's console shall reflect the configuration of the CB-OTH V to include: windscreen; navigation displays; radios and speakers; and primary propulsion controls.
 - 098-1.5.5 [Orig] The model shall include Coast Guard markings, including the "U.S. Coast Guard" and hull number. The KO will specify the hull number in the delivery order.
 - 098-1.5.6 [Orig] The trailer which includes the wheels and tires, bunks, hitch, and tie down points with straps and access ladder.
- 098-1.6 [Orig] The display model shall set on the scaled model of the trailer and be securely mounted to an oak base with a "honey" finish. The base shall be provided with port and starboard brass plaques that identify the model and shall include the "US Coast Guard Over The Horizon-V (CB-OTH V)"; boat length overall and beam; scale of the model; and the prime manufacturers name.
- 098-1.7 [Orig] The model shall be enclosed in a ¼ inch-thick clear safety glass panel case.
- 098-1.8 [Orig] The model shall be packaged and delivered in accordance with Section 083 and 084.

100 [Orig] STRUCTURE

100-1 [Orig] General

- 100-1.1 [Orig] The structure includes the hull bottom, sides, transom, and deck(s) including internal structures (longitudinal stiffeners, keelsons, girders, foundations, transverse frames, bulkheads, etc.) and above deck structures including railings, mast(s) deck lockers, consoles, etc. The structure shall meet requirements as below:
- 100-1.1.1 [Orig] The structure shall be in accordance with ISO Standard 12215 Small Craft – Hull Construction and Scantlings. The hull structure material shall be aluminum. The ISO 12215 design category shall be Category A (“Ocean), and in accordance with Appendix J of ISO 12215-5; “Heavy duty workboats”. Calculations shall be performed by Method 1 or Method 5 of Table 2 (5.2), see also Specification 085-7.1.3. Drop tests (Method 6) shall not be acceptable regardless of the boat size. Note also that in accordance with J.2.2, Table J.3, the adjustment factor “kDYN2” (Table 7 of 8.3) is not applicable.
- 100-1.1.2 [Orig] Cyclical Loading - In addition to meeting ISO 12215, the structure shall be capable of operating 150 hours per year for the minimum 10-year service life at speeds up to 25 knots in seas with SWH of 4.1 feet, without any structural failures such as yielding, buckling, structural cracks, fractures, fatigue cracks, weld cracks, or other types of structural failure.
- 100-1.1.3 [Orig] Notch Impact-The hull bottom structure from the bow to mid-ship shall be structured to handle a notch impact comprising of vertical accelerations of 0.5G combined with longitudinal or transverse accelerations of 0.25G. The boat structure shall sustain loads derived from the notch impact on a concentrated area anywhere on the bottom three feet longitudinally by one foot transversely without exceeding the ISO 12215-1 allowable strength of the hull material.
- 100-1.1.4 [Orig] Note that ISO 12215 comprises 10 parts. Parts 3, 4, 5, and 6 are specifically applicable to a non-sailing aluminum monohull.
- 100-1.1.5 [Orig] The CB-OTH V shall be free of spaces where water from rain or spray can accumulate and be trapped.

100-2 [Orig] Details of Construction

- 100-2.1 [Orig] All construction details shall be in accordance with ISO 12215 standards. Details and practices described in ISO 12215 as “good practice” are mandatory, except where they conflict with the requirements in this Specification.
- 100-2.2 [Orig] Plate inserts shall have corner radii no less than one-tenth the minimum dimension of the insert but need not exceed 12 inches. Inserts may not be terminated on a butt or seam.
- 100-2.3 [Orig] The boat shall be considered a “craft with large deck openings” per ISO 12215-6, 6.2 and the gunwales, upper topsides, and other hull structure above the neutral axis of the hull girder shall be checked for longitudinal strength, especially with regard to buckling (Annex D).
- 100-2.4 [Orig] Where intercostal members are fitted, misalignment shall be limited to one-half the thickness of the web of the intercostal member. Where there are webs of different thickness, the thinner web shall be used to determine the allowable misalignment.

- 100-2.5 [Orig] The structural details shall be designed to maintain continuity and minimize stress concentrations and hard spots. Stiffeners shall not terminate on unstiffened plate and knife edges, and similar details shall be avoided. Abrupt changes in section shall be avoided. Thickness differences between connecting plates, other than doubler or insert plates, of more than 1/8 inch shall be tapered off 4 to 1. The maximum proportions between dimensions within a stiffener shall meet the limits of ISO 12215-5.
- 100-2.6 [Orig] Structure and fittings in way of propulsion and auxiliary machinery shall be arranged to provide clearance for disassembling parts and components without dismantling other machinery, structure, or piping.
- 100-2.7 [Orig] Butts shall not cross seams.
- 100-2.8 [Orig] Attachment of components to structural members shall not reduce the strength of the member unless the member has been specifically sized for such purpose. Brackets, margin plates, doubler plates, inserts, or special framing may be attached to the structure and used for mounting components. Drilling or tapping flanges of structural members shall not be done unless the members were sized with due consideration for such drilling or tapping.
- 100-2.9 [Orig] All exposed plate edges and all exposed corners of structural components shall be dressed, ground, or radiused to prevent personnel injury. All exposed edges and corners shall be rounded to a minimum of 0.03 inch. Sharp edges and corners that present a personnel hazard or potential damage to equipment during usage shall be protected or rounded to a minimum radius of 0.5 inch.

100-3 [Orig] Holes in Structure

- 100-3.1 [Orig] Circular holes may be used either to reduce the weight of the structure or to provide access, provided the required strength and rigidity characteristics are met. Note specifically that ISO 12215-5 restricts the proportions of stiffeners. This section may become applicable to the structure remaining outside of lightening holes if it forms a stiffener to a plate or a stanchion. Where the geometry of the structure precludes the use of a circular opening, other hole shapes may be used, however corners shall be rounded to radii of at least one-fourth of the clear dimension normal to the direction of principal stress.
- 100-3.2 [Orig] Holes shall be spaced so that the distances between edges of adjacent holes shall not be less than 1-1/4 times the diameter or the length of the holes. If adjacent holes are of different lengths, the minimum space between them shall be not less than 1-1/4 times the average of their two lengths.

100-4 [Orig] Limber Holes

- 100-4.1 [Orig] Limber holes shall be provided in longitudinal and transverse members for: bilge drainage; to prevent the accumulation and retention of liquids; and to permit their free flow to drains, scuppers, sumps, and suction pipes. Limber holes in bottom longitudinals shall be located to ensure draining of each bay formed by longitudinals and transverse frames. The number and size of limber holes may be reduced by including the area of scallops and cutouts for shell seams and butts where they are available for drainage.
- 100-4.2 [Orig] Tank design and construction shall prevent the formation of air or gas pockets and provide clear passage for air to escape via vent pipes.

102 [Orig] TIGHTNESS

102-1 [Orig] General

- 102-1.1 [Orig] The hull, decks, watertight bulkheads, and console surfaces shall be watertightness degree 1.
- 102-1.2 [Orig] All penetrations and mounting on the console shall be watertightness degree 1.
- 102-1.3 [Orig] Deck and bulkhead penetrations shall conform to the tightness of the deck or bulkhead on which they are installed. Stuffing tubes, flanged joints, or multi-cable transits shall be provided to maintain the required tightness of the structure where penetrated by non-welded items such as cables, wiring, or tubing.
- 102-1.4 [Orig] Stainless steel recessed threaded pipe plugs using stainless steel threaded inserts shall be installed at the top and bottom of inaccessible voids to allow for air testing and drainage.

103 [Orig] SHELL AND SUPPORTING STRUCTURE

103-1 [Orig] General

- 103-1.1 [Orig] The keel, keelsons, girders, propulsion engine foundations, bottom longitudinals, and side longitudinals shall be continuous through transverse structures. Collars or flat bar inserts shall be fitted around structure passing through watertight and oil-tight bulkheads. Abrupt changes in section shall be avoided.
- 103-1.2 [Orig] Watertight joints shall have continuous welding on both sides.
- 103-1.3 [Orig] Adequate shear area shall be provided on all welds between the webs of longitudinals and their supporting structure in accordance with ISO 12215-5. The webs of the bottom, side, and deck longitudinals shall be connected to the transverse web frames to transfer the shear loads. Clips may be used on either one side or both sides of the web as required.
- 103-1.4 [Orig] Full penetration welds shall be provided for butts and seams of the keel, bottom shell, side shell, working deck, and transom. Welded joints in the keel, keelsons, girders, propulsion engine foundations, and bottom longitudinals shall be full penetration welds at the webs as well as the flanges.
- 103-1.5 [Orig] Butt joints in longitudinals shall be at least 6 inches from transverse frames and 6 inches from plating butts.
- 103-1.6 [Orig] Interference of plating butts and seams with weld traces of structural members that attach to plating shall not be permitted. Butts shall be at least 3 inches, but no more than 12 inches from the molded lines of transverse structure. Seams shall be at least 3 inches from the molded lines of longitudinal structural members.
- 103-1.7 [Orig] Skegs or similar devices that kick up, detach, or otherwise move are allowable if the device is retained on the CB-OTH V and is readily placed back into operating condition with no operator input or action.

114 [Orig] FENDERING SYSTEM

114-1 [Orig] General

- 114-1.1 [Orig] The CB-OTH V shall be provided with a prominent fixed fendering system capable of absorbing impact at any point and at any angle. The fendering system shall protect the CB-OTH V from damage during launch and recovery from the parent cutter and when coming alongside other vessels for boarding, cargo transfer, and other operations. The fendering system shall also protect the CB-OTH V from collisions without structural damage at speeds up to 2 knots.
- 114-1.2 [Orig] The fendering system shall be either inflatable, foam/air hybrid, or foam. If an inflatable system is used, it must be subdivided into a minimum of five chambers, so if a single chamber is compromised the remaining chambers will remain inflated.
- 114-1.3 [Orig] The fendering system shall in no way damage, mar, or otherwise affect the craft being boarded.
- 114-1.4 [Orig] The fendering system shall extend around the complete perimeter of the boat but need not cover the stern.
- 114-1.5 [Orig] The fendering shall be constructed of durable materials which are resistant to puncture, impact, tearing, sunlight degradation, and suitable for stepping on during repeated embarking and disembarking by boat crews.
- 114-1.6 [Orig] The fendering system shall have heavy duty black or dark color rub strake on the outboard side of the fender where it would first come into contact with another object to protect the fender system from abrasions.
- 114-1.7 [Orig] The fendering color shall be International Orange SAE AMS-STD-595 ID # 12197. An alternate fendering color may be approved by the KO if International Orange is not available in the fendering material selected.
- 114-1.8 [Orig] The fendering system shall be attached using:
- Mechanical fasteners connected to foundations or other structure on the hull, or
 - The use of a bolt rope system. Aluminum alloy 6061 or 6063 are acceptable materials for the bolt rope extrusion.
- 114-1.9 [Orig] The mechanical fasteners shall be recessed to prevent damage to the fastener or to a vessel being boarded.
- 114-1.10 [Orig] The use of glue-on-type fendering is not acceptable. Through-hull securing attachments are not acceptable.
- 114-1.11 [Orig] The portion of the hull that comes in contact with the fendering system shall be treated as a faying surface and shall be coated in accordance with Section 631-2, Faying Surface Coating.
- 114-1.12 [Orig] If an inflatable fendering system is provided:
- 114-1.12.1 [Orig] Inflation and deflation valves shall be in accordance with ISO 6185-3 Section 6.4.
- 114-1.12.2 [Orig] The specified nominal pressure for each compartment shall be in accordance with ISO 6185-3 Section 7.6.

- 114-1.12.3 [Orig] One manual inflation pump shall be provided and provisions shall be made for its storage on the boat.
- 114-1.12.4 [Orig] If the fendering system has to be deflated for trailering, all necessary tools, equipment, covers, and instructions necessary to protect the fendering system while in transit shall be provided. The system shall be capable of being re-inflated in less than 30 minutes by a two person crew.
- 114-1.13 [Orig] The fendering system shall be repairable, enabling cosmetic repairs (e.g., painting, labeling, or markings) and minor (less than 1 ½ inch diameter) puncture or scrape (less than ½ inch in depth) repairs.

114-2 [Orig] Removal and Replacement

- 114-2.1 [Orig] The fendering shall be attached in such a manner that in the event of damage, the fendering shall be removable and shall be replaceable by four people with common hand tools in less than eight hours. Adhesives and welding shall not be used to attach the fendering system to the hull.

120 [Orig] STRUCTURAL BULKHEADS

120-1 [Orig] General

- 120-1.1 [Orig] Full penetration welds shall be provided for butts and seams of the bulkheads and tanks. Tee joints at boundary connections of bulkheads and tanks shall have continuous welding on both sides.
- 120-1.2 [Orig] All attachments of bulkhead stiffeners to bulkhead plating, up to the level of the chine and for one-tenth of their length at each end, shall be made by double continuous fillet welds. The nominal leg of the welds shall be 1/16 inch less than the thinner plate attached, but shall not be less than 1/8 inch.
- 120-1.3 [Orig] Where wiring trunks, pipe tunnels, or shaft tubes terminate in transverse watertight bulkheads, the end of such trunks or tunnels shall be sealed watertight.
- 120-1.4 [Orig] Attachments to bulkheads for the purpose of supporting local loads shall not impair the strength or tightness of the bulkhead. Insert and margin plates, additional reinforcing, special framing, or stiffening shall be installed to distribute local stress. Attachments shall be made to the framing and not directly to the bulkhead plating.

131 [Orig] DECKS

131-1 [Orig] General

- 131-1.1 [Orig] Deck shall be reinforced in way of equipment or components placing point loads on the structure, at hatch corners, and any other interruptions of the continuous deck.
- 131-1.2 [Orig] All deck openings shall have well rounded corners and shall be reinforced with an insert plate or coamings. Covers shall be stiffened near the perimeter so the cover does not distort, buckle, or become difficult to seal.
- 131-1.3 [Orig] The deck shall not "oil can" or otherwise flex.
- 131-1.4 [Orig] All fittings on the working deck shall be flush so as to prevent tripping.

- 131-1.5 [Orig] All covers on openings on the periphery of the gunwale, at the transom deck, or at the bow deck that would admit water into the hull interior if not covered shall be watertightness degree 1.
- 131-1.6 [Orig] Removable deck sections shall be provided to allow for removal of the fuel tank and propulsion system. Inspection plates shall be provided for access to fuel lines and all below-deck equipment.

167 [Orig] DOORS AND HATCHES

167-1 [Orig] General

- 167-1.1 [Orig] All hatches on the working deck or on a walking surface, shall be of the flush type, watertightness degree 1, and extend no more than 0.2 inches above the deck.
- 167-1.2 [Orig] All hatches shall
- be designed so that they do not permanently distort under operational conditions;
 - require no greater unlocking force than specified in ASTM F1166-07 Section 11.14.6; and
 - be provided with lifting aids to assist in opening and closing the hatch if the hatch weighs over 30 pounds.
- 167-1.3 [Orig] Primary hatches where routine or emergency access is required shall be watertightness degree 1 and require no tools to open or close.
- 167-1.4 [Orig] Hinged hatches, including hinged flush-mounted deck hatches, shall be arranged so they are held open allowing free access to the space and the hatch locking mechanism shall be in accordance with ASTM F1166-07 Section 11.14.7.
- 167-1.5 [Orig] Removable hatches shall be capable of opening without the use of tools, shall be capable of being securely stowed on board the CB-OTH V while underway, shall be captured by appropriate means so as not to be lost overboard or become missiles, and shall be capable of being immediately reinstalled.
- 167-1.6 [Orig] Engine space shall be fitted a hinged access hatch with a mechanically assisted lift mechanism that shall automatically lock when open and shall be manually unlocked to close.

170 [Orig] MASTS AND ARCHES

170-1 [Orig] General

- 170-1.1 [Orig] A means shall be provided to fly a National Ensign and a U.S. Coast Guard Ensign. The ensigns shall not interfere with any electronics or lights.
- 170-1.2 [Orig] Fittings and foundations shall be constructed to prevent tearing of ensigns or their rigging.
- 170-1.3 [Orig] Mast shall be arranged to minimize contact with other vessels when coming alongside, while conducting boarding's, and during launch and recovery operations.
- 170-1.4 [Orig] Fittings and equipment shall be accessible for maintenance in accordance with ASTM F1166-07.

- 170-1.5 [Orig] Masts and arches shall be watertightness degree 3 and provide means of free drainage.
- 170-1.6 [Orig] Masts and arches shall be un-stayed. The mast shall not be susceptible to excitation from synchronous boat motions, propeller frequency, and wind induced excitation.
- 170-1.7 [Orig] Masts and arches may be hinged to comply with Section 070-2.5. If hinged:
- shall be securable in both the raised and lowered position.
 - shall have a locking mechanisms that does not require any tools to activate.
 - shall take no more than two crewmembers with their feet on the deck to safely raise and lower when the boat is underway at idle speeds.
 - shall not interfere with the coxswain's visibility or restrict control of the boat in either the up or down position.
- 170-1.8 [Orig] The CB-OTH V shall be able to operate with the masts and arches in the lowered position.

180 [Orig] FOUNDATIONS AND BRACKETS

180-1 [Orig] General

- 180-1.1 [Orig] Strength and rigidity of foundations shall be suitable to withstand all the design loads and distribute such loads into the structure.
- 180-1.2 [Orig] Foundations shall be designed to minimize the effects of fatigue throughout the service life of the boat.
- 180-1.3 [Orig] Foundations shall contain no pockets which can retain liquids.
- 180-1.4 [Orig] Foundations shall be arranged to provide sufficient clearance for servicing equipment without dismantling other components.
- 180-1.5 [Orig] All foundations shall be designed and constructed so that positive and accurate alignment of equipment and components are maintained.

191 [Orig] FLOTATION MATERIAL INSTALLATION

191-1 [Orig] General

- 191-1.1 [Orig] Flotation material shall be placed as sheets or blocks to meet the requirements of ISO 12217-1 paragraph 6.8 and Level Flotation Tests in Annex F. Any additional flotation material shall be placed in voids or in other spaces in the boat where it is not exposed to weather or damage.
- 191-1.2 [Orig] All flotation foam shall be removable and replaceable without damage.
- 191-1.3 [Orig] The foam shall be retained firmly in place by mechanical means such as retaining bars or flexible straps that can be removed with common, non-powered hand tools, by other fasteners, by releasing buckles, or by securing a protective cover required by Section 191-1.1. Wedging the foam into the structure as the sole means of retention, or use of adhesives or adhesive tape is not permitted. Fasteners engaging the foam shall be installed in suitable reinforcement or other means to ensure that the fastener does not

cause the foam to deteriorate. If the flotation installation creates a faying surface, refer to Section 631-2.

- 191-1.4 [Orig] If voids contain flotation elements, they shall be provided with openings sufficiently large and placed such as to allow removal and reinstallation of any foam flotation elements with the pieces intact.
- 191-1.5 [Orig] The USCG reserves the right to have the Contractor demonstrate removal and replacement of any flotation and to visually inspect all voids to verify compliance with this Specification.

200 [Orig] PROPULSION PLANT

200-1 [Orig] General Requirements

- 200-1.1 [Orig] The CB-OTH V shall be powered by marine diesel engine(s) and waterjet propulsor(s) with reverse reduction gear(s).
- 200-1.2 [Orig] The power, torque, and RPM of the engine and propulsion unit shall not exceed those specified by the OEM for the intended service. The Contractor shall obtain and provide certification letters from the OEM, verifying the equipment installed on the CB-OTH V is in compliance with all OEM requirements. Compliance should address at a minimum:
- diesel engine(s);
 - engine compartment ventilation and air supply;
 - diesel fuel system;
 - cooling system;
 - exhaust system;
 - propulsion controls and monitoring system; and
 - torsional vibration.
- 200-1.3 [Orig] The propulsion engine model shall be a current production model that has been operated in commercial marine, naval service, or US Government marine service for at least two years with at least 500 operating hours at a rating equal to, or in excess, of that being offered.
- 200-1.4 [Orig] The propulsion system shall be capable of operating continuously, or when towing another vessel for 8 hours, at speeds of 5 knots or less without any adverse effect on the engine performance or warranty.
- 200-1.5 [Orig] The marine diesel engine shall be capable of operating continuously without adverse effects on engine performance and warranty using the following fuels: JP-5 (NATO symbol F-44) per MIL-DTL-5624(series), and Fuel, Naval Distillate (NATO symbol F-76) per MIL-DTL-16884(series). The use of additives with JP-5 is acceptable as long as the instruction for its use is detailed in the OEM technical data as delivered in accordance with Section 086-2, OEM Technical Manuals.
- 200-1.6 [Orig] The CB-OTH V shall be equipped with an emergency engine/propulsion cut-off device in accordance with ABYC A-33. The device shall be mechanical employing a physical lanyard that shall be connected to the coxswain and will automatically shut down the engine in the event that the coxswain ejected from the boat. The cut-off device shall be located such that the associated lanyard is not easily caught or entangled in the

helm or other objects on the console when properly attached to the bottom of the coxswain's lifejacket.

- 200-1.7 [Orig] The propulsion system shall be equipped with a remote manual fuel shut off device at the coxswain's position.
- 200-1.8 [Orig] With the boat either stored in the cutter's stern notch at a 15 degree bow up attitude or stored in a cradle on the cutter, the engine(s) shall have the capability to run at idle speed without raw water for a minimum of 5 minutes without damage to the raw water cooling system, exhaust system, or engine to permit engine start up prior to launch.
- 200-1.9 [Orig] The CB-OTH V shall not have propulsion parts below the keel of the boat when operated in the ahead direction.
- 200-1.10 [Orig] The CB-OTH V propulsion system components including the engine(s), drive train(s), and waterjet(s) shall be designed such that any component may be removed and replaced within 8 hours.
- 200-1.11 [Orig] The propulsion system shall be fitted with a block heater to maintain minimum engine starting temperature with an outside temperature of -20 degrees Fahrenheit while stored in its onboard cradle and connected to the parent cutter's 120 Volt AC shore power system.
- 200-1.12 [Orig] The following propulsion system's engine to reverse/reduction gear shaft information shall be provided:
- Outside Diameter;
 - Inside Diameter;
 - Material Type (e.g. 1026DOM [Drawn Over Mandrel]);
 - Modulus of Elasticity; and
 - Poisson's Ratio

233 [Orig] PROPULSION DIESEL ENGINES

233-1 [Orig] Emissions

- 233-1.1 [Orig] The marine diesel engine(s) shall be certified by the OEM that they comply with the exhaust emission regulations of *40 CFR Part 1042, Control of Emissions from New and In-Use Marine Compression-Ignition Engines and Vessels* for marine commercial engine.
- 233-1.2 [Orig] No request for a national security exemption will be endorsed and no pre-existing exemption will be accepted by the agency as a substitute for compliance with the requirements of *40 CFR Part 1042*.

233-2 [Orig] Fast Lube Oil Change System (FLOCS)

- 233-2.1 [Orig] The CB-OTH V shall come equipped with FLOCS connections. The system shall consist of required piping, hoses, and fittings that can be connected to a pump (not mounted on the boat) for removal of lube oil from the marine diesel engine(s), the waterjet(s) (if so lubricated), and the reverse/reduction gear(s).
- 233-2.2 [Orig] The FLOCS connections shall consist of a flexible suction hose connected to the lube oil sump drain connection(s) and a 3/4-inch male quick disconnect, positive shut-off coupling on the other end of the hose.

- 233-2.3 [Orig] The FLOCS suction hoses shall be of sufficient length for the quick disconnect, positive shut-off coupling to extend above the engine compartment cover, and to an area accessible for its use.
- 233-2.4 [Orig] Fittings shall be compatible with a FLOCS 15 Oil Evacuation Unit, Aeroquip Part No. FF9315-01, and NSN 4930-01-191-6166.
- 233-2.5 [Orig] All piping and hoses shall be constructed and arranged in accordance with Section 505, Piping, Hose, and Valve Requirements.

241 [ORIG] WATERJET AND MARINE REVERSE/REDUCTION GEAR

241-1 [Orig] Marine Reverse/Reduction Gear

- 241-1.1 [Orig] The craft shall have marine reverse/reduction gear(s) for operating the engine(s) with the waterjet(s) disengaged and for reversing to back flush the waterjet(s). Gear oil shall be cooled by heat exchanger with engine cooling seawater.

241-2 [Orig] Waterjets

- 241-2.1 [Orig] Waterjet impellers shall not cavitate so as to overspeed or damage the impeller in any operational condition including towing conditions. Voluntary operator RPM limits to preclude cavitation are only allowable in towing condition. If engine RPM must be voluntarily limited by the operator to control cavitation in towing conditions, limits shall be posted to be visible at the helm station.
- 241-2.2 [Orig] Proposed waterjets shall be provided with integral thrust reversing capabilities. The full range of steering shall be available when going astern.

241-3 [Orig] Steering

- 241-3.1 [Orig] The steering system shall meet the installation requirements of the propulsion system manufacturers.
- 241-3.2 [Orig] When a manual hydraulic system is installed, it shall be in accordance with *ABYC Standard P-23, Mechanical Steering and Propulsion Controls for Jet Boats*.
- 241-3.3 [Orig] When an electric/electronic steering system is installed, it shall be in accordance with *ABYC Standard P-27, Electric/Electronic Steering Control Systems*.

252 [Orig] PROPULSION CONTROL AND MONITORING SYSTEMS

252-1 [Orig] General

- 252-1.1 [Orig] The Contractor shall provide and install a propulsion control and monitoring system operable from the helm console which has provisions for starting, stopping, monitoring and controlling the engine(s), reverse/reduction gear(s), and waterjet(s).
 - 252-1.1.1 [Orig] If mechanical control systems are installed, they shall be in accordance with *ABYC Standard P-23, Mechanical Steering and Propulsion Controls for Jet Boats*.
 - 252-1.1.2 [Orig] If electric/electronic control systems are installed, they shall be in accordance with *ABYC Standard P-24, Electric / Electronic Propulsion Control Systems*.
- 252-1.2 [Orig] Controls shall be rated for commercial use.

- 252-1.3 [Orig] The control system shall consist of an independent helm, bucket and throttle control.
- 252-1.4 [Orig] At low (off-plane) speeds, the control system shall provide a separate mode, which can be enabled by the coxswain, which requires no more than two interfaces. A single control interface combining helm, throttle, and bucket (such as a joystick) is acceptable to meet this requirement.

252-2 [Orig] Instruments and Alarms

- 252-2.1 [Orig] The Contractor shall provide and install the following engine gauges and alarms indicated below, viewable and reachable by the coxswain, in accordance with Section 410-2 and Table 410-1. An OEM engine panel(s) meeting these requirements may be provided in lieu of separate gauges.
- Engine RPM;
 - Jacket Water Temperature;
 - High Jacket Water Temperature Visual Indicator with Alarm Tone;
 - Engine Lube Oil Pressure;
 - Engine Low Lube Oil Pressure Visual Indicator with Alarm Tone;
 - Voltmeter;
 - Low Voltage/Alternator Output Visual Indicator with Alarm Tone;
 - Engine Hour Meter;
 - Raw Water Flow (Note: An indicator shall be provided to indicate loss of exhaust system cooling water supply.);
 - Reverse/Reduction Gear Lube Oil Pressure;
 - Reverse/Reduction Gear Low Lube Oil Pressure Visual Indicator with Alarm Tone
 - Reverse/Reduction Gear Lube Oil Temperature; and
 - Reverse/Reduction Gear High Lube Oil Temperature Visual Indicator with Alarm Tone.
- 252-2.2 [Orig] Each individual alarm tone shall have the capability to be silenced while the condition is being investigated but the visual indicator shall remain illuminated until the condition is returned to its normal operating condition.

256 [Orig] RAW WATER COOLING SYSTEM

256-1 [Orig] General

- 256-1.1 [Orig] The raw water cooling system shall be installed in accordance with the engine OEM recommendations and allow operation in the environmental conditions stated in Section 051-3.
- 256-1.2 [Orig] The thru-hull raw water intake shall have fittings and a seachest valve in accordance with Section 505.
- 256-1.3 [Orig] The raw water intake system shall have a duplex raw water strainer installed between the thru-hull/seachest valve and the raw water pump. The strainer location shall allow direct access and room for maintenance without removing other components.

256-1.4 [A00001] The raw water system shall be capable of delivering raw water to the engine cooling system through a garden hose connection with the boat either stored in the cutter's stern notch at a 15-degree bow up attitude or stored in a cradle on the cutter.

259 [Orig] EXHAUST SYSTEMS

259-1 [Orig] General

- 259-1.1 [Orig] The engine exhaust system shall be in accordance with the engine OEM recommendations and with *ABYC Standard P-1, Installation of Exhaust Systems for Propulsion and Auxiliary Engines*.
- 259-1.2 [Orig] The CB-OTH V shall have a raw water cooled exhaust system. The diesel engine exhaust system shall be capable of running "dry" for 5 minutes prior to launching without failure with the boat either stored in the cutter's stern notch at a 15-degree bow up attitude or stored in a cradle on the cutter.

261 [Orig] FUEL SYSTEM

261-1 [Orig] General Requirements

- 261-1.1 [Orig] The fuel system shall be installed in accordance with the engine OEM recommendations and with *ABYC Standard H-33, Diesel Fuel Systems*.
- 261-1.2 [Orig] The diesel fuel tank shall be non-integral and constructed of aluminum and labeled in accordance with 33 CFR 183.514.
- 261-1.3 [Orig] If the fuel system requires more than one tank, each tank shall have a fuel fill, supply, return, and siphon connection. The fuel system shall be capable of supplying fuel from either tank and returning fuel to either tank. The tanks shall also have a crossover connection with a valve to isolate the tanks.
- 261-1.4 [Orig] The fuel supply shall have a fire safe shut-off ball valve mounted on the tank penetration. The fire safe shut-off valve shall be remotely operated to the shut position from the coxswain's position without opening a hatch.
- 261-1.5 [Orig] The fuel return line from the diesel engine to the supply tank shall be fitted with a check valve or arranged to prevent siphoning. There shall not be any open/close valves in the fuel return lines.
- 261-1.6 [Orig] The fuel supply system shall include:
- An engine mounted fuel oil filter provided by the OEM.
 - A secondary filter/strainer with water separator capabilities and with replaceable filter element. The secondary filter/strainer shall be installed where the filter/strainer and its cutoff valves are easily accessible for use and maintenance.
 - The secondary filter/strainer shall have fuel cutoff valves installed as close as possible on inlet and exit sides of the filter/strainer for isolate.
- 261-1.7 [Orig] The fuel tank shall be able to be filled to capacity, vented without spillage, and have the fuel level report accurate fuel levels with the boat either stored in the cutter's stern notch at a 15-degree bow up attitude or stored in a cradle on the cutter.
- 261-1.8 [Orig] The fuel tank shall have a specific siphon connection used to empty the tank without dumping the contents into the boat. This connection shall be accessible and usable without removing the tank or any other equipment.

- 261-1.9 [Orig] All tank connections shall be labeled to indicate their function.
- 261-1.10 [Orig] All tank connections shall be accessible for maintenance.
- 261-1.11 [Orig] The fuel system shall have the capability to be mechanically or electrically primed without the engine running.
- 261-1.12 [Orig] Fuel fill fitting shall be mounted to support fueling operations from both inside the boat (moored to a dock) and outside the boat (trailerred or cradled).

300 [Orig] ELECTRICAL POWER GENERATION AND DISTRIBUTION SYSTEM

300-1 [Orig] General Requirements

- 300-1.1 [Orig] The design, construction, and installation of all electrical systems and components shall be suitable in all respects for marine service and the intended application in accordance with *ABYC Standard E-11, AC and DC Electrical Systems on Boats*, unless otherwise specified herein. Additionally, the electrical system design and arrangement shall provide the following performance capabilities:
 - 300-1.1.1 [Orig] Boat electrical components and subcomponents shall be suitable for a marine environment and isolated from the marine environment. All electrical components shall resist corrosion, maximize longevity, and have sufficient ruggedness to withstand the rigors of use in the operating environment.
 - 300-1.1.2 [Orig] All connections not inside a watertight enclosure shall use IP 67 connectors.
 - 300-1.1.3 [Orig] All electrical enclosures and electrical enclosures' penetrations shall be rated IP 67 or better.
 - 300-1.1.4 [Orig] All enclosure penetrations shall provide watertight cable strain relief and be on the bottom of the enclosure.
 - 300-1.1.5 [Orig] All electrical cables which penetrate any watertight envelope or bulkhead on the boat shall be contained in a watertight system.
 - 300-1.1.6 [Orig] Any cable or wire used on CB-OTH V that is exposed to the elements or is not inside watertight enclosures shall be IP 67. Low smoke watertight cabling meeting the requirements of *ABYC Standard E-11* is acceptable.
- 300-1.2 [Orig] Electrical equipment bonding and personnel safety grounding shall be in accordance with *MIL-STD-1310(series)*.
- 300-1.3 [Orig] The electrical equipment shall be able to operate simultaneously with electronics equipment without causing interference to any electronic equipment.
- 300-1.4 [Orig] The CB-OTH V shall have an additional 10 percent of available power above design load on the DC power system.

300-2 [Orig] AC Power System

- 300-2.1 [Orig] A 120 Volt AC single phase, three wire, polarized, grounded neutral system, 60 hertz electrical power distribution system shall be installed on the CB-OTH V.
- 300-2.2 [Orig] The CB-OTH V shall be able to receive electrical power from the parent cutter or from shore to maintain battery charge and provide power to the engine block heater.

- 300-2.3 [Orig] The Contractor shall install a high-frequency switch-mode (HFSM) transformer. The transformer shall be wired in accordance with *ABYC E-11, Section 11.17.9 and Diagram 11*.
- 300-2.4 [Orig] The Contractor shall install a secure grounding (green) conductor, and a fail-safe galvanic isolator installed in accordance with *ABYC Standard A-28, Galvanic Isolators and ABYC Standard E-11, AC and DC Electrical Systems on Boats, Diagram 11*.
- 300-2.5 [Orig] The CB-OTH V 120 Volt AC system shall be designed and constructed to maintain the boat at an equal potential plane with the parent cutter's hull at all times while stowed on the cutter and receiving cutter-supplied ungrounded 120 Volt AC electrical power. Method used to maintain equal potential plane shall also provide protection from galvanic corrosion.
- 300-2.6 [Orig] The 120 Volt AC electrical power distribution system shall not use the CB-OTH V hull, structure, or engine block to complete any circuit.
- 300-2.7 [Orig] The CB-OTH V shall have a 120 Volt AC power distribution system that will supply all 120 Volt AC loads while the boat is stowed either on the parent cutter or on its trailer.

300-3 [Orig] DC Power System

- 300-3.1 [Orig] A 12 Volt DC two wire electrical power generation and distribution system shall be provided for propulsion engine starting and 12 Volt DC power distribution. The 12 Volt DC power system shall be polarized and the negative side grounded per *ABYC Standard E-11, AC and DC Electrical Systems on Boats, Para 11.5.2*. The 12 Volt DC system shall include the electric generating source, storage batteries, distribution panels, associated cabling, and equipment.
- 300-3.2 [Orig] The CB-OTH V shall have a 12 Volt DC power distribution system that will supply all underway 12 Volt DC electrical loads.
- 300-3.3 [Orig] The 12 Volt DC electrical power distribution system shall not use the CB-OTH V hull, structure, or engine block to complete any circuit.

301 [Orig] WIRING AND ELECTRIC CABLE

301-1 [Orig] General

- 301-1.1 [Orig] Unless otherwise specified, all Contractor furnished electrical cable shall be in accordance with *ABYC Standard E-11, AC and DC Electrical Systems on Boats, Para 11.14*.
- 301-1.2 [Orig] Conductors shall be continuous without splices between terminal connections.
- 301-1.3 [Orig] Wire runs shall be accessible for periodic maintenance and troubleshooting without removing components or equipment.

301-2 [Orig] Cable Installation and Wiring Methods

- 301-2.1 [Orig] Unless otherwise specified, all electrical cable shall be in accordance with *ABYC Standard E-11, AC and DC Electrical Systems on Boats, Para 11.14.4*. Additionally, the cable and wire installations shall conform with the following:
- 301-2.1.1 [Orig] Cable bending radius shall conform to *IEEE: Standard 45 Recommended Practice for Electrical Installation on Shipboard, Section 25.6*.

- 301-2.1.2 [Orig] Cable conductors within equipment or enclosures shall have sufficient length to facilitate tracing, troubleshooting, and opening and closing of hinged doors to prevent conductor damage. Surplus wire length shall be provided to relieve all tension and vibration, to allow for disconnection and servicing, and to permit multiple wires to be fanned at terminal studs.
- 301-2.1.3 [Orig] Battery cable connections shall be of the hex nut, lock washer type. Wing nuts shall not be used.
- 301-2.1.4 [Orig] All cabling shall be tinned boat cable in accordance with *IEEE: Standard 45 Recommended Practice for Electrical Installation on Shipboard*.
- 301-2.2 [Orig] Electrical cables and conductors shall be secured by: stainless steel supports, stainless steel banding with chafing protection (p-clamps), or nylon tie wraps.

302 [Orig] ELECTRICAL DESIGNATION AND MARKING

302-1 [Orig] General

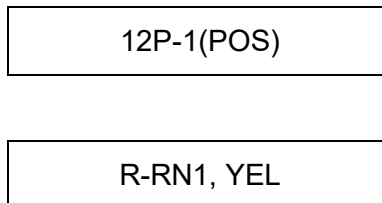
- 302-1.1 [Orig] All switches, electrical controls, components, and receptacles in the electrical system shall be marked to identify its function in the electrical system.
 - 302-1.1.1 [Orig] All switches shall be marked with a placard that describes the function of the switch. Electrical switches shall be provided with backlighting that is dimmable from one master dimmer control.
 - 302-1.1.2 [Orig] All receptacles shall be labeled with the maximum load rating and the voltage.
 - 302-1.1.3 [Orig] All circuits shall be identified on the circuit breaker panel with the name of the circuit, breaker size, equipment served, and an alpha-numeric designation, including voltage, as shown in Figure 302-1.

Figure 302-1 [Orig] - Typical Circuit Breaker Label



- 302-1.2 [Orig] All conductors, with the exception of color coded OEM supplied wire harnesses, shall be labeled at their termination points using the system designation prefix identified in *IEEE: Standard 45, Recommended Practice for Electrical Installation on Shipboard, Annex B, Circuit Designation*.
- 302-1.3 [Orig] Individual conductors shall be labeled on both ends with heat shrink white sleeves with mechanically applied markings, Figure 302-2.

Figure 302-2 [Orig] - Typical Conductor Labels



310 [Orig] DC ELECTRIC GENERATING SOURCES

310-1 [Orig] General

- 310-1.1 [Orig] The CB-OTH V shall be provided with a marine grade, engine-driven 12 Volt alternator to supply power for charging the batteries and supply the 12 VDC electrical distribution system.
- 310-1.2 [Orig] The alternator shall be sized to supply power to the boat's DC system sufficient to power all 12 VDC electrical loads and charge the batteries under the worst case condition as determined by the EPLA, with an additional 10 percent margin. The alternator shall be able to provide this amount of power over the entire operating speed range of the engine, including idle.
- 310-1.3 [Orig] At maximum engine speed, the alternator speed shall not exceed OEM specifications.

313 [Orig] BATTERIES AND BATTERY CHARGING

313-1 [Orig] General

- 313-1.1 [Orig] The CB-OTH V shall have two separate 12 Volt DC battery banks, a house battery bank and an engine starting battery bank. The starting battery bank is intended to be used for engine starting only, but may be used for other loads in an emergency. The house battery bank is intended to be used for all other electric loads on the boat, but may be used for engine starting.
- 313-1.2 [Orig] A battery parallel switch shall be provided to connect both battery banks for emergency power or emergency engine starting.
- 313-1.3 [Orig] Disconnect switches shall be provided to isolate each battery bank. Switches shall be rated and installed in accordance with *ABYC Standard E-11, AC and DC Electrical Systems on Boats, Para 11.6.1.2*. Switches shall be activated from outside the machinery spaces and spaces containing the batteries.
- 313-1.4 [Orig] The battery disconnects and parallel switches shall be configured to allow the engine to be started from any of the following sources: (1) the starting battery alone (normal), (2) the house battery alone (emergency), or (3) both batteries in parallel.
- 313-1.5 [Orig] The charging system shall be designed so that, under normal operation, both battery banks will be charged, but they will be isolated from each other and will not share loads.
- 313-1.6 [Orig] The battery parallel switch and the battery disconnect switches shall have protection over their connection terminals and cable terminal ends to prevent accidental contact.

313-2 [Orig] Batteries

- 313-2.1 [Orig] Each battery shall be an Absorption Glass Mat (AGM) cell type, the same size and rating. Size and rating shall be the higher of those in Section 313-2.3 or 313-2.4.
- 313-2.2 [Orig] Batteries shall be installed in accordance with *ABYC Standard E-10, Stowage Batteries*. Batteries shall be designed for marine use and shall be of the marine deep cycle type (starting and deep-cycle use).
- 313-2.3 [Orig] The engine starting battery bank shall be sized as follows:

- 313-2.3.1 [Orig] The engine starting battery bank capacity shall meet minimum engine OEM cold cranking specifications for the environmental conditions listed in Section 051.
- 313-2.3.2 [Orig] The engine starting battery bank shall have sufficient capacity to start the engine six times without recharging.
- 313-2.4 [Orig] The house battery bank shall be sized to provide all the DC electrical loads on the boat, except engine starting, while keeping the battery bank at full charge while underway.
- 313-2.5 [Orig] In the event of an electrical power generation system failure, the starting and house battery banks parallel shall have sufficient capacity to provide power to the loads shown in Table 313-1, at the listed usage factors, for a period of two hours. Load values for the individual loads shall be based on the EPLA.

Table 313-1 [Orig] - Emergency Power Requirements

Item	Usage
Tactical VHF/UHF Radio (Table 441-1)	20% transmit 80% receive
HF/ALE Radio (Table 441-3)	20% transmit 80% receive
Navigation Lights (332-3)	100%
All Bilge Pumps (529)	100%
Heading Sensor (424)	100%
GNSS Receiver (424)	100%
Depth Sounder (423)	100%
Automatic Identification System (444)	100%
Multi-Function Display (423)	100%
Propulsion System at Idle (233)	100%
Propulsion Control System (252)	100%

313-3 [Orig] Battery Charger

- 313-3.1 [Orig] A self-regulating battery charger receiving power from the 120 Volt AC distribution system shall be provided to charge the battery banks and supply 12 VDC loads when the boat is connected to cutter/shore power.
- 313-3.2 [Orig] The battery charger shall be installed in accordance with *ABYC Standard A-31, Battery Charger and Inverters*.
- 313-3.3 [Orig] The battery charger shall be sized to recharge all CB-OTH V batteries from a fully discharged state in 12 hours or less.

320 [Orig] ELECTRIC POWER DISTRIBUTION SYSTEM

320-1 [Orig] Electrical Distribution Panels

- 320-1.1 [Orig] Electrical distribution panels shall be provided for distribution of power to loads and located inside the console or interior of the boat. The breaker panel degree of enclosure shall suit the environment in which it is installed (IP 67 minimum).
- 320-1.2 [Orig] Each electrical load shall have a dedicated circuit breaker except electrical outlets and lighting.
- 320-1.3 [Orig] All line side connections to circuit breakers shall be made with copper bus (preferred) or daisy chained jumper wire (appropriately sized, common American Wire Gage (AWG) size for all jumpers). All line side connections shall be sized to suit maximum panel load.
- 320-1.4 [Orig] The Contractor shall provide two spare circuit breakers in each DC distribution panel. The spare circuit breakers shall be the size most frequently used within the panel.
- 320-1.5 [Orig] The Contractor shall provide one spare circuit breakers in the AC distribution panel. The spare circuit breakers shall be the size most frequently used within the panel.
- 320-1.6 [Orig] Panels with doors shall have quick-acting opening devices to access breakers. Panels shall be arranged so that when their doors are open water will not enter the panel while the boat is either stored in the cutter's stern notch at a 15-degree bow up attitude or while underway.
- 320-1.7 [Orig] Distribution panels that do not have doors shall be provided with circuit breaker guards to prevent accidental activation or deactivation.

320-2 [Orig] Circuit Breakers

- 320-2.1 [Orig] Circuit breakers for the AC and DC distribution system shall meet the construction, installation, and sizing requirements of *ABYC Standard E-11 AC and DC Electrical Systems on Boats, Para 11.10*.
- 320-2.2 [Orig] The power distribution system shall use circuit breakers. Fuses shall not be used as circuit protection in electrical distribution panels or sub-panels.
- 320-2.3 [Orig] In-line fuses shall only be used when required by the OEM, or when OEM equipment is delivered with in-line fuses. Fuses at the power source may be used as an overcurrent protection for the bilge pump. Each circuit with an in-line fuse shall be identified with its location in the electrical product drawings and the BIB. Equipment shall be tagged identifying the use and location of any in-line fuses.
- 320-2.4 [Orig] All circuit breakers, both AC and DC on the ungrounded (hot) conductors, shall be single pole, single pull to disconnect the electrical connectors. Double-pole breakers are also acceptable, but not required.

320-3 [Orig] Shore Power System

- 320-3.1 [Orig] The CB-OTH V shall have a 120 Volt AC electrical shore power system to receive electrical power from the parent cutter or from shore when the boat is stowed on the parent cutter or its trailer. The system shall be installed in accordance with *ABYC Standard E-11, AC and DC Electrical Systems on Boats, Para 11.6.2.2, Shore Power*.

- 320-3.2 [Orig] The Contractor shall provide a 30 amp, three-wire, 25-foot cord to allow connection (plug-in) to the parent cutters 120 Volt AC shore tie receptacle and to the boat's shore tie connection (plug-in). Onboard storage for this cable is not required.
- 320-3.3 [Orig] The CB-OTH V shall have a visible ground fault indicator that is viewable while connecting the shore power cable to the boat, to indicate if a ground fault exists on shore power.

320-4 [Orig] Portable Equipment Power Outlets

- 320-4.1 [Orig] The console shall be provided with two marine-grade "cigarette lighter" type accessory outlets with watertight covers for use with portable equipment.
- 320-4.2 [Orig] The console shall be provided with one marine grade, fast-charge dual USB charger for use with portable equipment. These USB ports shall not share a data connection with any installed CB-OTH V system.

332 [Orig] LIGHTING AND ILLUMINATION

332-1 [Orig] General

- 332-1.1 [Orig] All illuminated console controls, gauges, displays, and light switches shall be dimmable from 0 percent (no light emittance) to 100 percent for night operations. The lighting colors shall be in accordance with ASTM F1166-07 Section 6.3.

332-2 [Orig] Law Enforcement Light

- 332-2.1 [Orig] The CB-OTH V shall be equipped with one blue flashing law enforcement light. The light shall be marine grade, Light Emitting Diode (LED), and shall be located to provide 360 degree visibility out to a minimum of 2 nautical miles during day or night.
- 332-2.2 [Orig] The law enforcement light shall be shielded or mounted such that it does not illuminate the boat or interfere with crew operation of the boat.
- 332-2.3 [Orig] The law enforcement light shall comply with *Annex V to the USCG Navigation Rules Handbook, Inland Navigation Rules*.

332-3 [Orig] Navigation Lights

- 332-3.1 [Orig] The CB-OTH V shall have navigation LED lights in accordance with the *USCG Navigation Rules and Regulations Handbook; International Rules for Prevention of Collisions at Sea (72 COLREGS) Annex I* and *Inland Navigation Rules Annex I* requirements corresponding with underway operations and anchoring. Lights shall be certified by *ABYC Standard A-16, Electric Navigation Lights*.
- 332-3.2 [Orig] The navigation lights shall be powered by a single circuit breaker and switched using a single toggle switch for the different navigational configurations (e.g., underway or anchor).

332-4 [Orig] Hand Held Search Light

- 332-4.1 [Orig] The CB-OTH V shall have a hand-held search light with the following performance and characteristics:
- 332-4.1.1 [Orig] The hand-held search light shall provide sufficient visible light to operate for at least two hours to see objects at a distance of 300 yards.

- 332-4.1.2 [Orig] The hand-held search light shall be rechargeable using the onboard 12 Volt DC system, with the main auxiliary battery bank disconnect switch in the off position.

332-5 [Orig] Infrared Strobe Light

- 332-5.1 [Orig] The CB-OTH V shall be equipped with an Infrared (IR) strobe light (Hoffman Engineering, CAGE Code 06097, Part No. 728-1027-001 or equivalent) and flash controller (Hoffman Engineering, CAGE Code 06097, Part No. 730-1006-001 or equivalent) controlled from coxswain console. The light shall be located so that it is clearly visible to surrounding surface craft and from above when looking down at the CB-OTH V. Light shall be capable of steady, 80 flashes, and 120 flashes per minute to differentiate assets during Night Vision Goggles (NVG)/Blackout operations.

332-6 [Orig] Flood Lights

- 332-6.1 [Orig] The CB-OTH V shall be equipped with four independently switched LED flood lights that can be adjusted to illuminate the perimeter of the boat port, starboard, forward, and aft.
- 332-6.2 [Orig] The lights shall be IP 65 or better and be bright white in color (approximate color temperature of 6000k).
- 332-6.3 [Orig] The lights shall have an aluminum housing and rated for the CB-OTH V operational environment.

332-7 [Orig] Night Vision Goggle (NVG)

- 332-7.1 [Orig] All CB-OTH V console lights and instrumentation lighting shall be NVG compliant and dimmable to zero.
- 332-7.2 [Orig] If night vision imaging system (NVIS) filter material is used, equipment shall remain fully usable during all operations.

400 [Orig] COMMAND, CONTROL, AND COMMUNICATION

400-1 [Orig] General

- 400-1.1 [Orig] The command, control, and communication systems shall support the operations of the CB-OTH V. System components shall be suitable in all respects for marine service in the intended application in accordance with *Section 300*, cited ABYC standards, and IEEE STD 45; and in accordance to OEMs recommendations unless otherwise specified herein.
- 400-1.2 [Orig] All electronic enclosures shall be rated at a minimum of IP 67.

401 [Orig] RADIO FREQUENCY, TRANSMISSION LINES, AND CABLES

401-1 [Orig] General

- 401-1.1 [Orig] This section sets forth the general requirements for radio frequency, transmission lines, and cabling, and provides requirements for installation. For all other cable types or where this section is silent, electrical/electronic cabling shall meet the requirements of *Section 301, Wiring and Electrical Cable*.
- 401-1.2 [Orig] All cable connectors not inside a watertight enclosure shall be made with IP 67 connectors.

- 401-1.3 [Orig] All cables associated with electronic equipment shall be continuous runs. There shall be no splices. The only exception permitted would be for quick disconnects associated with removable items.

401-2 [Orig] Installation Requirements

- 401-2.1 [Orig] Radio frequency transmission lines shall meet the following installation requirements:
- 401-2.1.1 [Orig] Located to provide protection from mechanical abuse and heat damage.
 - 401-2.1.2 [Orig] Located to avoid physical or electrical interference with equipment, cables, or other radio frequency transmission lines.
 - 401-2.1.3 [Orig] Electrically balanced wherever necessary.
 - 401-2.1.4 [Orig] The entrance of moisture and dirt shall be prevented. Non-solid dielectric lines shall be installed so there are no pockets in which moisture can collect.
 - 401-2.1.5 [Orig] Installed so that the characteristic impedance of each line is not materially changed.
 - 401-2.1.6 [Orig] A loop of excess cable shall be provided to allow removal of the instruments, systems, and displays from consoles for accessing the back of the associated items by turning the items over without disconnecting any conductors.
 - 401-2.1.7 [Orig] Cables shall not be installed in areas where the ambient temperature, plus the center conductor temperature rise, exceeds the maximum temperature rating of the cable.
 - 401-2.1.8 [Orig] Stuffing tubes or multi-cable transits shall be used for passing through decks or bulkheads to maintain their watertight, airtight, fumetight, or light-tight integrity of the structure. Stuffing tubes shall be ASTM F1836M-15 type. Multi-cable transits shall be ABS- or UL-certified.
- 401-2.2 [Orig] Cables forming parts of different electronic circuits shall be routed in separate wire ways whenever possible.
- 401-2.3 [Orig] Cables shall be routed on the inboard side of beams or other supporting structures to provide additional protection.
- 401-2.4 [Orig] Cables shall be located so that the maximum number of circuits will be maintained in service in case of damage to a single area.
- 401-2.5 [Orig] Cables near hydraulic fluid piping shall have drip-proof shields or other barriers installed to protect from leak damage.

401-3 [Orig] Coaxial Cable

- 401-3.1 [Orig] Coaxial cable types selected shall be appropriate for the application. Standard methods shown in IEEE STD 45 shall be used for:
- 401-3.1.1 [Orig] Entry of coaxial cable to accessories, equipment, and wiring boxes.
 - 401-3.1.2 [Orig] Passing coaxial cable through bulkheads.
 - 401-3.1.3 [Orig] Protection of cable against heat, condensation, and mechanical damage.
 - 401-3.1.4 [Orig] Supporting and securing cable to decks and bulkheads.

- 401-3.2 [Orig] Coaxial cables shall be installed so that equipment servicing, equipment deflection, deflection of bulkheads, and maximum movement of expansion joints do not subject the cable to tension or shear damage. Sag between hangers shall be uniform for each row of cables in racks so that the clearance between rows will be the same throughout the cable run. Sag shall be limited to that allowed for electric cable in similar runs. Wherever cables enter stuffing tubes, the angle of approach shall be such as to allow tightening of gland nuts without the necessity of flexing cables.
- 401-3.3 [Orig] Coaxial cable shall enter equipment enclosures in accordance with the following:
- 401-3.3.1 [Orig] Watertightness Degree 1 & 2: Through-stuffing tubes in locations as provided on the equipment and best suited to the disposition of the cable.
- 401-3.3.2 [Orig] Watertightness Degree 3: Through-cable clamps located at the bottom or sides of the enclosure. If top entry is necessary, stuffing tubes shall be used.
- 401-3.4 [Orig] The inside bend radius of coaxial cable shall be greater than 10 times the cable diameter, except when the cable is subject to repeated flexure, in which case the inside bend radius shall be greater than 20 times the cable diameter.
- 401-3.5 [Orig] Terminal boxes, branch boxes, or other forms of standard electric wiring equipment shall not be used to terminate or connect coaxial cable. Coaxial cable shall not be spliced.

402 [Orig] SECURITY REQUIREMENTS

402-1 [Orig] General

- 402-1.1 [Orig] This Section applies to all Contractor-provided equipment containing either software or firmware, to include embedded software and firmware in equipment primarily described by other sections. For instance, the requirements of Section 402 would apply to an electronic engine control system per Section 233, a programmable battery charger per Section 313, a computer actuated steering system per Section 561, and any programmable radios or navigation systems not specifically exempt in other sections.
- 402-1.2 [Orig] Equipment within the HM&E boundary shall not be connected to the navigation and communication boundaries as defined by Section 042-1.
- 402-1.3 [Orig] Outdated or superseded versions of software and firmware shall be removed prior to, or immediately after installation of new versions.
- 402-1.4 [Orig] Prior to acceptance testing, all executable software and firmware, including that which is embedded in equipment, shall be verified to match the OEM's intended version by bitwise comparison, checksum, cryptographic hash, or other method as recommended by the OEM. Non-field programmable devices, and field-programmable devices with analog or discrete signal interfaces, are exempt from these verification requirements.

402-2 [Orig] Access Control

- 402-2.1 [Orig] If equipment has an account management or login function, the Contractor shall:
- Reset the default username/password. Feedback of authenticators shall be obscured.
 - Disable or delete any temporary or test account.
 - Set an idle logout period at five minutes.

- Document all reset, disable, and idle settings in appropriate section of the Boat Information Book.

402-2.2 [Orig] If equipment has an elevated-privilege mode function, the Contractor shall:

- Ensure there is a means to switch between the privilege mode and normal mode. This may be done using either a physical or software method.
- Maintained in the normal mode, unless necessary to switch over to the privilege mode.
- Document all equipment with elevated privilege mode and provide this list in the appropriate section of the Boat Information Book.

402-2.3 [Orig] If equipment has wireless technology, the Contractor shall:

- Disable, either physically or via software, all wireless functions unless otherwise directed by USCG; and
- Document all equipment with disabled wireless functions and provide this list in the appropriate section of the Boat Information Book.

402-2.4 [Orig] Physical Interfaces

402-2.4.1 [Orig] The Contractor shall remove or disable all physical interfaces that are not necessary to satisfy the requirements specified herein.

402-2.4.2 [Orig] Physical interfaces shall be secured within enclosures that are lockable, or require tools to open except where required to facilitate maintenance, commissioning, or as otherwise directed by the USCG.

402-2.4.3 [Orig] Document all removed or disabled physical interfaces in the appropriate section of the Boat Information Book.

402-2.5 [Orig] Logical Interface

402-2.5.1 [Orig] Remove or disable all functions, ports, protocols, and services that are not necessary to satisfy the requirements specified herein.

402-2.5.2 [Orig] Document all disabled functions, ports, protocols, and services in the appropriate section of the Boat Information Book.

402-3 [Orig] Data Logging/Audit

402-3.1 [Orig] The Contractor shall document all equipment that contains the following data logging or audit functions in the appropriate section of the Boat Information Book:

- Capability to record all successful and unsuccessful login attempts.
- Capability to record all activations of privilege mode.
- Capability to record the change of equipment set points or parameters.
- Capability to ensure all data entry or records include date and time of event.
- Capability to provide means to alert when at 95 percent of the storage capacity.
- Capability to overwrite the oldest data first.
- Capability to provide means to transfer data log to external storage device.

402-4 [Orig] External Device Connections

402-4.1 [Orig] The Contractor shall only connect OEM-approved devices to the Contractor-provided equipment with software or firmware.

- 402-4.2 [Orig] The connected device shall be dedicated for that specific equipment/task and shall not be used for any other purpose or connect to any external networks or systems.

402-5 [Orig] Vulnerability and Resolution Report

- 402-5.1 [Orig] The Contractor shall ensure that the Contractor-provided equipment with either software or firmware has been screened against the latest set of vulnerability information such as the National Vulnerability Database and Common Vulnerabilities and Exposures. The Contractor shall address any listed vulnerability and inform the USCG of vulnerability and resolution. The Contractor may use an automated vulnerability scanner/tool. The Contractor shall provide this in a report to the USCG.

403 [Orig] GROUNDING AND BONDING

403-1 [Orig] General

- 403-1.1 [Orig] Grounding, bonding, and shielding of equipment and cables shall meet the requirements of MIL-STD-1310 (series) to ensure safety and electromagnetic compatibility. All Radio Frequency (RF) transmission lines and cables shall be electrically bonded and shall be routed within the CB-OTH V structures to protect against Electromagnetic Interference (EMI). Cables routed topside or in exposed locations shall be shielded in accordance with the requirements of NAVSEA S9407-AB-HBK-010, either by use of shielded cables or by use of single or multi-cable conduit, or both. Type I or II bond straps shall be used where required.

405 [Orig] ANTENNA REQUIREMENTS

405-1 [Orig] General

- 405-1.1 [Orig] Arrangement and mounting of antennas shall be an integrated part of the total design and arrangement. The Contractor shall provide an antenna arrangement that supports satisfactory system performance across all frequencies and meets the EMI reduction requirements as outlined in Section 407.
- 405-1.2 [Orig] Antennas shall be physically separated to reduce electrical interaction and to avoid physical contact due to antenna deflection caused by ice loading, wind, sea conditions, or other adverse conditions.
- 405-1.3 [Orig] Antennas shall be mounted so their failure will not foul other antennas.
- 405-1.4 [Orig] Antenna mounts shall be constructed to support the antenna without failure while subjected to the CB-OTH V operating environment.

407 [Orig] EMI AND RADIO FREQUENCY INTERFERENCE (RFI) REDUCTION

407-1 [Orig] General

- 407-1.1 [Orig] The Contractor shall provide an antenna arrangement that supports satisfactory system performance across all frequencies, and meets the EMI reduction requirements.
- 407-1.2 [Orig] EMI and RFI shall be minimized in accordance with equipment manufacturer's recommendations and shall enable the operation of all electronic equipment simultaneously without disrupting operations. The Contractor shall ensure that effects of EMI do not hinder the overall operational effectiveness of the equipment, boat's systems, or those system components are damaged.

- 407-1.3 [Orig] Radiators and receptors of electromagnetic energy and related electronic systems shall be electromagnetically compatible. Electrical equipment shall be capable of operating simultaneously with electronic equipment without causing EMI and intermodulation interference.
- 407-1.4 [Orig] Boat control, instrumentation, communications and electronics systems shall not respond spuriously to EMI.

410 [Orig] REQUIREMENTS FOR CONTROL STATIONS AND DATA DISPLAY SYSTEMS

410-1 [Orig] General

- 410-1.1 [Orig] The CB-OTH V shall have all controls and gauges in sight of the seated operator, clearly identifiable, accessible, and operable during daytime, nighttime, cold weather operations, and during aggressive boat maneuvers as specified in the Control Criticality Table (Table 410-1).
- 410-1.2 [Orig] The console shall have a scratch-resistant and maintenance-free sheathing/coating to minimize glare from lights and electronics during night operations.
- 410-1.3 [Orig] Displays shall be non-tinted and non-polarized in accordance with MIL-STD 1472, Section 5.2.1.3.12.
- 410-1.4 [Orig] Display alphanumeric characters shall be a minimum of 12-point font (ASTM F1166-07 [2013] Section 15.1.10.8).
- 410-1.5 [Orig] All controls, buttons, knobs, switches, dials, or other manual input devices shall be selected and configured to accommodate their use with winter gloves. ASTM F1166-07, Section 5 Table 3 should be used as guidance. ASTM F1166, Table 11 shall be used to define added accommodations required for use with winter/arctic gloves.
- 410-1.6 [Orig] Displays shall be mounted flush to the console surface in accordance with MIL-STD-1472, Section 5.2.1.1.2, unless approved by the KO.
- 410-1.7 [Orig] Touch screens shall be avoided as much as possible.
 - 410-1.7.1 [Orig] If necessary, touch screens shall be positioned to avoid full arm extension and upward reach in accordance with MIL-STD-1472, Section 5.1.3.1.11.
 - 410-1.7.2 [Orig] Touch screens shall be fully functional when wet. Displays involving touch screen shall have finger rails, or similar support, at a minimum, along the top horizontal and each vertical side of the display to allow for stabilization of the operator's hand while using the thumb to operate specific buttons during CB-OTH V operations.
 - 410-1.7.3 [Orig] A touch screen shall not be the sole input means. Full functionality shall be provided without the use of a touch screen.
- 410-1.8 [Orig] All controls, displays, gauges, and indicator lights shall be selected, designed, and/or configured in accordance with ASTM F1166-07

410-2 [Orig] Location of Controls, Displays, and Equipment

- 410-2.1 [Orig] ASTM F1166-07, Section 6, Section 8, and Specification Section 410-3: Table 410-1 shall be used to identify the efficient location of controls, displays, and equipment.
- 410-2.2 [Orig] Controls, displays, and equipment shall be configured such that they are "viewable" and/or "reachable" in accordance Section 410-3 and Table 410-1.

- 410-2.3 [Orig] Controls and switches shall be located to eliminate the necessity for reaching through the helm (if steering wheel, the spokes of the steering wheel). Headset and microphone console connected wires shall be kept three inches away from the helm and propulsion controls when worn or operated by the coxswain.
- 410-2.4 [Orig] Controls that require adjustment while underway shall be provided with finger rails, or similar support, to allow for stabilization of the operator’s hand while using the thumb to operate specific buttons during CB-OTH V operations.

410-3 [Orig] Anthropometry Requirements

- 410-3.1 [Orig] Reach – Controls located on the console identified on the Control Criticality Table (Table 410-1) as “Viewable and Reachable” or “Reachable” shall be within comfortable reach for the 5th percentile female (28.2 inches, measured from seat back at shoulder height) to 95th percentile male (34.9 inches, measured from seat back at shoulder height) while seated and restrained, in accordance with MIL-STD 1472, Appendix B, Table B-IV.
- 410-3.2 [Orig] The viewing angle of the console shall be a maximum of 45 degrees from normal line of sight in accordance with ASTM F1166-07, Fig 20.
- 410-3.3 [Orig] Controls and displays identified on the Control Criticality Table as “Viewable and Reachable” shall be within 35 degrees left and right of center and 25 degrees above and 35 degrees below the horizontal line of sight for the coxswain and engineer positions.
- 410-3.4 [Orig] Controls and displays identified on the Control Criticality Table (Table 410-1) as “Viewable” shall be within 60 degrees left and right of center and within 50 degrees above and below the horizontal line of sight for the coxswain and engineer in accordance with ASTM F1166-07, Fig. 21.

Table 410-1 [Orig] – Control Criticality Table

	Coxswain	Engineer
Viewable and Reachable	<ul style="list-style-type: none"> • Propulsion Displays / Instruments and Alarms • Tactical VHF Radio • Crew Communications** • Lighting Controls • Loud Hailer • Horn • Siren • SINS 2 Multi-Functional Display 	<ul style="list-style-type: none"> • Tactical VHF Radio • Tactical UHF Radio • HF Radio • SINS 2 Multi-Functional Display • Crew communications** • Infrared Strobe Controls • Loud Hailer
Reachable	<ul style="list-style-type: none"> • Propulsion Controls • EMR Engine/Propulsion Cut-off • Remote Fuel Shut-off 	<ul style="list-style-type: none"> • Lighting Controls • Propulsion Displays/Instruments and Alarms

	Coxswain	Engineer
Viewable	<ul style="list-style-type: none"> • Heading (Remote Information Display) • Shock Monitoring System 	

410-3.5 **Tactile interfaces for push-to-talk (PTT) controls which are clipped to an operator’s gear need not be within the field of visibility of Section 410-3.3.

410-4 [Orig] Helm and Throttle Controls

- 410-4.1 [Orig] Feedback on helm and throttle controls shall have no discernible time lag between activation and indication on display in accordance with MIL-STD 1472, Section 5.1.1.9.
- 410-4.2 [Orig] Helm controls shall be placed within easy reach of the seated and restrained 5th percentile female, fingertip length at 16 inches from seat back, to 95th percentile male, fingertip length at 20.6 inches from seat back, in accordance with MIL-STD 1472, Appendix B, Table B-IV.
- 410-4.3 [Orig] If a steering wheel type helm is used, it shall
 - 410-4.3.1 [Orig] Have a maximum diameter of 16 inches, minimum diameter of 13 inches, maximum rim diameter of 1.125 inches and minimum rim diameter of 0.75 inches. Spokes of the wheel shall have a minimum of 45 degree separation in accordance with MIL-STD 1472, Table IX, and
 - 410-4.3.2 [Orig] Have a range of no greater than five turns, lock-to-lock.

410-5 [Orig] Propulsion Monitoring Gauges/Displays

- 410-5.1 [Orig] The Contractor shall provide and install propulsion monitoring gauges/displays in accordance with Section 252-1.4, Propulsion Control and Monitoring Systems. An OEM engine panel(s) meeting these requirements may be provided in lieu of separate gauges.
- 410-5.2 [Orig] All propulsion monitoring gauges/displays shall be flush mounted.
- 410-5.3 [Orig] All propulsion monitoring gauges/displays shall be provided separate from the navigation multi-function display.

424 [Orig] ELECTRONIC NAVIGATION SYSTEMS

424-1 [Orig] General

- 424-1.1 [A00001] The Contractor shall provide the CB-OTH V with the USCG SINS-2 equipment as listed below:
 - 12 inch Multifunctional Display (MFD) Raymarine Axiom Pro 12 RVX with RealVision 3D, 1kW CHIRP Sonar E70372-00-101);
 - P319 Depth Transducer, 600 Watt 200/50kHz Plastic Thru-hull, (Raymarine E66077);
 - Heading Sensor, (Raymarine EV-1 Heading Sensor E70096);
 - Global Navigation Satellite System (GNSS) Receiver, (Raymarine RS150);
 - i70S remote information display (E70327-S2);
 - Radome 4KW 24” HD, (Raymarine E92143); and

- National Marine Electronics Association (NMEA) 0183 to 2000 Converter (Raymarine A80455);
- 424-1.2 [Orig] The navigation system shall be installed in accordance with IEEE STD 45, Section 27. All of the SINS-2 displays shall be flush mounted in the consoles.
- 424-1.3 [Orig] The depth transducer shall be installed in accordance with the OEM's instructions.

436 [Orig] ELECTRICAL ALARM, SAFETY, AND WARNING SYSTEM

436-1 [Orig] General

- 436-1.1 [Orig] An alarm system shall be installed on the CB-OTH V that encompasses all the bilge, fire and smoke, and propulsion alarm systems. Alarm loudness and frequency shall be designed in accordance with ASTM F1166-07, Section 7 and Table 9. The alarm system shall be installed on the helm console where it is visible at a glance within the full range of head and body movements and accessible for system resets and testing either in a seated position or while standing.
- 436-1.2 [Orig] Warning lights and an audible alarm shall activate simultaneously to draw the crew's attention to the display panel and to identify what type of alarm has occurred and its location.
- 436-1.3 [Orig] Each audible alarm shall have the capability to be silenced while the condition is being investigated but the alarm light shall remain illuminated until the condition is returned to its normal operating condition.
- 436-1.4 [Orig] A means shall be provided to test the warning lights and audible alarm to verify that they are operational.
- 436-1.5 [Orig] Alarm systems (warning lights and controls) shall be consolidated in one alarm panel or grouped on the same section of the console.

436-2 [Orig] Bilge Alarm System

- 436-2.1 [Orig] The CB-OTH V shall have an automatic visual and audible bilge alarm system for each compartment to sense flooding and alert the crew.
- 436-2.2 [Orig] The alarm shall activate when liquid reaches two inches above the bilge pump suction in each compartment.

436-3 [Orig] Smoke and Fire Alarm System

- 436-3.1 [Orig] A fire and smoke alarm system shall be installed in the machinery space.
- 436-3.2 [Orig] Fire alarm sensor shall remain operational even in the presence of engine gases or hydrocarbon gases.

436-4 [Orig] Propulsion Alarm System

- 436-4.1 [Orig] The propulsion system gauges/indicators/alarms are addressed under Section 252-2, Instruments and Alarms.

436-5 [Orig] Shock Monitoring System (SMS)

- 436-5.1 [Orig] The CB-OTH V shall be equipped with a Shock Monitoring System (SMS) that monitors and provides real-time visual indication to the coxswain of accelerations experienced by the boat and coxswain at all times while operating.
- 436-5.2 [Orig] The SMS shall not use wireless technology.
- 436-5.3 [Orig] The SMS shall have six channels that monitor accelerations via two sensors, one installed in the coxswain's shock-mounted seat pan, and the other rigidly mounted within 12 inches of the boat center of gravity.
- 436-5.3.1 [Orig] Accelerations shall be monitored at a minimum of 500 Hz in 3 degrees of freedom in the vertical, transverse, and longitudinal directions, and shall be in terms of magnitude of gravity (g) with a precision of +/- 0.05g.
- 436-5.4 [Orig] The SMS shall have an independent, stand-alone display with the following characteristics:
- 436-5.4.1 [Orig] Display both sensor readings simultaneously, be viewable by the coxswain, and be clearly labeled to distinguish boat motion and seat motion
- 436-5.4.2 [Orig] Have a gradient of three divisions of lights arranged from low to high [green, amber, and red] with at least two increments within each division;
- 436-5.4.3 [Orig] A visual indication that the highest shock on the scale has been exceeded (Limit Exceeded) shall remain lit once activated, until a reset procedure has been followed to reset the indicator. The procedure to reset the indicator shall require the use of tools, a passcode (PIN), or physical key.
- 436-5.4.4 [Orig] A lighted mechanical dial, fixed-mounted LED lights or LCD display.
- 436-5.4.5 [Orig] The acceleration set points of each colored division as well as the shock duration required to light an increment shall be field-programmable and adjustable by the Coast Guard. Colored divisions shall be within a range of 0g - 10g adjustable by increments of 0.5g. Increments within each division shall be equally divided to span the division.
- 436-5.4.6 [Orig] All indicator lights and displays shall be dimmable to zero.
- 436-5.5 [Orig] Initial set-points for both sensors shall be:
- Green: 1 to < 1.5g
 - Green: 1.5g to < 2.0g
 - Amber: 2.0g to < 3.0g
 - Amber: 3.0g to < 3.5g
 - Red: 3.5g to < 5.0g
 - Red: 5.0g to < 5.5g
 - Limit Exceeded Indicator: over 5.5g
- 436-5.6 [Orig] The SMS shall not require the use of additional support equipment to determine if the boat or coxswain experienced a shock event during a mission that registered "Limit Exceeded."
- 436-5.7 [Orig] The Contractor shall provide the capability for SMS system initialization, setting shock divisions and increments, firmware updates, and general system maintenance and diagnostics.

- 436-5.8 [Orig] The SMS shall not require manual charging of batteries, removal of components, or any other maintenance activity beyond software or firmware updates and system initialization to support the functionality described in this section.
- 436-5.9 [Orig] If the system stores acceleration data it shall not be required to delete or otherwise interact with the data for continued system functionality. When storage is full the system will automatically overwrite the oldest data first.
- 436-5.10 [Orig] The system shall at a minimum meet IP 67 requirements including all components, displays, connectors, and connections.

441 [Orig] COMMUNICATION SYSTEMS

441-1 [Orig] General

- 441-1.1 [Orig] The Contractor shall provide and install (in accordance with the OEM's requirements) the following communication systems:
- Tactical VHF/UHF/700/800 Radio System; and
 - High Frequency/Automatic Link Establishment (HF/ALE) Radio.
- 441-1.2 [Orig] Communication systems installation shall be modular with connector terminated cables to the maximum extent practicable to facilitate maintenance and future radio upgrades.
- 441-1.3 [Orig] Communication systems shall operate using 12 VDC.
- 441-1.4 [Orig] Communication systems shall meet the temperature, humidity, vibration, and shock requirements for the CB-OTH V operational environment and conditions.
- 441-1.5 [Orig] The transceivers for the radios shall be mounted for easy access to load frequencies and the code plugs.
- 441-1.6 [Orig] If the communication system requires a separate control head, the control head shall be mounted and shielded from sea spray.
- 441-1.7 [Orig] Each radio system shall perform independently and have a dedicated antenna through which it can transmit and receive. Each radio system, shall not interfere with the other radio systems.
- 441-1.8 [Orig] Each radio shall have a dedicated IP 65 water-resistant speaker that is clearly audible during all operating conditions. Each speaker shall have a cut-off switch to silence the speaker which shall not silence or interfere with the crew communications system. A single switch may be used for all radios.
- 441-1.9 [Orig] Each radio system shall have a dedicated IP 65 water-resistant palm microphone that can be used independent of the crew communications system.
- 441-1.10 [Orig] Vendor provided software must be capable of running on Windows 10 64-bit Operating/System.

441-2 [Orig] Tactical Radio System

- 441-2.1 [Orig] The tactical radio system shall be a marine-grade Land Mobile Radio (LMR) that is able to transmit and receive the following frequency bands:
- VHF band (136 MHz – 174 MHz) voice;
 - UHF band (380 MHz – 520 MHz) voice; and

- 700/800 band (762 MHz – 870 MHz) voice.
- 441-2.2 [Orig] The tactical radio system shall be enabled to operate in 6.25, 12.5, and 25 kHz channel spacing.
- 441-2.3 [Orig] The tactical radio system shall meet all FCC Part 90 requirements for the rated output power in each band. The minimum requirement for each output power shall be:
- VHF band: 1-25 Watts;
 - UHF band: 1-35 Watts; and
 - 700/800 band: 1-30 Watts.
- 441-2.4 [Orig] The tactical radio system shall be able to select the output power by two methods:
- By manually selecting configured Hi/Low power for any channel/frequency in the radio.
 - By programming a channel/frequency for low power or high power default automatically, with capability to change manually.
- 441-2.5 [Orig] The tactical radio system shall be capable of continuously scanning across all bands.
- 441-2.6 [Orig] The tactical radio system's control and display units shall:
- Have options for both front-mounted control units and the capability of connecting a minimum of two remote control units;
 - Have text display with minimum of two display lines, with minimum 12 characters per line;
 - Have both transmitter activation and signal reception indicators;
 - Have backlit front panel screen, capable of being dimmed for night operations; and
 - Have squelch override.
- 441-2.7 [Orig] The tactical radio system shall meet
- Association of Public Safety Communications Officials International (APCO) P25 TIA-102; and
 - TIA-102.CAAA & TIA-102.CAAB vibration and shock requirements.
- 441-2.8 [Orig] The tactical radio system shall be compatible with the National Enterprise Land Mobile Radio Infrastructure, Integrated Wireless Network (IWN), USCG R21 Network Infrastructure, and CBP Network Infrastructure.
- 441-2.9 [Orig] The tactical radio system shall be capable of interfacing with the Boat Crew Communications Systems (BCCS). The tactical radio shall provide constant level receive audio to the BCCS that is not controlled by the volume control, a connection for accepting external key, and be able to accept transmit audio from the BCCS system.
- 441-2.10 [Orig] The tactical radio system's triband antenna system shall:
- Be a marine ground plane independent antenna;
 - Be capable of full transmit and receive coverage across all frequency bands enabled in the radio, 136-174, 380-520 and 762-870 MHz bands; and
 - Have a maximum VSWR < 3:1 at all frequencies enabled in the tactical radio.
- 441-2.11 [Orig] The tactical radio system shall have the following encryption features:

- Enabled to support AES, DES (OFB & CFB) encryption algorithms.
- Enabled for manually loading encryption keys through the use of a P25 key loading mechanism.
- Compatible with Motorola Key Management Facility (KMF) and compliant with the following TIA/EIA-102 Over-The-Air-Rekeying (OTAR) Protocol.
- Have an audible and visual indication that transmissions are in the clear or encrypted mode.

441-2.12 [Orig] The tactical radio system shall have the following programming features:

- Capable of programming individual channel operation in P25 conventional or P-25 trunking mode of operation.
- Capable of programming individual channel operation in P-25 digital operation, to include both multiple and split NAC operation.
- Be user-programmable (ex: scan list) or programming software.
- Capable of programming a minimum of 1000 channels capable of being organized into groups/zones.
- Capable of programming individual analog channel operation, to include both multiple and split CTCSS Tone operation and digital coded squelch (DCS).

441-2.13 [Orig] The Contractor shall furnish all programming hardware, cables, adapters, and special tools needed for testing and alignment.

441-2.14 [Orig] The Contractor shall furnish all hardware, cables, adapters, and special tools required to load keys from a P25 key loading mechanism .

441-3 [Orig] High Frequency/Automatic Link Establishment (HF/ALE) Radio

441-3.1 [Orig] The HF/ALE radio high frequency single sideband (HF-SSB) mobile station that is enabled to transmit and receive 3 MHz – 29.9999 MHz.

441-3.2 [Orig] The HF/ALE radio minimum requirement for each output power shall be 125 Watts for the HF Band.

441-3.3 [Orig] The HF/ALE radio shall be capable of 2G ALE in accordance with MIL-STD-188-141D.

441-3.4 [Orig] The HF/ALE radio shall have a data modem that is capable of meeting MIL-STD-188-110D for full compatibility with 2G ALE systems.

441-3.5 [Orig] The HF/ALE radio's control and display units shall:

- Be able to be controlled and operated at its front panel.
- Have options for both front-mounted control units and the capability of connecting a minimum of two remote control units.
- Have backlit front panel screen, capable of being dimmed for night operations.
- Have squelch override.

441-3.6 [Orig] The HF/ALE radio shall meet the electromagnetic compatibility in accordance with MIL-STD 461E.

441-3.7 [Orig] The HF/ALE radio shall be compatible with Rockwell Collins Data Voice Privacy Module (DVP-200).

- 441-3.8 [Orig] The HF/ALE radio shall be compatible with the National Enterprise Land Mobile Radio Infrastructure, IWN, USCG R21 Network Infrastructure, and CBP Network Infrastructure.
- 441-3.9 [Orig] The HF/ALE radio shall be capable of interfacing with the BCCS. The tactical radio shall provide a connection for accepting external key and be able to accept transmit audio from the BCCS system.
- 441-3.10 [Orig] The HF/ALE radio's antenna system shall be optimized and configured for voice communication to perform within 18 to 100 nautical miles range.
- 441-3.11 [Orig] The HF/ALE radio shall be user-programmable (ex: scan list) or programming software with both ALE addresses and frequencies.
- 441-3.12 [Orig] The Contractor shall furnish all programming hardware, cables, adapters, and special tools needed for testing and alignment.

441-4 [Orig] Data and Voice Privacy Unit

- 441-4.1 [Orig] Within the console enclosure, the Contractor shall provide, at a minimum, the following for the USCG to be able to install a Collins Aerospace DVP-200 data and voice privacy processor:
- Space and weight
 - Height: three inches
 - Width: six and half inches
 - Depth: eight and half inches
 - Weight: 1.76 lbs.
 - Access and maintenance that allows operating and maintaining the DVP-200 electronics without the use of hand tools.
 - Arrangement shall be provided to accommodate a "Y" connection between the HF/ALE radio, crew communication system, and the DVP-200:
 - HF/ALE radio's and crew communication system's plugs are within seven inches of each other.
 - DVP-200 unit's plug is within one foot of both the HF/ALE radio's and crew communication system's plugs.
 - Secure mounting

441-5 [Orig] Crew Communications System

- 441-5.1 [Orig] The CB-OTH V shall be provided with a boat crew communication system. The BCCS may be wired, wireless, or combination of both.
- 441-5.2 [Orig] If wired, the system shall have six connection points. One at each of the five shock mitigating seats and one at the bow.
- 441-5.3 [Orig] If wireless, the system shall:
- 441-5.3.1 [Orig] Support a minimum of five headsets.
- 441-5.3.2 [Orig] Operate in accordance with Advanced Encryption Standard (AES) 256 bit. Wireless crew communication which meets AES does not need to have the wireless function disabled as required in Section 402-3.3.
- 441-5.3.3 [Orig] Be provided with a 120 VAC method of charging all headsets simultaneously. The charger shall not be installed on the boat.

- 441-5.4 [Orig] The BCCS shall provide hearing protection, crew intercom capabilities, communication over all radio voice circuits, and the loud hailer from each station.
- 441-5.5 [Orig] The BCCS shall be operable while wearing cold weather equipment (i.e., fleece-lined neoprene gloves).
- 441-5.6 [Orig] The system shall be capable of transmitting and receiving intelligible voice communications in relative wind speeds up to 50 knots.
- 441-5.7 [Orig] The system shall operate with 12 VDC input.
- 441-5.8 [Orig] The system shall be IP 67.
- 441-5.9 [Orig] The crew communications system headsets shall have a manufacturer-specified noise reduction rating of at least 20 dBA.
- 441-5.10 [Orig] All headsets shall have access to internal crew intercom via voice activation.

443 [Orig] VISUAL AND AUDIBLE COMMUNICATION SYSTEMS

443-1 [Orig] Loud Hailer/Siren/Horn/Whistle

- 443-1.1 [Orig] The CB-OTH V shall have a system capable of emitting automatic audible alarms/warning signals and external voice commands in all operating environments and meet the requirements of the *USCG Navigation Rules and Regulations Handbook; International Rules for Prevention of Collisions at Sea (72 COLREGS) Annex III and Inland Navigation Rules Annex III* for sound signaling.
- 443-1.2 [Orig] The system shall produce voice audio output intelligible at 150 feet in the operating environment within a 90 degree arc centered on the bow. The system shall have a volume control.
- 443-1.3 [Orig] The system shall be independent of other communication systems except the system shall interface with the crew communication system.
- 443-1.4 [Orig] The system shall be provided with an IP 67 speaker, mounted in accordance with the OEMs recommendations.
- 443-1.5 [Orig] The system shall have the ability to activate the siren/yelp without using the handheld microphone.
- 443-1.6 [Orig] The system shall be configured with a remote IP 65 microphone.
- 443-1.7 [Orig] The horn shall be operable by a dedicated momentary switch.
- 443-1.8 [Orig] The system shall be capable of automatic, timed sound signals for low visibility signaling.

444 [Orig] AUTOMATIC IDENTIFICATION SYSTEM (AIS)

444-1 [Orig] General

- 444-1.1 [Orig] The Contractor shall provide a Class-A AIS that fully interfaces with the USCG SINS-2 to provide secure and unsecure asset tracking.
- 444-1.2 [Orig] The AIS shall include:
 - 444-1.2.1 [Orig] A transponder;
 - 444-1.2.2 [Orig] A display (if not integrated into transponder);

444-1.2.3 [Orig] A separate GPS antenna; and

444-1.2.4 [Orig] A separate VHF antenna.

444-1.3 [Orig] The AIS shall have the following characteristics:

444-1.3.1 [Orig] The system shall operate on 12 Volts;

444-1.3.2 [Orig] The AIS equipment shall be integrated with the USCG standard SINS-2 equipment required by Section 424-1, to allow display of target data on the MFD. The integration of the equipment shall be in accordance with the OEMs requirements.

444-1.3.3 [Orig] The AIS equipment shall conform to ITU-R 1371-5, IMO Resolution A.694 (17) and IEC 61993-2;

444-1.3.4 [Orig] The AIS shall be IP67 compliant or contained within an enclosure that meets the IP67 standard and allows access for operating and maintaining the transponder display without the use of hand tools.

445 [Orig] OVER-THE-HORIZON SATELLITE BLUE FORCE TRACKING (SBFT) SYSTEM

445-1 [Orig] General

445-1.1 [Orig] The Contractor shall provide, space, weight and power that meets the following minimum requirements for the USCG to install a Short Burst Data (SBD) satellite blue force tracking system.

445-1.1.1 [Orig] Within a watertight enclosure, NAL Research Corporation Model 9602-LP modem:

- Height: three and one-half inches
- Width: three and one-half inches
- Depth: three and one-half inches
- Weight: 0.50 lbs
- Power: From a dedicated breaker, 200 mA at 5V input
- Access and maintenance that allows operating and maintaining the modem
- Secure mounting

445-1.1.2 [Orig] A mounting location with uninterrupted line of sight to the open air for a NAL Research Corporation Model SAF4070-IG dual iridium/GPS antenna:

- Access and maintenance that allows for operating and maintaining the antenna
- Secure mounting

445-1.1.3 [Orig] A designated path to route cables from the antenna to the modem and from the GNSS to the modem.

- The path between the antenna and the modem shall be no longer than five feet.
- Any watertight penetrations along the cable path shall be provided.

505 [Orig] PIPING, HOSE, AND VALVE REQUIREMENTS

505-1 [Orig] General

505-1.1 [Orig] Fluids shall be conveyed by pipe, tubing, or hose as appropriate to the fluid being conveyed and as specified herein.

- 505-1.2 [Orig] Piping and hoses shall be run as directly as possible with a minimum number of bends and fittings.
- 505-1.3 [Orig] Piping shall be supported to prevent vibration and abrasion.
- 505-1.4 [Orig] No valves, joints, or fittings other than welded ones shall be installed in any inaccessible spaces.
- 505-1.5 [Orig] Only metallic through hull fittings shall be used.
- 505-1.6 [Orig] Piping or tubing not part of purchased components shall be stainless steel or aluminum in accordance with Section 078

505-2 [Orig] Piping

- 505-2.1 [Orig] Piping shall not leak at any point in any system under normal operation.
- 505-2.2 [Orig] Threaded pipe and fitting installations of dissimilar metals in raw water systems shall not be made.

505-3 [Orig] Valves

- 505-3.1 [Orig] Valves shall be suitable for intended application and shall be located where they are readily accessible for inspection, operation, maintenance, and removal for repair.
- 505-3.2 [Orig] Valves for on/off applications shall be stainless steel flanged or threaded ball valves with stainless steel handles.
- 505-3.3 [Orig] Valves shall be located to allow for operations and maintenance and be reachable by personnel in PPE.
- 505-3.4 [Orig] Threaded valve and fitting installations of dissimilar metals in raw water systems shall not be made.
- 505-3.5 [Orig] Valves in the fuel service system shall meet the requirements of *ABYC Standard H-33, Diesel Fuel Systems*.
- 505-3.6 [Orig] All thru-hulls valves shall be 316 stainless steel and meet the requirements of *ABYC Standard H-27, Seacocks, Thru-Hull Fittings and Drain Plugs*.
- 505-3.7 [Orig] All valve handles shall be stainless steel.

505-4 [Orig] Hose and Hose Assemblies

- 505-4.1 [Orig] Contractor installed hoses and hose assemblies shall comply with SAE J1942 for the intended service.
- 505-4.2 [Orig] Fuel, lube oil, and hydraulic systems shall have stainless steel crimp-on or re-useable end fittings except for the fuel fill hose and fuel tank vent hose. End fittings shall be pressure rated equal to or greater than the mating hose, and compatible with applicable connections points of the system.
- 505-4.3 [Orig] Hoses in the raw water and bilge systems shall use hose barb fittings with two stainless steel hose clamps without the crimped end fittings.
- 505-4.4 [Orig] For raw water hoses in sizes exceeding that covered by SAE J1942, use Thermoid Bellowsflex 7910, or equal.

512 [Orig] VENTILATION**512-1 [Orig] General**

- 512-1.1 [Orig] The spaces containing batteries or diesel fuel stowage shall be ventilated in accordance with *ABYC Standards E-10, Storage Batteries* and *H-32 Ventilation of Boats using Diesel Fuel*.

526 [Orig] SCUPPER AND DECK DRAINAGE**526-1 [Orig] General**

- 526-1.1 [Orig] Scuppers in the aft working deck shall be fitted with non-return fittings such as “elephant socks” that allow rapid clearing of water if taken aboard with a means to ensure that water does not back flow onto the aft working deck through the scuppers, even when at rest or dead in the water for extended periods.
- 526-1.2 [Orig] Water intrusion through the scuppers shall be kept to a minimum. In no case shall this water intrusion cause flooding of the working deck to a level that would adversely affect the propulsion, fuel, or electrical systems. This requirement applies to scuppers when in “closed” as well as “activated” position.
- 526-1.3 [Orig] Deck lockers shall not drain freely into the working deck, but shall be provided with covers of watertightness degree 1 and drains with captive removable plugs.

529 [Orig] BILGE DRAINAGE AND PUMPS**529-1 [Orig] General**

- 529-1.1 [Orig] Drainage shall be provided throughout the CB-OTH V as required to prevent water pockets in the hull and to provide means to remove water from any compartments that do not drain to a low point in the hull while the boat is either stored in the cutter’s stern notch at a 15-degree bow up attitude or while underway.
- 529-1.2 [Orig] Drain plugs shall be installed at low points in all piping systems or equipment that may entrap water, including components and parts of equipment. All drains shall be readily accessible for operation and maintenance.
- 529-1.3 [Orig] A threaded drain plug, in accordance with *ABYC Standard H-27, Seacocks, Thru hull Fittings, and Drain Plugs* shall be provided in the transom to drain the hull when out of the water. The drain plug shall be attached to the boat by means such that it cannot be dropped, lost, or otherwise accidentally separated from the boat.
- 529-1.4 [Orig] An automatic visual and audible bilge alarm system shall be provided in accordance with Section 436-2.
- 529-1.5 [Orig] A sealed bilge is permissible provided access requirements are met. Sealed bilge compartments or voids do not require bilge pumps. If sealed bilge construction is used, the Contractor shall provide documentation certifying that the bilges were pressure tested prior to delivery.
- 529-1.6 [Orig] Each compartment shall have a submersible DC electric bilge pump installed in accordance with *ABYC Standard H-22, Electric Bilge Pump Systems*. Bilge pumps 12 V power shall be supplied from the battery side of the battery disconnect switch.

- 529-1.7 [Orig] Bilges located in the engine compartment shall be arranged so that any oil leaks or other contaminants shall be isolated from the open bilge so that they will not be inadvertently pumped overboard.
- 529-1.8 [Orig] Each bilge pump shall have a rated capacity of at least 2000 gallons per hour as stated by the OEM.
- 529-1.9 [Orig] Each bilge pump shall be located so that it takes suction from the lowest practical point of the compartment while the boat is;
- Stored in the cutter's stern notch at a 15-degree bow up attitude;
 - While underway (on plane); and
 - At the dock.
- 529-1.10 [Orig] Each bilge pump discharge shall incorporate a check valve that is installed as close as possible to the overboard fitting. Each bilge pump shall be piped so that it pumps directly overboard.
- 529-1.11 [Orig] The discharge shall be above the maximum heeled waterline in accordance with *ABYC Standard H-22, Electric Bilge Pump Systems, Para 22.8.6*.
- 529-1.12 [Orig] The electric bilge pump(s) control switch(es) shall be:
- 529-1.12.1 [Orig] Located on the console;
- 529-1.12.2 [Orig] Grouped in one location and arranged for easy operation from a seated position while minimizing the risk of accidental operation;
- 529-1.12.3 [Orig] Capable of manual on/off and automatic operation;
- 529-1.12.4 [Orig] Co-located with an indicator light that illuminates when the corresponding bilge pump is operating;
- 529-1.12.5 [Orig] IP 67 rated.

555 [Orig] FIRE EXTINGUISHING SYSTEM

555-1 [Orig] Portable Fire Extinguisher

- 555-1.1 [Orig] Portable fire extinguishers shall be installed in accordance with *ABYC Standard A-4, Fire Fighting Equipment*.
- 555-1.2 [Orig] Fire extinguishers shall be mounted so that they are secure, but readily accessible with a quick and positive release for immediate use. Fire extinguishers shall be located so that they do not hinder crew movement and operation.
- 555-1.3 [Orig] Fire extinguisher mounting brackets shall be marine type, heavy-duty, made of metal with a corrosion-resistant powder-coated finish, and appropriately sized to the extinguisher.
- 555-1.4 [Orig] All portable fire extinguishers shall have an inspection tag installed on the device.
- 555-1.5 [Orig] The engine compartment shall have a sight port to inspect the space visually for fire and a small opening port to discharge the fire extinguisher into the engine compartment without opening the main engine access hatch. A single port may be used to satisfy both requirements.

555-2 [Orig] Fire Suppression System

- 555-2.1 [Orig] The CB-OTH V shall have machinery space fire suppression system that can be activated from the coxswain station.
- 555-2.2 [Orig] The fire suppression system shall be sized for the engine compartment and installed in accordance with the OEM's instructions.
- 555-2.3 [Orig] The system shall be compliant with *NFPA 2001, Standard on Clean Agent Fire Extinguishing Systems 2018 Edition, Chapter 9, Marine Systems*.
- 555-2.4 [Orig] Piping or tubing between the clean agent storage cylinder and the nozzle shall be stainless steel.
- 555-2.5 [Orig] Wire-braided hoses shall be used to attach the clean agent storage cylinder to the fixed piping. A swivel coupling shall be used at one end of the hose for easy attachment and removal of the hose from the storage cylinder.

581 [Orig] ANCHOR AND HANDLING SYSTEMS

581-1 [Orig] General

- 581-1.1 [Orig] The CB-OTH V shall have an anchoring system comprised of the equipment shown in Table 581-1.

Table 581-1 [A00001] - Anchor Kit

Item	Quantity
Anchor: fluke-type, aluminum, weighing no more than 7 pounds, interlocking components, no welds	1 ea.
Anchor Shackle: 3/8", screw pin 316 Stainless Steel (not attached)	2 ea.
Chain: 1/4", 316 Stainless Steel	6 ft.
Jaw & Jaw Swivel: 3/8", screw pin 316 Stainless Steel (not attached)	1 ea.
Thimble: for 5/8" dia. Double Braided Nylon line, 316 Stainless Steel	1 ea.
Anchor Line: 5/8" dia. Double Braided Nylon line	150 ft.
Shackle: D Wide 304 SS 5/16" Captive Pin	2 ea.
Swivel: 5/16" 316 SS Jaw Eye	1 ea.

- 581-1.2 [Orig] The anchor line shall be spliced to fit the stainless steel thimble. An anchor shackle shall run through the thimble and attach to an eye of the jaw & jaw swivel. The other eye of the jaw & jaw swivel shall be attached to the anchor chain. The opposite end of the anchor chain shall be attached to the anchor shackle.
- 581-1.3 [Orig] The anchor shall be stowed in a bracket or locker that allows for secure, out of the way storage that is readily accessible.
- 581-1.4 [Orig] The anchor storage bracket shall allow the anchor chain to be attached to the anchor with a shackle when the anchor is secured in its stowage bracket, and the bracket shall prevent the anchor from shifting or vibrating.
- 581-1.5 [Orig] Hand tools shall not be required to remove the anchor from its stowage bracket.

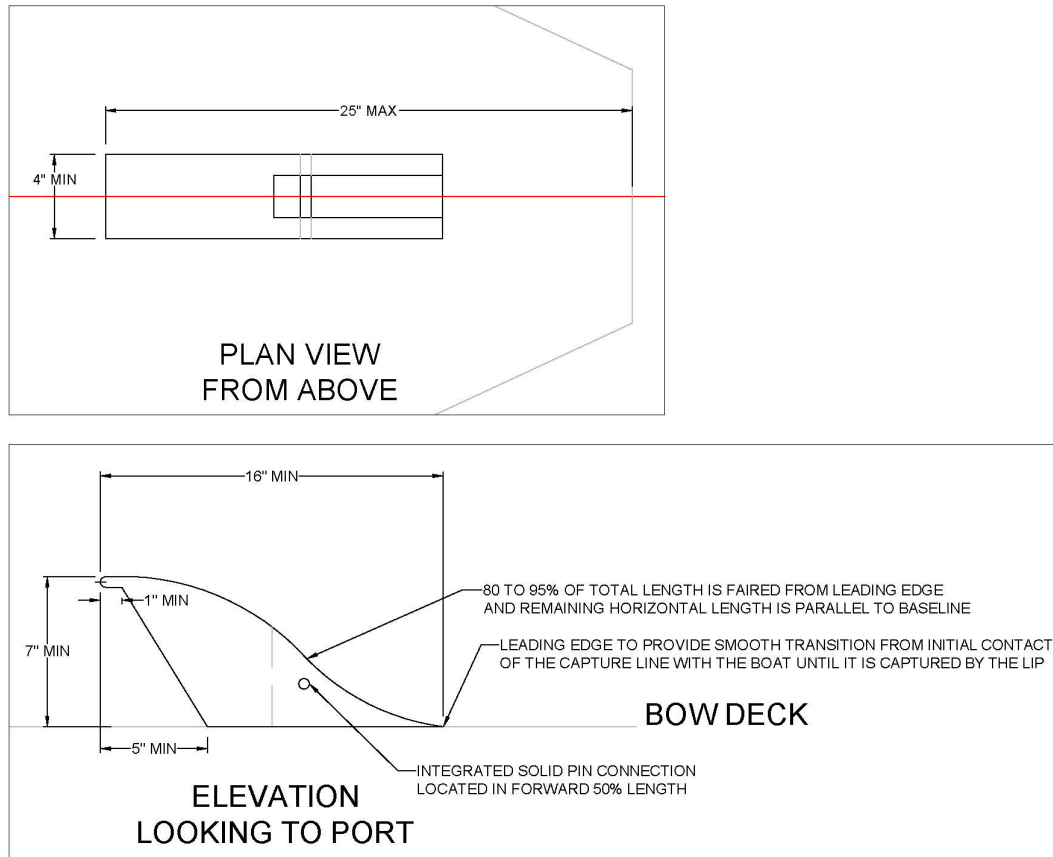
- 581-1.6 [Orig] The anchor line, chain, and fittings shall be stowed in a dry location that is readily accessible for use with the anchor.

581-2 [Orig] Stern Launch and Recovery Bow Horn Assembly

- 581-2.1 [Orig] The CB-OTH V shall be provided with a stern launch and recovery bow horn assembly.
- 581-2.2 [Orig] The assembly shall be located along the centerline at the bow. The aft most extent of the assembly shall not exceed 25 inches aft of the foremost point of the bow.
- 581-2.3 [Orig] The forward riding surface of the assembly shall rise smooth and continuous from fore-to-aft to permit free movement of the capture line. The vertical distance between the assembly lip and heel shall be at least seven inches. The longitudinal length of the assembly shall be a minimum of 16 inches. The upper most portion of the bow horn shall have an overhang of at least one inch to prevent the capture line from slipping off once the CB-OTH V is captured.
- 581-2.4 [Orig] The assembly shall be a minimum four inches wide. The longitudinal distance from the assembly heel to the bow horn lip shall be a minimum of five inches.
- 581-2.5 [Orig] The working surface of the assembly shall be smooth and free of sharp edges that might cause damage to lines or personnel.
- 581-2.6 [Orig] The leading edge of the assembly shall be arranged to provide a smooth transition from the initial contact of the capture line with the boat until it is captured by the lip. The assembly shall be faired from the leading edge to between 80-95% of the total length of the assembly with the remaining longitudinal length parallel to the baseline.
- 581-2.7 [Orig] The assembly shall have an integrated solid pin to accommodate both TR-7 and TR-10 Sea Catch quick release hooks.
- 581-2.7.1 [Orig] The integrated solid pin shall be horizontally oriented and recessed into the forward half of the longitudinal extent of the assembly. The assembly shall allow for proper operation of the quick release hooks.
- 581-2.7.2 [Orig] The integrated solid pin shall be designed to support a load of 8000 pounds in any direction.
- 581-2.8 [Orig] The assembly and the supporting structure shall be designed to withstand a load equal to the weight of the CB-OTH V in full load weight acting in a direction parallel to the baseline of the CB-OTH V.
- 581-2.9 [Orig] The assembly shall be free of spaces where water from rain or spray can accumulate and be trapped.
- 581-2.10 [Orig] The assembly shall be designed to interface with the:
- 581-2.10.1 [Orig] FRC (See Appendix D) - During the recovery process the CB-OTH V slides up the cutter's stern ramp. Before the boat slides down the ramp a recovery sling is thrown over the bow horn assembly. The boat then slides down the stern ramp several feet and stops sharply when the recovery sling comes taut.
- 581-2.10.2 [Orig] NSC (See Appendix D) - During the recovery process the CB-OTH V slides up the cutter's stern ramp, during which the bow horn assembly slides under the capture system, and then the CB-OTH V slides down the stern ramp several feet and stops sharply when the assembly is captured by the capture system.

581-2.11 [Orig] The bow area shall be clear of fittings or snag and pinching hazards that would interfere with the NSC or FRC capture system. Snag and pinching hazards include, but are not limited to, mooring cleats and pad eyes, raised hatches, and collar separation from bow step and anchor locker area.

Figure 581-1 [Orig] - Visualization of the Bow Horn Assembly



Note: This figure above is intended to illustrate the specification language outlined in Section 581-2 and should not be interpreted as the bow horn assembly design.

582 [Orig] MOORING, TOWING, TIE DOWN, AND LIFTING FITTINGS

582-1 [Orig] General

- 582-1.1 [Orig] All towing bitts, cleats, chocks, and eyes shall be free of sharp edges that might cause damage to mooring lines or personnel. The working surface of each bitt, cleat, and chock shall be polished to a maximum transverse surface roughness of 0.5 micrometers or less as measured by touch comparator.
- 582-1.2 [Orig] All towing bitts, cleats, chocks, and eyes shall be sized to handle 5/8 inch diameter Double Braided Nylon (DBN) line. Cleats shall be open base yacht type, which can pass the eye of a finished line. Fittings shall provide for at least one round turn of line and three figure eights.

- 582-1.3 [Orig] All bitts, chocks, eye, and the supporting deck structure shall be designed with a factor of safety of 1.5 on the ultimate strength of the fitting material under an applied load equal to breaking strength of the mooring line supplied, applied in any direction. Cleats shall be thru-bolted with stainless backing plates of adequate proportion to the size of the bolts used for each fitting.

582-2 [Orig] Mooring Fittings

- 582-2.1 [Orig] The CB-OTH V shall have a minimum of two sets of cleats and chocks (if necessary) sized for the mooring line, installed symmetrically port and starboard along the centerline, allowing for towing, mooring, and anchoring.
- 582-2.2 [Orig] Stern cleats shall be port and starboard on the transom for tending lines from the parent cutter.
- 582-2.3 [Orig] Foundations for deck fittings shall be provided to permit towing astern, side towing and being towed operations.

582-3 [Orig] Anchor and Towing Fittings

- 582-3.1 [Orig] A towing bow eye shall be provided at the bow of the boat on the stem below the fendering and above the waterline in the performance weight condition. The towing bow eye shall be sized to accommodate at least a 1 inch shackle. The bow eye shall be designed to minimize elongation or damage to the opening in the bow eye.
- 582-3.2 [Orig] A bow anchor bitt and aft towing bitt shall be provided on the centerline on the bow and stern, respectively, of the boat.
- 582-3.2.1 [Orig] The horizontal horns of the bitts shall be a single extruded pipe or solid bar running through the vertical towing post. Pipe or rod welded onto the post is not acceptable. If the bitt is not completely sealed it shall be provided with a drain at the lowest point.
- 582-3.2.2 [Orig] Towing load shall be based on towing a similar size vessel in SS5 at towing speed of five knots. The load is to be applied at the highest point of the towing post.
- 582-3.2.3 [Orig] The bitts shall be smoothed and rounded to a radius of not less than one inch.

582-4 [Orig] Tie Down Fittings

- 582-4.1 [Orig] The CB-OTH V shall at a minimum be equipped with one bow eye and two transom eyes to be used for securing the boat to the deck of the cutter when the boat is stored in the cradle. The bow eye shall be in addition to the towing bow eye required in Section 582-3.1.
- 582-4.1.1 [Orig] Each eye shall be sized to accept a 1/2" shackle and support a load of 3500 pounds in the direction of pull to secure the boat to the deck.
- 582-4.1.2 [Orig] The tie down bow eye shall be located on the stem below the towing bow eye and above the waterline in the performance weight condition.
- 582-4.1.3 [Orig] The transom eyes shall be located below the fendering.
- 582-4.2 [Orig] The CB-OTH V shall be equipped with tie down fittings to secure the boat to the trailer. The eyes to secure the boat to the deck may be used to meet this requirement if they are of sufficient strength and appropriately located.

- 582-4.2.1 [Orig] The total capacity of the tie down fittings shall be of sufficient strength to support, at a minimum, 150% of the weight of the trailer.
- 582-4.2.2 [Orig] The tie down fittings shall be sized and arranged to be used with the trailer tie down ratchet straps (provided with the trailer) to secure the boat to the trailer.
- 582-4.3 [Orig] The CB-OTH V shall have tie down fittings to comply with ATTLA certifications. Any of the tie down fittings in this section may be used to meet this requirement.

582-5 [Orig] Lift Systems

- 582-5.1 [Orig] The CB-OTH V shall be provided with a lift system capable of hoisting the boat in the 150% of the Full Load Weight condition using both dual point and single point davit systems. The lift system consists of lifting assemblies (including any straps, cables, shackles, master links, slings and other load carrying components not permanently connected to the CB-OTH V) and attachment points on the boat.
- 582-5.1.1 [Orig] Fitting and slings shall be designed in accordance with NSWCCD-23-TM-2009/33 Hoisting System Design and Certification Process Guidance except as noted.
- 582-5.1.2 [Orig] Force diagrams shall be submitted with the lifting system calculation and applicable product drawing(s) and used to determine the strength requirements for each component of the lift system.
- 582-5.1.3 [Orig] All components of the lifting system shall be designed with minimum safety factor of 6.0 based on the ultimate/breaking strength of the material.
- 582-5.1.4 [Orig] Be provided with OEM certification that indicates the industry standard testing that each lifting component has undergone.
- 582-5.2 [Orig] Dual point davit system:
- 582-5.2.1 [Orig] Lift points shall be designed to interface with Cranston-Eagle quick release hook models DPR-406-CBH and APR-356-CB-CSH.
- 582-5.2.2 [A00001] Lift points shall be easily reachable and provide sufficient clearance forward and aft of lifting eye to allow a fully outfitted 5th to 95th percentile crewmembers, as defined in Section 088-2.1, to stand either in front or behind and in line with the lifting eye with sufficient clearance to receive, handle, release, and connect quick release hooks delivered by the parent cutter's dual point davit system. Lifting points shall accept the quick release hook without human manipulation of lifting point, shackle, or other ring device during connection/release procedures.
- 582-5.2.3 [A00001] Lift points shall be appropriately designed to:
- Prevent the quick release hook from falling more than 45 degrees from the vertical position in the athwartships direction when the davit falls are slacked.
 - Prevent the hook from binding if the davit falls are suddenly tensioned. The hook shall be able to freely move to a vertical position without binding in the lift point.
- 582-5.3 [Orig] Single point davit system:
- 582-5.3.1 [Orig] Sling attachment points shall be easily accessible. Four attachment points located at the extremities of the cockpit to the extent practicable (forward, aft, outboard) shall be provided.

- 582-5.3.2 [Orig] Sling assemblies design shall be documented in a drawing including sling materials and dimensions. All sling legs shall be labeled with sewn-on patches indicating proper orientation.
- 582-5.3.3 [Orig] Spreader bars are not permitted.
- 582-5.3.4 [Orig] The sling system shall have an oval or pear shaped lift ring with handles to attach to the davit hook.
- 582-5.3.5 [A00001] Sling assemblies shall be synthetic web or synthetic rope
- 582-5.3.6 [Orig] Sling system shall meet the requirements of *ASME B30.9, SLINGS*. Sling design calculations shall include a Fabrication Efficiency (FE) factor, to address sewing, splices, and assembly techniques. A FE factor of 0.8 shall be used.
- 582-5.3.7 [Orig] When hoisting, the sling system shall orient the boat with a bow up attitude between 3-5 degrees.
- 582-5.3.8 [Orig] Certification of lift slings testing by the OEM shall be provided prior to delivery. The industry standard that the lift slings were manufactured to shall be labeled and attached to the lift slings.

600 [Orig] GENERAL OUTFIT

600-1 [Orig] General

600-1.1 [Orig] The Contractor shall provide each CB-OTH V with the items and stowage for the items identified in Table 600-1. Stowage shall be located and arranged to support effective use by the crew. Refer to Section 670 for requirements of open and watertight stowage.

Table 600-1 [A00001] - General Outfit

Item No.	General Outfit	Quantity	Description	Watertight Stowage	Open Stowage
1	Expandable Floating Boat Hook with mounting fittings	1			X
2	Foot pump (required if inflatable fendering is used, include pressure gauge)	1			X
3	Fendering Repair Kit	1		X	
4	Engine Ignition Kill Switch lanyard	2		X	
5	Ensign, National (16"x24")	1	NSN 8345-00-245-2040 or equal		X
6	Ensign, US Coast Guard (15"x24")	1	NSN 8345-00-242-0275 or equal		X
7	First Aid Kit, 10 Person	1	ANSI Class B First Aid	X	
8	CG Orange 20" Life Ring Buoy	1	The life ring shall be mounted onto the boat along with a floating waterlight that meets 46 CFR § 180.70(d)		X

Item No.	General Outfit	Quantity	Description	Watertight Stowage	Open Stowage
9	Floating Marker Light with Stowage Bracket	1	Automatic crew overboard marker light compliant with 46 CFR § 161.010, Tested to UL 1196, with 6 VDC lantern style battery.		X
10	Water Rescue Throw Bag	1	Orange UV resistant non-mesh polyester bag with flotation insert, quick release buckle, & 75ft of ½" abrasion-resistant high-visibility floating water rescue rope. 3/8" and 7/16" rope is acceptable.		X
11	Snap hook for marker light lanyard & throw bag	2	Stainless steel, between 3 and 3.5 inches, with a safe working load in excess of 2100 lbs. and a breaking strength in excess of 2900 lbs.		X
12	Anchor Kit and Components	1	Refer to Section 581		X
13	Basic Tool Kit in Watertight case	1	Refer to Section 670-4		X
14	Portable Bilge Pump, 5 gallons per minute minimum	1	Manually operated		X
15	Mooring Lines, 5/8" DBN line, 25 feet in length	4			X
16	½" Anchor Shackle, screw pin, 316 Stainless Steel	2	For Bow Eyes		X
17	Binoculars, 7x50 (Marine waterproof)	1		X	
18	Portable Fire Extinguisher, B-1	1	USCG Approved, Refer to Section 555-1		X
19	Hand held Searchlight (in accordance with 332-4)	1		X	

602 [Orig] HULL, MECHANICAL DESIGNATION, AND MARKING

602-1 [Orig] Boat Identification Plate

602-1.1 [Orig] The CB-OTH V shall be provided with a manufacturer's identification plate, mounted in accordance with the *Boat Management Manual, COMDTINST 16114.4 (series)*. The plate identifies the name and address of the manufacturer and the USCG boat number, model number of the boat, the year built, and the crew, passenger, and cargo capacities in accordance with 33 CFR 181 and *ABYC Standard S-7, Boat Capacity Labels*. The CB-OTH V shall have full identification numbers in accordance with 33 CFR 181.

- 602-1.2 [Orig] The CB-OTH V identification plate shall be a minimum of 4 inches by 6 inches and be made of metal with either engraved or raised molded permanent letters. The plate shall be a minimum of 1/8 inches thick.

602-2 [Orig] Hull and Fender Markings

- 602-2.1 [Orig] The CB-OTH V shall be marked port and starboard with "U.S. COAST GUARD" in block letters that are 6 inches high and shall be placed on the fendering in such a way so as to be highly visible from the side of the boat. The lettering shall be centered approximately in the middle of the boat, fore, and aft. Painted on letters are not acceptable. Lettering color shall be black.
- 602-2.2 [Orig] The assigned identification number (to be specified at the time of order) shall be block numbers that are 6 inches high and marked on the bow of the CB-OTH V, port and starboard, in addition to the center of the transom. Numbering color shall be black.

602-3 [Orig] Label Plates

- 602-3.1 [Orig] Each control, switch, gauge, and valve shall be provided with a durable and permanently attached label plate to indicate its function.
- 602-3.2 [Orig] Each radio, microphone, and speaker shall be labeled with the radio information (e.g. VHF/UHF/700/800, HF).
- 602-3.3 [Orig] All labels shall be a minimum of 12-point font (ASTM F1166-07 [2013], Section 15.1.10.8).
- 602-3.4 [Orig] Fuel fill shall be labeled.
- 602-3.5 [Orig] All permanent notices and signs required by the OSHA, the USCG, and the U.S. Public Health Service shall be mounted and sized in accordance with *ABYC Standard T-5, Safety Signs and Labels*.

602-4 [Orig] Lift Weight Label Plate

- 602-4.1 [Orig] A lift weight label plate shall be installed on the CB-OTH V. The label shall be attached to the outside console in a readily viewable location with threaded fasteners. The lettering on lift weight label plate shall be a minimum of 1/2 inch letters.
- 602-4.2 [Orig] Each label plate shall be boat specific. The weight indicated on the label shall be the Performance Weight minus 1250 pounds. The date of the scale weighing shall be shown on the label plate along with the Contractor's name.

602-4.3 [Orig] The label plate format shall be as shown:

READY TO LIFT WEIGHT:
(WITH ALL OUTFITTING, FULL FUEL, AND NO CREW OR CARGO)
XXXX LBS.
MM/DD/YY Contractor

602-4.4 [A00001] The lift weight label plate shall be a minimum of 4 inches by 6 inches and be made of metal with either engraved, or raised molded permanent letters. The variable characters may be punched. The plate shall be a minimum of 0.04 inches thick.

612 [Orig] HANDHOLD DEVICES

612-1 [Orig] General

- 612-1.1 [Orig] Handhold devices shall be located throughout the boat for crew and passenger safety, and efficient operation including shipboard launch and recover operation, in accordance with *ABYC Standard H-41, Reboarding Means, Ladders, Handholds, Rails, and Lifelines, Section 41.5*. In addition, the handhold device or its mounting structure shall not permanently deform under a load of 200 pounds applied in any direction.
- 612-1.2 [Orig] The CB-OTH V shall be outfitted with a minimum of two fixed handhold devices at each seat location. An exception for the coxswain is if a two handed helm (e.g. steering wheel) is provided.
- 612-1.3 [Orig] Each seat's handhold devices shall be arranged within arm's reach of the seated occupant and arranged such that the seated occupant does not hit their legs and knees against the handholds while underway.
- 612-1.4 [Orig] Additional handhold devices shall be located throughout the boat to allow a 5th percentile female to reach two handholds while transiting anywhere on the boat.
- 612-1.5 [Orig] The CB-OTH V shall be outfitted with external lifelines along 60% of the length of the hull.

613 [Orig] CANVAS AND COVERS

613-1 [Orig] General

- 613-1.1 [Orig] The CB-OTH V shall be provided with a console cover and a full boat cover. Covers shall have the following characteristics:
- 613-1.2 [Orig] Covers shall be fabricated of coated cloth, CID A-A-55308, Type 1.
- 613-1.3 [Orig] Covers shall be mildew resistant, oil resistant, abrasion resistant, and fire resistant.
- 613-1.4 [Orig] The edges shall be reinforced with
- MIL-C-20079, Type II Class 3 tape; or
 - one inch marine grade acrylic bias binding; or
 - one inch marine grade polyester bias binding
- 613-1.5 [Orig] Covers (including edges) shall be gray in color.
- 613-1.6 [Orig] When installed, the covers shall not trap or allow water to pool.

- 613-1.7 [Orig] The covers shall be vented.
- 613-1.8 [Orig] The covers shall be capable of being installed, used, and removed while the boat is stowed on the trailer or on the cutter.
- 613-1.9 [Orig] Covers shall be secured to be able to sustain 50-knot winds from any direction.
- 613-1.10 [Orig] All cover fasteners and hardware used as part of the cover to secure or attach the cover to the boat shall be stainless steel.
- 613-1.11 [Orig] The covers shall be configurable to allow use with the slings in a fully tensioned position or with no slings.
- 613-1.12 [Orig] The covers shall prevent leakage into the boat.
- 613-1.13 [Orig] The covers shall be marked for proper installation.
- 613-1.14 [Orig] When installed, the console cover shall allow access (e.g., connect, disconnect, inspect) to the shore tie connection and viewing of the ground fault indicator.
- 613-1.15 [Orig] Covers are not required to be stowed onboard the boat.

625 [Orig] WINDSCREEN

625-1 [Orig] General

- 625-1.1 [Orig] The CB-OTH V shall be fitted with a windscreen. The top of the windscreen shall be no greater than 58 inches above the working deck.
- 625-1.2 [Orig] The windscreen shall be designed to meet the ultimate strength (Annex F) with the safety factor (Table 5) of ISO 12216. In addition, the windscreen shall meet the following :
 - Be designed for a front facing pressure of five psi.
 - Not have any notch or discontinuity that creates reentrant corner.
 - Exposed corners with a minimum radius of three inches.
 - Glass shall not be used.
- 625-1.3 [Orig] Windscreens shall have the following minimum thickness:

Table 625-1 [Orig] - Windscreen Minimum Thickness

Material	Minimum Thickness, Imperial (in)
Polycarbonate (PC)	5/16
Poly (methyl) methacrylate (PMMA)	5/16

631 [Orig] COLORS, COATINGS, AND FINISH

631-1 [Orig] Aluminum Finish

- 631-1.1 [Orig] All aluminum surfaces on the exterior of the CB-OTH V shall be unpainted.
- 631-1.2 [Orig] All exposed aluminum surfaces on the exterior of the boat shall have a uniform natural finish or satin finish.

- 631-1.2.1 [Orig] The surface profile shall not exceed 1.0 mils as measured by replica tape.
- 631-1.2.2 [Orig] A satin finish shall have spherically shaped indentations with a diameter less than or equal to 0.2 mm as measured by an optical comparator such as a 7x Comparator with a #7 Reticle.

631-1.3 [Orig] A satin finish may be achieved by one of the following methods:

- 631-1.3.1 [Orig] Media - Glass bead size #8 using designation no. AGB-18 (U.S. sieve size 70-100) using SAE Standard AMS-2431, Rev. A or Blast conditions –
- 631-1.3.2 [Orig] Treat in such a manner as to achieve a smooth, clean, and uniformed finish free of nicks, grind, swirl, or other markings, to the same degree as would be achieved by bead blasting equivalent using the following:
- Air pressure - 80 PSI,
 - Nozzle tip - 7/16 inches, and
 - Nozzle angle - 75°-90° to the surface.

631-2 [Orig] Faying Surface Coating

631-2.1 [Orig] All faying surfaces, including the hull area in contact with the fender, shall be coated for corrosion resistance as follows:

- 631-2.1.1 [Orig] The surface preparation shall be by abrasive blast to bare metal with clean, fine aluminum oxide, garnet, or equivalent inert material conforming to CID A-A-59316, Type I & IV / (1.5-2.5) or SSPC-SP WJ-2/NACE WJ-2.
- 631-2.1.2 [Orig] The coating system shall be two coats of a high build epoxy, black in color (SAE AMS-STD-595, ID # 17038) at 5 mils Dry Film Thickness (DFT) qualified for use under MIL-PRF-23236 or MIL-PRF-24647.
- 631-2.1.3 [Orig] Bedding compound (e.g., one-part polyurethane) is an acceptable alternative coating system for faying surfaces at non-welded, bolted fittings. Bedding compound shall not be used in contact with the fender.

631-3 [Orig] Joints and Crevices

631-3.1 [Orig] Joints and crevices that may trap water shall be sealed with one part polyurethane caulking compound. Pockets too large to be caulked shall be treated as a faying surface.

633 [Orig] CATHODIC PROTECTION

633-1 [Orig] Sacrificial Anodes

- 633-1.1 [Orig] The CB-OTH V shall have sacrificial anodes for cathodic protection installed in accordance with ABYC Standard E-2, Cathodic Protection and sized per DnVGL RP-B401 (E_c° [V] design protective potential of -1.00V), for a salt water environment.
- 633-1.2 [Orig] The sacrificial anodes shall be zinc and meet the requirements of ASTM F1182.
- 633-1.3 [Orig] The sacrificial anodes on the external propulsion unit and the anodes on the boat's external hull shall have the same chemical composition.

634 [Orig] DECK COVERING

634-1 [Orig] General

- 634-1.1 [Orig] All exterior decks (including hatches, ladders, and steps and areas for routine maintenance and operations) shall be provided with non-skid surface meeting the requirements of MIL-PRF-24667C, Type XI, Composition PS.
- 634-1.2 [Orig] Color shall be SAE AMS-STD-595, ID # 36076, Navy Gray #2, Dark Gray.
- 634-1.3 [Orig] The non-skid material shall be installed in accordance with the manufacturer's recommendations.
- 634-1.4 [Orig] Size of any individual non-skid pad shall not exceed 24 inches in any one dimension. The non-skid material shall cover the deck area as appropriate, except that a 1-inch clearance shall be provided between non-skid pads and around fittings.

660 [Orig] SEATING

660-1 [Orig] Coxswain, Boat Engineer and Crew Seating

- 660-1.1 [Orig] The CB-OTH V shall have five dedicated, shock mitigating, forward facing seats (for the coxswain, boat engineer, and three crewmembers) with a seat restraining system.
- 660-1.2 [Orig] A properly seated and restrained crewmember in the coxswain position with a seated eye height of 26 inches above the seat pan shall be able to view the bow of the boat, and shall not have a blind spot greater than two boat lengths over the bow at the centerline (the bow horn is not considered an obstruction to visibility in this context) while the boat is at rest in calm water at the performance weight condition.
- 660-1.3 [Orig] While seated, in the upright position, the occupant's feet shall be supported such that the occupant shall be flat footed and knees bent at a 90-degree angle with an acceptable range of 70 to 180 degrees of movement (70 degrees seated with legs slightly behind the knee and 180 degrees at standing vertical) for the intended user population defined in Section 088-2.1
- 660-1.4 [Orig] Footrests, if used, shall be foldable/stowable when not in use and not interfere with standing operators or seated operators who do not require a footrest. Footrests shall travel with the seat through the shock mitigation stroke.
- 660-1.5 [Orig] Seats shall accommodate an occupant weight range of 110 pounds to 300 pounds for up to 6Gs for a nominal impact duration of 0.10 seconds without bottoming out the seat suspension.
- 660-1.6 [Orig] The Contractor shall provide documentation (e.g., OEM shock mitigating seat report) from the seat OEM to confirm the proposed seats meet the requirement of 660-1.5. Typical information the USCG would expect to see as verification of performance would include test procedures and results to include:
 - Seat OEM, model, description;
 - Test date, test site/laboratory;
 - Shock impulses tested (e.g., 1G, 2G, etc.);
 - Payload weights;
 - Description of test apparatus and instrumentation; and
 - Tabulated test results for all runs/conditions tested.

- 660-1.7 [Orig] Seating shall provide safe and comfortable support for the crew throughout the CB-OTH V environmental conditions with the following characteristics:
- 660-1.7.1 [A00001] All five shock mitigating seats shall have armrests. The armrests shall provide lateral stability for the occupant. Armrests with integrated handholds may be used to satisfy the handhold requirements of Section 612-1. The armrest and handholds shall not impede egress. The armrests shall be foldable.
 - 660-1.7.2 [Orig] Seating shall be configured to minimize interference between occupants and contact with boat features for the full seat travel. The design shall maintain a minimum leg/knee/thigh clearance of seven inches in front of and above the leg, knee, and thigh for the full range of seat travel. The 95th percentile male with PPE has a thigh thickness of eight and a half inches from the seat pan to the top of the thigh and a buttock's knee length of 27 inches.
 - 660-1.7.3 [A00001] Seats arranged athwartships shall have a minimum of three inches of clearance between the outermost part of each seat.
 - 660-1.7.4 [A00001] Seats arranged athwartships shall be mounted so that the centers of each seat are no closer than 30 inches apart.
 - 660-1.7.5 [Orig] Seats shall be fabricated of corrosion resistant materials.
 - 660-1.7.6 [Orig] Seat covering materials shall be waterproof and designed for a marine environment; shall be resilient to sun and salt water exposure; and shall resist puncture, ripping, and tearing in a high-use environment.
 - 660-1.7.7 [Orig] All seats shall have a minimum of one and a half-inch thick padding.
 - 660-1.7.8 [Orig] The seat restraint buckles shall allow for one handed operation while minimizing the possibility of inadvertent release or unclaspings.
 - 660-1.7.9 [Orig] Seat adjustments shall not require tools. Adjustments shall not require more than unlocking, adjustment, and locking motions.
 - 660-1.7.10 [Orig] Seats shall not be equipped with a recline adjustment. The angle between the seat pan and seat back shall be fixed.
 - 660-1.7.11 [Orig] Seat adjustment controls shall be reachable and usable by the occupant from the seated position with a lap belt on for the full range of personnel, and shall be located to prevent inadvertent seat movement/adjustment.

660-2 [Orig] Passenger Seating

- 660-2.1 [Orig] The CB-OTH V shall provide seating with handholds for seven additional passengers.

670 [Orig] STOWAGE

670-1 [Orig] General

- 670-1.1 [Orig] Watertight stowage shall be a Watertight Enclosure with an opening that is watertightness degree 1.
- 670-1.2 [Orig] Open stowage is non-watertight in which items stored within may be exposed to the elements.

- 670-1.3 [Orig] The CB-OTH V shall provide watertight stowage for specified outfit items. In addition, the boat shall include six cubic feet of useable watertight stowage space.
- 670-1.4 [Orig] The CB-OTH V shall be equipped with drains for all non-watertight stowage compartments.
- 670-1.5 [Orig] Stowage for the outfit items in the Specification, including Table 600-1 and any other items the Contractor deems necessary for the safe operation of the CB-OTH V, shall be provided.
- 670-1.6 [Orig] Stowage locations shall suit the items being stored, shall prevent damage and wear to the item, suitable to prevent damage to the items while the boat is operated in the marine environment, and shall not damage or wear other items being stored.

670-2 [Orig] Life Ring Buoy, Floating Marker Light, and Throw Bag

- 670-2.1 [Orig] The 20-inch life ring buoy, the floating marker light, and the throw bag shall be stowed in locations that are readily accessible to the aft deck. The life ring buoy shall be clear off the deck. A lanyard with a snap hook shall be attached for the floating marker light.
- 670-2.2 [Orig] The life ring buoy shall be labeled with the assigned identification number on the top half of the ring and "U.S. COAST GUARD" on the bottom half of the ring. The lettering shall be two inches in height.
- 670-2.3 [Orig] The life ring shall be applied with Type II retroreflective materials as required by 46 CFR 185.604 and IMO Resolution A.658(16).
- 670-2.4 [Orig] The life ring buoy stowage shall allow for the floating marker light to remain clipped to the life ring buoy. The throw bag remains unclipped from the ring buoy but can be rapidly clipped to the buoy when needed.

670-3 [Orig] Mooring Line Stowage

- 670-3.1 [Orig] Mooring lines shall be stowed in a location with drainage that is readily accessible, protected from UV, and vented.

670-4 [Orig] Tools, Tool Stowage, and Onboard Repair Parts

- 670-4.1 [Orig] The CB-OTH V shall be provided with a tool kit. The tool kit shall be contained in a watertight, airtight, dustproof, chemical resistant, corrosion proof case, approx. 14 inches x 12 inches x 6 inches, with inserts and shall at a minimum have the following tools:
- Metric Combination Wrench Set: 10mm, 11mm, 12mm, 13mm, 14mm, 15mm, 16mm, and 17mm in a durable case;
 - SAE Combination Wrench Set: 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, and 11/16 in. in a durable case;
 - 3/8 in drive SAE 6 or 12-point Socket Set: 1/4, 5/16, 3/8, 7/16, 1/2, 9/16, 5/8, 11/16, and 3/4 in. in a durable hard plastic case;
 - 3/8 in. drive Metric 6 or 12-point Socket Set 10mm, 12mm, 13mm, 14mm, 15mm, 16mm, 17mm, 18mm, and 19mm in a durable hard plastic case;
 - 3/8 in. drive ratchet with 3 in. and 6 in. extension bar in a durable hard plastic case;
 - 10 in. Adjustable Wrench;
 - Strap Wrench Set (two Piece);

- 10 in. Curved Jaw Locking Pliers;
- 10 in. Straight Jaw Pushlock Pliers;
- 10 in. Straight Jaw Pliers;
- 10-in-1 Ratcheting Multi-bit Screwdriver Set;
- 290 lumen LED Rechargeable Waterproof Spot-Beam Flashlight;
- 1/8 inch x 1/8 inch x 7.5 inch black poly cable ties, 50 Pack; and
- One roll (20 yards) of 2-inch wide duct tape.

670-4.2 [Orig] The CB-OTH V shall be provided with onboard repair parts to enable the crew to correct minor underway casualties (e.g. Belts, filters, light bulbs, fuses, etc.). The stowage for these parts shall be with the basic tool kit in their own waterproof chemical resistant, corrosion proof case similar to the case provided for the tool kit.

703 [Orig] WEAPON STOWAGE

703-1 [Orig] General

- 703-1.1 [Orig] The CB-OTH V shall have sufficient vertical or horizontal stowage for two small arms: M16/M4 Rifle w/M203 attachment and M870 Shotgun with a Trijicon model RX01-11 sighting scope.
- 703-1.2 [Orig] The weapons shall be readily accessible from stowage from a seated position that is not the coxswain's or engineer's within 10 seconds.
- 703-1.3 [Orig] The storage system shall adequately secure weapons during all CB-OTH V operating conditions.

910 [Orig] TRAILER

910-1 [Orig] Trailer Requirements

- 910-1.1 [Orig] The CB-OTH V trailer shall
- be US Department of Transportation (DOT) certified;
 - be specifically configured to carry the CB-OTH V at highway speeds without special permits or allowances;
 - be constructed of
 - aluminum or
 - hot galvanized steel; if the trailer is constructed of hot galvanized steel, then the hot galvanizing process shall be performed after welding, drilling, grinding, or other processes;
 - have a minimum of 15 inch wheels and tires rated 10 percent more than a maximum trailer weight when carrying an 8500lb boat;
 - have submersible LED lighting that meets US DOT requirements
 - have a 2-5/16 inch ball coupler and a 7-pin female electrical connection
 - designed for frequent launch and recovery of the CB-OTH V in a marine environment
 - have a minimum of four tie down points on the trailer for securing the trailer to the deck of a cutter.; and
 - be fully equipped for submersion during a marine launching including:
 - A fully sealed watertightness degree 1 electrical system.
 - A spindle type grease system with accessible wheel bearing grease points.

- Rollers, if used, shall be provided with 316 stainless steel shafts.
 - be provide the Certificate of Origin or Title for the trailer at delivery of the trailer.
- 910-1.2 [Orig] The fully outfitted CB-OTH V and its trailer shall meet all statutory limits for legal operation on the interstate highway system. To meet statutory towing width requirements, it is permissible to require the deflation of an inflatable fendering system.
- 910-1.3 [Orig] If any dissimilar metals are fastened or placed in contact with one another, they shall be isolated using a suitable permanent, maintenance free galvanic barrier capable of isolating the two materials.
- 910-1.4 [Orig] The trailer shall use safety chains, not safety cables.
- 910-1.5 [Orig] The trailer shall be equipped with the following:
- Retrieval winch with strap and hook;
 - Two Shackles, Anchor HD Galv. 5/8";
 - A minimum of three boat tie down points, one forward and two aft, for securing the boat to the trailer for over the road transport;
 - Matching, mounted, spare tire and wheel;
 - Trailer mount for spare tire that does not interfere with launch and retrieval of boat when spare tire is mounted;
 - One tie down ratchet strap per tie down point;
 - Tongue jack with handle and jack foot;
 - Lug nut wrench to remove the wheel lug nuts;
 - Bottle jack, sized to be used for changing a trailer tire with the boat on the trailer.
 - Two pairs of wheel chocks;
 - Trailer Ball (2-5/16 inch ball); and
 - Stowage compartment/box to store: the two shackles, tie down straps, the lug nut wrench, bottle jack, wheel chocks, trailer ball, and any tools/equipment necessary to arrange the boat with an inflatable fender for transport. The stowage compartment shall be made of durable, non-corrosive material suitable for the marine environment. If non-metallic, it shall be UV and solvent resistant.
- 910-1.6 [Orig] A ladder with hand grabs or rails in accordance with ASTM F1166-07 shall be provided to access boat and shall be secured to the trailer.
- 910-1.7 [Orig] All stepping surfaces on the trailer used to gain access to the boat shall have non-skid material permanently applied.
- 910-1.8 [Orig] A complete rigging system shall be provided to enable lifting the boat and trailer as a single unit. The rigging system shall be designed to lift the combined weight of:
- 150% of the weight of the trailer.
 - 11,500 lbs (150% of the boat weight without people).
- 910-1.9 [Orig] The rigging system may include lifting points on the trailer, attachable aluminum frames, cables, or a spreader bar. The rigging system will need to travel with the trailer so there shall be a means to secure the system on the trailer.

Appendix A List of Deliverables

CB-OTH V DELIVERABLE LIST							
#	Spec	Deliverable	Milestone	Submission	To	Required Delivery	Pricing Sheet #
	Ref.						
1	040-2.3 080-1	Logistics Conference Agendas and Minutes	Logistics Conference		KO	Formal Meeting agenda seven days prior to the meeting	08
						Formal Meeting minutes seven days after conclusion of the meeting	
2	040-4	Integrated Master Schedule	Logistics Conference		KO	Seven days prior	08
						Monthly thereafter, at the end of each calendar month, until the IMS has been submitted for the month containing the first anniversary of delivery order	
						Quarterly thereafter, at the end of March, June, September, and December	
3	041-2	CSA Data Files	PCB	1st	KO	With; allows 14 days to review	11
				Final		14 days after first review comments received	
4	041-4.8	PCA Resolution Report	PCA		KO	14 days after USCG provides PCA report to Contractor	11
5	068-1.3	Hull Structure Construction Documents	Open Hull Inspection		KO	14 days prior to	10
6	077-1.2	Accident Prevention Plan (or equivalent)	Logistics Conference		KO	At meeting	08
7	077-4.1 077-4.2	Safety Data Sheet (SDS)	Shipping of the Boat		KO	14 days prior	01
					Boat	With	
8	078-5	Restricted Chemical Use Report	First Delivery Order		KO	45 days after	01
					Boat	With	

CB-OTH V DELIVERABLE LIST							
#	Spec	Deliverable	Milestone	Submission	To	Required Delivery	Pricing Sheet #
	Ref.						
9	083-1.2	300 Hr. Maintenance Parts	Shipping of the Boats		Boat	With	01
10	83-2	300 Hr. Maintenance Requirement List (MRL)	Shipping of the Boats		KO	14 days prior	01
					Boat	With	
11	083-3	Master Equipment Configuration List (MECL)	Second Delivery Order	1st	KO	30 days after	10
						30 days GOV review	
			Shipping of the Boats Starting with the 2nd Delivery Order	Final	Boat	14 days after first review comments received	
12	083-4	Serial Number Report (SNR)	Shipping of the Boats Starting with the 1st Delivery Order	1st	KO	14 days prior to	01
			Shipping of the Boats Starting with the 2nd Delivery Order	Final	Boat	With (USCG will provide updated GFI as needed)	10
13	083-5	List of Special Tools & Test Equipment	Shipping of the Boats		KO	14 days prior	09
14	084-1.6	Shipping Inventory List	Shipping of the Boats		KO	Seven days prior	01
					Boat	With	
15	085-2	Drawing Number Assignment Report (DNAR)	Second Delivery Order	1st	KO	30 days after,	10
						14 days GOV review	
				Final		Seven days after first review comments received	
16		Contractor's Format Drawings or Model	Second Delivery Order		KO	30 After, Contractor's Format. Shall provide sufficient detail to support the submitted Calculations Deliverable. May be 2-D drawings, 3D model, or a combination of both. 2-D drawings and 3D model shall be viewable in AutoCAD.	10

CB-OTH V DELIVERABLE LIST							
#	Spec	Deliverable	Milestone	Submission	To	Required Delivery	Pricing Sheet #
	Ref.						
17	085-3	Product Drawings	Third Delivery Order	1st	KO	60 days after	11
			PCA	Final		Allow 45 days for GOV review 45 days after PCA comments received	
18	085-6	3D TDP	Third Delivery Order	1st	KO	60 days after, Allow 45 days GOV review	11
				Final		45 days after PCA comments received	
19	085-7	Calculations: Speed Range Dynamic Stability Structural Windscreen Equipment Selection for Main Prop Equipment Selection for Aux Systems Handrail and Lifelines* Hull Bottom Plate, Structure, Bow Horn* Weight Estimate Electrical Power Load Analysis* Stability Analysis* ATTLA Universal Data Sheet [051-10] Lifting System	Second Delivery Order	1st	KO	30 days after 45 days GOV review	10
				Final		14 days after first review comments received	
20	086-1.4	COTS Technical Manuals Index	Shipping of the Boats	1st	KO	With, Contractor's Format: Shall outline all COTS technical manuals associated with the First Boat	01
21	086-1.1	COTS Technical Manuals (Electronic Copy)	Shipping of the Boats		KO	14 days prior	01

CB-OTH V DELIVERABLE LIST							
#	Spec	Deliverable	Milestone	Submission	To	Required Delivery	Pricing Sheet #
	Ref.						
22	086-1.5	COTS Technical Manuals (DVD)	Shipping of the Boats		Boat	With	01
23	086-3	Boat Information Book (including HM&E Support Section, C4ISR System/Network Support Section, and Casualty Control Section)	Shipping of the Boats on the First Delivery Order	1st	Boat	With, Contractor Format: Shall include preliminary system schematics for fuel, electrical, communication, and navigation system, and lifting system	09
			Shipping of the Boats on the Second Delivery Order	2nd	KO	60 days before	10
					Boat	With	
Shipping of the Boats starting with the Third Delivery Order	Final	Boat	With	11			
24	089-1.4	Training Syllabus	Shipping of the Boats		KO	14 days prior	01
25	092-3.1.1	Acceptance Test Plan	First Delivery Order		KO	30 days after	09
26	092-3.1.2	Acceptance Test Procedures	Acceptance Test		KO	45 days prior to test	01
27	092-3.1.3	Acceptance Test Reports Scale Weighing Test Report [096-4] Hose Assembly Testing Report [505-4] Sealed Bilge Compartment Pressure Testing Certification [529-1.5] Lifting Sling Test Certification [582-5]	Delivery of Each Boat		KO	Seven days prior to	01
					Boat	With	
28	096-3	Center of Gravity Report	Acceptance Test		KO	45 days prior to	09
29	096-4	Product Weight Report	Third Delivery Order	1st	KO	60 days after,	11
						45 days GOV review	

CB-OTH V DELIVERABLE LIST							
#	Spec	Deliverable	Milestone	Submission	To	Required Delivery	Pricing Sheet #
	Ref.						
				Final		45 days after PCA comments received	
30	097	One Time Test Procedures Flotation Test Procedures [097-3] Drainage Test Procedures [097-4] Noise Test Procedures [097-5] Trim and List Test Procedures [097-6]	First Boat One Time Tests		KO	45 days prior to test	09
31	097	One Time Test Reports Flotation Test Report [097-3] Drainage Test Report [097-4] Noise Test Report [097-5] Trim and List Test Report [097-6]	Delivery of the First Boat		KO	Seven days prior to	09
32	098-1	Display Scale Model			KO	As Order	12
33	200-1.2	OEM Installation Certification Letters	Shipping of First Boat		KO	Seven days prior	09
34	200-1.12	Shaft Information	First Boat One Time Tests		KO	45 days prior	01
35	233-1.1	OEM Certification Letter for 40 CFR Part 1042, Control of Emissions from New and In-Use Marine Compression-Ignition Engines and Vessels	Shipping of First Boat		KO	Seven days prior	09
36	402-5	Vulnerability and Resolution Report	Shipping of the Boats		KO	Seven days prior	01
37	441-2.7	TIA-102.CAAA & TIA-102.CAAB Vibration and Shock Certification	Shipping of First Boat		KO	Seven days prior	09

CB-OTH V DELIVERABLE LIST							
#	Spec	Deliverable	Milestone	Submission	To	Required Delivery	Pricing Sheet #
	Ref.						
38	660-1.6	OEM Shock Mitigating Seat Test Report	Shipping of First Boat		KO	Seven days prior	09
39	910-1.1	Trailer Title	Shipping of Trailer		Trailer	With	02

Appendix B List of Referenced Standards

CB-OTH V List of References and Standards			
Document Section	Reference	Title	Rev./ Ver. *
041-2.1.2	MIL-HDBK-61	Configuration management guidance	B (APR 2020)
042-1.18 042-1.19 042-1.20 092-4.1.1 092-4.1.2.2	ISO 12216	Small craft - windows, portlights, hatches, deadlights and doors - strength and watertightness requirements	1st Ed (2002)
042-1	IEC 60529	Degrees of protection provided by enclosures (IP Code)	Corrigendum 1 - Amendment 2 (2019)
071-1.1 088-1.1 088-2.1 167-1.2 167-1.4 170-1.4 332-1.1 410-1.4 410-1.5 410-2.1 410-3.2 410-3.4 436-1.1 602-3.3 910-1.6	ASTM F1166-07	Standard practice for human engineering design for marine systems, equipment, and facilities	07 (2013)
074-3.5	AWS D1.2	Structural welding code - aluminum	6th Ed (2014)
074-2.2	AWS D3.7	Guide for Aluminum hull welding	2004
074-3.2	ASME BPVC Section V	Boiler and Pressure Vessels Code - Nondestructive Examination	2017
074-3.2	AWS B1.11	Guide for visual examination of welds	3rd Ed (2015)
077-4.1	FED-STD-313	Material Safety Data, transportation data and disposal data for hazardous materials furnished to USCG activities	F (Oct 2018)
078-2.1	ASTM B221		2014

CB-OTH V List of References and Standards			
Document Section	Reference	Title	Rev./ Ver. *
078-2.3 078-2.6		Standard specification for Aluminum and Aluminum - Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes	
078-2.1	ASTM B210	Standard specification for Aluminum and Aluminum - Alloy drawn seamless tubes	2019
078-2.2	ASTM B928	Standard specification for high magnesium Aluminum-alloy products for marine service and similar environments	2015
078-2.4	SAE AMS-QQ-A-250/8	Aluminum alloy 5052, Plate and Sheet	C (2014)
078-2.5	ASTM B241	Standard specification for Aluminum and Aluminum - Alloy seamless pipe and seamless extruded tube	2016
078-2.6	ASTM B179	Standard specification for Aluminum and Aluminum - Alloys in ingot and molten forms for castings from all casting processes	2018
078-3.1	AISI 302, 304, 316 and 316L	Stainless steel material grades (Refer ASTM A240)	
078-3.2	ASTM A312	Standard specification for seamless, welded and heavily cold worked austenitic stainless steel pipes	(18a) 2018
078-3.2	ASTM A269	Standard specification for seamless and welded austenitic stainless steel tubing for general service	(15a) 2015
078-3.3	ASTM A276/A276M	Standard specification for stainless steel bars and shapes	2017
078-3.5	ASTM A240/A240M	Standard specification for chromium and chromium-nickel stainless steel plate, sheet and strip for pressure vessels and for general applications	2018
078-4.1	33 CFR 183.114	Test of floatation materials	5-Jun-19
078-4.1	49 CFR 571.302	Flammability of interior materials	5-Jun-19
078-4.1	CID A-A-59135	Commercial Item Description – Packaging Material, Sheet	28-Oct-97
078-4.1	CID A-A-59136	Commercial Item Description - Cushioning material, packaging, closed cell foam plank	28-Oct-97
079-1.1 079-1.1.1 079-1.1.2 079-1.2 079-1.1.2.1 079-1.6 097-3.1 097-3.1.1 097-3.3 191-1.1	ISO 12217-1	Small craft - stability and buoyancy assessment and categorization - part 1: non-sailing boats of hull length greater than or equal to 6 m	3rd Ed (2015)

CB-OTH V List of References and Standards			
Document Section	Reference	Title	Rev./ Ver. *
079-1.3	ISO 11812	Small craft - Watertight cockpits and quick-draining cockpits	2001
079-1.1.2.2 114-1.12.1 114-1.12.2	ISO 6185-3	Inflatable Boats – Part 3: Boats with a hull length less than 8 m with a motor rating of 15 kW and greater	2014 Edition 2
085-1.6 085-1.6.1 086-1.6 086-1.6.1	FAR Clause 52.227-14	Federal Acquisition Regulations Rights in Data	May-14
085-1.7 086-1.8	COMDTINST M5260.6	Management of scientific and technical information (STINFO)	A (Sep 2015)
085-1.7 086-1.8	CGTO PG-85-00-290-S	Standardized STINFO Markings Process Guide	23-Nov
085-2.3 085-3.2	COMDTINST M9085.1	Naval engineering computer aided engineering standards	C (2011)
085-2.3	ANSI/ASME Y14.1	Standard ANSI-Series Paper sizes	2012
085-6.2	MIL-STD-31000B	Technical Data Packages	B (Oct 2018)
085-6.4 085-6.5	ISO 10303-242:2014/Cor 1:2016	Industrial automation integration - Product data representation and exchange	2016
085-7.1.7 612-1.1	ABYC Standard H-41	Reboarding Means, Ladders, Handholds, Rails, and Lifelines	2014
085-7.1.10.3 300-1.1 300-1.1.6 300-2.3 300-2.4 300-3.1 301-1.1 301-2.1 313-1.3 320-2.1 320-3.1	ABYC Standard E-11	AC & DC Electrical Systems on Boats	2018
086-3.1.1	ABYC T-24	Owner's Manuals	2014
088-1.1	ABCD-TR-08-01v1.0	High Speed Craft Human Factors Engineering Design Guide	v1.0
088-1.1	ABCD-TR-15-001	Supplement to High Speed Craft Human Factors Engineering Design Guide	2015

CB-OTH V List of References and Standards			
Document Section	Reference	Title	Rev./ Ver. *
088-2.5	ABYC Standard H-1	Field of Vision from the Helm Position	2019
085-7.1.1 100-1.1.1; 100-2.5 100-1.1.4 100-2.5 100-3.1 103-1.3	ISO 12215-5	Small craft - hull construction and scantlings - part 5: design pressures for monohull, design stresses, scantlings determination	2019
097-4.1 612-1.1	ABYC Standard H-4	Cockpit Drainage Systems	2015
097-5.2	MIL-STD-1474E	Design Criteria Standard Noise Limits	E (Apr 2015)
097-5.2 100-1.1.3	COMDTINST M5100.47 ISO 12215-1	USCG Safety and Environmental Health Manual Small craft - Hull construction and scantlings -- Part 1: Materials: Thermosetting resins, glass-fibre reinforcement, reference laminate	C (2019) 2000
100-1.1.4	ISO 12215-3	Small craft - hull construction and scantlings - part 3: Materials: Steel, aluminum alloys, wood, other materials	2002
100-1.1.4	ISO 12215-4	Small craft - hull construction and scantlings - part 4: Workshop and manufacturing	2002
100-1.1.4 100-2.1 100-2.3	ISO 12215-6	Small craft - hull construction and scantlings - part 6: structural arrangements and details	2008
114-1.7 631-2.1.2 634-1.2	SAE AMS-STD-595	Colors Used in Government Procurement	A (2017)
200-1.5	MIL-DTL-5624	Turbine fuel, aviation, grades JP-4 and JP-5	W (Mar 2016)
200-1.5	MIL-DTL-16884	Detail Specification - Fuel, naval distillate	P (Sep 2017)
200-1.6	ABYC Standard A-33	Emergency Engine/Propulsion Cut-Off Devices	2018
233-1.1 233-1.2	40 CFR Part 1042	Control of emissions from new and in-use marine compression-ignition engines and vessels	7-Jun-19
241-3.2 252-1.1.1	ABYC Standard P-23	Mechanical Steering and Propulsion Controls for Jet Boats Manual	2017
252-1.1.2	ABYC Standard P-24	Electric / Electronic Propulsion Control Systems	2013
259-1.1	ABYC Standard P-1	Installation of Exhaust Systems for Propulsion and Auxiliary Engines	2014
261-1.1	46 CFR 182.435-540	Subpart D—Specific Machinery Requirements and Subpart E—Bilge and Ballast Systems	7-Jun-19

CB-OTH V List of References and Standards			
Document Section	Reference	Title	Rev./ Ver. *
261-1.1 505-3.5	ABYC Standard H-33	Diesel Fuel Systems	2016
300-1.2 403-1.1	MIL-STD-1310	Shipboard bonding, grounding, and other techniques for electromagnetic compatibility and safety	H (2009) with Notice 1 of Aug 2014
300-2.4	ABYC Standard A-28	Galvanic Isolators	2014
301-2.1.1 301-2.1.4 302-1.2 400-1.1 401-3.1 424-1.2	IEEE 45	Recommended practice for electric installations on shipboard	2002
313-2.2	ABYC Standard E-10	Storage Batteries	2016
313-3.2	ABYC Standard A-31	Battery Charger and Inverters	2015
332-3.1 443-1.1	USCG Navigation Rules and Regulations Handbook	USCG Navigation Rules and Regulations Handbook; International Rules for Prevention of Collisions at Sea (72 COLREGS) and Inland Navigation Rules	Aug 2014 edition with Change -006 of 24 JAN 2018
332-3.1	ABYC Standard A-16	Electric Navigation Lights	2016
403-1.1	NAVSEA S9407-AB-HBK-010	Handbook of shipboard electromagnetic shielding practices	2 (2010)
410-1.3 410-1.6 410-1.7.1 410-3.1 410-4.1 410-4.2 410-4.3.1	MIL-STD-1472	Standard Human Engineering	G(1) (Jan 2019)
505-3.6 529-1.3	ABYC Standard H-27	Seacocks, Thru-Hull Fittings and Drain Plugs	2014
505-4.1 505-4.4	SAE J1942	Hose and Hose assemblies for marine applications	2019
512-1.1	ABYC Standard H-32	Ventilation of Boats Using Diesel Fuel	2018
529-1.6 529-1.11	ABYC Standard H-22	Electric Bilge Pump Systems	2011
555-1.1	ABYC Standard A-4	Fire Fighting Equipment	2018

CB-OTH V List of References and Standards			
Document Section	Reference	Title	Rev./ Ver. *
582-5.1.1	NSWCCD-23-TM-2009/33	Hoisting System Design and Certification Process Guidance	Rev A (2009)
582-5.3.6	ASME B30.9	Slings	2018
602-1.1	ABYC Standard S-7	Boat Capacity Labels	2015
602-1.1	COMDTINST 16114.4	Boat Management Manual	B (2012)
602-1.1	33 CFR 181	Manufacturer requirements	7-Jun-19
602-3.5	ABYC Standard T-5	Safety Labels and Signs	2016
613-1.2	CID A-A-55308	Commercial item description: Cloth and strip, laminated or coated, vinyl nylon or polyester, high strength, flexible	May-97
613-1.4	MIL-C-20079	Military Specification: cloth, glass, tape, textile glass and tread, glass and wire-reinforced glass	H (Jul 1987)
631-1.3.1	SAE AMS-2431	Peening Media, General Requirements	2018
631-2.1.1	SSPC-SP WJ-2/NACE WJ-2	Very thorough water jetting	12-Mar
631-2.1.2	MIL-PRF-23236	Coating systems Ship structures	D (Sep 2009)
631-2.1.2	MIL-PRF-24647	Paint system, anticorrosive, ships hull	E (Jan 2018)
633-1.2	ASTM F1182	Standard specification for anodes, sacrificial zinc alloy	07(2013)
633-1.1	ABYC Standard E-2	Cathodic Protection	2013
633-1.2	ASTM F1182	Standard Specification for Anodes, Sacrificial Zinc Alloy	2019
634-1.1	MIL-PRF-24667	Coating System, Non-Skid for Roll, Spray, or Self-Adhering Application	C (Mar 2018)
670-2.3	46 CFR 185.604	Lifesaving Equipment Markings	31-Oct-08
670-2.3	IMO Resolution A.658(16)	Use and Fitting of Retro-Reflective Materials on Life-Saving Appliances	19-Oct-89

Appendix C List of Government Furnished Information

Government Furnished Information				
GFI ID	Section	Reference	Title	Rev
1	041-5.1 041-5.2	DD Form 1692	Engineering Change Proposal (ECP)	-
2	041-5.3	Engineering Change Installation Instructions (ECII)	Engineering Change Installation Instructions (ECII)	2017
3	042-1.2 083-3.1 083-3.2 083-3.3 083-3.4 083-3.4.3 083-3.4.16	Master Equipment Configuration List (MECL)	Master Equipment Configuration List (MECL)	-
4	042-1.17 083-2.1 083-3.4.1 083-3.4.3 085-3.2 085-3.4.1 096-4.1.3	ESWBS List	ESWBS List	-
5	051-10.2 085-7.1.12	ATTLA Universal Data Sheet	ATTLA Universal Data Sheet	-
6	078-5.3	NAVSEA Hazardous Material Avoidance Process, T9070-AL-DPC-020/077-2	NAVSEA Hazardous Material Avoidance Process	28-Sep-15
7	083-4 083-4.1	Serial Number Report (SNR)	Serial Number Report (SNR)	-
8	085-1.7 086-1.8	CGTO PG-85-00-290-S	Standardized STINFO Markings Process Guide	2010

Government Furnished Information				
GFI ID	Section	Reference	Title	Rev
9	085-3.2	USCG Drawing Templates	USCG Drawing Templates	2014
10	085-7.1.10	Electrical Power Load Analysis (EPLA)	Electrical Power Load Analysis (EPLA)	-
	085-7.1.10.1			
	085-7.1.10.2			
	085-7.1.10.4			
	310-1.2			
313-2.5				
11	602-1.1	COMDTINST 16114.4	Boat Management Manual	B

Appendix D Interface Drawing