

**STATEMENT OF WORK (SOW)**  
**FOR**  
**HALIFAX CLASS OILY WATER SEPARATOR (OWS) SYSTEM**

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## **1. PURPOSE**

- 1.1. This Statement of Work (SOW) defines the requirements of the Department of National Defence (DND) for the supply of quantity one (1) Oily Water Separator (OWS) System, complete with Bilge Alarm and effluent control system for possible use onboard Royal Canadian Navy (RCN) Halifax Class Frigates (HFX), herein identified as the First System.
- 1.2. This SOW also includes additional requirements for an Option if CANADA chooses to exercise its rights to procure any additional systems for use in HFX Class Frigates or in shore units
- 1.3. The installation of any supplied OWS system is not a requirement of this SOW.
- 1.4. In the event of a conflict between the text of this SOW and the applicable documents cited herein, the SOW must take precedence.

## **2. BACKGROUND:**

- 2.1. The Vessel Pollution and Dangerous Chemicals Regulations (SOR/2012-69) under the Canada Shipping Act 2001, requires all Canadian ships to have the capability to process, monitor and control the discharge of shipboard generated bilge water in accordance with current MARPOL regulations.
- 2.2. The RCN requires an efficient, reliable, compact system, with minimal user input, that can separate free and emulsified oil from bilge fluid providing an effluent discharge that meets or exceeds current national and international requirements.

## **3. APPLICABLE DOCUMENTS**

- 3.1. Applicability:
  - 3.1.1. The following documents form part of this SOW to the extent specified herein. Unless otherwise specified, the issue or amendment of documents effective for this requirement must be those in effect on the date of contract award.
  - 3.1.2. Canadian Forces Technical Order (CFTO) D-01-100-214/SF-000 Specification for Preparation of Provisioning Documentation for Canadian Forces Equipment.
  - 3.1.3. CFTO C-01-100-100/AG-005 Specification: Acceptance of Commercial and Foreign Government Publications as Adopted Publications.
  - 3.1.4. SAE EIA 649C-2019 Configuration Management Standard.
  - 3.1.5. CFTO D-01-400-002/SF-000 Specification: Levels of Engineering Drawings.
  - 3.1.6. CFTO D-03-003-007/SG-000 Specification for Design and Test Criteria for Shock Resistant Equipment in Naval Ships, 1978.
  - 3.1.7. CFTO D-03-003-019/SG-001 Standard for Vibration Resistant Equipment, 1978.

- 3.1.8. CFTO C-03-010-000/MM-001 Canadian Naval Shipboard Techniques for Electromagnetic Compatibility, 2007.
- 3.1.9. CFTO D-03-003-012/SG-000 Airborne Noise Levels in Canadian Forces Vessels, 2015.
- 3.1.10. CFTO D-02-002-001/SG-001 Standard for Identification Marking of Canadian Military Property.
- 3.1.11. CFTO D-LM-008-002/SF-001 Specification for Marking for Storage and Shipment.
- 3.1.12. CFTO D-LM-008-036/SF-000 Department of National Defence Minimum Requirements for Manufacture's Standard Pack.

**4. DOCUMENTATION**

- 4.1.1. All documentation delivered under this SOW must be in both hard and soft copies. The soft copy must be delivered on CD-ROM. Unless otherwise agreed by CANADA, the acceptable formats for electronic data are in Table 1- Electronic Data Format.

Table 1 - Electronic Data Format

DATA TYPE	ELECTRONIC FORMAT
Text	Microsoft Word 2013
Graphics	Microsoft PowerPoint 2013, Microsoft Visio 2013
Spreadsheets	Microsoft Excel 2013
Database	Microsoft Access 2013
Schedule	Microsoft Project 2013

## **5. SUPPLY OF THE FIRST SYSTEM**

The following pertains to the supply of the First System only.

### **5.1. FIRST SYSTEM - TECHNICAL REQUIREMENTS**

5.1.1. The Contractor must comply with the technical requirements as detailed in Annex C: Technical Statement of Requirements (TSOR) for the supply of the First System.

### **5.2. FIRST SYSTEM - PROJECT MANAGEMENT**

5.2.1. The Contractor must designate a Project Manager (PM) who will be the primary contact between the Contracting Authority (CA) and the Contractor, and who will be responsible for all technical and administrative aspects of this requirement.

### **5.3. FIRST SYSTEM - MEETINGS**

5.3.1. Within two (2) months of contract award, the Contractor must arrange and conduct a Kick-Off meeting at the Contractor's facility at a time mutually agreed between CANADA and the Contractor.

5.3.2. The Contractor must prepare and deliver the Kick-Off meeting agenda within 5 (five) working days before the meeting

5.3.3. The Kick-Off meeting, chaired by the CA, is to review the Statement of Work (SOW), delivery and critical timelines and any other contractual or programmatic issues associated with the delivery of the First System as mutually agreed between CANADA and the Contractor.

5.3.4. The Contractor must produce the minutes for the Kick-Off meeting to include decisions and action items for the acceptance of CANADA within five (5) days of holding the meeting.

5.3.5. Further meetings, if required, are to be as mutually agreed between CANADA and the Contractor.

### **5.4. FIRST SYSTEM - INTEGRATED LOGISTICS SUPPORT**

5.4.1. The Contractor must provide a complete Provisioning Parts Breakdown (PPB) list, including consumables in accordance with CFTO D-01-100-214/SF-000 one (1) month prior to delivery of the First System.

5.4.2. The Contractor must provide a recommended spare parts list (RSPL) to support two (2) months continuous operation one (1) month prior to delivery of the First System.

5.4.3. At an agreed upon time, and after review and concurrence of the RSPL by CANADA, the Contractor must provide two (2) months' worth of recommended replacement parts (including consumables) based on a Planned Maintenance and Overhaul Schedule and Mean Time Between Failure (MTBF) data.

## 5.5. FIRST SYSTEM - TECHNICAL DATA PACKAGE

5.5.1. The Contractor must provide an Operations and Maintenance Manual (OMM) meeting the requirements of CFTO C-01-100-100/AG-005, produced in the English language, upon delivery of the First System.

5.5.2. The OMM must contain the following for equipment supplied for the First System as detailed in CFTO C-01-100-100/AG-005:

5.5.2.1. Preparation and operation instructions as well as information required for the function and specification of equipment;

5.5.2.2. Recommended planned and corrective maintenance instructions;

5.5.2.3. A fault finding and troubleshooting section for the equipment, and

5.5.2.4. An illustrated parts list (IPL).

## 5.6. FIRST SYSTEM - ENGINEERING SUPPORT

5.6.1. The Contractor must provide a Certified Contractor Representative to the Naval Engineering Test Establishment (NETE) facility in Montreal, Quebec at a time agreed upon by CANADA, to a maximum of ten (10) working days to:

5.6.1.1. Certify the correct installation of the First System at the facility;

5.6.1.2. Define, schedule and conduct commissioning and Set-to-Work (STW) at the facility. The Certified Contractor Representative must provide written confirmation clearly stating the OWS has been successfully commissioned and STW. This includes confirmation that the Bilge Alarm has been checked, is correct and is covered by a calibration certificate for at least 12 months from completion of commissioning;

5.6.1.3. Verify the installed equipment and total system are operating as designed, and

5.6.1.4. Conduct operator and routine maintenance training at the facility for up to three (3) designated personnel. Training must include as a minimum:

5.6.1.4.1. Preparation of the OWS for start-up;

5.6.1.4.2. Start-up of the OWS;

5.6.1.4.3. Operation of the OWS;

5.6.1.4.4. Switch of the Bilge Alarm from 15 ppm to 5 ppm, if applicable;

5.6.1.4.5. The optimization of the performance of the OWS (i.e. tuning, calibration, adjusting, etc.);

5.6.1.4.6. System shut down, short and long term system preservation;

- 5.6.1.4.7. System monitoring;
- 5.6.1.4.8. Instrumentation;
- 5.6.1.4.9. The use of the System Manual for troubleshooting OWS related technical issues, and
- 5.6.1.4.10. System routine inspections, adjustments and first and second level maintenance as defined in the TSOR Annex C, Appendix C. Preparation of the OWS for start-up;

5.6.2. The Contractor must provide offsite technical support to address and resolve any equipment operation technical issues for a period of one year commencing on completion of STW. The requests will be submitted via telephone and or email communication and must tracked and be responded to within two (2) business days.

#### 5.7. FIRST SYSTEM - ADDITIONAL WORK REQUESTS

5.7.1. The requirement for additional work for the Contractor to perform on an “as and when requested” basis will be initiated and authorized by CANADA. The scope of the additional work may include, but is not limited to the following:

- 5.7.1.1. First System installation technical assistance;
- 5.7.1.2. OWS troubleshooting;
- 5.7.1.3. First System repair for non-warranty items, and
- 5.7.1.4. Technical investigation.

#### 5.7.2. FIRST SYSTEM - NOISE TESTING

5.7.3. The First System must meet the shipboard noise requirements detailed in CFTO D-03-003-012/SG-00 Airborne Noise Levels in Canadian Forces Vessels (Air Noise Control (ANC) 100 maximum).

5.7.4. Airborne Noise testing must be conducted in accordance with, and results must meet the requirements of, D-03-003-012/SG-000 Airborne Noise Levels in Canadian Forces Vessels.

5.7.5. Noise testing results in accordance with Part 2, para 13 of D-03-003-012/SG-000 Airborne Noise Levels in Canadian Forces Vessels are to be submitted to the Technical Authority (TA) for acceptance one (1) month prior to delivery of the First System.

#### 5.8. FIRST SYSTEM - DELIVERABLES

5.8.1. Deliverables required under Section 5 (Supply of the First System) are summarized in Table 2 and are to conform to the requirements of Section 4 (Documentation).

Table 2-Documentation Deliverables Summary

Deliverable	Section in SOW	Delivery
Contract Meeting Agenda	Para 5.3.2	Meeting - 5 days
Meeting Minutes	Para 5.3.4	Meeting + 5 days
Provisioning Parts Breakdown (PPB)	Para 5.4.1	First System -1 month
Recommended Spare Parts List (RSPL)	Para 5.4.2	First System -1 month
Operation and Maintenance Manual(s) (OMM)	Para 5.5.1	First System
Noise testing results	Para 5.7.5	First System -1 month

#### 5.8.2. FIRST SYSTEM - Equipment Delivery Schedule

5.8.2.1. The Contractor must deliver one (1) OWS System no later than three (3) months following contract award or at a time agreed upon by CANADA.

## 6. SUPPLY OF OPTIONAL SYSTEMS

6.1. The following applies only if CANADA exercises the Option Period to procure twelve (12) additional systems (Option Systems). These additional systems must be functionally identical to the First System supplied.

### 6.2. OPTION SYSTEM - TECHNICAL REQUIREMENTS

6.2.1. The Contractor must comply with the technical requirements as detailed in Annex C: Technical Statement of Requirements (TSOR) for the supply of ANY Option System.

### 6.3. OPTION SYSTEM - PROJECT MANAGEMENT

6.3.1. The Contractor must designate a Project Manager (PM) with the authority to plan, direct, control and make decisions related to the Contractor's obligations under the Option System.

6.3.2. The PM must be the primary contact between the Contractor and CANADA.

6.3.3. The Contractor must prepare and deliver a Project Management Plan (PMP) to identify how the Contractor intends to fulfill the project Option System of the SOW.

6.3.4. The PMP must be delivered within two (2) months of CANADA exercising the Option Requirement or as agreed upon by CANADA. The PMP must include, but is not limited to, the following sections:

6.3.4.1. Management Organization, Communications and Responsibilities;

6.3.4.2. Work Breakdown Structure (WBS);

6.3.4.3. Master Schedule with Milestones;

6.3.4.3.1. Delivery Schedule, and

6.3.4.3.2. Critical path activities.

6.3.4.4. Quality Assurance Plan;

6.3.4.5. Test Plans, and

6.3.4.6. Risk Register and Mitigation Strategy.

6.3.5. The Contractor must develop and implement a Configuration Management Plan (CMP) in accordance with SAE EIA-649C-2019. The CMP must be delivered within two (2) months of CANADA exercising the Option Requirement or as agreed upon by CANADA.

### 6.4. OPTION SYSTEM - PROJECT MEETINGS

6.4.1. Within one (1) month of CANADA exercising the first Option System, the Contractor must conduct a project Kick-Off Meeting at the Contractor's facility.

- 6.4.2. The Contractor must prepare and deliver a meeting agenda within five (5) working days before the meeting.
- 6.4.3. The Kick-Off Meeting agenda must include, without being limited, to the following:
  - 6.4.3.1. The PMP;
  - 6.4.3.2. The CMP;
  - 6.4.3.3. The Statement of Work (SOW), and
  - 6.4.3.4. Any other contractual or programmatic issues associated with the project as mutually agreed between CANADA and the Contractor.
- 6.4.4. Progress review meetings, chaired by the CA, must take place at the Contractor's facility at a minimum of once per year. Interim meetings may also be scheduled on an as and when required basis. Contractor's attendees at these meetings must, as a minimum, be its Project Manager, Production Manager (Superintendent) and Quality Assurance Manager. Progress meetings will incorporate a technical portion to be chaired by the TA.
- 6.4.5. The Progress review meeting must encompass total project status as of the review date. The Contractor, at a minimum, must report on the following:
  - 6.4.5.1. Progress to date;
  - 6.4.5.2. Variation from planned progress and the corrective action to be taken during the next reporting period;
  - 6.4.5.3. A general explanation of foreseeable problems and proposed solutions, including an assessment of their impact on the contract in terms of schedule, technical performance and risk. The proposed solution should include the effort involved and the consequences to the schedule (Risk Register);
  - 6.4.5.4. Proposed changes to the schedule;
  - 6.4.5.5. Progress on action items, problems or special issues;
  - 6.4.5.6. Deliverables submitted prior to PRM;
  - 6.4.5.7. Milestones (technical and financial);
  - 6.4.5.8. Activities planned for the next reporting period;
  - 6.4.5.9. Status of Intellectual Property (IP) agreements, International Traffic in Arms Regulations (ITAR), Technical Assistance Agreements (TAA), Controlled Technology Access and Transfer (CTAT) or other agreements;
  - 6.4.5.10. Status of any change notifications and requests;
  - 6.4.5.11. Any changes to the PMP, and

6.4.5.12. Other business as mutually agreed to by CANADA and the Contractor.

#### 6.5. OPTION SYSTEM – MEETING AGENDA

6.5.1. The Contractor must prepare and submit an electronic copy of the agenda to CANADA no later than five (5) working days prior to any meeting. Except in the case of unscheduled meetings, in which case the Contractor must submit an agenda 24 hours prior to the meeting.

6.5.2. CANADA and the Contractor must mutually agree to the contents of the agenda.

6.5.3. Supporting documentation and the agenda must be prepared in the Contractor's format.

6.5.4. The agenda must include the following:

6.5.4.1. Purpose of the meeting;

6.5.4.2. A list of expected attendees;

6.5.4.3. Time, date, location and expected duration of the meeting;

6.5.4.4. Facilities and equipment to be provided for the attending personnel;

6.5.4.5. A list of data items and documents to be reviewed or provided to support the meeting. Adequate copies of all such data and documentation must be provided, and

6.5.4.6. Adequate copies of the current Action Item List (AIL), where appropriate.

#### 6.6. OPTION SYSTEM - MEETING MINUTES

6.6.1. The Contractor must record, produce, deliver and revise, as required, minutes for all meetings. The Contractor must prepare and distribute an electronic copy of the minutes to CANADA within five (5) working days following the meeting. Meeting minutes are accepted once signed by the CA. CANADA will advise the Contractor of any issues within two (2) working days of receiving the minutes at which point the Contractor will be responsible for revision and resubmittal within two (2) working days.

6.6.2. Meeting/Teleconference/Conference minutes must be prepared in the Contractor's format and must include the following information:

6.6.2.1. Date and location of the meeting;

6.6.2.2. Name, organization, phone number, e-mail address and title of each person that attended the meeting;

6.6.2.3. Statement relating to the purpose and/or objective of the meeting, and

6.6.2.4. The original agenda and any revisions to the agenda-this may be accomplished by reference to attachments or enclosures.

6.6.3. Minutes should include a record of each item discussed or reviewed during the meeting, including;

- 6.6.3.1. A brief statement identifying the item or problem and their status;
- 6.6.3.2. A summary of pertinent information associated with the item;
- 6.6.3.3. A recommendation;
- 6.6.3.4. An action item-identifying the person or organization responsible for taking and/or co-ordinating required action with key dates and closure criteria, and
- 6.6.3.5. An updated Action Item List (AIL) with all open and closed items.

## 6.7. OPTION SYSTEM - INTEGRATED LOGISTIC SUPPORT

6.7.1. For the Option System:

- 6.7.1.1. The Contractor must submit a Provisioning Parts Breakdown (PPB) list in accordance with CFTO D-01-100-214/SF-000 within two (2) months of CANADA exercising the Option Requirement or as agreed upon by CANADA;
- 6.7.1.2. The Contractor must submit a Recommended Spare Parts List (RSPL) in accordance with CFTO D-01-100-214/SF-000 within two (2) months of CANADA exercising the Option Requirement or as agreed upon by CANADA;
- 6.7.1.3. The Contractor must deliver a Planned Maintenance and Overhaul Schedule in accordance with CFTO C-01-100-100/AG-005 within two (2) months of CANADA exercising the Option Requirement or as agreed upon by CANADA;
- 6.7.1.4. Following the acceptance of the RSPL by CANADA, the Contractor must provide two (2) years' worth of recommended replacement parts based on a Planned Maintenance and Overhaul Schedule and Mean Time Between Failures (MTBF) data of all components to support the Option Requirement;
- 6.7.1.5. The Contractor must provide a complete parts breakdown list including consumables to the TA for review and acceptance within two (2) months of CANADA exercising the Option Requirement or as agreed upon by CANADA.
- 6.7.1.6. The Contractor must submit the Supplementary Provisioning Technical Documentation (SPTD) required for codification and cataloguing of all items listed in the PPB and RSPL;
- 6.7.1.7. The SPTD must be prepared in accordance with the instructions contained in CFTO D-01-100-214/SF-000 and delivered by the Contractor one (1) month prior to the conduct of the Initial Provisioning Conference (IPC);

- 6.7.1.8. As part of the SPTD, the Contractor must prepare and deliver engineering drawings and associated lists for review and acceptance by CANADA, which include all parts defined in the PPB and RSPL, and
- 6.7.1.9. The Contractor must hold an Initial Provisioning Conference (IPC) to allow the DND personnel the opportunity to verify that the PPB and engineering drawings and associated lists reflect the Option System configuration. The IPC must be held within three (3) months of conducting the Factory Acceptance Test (FAT) or as agreed upon by CANADA.

## 6.8. OPTION SYSTEM - TECHNICAL DATA PACKAGE

### 6.8.1. Technical Manuals

- 6.8.1.1. All technical manuals must be in both official languages of Canada: English and French.
- 6.8.1.2. Submission of all technical manuals must be made in consultation with, and within a timeframe agreed upon between CANADA and the Contractor, but not later than the delivery date of the first Option System. Consultation includes a review and concurrence that the manuals meet the criteria below, with any further changes made at the expense of the Contractor.
- 6.8.1.3. The Contractor must prepare and deliver an Operations and Maintenance Manual(s) (OMM) in accordance with CFTO C-01-100-100/AG-005 for the Option System.

### 6.8.2. Manual(s) must contain as a minimum the following as detailed in CFTO C-01-100-100/AG-005:

- 6.8.2.1. Operation instructions as well as information required for the function and specification of the Option System;
- 6.8.2.2. Recommended planned, corrective maintenance and storage instructions for the Option System;
- 6.8.2.3. Fault finding and troubleshooting section for the Option System, and.
- 6.8.2.4. An illustrated parts list (IPL) for the Option System.

## 6.9. OPTION SYSTEM - ENGINEERING DRAWINGS

- 6.9.1. The Contractor must deliver a complete set of engineering drawings for the Option System in PDF format.
- 6.9.2. The engineering drawings must include, but are not limited to;
  - 6.9.2.1. schematic drawings;

- 6.9.2.2. assembly drawings, and
- 6.9.2.3. identification of all component parts in order to conduct first and second level maintenance in accordance with TSOR Annex C, Appendix C.
- 6.9.3. The engineering drawings must be produced to a Level 1 classification in accordance with CFTO D-01-400-002/SF-000.
- 6.9.4. Engineering drawings must be submitted to the TA for acceptance not later than the date of delivery of the first Option System.

#### 6.10. OPTION SYSTEM - ENGINEERING SUPPORT

##### 6.10.1. Installation Guidance Package

- 6.10.1.1. The Contractor must prepare, in the Contractor's format, an Installation Guidance Package acceptable to the TA that will provide all the necessary information, including drawings and associated lists, sufficient to enable DND to produce a Ship Installation Specification.
- 6.10.1.2. The content of the Contractor's Installation Guidance Package must address the requirements of the Installation Guidance Package Checklist (Appendix I).
- 6.10.1.3. The Contractor must submit the draft Installation Guidance Package, within two (2) months of CANADA exercising the Option Requirement or as agreed upon by CANADA, for review by the TA.
- 6.10.1.4. The Contractor must submit a finalized Installation Guidance Package, within two (2) months of completion of the FAT or as agreed upon by CANADA, for review and acceptance by the TA.

#### 6.11. OPTION SYSTEM – CADRE AND COASTAL TRAINING

- 6.11.1. The Contractor must conduct Cadre and coastal training sessions that include, but are not limited to the following:
  - 6.11.1.1. Instruction and practical training for DND operational, maintenance and training staff on the Oily Water Separator system components and functions;
  - 6.11.1.2. Preparation of the OWS for start-up;
  - 6.11.1.3. Start-up of the OWS;
  - 6.11.1.4. Operation of the OWS;
  - 6.11.1.5. Switch of the Bilge Alarm from 15 ppm to 5 ppm, if applicable;
  - 6.11.1.6. The optimization of the performance of the OWS (i.e. tuning, calibration, adjusting, etc.);

- 6.11.1.7. System shut down and short and long term system preservation;
  - 6.11.1.8. System monitoring;
  - 6.11.1.9. Instrumentation;
  - 6.11.1.10. The use of the System Manual for troubleshooting OWS related technical issues, and
  - 6.11.1.11. System routine inspections, adjustments and first and second level maintenance as defined in the TSOR Annex C, Appendix C.
- 6.11.2. The Contractor must prepare and produce a Course Training Package (CTP) for the Cadre and coastal training sessions.
- 6.11.3. The Contractor must deliver a CTP in accordance with best current industrial practices. The CTP must include, but is not limited to the following:
- 6.11.3.1. Outline;
  - 6.11.3.2. Student Training material;
  - 6.11.3.3. Workbooks and Manuals, and
  - 6.11.3.4. Appropriate training aids to be used with or without the availability of the Option System for training.
- 6.11.4. The Contractor must submit the CTP within two (2) months of completion of the FAT or as agreed upon by CANADA. The CTP will be reviewed by the TA prior to acceptance and any comments will be forwarded within one month of submission for contractor action. The Contractor will update the CTP to address any deficiencies or modifications noted by the TA and resubmit within one (1) month for acceptance by the TA.
- 6.11.4.1. The CTP will be used for subsequent internal DND training on the Option Systems at DND facilities.
- 6.11.5. The Contractor must conduct 14 (fourteen) operator and maintenance cadre training sessions.
- 6.11.5.1. Twelve training sessions must be provided to DND operational, maintenance and shipboard staff.
    - 6.11.5.1.1. Five (5) training sessions will take place in Esquimalt, BC and seven (7) training sessions will take place in Halifax, NS respectively aboard HFX Class ships alongside.
    - 6.11.5.1.2. Each of the Cadre training sessions must be conducted concurrently with the individual ship installation STW.

- 6.11.5.1.3. The Cadre training sessions must be conducted with a maximum of six (6) students at each training session.
  - 6.11.5.1.4. The Cadre training sessions must take no more than five (5) business days or as agreed upon by CANADA.
  - 6.11.5.1.5. The Contractor must provide six (6) student training material hard copies and one (1) student training material soft copy for each Cadre training session.
  - 6.11.5.1.6. The scheduling of each Cadre training session will be dependent on the ship installation schedule and will be coordinated between the TA and the Contractor.
- 6.11.5.2. Two (2) coastal training sessions must be provided to DND operational, maintenance and training staff. The intent of this training is to prepare personnel to teach operation of the option systems to students (train-the-trainer) and to instruct shore based maintainers in advanced system second level maintenance and repair.
- 6.11.5.2.1. One (1) coastal training session will take place in Esquimalt BC and one (1) coastal training session will take place in Halifax, NS at the respective Canadian Forces Naval Engineering School. .
  - 6.11.5.2.2. The coastal training sessions must be conducted with a maximum of ten (10) students at each training session.
  - 6.11.5.2.3. The coastal training sessions must take no more than five (5) business days or as agreed upon by CANADA.
  - 6.11.5.2.4. The Contractor must provide ten (10) CTP hard copies and one (1) CTP soft copy for each coastal training session.
  - 6.11.5.2.5. Each of these coastal training sessions must be conducted within one (1) year of the first respective coastal ship installation STW and will be coordinated between the TA and the Contractor.

## 6.12. OPTION SYSTEM -TESTS AND TRIALS

- 6.12.1. Testing and qualification of the Option System for Shock, Vibration or Electromagnetic Interference, if not already tested and qualified, must be successfully completed by the Contractor within one (1) year of CANADA exercising the option requirement for the Option System(s) and prior to performing the Factory Acceptance Test (FAT). Any system design changes required to obtain qualification must not affect the performance measured for the First System, hence the Option System must be functionally identical.

6.12.2. For Option Systems already tested and qualified, the Contractor must provide copies of certificates or test reports clearly demonstrating to the TA compliance with the stated requirements for shock, vibration and electromagnetic interference.

#### 6.12.3. Shock

6.12.3.1. For the Option Systems to meet the shipboard shock requirements detailed in CFTO D-03-003-007/SG-000, the Contractor must perform, produce and deliver, in the Contractor's format, the shock calculations detailed in CFTO D-03-003-007/SG-000 to meet Shock Grade 3 requirements to qualify the equipment.

6.12.3.2. Shock calculations must be submitted for TA review and acceptance on a mutually agreed date, but not less than the (3) months prior to performing the FAT.

#### 6.12.4. Vibration

6.12.4.1. For the Option Systems not tested to meet the shipboard vibration requirements detailed in CFTO D-03-003-019/SG-001, the Contractor must produce and deliver, in the Contractor's format a Vibration Test (VT) plan and procedure to be utilized to attain the required qualification.

6.12.4.2. The VT plan and procedures must contain all conditions, precautions, adjustments, mounting, equipment configuration and test equipment requirements to prepare the equipment for test.

6.12.4.3. The VT plan and procedures must be submitted for TA review and acceptance on a mutually agreed date, but not less than one (1) month prior to undertaking qualification testing.

6.12.4.4. The Contractor must conduct, on a date agreed between the Contractor and CANADA, the accepted VT on an Option System, optionally witnessed by the TA or designated representative.

6.12.4.5. The Contractor must produce and submit a VT report, in the Contractor's format, upon successful completion of the test within 10 (ten) days of testing to the TA. The report must contain, as a minimum, qualification attained, all readings recorded, measurements taken, observations made and the names and signatures of test witnesses.

#### 6.12.5. Electromagnetic Interference

6.12.5.1. For the Option Systems not tested to meet the shipboard Electromagnetic Interference requirements detailed in CFTO C-03-010-000/MM-001, the Contractor must produce and deliver, in the Contractor's format an Electromagnetic Interference Test (EMIT) plan and procedure to be utilized to attain the required qualification.

- 6.12.5.2. The EMIT plan and procedures must contain all conditions, precautions, adjustments, equipment configuration and test equipment requirements to prepare the equipment for test.
- 6.12.5.3. The EMIT plan and procedures must be submitted for TA review and acceptance on a mutually agreed date, but not less than one (1) month prior to undertaking qualification testing.
- 6.12.5.4. The Contractor must conduct, on a date agreed between the Contractor and CANADA, the accepted EMIT on an Option System, optionally witnessed by the TA or designated representative.
- 6.12.5.5. The Contractor must produce and submit an EMIT report, in the Contractor's format, upon successful completion of the test within 10 (ten) days of testing to the TA. The report must contain, as a minimum, qualification attained, all readings recorded, measurements taken, observations made and the names and signatures of test witnesses.
- 6.12.6. Factory Acceptance Test
- 6.12.6.1. The Contractor must produce and deliver, in the Contractor's format, a Factory Acceptance Test (FAT) plan and procedure that provides an overall outline of the entire spectrum of activities related to the factory test of the Option System for functionality and performance. This is to include pass/fail criteria.
- 6.12.6.2. The FAT plan and procedures must contain all conditions, precautions, adjustments, starting procedures, tolerances and test equipment required to prepare the Option System for execution of the FAT.
- 6.12.6.3. The FAT plan and procedure must be submitted for TA review and acceptance on a mutually agreed date, but not less than 15 (fifteen) days prior to commencing testing of the first complete Option System.
- 6.12.6.4. The Contractor must conduct the FAT within three (3) months of CANADA receiving the Shock calculations, Electromagnetic Interference report and Vibration report (or proof of testing and qualification of Shock, Vibration or Electromagnetic Interference) or as agreed upon by CANADA.
- 6.12.6.5. The Contractor must conduct the accepted FAT for the first Option System in the Contractor's facility; witnessed by the TA or TA designated representatives.
- 6.12.6.6. The Contractor must produce and submit a FAT report, in the Contractor's format, on successful completion of the Option System test within 10 (ten) days of testing to the TA. The report must contain, as a minimum, all readings recorded, measurements taken, observations made and the names and signatures of test witnesses.

#### 6.12.7. Set-to-Work Tests

- 6.12.7.1. The Contractor must produce and deliver, in the Contractor's format a STW plan and procedure that provides detailed instructions for the inspection, set up, adjustment and functional test of each Option System after installation in each designated location.
- 6.12.7.2. The STW plan and procedure must be submitted for TA review and acceptance on a mutually agreed date, but not less than 15 (fifteen) days prior to the first complete Option System to be delivered.
- 6.12.7.3. The accepted STW must be performed by the Certified Contractor Representative equipped with any special tools, instruments or parts necessary to perform the work after installation of each Option System in each designated location.
- 6.12.7.4. STW activities performed by the Certified Contractor Representative must be witnessed by the TA or designated representative.
- 6.12.7.5. On completion of each STW, the Option System must be certified in writing by the Certified Contractor Representative as fully prepared and ready for in-service use.
- 6.12.7.6. The Contractor must produce and submit a STW report, in the Contractor's format, on successful completion of each Option System's STW within 10 (ten) days to the TA. The report must contain, as a minimum, all readings recorded, measurements taken, observations made, the names and signatures of STW witnesses, training conducted and the names of personnel trained.
- 6.12.7.7. Availability of Certified Contractor Representative to perform STW must be arranged between the Contractor and TA with the Contractor given a minimum 30 (thirty) days' notice by CANADA of the requirement to perform the STW.
  - 6.12.7.7.1. The STW must take no more than five (5) business days or as agreed upon by the CANADA.
  - 6.12.7.7.2. Scheduling of each STW will be dependent on ship installation schedule and will be coordinated between the TA and the Contractor.

#### 6.12.8. Harbour Acceptance Trial Test Plan:

- 6.12.8.1. The Contractor must produce and deliver, in the Contractor's format, a Harbour Acceptance Test plan and procedure (HATTP) that provides an overall outline of the entire spectrum of activities related to the test of the Option System for functionality and performance as installed in a HFX Class ship.
- 6.12.8.2. The HATTP must detail the procedures to be followed for Option System preparation, instrumentation calibration or test, loading, start up, operation and shutdown to test the performance of the Option System against factory results.

- 6.12.8.3. The HATTP must be submitted for TA review and acceptance upon a mutually agreed date, but not less than 15 (fifteen) days prior to the first installed Option System to be tested.
- 6.12.8.4. The HATTP will be conducted once by the TA or designated representative. The Contractor must provide a Certified Contractor Representative to assist in the operation of the Option System and to provide technical guidance for the duration of the HATTP.
- 6.12.8.5. Availability of a Certified Contractor Representative to support conduct of the HATTP must be arranged between the Contractor and TA with the Contractor given a minimum 30 (thirty) days' notice by CANADA of the requirement to provide the HATTP assistance
- 6.12.8.6. The HATTP must take no more than two (2) business days or as agreed upon by the CANADA.
- 6.12.8.7. Scheduling of each HATTP will be dependent on ship installation schedule and will be coordinated between the TA and the Contractor.
- 6.12.9. Sea Acceptance Trial Test Plan:
- 6.12.9.1. The Contractor must produce and deliver, in the Contractor's format, a Sea Acceptance Trial Test Plan (SATTP) that provides an overall outline of the entire spectrum of activities related to the test of the Option System for functionality and performance as installed in a HFX Class ship at sea.
- 6.12.9.2. The SATTP must detail the procedures to be followed for Option System preparation, instrumentation calibration or test, loading, start up, operation and shutdown under the environmental conditions specified in the TSOR (Annex C) to test the performance of the supplied equipment against factory results.
- 6.12.9.3. The SATTP must be submitted for TA review and acceptance concurrently with the HATTP.
- 6.12.9.4. The SATTP will be conducted by the TA or designated representative.
- 6.13. OPTION SYSTEM - ADDITIONAL WORK REQUESTS
- 6.13.1. The requirement for additional work for the Contractor to perform on an "as and when requested" basis will be initiated and authorized by CANADA. The scope of the additional work may include but is not limited to the following:
- 6.13.1.1. Ship OWS technical assistance;
- 6.13.1.2. OWS troubleshooting;
- 6.13.1.3. Technical investigation, or

6.13.1.4. Additional OWS operator/maintainer training.

6.14. OPTION SYSTEM - WARRANTY

6.14.1. Refer to Terms and Conditions (T&C) for warranty requirements.

6.15. OPTION SYSTEM - PREPARATION FOR DELIVERY

6.15.1. Equipment marking and preparation for shipping are as detailed in CFTOs D-02-002-001/SG-001, D-LM-008-002/SF-001 and D-LM-008-036/SF-000

6.16. OPTION SYSTEM - DELIVERABLES

6.16.1. Deliverables required under Section 6 (Unit Requirement) are summarized in Table 3 and are to conform to the requirements of Section 4 (Documentation).

Table 3-Option System – Documentation Deliverables Summary

Deliverable	Section in SOW	Delivery
Project Management Plan (PMP)	Para 6.3.4	Exercise of Option +2 months
Configuration Management Plan (CMP)	Para 6.3.5	Exercise of Option +2
Contract Kick-Off-Meeting Agenda	Para 6.4.2	Meeting -5 days
Meeting Agenda	Para 6.5.1	Meeting -5 days
Meeting Minutes	Para 6.6.1	Meeting +5 days
Provisioning Parts Breakdown (PPB)	Para 6.7.1.1	Exercise of Option +2 months
Recommended Spare Parts List (RSPL)	Para 6.7.1.2	Exercise of Option +2 months
Planned Maintenance Schedule and Overhaul Schedule	Para 6.7.1.3	Exercise of Option +2 months
Complete Parts Breakdown List	Para 6.7.1.5	Exercise of Option +2 months
Supplementary Provisioning Technical Documentation (SPTD)	Para 6.7.1.7	IPC -1 month
Operation and Maintenance Manual(s) (OMM)	Para 6.8.1.3	First Option Delivery
Engineering Drawings	Para 6.9.4	First Option Delivery
Draft Installation Guidance Package	Para 6.10.1.3	Exercise of Option +2 months
Installation Guidance Package	Para 6.10.1.4	FAT +2 months
Cadre Training Package (CTP)	Para 6.11.4	FAT +2 months
Proof of Qualification for Shock	Para 6.12.2	Prior to start of FAT
Proof of Testing and Qualification for Vibration	Para 6.12.2	Prior to start of FAT
Proof of Testing and Qualification for Electromagnetic Interference	Para 6.12.2	Prior to start of FAT
Shock Test (ST) calculations	Para 6.12.3.2	FAT –3 months
If required, Vibration Test (VT) Plan and Procedure	Para 6.12.4.3	Test -1 month
If required, Vibration Test (VT) Report	Para 6.12.4.5	Test + 10 days
If required, Electromagnetic Interference Test (EMIT) Plan and Procedure	Para 6.12.5.3	Test -1 month
If required, Electromagnetic Interference Test (EMIT) Report	Para 6.12.5.5	Test + 10 days
Factory Acceptance Test (FAT) Plan and Procedure	Para 6.12.6.3	FAT -15 days
Factory Acceptance Test (FAT) Report	Para 6.12.6.6	FAT +10 days
Set-To-Work (STW) Plan and Procedures	Para 6.12.7.2	First delivery -15 days
Set-To-Work (STW) Certificate (one for each unit)	Para 6.12.7.5	As scheduled
Set-To-Work (STW) Report (one for each unit)	Para 6.12.7.6	As scheduled +10 days
Harbour Acceptance Trial Test Plan (HATTP) and Procedure	Para 6.12.8.3	As scheduled -15 days
Sea Acceptance Trial Test Plan (SATTP) and Procedure	Para 6.12.9.3	Same date as HATTP

6.16.2. Equipment Delivery Schedule

6.16.2.1. The Contractor must deliver the Option System(s) at a time agreed upon by CANADA.

## Installation Guidance Package Checklist

Item	Description
<b>General Documentation</b>	
G1.	Drawing Title, number and revision match the Drawing List
G2.	Unit description and nomenclature identified on Drawing
G3.	Drawing reproducible
G4.	Drawing legible
G5.	Drawing signed off by appropriate authority
G6.	Drawing received in original electronic format (PDFs acceptable)
G7.	3D models (if available) (in any format)
<b>Physical Size</b>	
PH1.	Equipment size completely described (height, width, depth )
PH2.	Dimensional tolerance specified
PH3.	All moving part clearances and installation or maintenance access areas defined and labelled
PH4.	If equipment shock mounted, are excursion clearances defined
PH5.	Sway brace mounting points defined
PH6.	Cable clearance defined
PH7.	Weight stated, if liquid cooled, wet-weight is required
PH8.	Centre of gravity dimensionally located
PH9.	Mounting bolt pattern or templates, etc., identified and dimensioned
PH10.	Mounting hole size defined
PH11.	Mounting hardware defined (fastener/washer quantity, size and type)
PH12.	Non-standard mounting hardware torque values defined (dry or lubricated)
PH13.	Mounting restrictions (such as orientation or location) based on shock qualification are stated. If restrictions do not exist, then "unrestricted mounting" should be stated.
PH14.	Coolant connections dimensionally located
PH15.	Cooling air exhaust and intake defined and dimensionally located and clearance required for air inlet/exhaust stated
PH16.	Dry/air/gas connection defined (marked with "inlet" or "purge point") and dimensionally located
PH17.	Cable connections dimensionally located
PH18.	Waveguide connections defined (flange type and marked with "port #" or "RF output") and dimensionally located
PH19.	Dimensionally locate and size unit ground studs if required
PH20.	Lifting aids dimensionally located. Eyebolt ID/OD defined
<b>Foundation</b>	
F1.	Mounting surface requirements defined (flatness, orientation, etc.)
F2.	Resilient mounting indicated
F3.	Interfacing materials defined (for galvanic corrosion avoidance)
F4.	Mounting plate thickness
F5.	Critical Alignment requirements
F6.	Bonding and grounding requirements clearly stated
F7.	Are special installation notes required (bonding, grounding, spacers, etc.)
<b>Topside</b>	
T1.	Centre of wind resistance located
T1A.	Drag & lift @ rated max environmental wind load
T2.	System characteristics i.e., rotating or non-rotating antenna, forcing frequencies, feedback control system characteristics, etc.
T3.	All available rotating antenna/radome vibration test data

Item	Description
T4.	Antenna/Radome Finite Element Model, or the following: Antenna/Radome basic geometry, Weight and centre-of-gravity Rotary moments-of-inertia, Material properties, System stiffness matrix
T5.	Are service platforms for access and maintenance defined if required
T6.	Maximum allowable loads (including accelerations) stated, environmental requirements defined
T7.	Topside installation notes stated
<b>Power</b>	
PW1.	Power requirements (type, operating voltage, peak current including fully drained UPS if applicable, nominal current, frequency, phase and source) defined
PW2.	Power factor (leading or lagging) for steady state operation
PW3.	Grounding requirements (single point, wire gauge)
PW4.	External motor power and load factor stated if applicable
PW5.	Make and type of electric motor (AC induction, AC synchronous, DC shunt, DC series, etc.)
PW6.	Electrical connection diagram
PW7.	External motor efficiency (%) stated if applicable
<b>Heat Dissipation</b>	
H1.	Cooling requirements stated (CFM, GPM, inlet temp, quality, flow pressure, max pressure drop)
H2.	Coolant connections located, identified (type, flow direction)
H3.	Flow rate cooling requirements per MIL-W-21965
H4.	Water cooled equipment requirements: flow, inlet temperature, flow pressure, and maximum pressure drop
H5.	Heat dissipation to coolant and to room stated for steady state condition
<b>Electrical Interfaces</b>	
EL1.	Cable connections identified (marking, jack #)
EL2.	Cable connections defined (part number identified)
EL3.	Connector pinning information
EL4.	Interface type (i.e., RS-232, NTDS, etc.) and function name
EL5.	If redundant interfaces, indicate Norm and Alt
EL6.	Waveguide connections identified
EL7.	Sufficient cable clearance identified
EL8.	For non-standard interfaces, cable length constraints or max allowable loss value is given
<b>Environmental</b>	
EN1.	Shock grade and class per MIL-S-901 and D-03-003-007/SF-000
EN2.	Vibration requirements per MIL-STD-167-1
EN3.	Operating and non-operating temperature ranges
EN4.	Relative Humidity MIL-STD-810
EN5.	Power tolerances per STANAG 1008
<b>Other</b>	
O1.	Special Human factors access requirements defined (sight gage, handles, switches, etc.)
O2.	Special installation tools or special test equipment identified if required
O3.	Special stowage requirements listed if required, i.e. SWE headsets, SWE test cables, SWE hoses, etc.
O4.	Control, Monitoring & Instrumentation Requirements
O5.	Can unit be mounted in exposed weather, if so, installation guidance provided
O6.	EMI Characteristics

<b>Item</b>	<b>Description</b>
O7.	Dry air/gas requirements defined (pressure, quantity, quality, etc. for normal operation and initial operation/post maintenance)
O8.	Special waterproofing requirements stated
O9.	Other non-standard installation practices stated if required
O10.	Any Other installation related factors that should be considered