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11 Laurier St. / 11, rue Laurier
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Core 0B2 / Noyau 0B2
Gatineau
Québec
K1A 0S5
Bid Fax: (819) 997-9776

SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

Vendor/Firm Name and Address
Raison sociale et adresse du
fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution
Electronics, Simulators and Defence Systems Div.
/Division des systèmes électroniques et des systèmes de
simulation et de défense
11 Laurier St. / 11, rue Laurier
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Gatineau
Québec
K1A 0S5

Title - Sujet Naval Remote Weapon Station	
Solicitation No. - N° de l'invitation W8472-125389/C	Amendment No. - N° modif. 003
Client Reference No. - N° de référence du client W8472-125389	Date 2015-09-25
GETS Reference No. - N° de référence de SEAG PW-\$\$QF-101-25301	
File No. - N° de dossier 101qf.W8472-125389	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2015-11-06	
Time Zone Fuseau horaire Eastern Standard Time EST	
F.O.B. - F.A.B. Specified Herein - Précisé dans les présentes	
Plant-Usine: <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input checked="" type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Rancourt, Michael	Buyer Id - Id de l'acheteur 101qf
Telephone No. - N° de téléphone (819) 956-5650 ()	FAX No. - N° de FAX (819) 956-5650
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: See Herein	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée	Delivery Offered - Livraison proposée
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date

This solicitation amendment 3 is to respond to bidders questions, and insert revised Request for Proposal (RFP) documents:

Due to responses to Bidder Questions, the following revised RFP documents have been provided with this amendment and will supersede the existing RFP documents:

- a) Volume 1, Annex D NRWS Bid Evaluation Plan.
- b) Volume 1, Appendix 1 to Annex D Compliance Matrix.
- c) Volume 2, Appendix 3 to Annex B Technical Statement of Requirements; and
- d) Volume 2, Appendix 4 to Annex B Installation Guidance Package.

As a result, the following sections have been revised in the above documents provided with this amendment:

- a) Volume 1, Annex D: Table 2 – Area 1 Total Scores, Table 3 – Area 2 Total Scores, Table 4 – Area 3 Total Scores, Table 6, Table 7 requirements numbering, and Table 7 – Area 6 Total Scores;
- b) Volume 1, Appendix 1 to Annex D: Table 2 – requirements 3.2.2, 3.3.2, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.4.16, 3.4.18, 3.9.13, and 3.10.5;
- c) Volume 2, Appendix 3 to Annex B: requirements 3.9.13, and 5.1.1; and
- d) Volume 2, Appendix 4 to Annex B: requirements 1.4, 3.3.4.1, 3.3.6.2, 3.3.7.2, and 3.3.8.2.

Bidder Questions

Question 1:

Reference: Volume 2 Annex B Appendix 3 Technical Statement of Requirements (TSOR)

(Applicable Requirements: 3.2.7, 3.3.18, 3.4.7 and 3.4.18) In order to satisfy the TSOR requirements of 3.2.7 (decoupled elevation), 3.3.18 (independent EOSS stabilization) and 3.4.7 (threat at centre of Operator Display), it appears that Canada is looking for a fully stabilized EOSS pod with an independent range of motion relative to the mount. Please confirm or detail Canada's requirement as it pertains to the relationship of these three requirements.

Answer:

The bidder's proposed solution shall meet each individual requirement in order to be considered responsive.

Question 2:

Reference: Volume 2 Annex B Appendix 3 TSOR

(Applicable Requirement: 3.3.18) If the mount is fixed in a stationary position, what is the qualitative measurement for the expected level of stabilization of the EO sensor suite? Recommend modifying requirement similar to TSOR stabilization requirement 3.3.9, but specific to the EO sensor suite while the mount is fixed in a stationary position.

Answer:

The requirement shall be left as is.

Question 3:

Reference: Volume 2 Annex B Appendix 3 TSOR

(Applicable Requirements: 3.3.4, 3.3.6, 3.3.11 and 3.3.13) It is assumed that the NRWS shall enable the Operator to select (acquire) a threat for automatic tracking, as per requirement 3.3.3. For requirements 3.3.4, 3.3.6, 3.3.11 and 3.3.13, it is recommended that "automatically" be removed from the requirement as it is desirable that the Operator be responsible for the identification of threats for automatic tracking.

Answer:

Operator's ability to acquire and track threats is captured under Volume 2 Annex B Appendix 3 TSOR requirement 3.3.8.

Question 4:

Reference: Volume 2 Annex B Appendix 3 TSOR

(Applicable Requirement: 3.9.10.6) Please identify what protocol is used by the Navigation Distribution System (NDS) to report the true bearing.

Answer:

The NDS protocol to report true bearing is through a Local Area Network (LAN) in accordance with RFC1112 Internet Group Management Protocol (IGMP).

Question 5:

Reference: Volume 1 Annex D NRWS Bid Evaluation Plan.

(Applicable Requirements: 21, 26, 30, 32, 34, 36, 38, 39, 40, 41, 42 and 43) Subject requirements are collector requirements for a number of individual requirements, and are point rated as Theory, Simulation or Application. How will Canada evaluate these collector requirements if the bidder's compliance is a mixture of Theory, Simulation and Application?

Example: Section 3.2 Surveillance, has 19 individual requirements. If a bidder can prove ten (10) requirements as Application and nine (9) requirements as Theory, what rating would the bidder receive?

Answer:

Collector requirements have been broken down into individual requirements for the purpose of the evaluation. A revised Volume 1, Annex D NRWS Bid Evaluation Plan, and Volume 1, Appendix 1 to Annex D Compliance Matrix, has been inserted with this amendment to formerly add these changes.

Question 6:

Reference: Volume 1 Annex A NRWS RFP

(Applicable Requirement: 1.1.c) This section looks to be incorrect as the remainder of the RFP identifies the following parts "PART A: NRWS Acquisition and Repair and Overhaul Bid Section" and "PART B: NRWS Industrial and Technological Benefits and Value Proposition Bid Section". Please confirm that these parts are accurate.

Answer:

DELETE Volume 1 Annex A, Article 1.1 (c) in its entirety, and

REPLACE The above delete text with the following:

- (c) Notwithstanding that this solicitation divides the bid into two parts (Part A: NRWS Acquisition and Repair and Overhaul Bid Section, and Part B: NRWS Industrial and Technological Benefits and Value Proposition Bid Section), Canada may consider information submitted for one part in its evaluation of the other part. It is the Bidder's responsibility to ensure consistency amongst all parts of its bid.

Question 7:

Reference: Volume 2 Annex B NRWS Statement of Work

(Applicable References: 3.7.1.7.e and f) Functional Audit and Physical Configuration Audit are to be held at "Canada's facility"; however, Table 1: Key Events and Prerequisites identifies that these must be held before any Training Facility or Ship Installation. As it is highly beneficial for these audits to occur in the proximity of the NRWS equipment, it is recommended that these be held at the Contractor's facility or a mutually agreed location.

Answer:

DELETE Volume 2 Annex B Statement of Work, Article 3.7.1.7 (e) & (f) in its entirety, and

REPLACE The above delete text with the following:

- e. Functional Audit, convened at Contractor's facility – In accordance with paragraphs 4.7.3.1, 4.7.3.2 and 4.7.3.3;
- f. Physical Configuration Audit (PCA), convened at Contractor's facility – In accordance with paragraphs 4.7.3.1, 4.7.3.2, and 4.7.3.3;

Question 8:

Reference: Volume 2 Annex B Appendix 3 TSOR

(Applicable Reference: 5.1.1) The Installation Guidance Package (Volume 2 Annex B, Appendix 4) identifies that all Operator Chairs will be provided by Canada (3.3.4.1) and the Contractor will be responsible for installation. Please confirm that 5.1.1 is a Draft RFP holdover and that the Operator Chairs will be provided by Canada.

Answer:

"Seats" in Volume 2 Annex B Appendix 3 TSOR requirement 5.1.1 is intended to mean any bases to which equipment will be fastened and is not defined as an Operator Chair.

Question 9:

Reference: Volume 2 Annex B Appendix 4 Installation Guidance Package

(Applicable Reference: 1.4) The Installation Guidance Package identifies that Veto Switches will be provided by Canada (3.3.9.3) and the Contractor will be responsible for firing circuit interrupt cables. Please confirm the Veto Switches will be provided by Canada.

Answer:

DELETE Volume 2, Annex B Appendix 4 Article 1.4, in its entirety, and

REPLACE The above delete text with the following:

- 1.4 The installation of the NRWS System will consist of installing multiple remotely operated weapon mounts, sensor suites, and operator consoles.

Question 10:

Reference: Volume 3 Annex E, Industrial and Technological Benefits (ITB) Terms and Conditions

Please confirm that this is the correct file and should be labelled VOLUME 3 ANNEX E.

Answer:

Correct, there are two identical Industry Canada ITB Terms and Conditions documents in the Request for Proposal, one for the resulting Acquisition contract (Volume 2 Annex C), and one for the Repair and overhaul Contract (Volume 3 Annex E). Both documents were labeled in error as Volume 2, Annex C.

DELETE The title "VOLUME 2 ANNEX C" from Volume 3 Annex E, in its entirety, and

REPLACE The above delete title with:

VOLUME 3 ANNEX E

Question 11:

Reference: Volume 1, Part 5 - Certifications

(Applicable Reference: 5.1.1) The sentence is cut off. Please amend with full requirement.

Answer:

DELETE Volume 1, Article 5.1.1 Declaration of Convicted Offences, in its entirety, and

REPLACE The above delete title with:

5.1.1 Declaration of Convicted Offences

As applicable, pursuant to subsection Declaration of Convicted Offences of section 01 of the Standard Instructions, the Bidder must provide with its bid, a completed Declaration Form, to be given further consideration in the procurement process.

(<http://www.tpsgc-pwgsc.gc.ca/ci-if/formulaire-form-eng.html>)

Question 12:

Reference: Volume 2 NRWS RFP

(Applicable Reference: 8.1) Please confirm that "N°1, N°8" should read "N°1 through N°8".

Answer:

DELETE Volume 2, Article 8.1 Basis of Payment – Firm Price, in its entirety, and

REPLACE The above delete title with:

8.1 Basis of Payment – Firm Price

For Schedule A NRWS Acquisition Pricing Article 2, items N°1 through N°8, and should the options be exercised, Schedule A Article 3 items N°1 through N°5:

In consideration of the Contractor satisfactorily completing its obligations under the Contract, the Contractor will be paid a *Firm Price* of \$ (to be inserted at contract award).

For the firm price portion of the Work only, Canada will not pay the Contractor for any design changes, modifications or interpretations of the Work unless they have been approved, in writing, by the Contracting Authority before their incorporation into the Work.

Question 13:

Reference: General RFP

Live firing test within the scope of the evaluation of technical requirements require the following items, but not limited to; munitions, air target (drone/UAV), target sea surface ship/vessel, target set up, periphery safety set up and personnel. Please clarify if these items and services will be provided by Canadian government, free of charge.

Answer:

No live firing tests are required for the scope of bid evaluation. Canada is responsible for the costs of listed items and services once in contract.

Question 14:

Reference: General RFP

With reference to "3.5 Weapon Effectiveness" section of table 2 "Vol.1 Annex D Appendix 1 Compliance Matrix", it reads (in 3.5.2.c) that firing from a range of 600m will be performed with an airspeed of 64m/sec. We calculate, with these assumptions, that the target would reach the vessel/weapon in 8 seconds. However, it is required in this article that the mission must be accomplished in 16 seconds. Please clarify.

Answer:

A fire control solution can be obtained at a distance greater than 600 meters. The 16 seconds commences once a fire control solution is obtained.

Question 15:

Reference: Volume 2 Annex B NRWS Statement of Work

(Applicable References: 1.1.1) Volume 2 Annex B NRWS Statement of Work (SOW) 1.1.1 defines the work to be completed. Volume 2 Annex B 1.3.1 (o), a system is defined as

"NRWS System: The NRWS System consists of four remotely operated NRWS mounts, sensor suites, and NRWS operator consoles integrated together."

In Volume 2 Annex B Appendix 3 Technical Statement of Requirements 1.2.1 (d), NRWS is defined as:

"NRWS: One NRWS Mount and an NRWS Operator Console and all the auxiliary components."

In Volume 2 NRWS Resulting Contract Schedule A, it requires:

- forty (40) complete NRWS (including cabling) as defined in Annex B Statement of Work and its appendices;
- eight (8) complete NRWS as defined in Annex B Statement of Work and its appendices; and
- an optional eight (8) additional complete NRWS as defined in Annex B Statement of Work and its appendices.

Please confirm:

- a) The NRWS System is 4 x NRWS with all the ancillary equipment as defined in Annex B Statement of Work and its appendices (i.e. with backup power, recording, veto).
- b) Forty (40) complete NRWS is 10 Halifax ship sets of NRWS System.
- c) Eight (8) complete NRWS is 2 Queenston ship sets of NRWS System (same as Halifax but minus cables).
- d) Eight (8) additional complete NRWS is 2 Halifax ships sets of NRWS and will be exercised as ship sets.
- e) If the options are not for 2 ship sets, then what would be required to be delivered if quantity one was requested?
- f) What is required for the NRWS in a training facility (i.e. one working NRWS mount and operator console

Answer:

The following is confirmed:

- a) the NRWS System is 4 x NRWS with all the ancillary equipment as defined in Annex B Statement of Work and its appendices (i.e. with backup power, recording, veto);

-
- b) forty (40) complete NRWS is 10 Halifax ship sets of NRWS System;
 - c) eight (8) complete NRWS is 2 Queenston ship sets of NRWS System (same as Halifax but minus cables); and
 - d) eight (8) additional complete NRWS is 2 Halifax ships sets of NRWS and will be exercised as ship sets. The options will be exercised as ship sets and not individual units. A NRWS Training Facility consists of one working NRWS mount and operator console.

Question 16:

Reference: Volume 2 NRWS RFP

(Applicable Reference: Schedule A, TSOR and IGP) In Volume 2 NRWS Acquisition Resulting Contract Schedule A Article 4 it states "costs to install one (1) Halifax Class NRWS System" but further indicates "Applies to Schedule A, Article 2 Item N°1, N°6, and should the options be exercised, Schedule A Article 3 Item N°1". Item N°6 is Training Facilities NRWS and not Halifax Class. Please clarify.

Answer:

DELETE Reference to Schedule A, Article 2 Item N°6, from Schedule A Article 4.

Question 17:

Reference: Volume 2 Annex B Appendix 4 IGP

(Applicable Reference: 3.3.3.1)

Please define "sufficient space" as it pertains to the passage way to the remainder of the compartment.

Answer:

"Sufficient Space" shall be interpreted as the minimum width of One Person Passage Forward as defined in section 5.11.2.2.2 of MilSTD 1472G.

Question 18:

Reference: Volume 2 Annex B Appendix 3 TSOR

(Applicable Reference: 6.2.1) In addition to the defined Deployment Usage Period of 90 days, please identify an average number of deployments per NRWS system per year.

Answer:

Volume 2 Annex B Appendix 3 TSOR Requirement 6.2.2 further defines total availability per calendar year.

Question 19:

Reference: Volume 2 Annex B Appendix 4 IGP

Solicitation No. - N° de l'invitation

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Amd. No. - N° de la modif.

003

Buyer ID - Id de l'acheteur

101qf

Client Ref. No. - N° de réf. du client

W8472-125389

File No. - N° du dossier

101qfW8472-125389

CCC No./N° CCC - FMS No/ N° VME

Various requirements are to be met "by Canada" as per the NRWS Installation Guidance Package. Can it be assumed that all activities will be completed prior to the Contractor performing its activities?

Answer:

Yes, it can be assumed that all activities by Canada will be completed prior to the Contractor performing their activities.

Question 20:

Reference: Volume 2 Annex B Appendix 3 TSOR

(Applicable Reference: 3.9.12.4) Please confirm what video standard is expected by Canada. We assume NTSC and not PAL.

Answer:

The video standard is NTSC.

Question 21:

Please confirm that this acquisition does not include the procurement of the Fabrique National (FN) M2 0.50 Calibre Heavy Machine Gun (HMG) or the 7.62 millimetre C6 machine gun as these will be Government Furnished?

Answer:

Yes, confirmed that this acquisition does not include the procurement of the Fabrique National (FN) M2 0.50 Calibre Heavy Machine Gun (HMG) or the 7.62 millimetre C6 machine gun as these will be Government Furnished.

Question 22:

Reference: Volume 1 Annex D NRWS Bid Evaluation Plan

As per RFP Volume 1, Annex D 3.1 (b), bidders are required to submit "Proven Experience" write-ups.

In order to do so, bidders may need to contact Department of National Defence (DND) Project Managers from previous DND / Royal Canadian Navy (RCN) projects to submit their name, contact information and confirm acknowledgement of that experience.

Not knowing if some of the individuals from the DND may be involved with the NRWS project, what is an acceptable way for us to contact members of the DND?

Answer:

The Bid Evaluation document in section 3.1 (b) identifies the criteria to demonstrate "proven experience." In order to obtain contact information (or permission to use their contact information) from Government officials involved with the NRWS project, the request should be sent to the NRWS Contracting Authority. The Contracting Authority will review the request and obtain the information on behalf of the bidder.

Any requests for statements, reference letters or personal opinions from Government officials involved with the NRWS project to further validate previous experience will not be sought.

Question 23:

Reference: Volume 1 Annex A NRWS RFP

(Applicable Reference: 1.2.1) Believe this is a holdover from the Draft RFP as the Rated TSOR (Area 5, TSOR Requirements) has a Minimum Pass of 61 of 152 available points. Please confirm.

Answer:

DELETE Volume 1 Annex A, Article 1.2.1, Part A - Section I Technical Bid, Review Parameters, paragraph 3, table line item 6, in its entirety, and

REPLACE the above delete table line with:

Table	Annex /SOW	Minimum Pass	Sample calculation
6	Point-Rated NRWS Project Requirements - Area 5, TSOR Requirements	58 of 147 available points	Points awarded will be indicated in the "Points Awarded" column

Question 24:

Reference: Volume 1 Annex A NRWS RFP

(Applicable Reference: 1.2.1) Annex A Area 1 Bidder Experience indicates 16 of 40 in the point-rated table however Annex D, Appendix 1 indicates 18 of 46 for scoring. Please confirm which is correct.

Answer:

We assume the Bidder is referring to Annex D and not Annex D Appendix 1. As such:

DELETE Volume 1 Annex A, Article 1.2.1, Part A - Section II Management Bid, Review Parameters, paragraph 3, table line item 2, in its entirety, and

REPLACE the above delete table line with:

Table	Annex /SOW	Minimum Pass	Sample calculation
2	Point-Rated NRWS Project Requirements – Area 1 Bidder Experience	18 of 40 available points	Points awarded will be indicated in the "Points Awarded" column

Solicitation No. - N° de l'invitation

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Buyer ID - Id de l'acheteur

101qf

Client Ref. No. - N° de réf. du client

W8472-125389

File No. - N° du dossier

101qfW8472-125389

CCC No./N° CCC - FMS No/ N° VME

**ALL OTHER TERMS AND CONDITIONS OF THE SOLICITATION DOCUMENT
REMAIN UNCHANGED.**



ANNEX D

Bid Evaluation Plan

Naval Remote Weapon Station System

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1. INTRODUCTION

1.1 This document identifies the procedure by which bids for the Naval Remote Weapon Station (NRWS) Systems will be evaluated by Canada.

1.2 This document forms a part of the Request for Proposal (RFP) for the NRWS Project.

2. BID COMPLETENESS

2.1 It is the sole responsibility of the Bidders to provide sufficient information to allow an adequate assessment of their bid in accordance with this Bid Evaluation Plan.

2.2 The Bidders are to enter references to where their bid's compliance information can be found under the Bidder's Response column of Tables 1 to 7 prior to submitting the bid.

3. EVALUATION PROCESS

3.1 The evaluation process will be conducted by the Bid Evaluation Team as follows:

- a. A review of bids to ensure compliance with all mandatory requirements of Table 1 will be conducted. The Bid Evaluation Team will identify where demonstration of compliance with mandatory requirements has been provided in a bid, assess this information for compliance, and enter the results in the Evaluation of Bidder's Response column of Table 1. Compliance or non-compliance will be indicated in the last 2 columns of Table 1.
- b. For the evaluation of the bidder's response to all Tables the definition of "Proven Experience" for each project shall include as a minimum:
 - (1) Project name;
 - (2) Description of project;
 - (3) Scope of work demonstrating the requirement is met;
 - (4) Date of completion of project;
 - (5) Duration of project; and
 - (6) Customer name and contact information, including project manager name, direct phone number, and company address.
- c. The bids will be scored with respect to each point-rated requirements of Tables 2 to 7. The Bid Evaluation Team will use the provided Bidder's Response column to acquire where point-rated information has been provided in the bid. Each point-rated requirement will be assessed and

scored by the Bid Evaluation Team in accordance with the Rating Method column in Tables 2 to 7. The scores will be input into the Points Awarded column in Tables 2 to 7 by the Bid Evaluation Team. For some rated requirements, the level of information provided will be evaluated as follows:

- (1) Exceptional: The proposal fully demonstrates that the Bidder would meet this requirement in a comprehensive manner. The proposal includes at least one example of previous project experience which details how the area being evaluated was addressed in that project. It appears that the requirement is fully understood and clearly demonstrates an understanding of the difference between mandatory scope of work and performance above the mandatory. There are no apparent weaknesses that would affect the achievement of the work associated with this requirement.
- (2) Reasonable: The proposal reasonably demonstrates that the Bidder would meet this requirement. It appears that the requirement is understood; however, there are weaknesses for which a risk must be raised, which should not impact the accomplishment of the requirement, however, these weaknesses may adversely affect project schedule, cost or scope.

For some Technical Statement of Requirements (TSOR), the level of information provided will be evaluated as follows:

- (1) Theory: An explanation, detailed description, or functional description of the proposed functionality to address the point rated requirement. (For example: (i) An explanation is generic description of the area being evaluated. (ii) A detailed description is a generic description of the area being evaluated including details of specific functionality. (iii) Functional specification is a generic description of the area being evaluated including details of specific functionality and behaviour of the area being evaluated.)
- (2) Simulation: A textual description of the results of a simulation which has been performed to demonstrate the proposed functionality of the point rated requirement.
- (3) Application: A textual description of how the point rated requirement has been used successfully in a real world scenario. The application is to be supported by data, which includes tests/trials (plans, procedures, results) or 3rd party report certification.

- d. Comments will be provided in the Evaluation of Bidder's Response column. The point-rated requirements are based on management and technical features of the bid that are beyond the minimum mandatory requirements stated in the SOW, TSOR, Computer Based Trainer Specification, R&O TSOW. These features are assessed and scored to determine the bid's added value above the minimum mandatory requirements;
- e. The Points Awarded within each evaluation Area of Tables 2 to 6 must meet the Minimum Allowable Points for each Area. Any bid that does not achieve the Minimum Allowable Points in each evaluation Area of Tables 2 to 6 will not be considered further. Evaluation Area 6 (Onboard Trainer Specification Requirements) of Table 7 does not have a minimum points requirement;
- f. The Points Awarded will be summed within each of the six evaluation areas of Tables 2 to 7, and the Area Percent Score will be calculated with respect to the maximum points available for each respective area, specifically:

$$\frac{\text{Points Awarded for Area}}{\text{Maximum Points Available for Area}} \times 100 = \text{Area Percent Score (\%)}$$

- g. The Area Percent Scores of each area will then be inputted into Table 8 and weighted according to the Area Weighting factors listed in Table 8.
- h. The Weighted Area Percent Scores of areas 1 to 6 will be summed to provide a Total Technical Score for Bid which will be inputted into Table 8.

Table 1: Mandatory Bid Requirements

No.	Requirement	RFP Applicable Section	Bidder's Response	Evaluation of Bidder's Response	Compliant	
					Yes	No
1	The bid includes a completed Compliance Matrix, found in Volume 1 - Annex D Appendix 1, which illustrates compliance with each mandatory SOW and TSOR requirement.	Volume 1 - Annex D Appendix 1				
2	The bidder/bid team agrees not to introduce new or third party software that would limit the rights of Canada to use the NRWS System, except where this software has been authorized by the Contracting Authority following contract award.	SACC Reference 4003				
3	The bid has demonstrated the bidder/bid team has Proven Experience in a minimum of one project, of similar complexity to the scope of work as detailed in Volume 2 - Annex B, managed as the prime contractor, with successfully fielded naval equipment in the 10 year period prior to the date of the close of the solicitation period.	Volume 2 - Annex B Section 4.5				
4	The bid has demonstrated the bidder/bid team has Proven Experience in a minimum of one project, with successfully fielded naval fire control solutions in the 5 year period prior to the date of the close of the solicitation period.	Volume 2 - Annex B Section 4				
5	The bid has demonstrated the bidder/bid team has Proven Experience in a minimum of one project, with successful integration of infra-red cameras, optical cameras, laser range finders, tracking algorithms, and fire control solutions in the 5 year period prior to the date of the close of the solicitation period.	Volume 2 - Annex B Section 4				
6	The bid has demonstrated the bidder/bid team has Proven Experience in a minimum of one Repair and Overhaul project, of similar complexity to the scope of work as detailed in Volume 3 - Annex C, in the defence sector in the 10 year period prior to the date of the close of the solicitation period.	Volume 3 - Annex C Section 3.1				

Table 2: Point-Rated Requirements – Area 1 Bidder Experience					
No.	Requirement	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
1	Number of projects, of similar complexity to the scope of work as detailed in Volume 2 - Annex B, the bidder/bid team has managed as the prime contractor, with successfully fielded naval equipment in the 10 year period prior to the date of the close of the solicitation period.		0 Points – The bid demonstrates Proven Experience in 1 project; 3 Points – The bid demonstrates Proven Experience in 2 to 3 projects; 9 Points – The bid demonstrates Proven Experience in 4 to 5 projects; or 15 Points – The bid demonstrates Proven Experience in 6 or more projects.		
2	Number of projects, of similar complexity to the scope of work as detailed in Volume 3 - Annex C, the bidder/bid team has managed as the prime contractor, in the defence sector in the 10 year period prior to the date of the close of the solicitation period.		0 Point – The bid demonstrates Proven Experience in 1 project; 2 Points – The bid demonstrates Proven Experience in 2 to 3 projects; 4 Points – The bid demonstrates Proven Experience in 4 to 5 projects; or 6 Points – The bid demonstrates Proven Experience in 6 or more projects.		
3	Number of projects, of similar complexity to the scope of work as detailed in Volume 2 - Annex B, the bidder/bid team has managed with successfully fielded military equipment for the Canadian Government in the 10 year period prior to the date of the close of the solicitation period.		3 Points – The bid demonstrates Proven Experience in 1 project; 9 Points – The bid demonstrates Proven Experience in 2 to 3 projects; or 15 Points – The bid demonstrates Proven Experience in 4 or more projects.		
4	Number of successful design, development, integration, and installations of naval gun systems in the 10 year period prior to the date of the close of the solicitation period.		2 Point – Proven Experience in completion of 1 installation configuration; 6 Points – Proven Experience in completion of 2 to 3 installation configuration; or 10 Points – Proven Experience in completion of 4 or more installation configuration.		
Area 1 Total					
Maximum Available Points: 46.0					
Minimum Allowable Points: 18.0					

Table 3: Point-Rated Requirements - Area 2, Volume 2 - Annex B SOW Section 3.0, Project Management						
No.	Requirement	SOW Requirement Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
3.1 Project Manager						
5	The Contractor shall implement and maintain a team, headed by a single Project Manager (PM), to carry out the work required in this SOW.	3.1.1		3 Points – Resume of PM demonstrates a minimum of 5 years of Proven Experience as the PM in similar projects in the last 10 years; 3 Points – The Bid includes a copy of valid Project Management Institute (PMI) Project Management Professional (PMP) certificate for the PM; or 9 Points – Resume of PM meets both rating criteria above.		
3.3 Scope and Schedule Management						
6	The Contractor shall implement the scope of the work specified in this SOW in accordance with the project management processes of the PMP and IMS Authorized by Canada.	3.3.1		Approach to Scope Management and in scope unforeseen work in providing all deliverables in accordance with SOW requirements. 2 Points – Reasonable; or 6 Points – Exceptional.		
	The Contractor shall implement all Authorized in scope unforeseen work to this SOW in accordance with any corresponding schedule and plan changes Authorized by Canada.	3.3.2				
7	The Contractor shall implement the scope of the work specified in this SOW in accordance with the project management processes of the PMP and IMS Authorized by Canada.	3.3.1		Approach to Schedule Management and Schedule Change Management in providing all required deliverables according to the SOW prerequisites and events. 2 Points – Reasonable; or 6 Points – Exceptional.		
	The Contractor shall implement all Authorized in-scope changes to this SOW in accordance with any corresponding schedule and plan changes Authorized by Canada.	3.3.2				

Table 3: Point-Rated Requirements - Area 2, Volume 2 - Annex B SOW Section 3.0, Project Management

No.	Requirement	SOW Requirement Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
8	The Contractor shall meet all the scheduling requirements of Paragraphs 3.3.5, 3.3.8, and 3.3.9 of the SOW.	3.3.5, 3.3.8, 3.3.9		IMS schedule requirements are addressed, and all activities defined, sequenced, scheduled, and resources assigned to provide deliverables in accordance with the SOW prerequisites and events. 4 Points – Reasonable; or 12 Points – Exceptional.		
3.4 Quality Management						
9	The Contractor shall implement a Quality Management Program in accordance with the PMP of CDRL NRWS-PM-001 for the Work specified in this SOW.	3.4.1		The degree to which the bidder/bid team are certified under ISO 9001-2008. 0 Points – No ISO 9001-2008 certification; 5 Points – Prime contractor is certified under ISO 9001-2008 but not all bid team members are certified; or 10 Points – All bid team members are certified under ISO 9001-2008.		
3.5 Risk Management						
10	The Contractor shall implement a Risk Management Program in accordance with the PMP of CDRL NRWS-PM-001 for all Work specified in this SOW.	3.5.1		Approach to Risk Management and identifying, prioritizing and mitigating risk. 2 Point – Reasonable; or 6 Points – Exceptional.		

Table 3: Point-Rated Requirements - Area 2, Volume 2 - Annex B SOW Section 3.0, Project Management						
No.	Requirement	SOW Requirement Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
11	The Contractor shall implement a Risk Management Program in accordance with the PMP of CDRL NRWS-PM-001 for all Work specified in this SOW.	3.5.1		The bid demonstrates identification, prioritization and mitigation of risk(s) associated with installation of the NRWS System for HALIFAX Class ships. 3 Point – Reasonable; or 9 Points – Exceptional.		
3.6 Documentation Deliverables						
12	The Contractor shall deliver all documentation to Canada on the SDE in Microsoft Office 2010 or Adobe Portable Document Format.	3.6.1.2		Proven Experience with delivering documentation using a SDE in the 5 year period prior to the date of the close of the solicitation period. 1 Point – Bidder has setup and maintained a SDE in at least 1 project; or 3 Points – Bidder has setup and maintained a SDE in at least 1 project with the Government of Canada.		
						Area 2 Total Maximum Available Points: 61.0 Minimum Allowable Points: 24.0

Table 4: Point-Rated Requirements - Area 3, Volume 2 - Annex B SOW Section 4.0, System Engineering

No.	Requirement	SOW Requirement Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
4.2 Requirement Management						
13	The Contractor shall prepare and deliver a Verification Cross Reference Matrix in accordance with CDRL NRWS-SE-003, that shall identify for each requirement in the TSOR what verification method(s) will be used by the Contractor to verify compliance of the NRWS System and all associated deliverable material, documents, and services within the TSOR.	4.2.6		<p>Bidder provides details on the use of a mature and automated process in Requirements Management in previous projects.</p> <p>Details are to include Requirement Management software used, and how long the process has been used by the Bidder.</p> <p>0 Points – No information, or maturity of proposed automated processes not demonstrated;</p> <p>3 Point – Automated process not used, but maturity of the requirement management process is demonstrated, and its compliance with the SOW Section 4.2 is demonstrated; or</p> <p>6 Points – Automated process used, application in other projects and its compliance with the SOW Section 4.2 is demonstrated.</p>		
4.3 Design Reviews						
14	<p>The Contractor shall convene a PDR with Canada to explain and validate the design of the proposed NRWS System with respect to this SOW and TSOR.</p> <p>and</p> <p>The Contractor shall prepare and deliver a draft PDR Documentation package in accordance with Paragraph 4.3.1.2 of the SOW.</p>	4.3.1.1, 4.3.1.2		<p>The bid demonstrates that the bidder/bid team has successfully performed:</p> <p>0 Points – No PDR/CDRs on any defence projects in the last 10 years;</p> <p>3 Point – PDR and CDR on 2 defence project in the last 10 years;</p> <p>6 Points – PDR and CDR on 3 to 5 defence projects in the last 10 years;; or</p> <p>9 Points – PDR and CDR on 6 or more.</p>		
	The Contractor shall convene and co-chair a CDR with Canada to explain and validate the design of the proposed NRWS System with respect to this SOW and TSOR.	4.3.2.1, 4.3.2.2				

Table 4: Point-Rated Requirements - Area 3, Volume 2 - Annex B SOW Section 4.0, System Engineering						
No.	Requirement	SOW Requirement Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
	and The Contractor shall prepare and deliver a draft CDR Documentation package in accordance with Paragraph 4.3.2.2 of the SOW.					
4.5 Delivery, Installation, and STW						
15	The Contractor shall install each NRWS System in each ship listed in Table 2, of this SOW, in accordance with the Authorized NRWS System HFX Class Engineering Change (EC) Specification generated from ECGP of CDRL NRWS-TD-001.	4.5.2.2		The bid demonstrates how the NRWS System will be installed in HALIFAX Class ships, including use of sub-contractors, shipyards, and/or other resources. 3 Point – Reasonable; or 9 Points – Exceptional.		
4.7 Configuration Management						
16	The Contractor shall implement the CM Process to manage the configuration of the NRWS System and associated deliverables in accordance with the Authorized CM Plan.	4.7.1.2		Bidder provides details on the use of a mature and automated process in Configuration Management in previous projects. Details are to include Configuration Management software used, and how long the process has been used by the Bidder. 0 Points – No information, or maturity of proposed automated process not demonstrated; 3 Points – Automated process not used, but maturity of the configuration management process demonstrated, and its compliance with the SOW Section 4.7 is illustrated; or 6 Points – Automated process used, application in other projects and its compliance with the SOW Section 4.7 illustrated.		
4.8 Technical Documentation						

Table 4: Point-Rated Requirements - Area 3, Volume 2 - Annex B SOW Section 4.0, System Engineering						
No.	Requirement	SOW Requirement Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
17	The Contractor shall prepare and deliver an ECGP in accordance with CDRL NRWS-TD-001 to assist in defining all changes required to HFX Class ships to accommodate the NRWS System.	4.8.1.1		0 Points – No experience in delivering TDP and ECGP demonstrated; 8 Points – Proven Experience in delivering TDP and ECGP for at least 2 projects for Government of Canada of similar complexity to the scope of work in the past 10 years from the date of bid closing; or 16 Points – Proven Experience in delivering TDP and ECGP for at least 2 projects for Government of Canada of similar complexity to the scope of work, of which one project must have been for the Royal Canadian Navy, in the past 10 years from the date of bid closing.		
	The Contractor shall prepare and deliver the TDP in accordance with CDRL NRWS-TD-002 and with Paragraphs 4.8.2.1 to 4.8.2.5 of the SOW for Authorization by Canada.	4.8.2.1 to 4.8.2.5				
Area 3 Total Maximum Available Points: 46.0 Minimum Allowable Points: 18.0						

Table 5: Point-Rated Requirements - Area 4, Volume 2 - Annex B SOW Section 5.0, Integrated Logistic Support

No.	Requirement	SOW Requirement Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
5.2 Integrated Logistic Support Planning						
18	The Contractor shall prepare and deliver an ILS Plan in accordance with CDRL NRWS-ILS-001 to define how the ILS requirements of the SOW will be addressed for Authorization by Canada.	5.2.1.1		ILS requirements of the SOW addressed in CDRL NRWS-ILS-001 3 Point – Reasonable; or 6 Points – Exceptional.		
5.2.2 Logistic Support Analysis						
19	The Contractor shall conduct a Logistic Support Analysis (LSA) on the NRWS System in accordance with the ILS Plan.	5.2.2.1		The bid describes how LSA will be performed in accordance with Section 5 of the SOW requirements. 2 Points – Reasonable; or 4 Points – Exceptional.		
5.5 Initial Cadre Training						
20	The Contractor shall conduct Operator ICT, based upon the Authorized ICT package, for a minimum of 10 to a maximum of 15 students, at locations designated by Canada. The Contractor shall conduct Maintainer ICT, based upon the Authorized ICT package, for a minimum of 10 to a maximum of 15 students, at locations designated by Canada.	5.5.4 5.5.5		0 Points – No information provided in bid; 4 Point – Proven Experience in a past project providing remote weapon station training to military operators and maintenance personnel; or 12 Points – Proven Experience in a past project providing remote weapon station training to military operators and maintenance personnel and experience providing training to Canadian Military operators and maintenance personnel.		
						Area 4 Total Maximum Available Points: 22

Table 6: Point-Rated Requirements – Area 5, Volume 2 – Annex B, Appendix 3 TSOR Requirements

No.	Requirement	TSOR Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
3.2 Surveillance						
21	Each NRWS mount shall be provided with an Electro-Optical (EO) sensor suite that allows the Operator to detect, in both day and night conditions the threats listed in Table 1 to this Appendix at a range of 2,000 metres.	3.2.1		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.2.1. 1 Point – Theory; 2 Points – Simulation; or 3 Points – Application.		
22	Each NRWS mount shall be provided with an Electro-Optical (EO) sensor suite that allows the Operator to detect, in both day and night conditions the threats listed in Table 1 to this Appendix at a range of 2,000 metres.	3.2.1		1 Point – Range increased by at least 1000 metres beyond the mandatory 2000 metres ; or 3 Points – Range increased by at least 2000 metres beyond the mandatory 2000 metres.		
23	The NRWS EO sensor suite shall allow the Operator to identify, in both day and night conditions, the threats listed in Table 1 to this Appendix at a range of 1,800 metres, with the exception of the Personnel threat.	3.2.2		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.2.2. 1 Point – Theory; 2 Points – Simulation; or 3 Points – Application.		
24	The NRWS TIC shall have a Wide Horizontal Field of View (FOV) of at least 9.0 degrees.	3.2.4.3		1 Point – Wide Horizontal FOV greater than 10.0 but less than 12.0; or 3 Points – Wide Horizontal FOV of 12.0 degrees or more.		
25	The NRWS day camera zoom shall perform at a minimum in all the ranges of horizontal FOV from 3.0 degrees to 40.0 degrees.	3.2.5.3		1 Point – Optical zoom ranges of horizontal FOV of less than 2 degrees.		
26	The NRWS day camera zoom shall perform at a minimum in all the ranges of horizontal FOV from 3.0	3.2.5.3		1 Point – Optical zoom ranges of horizontal FOV of		

Table 6: Point-Rated Requirements – Area 5, Volume 2 – Annex B, Appendix 3 TSOR Requirements

No.	Requirement	TSOR Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
	degrees to 40.0 degrees.			more than 45 degrees; or 3 Points – Optical zoom ranges of horizontal FOV of more than 50 degrees.		
3.3 Acquisition and Tracking						
27	The NRWS shall have mount velocities and accelerations, in order to track the threats listed in Table 1 on closing, crossing, and manoeuvring courses at ranges of 200 metres and above.	3.3.2		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.3.2. 0.5 Points – Theory; 1.5 Points – Simulation; or 2.5 Points – Application.		
28	The NRWS shall automatically acquire the threats listed in Table 1 to this Appendix in day and night conditions.	3.3.4, 3.3.6		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.3.4 and 3.3.6. 0.5 Points – Theory; 1.5 Points – Simulation; or 2.5 Points – Application.		
29	The NRWS shall automatically track the acquired threats in day and night conditions once selected by the Operator.	3.3.5,3.3.7		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.3.5 and 3.3.7. 0.5 Points – Theory; 1.5 Points – Simulation; or 2.5 Points – Application;		
30	The NRWS shall be a stabilized platform that maintains the EO sensor suite and weapon within 1.0 milliradian standard deviation pointing accuracy, while in Sea State 3 as defined in the World Meteorological Organization (WMO) code tables and as described in Table 4.	3.3.9		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.3.9. 2 Points – Theory; 6 Points – Simulation; or 10 Points – Application;		

Table 6: Point-Rated Requirements – Area 5, Volume 2 – Annex B, Appendix 3 TSOR Requirements

No.	Requirement	TSOR Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
31	The NRWS shall be a stabilized platform that maintains the EO sensor suite and weapon within 1.0 milliradian standard deviation pointing accuracy, while in Sea State 3 as defined in the World Meteorological Organization (WMO) code tables and as described in Table 4.	3.3.9		8 Point – 0.80 milliradian or less standard deviation pointing accuracy; or 15 Point – 0.60 milliradian or less standard deviation pointing accuracy.		
32	The NRWS shall acquire and track the threats listed in Table 1 to this Appendix at all ranges from 50 metres to 1,000 metres.	3.3.10		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.3.10. 0.5 Points – Theory; 1.5 Points – Simulation; or 2.5 Points – Application.		
33	The NRWS shall acquire and track the threats listed in Table 1 to this Appendix at all ranges from 50 metres to 1,000 metres.	3.3.10		3 Points – Tracking Range of all threats increased by at least 500 metres beyond the mandatory 1,000 metres; or 5 Points – Tracking Range of all threats increased by at least 1,000 metres beyond the mandatory 1,000 metres.		
34	The NRWS shall automatically re-acquire and track dynamic threats, in the event that the threat has been obstructed for up to and including 2 seconds.	3.3.16		The bid demonstrates how the proposed NRWS System re-acquires and tracks dynamic threats, in the event that the threat has been obstructed. 1 Points – Theory; 3 Points – Simulation; or 5 Points – Application.		
3.4 Fire Control and Engagement						

Table 6: Point-Rated Requirements – Area 5, Volume 2 – Annex B, Appendix 3 TSOR Requirements						
No.	Requirement	TSOR Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
35	The NRWS shall produce a fire control solution on the threats listed in Table 1 to this Appendix while the threats are manoeuvring at all ranges from 200 metres to 1,000 metres.	3.4.2		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.4.2. 1 Point – Theory; 2 Points – Simulation; or 3 Points – Application.		
36	The NRWS shall produce a fire control solution on the threats listed in Table 1 to this Appendix while the threats are manoeuvring at all ranges from 200 metres to 1,000 metres.	3.4.2		3 Point – Fire control solution increased by at least 500 metres beyond the mandatory 1,000 metres; or 5 Points – Fire control solution increased by at least 1,000 metres beyond the mandatory 1,000 metres.		
37	The NRWS shall produce a fire control solution within 16 seconds or less on threats listed in Table 1, when a verbal designation is given to the Operator of the surface threat range and surface threat bearing anywhere within the NRWS's weapon arc.	3.4.5		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.4.5. 1 Point – Theory; 2 Points – Simulation; or 3 Points – Application.		
38	The NRWS Operator Console shall enable the Operator to offset the firing aim point when tracking threats and targets.	3.4.16		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.4.16. 0.5 Points – Theory; 1 Point – Simulation; or 2 Points – Application.		
39	The NRWS shall maintain the threat at the centre of the Operator Display while engaging the threat.	3.4.18		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.4.18. 0.5 Points – Theory; 1 Point – Simulation; or 2 Points – Application.		

Table 6: Point-Rated Requirements – Area 5, Volume 2 – Annex B, Appendix 3 TSOR Requirements

No.	Requirement	TSOR Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
3.5 Weapon Effectiveness						
40	<p>The NRWS shall achieve at least 7 hits against a surface target within 16 seconds or less of obtaining a fire control solution where:</p> <ul style="list-style-type: none"> a. the FN M2 0.50 Calibre HMG is mounted; b. the target has an aspect ratio of 2 by 1 and presents a vulnerable area of 2 square metres; c. the surface target is closing the NRWS Mount at a speed through the water of 25 metres per second while conducting a continuous narrow weave; d. not more than 50 rounds are expended; and e. the engagement starts at 600 metres. 	3.5.1		<p>The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.5.1.</p> <p>1 Point – Theory; 3 Points – Simulation; or 5 Points – Application.</p>		
41	<p>The NRWS shall achieve a Circular Error Probable (CEP) of 2.5 milliradians or less where:</p> <ul style="list-style-type: none"> a. the target is a vertical panel with a centred, high contrast aim point; b. the target is towed on a steady course and at a speed of 8 to 10 knots; c. the firing ship is stationed such that a constant target bearing perpendicular to the target course +/- 2 degrees and a constant target range of 500 metres +/- 50 metres are maintained; d. the sea state is not less than Sea State 1 and not more than Sea State 3 as defined in the WMO code tables and as described in Table 4; e. the salvo size is 1; f. the sample size is not less than 100 rounds; g. CEP of 2.5 milliradians shall be interpreted to mean that not less than 50% of the rounds fired shall land on or within a circle of a radius equivalent to 2.5 milliradians for the range at the time of firing; and h. rounds fired for alignment/calibration are not 	3.5.3		<p>The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.5.3.</p> <p>1 Point – Theory; 3 Points – Simulation; or 5 Points – Application.</p>		

Table 6: Point-Rated Requirements – Area 5, Volume 2 – Annex B, Appendix 3 TSOR Requirements

No.	Requirement	TSOR Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
	scored or counted in the sample.					
42	The NRWS shall achieve a Circular Error Probable (CEP) of 2.5 milliradians as defined in TSOR 3.5.3.	3.5.3		8 Points – CEP of 2.25 milliradians or less; or 15 Points – CEP of 2.0 milliradians or less.		
3.10 Initialization and Built-In Test						
43	The NRWS shall initialise from a shutdown state to full functionality in accordance with this TSOR in: a. less than 2 minutes, with the exception of the TIC, when selected by the Operator; and b. less than 7 minutes, including the TIC, when selected by the Operator.	3.10.1		1 Point – less than 60 seconds, with the exception of the TIC; or 3 Points – less than 30 seconds, with the exception of the TIC.		

Table 6: Point-Rated Requirements – Area 5, Volume 2 – Annex B, Appendix 3 TSOR Requirements

No.	Requirement	TSOR Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
44	The NRWS Built-In Test (BIT) shall automatically detect faults.	3.10.5		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 3.10.5. 2 Points – Theory; 4 Points – Simulation; or 6 Points – Application.		
4. Physical Requirements						
45	The NRWS shall be at a technology readiness level of at least 8 in accordance with the Technical Readiness Assessment Guidance, Department of Defense.	4.1.17		1 Point – Formal letter from an end user that the proposed NRWS has a TRL of at least 8. 2 Points – Formal letter from an end user that the proposed NRWS has a TRL of at least 9.		
6. Specialty Engineering Requirements						
46	The NRWS shall have no less than 98% availability, 24 hours a day, seven days a week, throughout a deployed period of no less than 90 days considering the typical usage patterns as outlined Table 3.	6.2.1		The bid provides details on how the proposed NRWS System availability requirements are achieved and comply with TSOR Reference 6.2.1. 1 Point – Theory; 2 Points – Simulation; or 3 Points – Application.		
47	The NRWS daily preventive maintenance shall be less than 30 minutes in total in a 24 hour period.	6.4.1		The bid provides details on how the proposed NRWS System maintainability requirements are achieved and comply with TSOR Reference 6.4.1. 1 Point – Theory; 2 Points – Simulation; or 3 Points – Application.		

Table 6: Point-Rated Requirements – Area 5, Volume 2 – Annex B, Appendix 3 TSOR Requirements

No.	Requirement	TSOR Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
48	The NRWS MTTR shall be less than 1 hour for corrective maintenance repair functions which includes combined diagnostic and LRU replacement time but does not include time associated with provisioning the LRU.	6.4.3		The bid provides details on how the proposed NRWS System maintainability requirements are achieved. 1 Point – Theory; 2 Points – Simulation; or 3 Points – Application.		
7. Environmental Requirements						
49	The NRWS equipment shall operate in accordance with this TSOR following exposure to shock conditions specified in D-03-003-007/SF-000 Grade 1 Type A, Section 6.	7.2.3		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 7.2.3. 1 Point – Theory; 3 Points – Simulation; or 5 Points – Application.		
50	The NRWS equipment shall operate in accordance with this TSOR when excited by Type 1 environmental vibration levels up to and including 33Hz as specified in MIL-STD-810G, method 528.1.	7.3.2		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 7.3.2. 1 Point – Theory; 3 Points – Simulation; or 5 Points – Application.		
51	The NRWS equipment exposed to the weather shall operate in accordance with this TSOR when subjected to conditions which produce icing loads of up to and including 20 kilograms per square metre.	7.8.1		The bid demonstrates how the proposed NRWS System complies with TSOR Reference 7.8.1. 1 Point – Theory; 3 Points – Simulation; or 5 Points – Application.		
8. Supportability						
52	The NRWS System shall have an operational life expectancy of not less than 15 years.	8.1		2 Points – The bid demonstrates how the proposed NRWS System shall have an operational life		

Table 6: Point-Rated Requirements – Area 5, Volume 2 – Annex B, Appendix 3 TSOR Requirements						
No.	Requirement	TSOR Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
53	The NRWS System shall accommodate the facilitation of new technologies, including, but not limited to, the upgrade of individual sensors, without having to replace other components.	8.2		<p>expectancy of 20 years or more; or</p> <p>6 Points - The bid demonstrates how the proposed NRWS System shall have an operational life expectancy of 25 years or more.</p> <p>The bid demonstrates how the proposed NRWS System complies with TSOR Reference 8.2.</p> <p>1 Point – Theory; 3 Points – Simulation; or 5 Points – Application.</p>		
Area 5 Total Maximum Available Points: 147.0 Minimum Allowable Points: 58.0						
Table 7: Point-Rated Requirements - Area 6, Volume 2 – Annex B, Appendix 3 TSOR Requirements						
No.	Requirement	TSOR Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
3.11 Onboard Trainer						
54	If the NRWS System is equipped with an onboard trainer, it shall meet all the requirements in Section 3.11 and Paragraph 3.7.5 of the TSOR.	3.11, 3.7.5		<p>0 Points – No onboard trainer; or</p> <p>5 Point – Onboard trainer included, meets all requirements specified in Section 3.11 and Paragraph 3.7.5 of the TSOR.</p>		
55	If the NRWS System has an onboard trainer, the NRWS System onboard trainer shall include not less than 5 pre-programmed naval combat scenarios.	3.11.6		<p>0 Points – No onboard trainer; or</p> <p>1 Point – 10 scenarios or more with varying levels complexity.</p>		
56	If the NRWS System has an onboard trainer, the NRWS System onboard trainer combat scenarios shall vary in level of complexity.	3.11.7		<p>0 Points – No onboard trainer;</p> <p>1 Point – Editable training combat scenarios; or</p>		

Table 6: Point-Rated Requirements – Area 5, Volume 2 – Annex B, Appendix 3 TSOR Requirements

No.	Requirement	TSOR Reference	Bidder's Response	Rating Method	Evaluation of Bidder's Response	Points Awarded
				2 Points – Onboard trainer software is as provided for Computer Based Trainer.		
Area 6 Total Maximum Available Points: 8.0 Minimum Allowable Points: 0.0						

Table 8: Total Technical Score for Bid

Area No.	Area Score	Area Percent Score (Area Score / Max. Available Points) x 100	Weight Scale for Area	Total Weighted Score Awarded	Max Score Possible
1			1.5		150
2			1.5		150
3			1.75		175
4			1		100
5			4		400
6			0.25		25
Total Technical Score for Bid:					1000



ANNEX D

Appendix 1

Compliance Matrix

Naval Remote Weapon Station System

1. INTRODUCTION

- 1.1 This document identifies the procedure by which proposals for the Naval Remote Weapon Station (NRWS) System will be evaluated by Canada with respect to the mandatory Request for Proposal (RFP) requirements of Volume 2- Annex B Statement of Work (SOW), Volume 2 - Annex B Appendix 3 Technical Statement of Requirements (TSOR), and Volume 2 - Annex B Appendix 5 Computer Based Trainer Specification.
- 1.1.1 Bidders must complete and submit this Compliance Matrix with their proposals in order to be given consideration in the bid evaluation process.

2. MANDATORY REQUIREMENTS

- 2.1 All SOW, TSOR and Computer Based Trainer Specification requirements are mandatory. For all requirements itemized in Tables 1, 2, and 3, the Bidder shall indicate whether the proposed solution to the requirement is compliant or non-compliant by placing an 'X' in the appropriate 'Yes' or 'No' cell under the "Compliant" column.
- 2.2 The Bidder should not place the indications required by Paragraph 2.1 in any cells that are on the same row as SOW, TSOR, and Computer Based Trainer Specification headings, sub-headings, and sub-sub-headings in Tables 1, 2, and 3. Where a Bidder has erroneously made an indication in one of the precluded rows, the evaluation team will only consider responses to requirements for which a Compliance Method has been specified by Canada.
- 2.3 The Bidder shall reference where proof of compliance may be found in their bid, and indicate this reference in the "Bidder's Response" column of Tables 1, 2, and 3 for each mandatory requirement.
- 2.4 Tables 1, 2, and 3 each contain columns titled "Compliance Method" that indicates the minimum required for demonstrating compliance with a mandatory requirement. Only the following methods are acceptable for supporting a Bidder's claim of compliancy for each of the mandatory requirements:
 - a. Table 1:
 - (1) A – Compliance statement to clearly agree that the stated work will be completed;
 - (2) B – Provision of details as to how the stated work will be undertaken; and
 - (3) W – Provision of identified DID with the bid;
 - b. Table 2 and 3:

- (1) C – A compliance statement which clearly demonstrates that the solution proposed for the NRWS System fully complies with the requirement;
- (2) D – Product specifications, manuals, or other published documentation that demonstrates that the solution proposed for the NRWS System fully complies with the requirement;
- (3) E – Analysis or simulation predicting the performance of solution(s) proposed for the NRWS System, which demonstrates full compliance with the requirement; and
- (4) F – Test results or documented performance of existing equipment proposed for the NRWS System, which demonstrates full compliance with the requirement.

3. POINT-RATED REQUIREMENTS

- 3.1 In addition to mandatory requirements, bids will be evaluated on a point-rated basis with respect to certain SOW, TSOR, and Computer Based Trainer Specification requirements in accordance with Volume 1 - Annex D Bid Evaluation Plan Tables 2 through 7. In order to be awarded points in accordance with Volume 1 - Annex D Bid Evaluation Plan Tables 2 through 7, information must be indicated in Tables 1, 2, and 3 below, and provided with proposals.

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3.1 Project Manager				
3.1.1 The Contractor shall implement and maintain a team, headed by a single Project Manager (PM), to carry out the Work required in this SOW.	A			
3.2 Project Management Plans				
3.2.1 The Contractor shall prepare, deliver and maintain a Project Management Plan (PMP) in accordance with Contract Data Requirements List (CDRL) NRWS-PM-001 for Authorization by Canada.	A and W			
3.2.2 The Contractor shall prepare, deliver and maintain an Integrated Master Schedule (IMS) in accordance with CDRL NRWS-PM-002 for Authorization by Canada.	A and W			
3.3 Scope and Schedule Management				
3.3.1 The Contractor shall implement the scope of the Work specified in this SOW in accordance with the project management processes of the PMP and IMS Authorized by Canada.	A and B			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
<p>3.3.5 The Contractor shall prepare, deliver and maintain all project deliverables in accordance with:</p> <p>A. The CDR/L and associated Data Item Descriptions (DID); and</p> <p>B. Hardware and software deliverables in accordance with the Technical Statement Of Requirements (TSOR).</p>	A			
<p>3.3.7 The Contractor shall use the IMS as a baseline against which project progress shall be controlled and measured, and against which project changes shall be evaluated.</p>	A			
<p>3.3.8 The Contractor shall address the following schedule requirements for HEX NRWS Systems in project planning:</p>	A and B			
<p>a. Plan long-term schedules for installation and STW as applicable to ships listed in Table 2;</p>	A and B			
<p>b. Plan long-term schedules to accommodate First Article NRWS System installation and STW;</p>	A and B			
<p>c. Plan long-term schedules for subsequent shipboard installations and STW assuming that they will be uniformly distributed throughout the year as indicated by Table 2;</p>	A and B			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
d. Consult Canada on the second Monday of April of each year to Contract completion to acquire an updated schedule for proposed ship availability;	A			
e. Plan and execute all Contractor activities in ships to accommodate a minimum of one month notice from Canada regarding the final availability dates for each ship;	A			
f. Plan and execute all Contractor activities in ships to accommodate a minimum of one month notice from Canada, for the substitution of any ship listed in Table 2, with any other ship in the same region; and	A			
g. Plan and execute all Contractor activities in Canada's ships in conjunction with existing ship programs.	A			
3.3.9 The Contractor shall address the following schedule requirements for Queenston Class NRWS Systems in project planning:	A and B			
a. Plan long-term schedules for delivery in accordance with Table 2	A and B			
b. Consult Canada on the second Monday of April of each year to Contract Completion to acquire an updated schedule for proposed Queenston Class availability; an	A			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
c. Deliver each Queenston Class NRWS System no sooner than 60 business days and no later than 40 business days prior to the installation dates specified by Canada on the second Monday of April of each year.	A			
3.4 Quality Management				
3.4.1 The Contractor shall implement a Quality Management Program in accordance with the PMP of CDRL NRWS-PM-001 for the Work specified in this SOW.	A and W			
3.5 Risk Management				
3.5.1 The Contractor shall implement a Risk Management Program in accordance with the PMP of CDRL NRWS-PM-001 for all Work specified in this SOW.	A and W			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3.6 Documentation Deliverables				
3.6.1 Shared Data Environment				
<p>3.6.1.1 The Contractor shall implement a web-based Shared Data Environment (SDE) that will enable:</p> <ul style="list-style-type: none"> a. Only personnel Authorized by Canada to access the SDE; b. Canada and the Contractor to store, exchange and share information; c. Canada and the Contractor to render documents as read-only, and to edit documents via password protection; d. Canada and the Contractor to amend and add comments to deliverable documentation via password protection; e. Canada and the Contractor to track all amendments and comments to deliverables, including the identification of individual editor or commenters; and f. All data in the SDE to be maintained in accordance with Section 4.7. 	A and B			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
4.0 SYSTEM ENGINEERING				
4.1 General				
4.1.2 The Contractor shall prepare and deliver a System Engineering Management Plan in accordance with CDRL NRWS-SE-001.	A and W			
4.1.3 The Contractor shall conduct system engineering in accordance with the System Engineering Management Plan and the requirements of this SOW.	A and B			
4.1.4 The Contractor shall conduct system engineering to ensure that all proper approvals for International Trade in Arms Regulations are obtained for the NRWS System and all associated deliverables.	A			
4.2 Requirement Management				
4.2.4 The Contractor shall prepare and deliver a final System Specification in accordance with CDRL NRWS-SE-002 that will become the Functional Baseline when Authorized by Canada.	A			
4.2.5 The Contractor shall design the NRWS System following Authorization of the System Specification and SRR Minutes by Canada, and in accordance with all other Event Prerequisites of Table 1, of this SOW.	A and B			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
4.2.6 The Contractor shall prepare and deliver a Verification Cross Reference Matrix in accordance with CDRL NRWS-SE-003, that shall identify for each requirement in the TSOR what verification method(s) will be used by the Contractor to verify compliance of the NRWS System and all associated deliverable material, documents, and services with the TSOR.	A			
4.4 Safety Management				
4.4.1 The Contractor shall prepare, deliver, and maintain a Safety Control Plan in accordance with CDRL NRWS-SE-006.	A			
4.5 Delivery, Installation, and STW				
4.5.1 NRWS System Delivery				
4.5.1.1 The Contractor shall deliver each NRWS System to the locations specified in Table 2, in accordance with the IMS.	A			
4.5.1.2 The Contractor shall store each NRWS System until each component is installed.	A			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
<p>4.5.2 HFX Class NRWS System Installation</p> <p>4.5.2.2 The Contractor shall install each NRWS System in each ship listed in Table 2 in accordance with the Authorized NRWS System HFX Class Engineering Change (EC) Specification generated from ECGP of CDRL NRWS-TD-001.</p>	A and B			
<p>4.6 Acceptance Process</p>				
<p>4.6.1 System Acceptance</p> <p>4.6.1.1 The Contractor shall provide Objective Evidence (OE) of NRWS System and associated deliverable compliance with all requirements of this SOW for Acceptance by Canada via the Acceptance Program in accordance with CDRL NRWS-SE-009.</p>	A and W			
<p>4.6.2 Test and Evaluation Master Plan</p> <p>4.6.2.1 The Contractor shall prepare, deliver, and maintain a TEMP in accordance with CDRL NRWS-SE-009 for Authorization by Canada, to define the entire process by which compliance of the proposed NRWS System and associated deliverables will be demonstrated with respect to this SOW.</p>	A and W			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
4.7 Configuration Management				
4.7.1 General				
4.7.1.1 The Contractor shall prepare, deliver for Acceptance and maintain a Configuration Management (CM) Plan in accordance with CDRL NRWS-CM-001.	A and W			
4.7.1.2 The Contractor shall implement the CM Process to manage the configuration of the NRWS System and associated deliverables in accordance with the Authorized CM Plan.	A and B			
4.7.3 Configuration Audits				
4.7.3.1 The Contractor shall support Canada in conducting Functional Audit and PCA following Acceptance of the FAT Test Reports for each First Article NRWS System configuration variant.	A and B			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
4.8 Technical Documentation				
4.8.1 Engineering Change Guidance Package				
4.8.1.1 The Contractor shall prepare and deliver an ECGP in accordance with CDRL NRWS-TD-001 to assist in defining all changes required to HFX Class ships to accommodate the NRWS System.	A and B			
4.8.1.2 The Contractor shall prepare the ECGP based on the Hull and Cabling information outlined in the Installation Guidance Package found in Annex B, Appendix 4.	A			
4.8.1.7 The Contractor shall conduct an on-site survey of each HAL Class vessel using the NRWS System HAL Class EC Specification.	A and B			
4.8.1.8 If configuration deviations are identified during the on-site survey that will impact the NRWS System installation, the Contractor shall particularize the NRWS System HFX Class EC Specification, for the surveyed HFX Class ship and deliver it to Canada for Authorization.	A			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
5.0 INTEGRATED LOGISTIC SUPPORT				
5.1 General				
5.1.2 The Contractor shall undertake all ILS that may be required to implement and maintain each NRWS System and its associated deliverables until final Acceptance of each NRWS System deliverable by Canada.	A, B			
5.2 Integrated Logistic Support Planning				
5.2.1 Logistic Support Planning				
5.2.1.1 The Contractor shall prepare and deliver an ILS Plan in accordance with CDRL NRWS-ILS-001 to define how the ILS requirements of this SOW will be addressed for Authorization by Canada.	A, W			
5.2.2 Logistic Support Analysis				
5.2.2.1 The Contractor shall conduct a Logistic Support Analysis (LSA) on the NRWS System in accordance with the ILS Plan.	A and B			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
5.3 Initial Provisioning				
5.3.1 Sparing				
5.3.1.1 The Contractor shall provide quantities of initial Level 1 and 2 spares as follows:	A			
a. To support each NRWS System that will be implemented in the units itemized in Table 2, of this SOW; and				
b. To support each in-service NRWS System for the first two (2) years of operation.				
5.3.1.2 The Contractor shall deliver each set of Level 1 spares and Special Tools and Test Equipment prior to each NRWS System STW.	A			
5.3.1.3 The Contractor shall deliver all Level 2 spares and Special Tools and Test Equipment prior to First Article SAT.	A			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
<p>5.3.2 Long Lead Time Initial Provisioning Conference</p> <p>5.3.2.4 The Contractor shall define the proposed LLTIP processes and each materiel item at the LLTIP Conference in accordance with the LLTIP Conference Documentation Package of Paragraph 5.3.2.3.</p>	A and B			
<p>5.3.3 Initial Provisioning Conference</p> <p>5.3.3.3 The Contractor shall define the proposed NRWS IP processes and each materiel item at the IP Conference in accordance with the IP Conference Documentation Package of Paragraph 5.3.3.2.</p>	A and B			
<p>5.4 Training Development Program</p> <p>5.4.1 The Contractor shall create a Training Development Program that addresses each of the requirements specified in this SOW and is consistent with the Canadian Forces Individual Training and Education System principles.</p> <p>5.4.2 The Contractor shall consult Canada for information on occupations, positions, training and work environments that will be affected by the acquisition of the NRWS System.</p>	A and B			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
5.4.3 The Contractor shall create a Task List for operators and maintainers, identifying operator and maintenance tasks for system, sub-system, and integrated system.	A and B			
5.4.4 The Contractor shall identify Performance Objectives for each Task List created.	A and B			
5.4.5 The Contractor shall create Enabling Objectives to address the new skills and knowledge required for the Training Development Program.	A and B			
5.4.6 The Contractor shall create a summary of the recommended training materials, aids, and equipment required for the Training Development Program.	A and B			
5.5 Initial Cadre Training				
5.5.1 The Contractor shall prepare and deliver an NRWS System Operator ICT Package in accordance with CDRL NRWS-ILS-006 based upon the Authorized Training Development Program Report.	A			
5.5.2 The Contractor shall prepare and deliver a NRWS System Maintainer ICT Package in accordance with CDRL NRWS-ILS-006 based upon the Authorized Training Development Program Report.	A			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
5.5.3 The Contractor shall structure Operator and Maintainer training around the conventional, classroom, instructor-led format, with provision for "hands-on" time with an NRWS to exercise the required Operator and Maintainer skills.	A and B			
5.5.4 The Contractor shall conduct Operator ICT, based upon the Authorized ICT package, for a minimum of 10 to a maximum of 15 students, at locations designated by Canada.	A			
5.5.5 The Contractor shall conduct Maintainer ICT, based upon the Authorized ICT package, for a minimum of 10 to a maximum of 15 students, at locations designated by Canada.	A			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
5.6 Manuals				
5.6.1 The Contractor shall prepare, and deliver the following manuals:	A			
a. Installation and Set-To-Work Manual in accordance with CDRL NRWS-TD-003;				
b. System User Manual in accordance with CDRL NRWS-TD-004;				
c. Illustrated Parts Breakdown in accordance with CDRL NRWS-TD-005; and				
d. Maintenance Manual in accordance with CDRL NRWS-TD-006.				
5.7 Computer Based Trainers				
5.7.1 The Contractor shall supply Computer Based Trainers to train the NRWS Operators on how to use the NRWS System.	A and B			
5.7.2 The Contractor shall meet all requirements contained in the Computer Based Trainer Specification found in Annex B, Appendix 5.	A and B			
5.7.3 The Contractor shall deliver Computer Based Trainers to CFFSE.	A			

Table 1 – Mandatory SOW Requirements

SOW Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
5.7.4 The Contractor shall deliver Computer Based Trainers to CFNES.	A			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response		Compliant	
		Yes	No	Yes	No
3. PERFORMANCE REQUIREMENTS					
3.1 Threats					
3.1.1 The NRWS System shall defend against the threats listed in Table 1.	C				
3.2 Surveillance					
3.2.1 Each NRWS mount shall be provided with an Electro-Optical (EO) sensor suite that allows the Operator to detect, in both day and night conditions the threats listed in Table 1 to this Appendix at a range of 2,000 metres.	C and D or E or F				
3.2.2 The NRWS EO sensor suite shall allow the Operator to identify, in both day and night conditions, the threats listed in Table 1 to this Appendix at a range of 1,800 metres, with the exception of the Personnel threat	C and D or E or F				
3.2.3 The NRWS EO sensor suite shall allow the Operator to conduct fall of shot observation at a range of 1,000 metres while using 0.50 Calibre tracer ammunition.	C and D				
3.2.4 The NRWS EO sensor suite shall include a Thermal Imaging Camera (TIC).	C and D				
3.2.4.1 The NRWS TIC shall be located on the NRWS Mount.	C				
3.2.4.2 The NRWS TIC shall have a variable field of view.	C and D				

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3.2.4.3 The NRWS TIC shall have a Wide Horizontal Field of View (FOV) of at least 9.0 degrees.	C and D			
3.2.4.4 The NRWS TIC shall have a Narrow Horizontal FOV in the range of 2.0 degrees to 4.0 degrees.	C and D			
3.2.4.5 The NRWS TIC shall allow the Operator a 50 percent probability of identifying a unprotected man standing erect as described in STANAG 4512, characterized by a temperature difference, target to background, of 2K with a background temperature of 288K at a range of 1,600 metres and a visibility level characterized by an atmospheric IR attenuation factor of 0.2/kilometre in accordance with STANAG 4347.	C and D and F			
3.2.5 The NRWS EO sensor suite shall include a day camera.	C and D			
3.2.5.1 The NRWS day camera shall be located on NRWS Mount.	C			
3.2.5.2 The NRWS day camera shall have a variable continuous zoom.	C and D			
3.2.5.3 The NRWS day camera zoom shall perform at a minimum in all the ranges of horizontal FOV from 3.0 degrees to 40.0 degrees.	C and D			
3.2.5.4 The NRWS day camera shall have a colour mode.	C and D			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	
		Yes	No
3.2.5.5 The NRWS day camera shall allow the Operator a 50 percent probability of identifying an unprotected man standing erect as described in STANAG 4512 at a range of 1,800 metres under the following conditions: a. A clear day with atmospheric transmittance of 23.5 kilometres at sea level, in the visible wavelengths, 1E04 lux illuminance and line of sight; b. A target contrast of 19%; and c. Low turbulence conditions: Cn2= 1E-14 (m-2/3).	C and D and F		
3.2.6 The NRWS EO sensor suite shall include a Class 1 laser range finder (LRF) in accordance with American Standards Institute (ANSI) Z136.1, 2014.	C and D		
3.2.6.1 The NRWS LRF shall measure range of the threats listed in Table 1 at 2,000 metres.	C and D or E or F		
3.2.6.2 The NRWS LRF shall measure range with an accuracy of +/-5 metres against the threats listed in Table 1 when the threats are in the range of 200 metres to 1,000 metres.	C and D or E or F		
3.2.7 The NRWS shall have a surveillance mode whereby the weapon shall be de-coupled from the EO sensor suite and elevated to a minimum of 15 degrees relative to the line of site of the EO sensor suite.	C and D		

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3.3 Acquisition and Tracking				
3.3.1 The NRWS shall be a real-time system such that the response to a selected function must be at such a rate that there is no delay discernible by the Operator.	C			
3.3.2 The NRWS shall have mount velocities and accelerations, in order to track the threats listed in Table 1 on closing, crossing, and manoeuvring courses at ranges of 200 metres and above.	C and D or E or F			
3.3.3 The NRWS shall enable the Operator to select a threat for automatic tracking.	C and D			
3.3.4 The NRWS shall automatically acquire the threats listed in Table 1 to this Appendix in day conditions.	C and D or E or F			
3.3.5 The NRWS shall automatically track the acquired threats in day conditions once selected by the Operator.	C and D or E or F			
3.3.6 The NRWS shall automatically acquire the threats listed in Table 1 to this Appendix in night conditions.	C and D or E or F			
3.3.7 The NRWS shall automatically track the acquired threats in night conditions once selected by the Operator.	C and D or E or F			
3.3.8 The NRWS shall enable the Operator to remotely acquire and track threats	C and D			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3.3.9 The NRWS shall be a stabilized platform that maintains the EO sensor suite and weapon within 1.0 milliradian standard deviation pointing accuracy, while in Sea State 3 as defined in the World Meteorological Organization (WMO) code tables and as described in Table 4.	C and E or F			
3.3.10 The NRWS shall acquire and track the threats listed in Table 1 to this Appendix at all ranges from 50 metres to 1,000 metres.	C and E or F			
3.3.15 The NRWS shall automatically re-acquire and track stationary threats, in the event that the threat has been obstructed for up to and including 2 seconds.	C and E or F			
3.3.16 The NRWS shall automatically re-acquire and track dynamic threats, in the event that the threat has been obstructed for up to and including 2 seconds.	C and E or F			
3.3.17 The NRWS shall have an automatic re-acquisition probability of at least 90%.	C and E or F			
3.3.18 The NRWS EO sensor suite shall be independently stabilized from the weapon cradle.	C and D			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3.4 Fire Control and Engagement				
3.4.1 The NRWS shall produce a fire control solution on the threats listed in Table 1 to this Appendix while the threats are stationary at all ranges from 200 metres to 1,000 metres.	C and E or F			
3.4.2 The NRWS shall produce a fire control solution on the threats listed in Table 1 to this Appendix while the threats are manoeuvring at all ranges from 200 metres to 1,000 metres.	C and E or F			
3.4.3 The NRWS shall produce a fire control solution on the targets listed in Table 2 to this Appendix while the targets are stationary at all ranges from 200 metres to 1,000 metres.	C and E or F			
3.4.4 The NRWS shall produce a fire control solution on the targets listed in Table 2 to this Appendix while the targets are manoeuvring at all ranges from 200 metres to 1,000 metres.	C and E or F			
3.4.5 The NRWS shall produce a fire control solution within 16 seconds or less on threats listed in Table 1, when a verbal designation is given to the Operator of the surface threat range and surface threat bearing anywhere within the NRWS's weapon arc.	C and E or F			
3.4.7 The NRWS shall maintain the threat at the centre of the Operator Display when the fire control solution is applied.	C and D			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3-4.15 The NRWS Mount shall be capable of being aimed locally, by physically removing or disengaging any drive system, disabling remote functions, and locally firing the weapon.	C and D			
3-4.16 The NRWS Operator Console shall enable the Operator to offset the firing aim point when tracking threats and targets.	C and D or E or F			
3-4.17 The NRWS Operator Console shall enable the Operator to engage the threats listed in Table 1 from 50 metres to at least 600 metres.	C			
3-4.18 The NRWS shall maintain the threat at the centre of the Operator Display while engaging the threat.	C and D or E or F			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
<p>3.5 Weapon Effectiveness</p> <p>3.5.1 The NRWS shall achieve at least 7 hits against a surface target within 16 seconds or less of obtaining a fire control solution where:</p> <ul style="list-style-type: none"> a. the FN M2 0.50 Calibre HMG is mounted; b. the target has an aspect ratio of 2 by 1 and presents a vulnerable area of 2 square metres; c. the surface target is closing the NRWS Mount at a speed through the water of 25 metres per second while conducting a continuous narrow weave; d. not more than 50 rounds are expended; and e. the engagement starts at 600 metres. 	C and E or F			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
<p>3.5.2 The NRWS shall achieve at least 7 hits against an air target within 16 seconds or less of obtaining a fire control solution where:</p> <ul style="list-style-type: none"> a. the FN M2 0.50 Calibre HMG is mounted; b. the target has an aspect ratio of 2 by 1 and presents a vulnerable area of 2 square metres; c. the target is closing the NRWS Mount at an airspeed of 64 metres per second, without evasive manoeuvres; d. not more than 100 rounds are expended; and e. the engagement starts at 600 metres. 	C and E or F			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
<p>3.5.3 The NRWS shall achieve a Circular Error Probable (CEP) of 2.5 milliradians or less where:</p> <ul style="list-style-type: none"> a. the target is a vertical panel with a centred, high contrast aim point; b. the target is towed on a steady course and at a speed of 8 to 10 knots; c. the firing ship is stationed such that a constant target bearing perpendicular to the target course +/- 2 degrees and a constant target range of 500 metres +/- 50 metres are maintained; d. the sea state is not less than Sea State 1 and not more than Sea State 3 as defined in the WMO code tables and as described in Table 4; e. the salvo size is 1; f. the sample size is not less than 100 rounds; g. CEP of 2.5 milliradians shall be interpreted to mean that not less than 50% of the rounds fired shall land on or within a circle of a radius equivalent to 2.5 milliradians for the range at the time of firing; and h. rounds fired for alignment/calibration are not scored or counted in the sample. 	C and E or F			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3.6 Power				
3.6.3 The NRWS shall operate in full compliance with this TSOR for not less than 10 minutes without ships power.	C and D			
3.7 Weapon Aiming and Firing Limitation				
3.7.1 The NRWS System shall incorporate firing circuit interrupts.	C and D			
3.7.2 The NRWS System shall have a firing enable key.	C and D			
3.7.3 The NRWS shall have a readily accessible override function located at the NRWS mount.	C and D			
3.7.4 The NRWS shall have safety interlocks that will prevent NRWS mount movement and firing functions in the event that the NRWS mount is not safe to operate.	C and D			
3.7.5 If the NRWS has an onboard trainer, the onboard trainer shall incorporate software and hardware inhibits to prevent operation of the NRWS mounted weapon.	C and D			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3.7.6 The NRWS shall have adjustable mechanical firing cut-outs for training, elevation and depression.	C and D			
3.7.7 The NRWS shall have adjustable firing cut-outs in software to ensure the weapon cannot be fired within a distance of the ships silhouette (2.5 calibres (32 millimetres) from ship's hard obstructions and more for antennas).	C and D			
3.8 Ammunition Handling				
3.8.1 The NRWS mount ammunition box shall accommodate not less than 200 rounds of linked 12.7 millimetre ammunition when the FN M2 0.50 Calibre HMG is mounted and not less than 400 rounds of linked 7.62 millimetre ammunition when the C6 machine gun is mounted.	C and D			
3.8.2 The NRWS mount shall collect casings, rounds and links ejected from the weapon.	C and D			
3.8.3 The NRWS mount ammunition box shall be located on the NRWS mount, without requiring access below deck.	C and D			
3.9 Operator Console				

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3.9.6 The NRWS Operator Console shall incorporate a selector switch to allow operation of one of two NRWS mounts as selected by the Operator.	C			
3.9.7 The NRWS Operator Console shall only control the NRWS mount that has been selected by the selector switch.	C			
3.9.8 The NRWS Operator Console shall comply with MIL-STD-1472G section 5.10.3.2, section 5.10.3.4.4, section 5.10.3.7 and section 5.10.4.	C and D			
3.9.9 The NRWS Operator Console selector switch shall allow operation of the selected NRWS mount only if the NRWS mount is not currently selected for operation.	C and D			
3.9.10 The NRWS Operator Console shall have an Operator display.	C and D			
3.9.11 The NRWS Operator Console shall incorporate Operator controls.	C and D			
3.9.12 The NRWS shall have a video recorder.	C and D			
3.9.13 The NRWS Operator Console shall incorporate an Operator chair.	C and D			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3.10 Initialization and Built-In Test				
3.10.1 The NRWS shall initialise from a shutdown state to full functionality in accordance with this TSOR in: <ul style="list-style-type: none"> a. less than 2 minutes, with the exception of the TIC, when selected by the Operator; and b. less than 7 minutes, including the TIC, when selected by the Operator. 	C and D or F			
3.10.2 The NRWS shall automatically re-initialise from an abnormal shutdown to full functionality in accordance with this TSOR in: <ul style="list-style-type: none"> c. less than 4 minutes, with the exception of the TIC; and d. less than 10 minutes, including the TIC. 	C and D or F			
3.10.4 The NRWS shall operate at a reduced level of performance in the event of a critical failure.	C and D			
3.10.5 The NRWS Built-In Test (BIT) shall automatically detect faults.	C and D or E or F			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
3.11 Onboard Trainer				
3.11.1 If the NRWS has an onboard trainer, the onboard trainer shall be either appended or embedded to the NRWS.	C and D *if onboard trainer included			
3.11.6 If the NRWS has an onboard trainer, the onboard trainer shall include not less than 5 pre-programmed naval combat scenarios.	C and D *if onboard trainer included			
3.11.7 If the NRWS has an onboard trainer, the onboard trainer combat scenarios shall vary in level of complexity.	C and D *if onboard trainer included			
4. PHYSICAL REQUIREMENTS				
4.1 Equipment				
4.1.2 The NRWS shall provide a means to singly mount each of the following weapons in one weapon cradle: <ul style="list-style-type: none"> a. FN M2 0.50 Calibre HMG; and b. 7.62 millimetre C6 machine gun. 	C and D			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
4.1.4 The NRWS shall have a cover to protect functional components of the mounted weapon.	C and D			
4.1.6 The NRWS shall have a means to align the EO sensor suite and the mounted weapon to a common reference point on the ship.	C and D			
4.1.7 The NRWS shall have a means to align the EO sensor suite and the mounted weapon to a common reference point at the maximum effective range of the NRWS.	C and D			
4.1.8 The NRWS EO sensor suite shall incorporate an Operator controlled jet wash system to clean any debris impeding functionality of the EO sensor suite optics.	C and D			
4.1.9 The NRWS EO sensor suite shall incorporate an Operator controlled de-icing system to melt any ice accumulation impeding functionality of the EO sensor suite.	C and D			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
4.1.17 The NRWS shall be at a technology readiness level of at least 8 in accordance with the Technical Readiness Assessment Guidance, Department of Defense.	C and D and bidder has provided the Supporting Information as defined in the Technology Readiness Assessment Guidance, DOD, April 2011			
4.2 Range of Motion				
4.2.1 Each NRWS mount shall traverse continuously clockwise and counter-clockwise for 360 degrees in azimuth	C and D or E or F			
4.2.2 Each NRWS mount shall elevate the weapon to a minimum of 55 degrees above the horizontal plane.	C and D or E or F			
4.2.3 Each NRWS mount shall depress the weapon to a minimum of 20 degrees below the horizontal plane.	C and D or E or F			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
6. SPECIALTY ENGINEERING REQUIREMENTS				
6.2 Availability				
6.2.1 The NRWS shall have no less than 98% availability, 24 hours a day, seven days a week, throughout a deployed period of no less than 90 days considering the typical usage patterns as outlined table 3.	C and E or F			
6.2.2 The NRWS shall be available for no less than 250 days per calendar year.	C and E or F			
6.3 Survivability				
6.3.1 The NRWS shall withstand exposure to conditions up to and including Sea State 6 as defined in the WMO code tables and as described in Table 4.	C and D or E or F			
6.4 Maintainability				
6.4.1 The NRWS daily preventive maintenance shall be less than 30 minutes in total in a 24 hour period.	C and E or F			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
6.4.3 The NRWS MTTR shall be less than 1 hour for corrective maintenance repair functions which includes combined diagnostic and LRU replacement time but does not include time associated with provisioning the LRU.	C and E or F			
7. ENVIRONMENTAL REQUIREMENTS				
7.1 Ship's Motion and Sea State				
7.1.1 The NRWS shall operate while the ship has a permanent list within the range of -20 to +20 degrees.	C and D or E or F			
7.1.2 The NRWS shall operate while the ship has a permanent trim of 5 degrees.	C and D or E or F			
7.1.3 The NRWS shall operate while the ship is rolling within the range of -40 to +40 degrees.	C and E or F			
7.1.4 The NRWS above deck equipment shall operate in accordance with this TSOR after immersion in a mean green water load of 42 kilopascals.	C and E or F			
7.1.5 The NRWS shall operate in conditions up to and including Sea State 5 as defined in the WMO code tables and as described in Table 4.	C and E or F			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
7.2 Mechanical Shock				
7.2.3 The NRWS equipment shall operate in accordance with this TSOR following exposure to shock conditions specified in D-03-003-007/SF-000 Grade 1 Type A, Section 6.	C and E or F			
7.3 Vibration				
7.3.2 The NRWS equipment shall operate in accordance with this TSOR when excited by Type I environmental vibration levels up to and including 33Hz as specified in MIL-STD-810G, method 528.1.	C and E or F			
7.5 Temperature, Humidity, and Solar Radiation				
7.5.1 The NRWS equipment not exposed to the weather shall operate in accordance with this TSOR in temperatures ranging from 0 to 40 degrees Celsius.	C and D or F			
7.5.2 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR in temperatures ranging from -32 to 40 degrees Celsius.	C and D or F			
7.5.4 The NRWS equipment shall operate in accordance with this TSOR in 95% humidity condensing environment.	C and D or F			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
7.5.5 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR when exposed to the solar environment described in MIL-STD-810G, method 505.6 Procedure II.	C and D			
7.6 Wind				
7.6.1 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR under the sustained winds, plus gusts as described in STANAG 2895 Table 26.	C and D			
7.7 Rainfall, Dust, and Spray				
7.7.1 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR under rainfall conditions of 0.8 millimetres per minute.	C and D or F			
7.7.2 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR under dust concentrations of 1 gram per cubic metre.	C and D or F			
7.7.4 The NRWS electrical equipment exposed to the weather shall be watertight, spray tight, and dust proof in accordance with MIL-STD-108E.	C and D			
7.8 Ice				

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
7.8.1 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR when subjected to conditions which produce icing loads of up to and including 20 kilograms per square metre.	C and E or F			
7.8.2 The NRWS equipment exposed to the weather shall not be damaged by an icing load of up to and including 37 kilograms per square metre except as otherwise specified in TSOR requirement 7.8.3.	C and E or F			
7.8.3 The NRWS equipment exposed to the weather shall not be damaged by an icing load of up to and including 180 kilograms per square metre if located in the forward one-third of the ship and below a line parallel to and 12.2 metres above the Halifax Class vessels design waterline.	C and E or F			
7.9 Corrosion and Salt Fog				
7.9.1 The NRWS above deck components shall be constructed from galvanic compatible materials.	C and D			
7.9.2 The NRWS above deck components exposed to the weather shall be constructed from materials with surface treatments in order to preclude failure due to oxidation and corrosion.	C and D			

Table 2 – Mandatory TSOR Requirements

TSOR Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
7.9.4 The NRWS shall be resistant to the effects of salt deposits on the physical aspects of materiel when subjected to the test described in method 509.6 of MIL-STD-810G.	C and D			
7.9.5 The NRWS shall be resistant to the effects of salt deposits on the electrical aspects of materiel when subjected to the test described in method 509.6 of MIL-STD-810G.	C and D			
8. SUPPORTABILITY				
8.1 The NRWS shall have an operational life expectancy of not less than 15 years.	C and D or E			
8.2 The NRWS shall accommodate the facilitation of new technologies, including, but not limited to, the upgrade of individual sensors, without having to replace other components.	C and D			
8.3 The NRWS hardware architecture shall be an open architecture format.	C and D			

Table 3 – Mandatory Computer Based Trainer Specification Requirements

Computer Based Trainer Specification Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No

Table 3 – Mandatory Computer Based Trainer Specification Requirements

Computer Based Trainer Specification Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
2. TECHNICAL REQUIREMENTS				
2.1 General Requirements				
2.1.1 The Computer Based Trainer shall have an Operator Trainer Mode.	C			
2.1.2 The Computer Based Trainer shall have an Instructor Trainer Mode.	C			
2.1.3 The Computer Based Trainer shall operate in either the Operator Trainer Mode or the Instructor Trainer Mode as selected by the user.	C			
2.1.4 The Computer Based Trainer Controls shall have a Physical Fidelity level of not less than 4 in accordance with Table 1, to this Appendix.	C and D			
2.1.5 The Computer Based Trainer Display shall have a Physical Fidelity level of not less than 3 in accordance with Table 1, to this Appendix.	C and D			
2.1.6 The Computer Based Trainer Software shall have a Functional Fidelity level of not less than 4 in accordance with Table 2, to this Appendix.	C and D			

Table 3 – Mandatory Computer Based Trainer Specification Requirements

Computer Based Trainer Specification Requirement	Compliance Method	Bidder's Response	Compliant	
			Yes	No
2.1.7 The Computer Based Trainer shall include not less than 10 pre-programmed Combat Scenarios.	C and D			
2.2 Combat Scenarios				
2.2.1 The Combat Scenarios shall vary in levels of complexity.	C and D			
2.2.2 The Combat Scenarios shall simulate each threat and target types as specified in the NRWS System TSOR, Tables 1 and 2 of Annex B, Appendix 3.	C			
2.4 Instructor Trainer Mode				
2.4.1 The Instructor Trainer Mode shall allow the instructor to create Combat Scenarios.	C and D			
2.4.2 The Instructor Trainer Mode shall allow the instructor to edit Combat Scenarios including environment conditions and marine operating areas as defined in section 2.2 of this Specification.	C and D			



ANNEX B
Appendix 3

Technical Statement of Requirements

Naval Remote Weapon Station System

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1. INTRODUCTION

1.1 Scope

1.1.1 This Technical Statement of Requirements (TSOR) contains the performance and technical requirements for the Naval Remote Weapon Station (NRWS) System, which will consist of multiple remotely operated weapon mounts, sensor suites, and Operator Consoles to be designed, manufactured, supported, initially spared and installed for operation in the Royal Canadian Navy.

1.2 Terminology

1.2.1 The following definitions shall apply throughout this TSOR:

- a. Availability: The probability that the NRWS is in an operable state at any time, based on a combination of Mean Time Between Failure (MTBF) and Mean Time To Repair (MTTR). This relationship is given by $Availability (as \%) = \frac{MTBF}{MTBF + MTTR} \times 100$;
- b. Local: Operations conducted at the physical location of the NRWS Mount by the Operator;
- c. NRWS System: The NRWS System consists of four remotely operated NRWS mounts, sensor suites, and NRWS Operator Consoles integrated together;
- d. NRWS: One NRWS Mount and an NRWS Operator Console and all the auxiliary components;
- e. NRWS Mount: The above deck component that secures, aims, and fires the mounted weapon, and secures the electro-optical sensor suite;
- f. NRWS Operator Console: The component that provides the primary point for Operator monitoring and control of NRWS Mounts;
- g. Operator: The individual member of ship's staff who is operating the NRWS; and
- h. Remote: Controlling the NRWS Mount at a distance away using the NRWS Operator Console.

1.2.2 The following acronyms shall apply to this TSOR:

Acronyms	
CEP	Circular Error Probable
FN	Fabrique National

HMG	Heavy Machine Gun
LRF	Laser Range Finder
LRU	Line Replaceable Unit
NRWS	Naval Remote Weapon Station
TIC	Thermal Imaging Camera
TSOR	Technical Statement of Requirements
WMO	World Meteorological Organization

1.3 Intended Application

1.3.1 The NRWS System will provide a short range, point defence, and limited area defence capability within the layered defence concept employed in Canada’s twelve Halifax Class vessels and two Joint Support Ship Vessels when they are commissioned.

1.3.2 The NRWS System will be employed to engage small sea-surface and low-slow air threats while underway, alongside, moored, and at anchor, as well as engage land vehicles when alongside. Within this role, the NRWS System will provide surveillance, threat detection, tracking, warning shots, non-disabling fire, disabling fire, and threat battle damage assessment. Additionally, the NRWS System will be used to conduct surface surveillance in support of Search and Rescue, and to acquire information regarding neutral and threat forces during domestic and international operations.

1.3.3 NRWS Systems will be supplied to Canada in order to be later fitted on the Joint Support Ship Class vessels. Canada is separately responsible for NRWS System installation on these vessels which will include procurement of cables.

1.4 System Overview

1.4.1 The NRWS will enable Canada to singly mount the Fabrique National (FN) M2 0.50 Calibre Heavy Machine Gun (HMG) or the 7.62 millimetre C6 machine gun. The NRWS will provide full remote operation of these weapons.

1.4.2 The design of the NRWS System will provide the automated weapon mounts and associated equipment in each vessel necessary to provide a 360 degree threat engagement, while significantly enhancing the lethality currently achievable with locally operated pintle mounted HMGs. The design will allow for optimum coverage, lethality (two mount coverage per threat), and ensure redundancy of the NRWS Mounts and NRWS Operator Consoles.

- 1.4.3 There will be one NRWS Operator Console per NRWS Mount. However, two Operator Consoles will be able to operate either of the port NRWS mounts and two Operator Consoles will be able to operate either of the starboard NRWS mounts.
- 1.4.4 The NRWS System will support the use of the HMG in the zone between the maximum effective range of small arms teams and the minimum range of the Halifax Class vessel's main gun.
- 1.4.5 The NRWS System will consist of non-developmental military off-the-shelf hardware and software that is customized to meet the requirements of Canada.
- 1.4.6 The NRWS System will provide the required capabilities within all of the environments necessary to support world-wide Canadian naval operations.

2. APPLICABLE DOCUMENTS

- 2.1 The following documents listed are applicable to and shall form part of this TSOR:
 - a. MIL-STD-1472G, Department of Defense Design Criteria Standard, Human Engineering;
 - b. MIL-DTL-24643C, General Specification for Shipboard Use of Low Smoke Electric Cable and Cords;
 - c. C-03-010-000/MM-001, Technical Manual, Canadian Naval Shipboard Techniques for Electromagnetic Compatibility;
 - d. D-03-003-005/SF-000, General Electrical Specification for Canadian Forces Ships;
 - e. MIL-STD-1310H (Navy), Shipboard Bonding, Grounding, and Other Techniques For Electromagnetic Compatibility, Electromagnetic Pulse (EMP) Mitigation, and Safety;
 - f. Technical Readiness Assessment Guidance, Department of Defense (DOD);
 - g. D-02-002-001/SG-001, Identification Marking of Canadian Military Property;
 - h. MIL-STD-461F, Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment;
 - i. STANAG 2895, MMS Edition 1, Extreme Climate Conditions and Derived Conditions for Use in Defining Design/Test Criteria for NATO Forces Material;
 - j. MIL-STD-108E, Definitions and Basic Requirements for Enclosures for Electric and Electronic Equipment;

- k. D-03-003-007/SF-000, Specification for Design and Test Criteria for Shock Resistant Equipment in Naval Ships;
- l. C-03-007-181/ME-001, Cable and Cable Termination Data for Shipboard Installation;
- m. MIL-STD-810G, Environmental Engineering Considerations and Laboratory Tests;
- n. C-03-010-000/AG-001, EMSEC Control Plan and Procedures for Naval Vessels.
- o. STANAG 4347, Definition of Nominal Static Range Performance for Thermal Imaging Systems; and
- p. STANAG 4512, Dismounted Personnel Target.

2.2 In the event of a conflict between this TSOR and an applicable document, this TSOR at the time of bid closing shall take precedence to the extent necessary to resolve such conflict.

2.3 The latest approved revision of the documents listed in paragraph 2.1 shall apply unless otherwise specified.

3. PERFORMANCE REQUIREMENTS

3.1 Threats

3.1.1 The NRWS System shall defend against the threats listed in Table 1.

<u>Table 1 – Threats</u>				
<u>Threat Type</u>	<u>Threat Size</u>	<u>Threat Construction</u>	<u>Threat Speed</u>	<u>Threat Manoeuvres</u>
Boats	2 square metres or greater	Standard civilian Standard military	0 to 25 metres/second	A continuous narrow weave consisting of a threat that manoeuvres in a random pattern up to 45 degrees either side of its course.
Aircraft	2 square metres or greater	Light fixed wing Light rotary	0 to 64 metres/second	Closing, not evasive

Land Vehicles	2 square metres or greater	Standard civilian such as trucks, cars, motorcycles		Continuous, weave
Personnel		Armed or IED laden		

3.2 Surveillance

- 3.2.1 Each NRWS mount shall be provided with an Electro-Optical (EO) sensor suite that allows the Operator to detect, in both day and night conditions the threats listed in Table 1 to this Appendix at a range of 2,000 metres.
- 3.2.2 The NRWS EO sensor suite shall allow the Operator to identify, in both day and night conditions, the threats listed in Table 1 to this Appendix at a range of 1,800 metres, with the exception of the Personnel threat.
- 3.2.3 The NRWS EO sensor suite shall allow the Operator to conduct fall of shot observation at a range of 1,000 metres while using 0.50 Calibre tracer ammunition.
- 3.2.4 The NRWS EO sensor suite shall include a Thermal Imaging Camera (TIC).
- 3.2.4.1 The NRWS TIC shall be located on the NRWS Mount.
- 3.2.4.2 The NRWS TIC shall have a variable field of view.
- 3.2.4.3 The NRWS TIC shall have a Wide Horizontal Field of View (FOV) of at least 9.0 degrees.
- 3.2.4.4 The NRWS TIC shall have a Narrow Horizontal FOV in the range of 2.0 degrees to 4.0 degrees.
- 3.2.4.5 The NRWS TIC shall allow the Operator a 50 percent probability of identifying a unprotected man standing erect as described in STANAG 4512, characterized by a temperature difference, target to background, of 2K with a background temperature of 288K at a range of 1,600 metres and a visibility level characterized by an atmospheric IR attenuation factor of 0.2/kilometre in accordance with STANAG 4347.
- 3.2.5 The NRWS EO sensor suite shall include a day camera.
- 3.2.5.1 The NRWS day camera shall be located on NRWS Mount.
- 3.2.5.2 The NRWS day camera shall have a variable continuous zoom.
- 3.2.5.3 The NRWS day camera zoom shall perform at a minimum in all the ranges of horizontal FOV from 3.0 degrees to 40.0 degrees.

- 3.2.5.4 The NRWS day camera shall have a colour mode.
- 3.2.5.5 The NRWS day camera shall allow the Operator a 50 percent probability of identifying an unprotected man standing erect as described in STANAG 4512 at a range of 1,800 metres under the following conditions:
 - a. A clear day with atmospheric transmittance of 23.5 kilometres at sea level, in the visible wavelengths, 1E04 lux illuminance and line of sight;
 - b. A target contrast of 19%; and
 - c. Low turbulence conditions: $C_n^2=1E-14 (m^{-2/3})$.
- 3.2.6 The NRWS EO sensor suite shall include a Class 1 laser range finder (LRF) in accordance with American Standards Institute (ANSI) Z136.1, 2014.
 - 3.2.6.1 The NRWS LRF shall measure range of the threats listed in Table 1 at 2,000 metres.
 - 3.2.6.2 The NRWS LRF shall measure range with an accuracy of +/-5 metres against the threats listed in Table 1 when the threats are in the range of 200 metres to 1,000 metres.
- 3.2.7 The NRWS shall have a surveillance mode whereby the weapon shall be de-coupled from the EO sensor suite and elevated to a minimum of 15 degrees relative to the line of site of the EO sensor suite.

3.3 Acquisition and Tracking

- 3.3.1 The NRWS shall be a real-time system such that the response to a selected function must be at such a rate that there is no delay discernible by the Operator.
- 3.3.2 The NRWS shall have mount velocities and accelerations, in order to track the threats listed in Table 1 on closing, crossing, and manoeuvring courses at ranges of 200 metres and above.
- 3.3.3 The NRWS shall enable the Operator to select a threat for automatic tracking.
- 3.3.4 The NRWS shall automatically acquire the threats listed in Table 1 to this Appendix in day conditions.
- 3.3.5 The NRWS shall automatically track the acquired threats in day conditions once selected by the Operator.
- 3.3.6 The NRWS shall automatically acquire the threats listed in Table 1 to this Appendix in night conditions.
- 3.3.7 The NRWS shall automatically track the acquired threats in night conditions once selected by the Operator.

- 3.3.8 The NRWS shall enable the Operator to remotely acquire and track threats.
- 3.3.9 The NRWS shall be a stabilized platform that maintains the EO sensor suite and weapon within 1.0 milliradian standard deviation pointing accuracy, while in Sea State 3 as defined in the World Meteorological Organization (WMO) code tables and as described in Table 4.
- 3.3.10 The NRWS shall acquire and track the threats listed in Table 1 to this Appendix at all ranges from 50 metres to 1,000 metres.
- 3.3.11 The NRWS shall automatically acquire the targets listed in Table 2 to this Appendix in day conditions.
- 3.3.12 The NRWS shall automatically track the acquired targets in day conditions once selected by the Operator.
- 3.3.13 The NRWS shall automatically acquire the targets listed in Table 2 to this Appendix in night conditions.
- 3.3.14 The NRWS shall automatically track the acquired targets in night conditions once selected by the Operator.

<u>Table 2 – Targets</u>			
<u>Type of Target</u>	<u>Example of Target</u>	<u>Size of Target</u>	<u>Range of Target</u>
Super structures of ships	Funnels and masts	2 square metre area	No less than 1,000 metres
Sub-structures of commercial vessels	Funnels, steering gear, doors, windows	2 square metre area	Up to and including 1,000 metres
Optically/Thermally discernible features	Doors, windows, hatches, exhaust plumes, markings (lettering/numbering/crests/stripes)	2 square metre area	No less than 1,000 metres

- 3.3.15 The NRWS shall automatically re-acquire and track stationary threats, in the event that the threat has been obstructed for up to and including 2 seconds.
- 3.3.16 The NRWS shall automatically re-acquire and track dynamic threats, in the event that the threat has been obstructed for up to and including 2 seconds.
- 3.3.17 The NRWS shall have an automatic re-acquisition probability of at least 90%.

3.3.18 The NRWS EO sensor suite shall be independently stabilized from the weapon cradle.

3.4 Fire Control and Engagement

3.4.1 The NRWS shall produce a fire control solution on the threats listed in Table 1 to this Appendix while the threats are stationary at all ranges from 200 metres to 1,000 metres.

3.4.2 The NRWS shall produce a fire control solution on the threats listed in Table 1 to this Appendix while the threats are manoeuvring at all ranges from 200 metres to 1,000 metres.

3.4.3 The NRWS shall produce a fire control solution on the targets listed in Table 2 to this Appendix while the targets are stationary at all ranges from 200 metres to 1,000 metres.

3.4.4 The NRWS shall produce a fire control solution on the targets listed in Table 2 to this Appendix while the targets are manoeuvring at all ranges from 200 metres to 1,000 metres.

3.4.5 The NRWS shall produce a fire control solution within 16 seconds or less on threats listed in Table 1, when a verbal designation is given to the Operator of the surface threat range and surface threat bearing anywhere within the NRWS's weapon arc.

3.4.6 The NRWS shall automatically adjust the position of the weapon in accordance with the fire control solution.

3.4.7 The NRWS shall maintain the threat at the centre of the Operator Display when the fire control solution is applied.

3.4.8 This paragraph has been intentionally left blank.

3.4.9 This paragraph has been intentionally left blank.

3.4.10 The NRWS shall remotely charge (cock) the installed weapon when selected by the Operator.

3.4.11 The NRWS shall have remote selectable salvo sizes including 1 round, 3 rounds, and continuous firing.

3.4.12 The NRWS Operator Console shall enable the Operator to remotely train and elevate the weapon without stabilization.

3.4.13 The NRWS Operator Console shall enable the Operator to remotely train and elevate the weapon with stabilization.

3.4.14 The NRWS Operator Console shall enable the Operator to remotely fire the weapon.

- 3.4.15 The NRWS Mount shall be capable of being aimed locally, by physically removing or disengaging any drive system, disabling remote functions, and locally firing the weapon.
- 3.4.16 The NRWS Operator Console shall enable the Operator to offset the firing aim point when tracking threats and targets.
- 3.4.17 The NRWS Operator Console shall enable the Operator to engage the threats listed in Table 1 from 50 metres to at least 600 metres.
- 3.4.18 The NRWS shall maintain the threat at the centre of the Operator Display while engaging the threat.

3.5 Weapon Effectiveness

- 3.5.1 The NRWS shall achieve at least 7 hits against a surface target within 16 seconds or less of obtaining a fire control solution where:
 - a. the FN M2 0.50 Calibre HMG is mounted;
 - b. the target has an aspect ratio of 2 by 1 and presents a vulnerable area of 2 square metres;
 - c. the surface target is closing the NRWS Mount at a speed through the water of 25 metres per second while conducting a continuous narrow weave;
 - d. not more than 50 rounds are expended; and
 - e. the engagement starts at 600 metres.
- 3.5.2 The NRWS shall achieve at least 7 hits against an air target within 16 seconds or less of obtaining a fire control solution where:
 - a. the FN M2 0.50 Calibre HMG is mounted;
 - b. the target has an aspect ratio of 2 by 1 and presents a vulnerable area of 2 square metres;
 - c. the target is closing the NRWS Mount at an airspeed of 64 metres per second, without evasive manoeuvres;
 - d. not more than 100 rounds are expended; and
 - e. the engagement starts at 600 metres.
- 3.5.3 The NRWS shall achieve a Circular Error Probable (CEP) of 2.5 milliradians or less where:
 - a. the target is a vertical panel with a centred, high contrast aim point;

- b. the target is towed on a steady course and at a speed of 8 to 10 knots;
- c. the firing ship is stationed such that a constant target bearing perpendicular to the target course +/- 2 degrees and a constant target range of 500 metres +/- 50 metres are maintained;
- d. the sea state is not less than Sea State 1 and not more than Sea State 3 as defined in the WMO code tables and as described in Table 4;
- e. the salvo size is 1;
- f. the sample size is not less than 100 rounds;
- g. CEP of 2.5 milliradians shall be interpreted to mean that not less than 50% of the rounds fired shall land on or within a circle of a radius equivalent to 2.5 milliradians for the range at the time of firing; and
- h. rounds fired for alignment/calibration are not scored or counted in the sample.

3.6 Power

- 3.6.1 The NRWS shall be compliant with the electrical system requirements as specified in D-03-003-005/SF-000.
- 3.6.2 The NRWS shall utilize existing ships power infrastructure to provide power for the NRWS.
- 3.6.3 The NRWS shall operate in full compliance with this TSOR for not less than 10 minutes without ships power.

3.7 Weapon Aiming and Firing Limitation

- 3.7.1 The NRWS System shall incorporate firing circuit interrupts.
 - 3.7.1.1 The NRWS System shall be configured with one firing circuit interrupt for port NRWS mounts and one firing circuit interrupt for starboard NRWS mounts.
 - 3.7.1.2 When the firing circuit interrupt is activated, the firing circuit interrupt shall interrupt the physical firing circuit and inhibit firing of the two NRWS controlled weapons.
 - 3.7.1.3 When the NRWS firing circuit interrupt is activated, the NRWS shall permit the Operator to remotely move the mount and utilize the NRWS EO sensor suite.
 - 3.7.1.4 When the NRWS firing circuit interrupt is activated, the NRWS shall permit the automatic tracking process.
- 3.7.2 The NRWS System shall have a firing enable key.

- 3.7.2.1 When inserted, the NRWS firing enable key shall enable all NRWS mount firing functions.
- 3.7.2.2 The NRWS firing enable key shall be installed in close proximity to each NRWS Operator Console.
- 3.7.3 The NRWS shall have a readily accessible override function located at the NRWS mount.
 - 3.7.3.1 When activated, the NRWS mount override function shall disable all functions controlled from the NRWS Operator Console.
 - 3.7.3.2 When activated, the NRWS mount override function shall have a two step disengagement process to prevent accidental disengagement of the override function.
- 3.7.4 The NRWS shall have safety interlocks that will prevent NRWS mount movement and firing functions in the event that the NRWS mount is not safe to operate.
- 3.7.5 If the NRWS has an onboard trainer, the onboard trainer shall incorporate software and hardware inhibits to prevent operation of the NRWS mounted weapon.
- 3.7.6 The NRWS shall have adjustable mechanical firing cut-outs for training, elevation and depression.
- 3.7.7 The NRWS shall have adjustable firing cut-outs in software to ensure the weapon cannot be fired within a distance of the ships silhouette (2.5 calibres (32 millimetres) from ship's hard obstructions and more for antennas).
- 3.7.8 The NRWS shall have an electronic means of aligning the EO sensor suite to the boresight of the weapon gun barrel.

3.8 Ammunition Handling

- 3.8.1 The NRWS mount ammunition box shall accommodate not less than 200 rounds of linked 12.7 millimetre ammunition when the FN M2 0.50 Calibre HMG is mounted and not less than 400 rounds of linked 7.62 millimetre ammunition when the C6 machine gun is mounted.
- 3.8.2 The NRWS mount shall collect casings, rounds and links ejected from the weapon.
- 3.8.3 The NRWS mount ammunition box shall be located on the NRWS mount, without requiring access below deck.

3.9 Operator Console

- 3.9.1 The NRWS System shall incorporate one NRWS Operator Console for each NRWS mount.

- 3.9.2 The NRWS Operator Console shall control the NRWS mount.
- 3.9.3 The NRWS Operator Console shall provide proportional control for laying the weapon in training and elevation.
- 3.9.4 The NRWS Operator Console shall provide positive and safe control for cocking, firing, and ceasing fire.
- 3.9.5 The NRWS Operator Console shall require two Operator actions to fire the NRWS mounted weapon.
- 3.9.6 The NRWS Operator Console shall incorporate a selector switch to allow operation of one of two NRWS mounts as selected by the Operator.
- 3.9.7 The NRWS Operator Console shall only control the NRWS mount that has been selected by the selector switch.
- 3.9.8 The NRWS Operator Console shall comply with MIL-STD-1472G section 5.10.3.2, section 5.10.3.4.4, section 5.10.3.7 and section 5.10.4.
- 3.9.9 The NRWS Operator Console selector switch shall allow operation of the selected NRWS mount only if the NRWS mount is not currently selected for operation.
- 3.9.10 The NRWS Operator Console shall have an Operator display.
 - 3.9.10.1 The NRWS Operator display shall have a display size of not less than 10 inches and resolution of not less than 800 x 600 pixels.
 - 3.9.10.2 The NRWS Operator display shall display all imaging information from the NRWS EO sensor suite.
 - 3.9.10.3 The NRWS Operator display shall display the range finding measurements.
 - 3.9.10.4 The NRWS Operator display shall display all NRWS operating modes.
 - 3.9.10.5 The NRWS Operator display shall display all Operator selectable screen functions.
 - 3.9.10.6 The NRWS Operator display shall display the current training and elevation status of the NRWS mount in:
 - a. true bearing; and
 - b. relative bearing to the ships head.
 - 3.9.10.7 The NRWS Operator display shall display a reticule graduated in degrees and milliradians.
 - 3.9.10.8 This paragraph has been intentionally left blank.

- 3.9.10.9 The NRWS Operator display shall display the number of rounds which have been fired.
- 3.9.10.10 The NRWS Operator display shall display the current NRWS status and any associated fault messages.
- 3.9.10.11 The NRWS Operator display shall display a safe to fire indicator.
- 3.9.10.12 The NRWS Operator display shall display a visual reference indicating the amount of time remaining for system operation once the NRWS is functioning on backup power.
- 3.9.10.13 The NRWS Operator display shall be dimmable by the Operator from complete luminosity to complete shutdown of luminosity.
- 3.9.10.14 The NRWS Operator display shall provide an exact replication of what is being displayed on the Operator display to an output source for viewing from a remote monitor.
- 3.9.10.15 The NRWS Operator display shall be in accordance with MIL-STD-1472G section 5.2.3.
- 3.9.11 The NRWS Operator Console shall incorporate Operator controls.
 - 3.9.11.1 The NRWS Operator controls shall incorporate a means to power each NRWS on and off.
 - 3.9.11.2 The NRWS Operator controls shall incorporate all controls required to maintain safe control over the NRWS mount.
 - 3.9.11.3 The NRWS Operator controls shall incorporate a means to wash the EO sensor suite optics.
 - 3.9.11.4 The NRWS Operator controls shall incorporate a means to de-ice EO sensor suite.
 - 3.9.11.5 The NRWS Operator controls shall incorporate all functions required to support surveillance and associated detection, recognition, and identification of threats.
 - 3.9.11.6 The NRWS Operator controls shall incorporate all functions required to select threats for tracking.
 - 3.9.11.7 The NRWS Operator controls shall incorporate all functions required for stabilization control for remotely tracking of threats.
 - 3.9.11.8 The NRWS Operator controls shall incorporate all functions required for stabilization control for remotely training and elevating the weapon.
 - 3.9.11.9 The NRWS Operator controls shall incorporate all functions required for selection of salvo sizes.

- 3.9.11.10 The NRWS Operator controls shall incorporate all functions required to position the weapon in accordance with the fire control solution.
- 3.9.11.11 The NRWS Operator controls shall incorporate all functions required for full operation of the weapon that is fitted to the mount.
- 3.9.11.12 The NRWS Operator controls required to fire the NRWS mount in an immediate and urgent operational situation shall be immediately accessible at all times.
- 3.9.11.13 The NRWS Operator controls shall incorporate all functions required for stabilization control.
- 3.9.11.14 The NRWS Operator controls shall incorporate all functions required to offset the firing aim point when tracking threats and targets.
- 3.9.11.15 The NRWS Operator controls shall incorporate all functions required for monitoring fall of shot.
- 3.9.11.16 This paragraph has intentionally been left blank.
- 3.9.11.17 The NRWS Operator controls shall incorporate all functions required for selection of NRWS operating modes.
- 3.9.11.18 The NRWS Operator controls shall incorporate on the screen only the Operator selectable settings for the mode the NRWS is functioning in.
- 3.9.11.19 The NRWS Operator controls shall be co-located with the NRWS Operator display.
- 3.9.11.20 The NRWS Operator controls shall be readable in all lighting conditions between direct sunlight and complete darkness.
- 3.9.11.21 The NRWS Operator controls shall be readable under red lighting conditions.
- 3.9.11.22 The NRWS Operator controls which emit light shall be dimmable by the Operator from complete luminosity to complete shutdown of luminosity.
- 3.9.11.23 The NRWS Operator controls markings shall be white on a dark background.
- 3.9.11.24 The NRWS Operator controls shall be suitable for an Operator subject to a dynamic marine environment.
- 3.9.11.25 The NRWS Operator controls shall respond to the Operator's input while the Operator is wearing full flash gear including gloves.
- 3.9.12 The NRWS shall have a video recorder.
 - 3.9.12.1 The NRWS video recorder shall record all that is displayed on the NRWS operator display.

- 3.9.12.2 The NRWS video recorder shall record for not less than 24 hours.
- 3.9.12.3 The NRWS video recorder shall record video with a date/time stamp.
- 3.9.12.4 The NRWS video recorder shall record video to common commercially available portable media.
- 3.9.13 The NRWS Operator Console shall incorporate an Operator chair.
- 3.9.13.1 The NRWS Operator chair shall comply with MIL-STD-1472G section 5.10.3.2.4.
- 3.9.13.2 The NRWS Operator chair shall accommodate both male and female Operators whose seated body dimensions span between the 5th percentile to the 95th percentile for seated body dimensions as described in the MIL-STD-1472G, Appendix B, Table B-IV.
- 3.9.13.3 The NRWS Operator chair shall have a lap belt to secure the Operator for safe control of the NRWS under conditions up to and including Sea State 5 as defined in the WMO code tables and as described in Table 4.

3.10 Initialization and Built-In Test

- 3.10.1 The NRWS shall initialise from a shutdown state to full functionality in accordance with this TSOR in:
 - a. less than 2 minutes, with the exception of the TIC, when selected by the Operator; and
 - b. less than 7 minutes, including the TIC, when selected by the Operator.
- 3.10.2 The NRWS shall automatically re-initialise from an abnormal shutdown to full functionality in accordance with this TSOR in:
 - a. less than 4 minutes, with the exception of the TIC; and
 - b. less than 10 minutes, including the TIC.
- 3.10.3 The NRWS shall enable the Operator to perform a controlled shut down.
- 3.10.4 The NRWS shall operate at a reduced level of performance in the event of a critical failure.
- 3.10.5 The NRWS Built-In Test (BIT) shall automatically detect faults.
- 3.10.6 The NRWS BIT shall monitor for faults on the TIC.
- 3.10.7 The NRWS BIT shall monitor for faults on the day camera.
- 3.10.8 The NRWS BIT shall monitor for faults on the LRF.

- 3.10.9 The NRWS BIT shall monitor for faults on the training/elevation system.
- 3.10.10 The NRWS BIT shall monitor for faults on the weapon control system.
- 3.10.11 The NRWS BIT shall monitor for faults on the power availability.
- 3.10.12 The NRWS BIT shall monitor for faults on the processing systems.
- 3.10.13 The NRWS BIT shall monitor for electrical faults on each Line Replaceable Unit (LRU).
- 3.10.14 The NRWS BIT shall display corresponding fault alarms to the Operator indicating the nature of the faults.

3.11 Onboard Trainer

- 3.11.1 If the NRWS has an onboard trainer, the onboard trainer shall be either appended or embedded to the NRWS.
- 3.11.2 If the NRWS has an onboard trainer, when the onboard trainer is active, the NRWS shall display this mode on the NRWS Operator display.
- 3.11.3 If the NRWS has an onboard trainer, when the onboard trainer is active, the NRWS shall simulate the firing of the mounted weapon.
- 3.11.4 If the NRWS has an onboard trainer, the onboard trainer shall simulate the firing of NRWS without ammunition being present on the mount.
- 3.11.5 If the NRWS has an onboard trainer, the onboard trainer shall simulate the firing of NRWS without a weapon being present on the mount.
- 3.11.6 If the NRWS has an onboard trainer, the onboard trainer shall include not less than 5 pre-programmed naval combat scenarios.
- 3.11.7 If the NRWS has an onboard trainer, the onboard trainer combat scenarios shall vary in level of complexity.
- 3.11.8 If the NRWS has an onboard trainer, the onboard trainer shall include a control to exit the onboard trainer in not more than two Operator actions.

4. PHYSICAL REQUIREMENTS

4.1 Equipment

- 4.1.1 The NRWS components internal to the ship shall be capable of being installed in existing ship compartments.

- 4.1.2 The NRWS shall provide a means to singly mount each of the following weapons in one weapon cradle:
- a. FN M2 0.50 Calibre HMG; and
 - b. 7.62 millimetre C6 machine gun.
- 4.1.3 The NRWS shall provide a means to mount the FN M2 0.50 Calibre HMG and 7.62 millimetre C6 machine gun without modification to the current configuration of these weapons held by Canada.
- 4.1.4 The NRWS shall have a cover to protect functional components of the mounted weapon.
- 4.1.5 The NRWS cover shall allow weapon firing at any time without cover removal.
- 4.1.6 The NRWS shall have a means to align the EO sensor suite and the mounted weapon to a common reference point on the ship.
- 4.1.7 The NRWS shall have a means to align the EO sensor suite and the mounted weapon to a common reference point at the maximum effective range of the NRWS.
- 4.1.8 The NRWS EO sensor suite shall incorporate an Operator controlled jet wash system to clean any debris impeding functionality of the EO sensor suite optics.
- 4.1.9 The NRWS EO sensor suite shall incorporate an Operator controlled de-icing system to melt any ice accumulation impeding functionality of the EO sensor suite.
- 4.1.10 This paragraph has been intentionally left blank.
- 4.1.11 The NRWS above deck components shall be painted in accordance with MIL-T-704 using topcoat in accordance with MIL-C-22750 and primer in accordance with MIL-P-53022.
- 4.1.12 The NRWS above deck components exterior painted surfaces shall be painted grey in colour in accordance with FED-STD-595C colour chip 26480.
- 4.1.13 The NRWS above deck components interior painted surfaces shall be painted white in colour in accordance with FED-STD-595C colour chip 17925.
- 4.1.14 The NRWS equipment handling shall be in accordance with MIL-STD-1472G sections 5.8.6 & 5.9.11.
- 4.1.15 The NRWS shall not employ existing shipboard hardware to meet the requirements of this TSOR with the exception of true heading information.
- 4.1.16 This paragraph has been intentionally left blank.

4.1.17 The NRWS shall be at a technology readiness level of at least 8 as defined in Technical Readiness Assessment Guidance, Department of Defense.

4.2 Range of Motion

4.2.1 Each NRWS mount shall traverse continuously clockwise and counter-clockwise for 360 degrees in azimuth.

4.2.2 Each NRWS mount shall elevate the weapon to a minimum of 55 degrees above the horizontal plane.

4.2.3 Each NRWS mount shall depress the weapon to a minimum of 20 degrees below the horizontal plane.

4.3 Cables

4.3.1 The NRWS cables shall have low smoke and halogen-free properties as specified in MIL-DTL-24643C.

4.3.2 The NRWS cabling shall be terminated as specified in C-03-007-181/ME-001.

4.3.3 The NRWS cabling shall be marked and labelled as specified in D-02-002-001/SG-001.

4.3.4 The NRWS cabling shall be shielded as specified in C-03-010-000/MM-001, section 6, paragraphs 118-168.

4.3.5 The NRWS cabling shall adhere to C-03-010-000/AG-001.

4.3.6 The NRWS cabling shall adhere to MIL-STD-1310H (Navy).

5. INTERFACE REQUIREMENTS

5.1 Mechanical Interface Requirements

5.1.1 The NRWS equipment shall incorporate the Contractor supplied retention devices, and fasteners in order to mount the NRWS equipment to the ship's structure.

5.1.2 The NRWS shall provide all required mechanical interfaces to existing shipboard systems such as cooling water, conditioned air, compressed air, and condensate drains that may be necessary for full operational capability.

5.1.3 The NRWS shall provide all mechanical interfaces to existing shipboard systems that may be necessary for full operational capability without degrading the performance of any existing shipboard system.

- 5.1.4 The NRWS shall provide all mechanical interfaces to existing shipboard systems that may be necessary for full operational capability without interfering with the use of these systems for their existing primary functions.

5.2 Electrical Interface Requirements

- 5.2.1 The NRWS shall provide all required electrical interfaces to existing electrical shipboard systems that may be necessary for full operational capability.
- 5.2.2 The NRWS shall provide all electrical interfaces to existing shipboard systems that may be necessary for full operational capability without degrading the performance of any existing shipboard system.
- 5.2.3 The NRWS shall provide all electrical interfaces to existing shipboard systems that may be necessary for full operational capability without interfering with the use of these systems for their existing primary functions.

5.3 Signal Interface Requirements

- 5.3.1 The NRWS shall provide all signal interfaces to existing shipboard systems that may be necessary for full operational capability without degrading the performance of any existing shipboard system.
- 5.3.2 The NRWS shall provide all signal interfaces to existing shipboard systems that may be necessary for full operational capability without interfering with the use of these systems for their existing primary functions.
- 5.3.3 The NRWS shall provide all signal interfaces to existing shipboard systems that may be necessary for full operational capability without jeopardizing existing certifications of these systems.

6. SPECIALTY ENGINEERING REQUIREMENTS

6.1 Health and Safety

- 6.1.1 The NRWS shall out-gas in a manner that does not pose a health hazard to humans.
- 6.1.2 The NRWS shall be flame resistant, non-combustible and fire retardant.
- 6.1.3 The NRWS shall preclude electrical hazards in accordance with MIL-STD-1472G section 5.7.9.1 and D-03-003-005/SF-000 section 1.3.3.
- 6.1.4 The NRWS shall preclude mechanical hazards in accordance with MIL-STD-1472G section 5.7 and D-03-003-005/SF-000 section 1.3.3.
- 6.1.5 The NRWS shall generate noise levels that are in accordance with MIL-STD-1472G section 5.5.4.

- 6.1.6 The NRWS shall be designed for maintenance as described in MIL-STD-1472F section 5.9 and D-03-003-005/SF-000 section 1.3.7, to ensure that all required preventative and corrective maintenance functions may be completed.
- 6.1.7 The NRWS shall be grounded in accordance with the requirements of D-03-003-005/SF-000 part 4 and MIL-STD-1310H (Navy) section 3.20.

6.2 Availability

- 6.2.1 The NRWS shall have no less than 98% availability, 24 hours a day, seven days a week, throughout a deployed period of no less than 90 days considering the typical usage patterns as outlined Table 3.

Table 3 – Typical NRWS Usage During a Deployed Period of 90 days	
NRWS	90% turned on
NRWS TIC	30% TIC usage
NRWS day camera	45% usage for surveillance
NRWS rounds fired	600 rounds per NRWS mount

- 6.2.2 The NRWS shall be available for not less than 250 days per calendar year.
- 6.2.3 Any NRWS electrical single point of failure shall permit the local operation of the NRWS mounted weapon.

6.3 Survivability

- 6.3.1 The NRWS shall withstand exposure to conditions up to and including Sea State 6 as defined in the WMO code tables and as described in Table 4.

Table 4 - Halifax Class Motions and Accelerations at Mount Locations

These results are the maximum expected ship motions and accelerations at the proposed installation locations at the respective sea state and speed with a 99% confidence level. The results provided are predictions and appropriate safety factors shall be applied. These results do not take into account any shock and/or blast requirements.

	Speed [knots]	Displacement			Velocity		Acceleration	
		Vertical [m]	Lateral [m]	Longitudinal [m]	Vertical [m/s]	Vertical [m/s ²]	Lateral [m/s ²]	Longitudinal [m/s ²]
Sea State 2	0	0.03	0.02	0.01	0.04	0.01	0.01	0.00
	5	0.15	0.10	0.00	0.20	0.03	0.03	0.01
	10	0.15	0.10	0.19	0.25	0.04	0.04	0.01
	15	0.29	0.34	0.19	0.25	0.04	0.04	0.01
	20	0.20	1.25	0.29	0.25	0.04	0.04	0.01
	25	0.33	0.52	0.14	0.25	0.04	0.05	0.01
	30	0.39	0.55	0.15	0.25	0.04	0.05	0.01
Sea State 3	0	0.39	0.16	0.06	0.48	0.06	0.03	0.01
	5	1.8	0.8	0.25	2.35	0.32	0.13	0.05
	10	1.6	0.85	0.29	2.2	0.32	0.14	0.06
	15	1.54	1.06	1.38	2.01	0.31	0.14	0.06
	20	1.54	2.02	1.44	1.94	0.29	0.15	0.06
	25	1.54	4.21	1.56	1.94	0.28	0.15	0.06
	30	1.85	11.11	2.52	1.89	0.26	0.15	0.06
Sea State 4	0	0.9	0.42	0.1	0.98	0.11	0.05	0.01
	5	4.62	2.13	0.55	5.26	0.64	0.26	0.08
	10	4.68	2.18	0.64	5.57	0.7	0.26	0.09
	15	4.59	2.35	2.9	5.73	0.75	0.27	0.11
	20	4.43	5.53	4.55	5.65	0.77	0.27	0.11
	25	5.24	14.92	8.64	5.51	0.78	0.28	0.13
	30	5.43	27.13	8.11	5.27	0.78	0.28	0.14
Sea State 5	0	1.41	0.96	0.18	1.24	0.12	0.07	0.02
	5	7.38	4.78	1.52	6.62	0.69	0.34	0.08
	10	7.85	4.73	2.61	7.61	0.80	0.35	0.09
	15	8.18	4.64	5.84	8.58	0.96	0.35	0.12
	20	8.41	10.11	17.43	9.36	1.11	0.34	0.16
	25	9.39	21.86	24.88	9.94	1.24	0.35	0.19
	30	9.19	25.95	19.87	10.27	1.33	0.37	0.21
Sea State 6	0	2.17	1.70	0.44	1.58	0.15	0.09	0.02
	5	10.92	8.20	3.54	8.67	0.80	0.44	0.10
	10	11.35	7.91	5.95	9.83	0.94	0.44	0.12
	15	11.82	7.57	11.40	11.17	1.14	0.44	0.14
	20	12.35	11.69	27.93	12.60	1.39	0.45	0.17
	25	12.92	24.70	42.98	13.93	1.67	0.46	0.22
	30	13.34	33.97	32.17	14.93	1.90	0.47	0.27

6.4 Maintainability

- 6.4.1 The NRWS daily preventive maintenance shall be less than 30 minutes in total in a 24 hour period.
- 6.4.2 This paragraph has been intentionally left blank.
- 6.4.3 The NRWS MTTR shall be less than 1 hour for corrective maintenance repair functions which includes combined diagnostic and LRU replacement time but does not include time associated with provisioning the LRU.
- 6.4.4 The NRWS shall enable an Operator to install the NRWS mountable weapons while standing on the deck beside the NRWS mount.
- 6.4.5 The NRWS shall enable an Operator to load the NRWS mounted weapon with ammunition while standing on the deck beside the NRWS mount.
- 6.4.6 The NRWS shall enable an Operator to empty the spent cartridges/casings/links container(s) while standing on the deck beside the NRWS mount.
- 6.4.7 The NRWS shall enable an Operator to clear ammunition jams while standing on the deck beside the NRWS mount or on inboard platforms that are provided with the NRWS.
- 6.4.8 The NRWS shall enable an Operator to change gun barrels while standing on the deck beside the NRWS mount or on inboard platforms that are provided with the NRWS.

6.5 This section has been intentionally left blank

6.6 Nameplates and Product Marking

- 6.6.1 The NRWS shall be marked and labelled in accordance with D-02-002-001/SG-001.
- 6.6.2 The NRWS equipment weighing more than 15 kilograms shall be marked to identify its weight.
- 6.6.3 The NRWS equipment that presents a hazard to personnel shall be labelled in accordance with the requirements of MIL-STD-1472G Section 5.7.2.1.

7. ENVIRONMENTAL REQUIREMENTS

7.1 Ship's Motion and Sea State

- 7.1.1 The NRWS shall operate while the ship has a permanent list within the range of -20 to +20 degrees.
- 7.1.2 The NRWS shall operate while the ship has a permanent trim of 5 degrees.

- 7.1.3 The NRWS shall operate while the ship is rolling within the range of -40 to +40 degrees.
- 7.1.4 The NRWS above deck equipment shall operate in accordance with this TSOR after immersion in a mean green water load of 42 kilopascals.
- 7.1.5 The NRWS shall operate in conditions up to and including Sea State 5 as defined in the WMO code tables and as described in Table 4.

7.2 Mechanical Shock

- 7.2.1 The NRWS equipment enclosures, mounts, and retention devices shall prevent equipment deflection that could be hazardous to personnel or other shipboard equipment under exposure to shock conditions specified in D-03-003-007/SF-000 Grade 1 Type A, Section 6.
- 7.2.2 The NRWS equipment shall have restraints fitted that preclude equipment from becoming projectiles; remain fully intact, and in their normal operational positions, under exposure to shock conditions specified in D-03-003-007/SF-000 Grade 1 Type A, Section 6.
- 7.2.3 The NRWS equipment shall operate in accordance with this TSOR following exposure to shock conditions specified in D-03-003-007/SF-000 Grade 1 Type A, Section 6.

7.3 Vibration

- 7.3.1 The NRWS equipment enclosures, mounts, and retention devices shall remain fully intact, and in their normal operational positions, when excited by Type 1 environmental vibration levels up to and including 33Hz as specified in MIL-STD-810G, method 528.1.
- 7.3.2 The NRWS equipment shall operate in accordance with this TSOR when excited by Type 1 environmental vibration levels up to and including 33Hz as specified in MIL-STD-810G, method 528.1.

7.4 Electromagnetic Effects

- 7.4.1 The NRWS shall operate in accordance with this TSOR when subjected to the shipboard electromagnetic environments specified by MIL-STD-461F, Section 5, requirements CE101, CE102, RE101, and RE102.
- 7.4.2 The NRWS shall not generate an electromagnetic environment that exceeds the standards described in MIL-STD-461F, Section 5, requirements CS101, CS114, CS116, RS101, and RS103.
- 7.4.3 The NRWS shall not generate radiated electromagnetic interference emissions into other nearby systems as specified in C-03-010-000/MM-001, Part 4.

7.5 Temperature, Humidity, and Solar Radiation

- 7.5.1 The NRWS equipment not exposed to the weather shall operate in accordance with this TSOR in temperatures ranging from 0 to 40 degrees Celsius.
- 7.5.2 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR in temperatures ranging from -32 to 40 degrees Celsius.
- 7.5.3 The NRWS equipment shall withstand the storage and transit conditions specified for Categories M1, M2, and M3 of STANAG 2895.
- 7.5.4 The NRWS equipment shall operate in accordance with this TSOR in 95% humidity condensing environment.
- 7.5.5 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR when exposed to the solar environment described in MIL-STD-810G, method 505.6 Procedure II.

7.6 Wind

- 7.6.1 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR under the sustained winds, plus gusts as described in STANAG 2895 Table 26.
- 7.6.2 The NRWS equipment exposed to the weather shall not sustain damage when subjected to sustained winds of 50 metres/second.

7.7 Rainfall, Dust, and Spray

- 7.7.1 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR under rainfall conditions of 0.8 millimetres per minute.
- 7.7.2 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR under dust concentrations of 1gram per cubic metre.
- 7.7.3 The NRWS equipment located in a sheltered environment shall operate in accordance with this TSOR when in a drip environment as identified in MIL-STD-810G, method 506.6, Procedure III.
- 7.7.4 The NRWS electrical equipment exposed to the weather shall be watertight, spray tight, and dust proof in accordance with MIL-STD-108E.

7.8 Ice

- 7.8.1 The NRWS equipment exposed to the weather shall operate in accordance with this TSOR when subjected to conditions which produce icing loads of up to and including 20 kilograms per square metre.
- 7.8.2 The NRWS equipment exposed to the weather shall not be damaged by an icing load of up to and including 37 kilograms per square metre except as otherwise specified in TSOR requirement 7.8.3.
- 7.8.3 The NRWS equipment exposed to the weather shall not be damaged by an icing load of up to and including 180 kilograms per square metre if located in the forward one-third of the ship and below a line parallel to and 12.2 metres above the Halifax Class vessels design waterline.

7.9 Corrosion and Salt Fog

- 7.9.1 The NRWS above deck components shall be constructed from galvanic compatible materials.
- 7.9.2 The NRWS above deck components exposed to the weather shall be constructed from materials with surface treatments in order to preclude failure due to oxidation and corrosion.
- 7.9.3 The NRWS above deck components exposed to the weather shall not corrode when subjected to the tests as described in ASTM G7, ASTM G31, ASTM G50, and ASTM G52.
- 7.9.4 The NRWS shall be resistant to the effects of salt deposits on the physical aspects of materiel when subjected to the test described in method 509.6 of MIL-STD-810G.
- 7.9.5 The NRWS shall be resistant to the effects of salt deposits on the electrical aspects of materiel when subjected to the test described in method 509.6 of MIL-STD-810G.

8. SUPPORTABILITY

- 8.1 The NRWS shall have an operational life expectancy of not less than 15 years.
- 8.2 The NRWS shall accommodate the facilitation of new technologies, including, but not limited to, the upgrade of individual sensors, without having to replace other components.
- 8.3 The NRWS hardware architecture shall be an open architecture format.



ANNEX B

Appendix 4

Installation Guidance Package

Naval Remote Weapon Station System

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1. BACKGROUND

- 1.1 This Installation Guidance Package provides general guidance to Bidders to assist in determining the level of effort for hull and cabling work required to install the Naval Remote Weapon Station (NRWS) System on Halifax Class Ships.
- 1.2 Throughout the installation of the NRWS System, ongoing concurrent work may be performed on the ship and in close proximity to the NRWS System installation.
- 1.3 The installation of the NRWS System components may cease during brief work stoppages which may include ship radiating periods.
- 1.4 The installation of the NRWS System will consist of installing multiple remotely operated weapon mounts, sensor suites, , and operator consoles.

2. INSTALLATION IMPACT

- 2.1 The NRWS System will impact the ship's power systems and hull penetrations. Equipment installations will also be required for the following areas of the Halifax Class Ships:
 - a) Fire Control Equipment Room (FCER) No.3
 - b) Bridge Wings
 - c) Quarter Deck
 - d) Operations Room
 - e) Bridge
- 2.2 Each mount will have a dedicated operator console.
- 2.3 The installation of the four NRWS mounts will be at the locations outlined in Table 1.
- 2.4 The installation of the four NRWS operator consoles will be at the locations outlined in Table 1.

Table 1: NRWS System Component Locations

NRWS System Component	Quantity	Location
Mounts	2	Bridge Wings
	2	Quarter Deck
Operator Consoles	4	FCER No.3

- 2.5 The installation of each NRWS System shall not cause any physical interference with existing ships weapons and sensors.
- 2.6 The installation of each NRWS System shall not cause any operational interference with existing ships weapons and sensors.
- 2.7 The installation of each NRWS System shall not cause any interference with flight operations.

3. DESCRIPTION OF HULL WORK REQUIRED

3.1 Purpose

3.1.1 This hull section of the installation guidance package identifies the locations for installation of the mounts and operator consoles that will have an impact on the hull of the Halifax Class Ships.

3.2 Equipment/Materiel Removals

3.2.1 All equipment/materiel removals will be performed by Canada.

3.2.2 FCER No.3 will be configured as per figure 1.

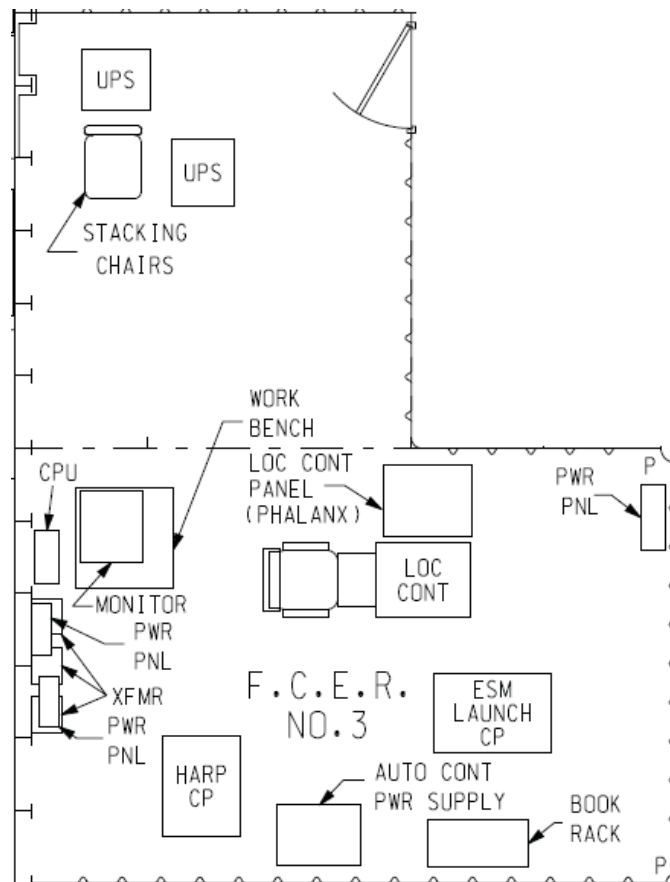


Figure 1: FCER No.3

3.3 Installations

3.3.1 All work in section 3.3 will be performed by the Contractor.

3.3.2 General Installation Procedures

3.3.2.1 All deck penetrations required for the routing of cabling between the mount and the operator consoles will be the responsibility of the Contractor.

3.3.3 FCER No.3 Room Installation Information

3.3.3.1 Four (4) NRWS Operator Consoles shall be installed in the 2.9 meters by 1.65 meters location as indicated in Figure 2. Sufficient space must be made for a passage way to the remainder of the compartment.

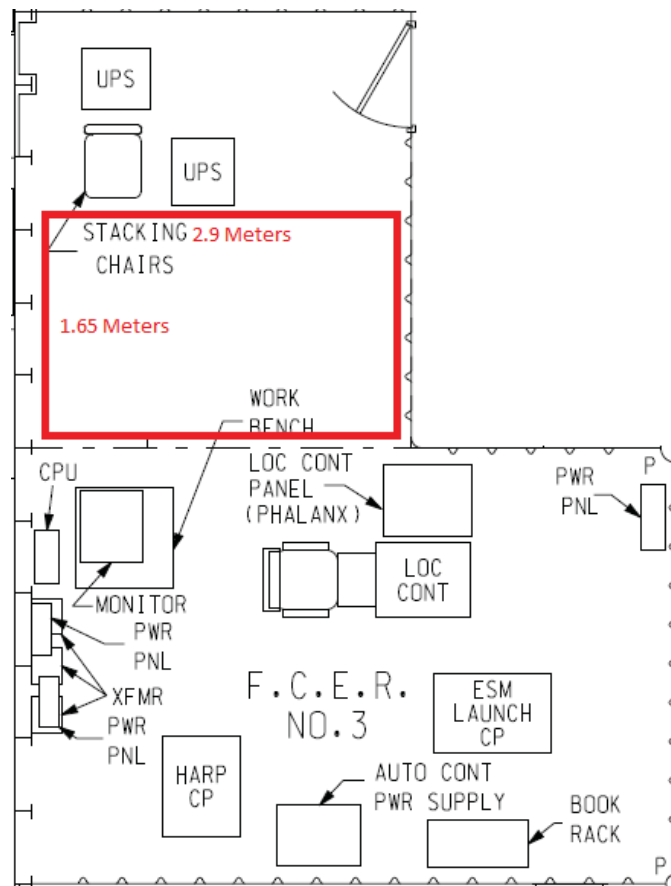


Figure 2: FCER No.3 Installation Location for Operator Consoles

3.3.4 Operator Chairs

- 3.3.4.1 All operator chairs will be provided by the Contractor.
- 3.3.4.2 The Contractor shall be responsible for the installation of each operator chair.
- 3.3.4.3 An operator chair shall be installed for each NRWS Operator Console within the FCER No.3 with the specified limits defined in Figure 2.

3.3.5 Shipboard Internal Communication System

- 3.3.5.1 Canada will install one Shipboard Internal Communication System (SHINCOM) next to each NRWS Operator Console.

3.3.6 Navigation Distribution System

- 3.3.6.1 In order to display true bearing on the NRWS System, it is anticipated a feed from the Navigation Distribution System (NDS) will be required.
- 3.3.6.2 Canada will provide and install the cabling for the NDS feed up to FCER No.3.
- 3.3.6.3 The contractor shall be responsible for the installation of the cable(s) from the provided NDS feed to the required location for the NRWS System.

3.3.7 Bridge Wing Mount Installation

- 3.3.7.1 Canada will modify the existing Bridge Wing deck and bulwark and relocate existing equipment as per Technical Data Package (TDP) drawing number “HFX583 Sketch No.1”, sheets 6 and 7.
- 3.3.7.2 The Contractor shall be responsible for providing and installing an elevated platform to mount each NRWS mount. Elevated platforms shown on TDP drawing number “HFX583 Sketch No.1” are for illustration purposes only.
- 3.3.7.3 The mounts shall be installed at the locations identified in TDP drawing number “HFX583 Sketch No.1”, sheet 3.
- 3.3.7.4 Installations of the NRWS mounts shall occur at both port and starboard locations of the Bridge Wings of the ship.

3.3.8 Quarterdeck Mount Installation

- 3.3.8.1 Canada will modify the existing Quarterdeck as per TDP drawing number “HFX583 Sketch No.1”, sheet 4. Additional back up structures shown on sheet 4 are for illustration purposes only and are the contractor’s responsibility, if required.
- 3.3.8.2 The Contractor shall be responsible for providing and installing an elevated platform to mount each NRWS mount. Elevated platforms shown on TDP drawing number “HFX583 Sketch No.1” are for illustration purposes only.
- 3.3.8.3 The mounts on the Quarterdeck shall be installed at the locations identified in TDP drawing number “HFX583 Sketch No.1”, sheet 2.
- 3.3.8.4 Installations of the NRWS mounts shall occur at both port and starboard locations of the Quarterdeck of the ship.

3.3.9 NRWS Veto Functionality and NRWS Firing Circuit Interrupt

- 3.3.9.1 Two veto switches are required for the NRWS System in the OPS room and two veto switches are required for the NRWS System in the Bridge. One switch for port NRWS mounts and one switch for starboard NRWS mounts.
- 3.3.9.2 Remote Switching Boxes which are operated by the veto switches will be installed in FCER No.3.
- 3.3.9.3 Canada will provide and install the veto switches, Remote Switching Boxes and associated cabling.
- 3.3.9.4 The Contractor shall provide and install the firing circuit interrupt cable(s) from each NRWS Operator Console up to the Remote Switching Boxes.

4. DESCRIPTION OF CABLE INSTALLATION WORK REQUIRED

4.1 Relevant Documents

- 4.1.1 MIL-STD-1310 Rev H (Navy): Shipboard Bonding, Grounding, and Other Techniques For Electromagnetic Compatibility, Electromagnetic Pulse (EMP) Mitigation, and Safety;
- 4.1.2 C-03-007-181/ME-001: Cable and Cable Termination Data for Shipboard Installation

4.2 Purpose

4.2.1 These instructions provide guidance on cabling routing from the NRWS mounts to the NRWS operator consoles.

4.3 Installations

4.3.1 Cabling Installation

4.3.1.1 The estimated cable lengths for the NRWS System components may be used to estimate the level of effort required for the installation of the cables for the NRWS System. The table below outlines components and component locations of anticipated cabling connections required.

Estimated Cable Length (meters)	From		To	
	Component	Component Location	Component	Component Location
125	NRWS Mount	Port Side Bridge Wing	NRWS Operator Console/ RSB	FCER No.3
125	NRWS Mount	Starboard Side Bridge Wing	NRWS Operator Console/ RSB	FCER No.3
75	NRWS Mount	Port Side Quarterdeck	NRWS Operator Console/ RSB	FCER No.3
75	NRWS Mount	Starboard Side Quarterdeck	NRWS Operator Console/ RSB	FCER No.3

4.3.2 Power Cable Installations

4.3.2.1 Power cabling shall be supplied and installed at each Mount from the nearest available power panel.

4.3.2.2 Power cabling shall be supplied and installed at each Operator Console from the nearest available power panel.

4.3.3 Cable Routing

4.3.3.1 Where possible, all cabling shall be installed on existing wireways, in accordance with the specifications listed in 4.1.1.

4.3.3.2 All indicated cable lengths are estimated. Actual lengths should be measured at ship prior to cutting.

4.3.4 **Cabling Requirements**

4.3.4.1 Cable terminations shall be in accordance with the specification listed in 4.1.2.

4.3.4.2 Bonding and grounding of electrical equipment and cabling shall be in accordance with the specification listed in 4.1.1.