

**RETURN BIDS TO:
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**REQUEST FOR PRICE AND
AVAILABILITY
DEMANDE DE PRIX ET DE
DISPONIBILITÉ**

This is not a bid solicitation but an inquiry for the purpose of obtaining price and availability information for the goods, services, and construction specified herein. The information requested herein is for budgeting and planning purposes only. Contracts will not be entered into on the basis of suppliers' responses.

Il ne s'agit pas d'une invitation à soumissionner mais d'une demande de renseignements sur les prix et la disponibilité des biens, services et construction spécifiés aux présentes. Les renseignements demandés aux présentes sont nécessaires uniquement à l'établissement du budget et à la planification. Les marchés ne seront pas attribués suite aux réponses des fournisseurs/entrepreneurs.

Comments - Commentaires

Title - Sujet Underwater Warfare Suite Upgrade	
Solicitation No. - N° de l'invitation W8472-135462/A	Date 2012-07-04
Client Reference No. - N° de référence du client W8472-135462	GETS Ref. No. - N° de réf. de SEAG PW-\$\$QF-101-22959
File No. - N° de dossier 101qf.W8472-135462	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2012-08-31	
Time Zone Fuseau horaire Eastern Daylight Saving Time EDT	
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: Michael Rancourt	Buyer Id - Id de l'acheteur 101qf
Telephone No. - N° de téléphone (819) 956-3930 ()	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

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

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

Issuing Office - Bureau de distribution
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Solicitation No. - N° de l'invitation

W8472-135462/A

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

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Buyer ID - Id de l'acheteur

101qf

CCC No./N° CCC - FMS No/ N° VME

UNDERWATER WARFARE SUITE UPGRADE (UWSU)

PRICE AND AVAILABILITY (P&A)

REQUEST

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Annex A	Draft UWSU High-Level Requirements
Appendix 1 to Annex A	Cost Breakdown Table

LIST OF ACRONYMS

- ASW Anti-Submarine Warfare
- CFB Canadian Forces Base
- CGP Controlled Goods Program
- CSC Canadian Surface Combatant
- DND Department of National Defense
- HMC Her Majesty's Canadian
- HMS Hull Mounted Sonar
- ILS Integrated Logistic Support
- IRB Industrial and Regional Benefits
- PWGSC Public Works and Government Services Canada
- P&A Price and Availability
- RCN Royal Canadian Navy
- RFP Request for Proposal
- SPS Sonobuoy Processing System
- TA Towed Array
- UWSU Underwater Warfare Suite Upgrade
- UWW Underwater Warfare

1. Purpose

The Department of National Defence (DND) has identified a requirement to modernize and transition the current Halifax Ship Class Underwater Warfare (UWW) sensor suite and processing systems to improve the class's overall maritime combat capability.

The objective of this P&A request is to:

- a) advise industry of this requirement and provide industry with general and draft technical information on the UWSU project;
- b) provide industry with a preliminary set of high level specifications, deliverables, schedule, and project scope information;
- c) enable Canada to engage industry and obtain information regarding UWSU technology, including detailed, indicative, non-binding cost information for project planning purposes; and
- d) enable Canada to better evaluate and progress towards a possible UWSU acquisition along with associated ILS requirements.

2. Background

In 2007, the UWSU Project was approved to enter Options Analysis phase, with the objective to modernize the inboard interfaces and processing systems of the Anti-Submarine Warfare (ASW) sensors of the Halifax Class. Various technology demonstration projects conducted by DRDC showed that significant performance gains in passive detection could be achieved by focusing on the processing. Thus, this allowed the project to control up front acquisition costs by retaining and adapting to the existing wet-end sensors. Consultation with industry ensued with an LOI in 2008 and a P&A Request in 2010.

As a result of these consultations, the Project gained a better appreciation of the costs involved, while simultaneously gaining a better understanding of the future of ASW, in particular in regard to active techniques such as Multi-static Sonar. The existing Towed Array sensor, primarily designed for passive detection, was not suitable for use in active Sonar scenarios. Thus, while the UWSU Project was originally mandated to procure a system that would be upgradeable with new wet-ends during the In-Service Phase,

options to perform such upgrades as part of the UWSU Project were now being investigated.

At the current juncture, a significant change in scope is being proposed to senior management in the form of an updated Statement of Operational Requirements. Annex A, Draft UWSU High-Level Requirements, provides a high-level overview of the revised scope. In order for the Project to proceed, indicative cost estimates need to be developed, hence the need for a new Price and Availability Request. These indicative (Class C) estimates are required to move the project from Options Analysis and into Definition, and are thus crucial to the success of the UWSU project.

3. Project Scope

The UWSU Project scope would provide the Halifax Class with an UWW sensor suite capable of multi-sensor integration, processing, display and contact correlation for the automated detection, tracking, localizing, identification and classification of submarines, torpedoes, ships and small boats. The UWSU system would integrate the functions and control of the TA, the HMS, the SPS and all other UWW sensor systems through a combined tactical display to detect, localize, track and classify surface and subsurface contacts, including submarines, torpedoes, surface ships and small boats. The UWSU system would also include a ship self-noise monitoring capability.

The UWSU Project is also the precursor to the UWW sensor suite required for the future Canadian Surface Combatant (CSC). The commonality in requirements between the UWSU Project and the future CSC could provide the Royal Canadian Navy (RCN) an opportunity for the transition of the UWSU developed technology, capability and support methodologies from the Halifax Class to the future CSC Project.

If a follow-on RFP is issued, the project would potentially deliver and install this capability on the twelve (12) Halifax Class ships, and deliver updates to shore-based maintenance and operations trainers on both coasts. Details of the scope and deliverables are included in the Annex A, Draft UWSU High-Level Requirements.

In accordance with current plans for a potential follow-on solicitation, the UWSU System installation will be contracted to the shipyard separately, with support from the UWSU vendor.

4. Constraints

The design restrictions and constraints for the UWSU project are detailed in Annex A, Draft UWSU High-Level Requirements.

5. Schedule

In providing responses, the following estimated Project schedule should be utilized as a baseline:

- a) Release P&A to Industry - Summer 2012
- b) Potential RFP - Summer 2014
- c) Potential Contract award - Summer 2015
- d) Potential Full Capability Delivery - Winter 2021

6. Security

There is no security requirement associated with this P&A, however a possible future solicitation could include a security requirement. A requirement of this scope could require a Secret Security Clearance to perform the work.

7. P&A Technical Information Package

The technical Information Package available for this P&A is considered "Controlled Goods." As such, only persons/companies who are registered, exempt or excluded under the Controlled Goods Program (CGP) are lawfully entitled to examine, possess or transfer these controlled goods.

Requests for a technical Information package must be made by ordering the P&A document on the MERX web site, or by sending a request directly to the PWGSC Contracting Authority.

Details on how to register under the CGP are available at the Controlled Goods Program web site:

<http://ssi-iss.tpsgc-pwgsc.gc.ca/dmc-cgd/apropos-about/inscrptn-rgstrtn-eng.html>

All information on the Application for Registration (or exemption) Form will be verified and errors or inaccuracies may cause significant delays and/or result in denial of registration or exemption.

8. Strategy

The UWSU Project is now in its Preliminary Project Approval phase during which Canada will seek advice from Industry on available technical solutions and indicative, non-binding cost analyses to help define the final requirement, and solidify their confidence in the cost estimate of the project. Canada requests Respondents to provide input on a system design concept, consisting of proposed hardware and overall architecture. Section 8.1 to 8.3 represents a summary of the information requested in Annex A, Draft UWSU High-Level Requirements, and should serve as a guide to the technical information Canada is seeking from this P&A. Any additional relevant information Respondents wish to provide will be examined with great interest. As such,

Canada requests the following information:

- 8.1 Respondents are requested to describe past sales and current support arrangements with other navies and provide initial concepts for 2nd line (ship repair facility) and 3rd line (contractor) maintenance of inboard processing systems, and towed arrays and projector systems. A contact point at the customer navy is requested.
- 8.2 Respondents are requested to provide the basis for their cost estimates for the UWSU Project. It would be beneficial for Respondents to provide examples of similar equipment currently being supplied to major navies as part of an ongoing multi-hull, multi-class program with a long term support arrangement. Where system(s) are currently in-service or scheduled for delivery to other navies, the delivery schedules and history of the service life are requested.
- 8.3 Though not integral to the objectives of this P&A request, DND would like to be able to perform rough-order-magnitude forecasting of the in-service support costs for the UWSU system. Therefore, Respondents are requested to provide their projected costs for up to 5 years of in-service support for the system, including operating the technology insertion and technology refresh process, repair and overhaul, and Integrated Logistic Support (ILS) functions such as

configuration management, obsolescence management, and training. If Industry is providing these services for one or more customers, cost data for these services is requested.

- 8.4 A blank cost breakdown table has been provided as Appendix 1 to act as a guide for Respondents.

9. Industry Day

Canada will host a non-mandatory Industry Day event which will be held in Ottawa, Ontario, Canada. Members of the project team will provide a presentation on the UWSU Project and a Question and Answer session will be held. Canada will also offer private one-on-one meetings with Respondents who wish to meet with the project team on an individual basis.

Attendance at the event is not mandatory and will not affect the Respondents' ability to bid on a possible future solicitation. Any new information that may arise during the event will be provided to non-attendees through an amendment to the P&A on MERX.

The Industry Day event will be held on July 25th and 26th, 2012. These dates are firm. Respondents who choose to attend must submit a confirmed list of attending representatives to the PWGSC Contracting Authority identified under Section 13 of this P&A. Confirmed lists of attending representatives must be submitted no later than July 16th, 2012.

In order to provide adequate time to make travel arrangements, Canada will release an official event schedule shortly after July 5, 2012.

Canada will not be responsible for any costs associated with attendance at the Industry Day event.

10. Additional Information Requests

After review of all the information packages, additional information, clarifications, and/or demonstration of systems may be requested by DND via Contracting Authority identified in Section 13.

11. Industrial and Regional Benefits (IRB)

Although UWSU is early in the project approval process, it is anticipated that there could be an IRB requirement.

12. Enquiries

All enquiries and other communications related to this P&A shall be directed exclusively to the PWGSC Contracting Authority. All enquiries must be submitted to the Contracting Authority no later than fifteen (15) calendar days before the closing date of this P&A. Enquiries received after that time may not be answered.

Care should be taken by Respondents to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary " will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the questions or may request that the Respondent do so, so that the proprietary nature of the question is eliminated, and the enquiry can be answered with copies to all Respondents. Enquiries not submitted in a form that can be distributed to all Respondents may not be answered by Canada.

Changes to this P&A may occur and will be advertised on the Government Electronic Tendering System (MERX). It is each Respondent's responsibility to verify changes, if any, on MERX.

13. PWGSC Contracting Authority

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Public Works and Government Services Canada (PWGSC)
Defence and Major Projects Sector (DMPS)
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14. Potential Standard Acquisition Clauses and Conditions

For the purposes of responding to this P&A request, respondents may assume that the following Standard Acquisition Clauses and Conditions could apply to potential future RFP:

2030 - General Conditions - Higher Complexity - Goods

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/3/2030/6>

4003 - Licensed Software

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/4/4003/4>

4002 - Software Development or Modification Services

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/4/4002/3>

4006 - Contractor to Own Intellectual Property Rights in Foreground Information

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/4/4006/3>

15. Notes to Interested Respondents

This is neither a call for tender nor a Request for Proposal (RFP), and no agreement or contract for the procurement of the equipment stated above will be entered into solely as a result of this P&A. This announcement does not constitute a commitment by Canada. Canada does not intend to award a contract on the basis of the notice or otherwise pay for the information solicited. Any and all expenses incurred by Industry in pursuing this opportunity, including the provision of information and potential visits, are at the Respondents' sole risk and expense.

Any discussions on this subject with project staff representing DND or PWGSC, or any other Government of Canada representative, or other personnel involved in project activities, shall not be construed as an offer to purchase or as commitment by DND, PWGSC or Government of Canada as a whole.

Although the documents / information / data collected may be provided as commercial-in-confidence and will not be provided to a third party outside of Canada, Canada reserves the right to use the information to assist them in drafting performance

specifications and for budgetary purposes. Requirements are subject to change, which may be as a result of information provided in response to this P&A. Respondents are advised that any information submitted to Canada in response to this P&A may, or may not, be used by Canada in the development of the potential subsequent RFP. The issuance of this P&A does not create an obligation for Canada to issue a subsequent RFP, and does not bind Canada legally or otherwise, to enter into any agreement or to accept or reject any suggestions.

There will be no short-listing of Respondents for the purposes of undertaking any future work, as a result of this P&A. Similarly, participation in this P&A is not a condition or prerequisite for the participation to any RFP.

Respondents to this P&A should identify any submitted information that is to be considered as either company confidential, proprietary or if the response contains controlled goods.

16. P&A Closing Date and Submission of Respondent Information Packages

Respondents are asked to submit their UWSU information package to the PWGSC Contracting Authority identified in Section 13 of this P&A document, on or before August 31st, 2012 (P&A Closing date).

Five (5) hard copies and five (5) soft copies of the information packages are requested.

Respondent point of contact information must be included in the package.

Annex A

Draft UWSU High-Level Requirements

Underwater Warfare Suite Upgrade (UWSU)

PRICE AND AVAILABILITY

REQUEST

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List of Acronyms and Abbreviations

Acronym / Abbreviation	Description
AIS	Automatic Identification System
CANTASS	Canadian Towed Array Sonar System
CISD	Canadian Industrial Security Directorate
CFS	Command Function Select
CMS 330	Halifax Class Combat Management System
COTS	Commercial-Off-The-Shelf
CPF	Canadian Patrol Frigate
CSC	Canadian Surface Combatant
CSTC	Combat System Training Centre
CW	Continuous Wave
DEMON	Demodulation of Noise
DND	Department of National Defence
DOS	Designated Organization Screening
EW	Electronic Warfare
FELEX	Frigate Life Extension
FM	Frequency Modulated
GPS	Global Positioning System
HCM	Halifax Class Modernization
HMI	Human Machine Interface
HMS	Hull Mounted Sonar
ICT	Initial Cadre Training
ILS	Integrated Logistic Support
I/O	Input/Output
LFAS	Low Frequency Active Sonar
MFW	Multi-Function Workstation
MOSA	Modular Open Systems Architecture
MPT	Maintenance Procedures Trainer
NITES2R	Navy integrated tactical environmental System 2 Redesigned
P&A	Price and Availability
PWGSC	Public Works Government Services Canada
RCN	Royal Canadian Navy

RMP	Recognized Maritime Picture
RSSP	Recognized Sub-Surface Picture
SCS	Sonar Control Supervisor
SEACOT	Synthetic Environment Advanced Combat Operations Trainer
SEAWOLF	Synthetic Environment Advanced Weapon Operations Leadership Facility
SESS	Shipboard Electronic Sub-system
SPF	Sonar Performance Figure
SPS	Sonobuoy Processing System
TA	Towed Array
TLFAS	Towed Low Frequency Active Sonar
TMA	Target Motion Analysis
UWSU	Underwater Warfare Suite Upgrade
UWT	Underwater Telephone
UWW	Underwater Warfare

UNDERWATER WARFARE SUITE UPGRADE PROJECT

Aim

1. This document outlines the intent of the Underwater Warfare Suite Upgrade (UWSU) Project and seeks industry input in order to develop indicative non-binding cost estimates and to gain familiarity with industry capability and options available to be considered. The UWSU Project aims to modernize and transition the current Halifax Class Underwater Warfare (UWW) sensor suite and processing systems to improve the class's overall maritime combat capability. The UWSU Project is also the precursor to the UWW sensor suite required for the future Canadian Surface Combatant (CSC). The commonality in requirements between the UWSU Project and the future CSC could provide the Royal Canadian Navy (RCN) an opportunity for the transition of the UWSU developed technology, capability and support methodologies from the Halifax Class to the future CSC Project.

Design Philosophy and Guidance

2. The UWSU Project design approach will retain the existing wet-end sensor of the Hull Mounted Sonar (HMS) AN/SQS-510 transducer array, but replace the AN/SQR-19 low frequency passive receive Towed Array (TA) and the Sonobuoy Processing System (SPS). The UWSU Project is also investigating the feasibility of procuring a Towed Low Frequency Active Sonar (TLFAS) transmitter and a directional active receive array as optional components. The UWSU system will process and display information from the HMS, the new TA System, the new SPS, and any optionally procured components. The UWSU Project will also provide a new Active Intercept Sonar capability, which will be integrated into the UWW sensor suite. The overall system will provide enhanced processor performance and human-machine interfaces (HMI) that optimize the presentation of information to the operator, maximize ease of use, and minimize likelihood of error. The UWSU system will have an open architecture design that provides the flexibility for routine and relatively easy upgrades or additions in the future. HMI design must ensure improved detection and reduced operator workload. Operator workstations, interfaces and system components must provide easy access to sub-components with a minimum of disassembly. The design must minimize the amount of work during the Halifax Class installation phase by reusing, to the greatest extent possible, all existing hardware and handling equipment. If it is practicable and cost effective, the overall system design must take into consideration the potential for the developed solution to be transferred into the future CSC.

3. The Halifax Class Modernization/Frigate Life Extension Project (HCM/FELEX), is adding new capabilities to the ship class and includes upgrades such as a new command and control system, a new radar capability, a new electronic warfare system, and upgraded communications, but does not include an upgrade to the UWW sensor suite. The HCM/FELEX Project upgrades that impact the UWW sensor suite (Figure 1) are:

- a. new Multi-Function Workstations (MFWs) for the Sonobuoy Operator and the Sonar Control Supervisor (SCS); and
- b. added Input/Output (I/O) Computers to interface the current UWW sensor suite to the Combat Management System 330 (CMS 330) via standard Ethernet.

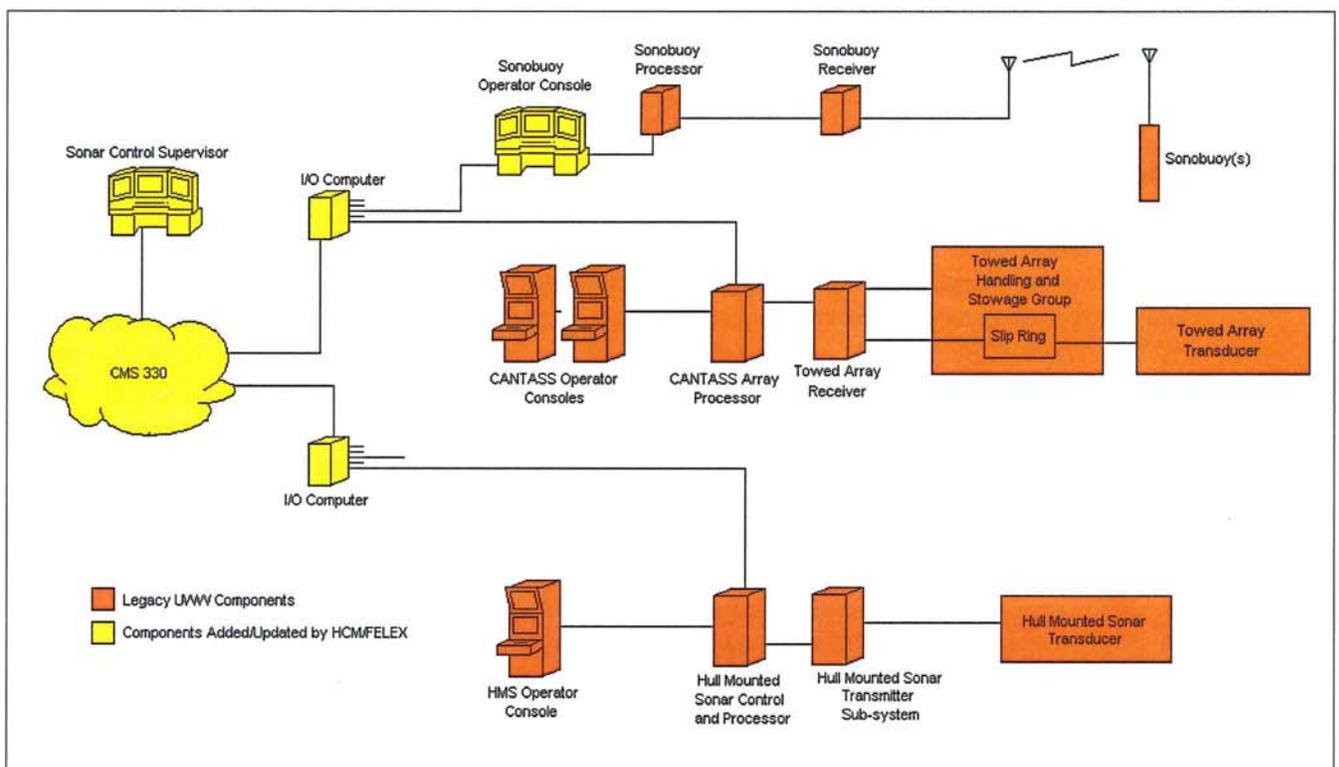


Figure 1: The configuration of the UWW suite following the completion of the HCM/FELEX project.

4. Design Concept for UWSU. Figure 2 is a conceptual design for the UWSU system. The block diagram is illustrative and does not prescribe the final design. It simply illustrates the scope and the relationship of system components.¹

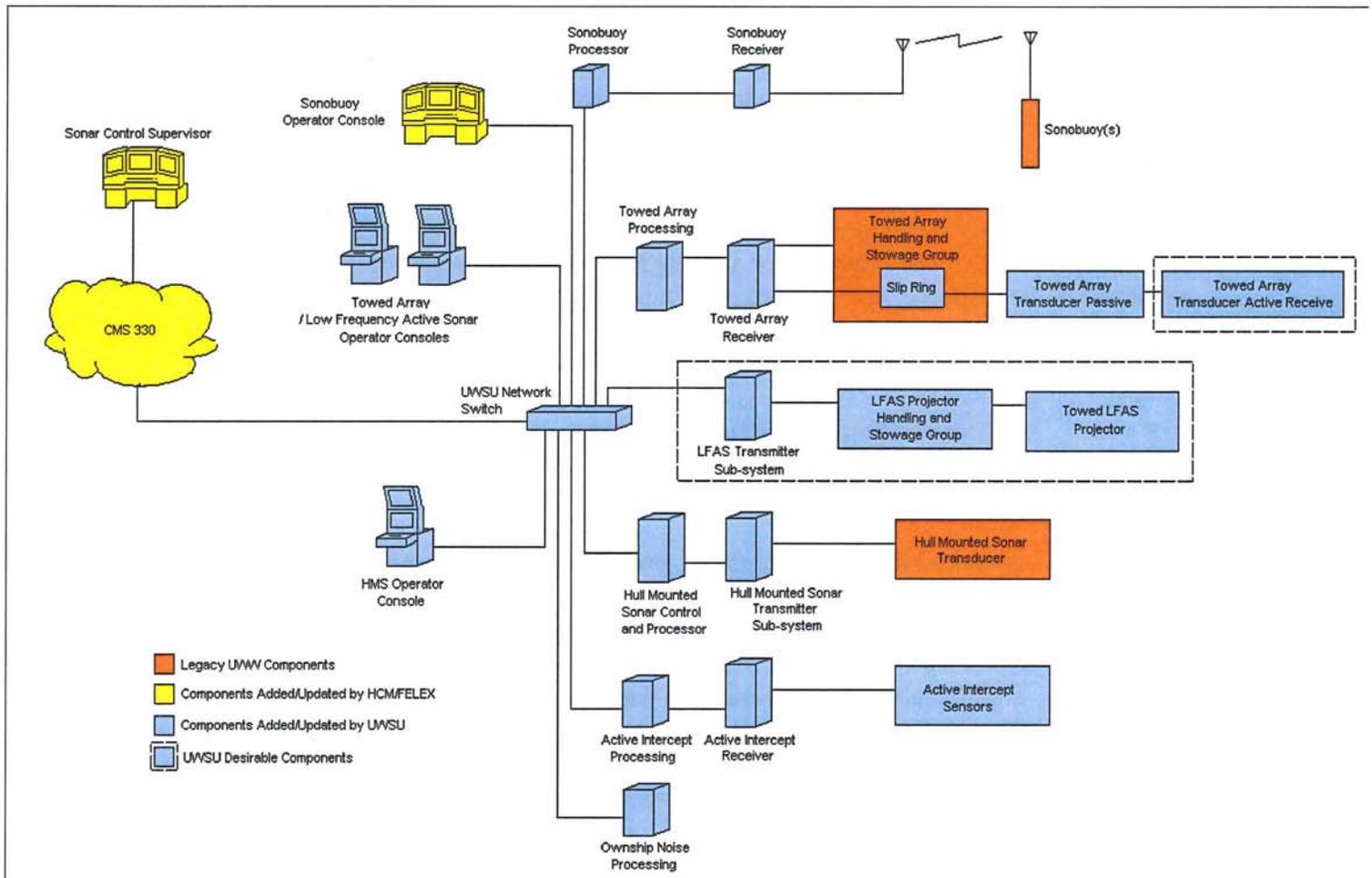


Figure 2 : UWW Suite, post-UWSU

The design restrictions for UWSU are as follows:

- a. The UWSU design must employ the commercial standards consistent with CMS 330 design for connections and communications between UWSU components;
- b. In order to reduce integration risk and minimize through-life support costs, the UWSU system must, where practicable, make use of the standard

¹ Though not pictured this way, the off-board Active Intercept Sensors and LFAS systems may share interfaces to the Towed Array Handling and Stowage Group and the Towed Array Receive electronics.

processors and the standard Multi function Workstations (2-EYE MFWs) employed by the CMS 330;

- c. The UWSU design must use HMI standards consistent with CMS 330 HMI standards; and
- d. The UWSU system interfaces must be open (i.e. non-proprietary and based on accepted standards) and extensible at all relevant levels to allow for additional capability and interoperability.

Alternatives may be suggested by industry, should respondents be unable to comply with the restrictions, or if the suggested alternatives are felt to have overwhelming technical, fiscal or other merit. The rationale for any suggested alternative approach should be fully explained in the response, and supported by indicative non-binding cost estimates.

- 5. The UWSU system must be designed to achieve the following:
 - a. improve threshold detection ranges;
 - b. improve accurate auto-tracking;
 - c. enhance target discrimination, processing sensitivity and beam forming;
 - d. reduce the effects of towed array bearing ambiguity;
 - e. simultaneously process passive data at several integration periods and frequency resolutions;
 - f. provide audio mode for all sensors;
 - g. provide computer-assisted target identification;
 - h. provide software capability to utilize own-ship sensors, including but not limited to HMS, TA, and active intercept hydrophones for monitoring of own-ship acoustic signature;
 - i. provide embedded onboard training capability to support steady state training;
 - j. provide Tactical Decision Aids which are functionally interfaced with the UWSU sensor suite and capable of automatically using data from sensors or other external sources;

- k. develop and manage a Recognized Sub-Surface Picture (RSSP) through the fusion of data received by the UWSU sensor suite and other contact information received from CMS 330; and
- l. contribute to the overall Recognized Maritime Picture (RMP) managed by CMS 330.

Open Architecture Design

6. The current Halifax Class UWW sensor suite has a closed architecture, with purpose-built software and hardware systems designed in the early 1980s. These systems are increasingly difficult to support as component availability is dwindling, and the specialist skill sets needed to maintain older technologies are no longer readily available. The UWSU design must minimize the problems of obsolescence and supportability by maximizing the use of standards-based Commercial-off-the-Shelf (COTS) components. This facilitates small-scale component replacement and avoids the need for large scale changes required to address obsolescence. The design must allow a periodic technology refresh to ensure the system keeps up with advances in technology. To that end, the design must use commercial standards for modular software to facilitate the porting of software from older UWSU system components to upgraded ones when conducting a technology refresh.

7. A Modular Open Systems Approach (MOSA) and an open architecture design must be used to ensure that system components can be cost-effectively supported and maintained current over the in-service life of the Halifax Class.² It will also allow the potential transfer of the UWSU system or components of this system and technology to the future CSC. The modular software design allows for the addition of new algorithms and techniques into appropriate points in the processing chain for evaluation and eventual technology insertion. Industry is requested to provide a clear and detailed explanation of how their solutions are based on and employ Open Architecture designs, how they would support Technology Refresh and Technology Insertion.

Technology Refresh and Technology Insertion

8. The design of the UWSU system must recognize the limited life-span of COTS components, in terms of availability and supportability, and plan for a five year Technology Refresh cycle, complemented by a one year Technology Insertion cycle. By virtue of a modular open architecture design, the UWSU design will minimize the risks and impacts of component and module replacements from the Technology Refresh process. Adjustments in Technology Refresh and Technology Insertion cycles may be made during the in-service life of the UWSU system, depending on changes in the state of industry and potential shifts in operational requirements.

² For planning purposes, the in-service life for the Halifax Class can be assumed to be 15+ years following completion of each ship's HCM/FELEX mid-life refit.

Future Considerations

9. Bi-static and Multi-static Capability. Bi-statics and multi-statics are emerging technologies for UWW. Although these technologies are relatively new, it is a design goal that the future UWSU system must be ready to take advantage of these technologies and other related technology such as Continuous Active Sonar. Modularity will allow for selection of components to meet requirements and control overall project costs. An open architecture designed system will allow a technology insertion of the hardware (such as communication network components) and software (such as multi-static algorithms) that would enable a bi-static and multi-static capability to be added when the technology matures. The UWSU procured processing systems and sensors, where applicable, must have the performance characteristics necessary to enable use in own-ship bi-static, bi-static or multi-static operations.

10. Transition to Future Ship Classes. A technology refresh process will be used during the in-service life of the UWSU system. It will allow the technology and design of UWSU to be maintained current, relevant, economically supportable and able to respond to changes in operational requirements. The UWSU system is intended to remain technically capable beyond the end of life for the Halifax Class, and enable the transition of capability as a whole or in part to the CSC should it be warranted and practicable.

Constraints

11. The following constraints are provided to industry:
- a. the SPS must maintain interoperability and compatibility with all domestic and allied sonobuoys with which they will be required to interface;
 - b. the UWSU Project components must use non-proprietary networking protocols and related middleware standards to the maximum extent practical. These standards will allow for internal UWSU sub-system modularity and connectivity with systems external to UWSU;
 - c. processing components of the UWSU Project must interface with CMS 330;
 - d. UWSU must make maximum re-use of the existing systems infrastructure such as cabinetry and towed array handling systems.
 - e. to the extent practical, the UWSU system should not exceed space and weight constraints or cooling and power requirements of existing equipment;
 - f. hull modifications must be minimal. Extensive modifications to the hull or superstructure may have negative impacts on the availability of the

ships for operations, and the overall cost of the project. Therefore, when considering options available to provide the UWSU system to the Fleet, these factors, and ultimately the scope of proposed hull/superstructure modifications are considered to be very important constraints;

- g. selection of hardware components for the UWSU system, such as cabinetry, operator consoles, processing equipment should maximize commonality with CMS 330 components. Commonality with CMS 330 HMI standards is also desired;
- h. it is the intention of the UWSU Project not to increase the existing number of sonar system operators and maintainers from those in the current Halifax Class personnel establishment. The incorporation of an improved HMI and the automation of tasks should reduce operator workload;
- i. the UWSU system and sub-systems must be capable of continuous operation 24 hours per day for 90 days without system failure, where a failure is any event which adversely affects the ability to maintain the Recognized Sub-Surface Plot and provide for the self-defence against UWW threats. The system must also be able to function while the ship is not underway;
- j. the UWSU system must process and display information from the existing HMS transducer array, the new Towed Array Sonar, a new SPS and potentially a new Active Intercept Sonar. It must also display all information relevant to the Recognized Sub-Surface Plot from the CMS 330;
- k. active sonar systems must have the ability to gradually increase their transmission power levels in order to allow implementation of marine mammal mitigation procedures. The UWSU system will provide the capability for the acoustic detection, identification and localization of marine mammals by way of their vocalizations and noise;
- l. an own-ship self-noise monitoring system must be provided. This system must be capable of utilizing current and additional new sensors, including inboard accelerometers should they be added in the future; and
- m. the environmental and survivability requirements for the UWSU system will be consistent with typical requirements for weapon, sensor and command and control systems for warships.

Costing

12. DND intends to use the Industry Price and Availability (P&A) responses to develop the indicative Project cost estimate that is needed to achieve governmental

approval to proceed to the Project Definition stage. Further, a breakdown of the estimate by sub-system and component level provided by industry will allow DND to envisage possible scenarios with regard to the selection of quantities of components to be procured. Industry responses to this P&A are therefore requested to include an **indicative, non-binding cost estimate** for each of the following UWSU system and sub-systems. Where assumptions have been made regarding re-use of existing equipment, for example handling gear, these should be stated in the P&A response. Further, when a response is based on the use of CMS 330 components such as the 2-EYE³ Multi-function workstations, these can be assumed to be Government furnished items and will not need to be costed as part of the P&A response. Costs are requested to be provided as per the cost breakdown table attached as appendix 1 to this document. Notwithstanding the information and costs being requested in the cost breakdown table, the Contractor can provide valuable assistance to the Project Team by providing any additional information that they feel may be relevant to the capability being sought.

13. Depending on the options selected, a minimum of eight and a maximum of twelve ship-sets will be required for installation on board ship, plus updates to 2 shore-based training facilities. Updates to the Team Operations Training,⁴ individual Operator Training,⁵ and Maintenance Procedures Training (MPT) systems are required to be delivered as part of the UWSU Project, including delivery of Initial Cadre Training (ICT). The numbers of ship-sets are preliminary and may be increased or decreased as project analysis is refined. Ideally, but not necessarily, 12 ship-sets of the inboard processing systems will be procured, with the quantities of wet-end sensors to be adjusted according to cost and budget. Industry is requested to provide component cost breakdowns for 8, 10, and 12 systems, plus updates to 2 shore training sites, and to indicate the effect of quantity on the pricing of components.

14. Passive Towed Array Processing System. The UWSU system must provide a new TA capable of processing contacts passively. The system must:

- a. substantially improve processing and display functions to greatly enhance passive detection;
- b. be capable of receiving and processing the full acoustic frequency bandwidth of passive received signals, including narrowband analysis, broadband tracking and Demodulation of Noise (DEMON) analysis; and
- c. provide a signature database for identification of passive contacts.

³ The 2-EYE workstation configuration consists of two vertically arranged display areas over a keyboard/trackball area.

⁴ Synthetic Environment Advanced Weapon Operations Leadership Facility (SEAWOLF)

⁵ Synthetic Environment Advanced Combat Operations Trainer (SEACOT)

Industry is requested to provide a breakdown of costs per ship for a complete Towed Array System and each of the sub components consisting of:

- d. a towed array handling system (re-use or replace);
- e. a replacement passive towed array;
- f. the processing system; and
- g. the associated cabling and communications equipment.

15. Towed Low Frequency Active Sonar (TLFAS) and Active Receive Array. The UWSU Project, as desirable components, is considering the acquisition of a TLFAS projector system and an Active Receive Array, together or separately. The decision to acquire a TLFAS and/or an Active Receive Array will be cost based. Considerations will include the footprint required for a TLFAS system, the degree of re-use and integration of components with the existing TA System including the handling system, the procurement costs, and the cost of any related hull modifications. Industry needs to consider the possibility of fit-for-but-not-with⁶ solutions and the procurement of a reduced number of ship sets while considering cost effectiveness, practicality and operational benefit. Portability of the systems between platforms is therefore a major consideration for this element of the UWSU Project. The TLFAS system must have:

- a. processing, control and display functions on the operator workstations similar to the rest of the UWSU system components;
- b. the tools, processing and display functions for standard Continuous Wave and Frequency Modulated pings, as well as for the generation of arbitrary (complex) waveforms; and
- c. all necessary cabling, transmitter, transmitter power supplies, and processing equipment to install and operate the TLFAS system.

Industry is requested to provide the cost of a TLFAS system for the Halifax Class, in either a vertical projector or a horizontal projector configuration, or both, including all necessary inboard electronics, cabling, software and power supplies. The system must have the potential to be used in a bi-static or multi-static UWW operation.

The Active Receive Towed Array system must have:

- d. the required frequency range, dynamic range and processing power to be capable of bi-static and multi-static active receive functions, including the capability for resolution of port-starboard ambiguity;

⁶ *Fit-for-but-not-with* means only conducting the necessary preparation and infrastructure work (e.g. hull work and cabling), but stopping short of actual installation of the main pieces of equipment. The objective is to allow for rapid transfer of equipment between platforms.

- e. processing, control and display functions on the operator workstations similar to the rest of the UWSU system components;
- f. the tools, processing and display functions for passive processing, and for processing of standard Continuous Wave and Frequency Modulated pings, as well as arbitrary (complex) waveforms; and
- g. all necessary cabling, power supplies and processing equipment necessary for operation.

16. Sonobuoy Processing System. The SPS in the Halifax Class needs to be improved and modernized for current and future operations. Its current limitations are: inability to control active sonobuoys, inability to access 68 of the 99 sonobuoy radio frequency channels, inability to monitor more than 4 sonobuoys at a time, and an HMI that is not user friendly. Industry is requested to provide a cost breakdown for a new SPS capable of utilizing all sonobuoys in the current NATO inventory and monitoring all available standard sonobuoy Radio Frequency (RF) channels. The SPS must be able to access all 99 standard sonobuoy frequencies, and access a minimum of 16 channels simultaneously. The SPS processor and receiver/transmitter must implement the standard sonobuoy Command Function Select (CFS) capability. The SPS must be able to control active and multi-mode sonobuoys.

17. Hull Mounted Sonar Processing. The UWSU Project will significantly improve the performance and capabilities of the existing Hull Mounted Sonar (HMS) by improving processing and display techniques, allowing for generation of advanced ping waveforms, and providing a transmission control function for the implementation of marine mammal mitigation procedures. The UWSU system must retain the existing functions of the AN/SQS-510, including interfaces to the Underwater Telephone (UWT) and the existing Sonar Performance Figure (SPF) measurement system. Costing is requested for improvements of the HMS Processing system, but not the wet end of the HMS. This improvement will provide the following additional capabilities:

- a. control and processing of all modes for the existing AN/SQS-510 medium frequency sonar;
- b. the capability to simultaneously conduct active and passive sensing; and
- c. provide the tools, processing and display functions for conventional Continuous Wave (CW) and Frequency Modulated (FM) pings, as well as for the generation of special purpose (complex) waveforms.

18. Active Intercept. The UWSU system will include an Active Intercept capability for the Halifax Class as a deliverable. Active Intercept sensors require a wide frequency bandwidth to provide the capability of detection, localization and identification of torpedo active sonars, mechanical and biological transients, and other active sonar transmissions besides those of torpedoes. The UWSU system must provide an integrated active transmission intercept capability, with the necessary processing, control and

display functions to detect active sonars. This capability must consist of both hull mounted and off board sensors to allow detection above and below the layer. Off board Active Intercept sensors are envisaged to be incorporated as an add-on module of the Passive Towed Array.

19. CMS 330 and UWSU System Interface. The UWSU system must provide an interface between the Halifax Class CMS 330 and the UWSU processor(s) with a two way connectivity channel for the information transfer to develop the RSSP and contribute to the overall RMP. Industry is requested to provide an estimate on the integration cost and a recommendation on how this integration will best be accomplished. Industry is requested to provide a cost for the hardware and software requirements for the interface between CMS 330 and the UWSU system. The information required for transfer, as a minimum must include:

- a. from UWSU processor(s) to CMS 330:
 - i. display UWSU system status information, including system or component fault information, towed array status (e.g depth), etc;
 - ii. contact bearing and frequency information for the conduct of Target Motion Analysis (TMA); and
 - iii. display the Recognized Sub-Surface Picture.
- b. from CMS 330 to the USWU processor(s):
 - i. non-acoustic sensors which contribute to the Recognized Sub-Surface Picture such as radar and Electronic Warfare (EW) information;
 - ii. full integration of Bathy data and graphics;
 - iii. navigation data including GPS position, own-ship's course, speed roll and pitch, chart overlays and Automatic Identification System (AIS) information;
 - iv. all UWW related alert messages;
 - v. all UWW related overlays;
 - vi. the Navy Integrated Tactical Environment System 2 Redesigned (NITES2R) software and applications. NITES2R which is being implemented as part of HCM/FELEX, is an application that provides meteorological and oceanographic forecasting and decision making tools;

- vii. all resulting data from the TMA solutions;
- viii. UWW related LINK 11, 16 and 22 information;
- ix. track management control messages; and
- x. system control and system status information (e.g. clock synchronization).

20. Combined Underwater Picture. The integrated UWSU UWW picture must be provided to CMS 330. All UWSU workstations must be able to display, at a minimum, the following information obtained from CMS 330:

- a. subsurface, and surface tracks;
- b. air tracks relevant to the Recognized Sub-Surface Picture (such as cooperating Helicopters and Long Range Patrol Aircraft);
- c. acoustic and EW lines of bearing;
- d. bathymetry information;
- e. TMA solutions;
- f. reference and geographical points;
- g. chart overlays and topographical maps; and
- h. estimates of detection and counter detection ranges.

21. Post-mission analysis and training. The UWSU system must be able to conduct embedded post-mission analysis and training. Specifically, the system must:

- a. be capable of recording all data, including operator annotations and selectively play back or export any data from the past 72 hours for onboard second level acoustic analysis and training;
- b. record all data on removable media;
- c. be capable of replay and export of raw acoustic data for post-mission analysis; and
- d. have an embedded training function capable of replay of recorded or synthetic data.

Requests

22. Industry is requested to describe past sales and current support arrangements with other navies and provide initial concepts for 2nd line (ship repair facility) and 3rd line (contractor) maintenance of inboard processing systems, and towed arrays and projector systems. A contact point at the customer navy is requested.

23. Industry is requested to provide the basis for their cost estimates for the UWSU Project. It would be beneficial for industry to provide examples of similar equipment currently being supplied to major navies as part of an ongoing multi-hull, multi-class program with a long term support arrangement. Where system(s) are currently in-service or scheduled for delivery to other navies, the delivery schedules and history of the service life are requested.

24. Though not integral to the objectives of this P&A request, DND would like to be able to perform rough-order-magnitude forecasting of the in-service support costs for the UWSU system. Therefore, Industry is requested to provide their projected costs for up to 5 years of in-service support for the system, including operating the technology insertion and technology refresh process, repair and overhaul, and Integrated Logistic Support (ILS) functions such as configuration management, obsolescence management, and training. If industry is providing these services for one or more customers, cost data for these services is requested.

25. A blank cost breakdown table has been provided as Appendix 1 to act as a guide for the responder.

Cost Breakdown Table

The following table is provided as a guide to responding to the P&A request.

	Item	Ref para	Cost per unit, Qty 8	Cost per unit, Qty 10	Cost per unit, Qty 12
Passive Towed Array	Interfaces and Processing System	17.			
	Towed Array sensor, incl assoc handling equipment, cabling, etc.	17.			
	Associated ILS costs, incl documentation and training*	17.			
	Non-recurring Engineering, incl handling systems	17.			
Towed Low Frequency Active Sonar (LFAS)	Interfaces and Processing System	18.			
	Low Frequency Active Receive Array	18.			
	Towed LFAS Projector, incl assoc transmitter, handling equipment, cabling, etc.	18.			
	Associated ILS costs, incl documentation and training	18.			
	Non-recurring Engineering, incl handling systems	18.			
Sonobuoy Processing System	Sonobuoy receiver/transmitter, incl cabling, antennae	19.			
	Sonobuoy Processor	19.			
	Associated ILS costs, incl documentation and training	19.			
	Non-recurring Engineering	19.			
Hull Mounted Sonar	Interfaces and Processing System	20.			
	Transmitter upgrade	20.			
	Associated ILS costs, incl documentation and training	20.			
	Non-recurring Engineering, incl handling systems	20.			

Active Intercept	Interfaces and Processing System	21.			
	Active Intercept Sensors – Hull Mounted, incl cabling	21.			
	Sensors – off board, incl cabling	21.			
	Associated ILS costs, incl documentation and training	21.			
	Non-recurring Engineering	21.			
Interface to CMS 330	Network infrastructure, incl cabling	22.			
	Associated ILS costs, incl documentation and training	22			
	Non-recurring Engineering	22.			
Trainer upgrades	Team Trainer, SEAWOLF updates, including Non-recurring Engineering	16.			
	Individual Trainer, SEACOT updates, including Non-recurring Engineering	16.			
	Maintenance Procedures Trainer updates, including Non-recurring Engineering	16.			
In-Service Support	Annual costs	27.			

* Training in this context refers to Initial Cadre Training

