

Volume 2, Annex C

System Requirements Document

Underwater Warfare Suite Upgrade

22 February 2017

ID		Requirement Type
SRD-9	Volume 2, Annex C to W8472-135462 System Requirements Document Dated: 22 February 2017	Heading
SRD-1039	Volume 2, Annex C System Requirements Document Underwater Warfare Suite Upgrade 22 February 2017	Heading
SRD-1	1 INTRODUCTION	Heading
SRD-14	1.1 Scope	Heading
SRD-11	1.1.1 The objectives of the Underwater Warfare Suite Upgrade (UWSU) Project are to overcome the deficiencies of the current Royal Canadian Navy (RCN) Halifax-class frigate Underwater Warfare Sensor System (UWSS) for Anti-Submarine Warfare (ASW) and to regain the Class's overall maritime combat capability.	Information
SRD-12	1.1.2 The purpose of this System Requirements Document (SRD) is to define the functional, performance, and other requirements for the UWSS that will fulfill the RCN Statement of Operation Requirement (SOR) for UWSU.	Information
SRD-23	1.1.3 As stated in the SOR, the specific objectives of the UWSU project are:	Information
SRD-24	(a) to deliver an UWSS that will provide the Halifax-class with the sensors to provide adequate self-protection and survivability capabilities against submarines and underwater weapons;	Information
SRD-19	(b) to improve the detection range performance against lower noise threshold enemy targets;	Information
SRD-25	(c) to provide operators with tactical decision aids by integrating all underwater sensors, data fusion agents and tracking algorithms that will enable operators to localize the enemy quicker and with a much greater degree of certainty;	Information
SRD-26	(d) to provide persistent active and passive detection capabilities above and below the sonic layer, including a towed passive and low frequency active sonar (LFAS);	Information
SRD-27	(e) to acquire a system comprised to the extent practical of Military-off-the-Shelf (MOTS) components to reduce project risk;	Information
SRD-	(f) to avoid tactical and technical obsolescence of the UWSS by	Information

ID		Requirement Type
28	acquiring systems that use readily available Commercial-Off-The-Shelf (COTS) components, open-architectures, and modular design concepts to allow for economical and rapid implementation of future capabilities and upgrades; and	
SRD-29	(g) to provide these capabilities in both single-ship independent deployer (SSID) and task group deployment scenarios, and in both littoral and open ocean environments.	Information
SRD-583	1.1.4 The UWSS upgrades apply to the Halifax-class frigates which have completed their mid-life refits under the Halifax Class Modernization / Frigate Life Extension (HCM/FELEX) project.	Information
SRD-13	1.1.5 The UWSS specified in this SRD includes the ship-fitted sensor system, hardware and software, cabling and other equipment needed to meet the requirements of this SRD.	Information
SRD-128	1.1.6 In addition to the ship-fitted UWSS, ancillary equipment including hardware, software and documentation needed to maintain and support the system, to provide Halifax-class Combat System software change management capability, to train operators and maintainers, and to provide post-mission analysis capabilities in accordance with this SRD are within scope for the UWSU project.	Information
SRD-180	1.1.7 Classified content that will form part of this SRD are included in Appendix 2 of this SRD.	Information
SRD-181	1.1.8 Classified parameters included in this SRD will be denoted using capitalization and enclosing "\$" symbols, for example, "\$VARIABLE\$", and will be listed in Appendix 2 of this SRD.	Information
SRD-15	1.2 Intended Application	Heading
SRD-16	1.2.1 The UWSS to be fitted to the Halifax-class is intended for use in all environments to which the Class might deploy: globally in waters of widely varying temperature and salinity, from the ice edge to tropical and desert coastlines, and from the littoral to the open ocean.	Information
SRD-17	1.2.2 The UWSS will be used:	Information
SRD-20	(a) as an essential element of the layered ASW defence concept using a combination of organic and non-organic sensors, either at the single ship or force level, meant to deter/detect threat submarines and their weapons;	Information
SRD-21	(b) to contribute to the above-water maritime picture compilation in sovereignty and fishery patrols, and in surveillance and interdiction operations; and	Information
SRD-22	(c) to contribute to submarine search and rescue operations.	Information

ID		Requirement Type
SRD-18	1.2.3 The operation of the UWSS will be conducted from the Halifax-class Operations Room by up to four operators, not including the Sonar Control Supervisor, but including the Senior Hand of the Watch, co-located to allow for operator collaboration.	Information
SRD-201	1.2.4 The Sonar Control Supervisor function as implemented under HCM/FELEX will retain its current role.	Information
SRD-30	1.3 Constraints	Heading
SRD-1180	1.3.1 There must be no changes to the current number of Halifax-class frigate concurrent towed systems. That is, any UWSS towed systems must be implemented as a single tow and must be able to be physically operable alongside the current towed torpedo countermeasure system, the AN/SLQ-25A Nixie.	Mandatory
SRD-31	1.3.2 There must be no changes to the legacy AN/SQS-510 External Sonar Dome (Canoe) under the UWSU project with the exception that sensors may be fitted to it.	Mandatory
SRD-174	1.3.3 There must be no changes to the AN/SLQ-25A Towed Torpedo Decoy under the UWSU project.	Mandatory
SRD-175	1.3.4 There must be no changes to the ship under the UWSU project, whether permanent or for the purpose of mission-fit, that would have an impact on the ability of the ship to conduct helicopter flight operations.	Mandatory
SRD-1448	1.3.5 The design and implementation of the UWSS by the Contractor in compliance with this SRD must preserve the material and capability state of the ship.	Mandatory
SRD-2	2 APPLICABLE DOCUMENTS	Heading
SRD-1158	2.1 Applicability	Heading
SRD-1179	2.1.1 The following documents, standards and definitions form part of this Contract to the extent specified in the individual Annexes, Appendices and Attachments. Unless otherwise stated, the dates of issue, revision or amendment in effect for each reference must be based on those in effect as of the date of the UWSU RFP release. Wherever a specific paragraph of a document is referenced as part of a requirement, all subparagraphs of the referenced paragraph must apply, unless otherwise indicated.	Mandatory
SRD-1159	2.1.2 The following documents support the SRD and must be considered as supplemental information if not specifically identified in the text. In the event of conflicts between the documents referenced below and the content of the SRD, the contents of the SRD must take precedence.	Mandatory
SRD-	2.2 References	Heading

ID		Requirement Type
1160		
SRD-1161	2.2.1 Commercial Standards	Heading
SRD-1162	2.2.1.1 National Marine Electronics Association (NMEA) 0183 Standard for Interfacing Marine Electronic Devices Version 3.01 dated 30 January 2002	Information
SRD-1163	2.2.2 Commercial Publications	Heading
SRD-852	2.2.2.1 World Meteorological Organization Publication Number 306 Manual on Codes Volume I.1	Information
SRD-1164	2.2.3 Canadian Forces Specifications and Standards	Heading
SRD-1019	2.2.3.1 A-P9-050-000/PT-001, Canadian Forces Individual Training & Education System	Information
SRD-873	2.2.3.2 C-59-007-006/MB-001, Sonobuoy Reference Guide	Information
SRD-1014	2.2.3.3 DAOD 5031-2, Individual Training and Education Strategic Framework	Information
SRD-1017	2.2.3.4 NAVORD 4500-0, RCN Individual and Collective/Operational Training Policy	Information
SRD-964	2.2.3.5 DRDC-RDDC-2015-R186; Scientific Report, 2012-Canadian Forces Anthropometric Survey (CFAS): Final Report, September 2015	Information
SRD-857	2.2.3.6 A-PD-050-000/AG-003, Future Naval Training System Strategy (FNTSS), 2015-06	Information
SRD-1166	2.2.3.7 Interface Design Document between the Halifax Class Navigation Data Distribution System and the Underwater Warfare Sensor System; See Note (*1)	Information
SRD-1445	2.2.3.8 NAVORD 3470-0, Maritime Acoustic Authority	Information
SRD-1450	2.2.3.9 INTERFACE CONTROL DOCUMENT (ICD) TUUM-6 UNDERWATER TELEPHONE FOR HALIFAX CLASS FRIGATES, 971066-B, 19 February 2015; See Note (*1)	Information
SRD-1451	2.2.3.10 INTERFACE CONTROL DOCUMENT (ICD) MK8-F BATHY THERMOGRAPH RECORDER RS-232 INTERFACE (COM2), 06 February 2009; See Note (*1)	Information
SRD-1167	2.2.4 Government of Canada Publications	Heading
SRD-1016	2.2.4.1 CSEC ITSG-33, Communications Security Establishment Canada (CSEC) IT Security Risk Management: A Lifecycle Approach	Information
SRD-1169	2.2.5 NATO Standards	Heading

ID		Requirement Type
SRD-1013	2.2.5.1 ANEP-77, NAVAL SHIP CODE	Information
SRD-891	2.2.5.2 ATP 1, Allied Maritime Tactical Instructions and Procedures, Chapter 9	Information
SRD-1131	2.2.5.3 STANAG 1382 SMER (EDITION 2) - EMERGENCY SONAR BEACONS TO AID THE DETECTION AND LOCALIZATION OF DISTRESSED SUBMARINES AND THE HOMING ONTO THEM OF SUBMERGED RESCUE CRAFT	Information
SRD-1165	2.2.6 Mil Standards	Heading
SRD-965	2.2.6.1 MIL-HDBK-2036, PREPARATION OF ELECTRONIC EQUIPMENT SPECIFICATIONS	Information
SRD-1007	2.2.6.2 MIL-S-901D, MILITARY SPECIFICATION: SHOCK TESTS. H.I. (HIGH-IMPACT) SHIPBOARD MACHINERY, EQUIPMENT, AND SYSTEMS, REQUIREMENTS FOR (17 MAR 1989)	Information
SRD-1000	2.2.6.3 MIL-STD-108E, DEFINITIONS OF AND BASIC REQUIREMENTS FOR ENCLOSURES FOR ELECTRIC AND ELECTRONIC EQUIPMENT, Notice 2, 8 August 1990	Information
SRD-1008	2.2.6.4 MIL-STD-167-1A, DEPARTMENT OF DEFENSE TEST METHOD STANDARD, MECHANICAL VIBRATIONS OF SHIPBOARD EQUIPMENT (TYPE I - ENVIRONMENTAL AND TYPE II - INTERNALLY EXCITED)	Information
SRD-1004	2.2.6.5 MIL-STD-461F, REQUIREMENTS FOR THE CONTROL OF ELECTROMAGNETIC INTERFERENCE CHARACTERISTICS OF SUBSYSTEMS AND EQUIPMENT	Information
SRD-1006	2.2.6.6 MIL-STD-740-2, MILITARY STANDARD: STRUCTURE-BORNE VIBRATORY ACCELERATION MEASUREMENTS AND ACCEPTANCE CRITERIA OF SHIPBOARD EQUIPMENT (30 DEC 1986)	Information
SRD-1001	2.2.6.7 MIL-STD-810G, DEPARTMENT OF DEFENSE TEST METHOD STANDARD, ENVIRONMENTAL ENGINEERING CONSIDERATIONS AND LABORATORY TESTS	Information
SRD-1111	2.2.6.8 MIL-STD-1310E, MILITARY STANDARD: SHIPBOARD BONDING, GROUNDING, AND OTHER TECHNIQUES FOR ELECTROMAGNETIC COMPATIBILITY AND SAFETY (18 AUG 1987)	Information
SRD-1010	2.2.6.9 MIL-STD-1399/301A, DEPARTMENT OF DEFENSE INTERFACE STANDARD: INTERFACE STANDARD FOR SHIPBOARD SYSTEMS SECTION 301A SHIP MOTION AND ATTITUDE (1986-07-21)	Information
SRD-958	2.2.6.10 MIL-STD-1472F, DEPARTMENT OF DEFENSE DESIGN CRITERIA STANDARD, HUMAN ENGINEERING	Information
SRD-1005	2.2.6.11 MIL-STD-1474E, DEPARTMENT OF DEFENSE DESIGN CRITERIA STANDARD, NOISE LIMITS	Information
SRD-	2.2.7 Notes	Heading

ID		Requirement Type
1185		
SRD-1186	2.2.7.1 (*1) Publication referenced for contractual completeness only. Publication will be made available by Canada only after contract award.	Information
SRD-3	3 FUNCTIONAL AND PERFORMANCE REQUIREMENTS	Heading
SRD-87	3.1 General Requirements	Heading
SRD-585	3.1.1 Shipboard Systems	Heading
SRD-584	3.1.1.1 Underwater Warfare Sensor System	Heading
SRD-141	3.1.1.1.1 The UWSS, comprising the ship-fitted sensor system, must include Underwater Sensor Components (USCs), an Underwater Data Management System (UDMS), Operator Workstations, and all associated cabling and interfaces necessary to meet the requirements as defined in this SRD.	Mandatory
SRD-1301	3.1.1.1.2 The UWSS must be a physically separate and independent system that is connected to other systems of the Halifax-class Combat System via external interfaces.	Mandatory
SRD-846	3.1.1.1.3 The UWSS must perform unrestricted operation in all environments to which Halifax-class frigates might deploy: globally in waters of widely varying temperature and salinity, from the ice edge to tropical and desert coastlines, and from the littoral to the open ocean.	Mandatory
SRD-847	3.1.1.1.4 The UWSS must have a sustained full operational capability in:	Mandatory
SRD-848	(a) worldwide ice-free, temperate and tropical temperatures, in all levels of humidity and precipitation, in every season;	Mandatory
SRD-849	(b) an upper deck icing environment;	Mandatory
SRD-850	(c) wind, waves, tides and currents found in open ocean, coastal, and littoral waters; and	Mandatory
SRD-851	(d) conditions no less than the upper limit of Sea State 5.	Mandatory
SRD-1449	3.1.1.1.5 The UWSS must not negatively impact the material and capability state of the ship in terms of stability, structural integrity, security, ship signatures, safety, seaworthiness and combat readiness.	Mandatory
SRD-482	3.1.1.2 Underwater Sensor Components	Heading
SRD-480	3.1.1.2.1 USCs are defined as all of the hardware and software needed to perform data acquisition, including sensors, cabling, receive and transmit electronics, handling and stowage systems, firmware and software.	Information

ID		Requirement Type
SRD-80	3.1.1.2.2 The UWSS must be composed of the following USCs:	Mandatory
SRD-81	(a) a Hull Mounted Sonar (HMS) system to replace the legacy AN/SQS-510;	Mandatory
SRD-82	(b) a Hull Mounted Torpedo Sonar Intercept (TORSIC) sensor system;	Mandatory
SRD-84	(c) a Sonobuoy Processing System (SPS) to replace the legacy AN/UYS-503 system;	Mandatory
SRD-83	(d) a Towed Active Passive Sonar (TAPS) system, including a TORSIC capability, to replace the legacy AN/SQR-501 CANTASS; and	Mandatory
SRD-1047	(e) a Bathythermograph Recorder System, incorporating the functions of the current Mk8-F Bathythermograph Recorder.	Mandatory
SRD-481	3.1.1.2.3 Some hardware and software components may be shared among the USCs.	Information
SRD-483	3.1.1.3 Underwater Data Management System	Heading
SRD-368	3.1.1.3.1 The UDMS, consisting of hardware and software, must serve as the centralized point of operation, control and processing for all UWSS USCs and all software functions of the UWSS.	Mandatory
SRD-551	3.1.1.3.2 The UDMS, via operator workstations, must serve as the centralized point of managing, displaying and taking operator input for the UWSS Human Machine Interface (HMI).	Mandatory
SRD-552	3.1.1.3.3 The UDMS must include all data collection capabilities of the UWSS, consisting of both hardware and software.	Mandatory
SRD-553	3.1.1.3.4 The UDMS must perform other functions of the UWSS including:	Mandatory
SRD-562	(a) onboard embedded training;	Mandatory
SRD-563	(b) ownship noise monitoring; and	Mandatory
SRD-564	(c) system health monitoring and diagnostics.	Mandatory
SRD-88	3.1.1.3.5 The UWSS must integrate the capabilities of the UDMS and the defined USCs into a unified system in order to meet the requirements of this SRD.	Mandatory
SRD-1494	3.1.1.3.6 The UDMS must process the information that is passed to the UDMS from other systems in accordance with Section 3.9.7 UDMS Interface to other Systems, as necessary in order to meet the requirements of this SRD.	Mandatory
SRD-	3.1.1.3.7 The UDMS must display the information that is passed to the	Mandatory

ID		Requirement Type																		
1495	UDMS from other systems in accordance with Section 3.9.7 UDMS Interface to other Systems.																			
SRD-485	3.1.1.4 Operator Workstations	Heading																		
SRD-486	3.1.1.4.1 The UWSS must include no less than four (4) operator workstations in the Operations room to accommodate simultaneously no less than four (4) operators.	Mandatory																		
SRD-554	3.1.1.5 Interfaces and Cabling	Heading																		
SRD-555	3.1.1.5.1 The UWSS must include all internal and external interfaces necessary to meet the UWSS functional and performance requirements.	Mandatory																		
SRD-586	3.1.1.5.2 The UWSS must include all interconnecting cabling between USCs and between the UWSS and external systems to which it is interfaced to meet the UWSS functional and performance requirements.	Mandatory																		
SRD-1248	3.1.1.6 Mounting Hardware and Racks	Heading																		
SRD-1249	3.1.1.6.1 The UWSS must include all mounting hardware and racks.	Mandatory																		
SRD-1311	3.1.1.7 Health Management	Heading																		
SRD-1444	Table of UWSS Health Management Monitored Elements	Mandatory																		
	<table border="1"> <thead> <tr> <th data-bbox="285 1184 1003 1306">Dynamic Parameters</th> <th data-bbox="1003 1184 1230 1306">Send Parameter to CMS 330</th> </tr> </thead> <tbody> <tr> <td data-bbox="285 1306 1003 1348">Status</td> <td data-bbox="1003 1306 1230 1348">Yes</td> </tr> <tr> <td data-bbox="285 1348 1003 1470">Sensor deployment status (i.e. HMS up/down, tow in/out, tow cable length, scope, and horizontal layback, etc.)</td> <td data-bbox="1003 1348 1230 1470">Yes</td> </tr> <tr> <td data-bbox="285 1470 1003 1512">Sensor power status (i.e. on/off)</td> <td data-bbox="1003 1470 1230 1512">Yes</td> </tr> <tr> <td data-bbox="285 1512 1003 1633">Sensor transmit/receive modes (i.e. transmitting/receiving, active/passive, frequencies, pulse widths, etc.)</td> <td data-bbox="1003 1512 1230 1633">Yes</td> </tr> <tr> <td data-bbox="285 1633 1003 1713">Hardware power status by system, by major component, and by subcomponents</td> <td data-bbox="1003 1633 1230 1713">Yes</td> </tr> <tr> <td data-bbox="285 1713 1003 1793">Software status (i.e. instantiated, loading, loaded, down, not loaded, re-loading, running, etc.)</td> <td data-bbox="1003 1713 1230 1793">Yes</td> </tr> <tr> <td data-bbox="285 1793 1003 1835">Operating mode</td> <td data-bbox="1003 1793 1230 1835">Yes</td> </tr> <tr> <td data-bbox="285 1835 1003 1864">Alignment - bearing, azimuth, elevation</td> <td data-bbox="1003 1835 1230 1864">Yes</td> </tr> </tbody> </table>	Dynamic Parameters	Send Parameter to CMS 330	Status	Yes	Sensor deployment status (i.e. HMS up/down, tow in/out, tow cable length, scope, and horizontal layback, etc.)	Yes	Sensor power status (i.e. on/off)	Yes	Sensor transmit/receive modes (i.e. transmitting/receiving, active/passive, frequencies, pulse widths, etc.)	Yes	Hardware power status by system, by major component, and by subcomponents	Yes	Software status (i.e. instantiated, loading, loaded, down, not loaded, re-loading, running, etc.)	Yes	Operating mode	Yes	Alignment - bearing, azimuth, elevation	Yes	
Dynamic Parameters	Send Parameter to CMS 330																			
Status	Yes																			
Sensor deployment status (i.e. HMS up/down, tow in/out, tow cable length, scope, and horizontal layback, etc.)	Yes																			
Sensor power status (i.e. on/off)	Yes																			
Sensor transmit/receive modes (i.e. transmitting/receiving, active/passive, frequencies, pulse widths, etc.)	Yes																			
Hardware power status by system, by major component, and by subcomponents	Yes																			
Software status (i.e. instantiated, loading, loaded, down, not loaded, re-loading, running, etc.)	Yes																			
Operating mode	Yes																			
Alignment - bearing, azimuth, elevation	Yes																			

ID		Requirement Type																																				
	<table border="1"> <tr> <td data-bbox="282 277 1003 317">User settings</td> <td data-bbox="1003 277 1230 317">No</td> </tr> <tr> <td data-bbox="282 317 1003 357">Interface status</td> <td data-bbox="1003 317 1230 357">Yes</td> </tr> <tr> <td data-bbox="282 357 1003 396">Location (software modules)</td> <td data-bbox="1003 357 1230 396">No</td> </tr> <tr> <td data-bbox="282 396 1003 436">Performance (including degradation)</td> <td data-bbox="1003 396 1230 436">Yes</td> </tr> <tr> <td data-bbox="282 436 1003 476">User Specified Thresholds</td> <td data-bbox="1003 436 1230 476">No</td> </tr> <tr> <td data-bbox="282 476 1003 558">Resource Usage - storage, bandwidth, CPU cycles, memory usage, etc.</td> <td data-bbox="1003 476 1230 558">No</td> </tr> <tr> <td data-bbox="282 558 1003 598">Error conditions</td> <td data-bbox="1003 558 1230 598">Yes</td> </tr> <tr> <td data-bbox="282 598 1003 638">User specified events</td> <td data-bbox="1003 598 1230 638">No</td> </tr> <tr> <td data-bbox="282 638 1003 720">User data - identification, user location (e.g. at which UWSS Operator Workstation), role</td> <td data-bbox="1003 638 1230 720">No</td> </tr> <tr> <td data-bbox="282 720 1003 842">Reply data, plot data, target tracking data, ping scheduler, antenna data, target environment statistics, remote command bus, and system status.</td> <td data-bbox="1003 720 1230 842">Yes</td> </tr> <tr> <td data-bbox="282 842 1003 882">Static Parameters</td> <td data-bbox="1003 842 1230 882"></td> </tr> <tr> <td data-bbox="282 882 1003 921">Purpose</td> <td data-bbox="1003 882 1230 921">No</td> </tr> <tr> <td data-bbox="282 921 1003 961">Location</td> <td data-bbox="1003 921 1230 961">No</td> </tr> <tr> <td data-bbox="282 961 1003 1043">Configuration management data - build, release, version, NATO Stock Number, etc.</td> <td data-bbox="1003 961 1230 1043">Yes</td> </tr> <tr> <td data-bbox="282 1043 1003 1083">Schematics</td> <td data-bbox="1003 1043 1230 1083">No</td> </tr> <tr> <td data-bbox="282 1083 1003 1123">Functional block diagrams</td> <td data-bbox="1003 1083 1230 1123">No</td> </tr> <tr> <td data-bbox="282 1123 1003 1163">Degradation impact – Operational</td> <td data-bbox="1003 1123 1230 1163">No</td> </tr> <tr> <td data-bbox="282 1163 1003 1203">Degradation impact – Technical</td> <td data-bbox="1003 1163 1230 1203">No</td> </tr> </table>	User settings	No	Interface status	Yes	Location (software modules)	No	Performance (including degradation)	Yes	User Specified Thresholds	No	Resource Usage - storage, bandwidth, CPU cycles, memory usage, etc.	No	Error conditions	Yes	User specified events	No	User data - identification, user location (e.g. at which UWSS Operator Workstation), role	No	Reply data, plot data, target tracking data, ping scheduler, antenna data, target environment statistics, remote command bus, and system status.	Yes	Static Parameters		Purpose	No	Location	No	Configuration management data - build, release, version, NATO Stock Number, etc.	Yes	Schematics	No	Functional block diagrams	No	Degradation impact – Operational	No	Degradation impact – Technical	No	
User settings	No																																					
Interface status	Yes																																					
Location (software modules)	No																																					
Performance (including degradation)	Yes																																					
User Specified Thresholds	No																																					
Resource Usage - storage, bandwidth, CPU cycles, memory usage, etc.	No																																					
Error conditions	Yes																																					
User specified events	No																																					
User data - identification, user location (e.g. at which UWSS Operator Workstation), role	No																																					
Reply data, plot data, target tracking data, ping scheduler, antenna data, target environment statistics, remote command bus, and system status.	Yes																																					
Static Parameters																																						
Purpose	No																																					
Location	No																																					
Configuration management data - build, release, version, NATO Stock Number, etc.	Yes																																					
Schematics	No																																					
Functional block diagrams	No																																					
Degradation impact – Operational	No																																					
Degradation impact – Technical	No																																					
SRD-1312	3.1.1.7.1 The UWSS must continuously monitor, display, control, and perform diagnostics on the health of the entire UWSS, under operator control.	Mandatory																																				
SRD-1313	3.1.1.7.2 The UWSS must shutdown UWSS systems, when commanded by UWSS HM, and under operator control.	Mandatory																																				
SRD-1314	3.1.1.7.3 The UWSS must restart UWSS systems, when commanded by UWSS HM, and under operator control.	Mandatory																																				
SRD-1315	3.1.1.7.4 The UWSS Health Management (HM) must monitor and report on, at minimum, the parameters identified in the table of UWSS Health Management Monitored Elements in Section 3.1.1.7 for UWSS systems in order to facilitate UWSS Health Management.	Mandatory																																				
SRD-1316	3.1.1.7.5 The UWSS HM must continuously manage dynamic parameter information as listed in the table of UWSS Health Management Monitored Elements in Section 3.1.1.7.	Mandatory																																				
SRD-	3.1.1.7.6 The UWSS HM must manage static parameter information as	Mandatory																																				

ID		Requirement Type
1317	listed in the table of UWSS Health Management Monitored Elements in Section 3.1.1.7.	
SRD-1318	3.1.1.7.7 The UWSS HM must detect all degradations and loss of UWSS capability indicated by the parameters identified in table of UWSS Health Management Monitored Elements in Section 3.1.1.7.	Mandatory
SRD-1319	3.1.1.7.8 The UWSS HM must generate an alert when UWSS HM detects degradation of UWSS capability.	Mandatory
SRD-1320	3.1.1.7.9 The UWSS HM must generate an alert when UWSS HM detects loss of UWSS capability.	Mandatory
SRD-1321	3.1.1.7.10 The UWSS HM must recommend actions to compensate for the degradation to maintain highest level of overall possible performance.	Mandatory
SRD-1322	3.1.1.7.11 The UWSS HM must ensure that the recommended actions for the degradation are not automatically implemented by UWSS HM unless the user accepts the recommended actions.	Mandatory
SRD-1323	3.1.1.7.12 The UWSS HM must implement the recommended actions for the degradation when the user accepts the recommended actions.	Mandatory
SRD-1324	3.1.1.7.13 The UWSS HM must cause UWSS to shutdown UWSS systems to prevent damage, under operator control.	Mandatory
SRD-1325	3.1.1.7.14 The UWSS HM must maintain, monitor, report, and display a system's availability report that includes the availability status of integrated systems, interfaces, software components, computer nodes, and hardware components, when selected by the user.	Mandatory
SRD-1326	3.1.1.7.15 The UWSS HM must assist the users to assess a Time-To-Failure for UWSS systems by generating assessments for computer nodes, hardware components, interfaces, and software components by determining their current uptime and predicting for the remaining time to failure.	Mandatory
SRD-1420	3.1.1.8 System Start-Up	Heading
SRD-1442	3.1.1.8.1 Cold-Boot	Heading
SRD-1421	3.1.1.8.1.1 A cold-boot will bring the system to a fully functional operational state. The functional operational state will be defined by default configuration settings. For TAPS, the tow may be in and ready to deploy, or already deployed when performing a cold-boot. For HMS, the transducer may be up and ready to lower or already down when performing a cold-boot.	Information
SRD-1422	3.1.1.8.1.2 The operators and technicians may choose to perform a cold-boot for initial system flash-up or when the system is already operating, as a method of ensuring the system is booted to a clean default state. If	Information

ID		Requirement Type
	equipment is already powered on, cold-boot will include power cycling all equipment.	
SRD-1443	3.1.1.8.2 Warm-Boot	Heading
SRD-1423	3.1.1.8.2.1 A warm-boot will bring the system to a fully functional operational state. The functional operational state will include recovery of the tactical picture and all configuration, functional, and operational settings based on what it was immediately prior to the warm-boot or immediately prior to last time the UWSS was operating. Each UWSS operator workstation will re-instate its display configuration to the last one in effect.	Information
SRD-1424	3.1.1.8.2.2 The operators and technicians may choose to perform a warm-boot for initial system flash-up or when the system is already operating, as a method of returning the system to its last operational state. The operators and technicians may also choose to perform a warm-boot after power loss, as a method of ensuring the state of the system is re-instated as it was immediately prior to the power loss.	Information
SRD-1425	3.1.1.8.3 Once all UWSS equipment is fully powered on from a full power off state, the UWSS must start up using either the cold-boot method or the warm-boot method as selected by the user.	Mandatory
SRD-1426	3.1.1.8.4 Once all UWSS equipment is fully powered on, the only user action to continue start-up of the UWSS must be a single user selection of the start-up method.	Mandatory
SRD-1427	3.1.1.8.5 On start-up, the UWSS must display the progress of the initialization of each UWSS system.	Mandatory
SRD-1428	3.1.1.8.6 From a fully powered off state, the UWSS must complete all required configuration, initialization, and flash-up of systems to a fully functional operational state, including selection and execution of cold-boot or warm-boot methods, in no more than 15 minutes.	Mandatory
SRD-1429	3.1.1.8.7 Cold-Boot Method	Heading
SRD-1430	3.1.1.8.7.1 When the cold-boot method is selected, the UWSS must initialize the systems utilizing the default configuration settings.	Mandatory
SRD-1431	3.1.1.8.7.2 From a fully functional operational powered on state, selection of the cold-boot method must result in all UWSS equipment being power cycled off, re-booted and completing all required cold-boot configuration, initialization and flash-up of systems to a fully functional operational state in no more than 15 minutes.	Mandatory
SRD-1432	3.1.1.8.8 Warm-Boot Method	Heading
SRD-	3.1.1.8.8.1 When the warm-boot method is selected, the UWSS must	Mandatory

ID		Requirement Type
1433	initialize the systems to the last configured state immediately prior to selection of the warm-boot or immediately prior to the last time the system was operating.	
SRD-1434	3.1.1.8.8.2 From a fully functional operational powered on state, selection of the warm-boot method must result in the UWSS being re-booted and completing all required warm-boot re-configuration and re-initialization to a fully functional operational state in no more than 5 minutes.	Mandatory
SRD-1435	3.1.1.8.8.3 When the warm-boot method is selected, the UWSS must restore the tactical picture to the last state immediately prior to warm-boot or immediately prior to the last time the system was operating.	Mandatory
SRD-1436	3.1.1.8.8.4 When the warm-boot method is selected, the UWSS must restore each operator workstation in its display configuration last in effect.	Mandatory
SRD-1437	3.1.1.9 System Shutdown	Heading
SRD-1438	3.1.1.9.1 The UWSS must shutdown UWSS systems, as requested by the user.	Mandatory
SRD-1439	3.1.1.9.2 The UWSS must shutdown UWSS systems, when commanded by UWSS HM.	Mandatory
SRD-1440	3.1.1.9.3 During operation, the UWSS must frequently save all system data required for warm-boot, in case of inadvertent shutdown or power loss.	Mandatory
SRD-1441	3.1.1.9.4 On shutdown, the UWSS must display the progress of the shutdown of each UWSS system.	Mandatory
SRD-587	3.1.2 Shore Systems	Heading
SRD-592	3.1.2.1 The UWSSs must come supplied with all necessary ancillary hardware, software and documentation, and applicable upgrades, to provide support for the UWSS, including:	Mandatory
SRD-593	(a) two (2) systems for maintenance at the Fleet Maintenance Facilities in full accordance with SRD Section 3.12;	Mandatory
SRD-594	(b) one (1) system for Halifax-class Combat Systems software support at the Combat Systems Support Center (East) (CSSC(E)) in full accordance with SRD Section 3.13;	Mandatory
SRD-598	(c) one (1) system for post mission analysis at the Acoustic Data Analysis Center (ADAC) in full accordance with SRD Section 3.11; and	Mandatory
SRD-595	(d) two (2) systems for the training of maintainers at the Halifax-class Maintenance Procedures Trainers (MPT) in full accordance with SRD Section 3.10.4.	Mandatory

ID		Requirement Type
SRD-597	3.1.2.2 The RCN's future Multi-Purpose Reconfigurable Trainer (MRT) for shore-based Operator Training is described in the Future Naval Training System Strategy, A-PD-050-000/AG-003.	Information
SRD-596	3.1.2.3 UWSS software source code and documentation must be provided in preparation for a future adaptation for shore-based Operator Training within future MRT systems.	Mandatory
SRD-1250	3.1.2.4 The UWSS must include all mounting hardware and racks.	Mandatory
SRD-1461	3.1.2.5 The UWSS must meet the System Security Requirements specified in Section 4.3 of this SRD.	Mandatory
SRD-86	3.2 Overall Performance Requirements	Heading
SRD-864	3.2.1 General Performance Requirements	Heading
SRD-655	3.2.1.1 The UWSS must provide detection, classification, localization and tracking of submarine and torpedo threats.	Mandatory
SRD-867	3.2.1.2 The UWSS should provide detection, classification, and localization of mine threats.	Desirable
SRD-743	3.2.1.3 The detection, classification, localization and tracking of these threats must be accomplished simultaneously with one and more of the USCs.	Mandatory
SRD-868	3.2.1.4 The spectral self-noise and flow noise of all active and passive receive USCs must not exceed that necessary to meet the overall performance requirements of the UWSS.	Mandatory
SRD-875	3.2.1.5 For the following Performance Requirements, Detection Range is defined as that range where the Signal Excess (SE) drops permanently below 0 dB. Drop-outs in SE less than 0.5 km in range extent may be ignored.	Information
SRD-876	3.2.1.6 Signal Excess is defined as the difference in decibels between target signal/echo received sound pressure level and the sum of total noise and reverberation levels minus a Detection Threshold determined by signal processing considerations. This must be based on the use of a Detection Threshold calculated using Swerling II statistical models with Probability of Detection (P_d) = 50% and a Probability of False Alarm (P_{fa}) = 0.01%. The Detection Threshold must include processing gain, array gain, and quantitative HMI recognition differentials. This is only applicable outside of short-range (< 0.5 km) vertical beam pattern effects.	Information
SRD-861	3.2.2 Performance Requirements against Submarines	Heading
SRD-	3.2.2.1 The UWSS must perform detection, classification, localization and	Mandatory

ID		Requirement Type
79	tracking of submarines defined by the following characteristics:	
SRD-656	(a) an active sonar target strength of no greater than \$SUB_TARGET_STRENGTH_MF_DB\$ dB in the frequency range of \$SUB_TARGET_STRENGTH_MF_FREQ\$ Hz;	Mandatory
SRD-1050	(b) an active sonar target strength of no greater than \$SUB_TARGET_STRENGTH_LF_DB\$ dB in the frequency range of \$SUB_TARGET_STRENGTH_LF_FREQ\$ Hz;	Mandatory
SRD-658	(c) a broadband radiated noise signature of no greater than \$SUB_BB_RAD_NOISE_DB\$ dB re 1 $\mu\text{Pa}^2/\text{Hz}$ at 1 meter at all frequencies from \$SUB_BB_RAD_NOISE_FMIN\$ Hz to \$SUB_BB_RAD_NOISE_FMAX\$ Hz;	Mandatory
SRD-659	(d) a narrowband radiated noise signature of no greater than \$SUB_NB_RAD_NOISE_DB\$ dB re 1 μPa at 1 meter at a frequency of \$SUB_NB_RAD_NOISE_FREQ1\$ Hz;	Mandatory
SRD-1175	(e) a narrowband radiated noise signature of no greater than \$SUB_NB_RAD_NOISE_DB\$ dB re 1 μPa at 1 meter at a frequency of \$SUB_NB_RAD_NOISE_FREQ2\$ Hz; and	Mandatory
SRD-660	(f) a maximum speed of \$MAX_SUB_SPEED\$ knots.	Mandatory
SRD-665	3.2.2.2 The UWSS must detect the above defined submarine threat at a range of no less than \$SUB_DETECT_RANGE\$ km, at every bearing relative to the ship, using the definition of Detection Range as specified in paragraphs 3.2.1.5 and 3.2.1.6.	Mandatory
SRD-863	3.2.2.3 The UWSS submarine Doppler estimation capabilities must accommodate submarine speeds from zero (0) to \$MAX_SUB_SPEED\$ knots.	Mandatory
SRD-866	3.2.2.4 The UWSS should provide software and tools for automated submarine detection with false alarm rates of no more than \$UWW_AUTO_DCLT_FAR\$ per hour.	Desirable
SRD-89	3.2.2.5 The UWSS must provide software and tools to perform operator assist for target detection, classification, localization and tracking of these threats.	Mandatory
SRD-844	3.2.2.6 The UWSS should meet the above submarine detection requirements in all environments and under all of the conditions defined in paragraphs 3.1.1.1.3 and 3.1.1.1.4.	Desirable
SRD-744	3.2.2.7 The UWSS must meet the above submarine detection requirements while underway at all ship's speeds of 15 knots and less.	Mandatory
SRD-862	3.2.3 Performance Requirements against Torpedoes	Heading
SRD-85	3.2.3.1 The UWSS must perform detection, classification, localization and tracking of torpedoes defined by the following characteristics:	Mandatory

ID		Requirement Type
SRD-661	(a) an active sonar target strength of no greater than \$TORP_TARGET_STRENGTH_DB\$ dB in the frequency range of \$TORP_TARGET_STRENGTH_FREQ\$ Hz;	Mandatory
SRD-662	(b) a broadband radiated noise signature of no greater than \$TORP_BB_RAD_NOISE_DB\$ dB re 1 $\mu\text{Pa}^2/\text{Hz}$ at 1 meter at all frequencies from \$TORP_BB_RAD_NOISE_FMIN\$ Hz to \$TORP_BB_RAD_NOISE_FMAX\$ Hz;	Mandatory
SRD-663	(c) a narrowband radiated noise signature of no greater than \$TORP_NB_RAD_NOISE_DB\$ dB re 1 μPa at 1 meter at a frequency of \$TORP_NB_RAD_NOISE_FREQ\$ Hz; and	Mandatory
SRD-664	(d) a maximum speed of \$MAX_TORP_SPEED\$ knots.	Mandatory
SRD-666	3.2.3.2 The UWSS must detect the above defined torpedo threat at a range of no less than \$TORP_DETECT_RANGE\$ km, at every bearing relative to the ship, using the definition of Detection Range as specified in paragraphs 3.2.1.5 and 3.2.1.6.	Mandatory
SRD-334	3.2.3.3 The UWSS torpedo Doppler estimation capabilities must accommodate torpedo speeds from zero (0) to \$MAX_TORP_SPEED\$ knots.	Mandatory
SRD-561	3.2.3.4 The UWSS should provide software and tools for automated torpedo detection with false alarm rates of no more than \$UWW_AUTO_DCLT_FAR\$ per hour.	Desirable
SRD-1102	3.2.3.5 The UWSS automated torpedo detection must disregard the operation of the ship's echo sounder.	Mandatory
SRD-853	3.2.3.6 The UWSS should meet the above torpedo detection requirements in all environments and under all of the conditions defined in paragraphs 3.1.1.1.3 and 3.1.1.1.4.	Desirable
SRD-877	3.2.3.7 The UWSS must meet the above torpedo detection requirements while underway at all ship's speeds of 15 knots and less.	Mandatory
SRD-1054	3.2.4 Performance Requirements against Torpedo Active Sonar	Heading
SRD-1056	3.2.4.1 The UWSS must detect torpedo active sonar and determine the angle-of-arrival of Continuous Wave (CW) active sonar pulses with frequencies between \$TORP_HOMING_SONAR_FMIN\$ Hz and \$TORP_HOMING_SONAR_FMAX\$ Hz, with a pulse duration no less than 50 ms duration with received Sound Pressure Level no greater than 80 dB re 1 μPa to an accuracy (± 1 standard deviation) no greater than $\pm 5^\circ$ over all azimuth angles.	Mandatory
SRD-1055	3.2.4.2 The UWSS should provide software and tools for automated detection of torpedo active sonar with false alarm rates of no more than \$TORSIC_AUTO_DCLT_FAR\$ per hour.	Desirable

ID		Requirement Type
SRD-865	3.2.5 Performance Requirements against Mines	Heading
SRD-667	3.2.5.1 The UWSS should provide detection and localization of moored midwater mines defined by the following characteristics:	Desirable
SRD-668	(a) an active sonar target strength of no greater than \$MINE_TARGET_STRENGTH_DB\$ dB at a frequency of \$MINE_TARGET_STRENGTH_FREQ\$ Hz; and	Desirable
SRD-669	(b) a moored depth of \$MINE_DEPTH\$ m.	Desirable
SRD-672	3.2.5.2 The UWSS should detect the above defined mine threat at a range of no less than \$MINE_DETECT_RANGE\$ meters in the forward sector of the ship no less than +/- 45 degrees relative to ship's heading, using the definition of Detection Range as specified in paragraphs 3.2.1.5 and 3.2.1.6.	Desirable
SRD-674	3.2.5.3 The UWSS should provide software and tools for automated mine detection with false alarm rates of no more than \$MINE_AUTO_DETECT_FAR\$ occurrences per hour.	Desirable
SRD-870	3.2.5.4 The UWSS should meet the above mine detection requirements in all environments and under all of the conditions defined in paragraphs 3.1.1.1.3 and 3.1.1.1.4.	Desirable
SRD-878	3.2.5.5 The UWSS should meet the above mine detection requirements while underway at all ship's speeds of 6 knots and less.	Desirable
SRD-1132	3.2.6 Performance Requirements for Submarine Search and Rescue	Heading
SRD-1133	3.2.6.1 The UWSS must detect and localize the Submarine Locating Acoustic Beacon (SLAB) of Victoria-class and other NATO submarines as defined in the standard STANAG 1382 for Submarine Search-and-Rescue (SubSAR) operations.	Mandatory
SRD-1134	3.2.6.2 The UWSS must meet the above SubSAR requirements without utilization of the towed systems.	Mandatory
SRD-1464	3.2.7 Performance Requirements for Transient Detection	Heading
SRD-1465	3.2.7.1 The UWSS must detect and localize acoustic transients that occur in the passive frequency ranges of the USCs that comprise the UWSS.	Mandatory
SRD-1478	3.2.7.2 The UWSS must provide bearing estimation to the source of detected acoustic transients consistent with the capabilities of the passive USC which made the detection.	Mandatory
SRD-1466	3.2.7.3 The UWSS should provide estimates of range to the source of detected acoustic transients.	Desirable
SRD-1467	3.2.8 Performance Requirements for Marine Mammal Detection	Heading

ID		Requirement Type
SRD-1468	3.2.8.1 The UWSS must detect and localize Marine Mammal vocalizations that occur in the passive frequency ranges of the USCs that comprise the UWSS.	Mandatory
SRD-1479	3.2.8.2 The UWSS must provide bearing estimation to the source of detected Marine Mammal vocalizations consistent with the capabilities of the passive USC which made the detection.	Mandatory
SRD-1469	3.2.8.3 The UWSS should provide estimates of range to the source of detected Marine Mammal vocalizations.	Desirable
SRD-90	3.3 Hull Mounted Sonar System Requirements	Heading
SRD-233	3.3.1 General	Heading
SRD-93	3.3.1.1 The HMS USC must include all software and hardware components necessary to meet the requirements of this SRD, including transducers, handling and stowage systems (frame and hoisting mechanisms), transmitter and receiver electronics, processing systems, interfaces and cabling.	Mandatory
SRD-95	3.3.1.2 The HMS USC may make use of the legacy AN/SQS-510 Single Element Transducers (SETs).	Optional
SRD-1306	3.3.1.3 The HMS USC must not make use of the legacy AN/SQS-510 SETs in their current state.	Mandatory
SRD-1307	3.3.1.4 The legacy AN/SQS-510 SETs, if reused, must be fully refurbished or replaced with equivalents, as necessary, and successfully passed performance testing and certification in order to meet all requirements as defined in this SRD, without the need for SET performance waivers.	Mandatory
SRD-96	3.3.1.5 The HMS USC may make use of the legacy AN/SQS-510 handling equipment, including hoisting mechanism.	Optional
SRD-1094	3.3.1.6 The HMS USC must retain the current capability to hoist the array frame out of the C5 sonar dome.	Mandatory
SRD-767	3.3.1.7 The HMS USC must implement an Underwater Telephone blanking signal during active transmissions.	Mandatory
SRD-768	3.3.1.8 The HMS USC must implement active transmission inhibit that prevent active transmissions from occurring while HMS transducers are above the waterline due to ship's pitch and roll.	Mandatory
SRD-772	3.3.2 HMS Passive Sonar Performance	Heading
SRD-100	3.3.2.1 The HMS USC must perform passive sonar operation in the range \$HMS_PSV_RCV_FMIN\$ Hz to \$HMS_PSV_RCV_FMAX\$ Hz.	Mandatory
SRD-771	3.3.2.2 The HMS USC must perform passive sonar operation simultaneously with HMS active sonar operation, in the intervals between active transmissions.	Mandatory

ID		Requirement Type
SRD-1096	3.3.2.3 The HMS USC passive sonar operation must continue to operate without clipping and without saturation during active sonar transmissions by consort ships and other active sonar sources, with a received sound pressure level of \$CONSORT_MAX_SPL\$ dB re 1 µPa for all source frequencies between \$HMS_PSV_RCV_FMIN\$ Hz to \$HMS_PSV_RCV_FMAX\$ Hz.	Mandatory
SRD-773	3.3.3 HMS Active Transmit Performance	Heading
SRD-101	3.3.3.1 The HMS USC must perform active sonar transmit operation in the range \$HMS_XMIT_FMIN\$ Hz to \$HMS_XMIT_FMAX\$ Hz.	Mandatory
SRD-698	3.3.3.2 The HMS USC active sonar transmit operation must have an on-axis Source Level of no less than \$HMS_XMIT_MIN_SL\$ dB re 1 µPa at 1 meter, omnidirectional in the horizontal plane.	Mandatory
SRD-1051	3.3.3.3 The HMS USC active sonar transmit must have a bandwidth of no less than \$HMS_XMIT_BANDWIDTH\$ Hz.	Mandatory
SRD-769	3.3.3.4 The HMS USC active sonar transmit power settings must perform selection by the operator from full power to -20 dB relative to full power.	Mandatory
SRD-770	3.3.3.5 The HMS USC active sonar transmit power settings must be selectable by the operator in increments of no greater than 3 dB relative to the lowest power setting.	Mandatory
SRD-754	3.3.3.6 The HMS USC active sonar transmit operation must implement the legacy AN/SQS-510 omni-directional, wide-directional, and narrow-directional transmission modes.	Mandatory
SRD-776	3.3.3.7 The HMS USC active sonar transmit function must perform pulsed operation at full power with a duty cycle from zero (0) to \$HMS_XMIT_DUTYCYCLE\$ percent.	Mandatory
SRD-777	3.3.3.8 The HMS USC must perform continuous full power transmission at the maximum duty cycle for no less than 120 hours without damage.	Mandatory
SRD-755	3.3.3.9 The HMS USC active sonar transmit must perform pulsed operation with pulse lengths between a minimum of \$HMS_XMIT_MIN_PULSE_LEN\$ seconds and a maximum of \$HMS_XMIT_MAX_PULSE_LEN\$ seconds, as selected by the operator.	Mandatory
SRD-756	3.3.3.10 The HMS USC active sonar transmit function must perform operator modification of pulse lengths without interruption of the transmission cycle.	Mandatory
SRD-112	3.3.3.11 The HMS USC active sonar transmit must perform pulsed operation with intervals between pulses between a minimum of \$HMS_XMIT_MIN_PULSE_INT\$ seconds and a maximum of \$HMS_XMIT_MAX_PULSE_INT\$ seconds, as selected by the operator.	Mandatory
SRD-757	3.3.3.12 The HMS USC active sonar transmit function must perform operator modification of pulse intervals without interruption of the	Mandatory

ID		Requirement Type
	transmission cycle.	
SRD-111	3.3.3.13 The HMS USC active sonar transmit function must perform single pulsed operation as selected and controlled by the operator.	Mandatory
SRD-758	3.3.3.14 The waveforms of the HMS USC active sonar transmit function must be definable and selectable by the operator.	Mandatory
SRD-759	3.3.3.15 The HMS USC active sonar transmit capability must include the following predefined waveforms, selectable by the operator:	Mandatory
SRD-760	(a) Continuous Wave (CW);	Mandatory
SRD-761	(b) Linear Frequency Modulated (FM); and	Mandatory
SRD-762	(c) Hyperbolic Frequency Modulated (HFM).	Mandatory
SRD-1453	3.3.3.16 The HMS USC active sonar must include the capability for the definition, transmission and processing of custom waveforms as developed and introduced through a controlled change process.	Mandatory
SRD-763	3.3.3.17 The HMS USC active sonar transmit capability must utilize custom waveforms, under operator control.	Mandatory
SRD-764	3.3.3.18 The HMS USC must define, load, and store in persistent storage no less than ten (10) operator defined waveforms, under operator control.	Mandatory
SRD-765	3.3.3.19 The waveforms of the HMS USC active sonar transmit must be transmitted with and without cosine-squared amplitude shading, as selected by the operator.	Mandatory
SRD-766	3.3.3.20 The HMS USC active transmit capability should support other amplitude shading formulas in addition to cosine-squared, as selected by the operator.	Desirable
SRD-774	3.3.4 HMS Active Receive Performance	Heading
SRD-775	3.3.4.1 The HMS USC must perform active sonar receive operation in the range \$HMS_XMIT_FMIN\$ Hz to \$HMS_XMIT_FMAX\$ Hz.	Mandatory
SRD-1454	3.3.4.2 The HMS USC active sonar receive capability must process all waveforms capable of being transmitted by the HMS USC.	Mandatory
SRD-1052	3.3.4.3 The HMS USC must perform active sonar receive operation with a horizontal beamwidth of no greater than \$HMS_RCV_BEAM_HORIZ_MAX\$ degrees.	Mandatory
SRD-1053	3.3.4.4 The HMS USC must perform active sonar receive operation with a vertical beamwidth of no greater than \$HMS_RCV_BEAM_VERT_MAX\$ degrees.	Mandatory
SRD-778	3.3.4.5 The HMS USC must have a target range accuracy of +/- 2% root-mean-square (rms) or better at ranges from zero (0) to 50 kilometers.	Mandatory

ID		Requirement Type
SRD-779	3.3.4.6 The HMS USC must have a target Doppler accuracy of +/- 2 knots rms or better at target speeds from zero (0) to \$MAX_TORP_SPEED\$ knots.	Mandatory
SRD-1105	3.3.4.7 The HMS USC active receive operation must continue to operate without clipping and without saturation during active sonar transmissions by consort ships and other active sonar sources, with a received sound pressure level of \$CONSORT_MAX_SPL\$ dB re 1 µPa for all source frequencies between \$HMS_XMIT_FMIN\$ Hz to \$HMS_XMIT_FMAX\$ Hz.	Mandatory
SRD-1303	3.3.5 Underwater Telephone Interface	Heading
SRD-1304	3.3.5.1 The HMS USC must include a hardware and software interface to the Underwater Telephone, as necessary in order to meet the requirements of this SRD.	Mandatory
SRD-1305	3.3.5.2 The hardware and software interface to the Underwater Telephone must send and receive signals to the extent permitted by the "INTERFACE CONTROL DOCUMENT (ICD) TUUM-6 UNDERWATER TELEPHONE FOR HALIFAX CLASS FRIGATES", as necessary in order to meet the requirements of this SRD.	Mandatory
SRD-1496	3.3.5.3 The HMS USC must process the signals that are passed from the Underwater Telephone interface, as necessary in order to meet the requirements of this SRD.	Mandatory
SRD-1497	3.3.5.4 The HMS USC must display the signals that are passed from the Underwater Telephone interface.	Mandatory
SRD-97	3.4 Towed Active Passive Sonar System Requirements	Heading
SRD-239	3.4.1 General	Heading
SRD-98	3.4.1.1 The TAPS USC must comprise all software and hardware components necessary to meet the requirements of this SRD, including hydrophone arrays, preamplifiers, non-acoustic sensors, transducers, data telemetry, vibration isolation, tow cables, rope drogue, stowage and handling systems, signal generation, transmitter and receiver electronics, power supplies, interfaces and associated cabling.	Mandatory
SRD-241	3.4.2 TAPS Passive Sonar Performance	Heading
SRD-99	3.4.2.1 The TAPS USC must perform passive sonar operation in the range \$TAPS_PSV_FMIN_FREQ\$ Hz to \$TAPS_PSV_FMAX_FREQ\$ Hz.	Mandatory
SRD-871	3.4.2.2 The TAPS USC should perform passive sonar operation in the range \$TAPS_PSV_VLF_FMIN_FREQ\$ Hz to \$TAPS_PSV_VLF_FMAX_FREQ\$ Hz.	Desirable

ID		Requirement Type
SRD-613	3.4.2.3 The TAPS USC passive receive system must have a minimum of 110 dB dynamic range over the range \$TAPS_PSV_FMIN_FREQ\$ Hz to \$TAPS_PSV_FMAX_FREQ\$ Hz.	Mandatory
SRD-616	3.4.2.4 The TAPS USC passive receive system must have unobstructed acoustic reception in the horizontal plane from forward end-fire to aft end-fire.	Mandatory
SRD-617	3.4.2.5 The TAPS USC passive receive must have no greater than \$TAPS_PSV_FMIN_BEAM\$ degrees beamwidth at \$TAPS_PSV_FMIN_FREQ\$ Hz and no greater than \$TAPS_PSV_FMAX_BEAM\$ degrees beamwidth at \$TAPS_PSV_FMAX_FREQ\$ Hz, 90 degrees broadside to the array, where the beamwidth is defined by the -3 dB points.	Mandatory
SRD-618	3.4.2.6 The TAPS USC passive receive beam side-lobes must not exceed -15 dB relative to the main lobe for all frequencies between \$TAPS_PSV_FMIN_FREQ\$ Hz and \$TAPS_PSV_FMAX_FREQ\$ Hz.	Mandatory
SRD-619	3.4.2.7 The TAPS USC passive sonar operation must continue to operate during active sonar transmissions by either the TAPS USC or the HMS USC.	Mandatory
SRD-1024	3.4.2.8 The TAPS USC passive sonar operation should maintain tracking of targets during ship manoeuvres at all ship speeds less than \$SHIP_TOW_MAX_SPEED\$ knots.	Desirable
SRD-626	3.4.2.9 In the event of saturation or clipping of the passive receive array by active sonar transmission, the TAPS USC passive sonar operation must return to normal operation within 25 milliseconds following the end of the transmission.	Mandatory
SRD-745	3.4.2.10 The TAPS USC passive sonar operation must continue to operate without clipping and without saturation during active sonar transmissions by consort ships and other active sonar sources, with a received sound pressure level of \$CONSORT_MAX_SPL\$ dB re 1 µPa for all source frequencies between 1.0 KHz and 3.0 KHz.	Mandatory
SRD-614	3.4.3 TAPS Active Sonar Performance	Heading
SRD-637	3.4.3.1 Low Frequency Active Sonar Transmit	Heading
SRD-103	3.4.3.1.1 The TAPS USC must perform LFA active sonar transmit operation in the range \$TAPS_LFA_XMIT_FMIN_FREQ\$ Hz to \$TAPS_LFA_XMIT_FMAX_FREQ\$ Hz.	Mandatory
SRD-1457	3.4.3.1.2 The TAPS USC may perform active sonar transmit operation outside the range \$TAPS_LFA_XMIT_FMIN_FREQ\$ Hz to \$TAPS_LFA_XMIT_FMAX_FREQ\$ Hz.	Optional
SRD-	3.4.3.1.3 The TAPS USC LFA active transmit bandwidth must be no less	Mandatory

ID		Requirement Type
883	than 20% of the center frequency of the transmit pulse.	
SRD-884	3.4.3.1.4 The TAPS USC LFA active transmit bandwidth should be no less than 50% of the center frequency of the transmit pulse.	Desirable
SRD-753	3.4.3.1.5 The TAPS USC LFA active sonar transmit operation must have an on-axis Source Level of no less than \$TAPS_LFA_XMIT_MIN_SL\$ dB re 1 µPa at 1 meter.	Mandatory
SRD-699	3.4.3.1.6 The TAPS USC LFA active sonar transmit function must meet overall LFA active sonar performance requirements at all depths 30m or greater without damage from acoustic cavitation.	Mandatory
SRD-700	3.4.3.1.7 The TAPS USC LFA active sonar transmit must automatically protect against self-damage from acoustic cavitation.	Mandatory
SRD-701	3.4.3.1.8 The TAPS USC LFA active sonar transmit function must perform full power transmit at depths up to 300 meters.	Mandatory
SRD-710	3.4.3.1.9 The TAPS USC LFA active sonar transmit power settings must perform selection by the operator from full power to -20 dB relative to full power.	Mandatory
SRD-714	3.4.3.1.10 The TAPS USC LFA active sonar transmit power settings must be selectable by the operator in increments of no greater than 3 dB relative to the lowest power setting.	Mandatory
SRD-702	3.4.3.1.11 The TAPS USC LFA active sonar transmit must perform pulsed operation at full power with a duty cycle from zero (0) to \$TAPS_LFA_XMIT_DUTYCYCLE\$ percent.	Mandatory
SRD-747	3.4.3.1.12 The TAPS USC LFA must meet overall LFA active sonar performance requirements at depths greater than 30 meters at the maximum duty cycle for no less than 120 hours without damage.	Mandatory
SRD-705	3.4.3.1.13 The TAPS USC LFA active sonar transmit must perform pulsed operation with pulse lengths between a minimum of \$TAPS_LFA_XMIT_MIN_PULSE_LEN\$ seconds and a maximum of \$TAPS_LFA_XMIT_MAX_PULSE_LEN\$ seconds, as selected by the operator.	Mandatory
SRD-706	3.4.3.1.14 The TAPS USC LFA active sonar transmit function must perform operator modification of pulse lengths without interruption of the transmission cycle.	Mandatory
SRD-707	3.4.3.1.15 The TAPS USC LFA active sonar transmit must perform pulsed operation with intervals between pulses between a minimum of \$TAPS_LFA_XMIT_MIN_PULSE_INT\$ seconds and a maximum of \$TAPS_LFA_XMIT_MAX_PULSE_INT\$ seconds, as selected by the operator.	Mandatory
SRD-708	3.4.3.1.16 The TAPS USC LFA active sonar transmit function must perform operator modification of pulse intervals without interruption of the transmission cycle.	Mandatory

ID		Requirement Type
SRD-709	3.4.3.1.17 The TAPS USC LFA active sonar transmit function must perform single pulsed operation as selected and controlled by the operator.	Mandatory
SRD-703	3.4.3.1.18 The waveforms of the TAPS USC LFA active sonar transmit function must be definable and selectable by the operator.	Mandatory
SRD-715	3.4.3.1.19 The TAPS USC LFA active sonar transmit capability must include the following predefined waveforms, selectable by the operator:	Mandatory
SRD-716	(a) Continuous Wave (CW);	Mandatory
SRD-717	(b) Linear Frequency Modulated (FM); and	Mandatory
SRD-718	(c) Hyperbolic Frequency Modulated (HFM).	Mandatory
SRD-1455	3.4.3.1.20 The TAPS USC LFA active sonar must include the capability for the definition, transmission and processing of custom waveforms as developed and introduced through a controlled change process.	Mandatory
SRD-720	3.4.3.1.21 The TAPS USC LFA active sonar transmit capability must utilize custom waveforms, under operator control.	Mandatory
SRD-721	3.4.3.1.22 The TAPS USC must define, load, and store in persistent storage no less than ten (10) operator defined waveforms, under operator control.	Mandatory
SRD-704	3.4.3.1.23 The waveforms of the TAPS USC LFA active sonar transmit must be transmitted with and without cosine-squared amplitude shading, as selected by the operator.	Mandatory
SRD-719	3.4.3.1.24 The TAPS USC LFA active transmit capability should support other amplitude shading formulas in addition to cosine-squared, as selected by the operator.	Desirable
SRD-638	3.4.3.2 Low Frequency Active Receive	Heading
SRD-620	3.4.3.2.1 The TAPS USC must perform LFA active sonar receive operation in the range \$TAPS_LFA_RCV_FMIN_FREQ\$ Hz to \$TAPS_LFA_RCV_FMAX_FREQ\$ Hz.	Mandatory
SRD-1456	3.4.3.2.2 The TAPS USC active sonar LFA receive capability must process all waveforms capable of being transmitted by the TAPS USC.	Mandatory
SRD-621	3.4.3.2.3 The TAPS USC LFA active sonar receive system must have a minimum of 110 dB dynamic range over the range in the range \$TAPS_LFA_RCV_FMIN_FREQ\$ Hz to \$TAPS_LFA_RCV_FMAX_FREQ\$ Hz.	Mandatory
SRD-631	3.4.3.2.4 The TAPS USC LFA active sonar receive system must have unobstructed acoustic reception in the horizontal plane from forward end-fire to aft end-fire.	Mandatory
SRD-	3.4.3.2.5 The TAPS USC LFA active sonar receive capability must be	Mandatory

ID		Requirement Type
104	directional to provide port-starboard ambiguity resolution of no less than 10 dB over the range \$TAPS_LFA_RCV_FMIN_FREQ\$ Hz to \$TAPS_LFA_RCV_FMAX_FREQ\$ Hz.	
SRD-623	3.4.3.2.6 The TAPS USC LFA active receive must have no greater than \$TAPS_LFA_RCV_FMIN_BEAM\$ degrees beamwidth at \$TAPS_LFA_RCV_FMIN_FREQ\$ Hz and no greater than \$TAPS_LFA_RCV_FMAX_BEAM\$ degrees beamwidth at \$TAPS_LFA_RCV_FMAX_FREQ\$ Hz, where the beamwidth is defined by the -3 dB points.	Mandatory
SRD-624	3.4.3.2.7 The TAPS USC LFA active receive beam side-lobes must not exceed -15 dB relative to the main lobe for all frequencies between \$TAPS_LFA_RCV_FMIN_FREQ\$ Hz to \$TAPS_LFA_RCV_FMAX_FREQ\$ Hz.	Mandatory
SRD-625	3.4.3.2.8 The TAPS USC LFA active receive capability must have bandwidth to measure Doppler shifting for targets from zero (0) to +/- \$MAX_SUB_SPEED\$ knots, corrected for ownship relative motion, where \$SHIP_TOW_MAX_SPEED\$ knots is the maximum ownship towing speed.	Mandatory
SRD-627	3.4.3.2.9 The TAPS USC LFA active receive sonar operation must continue to operate during active sonar transmissions by either the TAPS USC or the HMS USC.	Mandatory
SRD-1025	3.4.3.2.10 The TAPS USC active receive sonar operation must maintain tracking of targets during ship manoeuvres at all ship speeds less than \$SHIP_TOW_MAX_SPEED\$ knots.	Mandatory
SRD-628	3.4.3.2.11 In the event of saturation or clipping of the LFA active receive array by active sonar transmission, the TAPS USC LFA active receive sonar operation must return to normal operation within 25 milliseconds following the end of the transmission.	Mandatory
SRD-746	3.4.3.2.12 The TAPS USC LFA active receive sonar operation must continue to operate without clipping and without saturation during active sonar transmissions by consort ships and other active sonar sources with a received sound pressure level of \$CONSORT_MAX_SPL\$ dB re 1 µPa for all source frequencies between 1.0 KHz and 3.0 KHz.	Mandatory
SRD-639	3.4.3.3 Medium Frequency Active Receive	Heading
SRD-622	3.4.3.3.1 The TAPS USC should perform Medium Frequency (MF) active sonar receive operation in the range \$TAPS_MF_RCV_FMIN_FREQ\$ Hz to \$TAPS_MF_RCV_FMAX_FREQ\$ Hz for the purpose of ownship bistatic sonar operation with the HMS USC.	Desirable
SRD-630	3.4.3.3.2 The TAPS USC MF active sonar receive system should have a minimum of 110 dB dynamic range over the range in the range \$TAPS_MF_RCV_FMIN_FREQ\$ Hz to \$TAPS_MF_RCV_FMAX_FREQ\$ Hz.	Desirable
SRD-	3.4.3.3.3 The TAPS USC MFA active sonar receive system should have	Desirable

ID		Requirement Type
632	unobstructed acoustic reception in the horizontal plane from forward end-fire to aft end-fire.	
SRD-633	3.4.3.3.4 The TAPS USC MF active receive should have no greater than \$TAPS_MF_RCV_FMIN_BEAM\$ degrees beamwidth at \$TAPS_MF_RCV_FMIN_FREQ\$ Hz and no greater than \$TAPS_MF_RCV_FMAX_BEAM\$ degrees beamwidth at \$TAPS_MF_RCV_FMAX_FREQ\$ Hz, where the beamwidth is defined by the -3 dB points.	Desirable
SRD-634	3.4.3.3.5 The TAPS USC MF active receive beam side-lobes should not exceed -15 dB relative to the main lobe for all frequencies between \$TAPS_MF_RCV_FMIN_FREQ\$ Hz and \$TAPS_MF_RCV_FMAX_FREQ\$ Hz.	Desirable
SRD-635	3.4.3.3.6 The TAPS USC MF active receive sonar operation should continue to operate during active sonar transmissions by either the TAPS USC or the HMS USC.	Desirable
SRD-636	3.4.3.3.7 In the event of saturation or clipping of the MF active receive array by active sonar transmission, the TAPS USC MF active receive sonar operation should return to normal operation within 25 milliseconds following the end of the transmission.	Desirable
SRD-640	3.4.3.3.8 The TAPS USC MF active receive capability should have sufficient bandwidth to measure Doppler shifting for targets from zero (0) to +/- \$MAX_SUB_SPEED\$ knots, corrected for ownship relative motion, where \$SHIP_TOW_MAX_SPEED\$ knots is the maximum ownship towing speed.	Desirable
SRD-615	3.4.4 TAPS TORSIC	Heading
SRD-105	3.4.4.1 The TAPS USC must perform TORSIC operation in the range \$TORSIC_FMIN\$ Hz to \$TORSIC_FMAX\$ Hz.	Mandatory
SRD-781	3.4.4.2 The TAPS TORSIC must have a minimum of 110 dB dynamic range over the range in the range \$TORSIC_FMIN\$ Hz to \$TORSIC_FMAX\$ Hz.	Mandatory
SRD-782	3.4.4.3 The TAPS TORSIC must have a maximum of 3 dB variation in receive sensitivity versus frequency over the range \$TORSIC_FMIN\$ Hz to \$TORSIC_FMAX\$ Hz.	Mandatory
SRD-1058	3.4.4.4 In the frequency band \$TORSIC_FMIN\$ Hz to \$TORSIC_FMAX\$ Hz, the TAPS TORSIC must have a self-noise spectrum of no more than \$TORSIC_NOISE_SPECTRUM_DB\$ dB re 1 $\mu\text{Pa}^2/\text{Hz}$.	Mandatory
SRD-783	3.4.4.5 The TAPS TORSIC must have a maximum of 3 dB variation in receive sensitivity versus azimuth over the full 360 degrees of azimuth at \$TORSIC_FMIN\$ Hz.	Mandatory
SRD-1291	3.4.4.6 The TAPS TORSIC must provide bearing estimation with an accuracy of +/- five (5) degrees rms and a resolution of +/- 1 degree for all frequencies greater than \$TORSIC_FMIN\$ Hz.	Mandatory

ID		Requirement Type
SRD-787	3.4.4.7 The TAPS TORSIC should be configured to immediately and automatically resolve port starboard ambiguity.	Desirable
SRD-785	3.4.4.8 The TAPS TORSIC must continue to operate during active sonar transmissions by the TAPS USC and the HMS USC.	Mandatory
SRD-786	3.4.4.9 In the event of saturation or clipping of the TAPS TORSIC by active sonar transmission, the TAPS TORSIC must return to normal operation within 1 millisecond following the end of the transmission.	Mandatory
SRD-675	3.4.5 TAPS Non-Acoustic Sensors	Heading
SRD-676	3.4.5.1 The TAPS USC must include non-acoustic sensors (NAS) as part of the towed system to measure and record the following during TAPS operation:	Mandatory
SRD-678	(a) depth;	Mandatory
SRD-679	(b) temperature; and	Mandatory
SRD-680	(c) heading.	Mandatory
SRD-712	3.4.5.2 The TAPS USC NAS must measure and record pitch and roll of the towed system as necessary to meet the requirements for operation of directional elements of the TAPS USC.	Mandatory
SRD-688	3.4.5.3 The TAPS USC NAS must measure, and the UDMS must record, NAS parameters at a rate of no less than one (1) sample per second.	Mandatory
SRD-677	3.4.5.4 The TAPS USC must include no less than two NAS, one located fore and one located aft of the TAPS acoustic sensors and transmitters.	Mandatory
SRD-681	3.4.5.5 The TAPS USC NAS depth sensors must measure water depth between 0 and 500 meters.	Mandatory
SRD-682	3.4.5.6 The TAPS USC NAS depth sensors must have an accuracy of +/- 1.0 meters rms and a resolution of +/- 0.1 meters.	Mandatory
SRD-684	3.4.5.7 The TAPS USC NAS temperature sensors must measure water temperature between -2 degrees Celsius and +35 degrees Celsius.	Mandatory
SRD-683	3.4.5.8 The TAPS USC NAS temperature sensors must have an accuracy of +/- 1.0 degrees Celsius rms and a resolution of +/- 0.1 degrees Celsius.	Mandatory
SRD-685	3.4.5.9 The TAPS USC NAS temperature sensors must be thermally coupled to sea water with a time constant of no greater than 30 seconds.	Mandatory
SRD-686	3.4.5.10 The TAPS USC NAS heading sensors must measure heading in degrees (Magnetic).	Mandatory
SRD-687	3.4.5.11 The TAPS USC NAS heading sensors must have an accuracy of +/- 1.0 degrees (Magnetic) rms and a resolution of +/- 0.1 degrees (Magnetic).	Mandatory
SRD-	3.4.5.12 The TAPS USC NAS measurement and recording function must	Mandatory

ID		Requirement Type
689	not be affected by the operation of the TAPS active transmit function.	
SRD-691	3.4.6 TAPS Vibration Isolation	Heading
SRD-692	3.4.6.1 The TAPS USC may include vibration isolation to meet TAPS self-noise requirements at tow speeds of between \$SHIP_TOW_MIN_SPEED\$ knots and \$SHIP_TOW_MAX_SPEED\$ knots.	Optional
SRD-694	3.4.7 TAPS Rope Drogue	Heading
SRD-695	3.4.7.1 The TAPS USC may include a Rope Drogue, if necessary, at the aft end of the towed system to facilitate deployment and prevent array whipping.	Optional
SRD-697	3.4.7.2 The TAPS USC Rope Drogue, if fitted, must be detachable by operators from the rest of the towed system.	Mandatory
SRD-242	3.4.8 Towed System Handling, Stowage, Deployment and Retrieval	Heading
SRD-725	3.4.8.1 The TAPS must perform full operation at tow speeds between \$SHIP_TOW_MIN_SPEED\$ knots and \$SHIP_TOW_MAX_SPEED\$ knots.	Mandatory
SRD-733	3.4.8.2 The TAPS must include a Handling and Stowage system appropriate to meet the requirements of this SRD.	Mandatory
SRD-240	3.4.8.3 Operator control of the deployment of the towed system will remain local to the current CANTASS Handling and Stowage compartment.	Information
SRD-1299	3.4.8.4 The TAPS must perform deployment and retrieval operations at tow speeds between 7 knots and 12 knots.	Mandatory
SRD-1097	3.4.8.5 The TAPS should perform deployment and retrieval operations at tow speeds between 7 knots and 15 knots.	Desirable
SRD-748	3.4.8.6 The TAPS must perform deployment and retrieval operations to and from maximum scope without damage to the TAPS sensor and the handling system under all operational conditions in less than one hour.	Mandatory
SRD-749	3.4.8.7 The TAPS should perform deployment and retrieval operations under all operational conditions in less than 30 minutes.	Desirable
SRD-713	3.4.8.8 The TAPS USC LFA active sonar transmit must be prevented from transmission during deployment, recovery and while stowed on board ship.	Mandatory
SRD-735	3.4.8.9 The TAPS USC active sonar receive capability must continue to function during deployment and recovery and while cable scope is being adjusted.	Mandatory
SRD-736	3.4.8.10 The TAPS USC passive sonar receive capability must continue to function during deployment and recovery and while cable scope is being adjusted.	Mandatory
SRD-	3.4.8.11 The TAPS USC NAS measurement and recording capability must	Mandatory

ID		Requirement Type																											
690	continue to function during TAPS deployment and retrieval, and while cable scope is being adjusted.																												
SRD-243	3.4.8.12 The TAPS may make use of the legacy OK-410 Handling System via modification.	Optional																											
SRD-722	3.4.8.13 The TAPS Handling System must include braking systems to meet the overall safety requirements for the UWSS.	Mandatory																											
SRD-723	3.4.8.14 The TAPS Handling System must include cable cutting systems to meet the overall safety requirements for the UWSS.	Mandatory																											
SRD-724	3.4.8.15 The TAPS Handling System must include vibration isolation between the ship and the handling system to prevent negative impacts on ship's radiated noise signature.	Mandatory																											
SRD-1023	3.4.8.16 The TAPS Handling System must include a backup retrieval system.	Mandatory																											
SRD-727	3.4.8.17 The TAPS towing characteristics must permit depth and layback deployment of the towed system through adjustment of ship's speed and cable scope.	Mandatory																											
SRD-728	3.4.8.18 It is not necessary that the full operational depth of the towed system be achievable at all ship speed and cable scope combinations.	Information																											
SRD-726	3.4.8.19 The TAPS towed system must not exceed the maximum tow depth of \$TAPS_MAX_TOW_DEPTH\$ meters at a constant straight-ahead tow speed of \$SHIP_TOW_MIN_SPEED\$ knots at the maximum cable scope.	Mandatory																											
SRD-1298	<p>3.4.8.20 The Tow depth for the TAPS must not be shallower than the depths defined in the following table:</p> <table border="1" data-bbox="282 1293 1055 1627"> <thead> <tr> <th data-bbox="282 1293 570 1360"></th> <th colspan="2" data-bbox="570 1293 1055 1360">Sensor depth limits (m) at:</th> </tr> <tr> <th data-bbox="282 1360 570 1392"></th> <th data-bbox="570 1360 781 1392">Cable scope</th> <th data-bbox="781 1360 1055 1392">Cable scope</th> </tr> <tr> <th data-bbox="282 1392 570 1423">Tow Speed (knots)</th> <th data-bbox="570 1392 781 1423">1/2</th> <th data-bbox="781 1392 1055 1423">Full</th> </tr> </thead> <tbody> <tr> <td data-bbox="282 1423 570 1455">10</td> <td data-bbox="570 1423 781 1455">90</td> <td data-bbox="781 1423 1055 1455">180</td> </tr> <tr> <td data-bbox="282 1455 570 1486">12</td> <td data-bbox="570 1455 781 1486">70</td> <td data-bbox="781 1455 1055 1486">140</td> </tr> <tr> <td data-bbox="282 1486 570 1518">15</td> <td data-bbox="570 1486 781 1518">55</td> <td data-bbox="781 1486 1055 1518">110</td> </tr> <tr> <td data-bbox="282 1518 570 1549">20</td> <td data-bbox="570 1518 781 1549">40</td> <td data-bbox="781 1518 1055 1549">80</td> </tr> <tr> <td data-bbox="282 1549 570 1581">25</td> <td data-bbox="570 1549 781 1581">25</td> <td data-bbox="781 1549 1055 1581">50</td> </tr> <tr> <td data-bbox="282 1581 570 1623">30</td> <td data-bbox="570 1581 781 1623">15</td> <td data-bbox="781 1581 1055 1623">30</td> </tr> </tbody> </table>		Sensor depth limits (m) at:			Cable scope	Cable scope	Tow Speed (knots)	1/2	Full	10	90	180	12	70	140	15	55	110	20	40	80	25	25	50	30	15	30	Mandatory
	Sensor depth limits (m) at:																												
	Cable scope	Cable scope																											
Tow Speed (knots)	1/2	Full																											
10	90	180																											
12	70	140																											
15	55	110																											
20	40	80																											
25	25	50																											
30	15	30																											
SRD-145	<p>3.4.8.21 The Tow depth for the TAPS should not be shallower than the depths defined in the following table:</p> <table border="1" data-bbox="282 1854 1055 1883"> <thead> <tr> <th data-bbox="282 1854 570 1883"></th> <th data-bbox="570 1854 1055 1883">Sensor depth</th> </tr> </thead> <tbody> <tr> <td data-bbox="282 1854 570 1883"></td> <td data-bbox="570 1854 1055 1883"></td> </tr> </tbody> </table>		Sensor depth			Desirable																							
	Sensor depth																												

ID		Requirement Type																											
	<table border="1"> <thead> <tr> <th data-bbox="282 268 570 302"></th> <th colspan="2" data-bbox="570 268 1053 302">limits (m) at:</th> </tr> <tr> <th data-bbox="282 302 570 336"></th> <th data-bbox="570 302 781 336">Cable scope</th> <th data-bbox="781 302 1053 336">Cable scope</th> </tr> <tr> <th data-bbox="282 336 570 369">Tow Speed (knots)</th> <th data-bbox="570 336 781 369">1/2</th> <th data-bbox="781 336 1053 369">Full</th> </tr> </thead> <tbody> <tr> <td data-bbox="282 369 570 403">10</td> <td data-bbox="570 369 781 403">100</td> <td data-bbox="781 369 1053 403">200</td> </tr> <tr> <td data-bbox="282 403 570 436">12</td> <td data-bbox="570 403 781 436">80</td> <td data-bbox="781 403 1053 436">160</td> </tr> <tr> <td data-bbox="282 436 570 470">15</td> <td data-bbox="570 436 781 470">60</td> <td data-bbox="781 436 1053 470">120</td> </tr> <tr> <td data-bbox="282 470 570 504">20</td> <td data-bbox="570 470 781 504">45</td> <td data-bbox="781 470 1053 504">90</td> </tr> <tr> <td data-bbox="282 504 570 537">25</td> <td data-bbox="570 504 781 537">30</td> <td data-bbox="781 504 1053 537">60</td> </tr> <tr> <td data-bbox="282 537 570 571">30</td> <td data-bbox="570 537 781 571">20</td> <td data-bbox="781 537 1053 571">40</td> </tr> </tbody> </table>		limits (m) at:			Cable scope	Cable scope	Tow Speed (knots)	1/2	Full	10	100	200	12	80	160	15	60	120	20	45	90	25	30	60	30	20	40	
	limits (m) at:																												
	Cable scope	Cable scope																											
Tow Speed (knots)	1/2	Full																											
10	100	200																											
12	80	160																											
15	60	120																											
20	45	90																											
25	30	60																											
30	20	40																											
SRD-146	3.4.8.22 The ship must operate all towed sensor systems that form part of the TAPS System concurrently with the ship's Towed Torpedo Countermeasure (TTCM) system.	Mandatory																											
SRD-1300	3.4.8.23 The risk of physical interaction between the TAPS and TTCM, and the resultant risk of damage or loss of either system, must not curtail the ability of the ship to conduct concurrent tows.	Mandatory																											
SRD-147	3.4.8.24 Deployment and retrieval of concurrent tows may be done serially, i.e. one after the other, under normal circumstances. The order of deployment and retrieval will be such as to minimize likelihood of physical interaction between the tows. Under emergency situations, both tows may be deployed and retrieved simultaneously.	Information																											
SRD-148	3.4.8.25 The concurrent tows, TTCM and TAPS, should not come into physical contact with each other under every of the operational scenarios defined above.	Desirable																											
SRD-741	3.4.8.26 A minimum separation distance of two (2) meters at every point along either concurrent tow must be a design goal for the TAPS, at all speeds between \$SHIP_TOW_MIN_SPEED\$ knots and \$SHIP_TOW_MAX_SPEED\$ knots, and while the ship is undergoing turns of \$MAX_OWNESHIP_TURNRATE\$ degrees per second in either direction at the ship's maximum speed of \$MAX_OWNESHIP_SPEED\$ knots.	Mandatory																											
SRD-149	3.4.8.27 The TAPS must not physically come into contact with the ship's stern flap under normal circumstances while at sea and underway, during deployment and recovery and while the ship is underway at speeds between \$SHIP_TOW_MIN_SPEED\$ knots and \$SHIP_TOW_MAX_SPEED\$ knots.	Mandatory																											
SRD-92	3.5 Hull Mounted TORSIC Requirements	Heading																											
SRD-235	3.5.1 Hull Mounted TORSIC General Requirements	Heading																											
SRD-102	3.5.1.1 The Hull Mounted TORSIC USC must include all software and hardware components necessary to meet the requirements of this SRD,	Mandatory																											

ID		Requirement Type
	including transducers, receiver electronics, processing systems, interfaces and cabling.	
SRD-127	3.5.1.2 The Hull Mounted TORSIC USC transducer components must not be installed on the ship's hull, but must be installed either as a modification to the HMS sonar dome, or attached to the HMS transducer frame.	Mandatory
SRD-646	3.5.1.3 The Hull Mounted TORSIC USC transducer components should be installed at the greatest practical depth.	Desirable
SRD-643	3.5.1.4 The Hull Mounted TORSIC USC must not interfere with the operation of the HMS USC.	Mandatory
SRD-644	3.5.1.5 The Hull Mounted TORSIC USC must not interfere with the operation of the Underwater Telephone.	Mandatory
SRD-645	3.5.1.6 The Hull Mounted TORSIC USC must have unobstructed reception extending from the horizontal to the nadir and 360 degrees azimuth.	Mandatory
SRD-647	3.5.2 Hull Mounted TORSIC Performance Requirements	Heading
SRD-648	3.5.2.1 The Hull Mounted TORSIC USC must perform reception in the range \$TORSIC_FMIN\$ Hz to \$TORSIC_FMAX\$ Hz.	Mandatory
SRD-649	3.5.2.2 The Hull Mounted TORSIC USC must have a minimum of 110 dB dynamic range over the range in the range \$TORSIC_FMIN\$ Hz to \$TORSIC_FMAX\$ Hz.	Mandatory
SRD-1057	3.5.2.3 In the frequency band \$TORSIC_FMIN\$ Hz to \$TORSIC_FMAX\$ Hz, the Hull Mounted TORSIC must have a self-noise spectrum of no more than \$TORSIC_NOISE_SPECTRUM_DB\$ dB re 1 $\mu\text{Pa}^2/\text{Hz}$.	Mandatory
SRD-650	3.5.2.4 The Hull Mounted TORSIC USC must have a maximum of 3 dB variation in receive sensitivity versus frequency over the range \$TORSIC_FMIN\$ Hz to \$TORSIC_FMAX\$ Hz.	Mandatory
SRD-651	3.5.2.5 The Hull Mounted TORSIC USC must have a maximum of 3 dB variation in receive sensitivity versus azimuth over the full 360 degrees of azimuth.	Mandatory
SRD-652	3.5.2.6 The Hull Mounted TORSIC USC must provide bearing estimation with an accuracy of +/- five (5) degrees rms and a resolution of +/- 1 degree for all frequencies greater than \$TORSIC_FMIN\$ Hz.	Mandatory
SRD-653	3.5.2.7 The Hull Mounted TORSIC USC must continue to operate during active sonar transmissions by the TAPS USC.	Mandatory
SRD-654	3.5.2.8 In the event of saturation or clipping of the Hull Mounted TORSIC USC by active sonar transmission, the Hull Mounted TORSIC USC must return to normal operation within 1 millisecond following the end of the transmission.	Mandatory
SRD-91	3.6 Sonobuoy Processing System Requirements	Heading

ID		Requirement Type
SRD-216	3.6.1 General	Heading
SRD-94	3.6.1.1 The SPS USC must include all software and hardware components necessary to meet the requirements of this SRD, including antennas, radio frequency (RF) transmitter and receiver electronics, interfaces and cabling.	Mandatory
SRD-107	3.6.1.2 As antenna placement is outside the control of the Contractor, an antenna height of 26 m above the waterline will be assumed, and that line of sight to deployed sonobuoys is unobstructed by ship's structures.	Information
SRD-874	3.6.1.3 The SPS USC must have a range of no less than 20 km for VHF and UHF reception at Sea State 0.	Mandatory
SRD-217	3.6.2 Sonobuoy Compatibility	Heading
SRD-114	3.6.2.1 The SPS USC must be compatible with the following sonobuoys and other devices, as described in C-59-007-006/MB-001:	Mandatory
SRD-116	(a) AN/SSQ-536G(B) Bathythermograph Transmitter Set;	Mandatory
SRD-118	(b) AN/SSQ-53D(3) DIFAR;	Mandatory
SRD-119	(c) AN/SSQ-553G(B) DIFAR;	Mandatory
SRD-122	(d) AN/SSQ-62D DICASS;	Mandatory
SRD-123	(e) AN/SSQ-62E DICASS	Mandatory
SRD-124	(f) AN/SSQ-53F DIFAR;	Mandatory
SRD-125	(g) AN/SSQ-565 LFA; and	Mandatory
SRD-126	(h) AN/SSQ-573 DIFAR.	Mandatory
SRD-151	3.6.2.2 The SPS USC must include all components necessary to fully utilize the functionality of the above listed sonobuoys, as described in C-59-007-006/MB-001, including all required antennas, cabling, preamplifiers, receivers, transmitters, and processing systems.	Mandatory
SRD-219	3.6.2.3 The SPS USC should support NATO and other allied nation sonobuoys.	Desirable
SRD-230	3.6.2.4 The SPS USC must fully support Command Function Select (CFS) for all devices that support CFS.	Mandatory
SRD-277	3.6.3 Sonobuoy Antenna, Receiver and Transmitter	Heading

ID		Requirement Type
SRD-154	3.6.3.1 The SPS receiver and antenna and all associated electronics, interfaces and cabling must perform reception of the VHF frequencies as listed in C-59-007-006/MB-001.	Mandatory
SRD-155	3.6.3.2 The SPS transmitter and antenna, and all associated electronics, interfaces and cabling must support use of UHF Command Frequencies as employed by the sonobuoys, as listed above, as applicable.	Mandatory
SRD-130	3.6.3.3 The SPS USC must fully support UHF control of DICASS sonobuoys.	Mandatory
SRD-752	3.6.3.4 The SPS USC must fully support receiving and processing GPS data from analog and digital sonobuoys if so equipped.	Mandatory
SRD-750	3.6.3.5 The SPS USC receiver must provide bandwidth and phase accuracy to produce no greater than 5 degrees processor-induced rms bearing error.	Mandatory
SRD-1106	3.6.3.6 The SPS USC receiver must have Phase linearity characteristics in order to meet the overall UWSS performance requirements for DIFAR sonobuoy processing.	Mandatory
SRD-278	3.6.3.7 As available space on the upper decks and main mast of the ship is limited, the SPS USC receive and transmit capability should be implemented with a combined VHF and UHF antenna.	Desirable
SRD-134	3.7 Bathythermograph Recorder Requirements	Heading
SRD-985	3.7.1 The UWSS must implement the current function of the Mk8-F Bathythermograph Recorder.	Mandatory
SRD-1059	3.7.2 The UWSS may incorporate all or parts of the hardware and software components of the Mk8-F Bathythermograph Recorder.	Optional
SRD-986	3.7.3 The UWSS must connect directly to the recorder.	Mandatory
SRD-1187	3.7.4 The UWSS must perform all Bathythermograph Recorder operations from the UWSS Operator Workstations, under operator control.	Mandatory
SRD-1188	3.7.5 The UWSS must directly input all Bathythermograph information into the ARPS (Acoustic Range Prediction System), under operator control.	Mandatory
SRD-140	3.8 Operator Workstations Requirements	Heading
SRD-199	3.8.1 General	Heading
SRD-200	3.8.1.1 The UWSS must include operator workstations, include all software and hardware components, necessary to meet the requirements of this SRD.	Mandatory
SRD-	3.8.1.2 The operator workstations must implement all displays and	Mandatory

ID		Requirement Type
519	operator control functions as defined for the UWSS USCs and the functions of the UDMS.	
SRD-211	3.8.1.3 The UWSS operator workstations must be designed in accordance with Section 5.7 of MIL-STD-1472F for seated operation.	Mandatory
SRD-202	3.8.1.4 The UWSS operator interface must be implemented on no less than four (4) operator workstations in the Ops Room.	Mandatory
SRD-170	3.8.1.5 Each operator workstation must include at least two display surfaces of sufficient size and resolution that allows effective operator recognition differential during passive narrow band analysis.	Mandatory
SRD-276	3.8.1.6 All UWSS workstations must have all display and control functions of the UWSS.	Mandatory
SRD-1178	3.8.1.7 A physical separation of the UWSS operator workstations (e.g. walls or curtains) from the rest of the Operations Room must be implemented.	Mandatory
SRD-205	3.8.1.8 The legacy AN/SQS-510 consoles and the two AN/SQR-501 CANTASS consoles may be refurbished in order to meet the UWSS requirement.	Optional
SRD-204	3.8.1.9 Fourth Operator Workstation	Heading
SRD-1292	3.8.1.9.1 The fourth operator workstation in the Ops Room must be implemented using the existing 3-EYE Multi-Function Workstation (MFW) for the SPS.	Mandatory
SRD-1293	3.8.1.9.2 The UWSS must display and control all UWSS functionality on the left and center consoles of the 3-EYE MFW simultaneously.	Mandatory
SRD-1294	3.8.1.9.3 The existing 3-EYE MFW displays may be used in order to meet the Operator Workstation requirements in Section 3.8.	Optional
SRD-1295	3.8.1.9.4 The UWSS must use the existing controls on the 3-EYE MFW.	Mandatory
SRD-1296	3.8.1.9.5 The fourth operator workstation must allow the Operator to switch control between the UWSS and the existing 3-EYE MFW Isolated Networks third screen, using a KVM switch.	Mandatory
SRD-1297	3.8.1.9.6 The existing 3-EYE MFW KVM switch may be used to switch control between UWSS and the existing 3-EYE MFW Isolated Networks screen, in order to meet the Operator Workstation requirements in Section 3.8.	Optional
SRD-167	3.8.2 Operations Room Configuration	Heading
SRD-198	3.8.2.1 The design of the UWSS Operations Room configuration must be consistent with the requirements of MIL-STD-1472F.	Mandatory
SRD-960	3.8.2.2 The design of the UWSS Operations Room configuration and UWSS Operator workstations must accommodate a user population	Mandatory

ID		Requirement Type
	whose Anthropometric dimensions are described in the 2012-Canadian Forces Anthropometric Survey (CFAS), where:	
SRD-961	(a) the user population must include a female population described by the range from the 5th percentile to the 99th percentile of the CFAS; and	Mandatory
SRD-963	(b) the user population must include a male population described by the range from the 1st percentile to the 95th percentile of the CFAS.	Mandatory
SRD-214	3.8.2.3 The design of the UWSS Operations Room configuration should utilize the current footprint of the existing equipment.	Desirable
SRD-215	3.8.2.4 The design of the UWSS Operations Room configuration should avoid the need to relocate existing equipment.	Desirable
SRD-172	3.8.2.5 The Operations Room configuration must maximize the operating efficiency of the UWW team.	Mandatory
SRD-458	3.8.2.6 Each UWSS operator workstation must include seating that provides suitable ergonomic features to support operator effectiveness.	Mandatory
SRD-210	3.8.2.7 The seating at each operator workstation must meet safety requirements, including at a minimum seat-belts for heavy weather and manoeuvres.	Mandatory
SRD-212	3.8.2.8 The SHINCOM terminals implemented at the legacy HMS, SPS, SCS and TAS Sup positions under the HCM/FELEX Project must be retained for the UWSS operators.	Mandatory
SRD-213	3.8.2.9 The locations of the SHINCOM terminals for UWSS operators may be reconfigured to meet the functional requirements of the UWSS in the Ops Room.	Optional
SRD-132	3.9 Underwater Data Management System Requirements	Heading
SRD-185	3.9.1 General	Heading
SRD-133	3.9.1.1 The UDMS must include all software and hardware components necessary to meet the requirements of this SRD, including processing systems, mass storage systems, interfaces and cabling.	Mandatory
SRD-194	3.9.1.2 The UDMS must provide tools for operator assisted classification of threats.	Mandatory
SRD-182	3.9.1.3 The UDMS must provide operator and automated control of all USCs.	Mandatory
SRD-183	3.9.1.4 The UDMS must process, display and record all data from all USCs, both acoustic and non-acoustic.	Mandatory
SRD-316	3.9.1.5 The UDMS must display and record all data received from interfaces with external systems.	Mandatory
SRD-	3.9.1.6 The UDMS must create and maintain the Recognized Sub-Surface	Mandatory

ID		Requirement Type
184	Picture (RSSP).	
SRD-161	3.9.2 Processing General Requirements	Heading
SRD-856	3.9.2.1 The UDMS must provide all of the necessary sonar processing functions in order to contribute to meeting the overall performance requirements of the UWSS.	Mandatory
SRD-460	3.9.2.2 General Passive Sonar Processing Requirements	Heading
SRD-903	3.9.2.2.1 The following General Passive Sonar Processing requirements must be met by the HMS USC, the TAPS USC, and the SPS USC.	Mandatory
SRD-333	3.9.2.2.2 The UDMS must perform all necessary passive sonar processing, including beamforming, narrowband, broadband and DEMON processing, in order to meet the overall performance requirements of the UWSS.	Mandatory
SRD-898	3.9.2.2.3 The UDMS must have no less than ten (10) simultaneous narrowband passive sonar processing settings for bandwidth, frequency resolution and update rate for each passive sonar USC.	Mandatory
SRD-487	3.9.2.3 General Active Sonar Processing Requirements	Heading
SRD-904	3.9.2.3.1 The following General Active Sonar Processing requirements must be met by the HMS USC, the TAPS USC, and the SPS USC.	Mandatory
SRD-899	3.9.2.3.2 The UDMS must perform all necessary active sonar processing, including beamforming, matched filtering, estimation of Doppler shift, and sub-beamwidth fine bearing estimation, in order to meet the overall performance requirements of the UWSS.	Mandatory
SRD-879	3.9.2.3.3 The HMS USC must perform 360 degree azimuthal active search coverage of no less than once per minute for all targets at ranges no less than 25 kilometers.	Mandatory
SRD-880	3.9.2.3.4 The TAPS USC must perform 360 degree azimuthal active search coverage of no less than once per minute for all targets at ranges no less than 25 kilometers.	Mandatory
SRD-237	3.9.2.3.5 The UDMS must generate ping transmission messages for active sonar USCs to alert other UWSS USCs and processes of the start of transmission.	Mandatory
SRD-521	3.9.2.4 General TORSIC Processing Requirements	Heading
SRD-905	3.9.2.4.1 The following General TORSIC Processing requirements must be met by the Hull Mounted TORSIC USC, and the TAPS USC.	Mandatory
SRD-908	3.9.2.4.2 The UDMS must perform processing to fully utilize the capabilities of the TAPS USC TORSIC as defined in paragraph 3.4 and the Hull Mounted TORSIC USC as defined in paragraph 3.5.	Mandatory

ID		Requirement Type
SRD-789	3.9.2.4.3 The TAPS TORSIC and the Hull Mounted TORSIC must share the same TORSIC processing functions, implemented by the UDMS.	Mandatory
SRD-790	3.9.2.4.4 The following requirements must be met by the TAPS TORSIC only if the TAPS is deployed.	Mandatory
SRD-788	3.9.2.4.5 The UDMS TORSIC processing must perform automated and continuous detection and classification of torpedo HF active sonar transmissions.	Mandatory
SRD-791	3.9.2.4.6 The UDMS TORSIC processing must continue to function in the presence of ownship active sonar transmissions and the towed torpedo decoy, and in the vicinity of operating expendable torpedo countermeasures.	Mandatory
SRD-792	3.9.2.4.7 The UDMS must define TORSIC alert criteria that include detection and classification parameters, under operator control.	Mandatory
SRD-798	3.9.2.4.8 The UDMS must perform automated detection of the operation of the AN/SLQ-25A TCM and every expendable acoustic countermeasures.	Mandatory
SRD-800	3.9.2.4.9 The UDMS must perform automated detection of the operation of Underwater Telephones and Emergency Locator signals.	Mandatory
SRD-794	3.9.2.4.10 The UDMS must raise an alert automatically when criteria are met.	Mandatory
SRD-810	3.9.2.4.11 The UDMS must inhibit alerts that are automatically attributed to transmissions whose source is known, as selected by the operator.	Mandatory
SRD-1177	3.9.2.4.12 The UDMS must allow alerts that are automatically attributed to transmissions whose source is known, as selected by the operator.	Mandatory
SRD-900	3.9.2.5 Hull Mounted Sonar Processing	Heading
SRD-901	3.9.2.5.1 The UDMS processing must fully utilize all of the capabilities of the HMS USC, as defined in paragraph 3.3.	Mandatory
SRD-580	3.9.2.6 TAPS Processing	Heading
SRD-902	3.9.2.6.1 The UDMS processing must fully utilize all of the capabilities of the TAPS USC, as defined in paragraph 3.4.	Mandatory
SRD-581	3.9.2.6.2 The UDMS must provide automated and operator assisted tools for port-starboard ambiguity resolution of the TAPS USC omnidirectional passive array.	Mandatory
SRD-218	3.9.2.7 Sonobuoy Processing	Heading
SRD-907	3.9.2.7.1 The UDMS processing must fully utilize all of the capabilities of the SPS USC, as defined in paragraph 3.6.	Mandatory
SRD-152	3.9.2.7.2 For sonobuoy processing, the UDMS must:	Mandatory

ID		Requirement Type
SRD-115	(a) receive and process simultaneously a minimum of twenty-four (24) different sonobuoys;	Mandatory
SRD-538	(b) interact with no less than 16 separate sonobuoy channels simultaneously, under operator control;	Mandatory
SRD-539	(c) automatically scan all sonobuoy RF channels to determine the presence of new sonobuoys;	Mandatory
SRD-540	(d) notify the operator of the presence of new sonobuoys, and the loss (dropout) of previously acquired sonobuoy telemetry; and	Mandatory
SRD-541	(e) provide automated tools to allocate new sonobuoy telemetry to open receiver channels.	Mandatory
SRD-543	3.9.2.7.3 The UDMS should receive and process simultaneously more than twenty-four (24) different sonobuoys.	Desirable
SRD-751	3.9.2.7.4 The UDMS must have no greater than +/- 1% error in range (assuming correct sound speed profile) and no greater than +/- 10% error in estimated target Doppler.	Mandatory
SRD-280	3.9.2.7.5 The UDMS must perform sonobuoy-based bistatic and multistatic operations.	Mandatory
SRD-281	3.9.2.7.6 The UDMS bistatic operation must control a sonobuoy field consisting of one (1) active sonobuoy and no less than three (3) receiver sonobuoys.	Mandatory
SRD-550	3.9.2.7.7 The UDMS multistatic operation must control a sonobuoy field consisting of no less than four (4) active sonobuoys and no less than twelve (12) receiver sonobuoys.	Mandatory
SRD-556	3.9.2.7.8 The UDMS should provide tools to generate and to acquire and utilize active source transmission coordination information, including frequencies, pulse lengths and ping schedules from and for other task group units for sonobuoy multistatic processing.	Desirable
SRD-557	3.9.2.7.9 The UDMS must utilize predefined matched filters for all active sonobuoys as described in C-59-007-006/MB-001.	Mandatory
SRD-558	3.9.2.7.10 The UDMS should utilize predefined matched filters for NATO and allied active sonobuoys.	Desirable
SRD-572	3.9.3 Detection and Tracking	Heading
SRD-573	3.9.3.1 The UDMS must automatically detect and track passive broadband and narrowband contacts.	Mandatory
SRD-575	3.9.3.2 The UDMS must automatically detect and track monostatic active contacts.	Mandatory
SRD-576	3.9.3.3 The UDMS must automatically detect and track sonobuoy-based bistatic and multistatic active contacts.	Mandatory
SRD-	3.9.3.4 The UDMS should automatically detect and track other ownship	Desirable

ID		Requirement Type
577	bistatic, bistatic and multistatic active contacts.	
SRD-578	3.9.3.5 The UDMS must enable and disable automatic detector-follower tools on all USCs, under operator control.	Mandatory
SRD-579	3.9.3.6 The UDMS must initiate tracking of contacts not detected by the UDMS automatically, under operator control.	Mandatory
SRD-1104	3.9.3.7 The UDMS must track no less than \$UDMS_MAX_CONTACTS\$ simultaneous contacts.	Mandatory
SRD-369	3.9.4 Contact Identification and Classification	Heading
SRD-370	3.9.4.1 The UDMS must identify Contacts detected as: (a) underwater Contacts; and (b) surface Contacts.	Mandatory
SRD-372	3.9.4.2 The UDMS must classify underwater Contacts in accordance with "ATP 1, Allied Maritime Tactical Instructions and Procedures", Chapter 9.	Mandatory
SRD-418	3.9.4.3 The UDMS must include a Threat Force Database System (TFDS) to store, retrieve, modify and display acoustic signatures for the purpose of contact identification and classification.	Mandatory
SRD-419	3.9.4.4 The TFDS must be stored on removable media that allows ship's staff to perform updates.	Mandatory
SRD-420	3.9.4.5 The TFDS must include narrowband frequencies with predominant artifacts, broadband frequency ranges, transient behaviour and pictorial information.	Mandatory
SRD-796	3.9.4.6 The TFDS must include active sonar information for threat and allied torpedoes, and for threat and allied active sonars.	Mandatory
SRD-571	3.9.4.7 The UDMS should perform automated detection, identification and classification to the extent that alerts are raised for operators, after which, operators may assess the detection and raise alarms as appropriate.	Desirable
SRD-565	3.9.5 Bistatic and Multistatic Sonar	Heading
SRD-909	3.9.5.1 The UDMS must provide all of the necessary bistatic and multistatic processing functions necessary in order to contribute to meeting the overall performance requirements of the UWSS.	Mandatory
SRD-566	3.9.5.2 The UDMS must provide sonobuoy-based bistatic and multistatic processing functions.	Mandatory
SRD-567	3.9.5.3 The UDMS should provide ownship bistatic processing functions utilizing the HMS USC functioning as an emitter and the TAPS USC functioning as a receiver.	Desirable
SRD-892	3.9.5.4 The UDMS should provide bistatic processing functions utilizing sonobuoys functioning as emitters and the TAPS USC functioning as a receiver.	Desirable

ID		Requirement Type
SRD-569	3.9.5.5 The UDMS should provide non-cooperative bistatic processing functions utilizing the organic maritime helicopter HELRAS dipping sonar functioning as an emitter and the TAPS USC functioning as a receiver.	Desirable
SRD-568	3.9.5.6 The UDMS should provide non-cooperative bistatic processing functions utilizing the active sonar of other task group units functioning as emitters and the TAPS USC functioning as a receiver.	Desirable
SRD-337	3.9.6 Data Fusion	Heading
SRD-910	3.9.6.1 The UDMS must provide all of the necessary Data Fusion processing functions necessary in order to contribute to meeting the overall performance requirements of the UWSS.	Mandatory
SRD-338	3.9.6.2 The UDMS must generate Fused Tracks from all available information, by automatic and operator assisted correlation of data originating from:	Mandatory
SRD-339	(a) all UWSS USCs, including the TAPS, HMS, SPS and TORSIC;	Mandatory
SRD-340	(b) non-UWSS organic sensors as communicated to the UDMS by the Combat Management System; and	Mandatory
SRD-341	(c) non-organic information from other units, communicated to the UDMS by the Combat Management System.	Mandatory
SRD-342	3.9.6.3 The UDMS must automatically associate with a single contact every broadband and narrowband contacts on the same bearing exhibiting similar kinematics and similar acoustic characteristics.	Mandatory
SRD-574	3.9.6.4 The UDMS must use Fused Tracks to build and maintain a single common RSSP.	Mandatory
SRD-371	3.9.6.5 The UDMS must automatically attempt to associate every new passive and active contact classified as a torpedo	Mandatory
SRD-186	3.9.7 UDMS Interfaces to other Systems	Heading
SRD-1113	3.9.7.1 Combat Management System 330 (CMS 330)	Heading
SRD-135	3.9.7.1.1 The UDMS must include a hardware and software Internet Protocol based interface to the CMS 330, as necessary in order to meet the requirements of this SRD.	Mandatory
SRD-177	3.9.7.1.2 The hardware and software interface to the CMS 330 must pass the following information from the UDMS to CMS 330:	Mandatory
SRD-178	(a) UWSS system status information, including but not limited to, towed sensor deployment status (as currently implemented in CMS 330);	Mandatory
SRD-179	(b) contact bearing, range, course and speed information for the conduct of TMA;	Mandatory

ID		Requirement Type
SRD-378	(c) ASW and torpedo related alerts;	Mandatory
SRD-292	(d) acoustic range prediction system information;	Mandatory
SRD-377	(e) towed sensor deployment status, including depth, cable scope, and horizontal layback;	Mandatory
SRD-293	(f) bathymetric information;	Mandatory
SRD-294	(g) SPS sonobuoy data (non-acoustic);	Mandatory
SRD-295	(h) ping schedule information for all UWSS active sonar USCs;	Mandatory
SRD-296	(i) the RSSP;	Mandatory
SRD-1308	(j) interface status and control information for all UWSS component and system interfaces, and all UWSS external interfaces; and	Mandatory
SRD-1309	(k) UWSS HM monitored element information in accordance with the table of UWSS Health Management Monitored Elements in Section 3.1.1.7.	Mandatory
SRD-136	3.9.7.1.3 The hardware and software interface to the CMS 330 must pass the following information from CMS 330 to the UDMS:	Mandatory
SRD-137	(a) contacts of interest including, as a minimum, radar and Electronic Warfare (EW) information related to submarine and other emitters, such as radar and communications equipment;	Mandatory
SRD-138	(b) areas of probability (AOPs) for all such contacts (i.e. square, circular, and ellipse as applicable to the originating sensor);	Mandatory
SRD-298	(c) all UWW related alert messages;	Mandatory
SRD-299	(d) all UWW related overlays, including weapons firing exclusion zones;	Mandatory
SRD-300	(e) UWW related LINK 11, 16 and 22 (MultiLINK) information;	Mandatory
SRD-301	(f) track management control messages;	Mandatory
SRD-302	(g) system control and system status information, including clock synchronization;	Mandatory
SRD-303	(h) launch time and location of all Lightweight Torpedoes launched by ownship, task group ship, helicopter, and aircraft;	Mandatory
SRD-304	(i) deployment location, RF channel, sensor depth, and lifetime of all task group sonobuoys, both passive and active;	Mandatory

ID		Requirement Type
SRD-305	(j) ping schedules for task group active sonars;	Mandatory
SRD-306	(k) deployment time, type and operating lifetime of every expendable acoustic countermeasure;	Mandatory
SRD-1310	(l) interface status and control information;	Mandatory
SRD-1493	(m) Other UWW related information including UWW sensor contact information from non-UWSS sensors and sources such as from other ship sensors, task group units, helicopters, fixed-wing aircraft, and global sources; and	Mandatory
SRD-1498	(n) doctrine information related to UWW including system, subsystem and sensor configuration and settings, system management, health management, and system operating parameters, in order to facilitate execution of the CMS 330 doctrine propagated into the UWSS.	Mandatory
SRD-968	3.9.7.1.4 The hardware and software interface to the CMS 330 should pass the following information from CMS 330 to the UDMS:	Desirable
SRD-307	(a) Integrated Platform Management System (IPMS) data, including propeller RPM, propeller pitch, engine and gearbox configuration, and rudder angle; and	Desirable
SRD-309	(b) the operational modes of the Towed Torpedo Countermeasure (TTCM).	Desirable
SRD-1114	3.9.7.2 Navigation Data Distribution System (NavDDS)	Heading
SRD-1061	3.9.7.2.1 The UDMS must include a hardware and software interface to the NavDDS, as necessary in order to meet the requirements of this SRD.	Mandatory
SRD-1072	3.9.7.2.2 The hardware and software interface to the NavDDS must pass the following information from NavDDS to the UDMS to the extent permitted by the "Interface Design Document between the Halifax Class Navigation Data Distribution System and the Underwater Warfare Sensor System":	Mandatory
SRD-1075	(a) ownship navigation data;	Mandatory
SRD-1115	(b) environmental data;	Mandatory
SRD-397	(c) meteorological data;	Mandatory
SRD-1117	(d) Automatic Identification System (AIS) information;	Mandatory
SRD-1118	(e) Automatic Radar Plotting Aid information;	Mandatory

ID		Requirement Type
SRD-1119	(f) Precise Time of Day;	Mandatory
SRD-1081	(g) clock synchronization messages; and	Mandatory
SRD-1116	(h) data from the Echo Sounder System;	Mandatory
SRD-1120	3.9.7.2.3 The UDMS must manage data from zero (0) to greater than 200 AIS contacts.	Mandatory
SRD-1121	3.9.7.2.4 The UDMS must exchange data with the NavDDS utilizing the messages specified in "National Marine Electronics Association (NMEA) 0183 Standard for Interfacing Marine Electronic Devices Version 3.01 dated 30 January 2002".	Mandatory
SRD-1122	3.9.7.2.5 The UDMS must calculate position based on the geospatial model approximation of the World Geodetic System 1984.	Mandatory
SRD-1123	3.9.7.2.6 The UDMS must acquire the precise time of day reference from the NavDDS in the IRIG B123 format.	Mandatory
SRD-1124	3.9.7.2.7 The UDMS must use the precise time of day acquired from the NavDDS unless otherwise specified in this SRD.	Mandatory
SRD-1125	3.9.7.2.8 The UDMS must use the precise time of day acquired from the stand alone precise time of day source in the event that the NavDDS precise time of day becomes unavailable.	Mandatory
SRD-1126	3.9.7.2.9 The UDMS must synchronize to a common Coordinated Universal Time system time as provided by the NavDDS.	Mandatory
SRD-1127	3.9.7.3 Echo Sounder System	Heading
SRD-1302	3.9.7.3.1 The UDMS may include a direct hardware and software interface to the Echo Sounder, as necessary in order to meet the requirements of this SRD.	Optional
SRD-1128	3.9.7.3.2 The UDMS may implement the passing of information from the echo sounder using direct interfaces.	Optional
SRD-1129	3.9.7.3.3 The UDMS should pass the following information from the Echo Sounder System to the UDMS:	Desirable
SRD-1086	(a) notification of operation of the ship's Echo Sounder System.	Desirable
SRD-1090	3.9.7.4 For redundancy, the passing of navigational information and clock synchronization information may also be implemented with an interface to the CMS 330.	Optional
SRD-379	3.9.7.5 The UDMS must manually enter IPMS data that includes propeller RPM, propeller pitch, engine and gearbox configuration, and rudder angle, under operator control.	Mandatory
SRD-	3.9.7.6 The UDMS may implement the passing of information from IPMS	Optional

ID		Requirement Type
893	and TTCM using direct interfaces to those systems.	
SRD-381	3.9.7.7 The UDMS must manually enter operational modes of the Towed Torpedo Countermeasure, under operator control.	Mandatory
SRD-166	3.9.8 Human Machine Interface	Heading
SRD-886	3.9.8.1 General	Heading
SRD-499	3.9.8.1.1 The UDMS must provide the Human Machine Interface (HMI) for the operators to utilize the UWSS in order to meet the requirements of this SRD.	Mandatory
SRD-966	3.9.8.1.2 The HMI must be designed and implemented in a manner consistent with the requirements of MIL-STD-1472F.	Mandatory
SRD-911	3.9.8.1.3 The HMI must interact with all functions of the UWSS USCs and all functions of the UDMS, under operator control.	Mandatory
SRD-920	3.9.8.1.4 All UWSS operator displays and controls must be displayed at each of the four (4) operator consoles in the Operations Room, under operator control.	Mandatory
SRD-1189	3.9.8.1.5 All UWSS operator displays and controls must allow operator interaction at each of the four (4) operator consoles in the Operations Room.	Mandatory
SRD-500	3.9.8.1.6 The HMI must display and provide operator control interfaces on Operations Room workstations.	Mandatory
SRD-207	3.9.8.1.7 Each operator workstation must include a keyboard and trackball, or equivalent means, for system manipulation.	Mandatory
SRD-524	3.9.8.1.8 The UDMS must provide the capabilities for operators to:	Mandatory
SRD-525	(a) configure displays, including the selection, size and location of windows;	Mandatory
SRD-526	(b) save display configurations in nonvolatile memory and be able to manage and recall those configurations; and	Mandatory
SRD-527	(c) create and save combinations of windows associated with every combination of active and passive displays of USCs, and every other display created for the UWSS.	Mandatory
SRD-1037	3.9.8.1.9 Each operator workstation must include a default configuration that is used upon initial power-up.	Mandatory
SRD-1038	3.9.8.1.10 Upon warm-boot each operator workstation must restart in its display configuration last in effect.	Mandatory
SRD-206	3.9.8.1.11 On each operator display surface making up the UWSS, the system status consisting of system date and time, ship's position, speed and heading must be displayed.	Mandatory
SRD-	3.9.8.1.12 System status must be updated at a rate of no less than once	Mandatory

ID		Requirement Type
171	per second.	
SRD-474	3.9.8.1.13 The UDMS must provide text displays of bearing, range, frequency and time in accordance with the position of operator controlled cursors.	Mandatory
SRD-1034	3.9.8.1.14 The UDMS must provide graphical displays of target bearing and range automatically on tactical plots.	Mandatory
SRD-1035	3.9.8.1.15 Target bearings must be recorded and reported relative to the ownship's master datum.	Mandatory
SRD-475	3.9.8.1.16 The UDMS must provide operator controlled time and frequency harmonic cursors.	Mandatory
SRD-479	3.9.8.1.17 The UDMS must control the display time history for applicable plots, under operator control.	Mandatory
SRD-411	3.9.8.1.18 The UDMS must enter annotations on all sonar displays, under operator control.	Mandatory
SRD-412	3.9.8.1.19 Operator annotations must be automatically timestamped.	Mandatory
SRD-413	3.9.8.1.20 Operator annotations must automatically include context sensitive data, such as bearing and frequency, corresponding to the location of the display where the annotation was entered.	Mandatory
SRD-414	3.9.8.1.21 Operator annotations must be recorded by the Data Recording, Replay and Management System (DRRMS).	Mandatory
SRD-459	3.9.8.1.22 The UDMS must include colour palettes for operators to choose colour coding for representing directional information.	Mandatory
SRD-897	3.9.8.1.23 The UDMS must define and select no less than ten (10) multiple simultaneous passive sonar processing settings for bandwidth, frequency resolution, and update rate, under operator control.	Mandatory
SRD-530	3.9.8.1.24 Each operator workstation must include an audio replay capability with the following:	Mandatory
SRD-531	(a) an operator accessible standard audio jack;	Mandatory
SRD-532	(b) headphones of sufficient audio quality, including active noise cancellation, for listening to raw and beam formed audio from every active and passive sensor;	Mandatory
SRD-533	(c) select and listen to audio from every channel of every USC, under operator control;	Mandatory
SRD-535	(d) select and listen to live and recorded audio, under operator control;	Mandatory
SRD-534	(e) select and listen to raw and processed audio, under operator control; and	Mandatory
SRD-807	(f) select and mix down high frequency audio in human audible frequency ranges, under operator control.	Mandatory

ID		Requirement Type
SRD-912	3.9.8.2 Passive Sonar Displays and Operator Controls	Heading
SRD-913	3.9.8.2.1 The UDMS must provide the following passive sonar displays for all passive sonar USCs:	Mandatory
SRD-914	(a) normalized broadband Bearing Time Intensity (BTI);	Mandatory
SRD-915	(b) normalized narrowband Bearing Time Intensity (NBTI);	Mandatory
SRD-916	(c) normalized narrowband versus frequency (LOFAR); and	Mandatory
SRD-917	(d) DEMON.	Mandatory
SRD-924	3.9.8.2.2 BTI Displays must include time-history of ship's heading.	Mandatory
SRD-1098	3.9.8.2.3 BTI Displays must include time-history of the TAPS USC heading for TAPS Passive displays.	Mandatory
SRD-969	3.9.8.2.4 All time scales must display a minimum of 30 minutes of data history.	Mandatory
SRD-922	3.9.8.2.5 The UDMS must select multiple simultaneous passive processing and display settings for bandwidth, frequency resolution, and update rate, under operator control.	Mandatory
SRD-923	3.9.8.2.6 The UDMS must select passive processing and display modes independently for all passive USCs, under operator control.	Mandatory
SRD-488	3.9.8.3 Active Sonar Displays and Operator Controls	Heading
SRD-222	3.9.8.3.1 The UDMS must provide operator control interfaces for all active sonar USCs, implementing the following control functions:	Mandatory
SRD-223	(a) enable and disable active transmissions;	Mandatory
SRD-224	(b) modify transmission pulse frequency, waveform type, length and power level;	Mandatory
SRD-225	(c) modify inter-pulse period in terms of either time and range;	Mandatory
SRD-226	(d) modify directional transmission characteristics;	Mandatory
SRD-227	(e) generate single pings; and	Mandatory
SRD-228	(f) define and initiate automated transmitter control to follow marine mammal mitigation procedures.	Mandatory
SRD-261	3.9.8.3.2 The UDMS must provide the following operator display functions for all active sonar USCs:	Mandatory

ID		Requirement Type
SRD-268	(a) system status, whether operational or non-operational;	Mandatory
SRD-263	(b) transmission pulse frequency, waveform type, length and power level settings;	Mandatory
SRD-264	(c) inter-pulse period in terms of either time and range;	Mandatory
SRD-265	(d) directional transmission characteristics;	Mandatory
SRD-491	(e) active Plan-Position-Indicator (PPI), showing ping history and colour coding for target Doppler;	Mandatory
SRD-492	(f) active ping feature versus range (A-scan), divided up into multiple bearing sectors and one overall all-azimuth (360°) view, showing ping history and colour coding for target Doppler;	Mandatory
SRD-493	(g) active ping feature versus range and bearing (B-scan), showing ping history and colour coding for target Doppler;	Mandatory
SRD-1100	(h) directional displays must be absolute and ship's head relative, as selected by the operator;	Mandatory
SRD-494	(i) instantaneous display of transmit pulse range from source; and	Mandatory
SRD-1099	(j) ownship heading and TAPS heading.	Mandatory
SRD-489	3.9.8.3.3 The Active Sonar displays must filter displayed results based on Doppler that includes filtering on speed and whether closing or opening, under operator control.	Mandatory
SRD-497	3.9.8.3.4 The PPI displays must zoom the display in and out, under operator control.	Mandatory
SRD-468	3.9.8.4 TAPS Displays and Operator Controls	Heading
SRD-469	3.9.8.4.1 The UDMS must include all of the passive and active sonar displays and controls for the TAPS USC, as defined in paragraphs 3.9.8.2 and 3.9.8.3.	Mandatory
SRD-244	3.9.8.4.2 The TAPS operator interface must display the towed system depth in meters, deployed scope in meters, heading in degrees True (converted automatically from magnetic heading by the UWSS, if required), and water temperature in degrees Celsius with an update rate of no less than once per second.	Mandatory
SRD-285	3.9.8.5 SPS Displays and Operator Controls	Heading
SRD-921	3.9.8.5.1 The UDMS must include all of the passive and active sonar displays and controls for the SPS USC, as defined in paragraphs 3.9.8.2 and 3.9.8.3.	Mandatory

ID		Requirement Type
SRD-501	3.9.8.5.2 The UDMS must include the following displays for the SPS USC:	Mandatory
SRD-502	(a) all Passive Sonar Displays as defined under Passive Sonar General Requirements; and	Mandatory
SRD-503	(b) all Active Sonar Displays as defined under Active Sonar General Requirements;	Mandatory
SRD-284	3.9.8.5.3 The SPS operator display must include a status display containing the following information for all sonobuoys for which telemetry is being received:	Mandatory
SRD-286	(a) sonobuoy type;	Mandatory
SRD-287	(b) RF channel allocations;	Mandatory
SRD-288	(c) location in latitude and longitude;	Mandatory
SRD-888	(d) sensor depth;	Mandatory
SRD-889	(e) operational mode;	Mandatory
SRD-890	(f) predicted remaining lifetime; and	Mandatory
SRD-289	(g) DIFAR lock status.	Mandatory
SRD-282	3.9.8.5.4 The SPS status display must be updated with a rate of no less than once per second.	Mandatory
SRD-283	3.9.8.5.5 The SPS must manually input and manually modify sonobuoy locations, in latitude and longitude, under operator control.	Mandatory
SRD-290	3.9.8.5.6 The SPS must control active sonobuoys using both older UHF format for DICASS sonobuoys and new CFS protocols, including selection of pulse types, pulse lengths, and pulse intervals, under operator control.	Mandatory
SRD-291	3.9.8.5.7 The SPS must parse and incorporate ping schedules received from external sources.	Mandatory
SRD-522	3.9.8.6 TORSIC Displays and Operator Controls	Heading
SRD-609	3.9.8.6.1 The Hull Mounted TORSIC USC and the TORSIC included as part of the TAPS USC must share a common operator interface.	Mandatory
SRD-611	3.9.8.6.2 The TORSIC operator interface must be displayed at each of the four (4) operator consoles in the Operations Room, under operator control.	Mandatory
SRD-1190	3.9.8.6.3 The TORSIC operator interface must allow operator interaction at each of the four (4) operator consoles in the Operations Room.	Mandatory

ID		Requirement Type
SRD-252	3.9.8.6.4 The UDMS must provide operator control interfaces for all TORSIC sensors, implementing the following control functions:	Mandatory
SRD-253	(a) enable and disable operation;	Mandatory
SRD-254	(b) adjust automated detection and classification parameters;	Mandatory
SRD-255	(c) modify alert parameters; and	Mandatory
SRD-256	(d) replay processing and audio output of recordings.	Mandatory
SRD-269	3.9.8.6.5 The UDMS must provide the following operator display functions for all TORSIC sensors:	Mandatory
SRD-270	(a) system status, whether operational or non-operational;	Mandatory
SRD-271	(b) automated detection and classification parameters;	Mandatory
SRD-272	(c) alert parameters, including sonar frequency, ping duration, ping interval, and classification score;	Mandatory
SRD-274	(d) status of all UWSS active sonar USCs and of the AN/SLQ-25A TTCM;	Mandatory
SRD-799	(e) status of all expendable acoustic countermeasures;	Mandatory
SRD-275	(f) status of all known weapons, i.e. ownship and task group launched torpedoes; and	Mandatory
SRD-802	(g) estimated bearing to all detections meeting alert criteria.	Mandatory
SRD-797	3.9.8.6.6 The UDMS must provide a display of TORSIC data as time-scrolling narrowband frequency spectrograms.	Mandatory
SRD-804	3.9.8.6.7 The TORSIC spectrograms must provide operator control of frequency zoom, time averaging and background averaging.	Mandatory
SRD-805	3.9.8.6.8 The TORSIC spectrograms must provide operator cursor controlled display of time and frequency.	Mandatory
SRD-806	3.9.8.6.9 The TORSIC spectrograms must provide overlays that are indicators of currently set alert parameters.	Mandatory
SRD-803	3.9.8.6.10 The UDMS must provide a processing and audio replay function for TORSIC alerts, as selected and controlled by the operator.	Mandatory
SRD-187	3.9.9 Data Collection	Heading
SRD-143	3.9.9.1 The UDMS must include a Data Recording, Replay and Management System (DRRMS) in accordance with the Data Collection Requirements, Appendix 1 of this SRD.	Mandatory

ID		Requirement Type
SRD-157	3.9.10 Tactical Decision Aids	Heading
SRD-343	3.9.10.1 The UDMS must include Tactical Decision Aids tools for tactical planning, including multistatic sensor coordination.	Mandatory
SRD-192	3.9.10.2 The Tactical Decision Aids must be functionally interfaced with the overall UWSS and automatically use data from sensors and other external sources as required.	Mandatory
SRD-344	3.9.10.3 Database systems must manage data needed for the operation of the Tactical Decision Aids, including:	Mandatory
SRD-345	(a) ship signatures (including predicted ownship signature as a function of speed, manoeuvring and machinery state);	Mandatory
SRD-346	(b) threat target echo strengths; and	Mandatory
SRD-348	(c) hydrographic and bathymetric data.	Mandatory
SRD-349	3.9.10.4 The UDMS Tactical Decision Aids must calculate, accept operator input for, and display the following:	Mandatory
SRD-350	(a) AOPs;	Mandatory
SRD-351	(b) digital tactical charts;	Mandatory
SRD-352	(c) water space management tools;	Mandatory
SRD-353	(d) free form lines, circles and arcs on top of Tactical Plots;	Mandatory
SRD-354	(e) marine mammal mitigation zones of influence; and	Mandatory
SRD-355	(f) predicted physical behaviour of the TAPS, including position relative to the ship and curvature of the array, as a function of cable scope, ship's speed, and manoeuvres.	Mandatory
SRD-970	3.9.10.5 The UDMS Tactical Decision Aids should calculate, accept operator input for, and display the following:	Desirable
SRD-356	(a) digital navigation charts (desirable); and	Desirable
SRD-357	(b) Ocean Features Analysis (desirable).	Desirable
SRD-742	3.9.10.6 The predicted physical behaviour of the TAPS must be overlaid with the actual behaviour of the TAPS while deployed, as reported in real-time by the TAPS NAD modules.	Mandatory
SRD-197	3.9.10.7 For sonobuoys, the UDMS must provide tools for operators to draw equivalent bearing lines from sensor locations on digital tactical	Mandatory

ID		Requirement Type
	charts.	
SRD-1033	3.9.10.8 For all organic USCs, the UDMS must provide tools for operators to draw equivalent bearing lines relative to ownship on digital tactical charts.	Mandatory
SRD-478	3.9.10.9 The UDMS must provide tools for operators to draw equivalent bearing lines from sensor locations on active sonar displays.	Mandatory
SRD-477	3.9.10.10 The UDMS must perform estimates of marine mammal zones of influence.	Mandatory
SRD-476	3.9.10.11 Marine mammal zones of influence must be displayed on digital tactical charts.	Mandatory
SRD-1036	3.9.11 Target Motion Analysis	Heading
SRD-1040	3.9.11.1 The UDMS must perform Target Motion Analysis (TMA).	Mandatory
SRD-1048	3.9.11.2 The UDMS TMA derived contacts must form part of the RSSP.	Mandatory
SRD-1042	3.9.11.3 The UDMS TMA algorithms must automatically produce estimates of position, speed, and heading, with associated uncertainty estimates, bearings-only passive acoustic data.	Mandatory
SRD-1041	3.9.11.4 The UDMS must automatically initiate TMA on every bearings-only passive acoustic contact data with sufficiently high classification of submarine and torpedo, including TORSIC bearings.	Mandatory
SRD-1043	3.9.11.5 The UDMS must provide facility for operator initiation of TMA on other contacts of interest from non-acoustic sources.	Mandatory
SRD-1046	3.9.11.6 The automated TMA algorithm must include a facility that enters target velocity under operator control, and must constrain the TMA solution according to that velocity.	Mandatory
SRD-1049	3.9.11.7 The TMA tool must enable and disable the constraint, under operator control.	Mandatory
SRD-165	3.9.12 Acoustic Range Prediction	Heading
SRD-191	3.9.12.1 The UDMS must perform underwater Acoustic Range Prediction (ARP).	Mandatory
SRD-358	3.9.12.2 The UDMS ARP function must:	Mandatory
SRD-359	(a) utilize environmental data, including Ocean Features Analysis, threat, and own force data;	Mandatory
SRD-360	(b) convert the data through the use of various acoustic models into range predictions;	Mandatory
SRD-361	(c) display the results through meaningful visual graphics and tables for operators;	Mandatory

ID		Requirement Type
SRD-362	(d) utilize oceanographic and meteorological information in both its predictive form (model data), historical libraries, and observations (bathymetric probes);	Mandatory
SRD-363	(e) utilize model data as a full 4D representation (x-y-z over time) of the ocean and the atmosphere to account for boundaries in the water mass;	Mandatory
SRD-364	(f) include bathymetric data to represent the ocean bottom both in depth and type to include their impacts on acoustic propagation calculations;	Mandatory
SRD-365	(g) utilize threat and own force database information to calculate effective ranges;	Mandatory
SRD-838	(h) utilize estimated ownship radiated noise signature to calculate counter-detection ranges;	Mandatory
SRD-366	(i) directly modify elements of the Figure of Merit (FOM) equation, under operator control; and	Mandatory
SRD-367	(j) conduct bistatic range predictions for active sonobuoys.	Mandatory
SRD-144	3.9.12.3 The UDMS must implement a user interface that encompasses all user interface functions of the Mk8-F Bathythermograph Recording System as a local function on the UWSS workstations, eliminating the legacy Mk8-F legacy installation in the Ops Room.	Mandatory
SRD-142	3.9.12.4 The UDMS must incorporate the functions of the Mk8-F Bathythermograph Recording System, that supports the following probe types: 6655-00-162-2479, PROBE, BATHYTHERMOGRAPH (400M depth) 6655-00-932-1353, PROBE, BATHYTHERMOGRAPH (2000M depth) 6680-01-187-0817, PROBE, VELOCIMETER (2000M depth)	Mandatory
SRD-1136	3.9.12.5 The UDMS must implement a database to manage information for the operation of the Acoustic Range Prediction, including:	Mandatory
SRD-1137	(a) bathymetric data;	Mandatory
SRD-1138	(b) bottom type;	Mandatory
SRD-1139	(c) ambient noise levels;	Mandatory
SRD-1140	(d) oceanographic data;	Mandatory
SRD-1143	(e) environmental data;	Mandatory
SRD-1141	(f) meteorological forecast data; and	Mandatory

ID		Requirement Type
SRD-1142	(g) meteorological observational data.	Mandatory
SRD-1147	3.9.12.6 The UDMS must import, under operator control, all of the different types of data specified in Section 3.9.12.5 into the database, from files on digital media that are specified in Comma-Separated Values format.	Mandatory
SRD-1413	3.9.12.7 The UDMS must import and store no less than twenty (20) files from digital media into the database, under operator control.	Mandatory
SRD-1149	3.9.12.8 The UDMS must remove an imported file, under operator control.	Mandatory
SRD-1414	3.9.12.9 For each imported file, the UDMS must incorporate user file metadata including source, version, and description information in operator modifiable fields, under operator control.	Mandatory
SRD-1415	3.9.12.10 For each imported file, the UDMS must modify the source, version, and description information in operator modifiable fields, under operator control.	Mandatory
SRD-1416	3.9.12.11 The UDMS must store the source, version, and description information of all imported files.	Mandatory
SRD-1152	3.9.12.12 The UDMS must display the source, version, and description information of all imported files, under operator control.	Mandatory
SRD-1417	3.9.12.13 For each imported file, the UDMS must store the user file metadata and timestamp of import information.	Mandatory
SRD-1418	3.9.12.14 The UDMS must display the user file metadata and timestamp of import information of all imported files, under operator control.	Mandatory
SRD-1419	3.9.12.15 The UDMS must delete each of the different of the types of data specified in Section 3.9.12.5 from the database, under operator control.	Mandatory
SRD-1148	3.9.12.16 The UDMS must display all or subset of the database contents, under operator control.	Mandatory
SRD-1150	3.9.12.17 The UDMS must manually modify all and subsets of the types of data specified in Section 3.9.12.5 in the database, under operator control.	Mandatory
SRD-1153	3.9.12.18 The UDMS must utilize all and subsets of the types of data specified in Section 3.9.12.5 in the database to perform underwater Acoustic Range Prediction, under operator control.	Mandatory
SRD-1499	3.9.12.19 The UDMS must allow the operators to capture screen images of Acoustic Range Prediction results in jpeg format from all UWSS Operator consoles.	Mandatory
SRD-1500	3.9.12.20 The UDMS must annotate the captured screen images of Acoustic Range Prediction results with originating source (UWSS Operator console), the time and date and ship's location.	Mandatory

ID		Requirement Type
SRD-1501	3.9.12.21 The UDMS must export captured screen images of Acoustic Range Prediction results, under operator control.	Mandatory
SRD-1502	3.9.12.22 The UDMS must have an interface to provide personnel access to the exported captured screen images of Acoustic Range Prediction results using a means compliant with the derived security requirements for the UWSS.	Mandatory
SRD-189	3.9.13 Ownship Noise Monitoring	Heading
SRD-190	3.9.13.1 The UDMS must perform Ownship Noise Monitoring (ONM).	Mandatory
SRD-812	3.9.13.2 The ONM system must monitor all frequencies between \$ONM_FMIN\$ Hz and \$ONM_FMAX\$ Hz using the TAPS, HMS and hull-mounted TORSIC USCs when these USCs are deployed and operational.	Mandatory
SRD-1182	3.9.13.3 The ONM system must monitor all available subsets of frequencies between \$ONM_FMIN\$ Hz and \$ONM_FMAX\$ Hz in cases where not all USCs are deployed or operational.	Mandatory
SRD-813	3.9.13.4 The ONM system must calculate and display estimates of the actual real-time ownship narrowband and broadband acoustic signatures in dB re 1 μ Pa at 1 meter using sensor calibration data and transfer functions.	Mandatory
SRD-835	3.9.13.5 The ONM system must calculate estimates of ownship acoustic signatures based on a single USC and on combinations of USCs, as selected by the operator.	Mandatory
SRD-814	3.9.13.6 The ONM system must calculate and display estimated ownship acoustic signatures at a rate of no less than once every ten (10) seconds.	Mandatory
SRD-827	3.9.13.7 The ONM system should calculate and display estimated ownship acoustic signatures at a rate of no less than once every one (1) seconds.	Desirable
SRD-881	3.9.13.8 The ONM system should estimate and display of ambient noise levels in dB re 1 μ Pa ² /Hz.	Desirable
SRD-823	3.9.13.9 The ONM system must enter the following ship propulsion and machinery state information manually, and update the information as necessary, under operator control:	Mandatory
SRD-816	(a) port and starboard shaft rate;	Mandatory
SRD-817	(b) port and starboard propeller pitch;	Mandatory
SRD-818	(c) rudder angle; and	Mandatory
SRD-819	(d) ship's tactical stance (i.e., quiet states associated with machinery running bills).	Mandatory

ID		Requirement Type
SRD-815	3.9.13.10 The ONM system should acquire and record the ship's propulsion and machinery state directly from the Integrated Platform Management System (IPMS) or indirectly from the CMS 330.	Desirable
SRD-820	3.9.13.11 Updates of the ship propulsion and machinery state information should be no less than once per second.	Desirable
SRD-811	3.9.13.12 The design of ONM must allow input from additional sensors, including inboard fitted accelerometers.	Mandatory
SRD-821	3.9.13.13 The ONM operator control and display must be available and selectable by operators at every UWSS workstation.	Mandatory
SRD-842	3.9.13.14 The ONM system must implement a signature database consisting of narrowband and broadband historical and class average signatures versus frequency.	Mandatory
SRD-843	3.9.13.15 The ONM signature database must enter and manage the data contained in the database, under operator control.	Mandatory
SRD-840	3.9.13.16 The ONM system must provide a feature of the signature database that enters machinery tonal information that includes specifically machinery identifier, compartment, and, all known tonal frequencies, under operator control.	Mandatory
SRD-831	3.9.13.17 The ONM system must provide operator selection of historical and class average radiated noise signatures to form a baseline for comparison against the ONM calculated estimates.	Mandatory
SRD-832	3.9.13.18 The ONM system must define alert thresholds versus frequency against the baseline, under operator control.	Mandatory
SRD-836	3.9.13.19 The ONM system must define alert thresholds individually for specific USCs and in combination, under operator control.	Mandatory
SRD-833	3.9.13.20 The ONM baseline for the expected ownship noise level must be defined on a per sensor basis.	Mandatory
SRD-822	3.9.13.21 The ONM operator display must include:	Mandatory
SRD-824	(a) ship's propulsion and machinery state;	Mandatory
SRD-825	(b) ship's speed, heading, pitch and roll;	Mandatory
SRD-826	(c) environmental information, including wind speed and wave height;	Mandatory
SRD-828	(d) estimated ship's radiated noise signature;	Mandatory
SRD-829	(e) overlays of historical and class average radiated noise signatures; and	Mandatory
SRD-830	(f) overlays of operator defined alert thresholds.	Mandatory

ID		Requirement Type
SRD-837	3.9.13.22 The ONM system must compare the estimated ownship radiated noise signature against the defined thresholds, and raise an alert when those thresholds are exceeded.	Mandatory
SRD-841	3.9.13.23 When alerts occur, the ONM system must automatically attempt to associate known machinery tonals with the event and display the results on the ONM display.	Mandatory
SRD-1480	3.9.14 Transient Detection and Processing Requirements	Heading
SRD-1486	3.9.14.1 The UDMS must define alert thresholds for acoustic transients versus frequency and amplitude, under operator control.	Mandatory
SRD-1487	3.9.14.2 The UDMS must reprocess and aurally replay detected acoustic transients under operator control in order to aid in classification of the source.	Mandatory
SRD-156	3.9.15 Marine Mammal Mitigation Requirements	Heading
SRD-801	3.9.15.1 The UDMS must implement capabilities, tools and databases that will allow the ship's operators to implement Marine Mammal Mitigation Procedures as required by operational authorities, including:	Mandatory
SRD-1474	(a) active sonar control;	Mandatory
SRD-1475	(b) tactical decision aids;	Mandatory
SRD-1476	(c) operator aids for Marine Mammal classification; and	Mandatory
SRD-1477	(d) automated alerts.	Mandatory
SRD-1473	3.9.15.2 The UDMS must define alert thresholds for Marine Mammal vocalizations versus frequency and amplitude, under operator control.	Mandatory
SRD-1470	3.9.15.3 The UDMS must reprocess and aurally replay detected Marine Mammal vocalizations under operator control in order to aid in classification of the source.	Mandatory
SRD-246	3.9.16 Alerts	Heading
SRD-967	3.9.16.1 Alerts must be implemented in a manner consistent with the requirements as stated in MIL-STD-1472F.	Mandatory
SRD-795	3.9.16.2 The UDMS must implement the following automated alerts, and display these alerts at each operator workstation immediately when they occur:	Mandatory
SRD-248	(a) when the TAPS towed system is within 50 meters of the seabed;	Mandatory
SRD-	(b) when torpedo automatic detection occurs;	Mandatory

ID		Requirement Type
895		
SRD-249	(c) when TORSIC active sonar detection criteria are met;	Mandatory
SRD-839	(d) when ONM radiated noise thresholds are exceeded;	Mandatory
SRD-906	(e) when automatic detection of the operation of Underwater Telephones and Emergency Locator signals occur;	Mandatory
SRD-1471	(f) when automatic detection of acoustic transients occur; and	Mandatory
SRD-1472	(g) when automatic detection of Marine Mammal vocalizations occur.	Mandatory
SRD-247	3.9.16.3 All alerts must be accompanied by an audible warning.	Mandatory
SRD-158	3.10 Training System Requirements	Heading
SRD-932	3.10.1 General	Heading
SRD-933	3.10.1.1 The Training Systems delivered with the UWSS must include all hardware, software and training materials for training Sonar Operators, Weapons Engineering Technicians, Combat Systems Engineering Officers and Underwater Warfare Directors as necessary to permit operation and maintenance of the UWSS in order to meet the requirements of this SRD.	Mandatory
SRD-941	3.10.1.2 Training systems and materials must be developed using an approach that is consistent with DAOD 5031-2 and NAVORD 4500-0, and that meets the intent of the Future Naval Training System Strategy (FNTSS) to the greatest extent possible.	Mandatory
SRD-942	3.10.1.3 In conjunction with the Naval Personnel Training Group (NPTG), the UWSU Project has initiated a Training Needs Analysis (TNA) during the Definition Phase, to be completed during Implementation Phase.	Information
SRD-943	3.10.1.4 The training programs and the Training Systems and materials must be developed in a manner consistent with the TNA.	Mandatory
SRD-934	3.10.1.5 The Training Systems delivered must implement the Canadian Forces Individual Training Education System (CFITES) methodology.	Mandatory
SRD-935	3.10.1.6 The Training Systems methodology must include both conventional classroom format with provision for "hands-on" time.	Mandatory
SRD-405	3.10.2 On-board Operator Training	Heading
SRD-931	3.10.2.1 The Operator Training Capability must include all hardware, software and training materials for training Sonar Operators, Weapons Engineering Technicians and Underwater Warfare Directors as necessary to permit operation of the UWSS to meet the requirements of this SRD.	Mandatory

ID		Requirement Type
SRD-982	3.10.2.2 The Operator Training Capability must replay recorded data, on-board.	Mandatory
SRD-1191	3.10.2.3 The Operator Training Capability must use simulated scenarios for training.	Mandatory
SRD-936	3.10.2.4 An UWW operator team training capability must be embedded in the Halifax-class frigates by interfacing the UWSS OBT with the CMS 330 SETT and its environment, as a minimum, to deliver onboard training capability for Continuation Training (CT), and Operations Training (OT).	Mandatory
SRD-408	3.10.2.5 The UDMS must provide real-time replay of previously recorded sensor data from all USCs, as selected by the operator.	Mandatory
SRD-409	3.10.2.6 The UDMS must provide no less than two (2) times faster than real-time replay of previously recorded sensor data from every USC.	Mandatory
SRD-410	3.10.2.7 The UDMS should provide no less than four (4) times faster than real-time replay of previously recorded sensor data from every USC.	Desirable
SRD-971	3.10.2.8 The UDMS must conduct training in a fully realistic environment that can be altered by the SHOW (Senior hand of the watch) and the SETT acting as the game piece operator (GPO).	Mandatory
SRD-1176	3.10.2.9 The UDMS must modify, as selected by the SHOW and the SETT acting as GPO, variables such as Fade in, Fade out, intermittent contact, and the frequencies shown in the passive mode.	Mandatory
SRD-972	3.10.2.10 The UDMS must realistically display these simulated contacts inclusive of effects of Doppler, speed of the target, and the USC employed in the simulation.	Mandatory
SRD-980	3.10.2.11 The ocean environment for the UDMS On-board operator synthetic training must not be modeled, but rather, the training system must be fully dependent on the GPO for the simulation of detection ranges.	Mandatory
SRD-981	3.10.2.12 The ocean environment for the UDMS On-board operator synthetic training must be homogeneous.	Mandatory
SRD-973	3.10.2.13 The UDMS must conduct full operator training alongside and at sea with and without sensors deployed, and independently and in conjunction with the CMS.	Mandatory
SRD-974	3.10.2.14 The Training System must define, save, edit, download and execute training scenarios and contacts.	Mandatory
SRD-975	3.10.2.15 The UDMS must conduct training as a fully synthetic environment in a mode that is dependent on SETT for injects of targets and in a mode that is independent of SETT and CMS where the SHOW (Senior Hand Of the Watch) console may inject contacts and change the environment to suit training needs.	Mandatory
SRD-1107	3.10.2.16 The Training System must support complete UDMS functionality while conducting training.	Mandatory

ID		Requirement Type
SRD-1108	3.10.2.17 The Training System must not interfere with real-time operational function of the UDMS.	Mandatory
SRD-1109	3.10.2.18 The Training System must be prevented from enabling active transmission on all USCs.	Mandatory
SRD-1110	3.10.2.19 When the UDMS is conducting training, the UDMS must continuously indicate the components being used for training.	Mandatory
SRD-406	3.10.3 Shore-based Operator Training	Heading
SRD-937	3.10.3.1 A UWSS shore-based team training capability will be delivered at a later date as it is out of scope for this SRD. This capability will be delivered with the MRT Project (when implemented) at NFS(A) and NFS(P). As the UWSS is expected to receive frequent software and hardware updates, this training capability will be delivered in the form of a stimulated (vice emulated) equipment solution capable of interfacing with the Distributed Mission Operations Centre (DMOC) game master.	Information
SRD-1112	3.10.3.2 UWSS design and selection of technologies should be such as to ease transition to future training systems as described by the FNTSS and associated projects.	Desirable
SRD-940	3.10.3.3 As an interim operator training capability, NFS(A) and (P) will utilize ships' embedded training in lieu of a shore-based operations trainer.	Information
SRD-1026	3.10.3.4 Shore-based Operator Training should include Computer-based Training (CBT) as an interim means to develop basic operator proficiency.	Desirable
SRD-1027	3.10.3.5 The CBT should maximize the use of the operational UDMS software.	Desirable
SRD-407	3.10.4 Shore-based Maintainer Training	Heading
SRD-939	3.10.4.1 The Maintainer Training Capability must include all hardware, software and training materials for training Weapons Engineering Technicians and Combat Systems Engineering Officers undergoing military occupation phase training as necessary to permit first-line maintenance of the UWSS to meet the requirements of this SRD.	Mandatory
SRD-1029	3.10.4.2 Maintainer training capability must include a mix of classroom and emulated systems for all inboard processing systems, operator workstations, and sensor handling systems.	Mandatory
SRD-1032	3.10.4.3 Emulated Maintainer training capability may be integrated into the existing Vista maintainer trainer.	Optional
SRD-938	3.10.4.4 Maintainer training described in Section 3.10.4.3 will be conducted at NFS(A) in Halifax, Nova Scotia, and NFS(P) in Esquimalt, British Columbia.	Information
SRD-	3.10.4.5 Maintainer training capability may include actual system	Optional

ID		Requirement Type
1030	components installed at a shore facility where it is deemed classroom and emulated systems are insufficient to develop adequate maintainer proficiency.	
SRD-1031	3.10.4.6 Maintainer training described in Section 3.10.4.5 will be conducted at NFS(A) in Halifax, Nova Scotia.	Information
SRD-159	3.11 Post Mission Analysis Requirements	Heading
SRD-984	3.11.1 The Post Mission Analysis capability delivered with the UWSS must provide analysis levels up to and including full level 4.	Mandatory
SRD-983	3.11.2 The Post Mission Analysis capability must be integrated into the ADAC Digital Preview Processor system.	Mandatory
SRD-160	3.12 Support, Tools and Test Equipment Requirements	Heading
SRD-604	3.12.1 The support, tools and test equipment provided with the UWSS must provide full first-line maintenance support of the UWSS.	Mandatory
SRD-600	3.12.2 The support, tools and test equipment provided with the UWSS must provide full second-line maintenance support of the USC wet-end sensors, namely:	Mandatory
SRD-601	(a) the TAPS towed system, including all acoustic and non-acoustic sensors down to the LRU level, tow cables and connectors, and onboard handling and stowage systems;	Mandatory
SRD-602	(b) the HMS sensor system, including all acoustic sensors down to the LRU level, cables and connectors, and onboard handling and stowage systems; and	Mandatory
SRD-603	(c) the hull mounted TORSIC sensor system, including all acoustic sensors down to the LRU level, cables and connectors, and onboard handling and stowage systems.	Mandatory
SRD-599	3.12.3 The support, tools and test equipment provided with the UWSS must, for first and second line maintenance as described, include:	Mandatory
SRD-605	(a) all specialized test equipment; and	Mandatory
SRD-606	(b) all specialized shore-side handling equipment, including reelers;	Mandatory
SRD-1251	3.13 Shore-based UWSS System for Combat Systems at Combat Systems Support Center (East)	Heading
SRD-1252	3.13.1 General Requirements	Heading
SRD-1253	3.13.1.1 The Shore-based UWSS System will consist of a combination of stimulators, emulators, simulators, shipboard-equivalent, and shipboard UWSS equipment to provide a fully functional and operational UWSS system with the identical capability, and identical or higher fidelity as the	Information

ID		Requirement Type
	shipboard UWSS system for the purposes of:	
SRD-1254	(a) Combat Systems development, test, and integration activities;	Information
SRD-1255	(b) UWSS system test and trials, and integration activities; and	Information
SRD-1256	(c) UWSS system software verification activities prior to installation on a shipboard UWSS system.	Information
SRD-1257	3.13.1.2 The Shore-based UWSS System must include all hardware components, software components, associated cabling, mounting hardware, and racks.	Mandatory
SRD-1258	3.13.1.3 The Shore-based UWSS System must be a fully functional and operational UWSS system with the identical capability as the shipboard UWSS system.	Mandatory
SRD-1259	3.13.1.4 The Shore-based UWSS System must have the identical or higher fidelity as the shipboard UWSS system.	Mandatory
SRD-1260	3.13.1.5 The Shore-based UWSS System must maximize the re-use of shipboard hardware and software components such that the shore-based UWSS system can be used for:	Mandatory
SRD-1261	(a) Combat Systems development, test, and integration activities;	Mandatory
SRD-1262	(b) UWSS system test and trials, and integration activities; and	Mandatory
SRD-1263	(c) UWSS system software verification activities prior to installation on a shipboard UWSS system.	Mandatory
SRD-1264	3.13.1.6 The Shore-based UWSS System must reproduce all inputs the USCs would receive at sea.	Mandatory
SRD-1265	3.13.1.7 The Shore-based UWSS System must interface with the Combat Systems synthetic environment at CSSC(E) to maintain an overall coordinated Combat Systems environment.	Mandatory
SRD-1266	3.13.1.8 The Shore-based UWSS System must connect to the CMS 330 interface of the Combat Systems synthetic environment at CSSC(E).	Mandatory
SRD-1267	3.13.1.9 The Shore-based UWSS System must connect to the NavDDS interface of the Combat Systems synthetic environment at CSSC(E).	Mandatory
SRD-1272	3.13.2 Stimulated, Simulated, and Emulated UWSS Equipment	Heading
SRD-1273	3.13.2.1 The Shore-based UWSS System must consist of a combination of stimulators, emulators, and simulators for each of the following UWSS equipment:	Mandatory
SRD-1274	(a) Sonobuoy Processing System;	Mandatory
SRD-	(b) Hull Mounted Sonar System;	Mandatory

ID		Requirement Type
1275		
SRD-1276	(c) Towed Active and Passive Sonar System;	Mandatory
SRD-1277	(d) Hull Mounted Torpedo Sonar Intercept and Classification System; and	Mandatory
SRD-1278	(e) Bathythermograph Recorder System.	Mandatory
SRD-1279	3.13.2.2 The stimulated, emulated, and simulated UWSS equipment must reproduce all sensor inputs it receives, under control of the Combat Systems synthetic environment.	Mandatory
SRD-1280	3.13.2.3 The stimulated, emulated, and simulated UWSS equipment must simulate all equipment faults that can be reported to the UDMS, under operator control.	Mandatory
SRD-1281	3.13.2.4 The stimulated, emulated, and simulated UWSS equipment must maximize the re-use of shipboard hardware and software components.	Mandatory
SRD-1282	3.13.3 Shipboard UWSS Equipment	Heading
SRD-1283	3.13.3.1 The Shore-based UWSS System must consist of the following shipboard UWSS equipment:	Mandatory
SRD-1284	(a) Underwater Data Management System; and	Mandatory
SRD-1285	(b) All other miscellaneous shipboard UWSS equipment.	Mandatory
SRD-1286	3.13.3.2 The shipboard UWSS equipment must be loaded and operated with shipboard software.	Mandatory
SRD-1287	3.13.4 Shipboard-Equivalent UWSS Equipment	Heading
SRD-1288	3.13.4.1 The Shore-based UWSS System must consist of the following equipment with functional capability equivalent to shipboard UWSS equipment:	Mandatory
SRD-1289	(a) Operator Workstations.	Mandatory
SRD-1290	3.13.4.2 The shipboard-equivalent UWSS equipment must maximize the re-use of shipboard software.	Mandatory
SRD-6	4 SPECIALTY ENGINEERING REQUIREMENTS	Heading
SRD-32	4.1 Reliability, Availability, and Maintainability Requirements	Heading
SRD-1194	4.1.1 A Halifax-class frigate could be deployed for up to 250 days per year in a high readiness state. When deployed, the ship will be required to perform tasks. These tasks will be performed continuously 24 hours	Information

ID		Requirement Type
	per day for periods of up to 90 days.	
SRD-40	4.1.2 The UWSS must perform continuous underway operation 24 hours per day to meet HR SSID mission requirements without system failure, where a failure is every event that adversely affects the mission.	Mandatory
SRD-1193	4.1.3 Reliability	Heading
SRD-1195	4.1.3.1 The UWSS must have a system reliability of greater than 95% for a mission lasting 90 days operating continuously 24 hours a day.	Mandatory
SRD-1458	4.1.3.2 All UWSS Shore systems must each have a system reliability of 100% for a period of no less than 30 continuous days and an annual reliability of over 95% over 180 continuous days.	Mandatory
SRD-1196	4.1.4 Availability	Heading
SRD-1197	4.1.4.1 The UWSS system availability must support deployments as defined in paragraph 4.1.1.	Mandatory
SRD-1198	4.1.4.2 The UWSS system design must minimize single points of failure.	Mandatory
SRD-1199	4.1.4.3 The loss of any one UWSS subsystem or USC must not cause the loss of the entire UWSS capability.	Mandatory
SRD-1200	4.1.4.4 The UWSS must achieve no less than 99% availability, 24 hours a day, seven days a week, throughout a deployed period of up to 90 days.	Mandatory
SRD-1205	4.1.4.5 The UWSS must be available for no less than 250 days per calendar year.	Mandatory
SRD-1459	4.1.4.6 All UWSS Shore systems must each have an availability of no less than 180 days per calendar year.	Mandatory
SRD-74	4.1.5 Maintainability	Heading
SRD-1201	4.1.5.1 UWSS maintenance processes must consider the high level of self-sufficiency required by the ship for periods no less than, and sometimes exceeding, six months, where access to off-board spares and shore technical assistance will be unavailable for periods of up to 90 days.	Mandatory
SRD-1202	4.1.5.2 The UWSS maintenance program must support a 60-month period of operation between major docking work periods.	Mandatory
SRD-1203	4.1.5.3 UWSS System design and implementation must minimize maintenance requirements and minimize requirements for on-board spares.	Mandatory
SRD-1204	4.1.5.4 The UWSS maintenance cycle must take into consideration the fact that a ship could be deployed for up to 250 days per year in a high readiness state.	Mandatory
SRD-	4.1.5.5 Each unit of the UWSS must be designed and fabricated using	Mandatory

ID		Requirement Type
62	modular concepts for ease of maintenance, with low-level easily replaced modules and cards for all electronic functions.	
SRD-63	4.1.5.6 All subassemblies and Line Replaceable Units (LRUs) must be easily accessible and readily removable for repair.	Mandatory
SRD-64	4.1.5.7 Keying or its equivalent must be used to prevent incorrect positioning of every module, connector, and printed circuit card.	Mandatory
SRD-65	4.1.5.8 Positive stops must be provided on every hinged door and panel to lock it in the open position.	Mandatory
SRD-66	4.1.5.9 For all equipment, a system ground strap must be provided, conforming to MIL-STD-1310E, for connecting to the vessel's common ground bus.	Mandatory
SRD-67	4.1.5.10 External incandescent status lights, if used, must be re-lampable from the front of the equipment in question.	Mandatory
SRD-68	4.1.5.11 Normally-off lamps must have push-to-test or other similar test provisions, if applicable.	Mandatory
SRD-168	4.1.5.12 Local maintainer interfaces must be provided as built-in components in each space in which UWSS is installed.	Mandatory
SRD-169	4.1.5.13 Local maintainer interfaces should minimize the need to plug in external diagnostic devices such as laptop computers and specialized diagnostic tools.	Desirable
SRD-399	4.1.5.14 The UWSS must include Built-in Test (BIT) functions to monitor for faults on all UWSS components down to the LRU level.	Mandatory
SRD-398	4.1.5.15 To aid in the operator identification of bad sensor channels, BIT must include sensor level diagnostic displays for all USCs with the exception of the SPS.	Mandatory
SRD-400	4.1.5.16 Sensor level diagnostic BIT displays must provide a continual colour map of integrated intensity versus frequency for each sensor channel.	Mandatory
SRD-401	4.1.5.17 The integration period for the sensor BIT colour map must be operator selectable between one (1) and ten (10) seconds.	Mandatory
SRD-1460	4.1.5.18 Design requirements for maintainability for UWSS Shipboard Systems must be applied to all UWSS Shore systems.	Mandatory
SRD-75	4.1.6 Redundancy	Heading
SRD-76	4.1.6.1 The UWSS must interact with every subsystem from each of the UWSS operator workstations in the Ops Room.	Mandatory
SRD-1192	4.1.6.2 The UWSS must perform every function from each of the UWSS operator workstations in the Ops Room, under Operators and Maintainers control.	Mandatory
SRD-77	4.1.6.3 Interfaces between UWSS components must be a dual redundant network, where failure of one network system will not disrupt the	Mandatory

ID		Requirement Type
	operations of the UWSS.	
SRD-404	4.1.6.4 Interfaces between UWSS and external systems should provide redundancy where possible.	Desirable
SRD-78	4.1.6.5 Processing capacity in the UWSS must allow for assumption of processing load by alternate processors when failures occur.	Mandatory
SRD-403	4.1.6.6 UWSS must redistribute the processing loads in the event of failure, under operator control.	Mandatory
SRD-402	4.1.6.7 Redistribution of processing loads in the event of failure should be automatic.	Desirable
SRD-33	4.2 Health and Safety Requirements	Heading
SRD-1011	4.2.1 General	Heading
SRD-1012	4.2.1.1 The UWSS must be compliant with ANEP-77.	Mandatory
SRD-1022	4.2.1.2 Safety features implemented for the UWSS to prevent damage to equipment must be disabled using a Battle-short capability, as selected by the operator.	Mandatory
SRD-72	4.2.2 Hazardous Materials	Heading
SRD-69	4.2.2.1 In accordance with MIL-HDBK-2036, the following materials must not be used in the shipboard and shore-based equipment: (a) Carcinogens; (b) Exposed glass fibers; (c) Lithium and lithium compounds, except batteries approved for the intended service conditions; (d) Magnesium and magnesium alloys; (e) Polyvinyl Chloride (PVC); (f) Radioactive materials; and (g) Zinc and zinc alloys.	Mandatory
SRD-73	4.2.3 Electrical Hazards	Heading
SRD-70	4.2.3.1 In accordance with MIL-HDBK-2036, UWSS shipboard and shore-based equipment must be designed such that personnel cannot be exposed to voltages in excess of 30 Volts Alternating Current (VAC).	Mandatory
SRD-1173	4.2.3.2 In accordance with MIL-HDBK-2036, UWSS shipboard and shore-based equipment must be designed such that personnel cannot be exposed to voltages in excess of 60 Volts Direct Current (VDC).	Mandatory
SRD-71	4.2.3.3 All high voltage circuits must discharge to less than 30 volts within two seconds of power being removed.	Mandatory
SRD-	4.3 System Security Requirements	Heading

ID		Requirement Type
484		
SRD-1015	4.3.1 General System Security Requirements	Heading
SRD-948	4.3.1.1 The UWSS must protect assets, including technology, components and information, from compromise by implementing security solutions, as approved by Canada, and by meeting the security requirements and the security outcome requirements from the SOW, SRD, and UWSU System Security Requirements, Volume 2 Annex C Appendix 3 that mitigate risks posed by threats and vulnerabilities.	Mandatory
SRD-947	4.3.1.2 The UWSS must protect assets by implementing security solutions, as approved by Canada, from CSEC ITSG-33 Annex 3A, Security Controls Catalogue for each security outcome requirement in the UWSU System Security Requirements, Volume 2 Annex C Appendix 3 and derived requirements from the system architecture design process.	Mandatory
SRD-1447	4.3.1.3 Upon loading of an operational National Acoustic Library Database or upon processing of specific sensor or performance data, the UWSS will have a security classification of SECRET CANADIAN EYES ONLY. Unless otherwise determined or defined through the Security Working Group, the UWSS will at all other times have a security classification of CAN-SECRET.	Information
SRD-949	4.3.2 Mission-Critical Functions Requirements	Heading
SRD-950	4.3.2.1 For the components of the mission-critical functions, the UWSS must establish basic protection requirements unless justified by a cost-benefit analysis approved by Canada.	Mandatory
SRD-951	4.3.2.2 Those basic protections must consist of:	Mandatory
SRD-953	(a) Establish least privilege using distrustful decomposition (privilege reduction) or a similar approach to move mission-critical functions into separate mutually untrusting programs (see CMU/SEI-2009-TR-010, Secure Design Patterns);	Mandatory
SRD-954	(b) Physical and logical diversification of critical components for mission-critical functions that require redundancy to meet reliability and safety requirements;	Mandatory
SRD-955	(c) Physical and logical diversification with voting to establish trustworthiness of selected mission-critical function components;	Mandatory
SRD-956	(d) Wrappers for pre-existing COTS, MOTS, and legacy software to enforce strong typing, context checking and other interface validation methods for interfaces with mission-critical functions (see CMU/SEI-2009-TR-010, Secure Design Patterns); and	Mandatory
SRD-	(e) Wrappers for pre-existing COTS, MOTS, and legacy software to	Mandatory

ID		Requirement Type
957	identify and log invalid interface data using secure logging approaches (see CMU/SEI-2009-TR-010, Secure Design Patterns).	
SRD-35	4.4 Supportability Requirements	Heading
SRD-36	4.4.1 The UWSS must have a life expectancy through to the end of life of the Halifax-class.	Mandatory
SRD-38	4.4.2 The UWSS must be designed using COTS components and commercial standards to accommodate ongoing and continuous obsolescence management and periodic technology refresh.	Mandatory
SRD-37	4.4.3 The UWSS must be designed with open architecture principles that accommodate upgrades of hardware and software components.	Mandatory
SRD-7	5 ENVIRONMENTAL REQUIREMENTS	Heading
SRD-34	5.1 Ship's motion and Sea State	Heading
SRD-60	5.1.1 The UWSS shipboard equipment must remain fully operational for all vessel motion and attitude conditions in accordance with MIL-STD-1399, Section 301.	Mandatory
SRD-48	5.1.2 The UWSS shipboard equipment must have a sustained full operational capability in conditions no less than the upper limit of Sea State 5.	Mandatory
SRD-49	5.1.3 The UWSS shipboard equipment must have a sustained full operational capability at all ship's speeds from zero (0) to \$MAX_OWNSHIP_SPEED\$ knots and turn rates from zero (0) to \$MAX_OWNSHIP_TURNRATE\$ degrees per second in either direction at that maximum speed, for a period of no less than 30 minutes.	Mandatory
SRD-47	5.1.4 The UWSS shipboard equipment must survive conditions no less than Sea State 8.	Mandatory
SRD-737	5.1.5 The TAPS towed system, while deployed, must survive conditions no less than Sea State 6.	Mandatory
SRD-740	5.1.6 The TAPS towed system, while deployed, must survive external pressures equivalent to being hung vertically from the ship at maximum cable scope.	Mandatory
SRD-41	5.2 Mechanical Shock	Heading
SRD-51	5.2.1 The UWSS shipboard equipment must be qualified to the Grade A Class II shock loading requirements for deck mounted equipment, as specified in MIL-S-901.	Mandatory
SRD-52	5.2.2 Shock isolators may be fitted as part of the UWSS to meet the above requirement and, if used, these must be supplied with each shipboard equipment delivered, as appropriate.	Mandatory

ID		Requirement Type
SRD-42	5.3 Vibration	Heading
SRD-50	5.3.1 The UWSS must meet the requirements for Type I tests, as specified in MIL-STD-167-1A.	Mandatory
SRD-53	5.4 Acoustic Noise	Heading
SRD-54	5.4.1 The UWSS must meet the requirements for Grade A3 equipment as specified in MIL-STD-1474 Section 5.0.	Mandatory
SRD-55	5.5 Structure Borne Noise	Heading
SRD-56	5.5.1 The UWSS must meet the requirements for Type III equipment as specified in MIL-STD-740-2.	Mandatory
SRD-43	5.6 Electromagnetic Effects	Heading
SRD-58	5.6.1 The UWSS equipment must meet the requirements of MIL-STD-461F for surface ship installed equipment.	Mandatory
SRD-59	5.6.2 Filters may be included as part of the shipboard equipment to meet the above requirement and, if used, must be supplied with each UWSS shipboard equipment installation, as appropriate.	Mandatory
SRD-57	5.6.3 The UWSS shipboard equipment must operate and not be harmed when within magnetic fields, as follows: (a) Operating - 5 Gauss; (b) Non-operating - 30 Gauss; and (c) Storage - 30 Gauss.	Mandatory
SRD-44	5.7 Temperature, Humidity, Wind and Solar Radiation	Heading
SRD-738	5.7.1 The TAPS towed system must remain operable in water temperatures between -2 and +35 degrees Celsius.	Mandatory
SRD-1103	5.7.2 The TAPS including handling and stowage system must remain operable in air temperatures between -2 and +50 degrees Celsius.	Mandatory
SRD-739	5.7.3 The TAPS towed system must be stored in temperatures between -40 and +50 degrees Celsius without damage.	Mandatory
SRD-1446	5.7.4 The UWSS components exposed at any time to weather during deployment, operation and retrieval must continue to function in accordance with all requirements of this SRD under all conditions as specified in paragraphs 3.1.1.1.2 and 3.1.1.1.3 of this SRD.	Mandatory
SRD-1002	5.7.5 The UWSS components exposed to the weather must operate in accordance with this SRD when exposed to the solar environment described in MIL-STD-810G, method 505.5 Procedure II.	Mandatory
SRD-1003	5.7.6 The UWSS must operate in accordance with this SRD in a 95% humidity condensing environment.	Mandatory

ID		Requirement Type
SRD-995	5.8 Rainfall, Dust and Spray	Heading
SRD-996	5.8.1 The UWSS components exposed to the weather must operate in accordance with this SRD under rainfall conditions of 0.8 millimeters per minute.	Mandatory
SRD-997	5.8.2 The UWSS components exposed to the weather must operate in accordance with this SRD under dust concentrations of 1 gram per cubic meter.	Mandatory
SRD-998	5.8.3 The UWSS components located in a sheltered environment must operate in accordance with this SRD when in a drip environment as identified in MIL-STD-810G, method 506.5, Procedure III.	Mandatory
SRD-999	5.8.4 The UWSS components that are exposed to sea water and weather must be watertight, spray tight, and dust proof in accordance with MIL-STD-108E.	Mandatory
SRD-45	5.9 Ice	Heading
SRD-993	5.9.1 The UWSS components that are exposed to weather must operate in accordance with this SRD when subjected to conditions that produce icing loads of no less than 20 kilograms per square meter.	Mandatory
SRD-994	5.9.2 The UWSS components that are exposed to weather must not be damaged by an icing load of no less than 37 kilograms per square meter.	Mandatory
SRD-46	5.10 Corrosion	Heading
SRD-991	5.10.1 The UWSS components that are exposed to sea water and weather must be constructed from galvanic compatible materials.	Mandatory
SRD-992	5.10.2 The UWSS components that are exposed to sea water and weather must be constructed from materials with surface treatments in order to preclude failure due to oxidation and corrosion.	Mandatory
SRD-1206	6 Fitted-For-But-Not-With Requirements (FFBNW)	Heading
SRD-1207	6.1 All requirements as prescribed for in this SRD and its applicable annexes and appendices must apply for all FFBNW capabilities and ship-sets unless specifically otherwise stated within this section of this SRD.	Mandatory
SRD-1208	6.2 FFBNW Training and Torpedo Detection (FFBNW-TT)	Heading
SRD-1209	6.2.1 Definition	Heading
SRD-1210	6.2.1.1 This option will result in ship(s) receiving a torpedo detection capability, the ship embedded training, and the infrastructure required to rapidly transfer and receive all missing full-up ship-set equipment and components.	Information

ID		Requirement Type
SRD-1211	6.2.2 Components	Heading
SRD-1212	6.2.2.1 This option must include the following full-up UWSU solution components being replaced, upgraded and installed, in full accordance with their applicable respective sections of this SRD:	Mandatory
SRD-1245	(a) Hull Mounted Sonar System (SRD Section 3.3);	Mandatory
SRD-1213	(b) Hull Mounted TORSIC (SRD Section 3.5);	Mandatory
SRD-1214	(c) TORSIC (SRD Section 3.9.2.4);	Mandatory
SRD-1215	(d) SPS (SRD Section 3.6);	Mandatory
SRD-1216	(e) Bathythermograph Recorder (SRD Section 3.7);	Mandatory
SRD-1217	(f) Operator Workstations (SRD Section 3.1.1.4);	Mandatory
SRD-1218	(g) Interfaces and Cabling (SRD Section 3.1.1.5);	Mandatory
SRD-1219	(h) Elements of the Underwater Data Management System (UDMS) as described in Section 6.2.2.2; and	Mandatory
SRD-1220	(i) All required equipment, equipment modifications, racks, material, cabling, and miscellaneous infrastructure that require more than one month to fully install, set-to-work, integrate, and test.	Mandatory
SRD-1221	6.2.2.2 Elements of the full-up UDMS ship-set solution must be included and installed under this option in order to fully support the components described in Section 6.2.2, with full accordance to their respective applicable component requirements as defined in SRD Section 3.9 and elsewhere in this SRD.	Mandatory
SRD-1222	6.2.3 Performance	Heading
SRD-1223	6.2.3.1 Performance Against Torpedoes	Heading
SRD-1224	6.2.3.1.1 The UWSU solution and components delivered and installed under this option must all meet their respective individual component performance contributions towards the full-up solution meeting performance against torpedoes requirements defined under SRD Section 3.2.3.	Mandatory
SRD-1225	6.2.3.2 Performance Against Torpedoes Active Sonar	Heading

ID		Requirement Type
SRD-1226	6.2.3.2.1 The UWSU solution and components delivered and installed under this option must all meet their respective individual component performance contributions towards the full-up solution meeting performance against torpedoes active sonar requirements defined under SRD Section 3.2.4.	Mandatory
SRD-1227	6.2.3.3 Performance Requirement for Submarine Search and Rescue	Heading
SRD-1228	6.2.3.3.1 The UWSU solution and components delivered and installed under this option must all meet their respective individual component performance contributions towards the full-up solution meeting performance requirements for Submarine Search and Rescue defined under SRD Section 3.2.6.	Mandatory
SRD-1488	6.2.3.4 Performance Requirement for Transient Detection	Heading
SRD-1489	6.2.3.4.1 The UWSU solution and components delivered and installed under this option must all meet their respective individual component performance contributions towards the full-up solution meeting performance requirements for Transient Detection defined under SRD Section 3.2.7.	Mandatory
SRD-1490	6.2.3.5 Performance Requirement for Marine Mammal Detection	Heading
SRD-1492	6.2.3.5.1 The UWSU solution and components delivered and installed under this option must all meet their respective individual component performance contributions towards the full-up solution meeting performance requirements for Marine Mammal Detection defined under SRD Section 3.2.8.	Mandatory
SRD-1229	6.2.3.6 Training	Heading
SRD-1230	6.2.3.6.1 The UWSU solution and components delivered and installed under this option must meet all Training requirements defined under SRD Section 3.10.	Mandatory
SRD-1231	6.2.3.7 Transferability	Heading
SRD-1232	6.2.3.7.1 It must be possible to fully install, integrate, set-to-work and test the missing components from this option, in difference from a full-up ship-set solution, within one month.	Mandatory
SRD-1233	6.3 FFBNW Wires and Racks (FFBNW-WR)	Heading
SRD-1234	6.3.1 Definition	Heading
SRD-	6.3.1.1 This option will result in the removal of all non-UWSU related	Information

ID		Requirement Type
1235	legacy ASW equipment and the installation of the infrastructure required to rapidly transfer and receive all missing full-up ship-set equipment and components.	
SRD-1236	6.3.2 Components	Heading
SRD-1237	6.3.2.1 This option must include the following components to be replaced, upgraded, and installed, in full accordance with their applicable respective sections of this SRD:	Mandatory
SRD-1238	(a) Interfaces and Cabling (SRD Section 3.1.1.5);	Mandatory
SRD-1239	(b) All required equipment, equipment modifications, racks, material or cabling and miscellaneous infrastructure that requires more than one month to fully install, set-to-work, integrate, and test; and	Mandatory
SRD-1240	(c) A standalone set of computers to fully support Computer Based Training (CBT) requirements as prescribed in Section 6.3.3.1, as mandatory vice desirable.	Mandatory
SRD-1241	6.3.3 Training	Heading
SRD-1242	6.3.3.1 This option must include a standalone set of computers to support an onboard CBT solution as a mandatory requirement vice a desirable, as defined in SRD Section 3.10.3.4.	Mandatory
SRD-1243	6.3.4 Transferability	Heading
SRD-1244	6.3.4.1 It must be possible to fully install, set-to-work, integrate, and test the missing components from this option, in difference from a full-up ship-set solution, within one month.	Mandatory