



Acquisition Directorate

Nationwide Automatic Identification System Project

NAIS Performance Specification

December 20, 2007

Version 1.0



Homeland
Security

PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Table of Contents

Table of Contents	2
1 Introduction	3
1.1 Concept of Operations (CONOPS)	3
2 Reference Documents	9
3 Requirements	16
3.1 Design Constraints	16
3.2 General System Requirements	18
3.3 Physical Shore Station (PSS)	27
3.4 Logical Shore Station (LSS)	35
3.5 AIS Service Management (ASM)	36
3.6 Network Services and Enterprise Service Bus	38
3.7 Data Storage	38
3.8 Enterprise Services	40
3.9 Human-System Interface (HSI)	43
4 Verification	47
4.1 Methods of Verification	47
4.2 Verification Matrix	48
5 Notes	54
5.1 Glossary	54
5.2 Abbreviations and Acronyms	59



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

1 Introduction

This Performance Specification (PSPEC) contains requirements for Increment 2 of the United States Coast Guard (USCG) Nationwide Automatic Identification System (NAIS). Section 1 provides an overview of this document, a system Concept of Operations, and system design constraints within which the Contractor must operate. Section 2 provides the references cited in this document. Section 3 consists of specific requirements that will be used to verify system performance. Section 4 provides the planned methods of verification. Section 5 provides this document’s glossary of terms and a list of abbreviations.

The primary objectives of this document are to define system requirements, to provide sufficient context for the requirements such that the Contractor can understand the USCG’s vision for NAIS Increment 2 capability, and describe the relationships between NAIS and other systems and USCG Information Technology (IT) infrastructure. Minimizing Total Life-Cycle cost (TLC) while meeting operational requirements is paramount for the NAIS Project. TLC encompasses all costs associated with the design, implementation, operation, and support of this system. To achieve that goal, it is expected that the development of Increment 2 will leverage existing IT infrastructure, capabilities, standards, resources, and the application of lessons learned that have been dedicated to current capabilities. This PSPEC provides requirements to the level of deemed necessary in each area while acknowledging that a range of solution options are available meet these requirements.

1.1 Concept of Operations (CONOPS)

This section provides the CONOPS for the NAIS by presenting an overview of its functionality, its support for USCG missions, and a conceptual implementation of the system. The NAIS will enable the Coast Guard to transmit and receive AIS messages to/from vessels traveling on the navigable waters of the United States and its territories via receivers, transmitters and transceivers located on radio towers and other shoreside facilities, as well as buoys, offshore platforms, aircraft, and spacecraft. Received AIS data will be used for the purpose of identifying and tracking vessel movement, while transmitted messages will be used to provide Aids to Navigation (AtoN) and other marine broadcasts. The system will also support encrypted AIS (EAIS) messaging as well as Blue Force Tracking functionality. The system will monitor and manage the health of the VHF Data Link (VDL), as well as use the VDL to perform AIS channel management. Nationwide AIS data and functionality will be used by USCG, DHS, Department of Defense and other government agencies’ communications, surveillance and data processing systems in support of their missions.

1.1.1 Support to the USCG Missions

NAIS will provide functionality to support the five mission areas of the USCG.

1.1.1.1 Maritime Safety

The USCG’s Maritime Safety role is to eliminate deaths, injuries, and property damage associated with maritime transportation, fishing, and recreational boating.

1.1.1.1.0-1 Search and Rescue (SAR)

- a. Provide near-real-time locations for AIS-equipped vessels in distress.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- b. Assist SAR Controllers by providing the location of nearby AIS-equipped “Good Samaritans” capable of assisting in searching and / or rescuing mariners in distress.
- c. Allow SAR Controllers to track the progress of CG vessels, aircraft and other resources as they conduct searches along the prescribed search patterns.
- d. Enable watchstanders to replay search vessel tracks to evaluate coverage efficiency and enable SAR Controllers to redirect assets as necessary.

1.1.1.1.0-2 Safety Broadcasts

- a. Enable Sectors to transmit digital Marine Information Broadcasts (MIBs), weather broadcasts, and other safety-related broadcasts.
- b. Enhance voyage planning by providing urgent navigation warnings, AtoN status, and other pertinent navigation information (e.g., waterway closures, critical chart corrections).
- c. Allow Sector watchstanders to schedule safety broadcasts to be transmitted by NAIS to AIS-equipped vessels in their Areas of Responsibility (AOR).

1.1.1.1.0-3 Aids to Navigation (AtoN)

- a. Permit Sectors to transmit AtoN status messages (e.g., to automatically provide the AtoN operational status).
- b. Facilitate the identification of hazards to navigation not marked by physical AtoN, the transmittal of the location and characteristics of those hazards, and support the analysis of waterways and vessel movement.
- c. Facilitate the collection of vessel voyage information, especially within ports, to assist in traffic pattern analyses, waterways management, the placement of AtoN, and traffic separation schemes.

1.1.1.1.0-4 Safe Navigation

- a. Extend the range of vessel-to-vessel AIS communications through the use of repeater functions at AIS shore stations in areas of poor voice coverage or “radar shadows.”

1.1.1.1.0-5 AIS VHF Data Link (VDL) Management

- a. Provide the ability to monitor and manage the VDL to ensure AIS viability during periods of high volume and / or radio interference.
- b. Provide the ability to shift AIS traffic to alternate frequencies in the event of an emergency or natural disaster.

1.1.1.2 Maritime Security

The Maritime Security mission is to protect America's maritime borders from all intrusions by: (a) halting the flow of illegal drugs, aliens, and contraband into the United States through maritime routes; (b) preventing illegal fishing; and (c) suppressing violations of federal law in the maritime arena.

1.1.1.2.0-1 Maritime Domain Awareness (MDA)

- a. Feed near real-time AIS vessel location information to unclassified and classified Coast Guard Command and Control and Intelligence systems, specifically the Common Operating Picture (COP) and MAGNet.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- b. Provide real-time AIS data feeds to other CG maritime partners, including the Saint Lawrence Seaway Development Corporation (SLSDC) and joint Coast Guard/Port Authority Cooperative Vessel Traffic Services (CVTS).

1.1.1.2.0-2 Port Security

- a. Provide Sector Commanders with means to notify vessels of changes to the Maritime Security Level, and to monitor compliance with security zones.
- b. Enable operational commanders to identify, select and target vessels for law enforcement action, security screening inspections, boarding or other measures.
- c. Provide near real-time location of the vessels in question to effectively coordinate and deploy boarding and inspection teams.

1.1.1.3 Maritime Mobility

Support of Maritime Mobility involves facilitating maritime commerce and eliminating interruptions and impediments to the efficient and economical movement of goods and people, while maximizing recreational access to and enjoyment of the water.

1.1.1.3.0-1 Maritime Incident Investigation

- a. Assist in the investigation of maritime incidents by providing a detailed record of a vessel's movements and AIS message transmissions covering the time before, during and after the event.
- b. Provide detailed records of other vessels in the area that may have witnessed or contributed to incidents under investigation.

1.1.1.3.0-2 Navigation Mobility

- a. Providing vessel tracking data to Command and Control (C2) and intelligence systems for use in monitoring vessels.
- b. Provide an additional means to exchange navigation data and other pertinent marine information (e.g., bridge closures, location of safety/security zones, dangerous currents) to assist in reducing the risk of collisions, allisions and groundings.
- c. Facilitate domestic icebreaking resource deployment by providing a universal communication link that provides ships' status (e.g., position, speed, heading, course, and draft).
- d. Support the monitoring of compliance with existing vessel traffic management regulations, such as vessel routing schemes, regulated navigation areas, mandatory ship reporting systems, safety and security zones, transits of high value assets, management of marine events and regattas and other such requirements.

1.1.1.4 National Defense

The USCG's National Defense mission is to defend the nation, as one of the five U.S. armed services, and to enhance regional stability in support of the National Security Strategy, utilizing the Coast Guard's unique and relevant maritime capabilities.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

1.1.1.4.0-1 Blue Force Tracking (BFT)/Encrypted Messaging

- a. Supporting Encrypted AIS (EAIS) communications for Sensitive But Unclassified (SBU) messaging to/from CG units and other Port Partners.
- b. Give vessels a method of sending and receiving text messages, targets of interest, tracks, and other encrypted messages, enhancing CG operations without compromising vessel movements.

1.1.1.4.0-2 Strategic Information

- a. Allow other systems (e.g., MAGNet) to access the NAIS data, perform queries, and conduct other intelligence functions on the data (e.g., vessel movement anomaly detection).
- b. Enhance transparency in the maritime domain to detect, deter and defeat threats as early and distant from U.S. interests as possible.
- c. Provide maritime situational awareness for decision makers at all levels using a host of systems, sensors and processes to enable accurate, dynamic, and confident decision-making.
- d. Support the missions of other Federal, State and local agencies, such as customs clearance and local law enforcement.

1.1.1.5 Protection of National Resources

USCG's goal in the Protection of National Resources is to eliminate environmental damage and the degradation of natural resources associated with maritime transportation, fishing, and recreational boating.

1.1.1.5.0-1 Protection of National Resources

- a. Permit detection and tracking of vessels in mammal safety zones and other areas where vessel speed or intrusion is restricted.
- b. Enable replaying of vessel tracks to identify potential polluters.
- c. Permit monitoring of resources involved in pollution mitigation activities.

1.1.2 NAIS User Segments

The NAIS capabilities will be provided to the following three types of end-users:

- a. USCG Command Centers: Sector, District, and Headquarters command centers. This group includes Vessel Traffic Service (VTS) operators as well.
- b. NAIS System Operations Center: NAVCEN watchstanders and others responsible for NAIS Operations and Maintenance (O&M).
- c. Generic Users: These users are not defined specifically but the system will make allowance for new user groups to be added.

1.1.3 CONOPS Depiction

In order to provide a better understanding of how NAIS is expected to operate, the following graphic (Figure 1.1) is provided. This depiction and the accompanying notes are not design requirements, but are intended to provide an explanation of the NAIS CONOPS.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

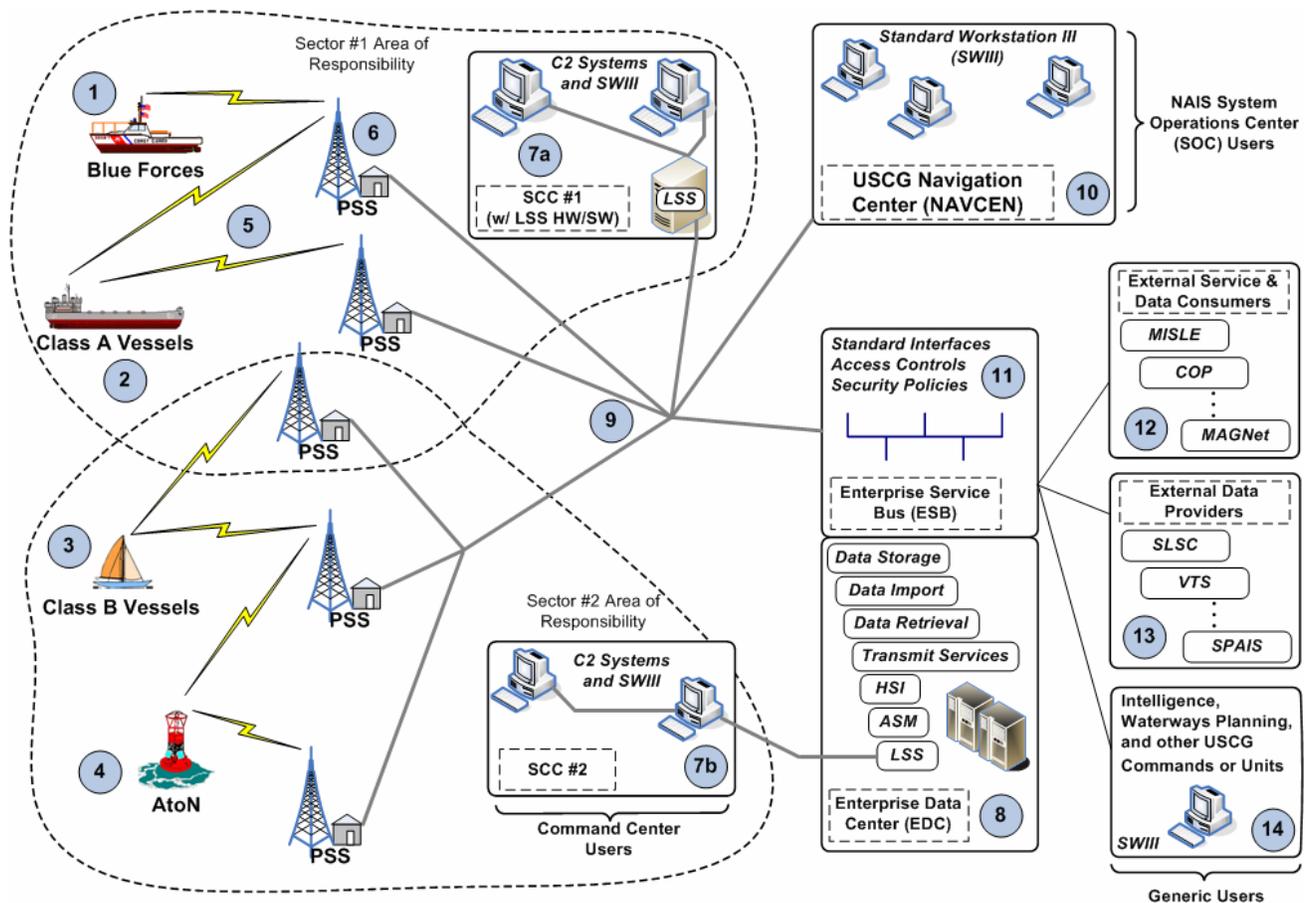


Figure 1.1: Representation of the NAIS CONOPS

Because NAIS will comply with international standards and guidelines governing AIS, it will communicate with all International Telecommunications Union (ITU) compliant AIS equipment. NAIS communications will include encrypted transmit and receive communications with Blue Forces (1) for position reports and targets of interest, as well as unencrypted communications with all types of vessels. Class A (2) and Class B (3) vessels will send position reports and vessel information as required by law, and will receive Aids to Navigation (AtoN) transmissions, marine broadcasts, or any other standard message from the USCG Physical Shore Stations (PSS). AIS-equipped AtoNs (e.g., buoys (4)) may transmit their real time position and other information.

These communications will take place over the VHF Data Link (VDL) (5), which operates on AIS 1 & 2 channels, but can be switched to other channels by the SOC. The PSSs (6) will serve as the infrastructure by which AIS messages are transmitted to and received from AIS equipped vessels.

Each USCG Sector will have NAIS functionality to support their missions, with each Sector’s Sector Command Center (SCC) having responsibility for monitoring AIS activity within its AOR. Every SCC will have access to NAIS functionality integrated into their C2 systems and/or SWIII, and *may* host the hardware and software to run its Logical Shore Station (LSS) software (7a). Conversely, an SCC (7b) may access LSS functionality via the LSS hardware and software that is hosted at the Enterprise Data Center (EDC) (8).



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Wide Area Network (WAN) connectivity will be provided by the CGDN+ and DHS OneNet networks **(9)**. These networks connect the PSS/LSS and SCCs with the EDC. The EDC is responsible for NAIS data storage, archiving, retrieval, and disaster recovery, and may host the transmit services, LSS, AIS Service Management (ASM), and server-side Human System Interface (HSI) functionality. The SOC **(10)** provides administrative support and oversight for the entire system. This includes VDL management, remote diagnostics and troubleshooting, technical support functions, and possibly hosting LSS functionality.

NAIS is expected to interoperate with many external systems, providing data and services to multiple users as well as importing data from other AIS data providers via the Enterprise Service Bus (ESB) **(11)**. The ESB will provide the standard interfaces and access controls required to interoperate with these systems (including consumers **(12)** like MAGNet, providers **(13)** such as the St. Lawrence Seaway Development Corporation (SLSDC), and other yet to be defined systems **(14)**). Authorized users within the USCG will be able to access NAIS Enterprise Services via a SWIII for specific mission needs.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

2 Reference Documents

The Contractor shall comply with the following references as per section 3 of this document, and shall use the most current version of the document as of the date of the contract award.

Ref. Number	Reference	Reference Link
United States Coast Guard Documents		
2.1.1	Command and Control Engineering Center (C2CEN) Encrypted Automatic Identification System (EAIS) v 4.0	This document is available in Attachment J.8, Technical Library: http://www.naisproject.net/NAIS_External/NAISMain/default_tech.asp
2.1.2	COMDTINST M2400.1G: Spectrum Management Policy and Procedures	This document is available in Attachment J.8, Technical Library: http://www.naisproject.net/NAIS_External/NAISMain/default_tech.asp
2.1.3	COMDTINST M11000.11 (series), USCG Civil Engineering Manual, Chapter 10	http://www.uscg.mil/directives/cim/11000-11999/CIM_11000_11A.pdf
2.1.4	MDA COI Fact Sheet: Maritime Domain Awareness Data Sharing Community of Interest	http://www.naisproject.net/NAIS_External/NAISdiscussion/rfp2/sections/Section_J/MDA-COI-Data.pdf
2.1.5	MDA COI DSWG: MDA Community of Interest Data Sharing Work Group vocabulary handbook	http://www.naisproject.net/NAIS_External/NAISdiscussion/rfp2/sections/Section_J/MDA-COI-vocab.pdf
2.1.6	MDA COI DSWG Spiral 2 XML schema	http://www.naisproject.net/NAIS_External/NAISdiscussion/rfp2/sections/Section_J/MDA-COI-XML-Schema.ZIP
2.1.7	USCG Information Technology Product Inventory (ITPI)	This document is available in Attachment J.8, Technical Library: http://www.naisproject.net/NAIS_External/NAISMain/default_tech.asp
2.1.8	USCG Inland Rivers Vessel Movement Center (IRVMC) Reporting Points	http://www.naisproject.net/NAIS_External/NAISdiscussion/rfp2/sections/Section_J/USCG-IRVMC-ReportingPoints.pdf
Other Government Documents		
2.2.1	29 U.S.C. 655: Occupational Safety and Health Act Of (OSHA) 1970	http://www.osha.gov/pls/oshaweb/owasrch.search_form?p_doc_type=OSHACT&p_toc_level=0&p_keyvalue=
2.2.2	29 U.S.C. 794d, Rehabilitation Act, Section 508	http://www.section508.gov/index.cfm?FuseAction=Content&ID=14



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Ref. Number	Reference	Reference Link
2.2.3	Code of Federal Regulations (CFR), Title 33 Navigation and Navigable Waters	http://www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=200733
2.2.4	Code of Federal Regulations (CFR), Title 33, part 3, Coast Guard Areas, Districts, Marine Inspection Zones, And Captain Of The Port Zones	The Codes of Federal Regulation can be obtained from the following website: http://www.access.gpo.gov/nara/cfr/waisidx_07/33cfr3_07.html
2.2.5	Code of Federal Regulations (CFR), Title 33, part 165, Regulated Navigation Areas And Limited Access Areas	The Codes of Federal Regulation can be obtained from the following website: http://www.access.gpo.gov/nara/cfr/waisidx_07/33cfr165_07.html
2.2.6	Code of Federal Regulations (CFR), Title 33, part 161, Vessel Traffic Management	http://www.access.gpo.gov/nara/cfr/waisidx_07/33cfr161_07.html
2.2.7	Code of Federal Regulations (CFR), Title 47, part 80, Colregs Demarcation Lines	The Codes of Federal Regulation can be obtained from the following website: http://www.access.gpo.gov/nara/cfr/waisidx_07/33cfr80_07.html
2.2.8	DHS Technical Reference Model (TRM) Interoperability Requirements	This document is available in Attachment J.8, Technical Library: http://www.naisproject.net/NAIS_External/NAISMain/default_tech.asp
2.2.9	Department of Defense (DoD) XML Registry and Clearinghouse policy	These collection of documents is available on the DoD Metadata Registry website: https://metadata.dod.mil/mdr/homepage.htm
2.2.10	Federal Communications Commission (FCC) Office of Engineering and Technology (OET) Bulletin 65 (Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields)	http://www.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet65/oet65.pdf
2.2.11	Federal Information Processing Standards (FIPS) Publication 140-2	http://csrc.nist.gov/publications/fips/fips140-2/fips1402.pdf
2.2.12	Federal Information Processing Standards Publication (FIPS) 197	http://csrc.nist.gov/publications/fips/fips197/fips-197.pdf
2.2.13	FED-STD-795: Uniform Federal Accessibility Standards	http://www.assistdocs.com/search/document_details.cfm?ident_number=53835&StartRow=1&PaginatorPageNumber=1&doc%5Fid=FED%2DSTD%2D795&status%5Fall=ON&search%5Fmethod=BASIC



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Ref. Number	Reference	Reference Link
2.2.14	Department Of Defense Design Criteria Standard - Human Engineering: MIL-STD-1472-F	http://hfetag.dtic.mil/docs-hfs/mil-std-1472f.pdf
2.2.15	National Fire Protection Association (NFPA) NFPA 70: National Electric Code (NEC)	This document is available for purchase on the NFPA website: http://www.nfpa.org/catalog/product.asp?pid=7008SB&order_src=A291
2.2.16	NFPA 75: Standard for the Protection of Electronic Computer/Data Processing Equipment	This document is available for purchase on the NFPA website: http://businesscontinuitybookstore.com/data/dr231a.htm
2.2.17	NFPA 101: Life Safety Code	This document is available for purchase on the NFPA website: http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=101
2.2.18	National Telecommunications and Information Administration (NTIA) Manual of Regulations & Procedures for Federal Radio Frequency Management	The latest version of this document is available for purchase on US Government Printing Office website. The May 2003 Edition can be viewed at: http://www.ntia.doc.gov/osmhome/redbook/Manual.pdf
2.2.19	United States Code, Title 5, Section 552a (the Privacy Act)	http://www.usdoj.gov/oip/privstat.htm
Non-Government Documents		
2.3.1	American National Standards Institute / Telecommunications Industry Association (ANSI/TIA) ANSI/TIA-222-G-2005: Structural Standards for Steel Antenna Towers and Supporting Structures	This document is available for purchase on the TIA website: http://www.tiaonline.org/
2.3.2	American Society for Testing and Materials (ASTM) A 36 (Standard Specification for Carbon Structural Steel)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.3	ASTM A 53 (Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.4	ASTM A 123 (Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Ref. Number	Reference	Reference Link
2.3.5	ASTM A 153 (Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.6	ASTM A 194 (Standard Specification for Carbon and Alloy Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.7	ASTM A 325 (Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.8	ASTM A 463 (Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.9	ASTM A 490 (Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.10	ASTM A 563 (Standard Specification for Carbons and Alloy Steel Nuts)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.11	ASTM A 615 (Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.12	ASTM A 780 (Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.13	ASTM F 1166 (Standard Practice for Human Engineering Design for Marine Systems, Equipment and Facilities)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.14	ASTM F 1337 (Standard Practice for Human Engineering Program Requirements for Ships and Marine Systems, Equipment, and Facilities)	This document is available for purchase on the ASTM website: http://www.astm.org/standards/
2.3.15	eXtensible Markup Language (XML)	http://www.w3.org/XML/
2.3.16	National Marine Electronics Association (NMEA) 0183 V3.01 formats	This document is available for purchase on the NMEA website: http://www.nmea.org/pub/0183
2.3.17	SEI / ASCE 7-02: Minimum Design Loads for Buildings and Other Structures	This document is available for purchase on the SEI website: http://content.seinstitute.org/



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Ref. Number	Reference	Reference Link
2.3.18	Telecommunications Industry Association/Electronics Industry Alliance (TIA/EIA) TIA/EIA-568-B: Commercial Building Telecommunications Wiring Standard	This document is available for purchase on the TIA website: http://www.tiaonline.org/
2.3.19	TIA-569-B: Commercial Building Standard for Telecommunications Pathways and Spaces	This document is available for purchase on the TIA website: http://www.tiaonline.org/
2.3.20	TIA TSB-88-B: Wireless Communications Systems - Performance In Noise And Interference	This document is available for purchase on the TIA website: http://www.tiaonline.org/
International Documents		
2.4.1	Building Code Requirements for Structural Concrete and Commentary ACI 318-05/318R-05	This document is available for purchase on the ICC website: http://www.iccsafe.org/e/prodshow.html?prodid=9021S05&stateInfo=IabfDkcEcjcAuokd5489 3
2.4.2	Convention on the Territorial Sea and the Contiguous Zone, 15 U.S.T. 1606	http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_1_1958_territorial_sea.pdf
2.4.3	IALA Recommendation A-124 on AIS Shore Stations and Networking Aspects Related to the AIS Service	http://site.ialathree.org/pages/publications/publicationssessaip2.php?lang=eng&id=59&LeTypePub=1
2.4.4	International Code Council: 2006 International Codes	http://www.iccsafe.org/
2.4.5	International Electrotechnical Commission (IEC) 61162-1: Maritime navigation and radio communication equipment and systems - Digital interfaces - Part 1: Single talker and multiple listeners, Edition 2, July 2000	This document is available for purchase on the ANSI website: http://webstore.ansi.org/ansidocstore/default.asp
2.4.6	IEC 61993-2: Maritime navigation and radiocommunication equipment and systems –Automatic identification systems (AIS) – Part 2: Class A shipborne equipment of the universal automatic identification system (AIS) – Operational and performance requirements, methods of test and required test results	http://www.iec.ch/index.html



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Ref. Number	Reference	Reference Link
2.4.7	IEC 62287-1: Maritime navigation and radiocommunication equipment and systems - Class B shipborne equipment of the automatic identification system (AIS) - Part 1: Carrier-sense time division multiple access (CSTDMA) techniques	http://webstore.iec.ch/preview/info_iec62287-1%7Bed1.0%7Den.pdf
2.4.8	IEC 62288: Maritime Navigation and Radio communication Equipment and Systems - Presentation of Navigation-related Information on Shipborne Navigational Displays - General Requirements - Methods of Testing	http://www.iec.ch/index.html
2.4.9	IEC 62320-1: Maritime navigation and radio communication equipment and systems - Automatic identification system (AIS) - Part 1: AIS Base Stations - Minimum operational and performance requirements, methods of testing and required test results	http://webstore.iec.ch/webstore/webstore.nsf/artnum/037701
2.4.10	Internet Engineering Task Force (IETF) IPv6 Specification, RFC 2460	http://www.ietf.org/rfc/rfc2460.txt
2.4.11	IMO NAV 53/INF.12: Use of AIS Binary Messages	http://www.naisproject.net/NAIS_External/NAISdiscussion/rfp2/sections/Section_J/53-21-INF-12.pdf
2.4.12	IMO Safety of Navigations Circular 236	http://www.imo.org/includes/blastDataOnly.asp/data_id%3D10741/236.pdf
2.4.13	International Telecommunications Union Sector for Radio communications (ITU-R) M.1371: Technical Characteristics for an Automatic Identification System (AIS) Using Time Division Multiple Access in the Maritime Mobile Band, including IALA Technical Clarifications on the ITU-R M.1371	http://www.itu.int/ITU-R/
2.4.14	ITU-R.P525 : Calculation of Free-Space Attenuation	This document is available with subscription to the ITU website: http://www.itu.int/rec/R-REC-P.525-2-199408-I/en
2.4.15	ITU-R.P526: Propagation by Diffraction	This document is available with subscription to the ITU website: http://www.itu.int/rec/R-REC-P.526-10-200702-I/en



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Ref. Number	Reference	Reference Link
2.4.16	ITU-R.P1546: Method for Point-to-Area Predictions for Terrestrial Services in the Frequency Range 30 MHz to 3000 MHz	This document is available with subscription to the ITU website: http://www.itu.int/rec/R-REC-P.1546-2-200508-I/en
2.4.17	United Nations Convention on the Law of the Sea (UNCLOS), 21 I.L.M. 1261	http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

3 Requirements

3.1 Design Constraints

Increment 2 of NAIS is expected to take advantage of several USCG and DHS enterprise IT infrastructure components. This section provides an overview of the constraints and integration requirements for the use of existing assets and infrastructure by NAIS, which are detailed in later attachments as identified below.

3.1.1 USCG Navigation Center (NAVCEN)

The NAIS System Operations Center (SOC) established for Increment 1 is located at the NAVCEN, in Alexandria, VA, and NAVCEN will serve as the SOC for I-2. In addition to the NAIS SOC, NAVCEN operates the Navigation Information Service (NIS), the Nationwide Differential Global Positioning System (NDGPS), and Long-Range Navigation (LORAN) system. NAVCEN also serves as the civilian interface for the Global Positioning System (GPS) and manages other navigation-related projects. NAVCEN houses much of the IT equipment required for the monitoring and management of these systems. Each of these systems includes wide-area network (WAN) connections via routers to the CGDN+ and other networks administered and monitored by TISCOM and DHS One Network (OneNet), Local Area Network (LAN) connections, and end-user computer workstations. Additional information on NAVCEN can be found at <http://www.navcen.uscg.gov>.

All system support functions (except for network monitoring and administration and field support desk), including, but not limited to, system monitoring (including facility alarms) and administration, help desk, user support, and SOC watchstander training, will continue to be provided by NAVCEN. A description of NAVCEN components and infrastructure to be made available for Increment 2 appears in Attachment J-9 of the NAIS I-2 RFP.

3.1.2 Enterprise Data Centers

Increment 1 data storage was established at the Coast Guard Enterprise Data Center (EDC) at the Operations Systems Center (OSC) in Martinsburg, WV. OSC will continue to host NAIS data storage components for Increments 2 and 3. NAIS Increment 2 will require a centralized repository for all NAIS data (including AIS messages, metadata, and other supporting information) in order to supply NAIS data to external systems and users, provide a warehouse for long-term storage of NAIS data, including AIS Messages from non-NAIS data sources (e.g., the Saint Lawrence Seaway Corporation and NOAA), and to provide a mechanism for analysis of this historical data. This repository will be the official DHS and Coast Guard data store for AIS information.

All enterprise-level databases must be located at the Coast Guard designated EDC primary and disaster recovery (DR) sites. A description of the OSC EDC appears in Attachment J-9 of the NAIS I-2 RFP.

3.1.3 DHS OneNet & CGDN+



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

NAIS will utilize DHS OneNet infrastructure to the maximum extent possible. TISCOM, the management authority for CGDN+, began the migration of USCG networks from CGDN+ to OneNet in Q1 CY 2007. After the migration is complete, security and day-to-day management of OneNet will be the responsibility of U.S. Customs and Border Protection (CBP), while TISCOM will support USCG-specific operations of OneNet. In cases where OneNet is not in use in a given sector, CGDN+ shall be used. A brief description of the publicly available information pertinent to OneNet and CGDN+ appears in Attachment J-9.

The Government expects that there will continue to be Internet connectivity to the NAIS through existing Increment 1 sites currently accessible via the Internet, or future Increment 3 data feeds. In order to minimize Total Life-Cycle cost (TLC) while meeting operational requirements, it is expected that the development of NAIS Increment 2 will leverage existing USCG and DHS IT infrastructure and capabilities (including CGDN+ and OneNet). If a PSS without OneNet or CGDN+ connectivity is recommended, the contractor shall follow the procedure identified in attachment J.1 – SOW, Section 3.1.1.4.9.6.

3.1.4 Sector Command Centers

The USCG has organized its operational command and control (C2) units into Sectors with Sector Command Centers (SCC). Each SCC monitors the sector area of responsibility (AOR) and performs a common, standardized set of mission activities and functions (tailored to meet the specific needs of each area).

In order to streamline and facilitate SCC operations supported by NAIS, it is expected that NAIS platform will integrate and interoperate with the SCC C2 systems to the greatest degree possible. NAIS functionality will be accessed via USCG standard workstations. Ideally, all NAIS end-user functions will be provided through the SCC C2 system, and will not require a separate workstation. Each SCC may support additional IT equipment if necessary for the specific technical solution.

Although several C2 systems, services, and components available at the SCC support classified data, NAIS is an unclassified system, and all AIS messages received and transmitted by the system are unclassified. Integration of NAIS functionality with any existing or planned classified system shall not require a change in the classification level of NAIS. Additional information describing the Sectors and SCCs is provided in Attachment J-9 of the NAIS I-2 RFP.

3.1.5 Geographic Information Systems

The DHS Office of the Chief Information Officer has designated the ESRI ArcGIS™ suite as the enterprise standard for Geographic Information Systems (GIS). DHS has established an enterprise license for ArcGIS products, and the Coast Guard will provide access to these tools as needed by the Contractor. ArcGIS components provided by the Coast Guard shall be reused to the extent possible. GIS data shall comply with the DHS Geospatial Data Model. The Contractor shall develop any applications using GIS components employing a standards-based approach to ensure interoperability.

3.1.6 HLS Enterprise Architecture and Technical Reference Model

The NAIS shall be compliant with the Homeland Security Institute (HLS) Enterprise Architecture (EA). All IT hardware and software shall be compliant with the HLS EA Technical Reference Model (TRM)



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Standards and Products Profile and/or the USCG IT Products Inventory (ITPI). There is no requirement for proposed products and standards to be listed in both the current TRM and the USCG ITPI. This requirement may be met if the items are currently listed in either or both of these documents. However, any new technologies or new products under existing technologies will be required to meet the standard for “technology insertion” into the DHS TRM, which is the current governing document. New products may be proposed, but the Contractor must provide assistance to support the Government’s justification for technology insertion.

3.1.7 Enterprise Service Bus (ESB) and Service Oriented Architecture (SOA)

The Coast Guard is developing an ESB based on the concept of delivering business events, documents, and data as asynchronous messages. The ESB will use a Java Messaging Service (JMS)-compliant backbone to route messages with eXtensible Markup Language (XML) payloads to topics and queues. NAIS business services, whether intended for Enterprise or NAIS-only consumption should be architected to leverage this ESB as appropriate. The Coast Guard has not yet solved all the security and access issues surrounding use of the ESB and SOA services. However, the architectural vision is to leverage the Coast Guard's Active Directory for user authentication, along with DoD-compliant Public Key Infrastructure (PKI). Further, the Coast Guard intends to use industry standards such as Security Assertion Markup Language (SAML) v2.0 and Web Services-Security (WS-Security), with others considered as adopted, as key components of their security strategy for SOA. NAIS shall be architected in such a way to utilize these security services and authentication capabilities as they become available.

3.2 General System Requirements

- 3.2.0.0-1 The system shall be designed for a 15 year life-cycle that will begin at Full Operational Capability (FOC) acceptance. For the purposes of the system design, an FOC date of Q4 FY2013 shall be used.
- 3.2.0.0-2 The NAIS system shall not degrade the performance or operational availability of other USCG systems.

3.2.1 Application Architecture

- 3.2.1.0-1 The NAIS shall be designed using Service Oriented Architecture (SOA) approaches in order to:
 - a. Ensure that NAIS software components are reused throughout their service life;
 - b. Make it easier to adapt NAIS software to meet new operational requirements;
 - c. Ease the reuse of existing and planned USCG and DHS IT infrastructure;
 - d. Improve scalability and modularity of the software components; and
 - e. Establish standard interoperable external interfaces for all NAIS software components to make it easier to integrate NAIS into existing (e.g., COP, MISLE, MAGNet) and yet to be developed systems.
- 3.2.1.0-2 The application architecture of NAIS shall align with the structure shown in Figure 3.1, which illustrates the top-level NAIS Application Architecture Components (Component(s)) within NAIS. It corresponds to high-level organization of functional requirements that will be provided by separate software segments. Each Component can be accessed and used independently. The



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Components illustrated represent the minimal amount of modularity required of the NAIS software. Additional modularity within the Components is allowed. However, the government is not requiring a specific architecture for lower-level modularity. In addition, this application architecture represents only certain requirements for the NAIS software and does not imply requirements for physical hardware.

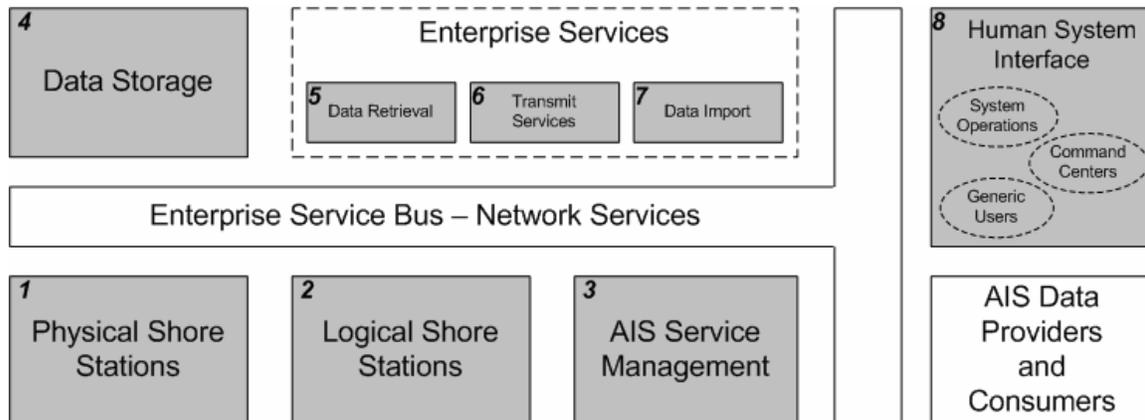


Figure 3.1: NAIS Application Architecture

The following describes the parts of the Application Architecture diagram.

The NAIS application architecture will consist of at least eight Components that communicate via a common ESB and set of Network Services, and can be accessed by other data providers and consumers. Several of the services are consistent with the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) A-124. The requirements for those Components derive from that document, but have additional requirements that are needed by the USCG.

1. *Physical Shore Stations (PSS)* represents the functionality of the transmit and receive infrastructure, predominantly at remote RF sites. This segment of the application draws heavily from the IALA guidelines for AIS Physical Shore Stations.
2. *Logical Shore Stations (LSS)* processes the data received from and transmitted to one or more PSSs and provides the Basic AIS Services¹ to the applications during runtime, as described in the IALA guidance, as well as additional functionality as laid out in this specification document.
3. *AIS Service Management* represents the management and maintenance functionality of the system, as described in the IALA guidance and the AIS Service Management section of this document.
4. The *Data Storage* service is comprised of the functionality and infrastructure required to store and maintains system data. This includes archival, database query, and disaster recovery

¹ Basic AIS Services, are the services described in IALA-124 guidance



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

functionality. As noted in the Design Constraints section of this document and the J-9 Attachment, this functionality will reside at the EDC.

Enterprise Services includes three loosely-coupled Components:

5. *Data Retrieval*, used to obtain a more refined view of the AIS messages and associated data;
6. *Transmit Services*, for validating and transmitting outbound AIS messages, thereby shielding external users from the complexity of delivering AIS messages to the PSS; and
7. *Data Import*, to allow NAIS to accept data from other, external (non-NAIS) AIS data sources.

The dotted line indicates that the three Components are grouped as *Enterprise Services*. The solid line for the individual Components shows that they must be modular in design and implementation.

8. *Human System Interface* represents the user interface segment of the system. The three sub-parts of this module represent the three distinct user types that must be served by the interface, which does not necessarily require separate software modules. The dotted lines represent that the needs of these three user segment may be satisfied either by separate user interface modules, or by a unified—but customizable—user interface module.

Figure 3.1 also illustrates two Components that are ancillary to the NAIS system.

The *Enterprise Service Bus (ESB)* will be provided by the Government. The telecommunications infrastructure will consist of DHS OneNet and the connected LANs at the various government facilities. Enhancements to the ESB will be made by the USCG to improve the USCG’s Service Oriented Architecture. *Network Services* are those methods, media, products, and platforms needed to communicate between NAIS internal Components.

AIS Data Providers and Consumers represents the external systems with which data may be shared. The specific systems that will provide or consume AIS data, or interface with any of the NAIS Components are not defined. Some systems are identified (e.g., MAGNet), but others are not, and others may not yet be developed. Conceptually, the NAIS Components shall be built with open and defined interfaces that allow for interoperability with external systems.

Software implementation decisions will be made during the system engineering process.

- 3.2.1.0-3 The software processes of the Components shall be portable to run on machines within the Design Constraints and the DHS TRM and the USCG Information Technology Product Inventory (ITPI).
- 3.2.1.0-4 All Components identified in Figure 3.1 shall be exposed and discoverable while adhering to system access privilege restrictions described in Sections 3.2.5 and 3.5.3 of this PSPEC.
- 3.2.1.0-5 The system design shall assume that a service registry will be made available by the Government, but service components shall be defined in such a way that they can be accessed without a registry (e.g., direct calls, hard-coded interfaces).



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

3.2.1.0-6 The application interfaces shall be based on international standards or otherwise open (e.g., provision of interface specification documentation) to inspection and reuse by other systems external to NAIS.

3.2.1.0-7 The application interfaces shall remain stable throughout the life of the system.

3.2.2 Facilities

NAIS system facilities are those structures, shelters, or similar assets that are provided, altered, or enhanced by the Contractor, and are the subject of the following requirements:

- a. Improved land, towers, equipment shelters, structures, and other real property
- b. Electrical power, telephone, telecommunications termination
- c. Site access and physical security
- d. Heating, cooling, ventilation, and lighting commensurate with the NAIS system and staff located at the site
- e. Fire and intrusion detection systems

3.2.2.0-1 Facilities shall be designed for a 30-year service life.

3.2.2.0-2 Facilities construction shall be completed in accordance with all requirements outlined in the environmental documentations that the Contractor will prepare in accordance with the Environmental Compliance section of the SOW, Section 3.1.2.2.4.6.

3.2.2.0-3 The construction or alteration of all facilities (e.g. towers, shelters, buildings, etc.) shall comply with the applicable federal, state, and local laws and regulations.

3.2.2.0-4 New equipment shelters shall be of concrete construction.

3.2.2.0-5 A monolithic design for new construction equipment shelters shall be used where practical.

3.2.2.0-6 Tilt-up shelter construction shall be used in locations where use of a monolithic shelter is impractical or cost prohibitive (e.g. a remote location with limited access).

3.2.2.0-7 The exterior finish of new construction equipment shelters shall be resistant to chips, cracks, spalling, fading, and damage due to interior wall corrosion.

3.2.2.0-8 New facilities or modifications to existing USCG facilities shall conform to USCG Civil Engineering Manual, COMDTINST 11000.11 (series) Chapter 10.

3.2.2.0-9 The design and implementation of the NAIS shall be in compliance with applicable areas of the Spectrum Management Policy and Procedures Manual (COMDTINST M2400.1G) and Manual of Regulations and Procedures for Federal Radio Frequency Management.

3.2.2.0-10 New towers or modifications to existing towers shall conform to the current versions of the following documents:



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- a. Structural Standards for Steel Antenna Towers and Supporting Structures (ANSI/TIA-222-G-2005).
- b. ACI 318-05/318R-05

3.2.2.0-11 New facilities or modifications to existing facilities shall conform to the current versions of the following documents:

- a. American Society for Testing and Materials (ASTM)-A-36
- b. ASTM-A-53
- c. ASTM-A-123
- d. ASTM-A-153
- e. ASTM-A-194 grade 2H or ASTM-A-563 grade DH
- f. ASTM-A-325
- g. ASTM-A-463
- h. ASTM-A-490
- i. ASTM-A-615
- j. ASTM-A-780
- k. ANSI/TIA-222-G-2005
- l. SEI / ASCE 7-02
- m. ACI 318-05/318R-05
- n. International Code Council (ICC), International Codes
- o. Life Safety Code (NFPA 101)
- p. National Electric Code (NFPA 70)
- q. Uniform Federal Accessibility Standards (UFAS), FED-STD-795 (Note: This standard is not applicable for remote sites)

3.2.2.0-12 Aluminum conductors shall be prohibited for interior power distribution wiring.

3.2.2.0-13 Facilities shall conform to NFPA 75 for construction and fire protection requirements.

3.2.2.0-14 Halon fire suppression systems shall not be used.

3.2.2.0-15 Asbestos shall not be used at NAIS facilities.

3.2.2.0-16 Chlorofluorocarbons shall not be used at NAIS facilities.

3.2.2.0-17 Facilities shall accept commercial power as provided by the local electric power utility.

3.2.2.0-18 Facilities shall supplement utility power as necessary to meet operational availability requirements.

3.2.2.0-19 NAIS facilities shall have an Uninterruptible Power Supply (UPS) to provide power during switchover from commercial power to supplemental power.

3.2.2.0-20 NAIS shall comply with Occupational Safety and Health Administration (OSHA) Act of 1970 regulations.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- 3.2.2.0-21 NAIS shall comply with Federal Communications Commission (FCC) Office of Engineering and Technology (OET) Bulletin 65 (Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields) regulations.
- 3.2.2.0-22 NAIS shall comply with all applicable local, state and federal safety and environmental laws, regulations and requirements to ensure personnel and environmental safety.
- 3.2.2.0-23 The system shall comply with Commercial Building Standard for Telecommunications Pathways and Spaces TIA-569-B.
- 3.2.2.0-24 The system shall comply with Commercial Building Telecommunications Wiring Standard TIA/EIA-568-B.
- 3.2.2.0-25 The NAIS system shall monitor, report, and log the physical status of system facilities to the SOC and applicable SCC. At a minimum, facilities that house NAIS system equipment will provide the following monitoring and status reporting capabilities. In cases where NAIS equipment resides at a non-NAIS facility (e.g., a Rescue 21 radio site), facilities monitoring may be done by the site owner, and the necessary alerts passed to NAIS system operations management.
- a. The system shall monitor and report changes in the status of physical intrusion and fire detection alarms at NAIS facilities.
 - b. The system shall monitor and report changes to the status of primary power, the transition to backup power, and the restoration of primary power.
 - c. The system shall monitor the fuel level for backup generators (where installed) and the charge of backup batteries (where installed), and report when lower than acceptable levels are discovered.
 - d. The system shall monitor and report the voltage output for batteries that are used for backup power.
 - e. The system shall monitor the environmental conditions within the facilities, and will report when an out-of-tolerance event is discovered.
 - f. The system shall monitor the status of tower lighting, and will report tower warning light failures.
 - g. For new monitoring and alarm capabilities at NAIS facilities, physical intrusion and fire detection alarms shall have a false alarm rate of no greater than 5% when detecting an out-of-tolerance event.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- h. For new monitoring and alarm capabilities at NAIS facilities, physical intrusion, physical status and fire detection alarms shall transmit an alarm to the alarm monitoring system within ten (10) seconds of detecting an out-of-tolerance event.

3.2.3 Operational Environment

- 3.2.3.0-1 All NAIS shelters shall be adequately conditioned so that the ambient temperature is maintained within the published limits for all equipments.
- 3.2.3.0-2 Environmentally sensitive equipment shall be housed in appropriate climate-controlled facilities.
- 3.2.3.0-3 The system shall be operable and survivable within the parameters outlined in Table 3.1, except where other requirements provide more stringent standards.²

Table 3.1: Environmental Tolerances

Environmental Parameters	Operational	Survivable
Temperature	-25 to 50 deg. C°	-82 to 70 deg. C°
Humidity	20% to 100% condensing	1% to 100% condensing
Wind Speed	65 kts sustained 100 kt gust	65 kts sustained 140 kt gust
Weather	Rain, fog, snow, sleet, freezing rain	Rain, fog, snow, sleet, freezing rain
Other	Salt, spray, sand, dust, static discharge, and vibration	Lightning strikes, salt water immersion, shock.

3.2.4 Information Assurance

- 3.2.4.0-1 The system shall incorporate data networking components (e.g. routers, switches, gateways) that implement National Institute of Standards and Technology (NIST) Special Publication compliant information assurance (IA) controls.
- 3.2.4.0-2 The system shall implement Federal Information Processing Standard (FIPS) 140-2 and 197 for data communications encryption.
- 3.2.4.0-3 The system shall be designed such that encryption and decryption of AIS messages is done externally to the system. The system shall not provide an encryption/decryption cryptographic function, nor the associated key management of such a function.
- 3.2.4.0-4 The system shall not allow the alteration of AIS messages received by NAIS receivers.

² The survivability of equipment can be addressed using protective facilities.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

3.2.5 Security Management

- 3.2.5.0-1 The system shall be able to interoperate and share data with both classified and unclassified systems.
- 3.2.5.0-2 The system shall share data with classified systems through a Cross Domain Solution (CDS) or Multi-Level Security (MLS) solution. The Government will provide the CDS or MLS solution. Details of the CDS or MS will be provided after contract award.
- 3.2.5.0-3 The system shall deliver data in a manner than can be accepted by the Government-provided CDS or MLS solution.
- 3.2.5.0-4 The system shall allow the Government to restrict access to system data and AIS functionality at each user level.
- 3.2.5.0-5 The system shall incorporate logical separation and access protection (i.e., gateways, firewalls) to protect the system from unauthorized use.
- 3.2.5.0-6 The system shall incorporate logical separation and access protection controls between various connected organizations and entities.
- 3.2.5.0-7 The system shall have the capability to monitor network activity, automatically report unauthorized activity, and block unauthorized access to network and system infrastructure.
- 3.2.5.0-8 All network hardware shall be IPv6 compatible without modification, upgrade, or replacement as specified by the Internet Engineering Task Force ([IETF](#)) IPv6 Specification, RFC 2460.

3.2.6 Scalability

- 3.2.6.0-1 The system and its Components and services shall scale to accommodate the performance thresholds as specified in Table 3.2. The scaling of the Components may be required individually or collectively.

Table 3.2: System Scalability Metrics

System Component	Threshold Performance at IOC	Threshold Performance at FOC
Physical Shore Station (PSS)	30 PSSs	400 PSSs
VDL Throughput	10% capacity saturation for each PSS	100% capacity saturation for each PSS
Human System Interface	20 concurrent users across 3 SCCs, SOC, and generic cases	400 concurrent users across all SCCs, SOC, and generic cases
Logical Shore Station (LSS)	10 LSSs	200 LSSs



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- 3.2.6.0-2 System growth shall not degrade performance of any of the system functions below the threshold requirements of this PSPEC.
- 3.2.6.0-3 Other system Components shall be able to scale to meet the service needs dependencies of the Components in Table 3.2. These Components are:
 - a. Storage
 - b. Enterprise Services
 - c. AIS Service Management

3.2.7 Operational Availability (A_0)

- 3.2.7.0-1 The system shall operate 24 hours a day, 7 days a week, in the environmental conditions described in Operational Environment section of this document, Section 3.2.3.
- 3.2.7.0-2 For each Sector Command Center (SCC), the system shall achieve a monthly operational availability (A_0) of ≥ 0.96 for each of the three critical functions defined in this section.

Receive and Transmit AIS Messages: This function is supported by the system elements that allow the end-user at the SCC to receive and use messages from, and transmit messages to, AIS mobile stations in the sector area of responsibility. For the operational availability calculations of this critical function, the Contractor shall take into account that any unavailable time observed, during normal system operations, over any part of the required coverage area, will count against the entire SCC sector availability for this critical function. For instance, in the event where one of the physical shore stations (PSSs) becomes inoperable and some part of the required coverage is lost, for the purpose of A_0 calculations, this critical function will be considered inoperable. In the case that the loss of a PSS does not result in a reduction of coverage or performance below the thresholds established in this specification, it is not considered to be a loss of operational availability.

Data Management: This function is supported by the system elements that are necessary to perform data processing, storage, retrieval and analysis at the SCC level. Although this capability will largely depend upon system Components that are centrally located, the A_0 will be measured per sector.

Interoperability: This function is supported by the system elements that provide the means of interfacing the data management function with unclassified and classified external systems.

- 3.2.7.0-3 For the purposes of system design, the Contractor shall assume an A_0 of ≥ 0.999 for the CGDN+ and OneNET networks, as described in their respective Design Constraints attachments.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- 3.2.7.0-4 For the purposes of system design, the Contractor shall assume an A_O of 99.5% for R21 equipment (including the transmit or receive port) that supports the NAIS at a PSS. This figure applies to the entire R21 site.³
- 3.2.7.0-5 The A_O for each critical function of each sector shall be calculated on a monthly basis using the below formula:

$$A_O = T_O / (T_O + T_m + T_l + T_a) \quad \text{where:}$$

Operating time (T_O) is the period of uptime where all of the elements of the critical function (as described above) are fully operable.

Maintenance Delay (T_m) is a period of downtime during the physical act of preventing, determining, and correcting equipment or software faults. It includes all actions taken to retain system/equipment/product in a useful serviceable condition or to restore it to usefulness / serviceability. Maintenance includes inspection, testing, servicing, repair, rebuilding, and reclamation.

Logistics Delay Time (T_l) is a period of downtime during which no maintenance takes place due to delays in parts/equipment delivery and transportation.

Administrative Delay Time (T_a) is a period of downtime during which no maintenance takes place due to delays in administrative processing and assignments of maintenance personnel.

3.3 Physical Shore Station (PSS)

3.3.1 General PSS Requirements

- 3.3.1.0-1 Individual PSSs, as well as the aggregate capability provided by all PSSs, shall comply with the NTIA Manual of Regulations & Procedures for Federal Radio Frequency Management for U.S. telecommunications services.

3.3.2 Individual PSS Units

- 3.3.2.0-1 The PSSs shall provide the capability described in IALA recommendation A-124, Part 6.6.
- 3.3.2.0-2 PSSs shall have the capability to store AIS messages when network connectivity is lost, and send the stored messages to appropriate LSSs when connectivity is regained.
- 3.3.2.0-3 PSSs shall be able to store and forward at least two weeks of AIS messages received over a fully utilized VDL.

³ The MTBF for the Co-Site Interference Mitigation System (CIMS) equipment is 134,000 hours, including all of the CIMS components. The MTBF for the VHF RX and TX antenna is estimated at 170,823 hours each.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- 3.3.2.0-4 The system shall provide, at a minimum, the following corresponding metadata for each AIS message transmitted from the PSS, and shall send the metadata to the NAIS data subsystem for storage and retrieval in conjunction with copies of the transmitted AIS message.
- a. UTC Timestamp (at time of transmission from the PSS – based upon GPS clock)
 - b. Remote site numbers(s) (i.e., base station ID numbers) from which the message was transmitted
 - c. Operator ID (i.e., the user ID of the Operator)
 - d. Power level control setting as defined in IEC-62320-1 annex A
 - e. Channel(s) on which the message was transmitted
 - f. Other administrative data as appropriate to aid in message retrieval, as determined during system design
- 3.3.2.0-5 The system shall provide and store, at a minimum, the following corresponding metadata for all messages received by the PSS, and shall send the metadata to the NAIS data subsystem for storage and retrieval in conjunction with copies of the received AIS message.
- a. UTC Timestamp (received from GPS clock)
 - b. Remote site numbers(s) (i.e., base station ID numbers) upon which the message was received
 - c. System source identifier (i.e., the system, NAIS or other, by which the message was received. Example: Saint Lawrence Seaway AIS System)
 - d. Consolidation tag (i.e., group number, number of messages received)
 - e. Received signal strength
 - f. Channel(s) on which the message was received
 - g. Packet Time of Arrival
 - h. Other administrative data as appropriate to aid in message retrieval, as determined at system design
- 3.3.2.0-6 Each base station shall meet the minimum requirements of the base station as described in IEC 62320-1, IEC 61162-1, and National Marine Electronics Association (NMEA) 0183 V3.01.
- 3.3.2.0-7 The base station shall provide a receiver sensitivity of at least -115dBm.
- 3.3.2.0-8 Where the PSS is integrated with other RF systems (e.g., Rescue21), the NAIS RF system output power shall be configurable up to at least 100 Watts.⁴
- 3.3.2.0-9 Base stations shall be capable of receiving and transmitting AIS messages that contain encrypted information as per Command and Control Engineering Center (C2CEN) Encrypted Automatic Identification System (EAIS) v 4.0.

3.3.3 Coverage

⁴ The Rescue 21 RF subsystem induces approximately 10 dB of insertion loss.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

3.3.3.0-1 The system shall provide at least the minimum transmit and receive performance as shown below in Table 3.3. Performance is measured in terms of the maximum acceptable Packet Error Rate (PER).

The geographic areas listed in Table 3.3 are defined below. Table 3.4 defines the Ports & Other Specified Areas. Table 3.5 describes the Inland Navigable Waterways. For coverage verification purposes, the characteristics of the vessel types (i.e., AIS mobile stations) are defined in section 3.3.4.

Table 3.3: Minimum Coverage Requirements, in PER

		Ports & Other Specified Areas (Table 3.4)	Inland Navigable Waterways (Table 3.5)	Coastal Waterways out to 24nm from baseline	Waters 24 to 50nm from baseline ⁵
Receive	Class A	25%	50%	50%	90%
	Class B				-- ⁶
Transmit	Class A	27%	42%	42%	--
	Class B	42%	52%	52%	--

3.3.3.0-2 The system shall provide transmit and receive coverage in the *Ports and Other Specified Areas* as defined in Table 3.4. Graphical representations of the coverage requirements in Table 3.4 are provided in Attachment J-5.

Table 3.4: Ports and Other Specified Areas

Port Areas		
Albany, NY	Jacksonville, FL	Port Everglades, FL
Anchorage, AK	Lake Charles, LA	Portland, ME
Baltimore, MD	Long Beach, CA	Portland, OR
Baton Rouge, LA	Los Angeles, CA	Portsmouth, NH
Beaumont, TX	Marcus Hook, NJ	Richmond, CA
Boston, MA	Memphis, TN	San Diego, CA
Camden, NJ	Miami, FL	San Francisco, CA
Charleston, SC	Mobile, AL	San Juan, PR
Chicago, IL	New Orleans, LA	Savannah, GA
Cincinnati, OH	New York/New Jersey	Seattle, WA
Cleveland, OH	Newport News, VA	South Louisiana, LA
Corpus Christi, TX	Norfolk Harbor, VA	St. Louis, MO
Detroit, MI	Oakland, CA	Tacoma, WA
Duluth-Superior, MN/WI	Paulsboro, NJ	Tampa, FL
Freeport, TX	Philadelphia, PA	Texas City, TX
Galveston, TX	Pittsburgh, PA	Valdez, AK
Honolulu, HI	Port Arthur, TX	Wilmington, DE
Houston, TX	Port Canaveral, FL	Wilmington, NC

⁵ See Glossary for definition of the baseline

⁶ This table provides *minimum* coverage performance requirements; even where no minimum requirement is provided, coverage is still considered to be of value to the Government.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Huntington, WV		
Critical Coastal and Non-Port Areas		
<ul style="list-style-type: none"> • US Waters of the Great Lakes: <ul style="list-style-type: none"> - Lake Superior: West End (Two Harbors, MN), Keweenaw Peninsula, MI, Marquette, MI - Lake Michigan: Straits of Mackinac (St Ignace, Charlevoix, Mackinaw City, MI), Door Peninsula (Green Bay, Sturgeon Bay, WI); Milwaukee, WI; South End (Gary, Indiana Harbor, Michigan City, IN), Holland/Grand Haven/Muskegon, MI - Lake Huron: Alpena, MI, Bay City, MI, Port Huron, MI - Lake Erie: Toledo, OH, Lorain, OH, Erie, PA, Buffalo, NY - Lake Ontario: Rochester/Sodus/Oswego, NY • California/Oregon Coast from Mexican Border to Cape Blanco: <ul style="list-style-type: none"> - Oceanside, CA; Santa Barbara Channel (Point Conception, Santa Barbara, Channel Islands, CA); Point Sur, CA; Point Arena, CA; Cape Mendocino, CA ; Lost Coast (Eureka, Crescent City, CA); Cape Blanco, OR • Delaware Bay Approaches (Cape May, Cape Henlopen) • Unimak Pass, AK • Cape Hatteras, NC 		
Vessel Tracking Service Areas		
VTS areas extending beyond (seaward of) the baseline. VTS Areas are described in the <u><i>Code of Federal Regulations (CFR), Title 33: Navigation and Navigable Waters, Part 161 – Vessel Traffic Management, Subpart C – Vessel Traffic Service and Vessel Movement Reporting System Areas and Reporting Points.</i></u>		
IRVMC Reporting Points		
IRVMC Reporting Points, as described in <u><i>CFR, Title 33: Navigation and Navigable Waters, Part 165.830 and Part 165.921.</i></u>		

3.3.3.0-3 The system shall provide transmit and receive coverage in *Inland Navigable Waterways* as defined in Table 3.5. Graphical representations of the coverage requirements in Table 3.5 are provided in Attachment J-5.

**Table 3.5: Inland Navigable Waterways
(Shoreward Coverage Boundaries)**

District / Sector	River / Waterway	Mile Marker / Landmark
D1		
Northern New England	Kennebec River	Days Ferry to Gardiner Bridge.
	Montsweag Bay	Hockomock Bay to Youngs Point.
	Sheepscot River	Middle Westport Island Wiscasset Bridge.
	New Meadows River	Dingly Island to Woolward Point.
	Damariscotta River	Farmers Island to New Castle.
	Medomak River	Waldoboro to Hungry Island.
	St. George River	Otis Cove to Thomaston.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

District / Sector	River / Waterway	Mile Marker / Landmark
	Pisgataqua River	I-95 Bridge to Broad Cove to Great Bay.
	Penobscot River	Bangor at the Joshua Chamberlain Bridge.
	Lake Champlain	US/Canada Border to Lock 12 in Whitehall, NY.
	Champlain Canal	MM 26.5 (Lock 12 in Whitehall, NY) to MM 0 (Southern end of Champlain Canal).
Long Island Sound	Connecticut River	Charter Oak Bridge (41-45N/072-39W), Hartford, CT. Approximately 44NM North of the mouth.
	Thames River	Norwich, CT (41-31.5N/072-05W). Approximately 13.5 NM north of the mouth.
New York	Hudson River	MM 184.2 (Southern end of Champlain Canal) to MM 0 (Southern tip of Manhattan/NY Harbor).
D5		
Delaware Bay	Delaware River	Trenton Falls.
	C & D Canal	Mouth to Maryland State line.
Baltimore	Sassafras River	Grove Pt. to Swantown Creek
	Chester River	Love Point to Spry Landing
	Choptank River	Tilghman Island to 331 Bridge in Denton, MD.
	Patapsco River	Bodkin Point to Baltimore Inner Harbor.
	Patuxent River	Drum point to Trueman Point.
	Potomac River	Point Lookout to Francis Scott Key Bridge, Wash. DC.
	Wicomico River	Long Point to Tonytank Creek, Salisbury, MD.
	Elk River	Turkey Point to 213 Bridge
	C & D Canal	Elk River to Rte. 213 Bridge, Chesapeake City, MD.
	Nanticoke River	Roaring Pt. to the route 24 bridge, DE.
Hampton Roads	York River	Up to West Point.
	Rappahannock River	Up to the Route 360 Bridge.
	James River	Up to Chickahominy River
North Carolina	Cape Fear River	The US 17 bridge turning basin (5 miles upstream of the Port of Wilmington).
	Neuse River	Day Beacon (DBN) 50 (35-08.5N 077-03.5W)
	Trent River	DBN 4 (35-04.5N 077-04W)
	Pamlico River	Pamlico River swing bridge at the town of Washington, NC (Route 17 Bridge)
D7		
Charleston	Cooper River	To Lighted Buoy 76, LLNR 3070
	Stono River	Wadamalaw Sound.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

District / Sector	River / Waterway	Mile Marker / Landmark
	Broad River	Hall Island.
	Savannah River/S. Channel	Little Kiffer Point.
	Ogeechee River	Ossabaw Sound.
Jacksonville	St. Johns River	To the Route 17 Bridge.
	Indian River	MM875 to MM890.
Miami	St. Lucie Canal	The whole canal.
D8		
Galveston	Houston Ship Channel	Manchester Bridge (610 Bridge).
	San Jacinto River	Hwy. 90 Bridge (near Crosby, TX.)
Corpus Christi	Brownsville Ship Channel	Port of Brownsville.
	Victoria Barge Canal	Pickering Basin
	Channel to Port Harlingen	Arroyo Colorado Cutoff to Port of Harlingen.
D9		
Buffalo	St. Lawrence River	Lighted Buoy 1 (LLNR 0005). Canadian border at Massena NY.
Detroit	Saginaw River	M-46 Bridge, approximately 20 miles upstream from the mouth of the river.
Lake Michigan	Grand River	14NM inland.
	Illinois River	MM291.1 to MM333.5. Which include the Chicago Sanitary Ship Canal, the Cal-sag & Calumet Rivers mm304.5-mm333.5, each separate channel is identified as part of the Illinois River system.
D11		
San Francisco	Sacramento River	City of Sacramento Water Intake Light (LLNR 7762) - Port of Sacramento
	Sacramento River Deep Water Ship Canal	Light 86 (LLNR 7615)
	San Joaquin River	Stockton Channel Light 48 (LLNR 7165) - Stockton
		Note: The navigable waters of the American, Old, Middle, N. & S. Mokelumne Rivers fall w/in a 10 mile radius of San Pablo Bay, Suisun Bay, Sacramento River & San Joaquin River.
	Lake Tahoe	All
D13		



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

District / Sector	River / Waterway	Mile Marker / Landmark
Portland	Umpqua River	MM 0 - MM 12 (Bridge at 43-39N, 123-50W in Scottsburg, OR)
	Siuslaw River	MM 0 - MM 18 (Bridge at 44-02N, 123-52W in Mapleton, OR)
	Columbia River	MM 0 - MM 45 (Eastern end of Puget Island)
	Columbia River	MM 40 - Western end of Puget Island to Richland.
	Willamette River	MM 0 - MM 30 (Columbia River confluence to Oregon City Falls)
Seattle	Hood Canal	The whole canal.
	Lake Washington	The whole Lake.
D17		
Anchorage	Bristol Bay	Tuklung Mt. HLS

3.3.3.0-4 The system shall provide transmit and receive coverage in the coverage exception areas as described in Table 3.6.

Table 3.6: Coverage Exceptions – Alaska and U.S. Territories

Area description	Receive PER		Transmit PER	
	Class A	Class B	Class A	Class B
Alaska Bering Sea coast north of Kotzebue to Canadian border	95%	-- ⁷	--	--
Cook Inlet North and East of Anchorage (Turnagin and Knik Arms)	90%	--	--	--
Aleutian Islands west of Dutch Harbor, except for Adak and Attu	90%	--	--	--
Alaska Peninsula west of 155° west longitude, except Unimak Pass	90%	--	--	--
Adak, Attu, Dutch Harbor and Unimak Pass	50%	50%	--	--
Gulf of Alaska between 137° and 144° west longitude	90%	--	--	--
Western Rivers covered by IRVMC (covering IRVMC designated reporting points)	90%	--	--	--
U.S. Territories (Island of Guam, Puerto Rico, U.S. Virgin Islands)	50%	50%	42%	52%
<u>U.S. waters exempt from AIS carriage requirements</u> ⁸	None		None	

⁷ This table provides *minimum* coverage performance requirements; even where no minimum requirement is provided, coverage is still considered to be of value to the Government.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

3.3.4 Coverage Verification Constraints

- 3.3.4.0-1 Contractor-proposed testing methodologies, which will be evaluated and approved by the Government, shall comply with prescribed configuration and testing requirements as stated below.⁹
- 3.3.4.0-2 Coverage verification tests shall assume the following configurations for mobile AIS stations for the purposes of coverage modeling and testing.
- a. Class A and Class B mobile AIS stations shall be equipped with omni-directional antennas.
 - b. Class A VHF antennas shall be at 10 meters height above sea level.
 - c. Class B VHF antennas shall be at 1 meter height above sea level.
 - d. The power output of Class A mobile AIS station units shall be 12.5 watts as measured at the transmit output port.
 - e. The power output of Class B mobile AIS station units shall be 2 watts as measured at the transmit output port.
- 3.3.4.0-3 Coverage verification tests shall assume watercraft-based mobile AIS stations; verification of coverage and performance is not required for AIS equipped aircraft.
- 3.3.4.0-4 The propagation analysis and coverage plots for proposed NAIS sites shall be conducted using proven methodologies and standards (e.g., CFR, title 47, part 80, Subpart P, ITU-R.P525/526, ITU-R.P1546, TIA TSB-88-B, etc.) applicable to each specific desired location. Antenna heights, effective radiated power, and other characteristics used for the modeling shall be in accordance with the proposed transceiver locations, system design, and applicable international AIS standards.
- 3.3.4.0-5 The results of coverage verification, which are to be performed in accordance with industry best practices, shall prove the validity of the Contractor’s standards and tools used for the propagation analysis and coverage plots.
- 3.3.4.0-6 Testing methodologies shall account for studies (refer to IMO NAV 53/INF.12, 18 May 2007) which show that when the AIS VDL is significantly populated, the throughput efficiency of the VDL is limited by the behavior of the shipborne AIS in all transmission modes. This requires isolating the coverage verification test from the behavior of the shipborne AIS, such that the coverage verification is indicative of the system design alone; not the behavior of the shipborne AIS. For example, it may be necessary to use FATDMA to exclusively allocate time-slots for both the base station and the shipborne units under test. The testing methodology shall also confirm that the noise level of these FATDMA-allocated time-slots is sufficiently low (that the signal level is near the thermal noise floor) during the test. Message repetition in multiple contiguous time-slots may be necessary to support the test.

⁸ As defined by Title 33 of the Federal Code of Regulations: Navigation and Navigable Waters.

⁹ Specific deliverables and work products for which the Contractor will be responsible are described in the Contract Data Requirements Lists: *CDRL 1.8.2.1: Master Test Plan, CDRL 1.8.2.3.1: Test Plan and Procedures, CDRL 1.8.2.3.4: DT&E Test Report*



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

3.4 Logical Shore Station (LSS)

3.4.1 General LSS Requirements

- 3.4.1.0-1 The LSS shall provide the capability described in IALA A-124 Part IV, Edition 1.2.
- 3.4.1.0-2 The system shall be capable of providing Joint Technical Architecture (JTA)-standard and registered (in compliance with Department of Defense (DoD) XML Registry and Clearinghouse policy) tags for NAIS data intended to be exchanged through the COP to the Global Information Grid (GIG) JTA.
- 3.4.1.0-3 The system shall be configurable such that it can provide AIS messages from the PSSs to other Components or systems in both the native and parsed format.
- 3.4.1.0-4 The system shall provide a configurable capability to automatically detect when static ship and voyage information changes, and trigger a user-configurable event or alarm.
- 3.4.1.0-5 The system shall allow operators to transmit any standard AIS message from any single PSS, predefined group of PSSs, or from a group of selected PSSs (ad hoc).
- 3.4.1.0-6 The system shall be capable of manually or automatically aggregating data from any PSS or group of PSSs, locally, regionally, or system wide.
- 3.4.1.0-7 The system shall be configurable to allow received AIS messages to be rebroadcast (repeated) by the PSS that received the AIS message or any other PSS (i.e., any PSS that is needed to achieve the coverage needed for navigation safety), and shall, at a minimum, support the functionality as described in the following use case:
- a. Where multiple vessels may approach a common location by routes separated by terrestrial obstructions that prevent AIS communications between the vessels, one or more PSSs providing coverage in that area are configured such that messages received from the vessels are retransmitted so that other vessels receive the obstructed vessel's position reports.
- 3.4.1.0-8 The system shall be able to filter and pass AIS messages based on any combination of message metadata attributes and values, including metadata as described in requirements 3.3.2.0-4 and 3.3.2.0-5.
- 3.4.1.0-9 The system shall be able to filter and pass NAIS data to other NAIS services based on any combination of attributes and values within the following messages:
- a. Position Report messages (Messages 1, 2, 3, and 18) as defined by ITU-R M 1371-3, Annex 8
 - b. Static and Voyage Related Data message (Message 5, 19, and 24) as defined by ITU-R M 1371-3, Annex 8
 - c. Standard SAR Aircraft Position Report message (Message 9) as defined by ITU-R M 1371-3, Annex 8.
 - d. Aids to Navigation message (Message 21)



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

e. Binary and safety related messages (messages 6, 8, 12, 14,25, and 26)

3.4.1.0-10 The system shall provide capability to configure the rate at which AIS messages are passed on to other external systems (e.g., the most recent position reports from any vessels every minute, 5 minutes, etc.)

3.5 AIS Service Management (ASM)

3.5.1 General ASM Requirements

3.5.1.0-1 The system shall provide ASM functionality that meets the requirements of IALA A-124, Part V.

3.5.1.0-2 The system shall record which USCG (or other) users acknowledge AIS messages from vessels.

3.5.1.0-3 The system shall support a configurable deconfliction process for transmitting AIS messages from multiple USCG users that make the request at the same time so that they are transmitted automatically by the appropriate PSSs. The deconfliction process shall be based on the priority of the user and/or message type.

3.5.1.0-4 ASM services shall be discoverable via the ESB while adhering to the access privilege restrictions outlined in PSPEC sections 3.2.5 and 3.5.3.

3.5.2 VHF Data Link (VDL) Management

3.5.2.1 VDL Monitoring

3.5.2.1.0-1 Operators shall be able to receive and display the contents of the base station output sentences (e.g., Frame Summary Report [FSR]) any selected PSS, group of PSSs, or pre-configured group of PSSs.

3.5.2.1.0-2 Operators shall be able to configure the parameters and thresholds within the AIS Device Status (ADS), FSR, and VDL Signal Information (VSI) messages to create VDL monitoring reports.

3.5.2.1.0-3 Operators shall be able to manually request and view a VDL monitoring report.

3.5.2.1.0-4 Operators shall be able to select the base stations which provide VDL monitoring reports.

3.5.2.1.0-5 The system shall, at a minimum, provide functionality to support the following use cases:

- a. The system constantly monitors the FSR from each of the base stations and alerts the operator when one or a combination of preset parameters is exceeded. When the parameters are exceeded, the system notifies the operator. The operator then views the information from the base station exceeding the parameters and uses the information to determine whether or not VDL management or other action (system repair) is needed.
- b. The operator requests from the system a graphical display of average noise levels of selected base stations. The operator then selects from those base stations the IDs of the base stations



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

where the average slots with Cyclic Redundancy Check (CRC) failures exceeds a designated threshold. Those base stations are then displayed on a map of the US.

- c. The operator receives an alarm indicating that the number of slots with received signal strength for a particular base station has been below a pre-set threshold level for the past five minutes. The operator reviews the AIS messages entering the system from that base station and notes that there are no messages being received by the base station. The operator identifies an adjacent base station and sends a Message 4 from that base station.

3.5.2.2 VDL Management

3.5.2.2.0-1 The operator shall be able to manage the VDL by transmitting management messages (e.g., DSC telecommands, Message 4, Message 16, Message 20, Message 22, and Message 23).

3.5.2.2.0-2 The system shall, at a minimum, provide functionality to support the following use cases:

- a. The operator is alerted to a high noise level on AIS1 in a port, selects all the vessels in that port and transmits a Message 22 to shift AIS operations in the port to a different channel for AIS 1.
- b. The operator in A. (above) determines through VDL monitoring (see above) that AIS1 is no longer interfered with, and transmits Message 22 to shift AIS operations in the port back to AIS 1.
- c. The operator selects all hazardous cargo vessels in a port and decreases their reporting interval to 5 seconds by sending a Message 23 to all selected vessels.
- d. The operator configures all base stations in the Sector AOR to pre-announce the fixed allocation schedules for each base station (FATDMA) by transmitting Message 20 as per a configurable schedule.

3.5.3 System Management

3.5.3.0-1 The system shall provide centralized performance management capabilities to include operational status reporting, performance monitoring and optimization, and reporting for critical system elements.

3.5.3.0-2 The system shall be able to provide centralized system administration with the ability to detect and troubleshoot system faults.

3.5.3.0-3 The system shall, upon NAIS operator request, generate user-defined status and performance reports including but are not limited to: service and subsystem availability reports; trouble ticket reports; and site health reports.

3.5.3.0-4 The system shall, from a centralized location, be capable of performing maintenance on system components to include software and firmware updates, diagnostics, and all other component-dependent maintenance.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- 3.5.3.0-5 The system shall notify its operators, locally and remotely, to physical threats such as fire and intrusion to NAIS infrastructure and assets.
- 3.5.3.0-6 The system shall provide centralized administration capabilities to include at a minimum: user administration, system receiver site management, NAIS data source management, NAIS data client management.
- 3.5.3.0-7 The system shall provide the capability to manage the access privileges of each user with respect to all NAIS functionality.
- 3.5.3.0-8 The system shall record all system configuration, maintenance, and administration actions taken by users of the system.
- 3.5.3.0-9 The system shall be able to log the following performance metrics:
 - a. System component response times
 - b. System component availability
 - c. System stability
 - d. Packet error rate

3.6 *Network Services and Enterprise Service Bus*

3.6.1 **Performance Standards**

- 3.6.1.0-1 The system shall transfer AIS messages (encrypted and unencrypted) from the Physical Shore Station (PSS) to the appropriate Sector Command Center (SCC) within one second. This latency will be measured from reception of the AIS Message by the base station to output of NAIS data from the router located at the associated SCC.
- 3.6.1.0-2 All AIS messages (encrypted and unencrypted) delivered from the PSS to storage and enterprise services shall have latency from time of receipt at PSS to the time of receipt at storage and enterprise services, not to exceed five seconds.

3.6.2 **Network Management**

- 3.6.2.0-1 Access to NAIS and its network resources shall be managed through the USCG's network directory service.
- 3.6.2.0-2 The system shall alert system administrators of any attempts to gain unauthorized access to, or unauthorized use of, the system through network connections.

3.7 *Data Storage*

3.7.1 **General Data Storage Requirements**

- 3.7.1.0-1 The system shall store all NAIS data received, created, modified, or transmitted by the system for at least 3 years.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- 3.7.1.0-2 The system shall respond to data query requests within 10 seconds of receiving requests for NAIS data that is less than 30 days old.
- 3.7.1.0-3 The system shall respond to data query requests within 60 seconds of receiving requests for NAIS data that is more than 30 days old.
- 3.7.1.0-4 The system shall, at a minimum, meet the operational requirements as set forth in the following use cases.
- a. As part of an incident investigation, a user at a Sector Command Center needs to know all of the vessels that traveled through a specific geographic area during a specific time period. Using the GIS functionality in the NAIS interface on the SWIII, the user bounds the geographic area, and uses that boundary in conjunction with the desired time period to query the database for the MMSI, vessel type, maximum speed, and size of all vessels that match the query parameters.
 - b. A user at a Sector Command Center needs to see the vessel track for a vessel inbound for that SCCs area of responsibility. The user queries the database for all messages and associated metadata received from that vessel from the time the vessel debarked to the present time.
 - c. A user needs to know all of the messages that were sent to or received from a particular vessel during a specific period of time. The user queries the database with the MMSI of the vessel and the period of time. The system returns all messages intended specifically for and received from that vessel, and also associates the vessel's track (i.e., location) during that period of time and determines which general broadcast messages should have been received by that vessel given the vessel's characteristics.
 - d. A user at the System Operations Center wishes to know the reporting rate for all vessels within range of a specific Physical Shore Station over a period of time. The user queries the database with the PSS and period of time, and receives a response that shows the MMSI, vessel characteristics, and timestamp and message type for each message received by that PSS over the period of time.
 - e. The MISLE system needs access to general NAIS data, and so runs a periodic automated query to determine how many vessels of a specific type are within each SCCs area of responsibility. The NAIS system responds with the number of vessels that match the criteria of the query for each SCC.
 - f. As part of navigation planning for a specific waterway or port, a USCG user wants to use historical vessel movement data to evaluate options for reducing risk of collisions. Using the system, the analyst queries the database to collect and plot vessel position reports to do statistical analysis to identify risks or plan new traffic patterns.

3.7.2 Data Management

- 3.7.2.0-1 AIS messages and metadata fields shall be parsed into tagged fields as described in the [MDA COI Data Sharing Working Group XML schema](#) for AIS.
- 3.7.2.0-2 The system shall store the most recent 3 year's of NAIS data collected by NAIS Increment 1.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- 3.7.2.0-3 The system shall identify and consolidate duplicate AIS messages, defined as a single AIS message sent from one vessel at one time but received simultaneously by multiple PSS.
- 3.7.2.0-4 The system shall record the receipt of, and all metadata associated with, all duplicate messages, and store this information along with the consolidated AIS data.

3.7.3 Data Integrity

- 3.7.3.0-1 The system shall store the user identity of the sender of AIS messages.
- 3.7.3.0-2 The system shall detect and report any loss of NAIS data integrity.

3.7.4 Archive Backup Restore

- 3.7.4.0-1 The system shall provide a redundant storage solution which ensures continuity of operations (COOP).
- 3.7.4.0-2 The system shall have the ability to archive and recover all NAIS data received, created, modified, or transmitted by the system.
- 3.7.4.0-3 The system shall automatically and periodically back up all NAIS data at a frequency configurable by system operators.
- 3.7.4.0-4 The system shall allow system operators to initiate data backup.
- 3.7.4.0-5 The system shall provide the capability to purge archived NAIS data after 3 years, or retain the NAIS data for a longer period if desired.
- 3.7.4.0-6 The system shall store AIS messages in both their raw format (as a single record) and as parsed data fields.

3.8 Enterprise Services

3.8.1 Data Retrieval Services

- 3.8.1.0-1 The system shall provide well defined interfaces to allow for the controlled export of NAIS data into other systems.
- 3.8.1.0-2 The system shall be capable of exporting NAIS data at a rate that reflects the maximum limits of the scalability requirements described in Table 3.2 (i.e., exporting all messages that are being received from 400 PSSs, each at 100% VDL loading).
- 3.8.1.0-3 The system shall allow the execution of user-defined data queries of the NAIS storage.
- 3.8.1.0-4 The system shall allow configurable query parameters based on any combination of the fields used to store NAIS data.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

3.8.1.0-5 The system shall provide a common service for distribution of NAIS data to all authorized users using the Maritime Domain Awareness (MDA) Community of Interest (COI) Data Management Working Group (DMWG) data vocabulary, data model, and XML schema.

3.8.2 Transmit Services

3.8.2.0-1 The system shall provide the capability to create and transmit all types of AIS Messages.

3.8.2.0-2 The system shall be able to create weather binary messages using meteorological and hydrological data from the National Weather Service (NWS); the NWS utilizes the following two interfaces: National Digital Forecast Database (NDFD) and Physical Oceanographic Real-Time System Uniform Flat File Format (PUFFF).

3.8.2.0-3 The system shall be able to receive and process a continuous external weather data feed (e.g., RSS) from the NWS in XML format.

3.8.2.0-4 The system shall be able to automatically and periodically broadcast weather binaries to all vessels in a sector, when weather data is available.

3.8.2.0-5 The system shall provide the capability to configure the type of weather information broadcast to each sector.

3.8.2.0-6 The system shall provide the capability to configure the periodicity of weather information broadcasts, on a per sector basis.

3.8.2.0-7 The system shall have the capability to automatically route AIS messages to appropriate PSSs for transmission.

3.8.2.0-8 The system shall be able to repeat AIS message transmission from a given base station for a user-defined duration to ensure that the threshold probability of reception is achieved

3.8.2.0-9 The system shall provide the capability to transmit AIS Messages to a single vessel identified by its Maritime Mobile Service Identity (MMSI).

3.8.2.0-10 The system shall provide the capability to transmit AIS messages to an arbitrary group of vessels (e.g., tankers, large passenger ships) identified by a list of MMSIs.

3.8.2.0-11 The system shall provide the capability to transmit AIS messages to all or selected vessels within a specified (either predefined or ad-hoc) geographic area

3.8.2.0-12 The system shall provide the capability to transmit AIS messages to specific types of vessels (e.g., tankers, large passenger ships).

3.8.2.0-13 The system shall provide the capability to transmit AIS messages to AIS equipped aircraft.

3.8.2.0-14 The system shall provide a method for creating and then sending predefined (“canned”) AIS messages.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- 3.8.2.0-15 The system shall provide a method for configuring thresholds and events to trigger the transmission of predefined messages.
- 3.8.2.0-16 The system shall provide a method to configure the schedule for sending predefined messages (e.g., one transmission per event, or repeated for a designated number of transmissions or period of time).
- 3.8.2.0-17 The system shall utilize a routing scheme that maximizes the probability of receipt of a transmitted AIS message by its intended recipient, based on the recipient’s last known position and other relevant data.
- 3.8.2.0-18 Transmitted AIS messages shall be forwarded to the Data Storage Component within the time constraints identified in Performance Standards within the Networking section of this document.
- 3.8.2.0-19 The system shall, at a minimum, be able to send AIS messages based on one or a combination of the following means:
- a. Geographic Location – “Box”: An operator, by means of the GIS component of the HSI, designates target vessels by creating a polygon containing the desired vessels
 - b. Geographic Location – “Bounds: An operator designates target vessels by designating one or more designated boundaries of latitude and/or longitude containing the vessels
 - c. Geographic Location – “AOR” (e.g., operator selects pre-defined polygon such as a Sector AOR or Captain of the Port (COTP) zone containing the desired vessels
 - d. Vessel Static Data: An operator selects any one or combination of data fields contained in Message 5 to use in filtering out or including target vessels
 - e. Vessel Position Reports: An operator selects any one or combination of data fields contained in Message 1, 2, and 3 to use in filtering out or including target vessels for sending message
 - f. Geographical Location – “Range”: An operator designates a vessel as “protected”, and a range around the protected vessel so that a messages are sent to any vessel entering the designated zone for the protected vessel
- 3.8.2.0-20 The system shall, at a minimum, provide functionality to support the following use cases:
- a. The operator selects all passenger vessels (static) as target vessels to send a message 12, addressed safety related message, warning of rough weather (ad hoc)
 - b. The operator selects all but anchored vessels (position) as target vessels in the VTS control area (AOR) to send a message 14 (ad hoc) warning about movement of a Liquefied Natural Gas (LNG) tanker and associated security zones.
 - c. The operator creates a pre-defined message and thresholds (canned) which transmits a message 12 warning about speed restrictions to prevent whale injuries to all vessels greater than 100 ft traveling faster than 12kts within the marine mammal protection zone displayed on a chart of the area (box).
 - d. The operator establishes a 1,000 yards security zone (range) displayed around the icon for an LNG tanker shown on a chart as it approaches Boston Harbor and configures a warning message (canned) to be automatically sent to any vessel approaching closer than 1,000 yards.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- e. The operator selects all vessels south of 26°S latitude (bounds) displayed on a chart of the area as target vessels to send a hurricane warning to (ad hoc).]
- f. USCGC ATTU wants to send an encrypted text message to a Sector Command Center. They enter the message into their "terminal", it is encrypted, and transmitted as a SBU Tactical Information Exchange and Display Systems (STEDS) message over AIS. The message is received at a base station and passed on to the Logical Shore Station, which determines that it is a STEDS message, and sends it to the decryption service. The decryption service decrypts the message and sends it back to the LSS for delivery to the sector.
- g. A user at a Sector Command Center wants to send a Target of Interest (TOI) message to USCGC ATTU. The user creates a message for USCGC ATTU, marks it for encryption, and sends the message as usual, at which point it is handled by the LSS. The LSS forwards it to the encryption service, which encrypts it and passes it back to the LSS for further transfer to USCGC ATTU, using the original message MMSI as the recipient address.

3.8.3 Data Import Services

- 3.8.3.0-1 The system shall provide a standard interface to import AIS messages from other, external (non-NAIS) systems/sources (e.g. Saint Lawrence Seaway, and Army Corps of Engineers) to the Storage Component.
- 3.8.3.0-2 The system shall be capable of importing data from a minimum of five external data providers using 20 PSSs, each at 100% VDL loading.
- 3.8.3.0-3 The system shall provide the capability to manage the NAIS data that is entered into the NAIS storage from external data feeds. In some cases, the USCG may not want all data imported into the database (e.g., filtering functions such as the LSS provides may be appropriate).
- 3.8.3.0-4 The system shall provide an interface to import AIS messages from the following systems:
 - a. Saint Lawrence Seaway Corporation (SLSC)
 - b. NOAA
 - c. Offshore Platforms (Petrocom)
 - d. Coast Guard Vessel Traffic Service (VTS)
 - e. MAGNet
 - f. Army Corps of Engineers
 - g. Commercial AIS Providers

3.9 Human-System Interface (HSI)

3.9.1 General HSI Requirements

- 3.9.1.0-1 All HSI functionality shall be browser compatible.¹⁰

¹⁰ This requirement does not imply a requirement for “web-based” applications. The application software can be implemented to run locally or at the EDC.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- 3.9.1.0-2 HSI functionality shall allow all system management responsibilities to be met with only the three system operators to be staffed at NAVCEN.
- 3.9.1.0-3 Human system interface software and functionality shall be loosely coupled with the rest of the system such that: the functionality of the HSI is limited to providing user access to system functionality provided by other high-level system Components; none of the functionality provided by the other Components is contained within, or dependent on, the HSI; only open, standard interfaces are used between the HSI and the rest of the system; and no proprietary technology is used in the HSI.
- 3.9.1.0-4 The human system interface(s) to be used in the NAIS system shall support three user groups, as described below:
- a. A User Interface for operational units (e.g., Sectors, Districts, etc.) to use in accessing the functionality of the LSS and Enterprise Services
 - b. A User Interface for the System Operations Center (SOC) to access all functionality of the system: LSS, PSS, ASM, Storage, and Enterprise Services
 - c. A Generic User interface that allows users to view NAIS data using the Data Retrieval Service and LSS functionality¹¹ via a Standard Workstation III (SWIII)
- 3.9.1.0-5 All HSI software shall be capable of running on a Standard Workstation III (SWIII).
- 3.9.1.0-6 The user interface shall uniquely identify messages that have been processed by any encryption or decryption services.

3.9.2 HSI Standards

- 3.9.2.0-1 The system shall comply with the following standards:
- a. MIL-STD-1472-F (Human Engineering)
 - b. ASTM F 1166 (Standard Practice for Human Engineering Design for Marine Systems, Equipment and Facilities)
 - c. ASTM F 1337 (Standard Practice for Human Engineering Program Requirements for Ships and Marine Systems, Equipment, and Facilities)
 - d. IEC 62288 (Maritime navigation and radio communication equipment and systems – Presentation of navigation-related information on shipborne navigation displays)
 - e. 29 U.S.C. 794d, Rehabilitation Act, Section 508
- 3.9.2.0-2 NAIS interface modules shall maintain the same GUI standards and look-and-feel of the legacy applications¹² by using similar controls, menus, navigation, and terminology.

3.9.3 Geographic Information System (GIS) Functionality

- 3.9.3.0-1 The system shall be capable of using and displaying GIS layers provided by third parties

¹¹ Generic users will not have AIS message transmit capabilities

¹² ~~These are the existing applications and user interfaces on the Standard Workstation III, which are a part of the Tech Library.~~



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- 3.9.3.0-2 The system shall be capable of importing NMEA 0183 Waypoint Files (.wpl) from Coast Guard applications for use in creating and transmitting SAR patterns via AIS.
- 3.9.3.0-3 System functionality shall be accessible via a GIS visualization tool for system troubleshooting and monitoring purposes, and shall, at a minimum, support the functionality as described in the following use case:
- a. A User’s graphical display shows a map with icons representing the location and status of each NAIS PSS site. Changes in a PSS icon’s appearance and an audible alarm indicate that that there is a system fault at the site. The user selects that site to view certain system parameters for the selected site. If necessary, the user chooses to display additional information and available remote administration tools to perform corrective action
- 3.9.3.0-4 System functionality shall be accessible via a graphical interface by which to display, sort, organize, and manipulate received and transmitted AIS messages from any source or origin, and shall, at a minimum, support the functionality as described in the following use cases:
- a. A user wishes to review all AIS messages transmitted or received by the system for the past hour. The user opens a query window on his console, enters the parameters for and submits the query. The results are displayed on the console in views similar to that of office suite software, search, sort, display, read, and print functionality.
 - b. A user wants to see a display of any message (addressed or otherwise) sent between two vessels in the past two hours. The user opens a query window on her console, selects the two vessels in the C2 display (automatically entering identifiers for each of the vessels into the query), enters the other parameters, and submits the query. The results are displayed on the console in views similar to that of office suite software with search, sort, display, read and print functionality.
- 3.9.3.0-5 System functionality shall be accessible via a graphical interface with which to create and manipulate vessel tracks, input Search and Rescue (SAR) patterns from other systems, and other visual representations on the GIS display, and shall, at a minimum, support the functionality as described in the following use cases:
- a. A user receives notification from a CG aircraft that a vessel is inbound for a port within the SCCs area of responsibility, but is still too far away for AIS reception by the system. The user wishes to transmit the track of the vessel to two CG assets patrolling the near the port using EAIS. Using the GIS display, the user creates the track provided, chooses CG assets to which to send the track, and sends the NAIS data to the system for transmission to the two CG assets. The system routes the message through the encryption service and then on to the appropriate transmitter(s) for transmission.
 - b. A user selects an AIS-equipped vessel on the GIS display and marks that vessel as a Target of Interest (TOI). The user then selects a CG asset (also on his GIS display) to which to send the TOI information using EAIS. The user then sends the TOI information to the system for transmission to the selected CG asset. The system routes the message through the encryption service and then on to the appropriate transmitter for transmission.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

- 3.9.3.0-6 The system shall have functionality to generate and send AIS messages based on user-created graphical representations and information (e.g., security zones, virtual AtoN).



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

4 Verification

Verification activities will be focused on determining what is required to prove that system design meets the NAIS requirements listed in this document. Validation activities will determine how the means of verification will be proven. These activities will also determine system testability, specialized equipment, facility and other resource requirements. It is important to determine early in the system design activity how the operational, functional, maintenance, and support features of the system will be tested, and to determine if special test equipment is needed. System requirements shall be verified during test and evaluation (T&E) to demonstrate the technical feasibility of system. Table 4.1 provides the minimum level of verification required for each requirement.

4.1 Methods of Verification

Methods used to verify system requirements include inspection, Analysis, Demonstration, and Formal Testing. The methods of verification and the level of assembly for those verifications shall be documented in the Developmental Test and Evaluation (DT&E) Plan and the Operational Test and Evaluation (OT&E) Plan.

4.1.1 Inspection

Physical inspection of items shall be performed on equipment, gear, or other physical items. Inspection shall be performed on designs, documents, and certifications to ensure compliance with the requirements. Inspection includes examinations, reviews, and in some cases, will constitute a part of a formal test.

4.1.2 Analysis

Analysis shall be used when testing is not required or is simply not feasible. Analysis includes modeling, simulation, and may constitute or be an element of a formal test.

4.1.3 Demonstration

Demonstration is similar to formal testing, but more informal in nature. Demonstrations shall be the precursors to formal tests allowing for more expediency in the design, prototyping and production of the system. Demonstration shall be a part of a formal test.

4.1.4 Formal Testing

Formal tests shall encompass experimental and systematic checking of the NAIS system performance during its developmental stage. They shall be performed by applying test experiments to the NAIS system, by making observations during the execution of these tests, and by subsequently assigning a verdict about the correct functioning of the system.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

4.2 Verification Matrix

Table 4.1: Requirements Verification Matrix

Requirement	Method	Notes
3.1 Design Constraints		
3.1.1	Analysis	
3.1.2	Analysis	
3.1.3	Analysis	
3.1.4	Analysis	
3.1.5	Analysis	
3.1.6	Analysis	
3.1.7	Analysis	
3.2 General System Requirement		
3.2.0.0-1	Analysis	
3.2.0.0-2	Analysis	
3.2.1		
3.2.1.0-1	Analysis	
3.2.1.0-2	Inspection	
3.2.1.0-3	Analysis	
3.2.1.0-4	Analysis	
3.2.1.0-5	Analysis	
3.2.1.0-6	Inspection	
3.2.1.0-7	Analysis	
3.2.2		
3.2.2.0-1	Inspection	
3.2.2.0-2	Analysis	
3.2.2.0-3	Inspection	
3.2.2.0-4	Inspection	
3.2.2.0-5	Inspection	
3.2.2.0-6	Analysis	
3.2.2.0-7	Inspection	
3.2.2.0-8	Inspection	
3.2.2.0-9	Inspection	
3.2.2.0-10	Inspection	
3.2.2.0-11	Inspection	
3.2.2.0-12	Inspection	
3.2.2.0-13	Inspection	
3.2.2.0-14	Inspection	
3.2.2.0-15	Inspection	
3.2.2.0-16	Inspection	
3.2.2.0-17	Inspection	
3.2.2.0-18	Demonstration	



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Requirement	Method	Notes
3.2.2.0-19	Demonstration	
3.2.2.0-20	Demonstration	
3.2.2.0-21	Inspection	
3.2.2.0-22	Inspection	
3.2.2.0-23	Inspection	
3.2.2.0-24	Inspection	
3.2.2.0-25	Formal Test	
3.2.3		
3.2.3.0-1	Analysis	
3.2.3.0-2	Demonstration	
3.2.3.0-3	Analysis	
3.2.4		
3.2.4.0-1	Formal Test	
3.2.4.0-2	Inspection	
3.2.4.0-3	Inspection	
3.2.4.0-4	Inspection	
3.2.5		
3.2.5.0-1	Demonstration	
3.2.5.0-2	Demonstration	
3.2.5.0-3	Demonstration	
3.2.5.0-4	Formal Test	
3.2.5.0-5	Formal Test	
3.2.5.0-6	Inspection	
3.2.5.0-7	Formal Test	
3.2.5.0-8	Demonstration	
3.2.6		
3.2.6.0-1	Analysis	
3.2.6.0-2	Analysis	
3.2.6.0-3	Analysis	
3.2.7		
3.2.7.0-1	Analysis	
3.2.7.0-2	Analysis	
3.2.7.0-3	Inspection	
3.2.7.0-4	Inspection	
3.2.7.0-5	Analysis	
3.3 Physical Shore Station		
3.3.1		
3.3.1.0-1	Demonstration	
3.3.2		
3.3.2.0-1	Inspection	
3.3.2.0-2	Demonstration	
3.3.2.0-3	Demonstration	



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Requirement	Method	Notes
3.3.2.0-4	Demonstration	
3.3.2.0-5	Demonstration	
3.3.2.0-6	Inspection	The Contractor shall provide a type approval certificate with test data (data must be certified by a recognized independent test laboratory, not self-certified) that states that the AIS base station complies with the latest versions of IEC 62320-1 and IEC 61162-1. This type approval certification shall be recognized and accepted by the appropriate USCG and FCC entities.
3.3.2.0-7	Formal Test	
3.3.2.0-8	Formal Test	
3.3.2.0-9	Formal Test	
3.3.3		
3.3.3.0-1	Analysis / Formal Test	Analysis for all required coverage areas, formal test for IOC coverage
3.3.3.0-2	Analysis / Formal Test	Analysis for all required coverage areas, formal test for IOC coverage
3.3.3.0-3	Analysis / Formal Test	Analysis for all required coverage areas, formal test for IOC coverage
3.3.3.0-4	Analysis / Formal Test	Analysis for all required coverage areas, formal test for IOC coverage
3.3.4		
3.3.4.0-1	N/A	
3.3.4.0-2	Analysis / Demonstration	Analysis for all required coverage areas, demonstration for IOC coverage
3.3.4.0-3	Inspection	
3.3.4.0-4	Analysis / Demonstration	Analysis for all required coverage areas, demonstration for IOC coverage
3.3.4.0-5	Analysis / Demonstration	Analysis for all required coverage areas, demonstration for IOC coverage
3.3.4.0-6	Analysis	
3.4 Logical Shore Station		
3.4.1		
3.4.1.0-1	Inspection	
3.4.1.0-2	Demonstration	
3.4.1.0-3	Formal Test	
3.4.1.0-4	Formal Test	
3.4.1.0-5	Formal Test	
3.4.1.0-6	Formal Test	
3.4.1.0-7	Formal Test	



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Requirement	Method	Notes
3.4.1.0-8	Formal Test	
3.4.1.0-9	Formal Test	
3.4.1.0-10	Demonstration	
3.5 AIS Service Management		
3.5.1		
3.5.1.0-1	Demonstration	
3.5.1.0-2	Demonstration	
3.5.1.0-3	Demonstration	
3.5.1.0-4	Demonstration	
3.5.2		
3.5.2.1		
3.5.2.1.0-1	Formal Test	
3.5.2.1.0-2	Formal Test	
3.5.2.1.0-3	Formal Test	
3.5.2.1.0-4	Formal Test	
3.5.2.1.0-5	Formal Test	
3.5.2.2		
3.5.2.2.0-1	Formal Test	
3.5.2.2.0-2	Formal Test	
3.5.3		
3.5.3.0-1	Demonstration	
3.5.3.0-2	Formal Test	
3.5.3.0-3	Demonstration	
3.5.3.0-4	Formal Test	
3.5.3.0-5	Formal Test	
3.5.3.0-6	Demonstration	
3.5.3.0-7	Demonstration	
3.5.3.0-8	Formal Test	
3.5.3.0-9	Demonstration	
3.6 Networking Services and Enterprise Service Bus		
3.6.1		
3.6.1.0-1	Formal Test	
3.6.1.0-2	Formal Test	
3.6.2		
3.6.2.0-1	Demonstration	
3.6.2.0-2	Formal Test	
3.7 Data Storage		
3.7.1		
3.7.1.0-1	Inspection	
3.7.1.0-2	Demonstration	
3.7.1.0-3	Demonstration	
3.7.1.0-4	Demonstration	



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Requirement	Method	Notes
3.7.2		
3.7.2.0-1	Inspection	
3.7.2.0-2	Demonstration	
3.7.2.0-3	Demonstration	
3.7.2.0-4	Demonstration	
3.7.3		
3.7.3.0-1	Formal Test	
3.7.3.0-2	Formal Test	
3.7.4		
3.7.4.0-1	Formal Test	
3.7.4.0-2	Formal Test	
3.7.4.0-3	Formal Test	
3.7.4.0-4	Formal Test	
3.7.4.0-5	Formal Test	
3.7.4.0-6	Formal Test	
3.8 Enterprise Services		
3.8.1		
3.8.1.0-1	Inspection	
3.8.1.0-2	Analysis	
3.8.1.0-3	Demonstration	
3.8.1.0-4	Formal Test	
3.8.1.0-5	Formal Test	
3.8.2		
3.8.2.0-1	Formal Test	
3.8.2.0-2	Formal Test	
3.8.2.0-3	Formal Test	
3.8.2.0-4	Formal Test	
3.8.2.0-5	Formal Test	
3.8.2.0-6	Demonstration	
3.8.2.0-7	Formal Test	
3.8.2.0-8	Demonstration	
3.8.2.0-9	Analysis	
3.8.2.0-10	Demonstration	
3.8.2.0-11	Demonstration	
3.8.2.0-12	Demonstration	
3.8.2.0-13	Demonstration	
3.8.2.0-14	Demonstration	
3.8.2.0-15	Demonstration	
3.8.2.0-16	Analysis	
3.8.2.0-17	Formal Test	
3.8.2.0-18	Formal Test	
3.8.2.0-19	Demonstration	



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Requirement	Method	Notes
3.8.2.0-20	Demonstration	
3.8.3		
3.8.3.0-1	Demonstration	
3.8.3.0-2	Analysis	
3.8.3.0-3	Demonstration	
3.8.3.0-4	Formal Test	
3.9 Human System Interface		
3.9.1		
3.9.1.0-1	Formal Test	
3.9.1.0-2	Formal Test	
3.9.1.0-3	Formal Test	
3.9.1.0-4	Formal Test	
3.9.1.0-5	Demonstration	The user interfaces shall be demonstrated and tested at the locations in which they will be used (e.g., SCC or SOC).
3.9.1.0-6	Demonstration	
3.9.2		
3.9.2.0-1	Inspection	
3.9.2.0-2	Demonstration	
3.9.3		
3.9.3.0-1	Inspection	
3.9.3.0-2	Inspection	
3.9.3.0-3	Inspection	
3.9.3.0-4	Demonstration	
3.9.3.0-5	Demonstration	
3.9.3.0-6	Demonstration	



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

5 Notes

5.1 Glossary

AIS Messages: Messages that are passed over the VDL.

AIS Message Transmit Services: Services designed to validate and transmit outbound AIS messages.

Analysis: Used when testing is not required or is simply not feasible. Analysis includes modeling, simulation, and possibly will constitute or be an element of a formal test.

Application Architecture Components: Also, referred to as “Components”, used to describe system hardware and software at the system level that provides unique capabilities, functionality, and/or services through its unique interfaces. These refer to the eight top-level Components listed in section 3.2.1 Application Architecture.

Archive Data Store: Is the final repository of NAIS data. Its goal is to offer efficient storage for NAIS data that are no longer needed for day-to-day operations, but which might be required for auditing or research purposes. As archived data ages, it is purged from the storage Component.

Baseline: The line defining the shoreward extent of the territorial sea of the United States drawn according to the principles, as recognized by the United States, of the Convention on the Territorial Sea and the Contiguous Zone, 15 U.S.T. 1606, and the 1982 United Nations Convention on the Law of the Sea (UNCLOS), 21 I.L.M. 1261. Normally, the U.S. baseline is the mean low water line along the coast of the United States.

Captain of the Port (COTP): The Coast Guard officer designated by the Commandant to control a Captain of the Port Zone as described in 33 CFR Part 3. The COTP’s duties involve directing & regulating the operation, movement, and anchoring of vessels within a designated area of responsibility, including management of foreign and domestic vessel traffic, regulated navigation areas and safety/security zones, and to enforce ports and waterways safety regulations (including AIS carriage requirements).

Class A Mobile AIS Stations: are stations that comply with IEC 61993-2, (ITU-R) M.1371.

Class B Mobile AIS Stations: are stations that comply with IEC 62287-1, (ITU-R) M.1371.

Common Operating Picture (COP): The Coast Guard COP is a tool for achieving situational awareness of what is transpiring in the Maritime Domain. The COP is a display of relevant information shared by more than one command. It provides a shared display of friendly, enemy/suspect, and neutral tracks on a chart, with geographically referenced overlays and data enhancements.

Data Client: A consumer (receiver) of AIS and other NAIS data.

Data Source: A provider of AIS (and other) data to the NAIS.



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Data Storage: The repository of NAIS data. It consists of three conceptually different data stores: Real-Time Data Store, Near Real-Time Data Store, and Archive Data Store.

Data Subscription Services: The main mechanisms by which the real-time AIS messages is delivered to external users.

Demonstration: Similar to formal testing, but more informal in nature. Demonstrations shall be the precursors to formal tests allowing for more expediency in the design, prototyping and production of the system. Demonstration shall be a part of a formal test.

DHS Enterprise Architecture: Defines the missions of the Department, the information and technologies needed by the Department to perform these missions, and the transformational processes for implementing new technologies in response to changing mission needs. (also called *HLS Enterprise Architecture*)

Enterprise Data Center (EDC): Facilities designed to host and meet NAIS data storage, management, retrieval, and disaster recovery requirements.

Enterprise Service Bus (ESB): Facilitates communication between internal NAIS services and external service users and data providers over a standardized platform. Will provide multiple adapters enabling existing, legacy USCG applications to consume NAIS services and provide data to NAIS.

External Interface: An external interface of the system is defined as any interface where at least one item of equipment or services involved in the interface is not under the control of the vendor.

Formal Testing: Shall encompass experimental and systematic checking of the NAIS system performance during its developmental stage. They shall be performed by applying test experiments to the NAIS system, by making observations during the execution of these tests, and by subsequently assigning a verdict about the correct functioning of the system.

Human System Interface (HSI) Services: A collection of services and applications that allow external and internal users to interact with the NAIS.

Increment 1: NAIS Increment 1 receives, stores, and distributes AIS messages from AIS equipped vessels in selected coastal areas and inland waterways. AIS messages are routed to a centralized enterprise data processing center (EDC) located at the USCG Operations Systems Center (OSC) in Kearneysville, West Virginia. Additional sources, such as the Saint Lawrence Seaway Corporation (SLSC), also supply AIS message via internet links to the EDC. Stored messages are periodically backed-up, and archived in offsite storage.

Upon receiving AIS message at the EDC, each message is parsed, checked for duplication, reformatted (as necessary), stored, and routed to the Maritime Common Operational Picture (COP), Maritime Awareness Global Network (MAGNet), and the Marine Information Safety and Law Enforcement System (MISLE).



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

NAIS users acquire access to AIS message via the COP, MAGNet and MISLE. Primary users are located in USCG Sector Command Centers (SCC) responsible for performing vessel identification and tracking, managing vessel traffic, ensuring maritime safety and security, and conducting search and rescue (SAR) operations. Additionally, other, non-USCG users may also utilize NAIS data extracted through the COP and MAGNet to perform similar functions. The Maritime COP, MAGNet, and MISLE fuse, merge and correlate NAIS data with other data sources to enhance the value and usefulness of the NAIS data.

A System Operations Center (SOC), located at the USCG Navigation Center (NAVCEN) in Alexandria, VA, provides system administration and end-user support, including managing system access, help desk support, and operator training (on SOC functions). Department of Homeland Security (DHS) / USCG EDC resources provide database administration and maintenance, backup and archive management, as well as support for all incoming and outgoing NAIS data interfaces. Similarly, the USCG Network Operations Center (NOC), currently located at the Telecommunications and Information Systems Command (TISCOM) in Alexandria, Virginia, provides Coast Guard Data Network + (CGDN+) network administration and maintenance, including all preventative and corrective maintenance.

Increment 2: The second phase of the NAIS program is the focus of this Performance Specification. Increment 2 (I-2) will enhance or replace the functional and operational capabilities of Increment 1 by:

- a. extending the NAIS receive capability, enabling NAIS to receive AIS messages to 50 nautical miles (nm) from the U.S. baseline, bridging the gaps and reducing weaknesses in Increment 1 coverage;
- b. providing the capability to transmit AIS messages out to 24 nm from the U.S. baseline;
- c. exploiting the full functional capabilities of AIS—including transmitting messages from shore stations, developing back-end data processing for validation and verification of AIS messages, and online queries to support the analysis of historical data;
- d. managing the Very High Frequency (VHF) Data Link (VDL) in order to: monitor VDL traffic, and enable authorized SOC operators to actively manage VHF channels used for AIS by each transceiver; and
- e. providing a service-oriented mechanism for disseminating NAIS data to all authorized users and external systems.

Of the three NAIS increments, Increment 2 is expected to have the greatest impact on, and deliver the greatest benefits to, USCG command centers. The increase in coverage for receiving AIS messages will provide earlier detection, identification, and tracking of vessels transiting U.S. waters, thereby greatly enhancing Maritime Domain Awareness for the USCG and DHS. Transmit functions are expected to both evolve and expand throughout the system life cycle as operational requirements for these functions are refined by the USCG. Transmit functions may be used by SCC and District watchstanders to manage vessel traffic in restricted waterways, create virtual Aids-to-Navigation (AtoN) on vessel navigation systems, send weather alerts, facilitate “Blue Force” communication, coordinate Search and Rescue (SAR) operations, and other operations yet to be identified.

SOC administrators will manage the increased number of new remote sites and system resources located at SCCs and the EDC, and for VDL management operations. SOC operators may also transmit binary

PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

messages to mobile (shipboard) AIS stations to alternate channels to receive and transmit AIS messages within a specific coverage area (for guidance on binary messages, see IMO Safety of Navigations Circular 236). Generic users will make use of NAIS data similar to Increment 1.

Increment 3: Increment 3 will extend the NAIS capability to receive AIS messages beyond 50 nm and up to 2000 nm from the U.S. baseline. This long range tracking capability will greatly enhance the USCG's ability to identify and monitor vessels approaching U.S. waters, and improve the Federal government's ability to protect the nation's coastlines. Increment 3 will not enhance end-user functionality as these capabilities will be provided with Increments 1 and 2.

Inspection: Physical inspection of items performed on equipment, gear, or other physical items. Inspection shall be performed on designs, documents, and certifications to ensure compliance with the requirements. Inspection includes examinations, reviews, and in some cases will constitute a part of a formal test.

Interface: An interconnection between subsystems having the dimensions of form, fit, and function, which are determined by the requirements of the interconnected subsystems.

Logical Shore Station (LSS): A software process that transforms the AIS Message flow associated with one or more PSS into a different AIS-related message flow.

Management Services: Allow NAIS operators to maintain the system. They offer management tools for the RF components located within the PSS (e.g., VDL monitoring, channel management, operational status), and for the NAIS itself (e.g., database administration, performance monitoring).

MDA COI DMWG: The Maritime Domain Awareness Critical Operational Issues Data Management Working Group provides the data vocabulary and data model used for distribution of data to all authorized users.

Monolithic shelter: Is defined as pure monolithic or a two piece structure where the roof and walls are monolithic.

NAIS Data: All data created by NAIS, including: AIS Messages, AIS Message Metadata, Health and Monitoring data, in addition to imported data.

NAIS Service: A grouping of business logic and rules specifically needed to implement an operational requirement. A service exposes an interface that can be discovered and called by other services and components. Services are loosely coupled to other services, components, and applications so that they can be made available to anyone.

Network Operations Center (NOC): Provides network administration and maintenance, including management of user access and monitoring of network device performance.

Operable: Refers to the system state in which all services and capabilities are operating without any degradation from intended system design.

PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Operators: Watchstanders, watch supervisors, and system administrators, trainers and trainees who operate and monitor the system from within the SOC and OSC.

Physical Shore Station (PSS): A physically fixed entity composed of at least: one AIS base station or one AIS repeater station, a power supply, VHF-/RF-domain equipment (at a minimum simply a cable and VHF antenna), a means to transport data to and from the AIS base station (if the PSS houses an AIS base station), and a means to protect the above components against environmental influence and damage. The PSS will generally have a Universal Time Coordinate (UTC) source of its own. The PSS may also include additional, optional AIS-related functions.

Providers: External AIS user systems, including Maritime COP, MAGNet, MISLE, and others.

Reliability: The probability that a system or component will perform its capabilities under given conditions for a specified period of time.

Sector Command Center: The USCG is in the process of reorganizing its operational command and control units into Sector Command Centers (SCC). Each SCC monitors area of responsibility (AOR) and

administers the missions of the Coast Guard.

Sensitive Information: Any information of which the loss, misuse, or unauthorized access to or modification of could adversely affect the national interest or the conduct of Federal programs, or the privacy to which individuals are entitled under Section 552a of Title 5, United States Code (the Privacy Act), but which has not been specifically authorized under criteria established by an Executive Order or an Act of Congress to be kept secret in the interest of national defense or foreign policy.

Service Oriented Architectures (SOA): provide patterns for design, development, deployment and management of a loosely coupled business application infrastructure. The NAIS system shall be developed using a SOA approach that is in line with the Department’s Enterprise Architecture.

Storage: See Data Storage.

Survivable: Refers to the ability of the system to preserve all data and other information through any event that renders the system inoperable; the system may cease to operate when parameters exceed the *operable* thresholds but not the survivable thresholds, however, when conditions return to operable thresholds, the system will return to normal operations with minimal human intervention.

System Operations Center (SOC): Provides system administration and maintenance.

Tracking: Measurement of the position coordinates of a target to provide data to determine the target path versus time.

U.S. Baseline: See *Baseline*

PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

Vessel: Every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water. (In this specification the term “vessel” is used to denote mandatory participating vessels and selected vessels.)

Watchstander: A military member or civilian employee of the Coast Guard, or an employee or representative of the marine community who monitors vessel movements, updates data within the system based on inputs from sensors and voice communications, and who disseminates information to users.

eXtensible Markup Language (XML): is a flexible way to create common information formats and share both the format and the data on the World Wide Web, intranets, and elsewhere.

5.2 Abbreviations and Acronyms

AIS	Automatic Identification System
ANSI	American National Standards Institute
ANSI/TIA	American National Standards Institute/Telecommunications Industry Association
AOR	Area of Responsibility
A _o	Operational Availability
AtoN	Aids to Navigation
C&A	Certification and Accreditation
C2	Command and Control
CBP	Customs and Border Protection Agency
CGDN+	Coast Guard Data Network +
COI	Critical Operational Issues
COMDTINST	Commandant Instruction
CONOPS	Concept of Operations
COP	Common Operational Picture
COTP	Captain of the Port
DHS	Department of Homeland Security
DMWG	Data Management Working Group
DoD	Department of Defense
DSC	Digital Select Calling
DT&E	Developmental Test and Evaluation
EDC	Enterprise Data Processing Center
ESB	Enterprise Service Bus
ESRI	Environmental Systems Research Institute, Inc.
FATDMA	Fixed Access Time Division Multiple Access
FCC	Federal Communications Commission
FIPS	Federal Information Processing Standard
FISMA	Federal Information Security Management Act of 2002
FOC	Full Operational Capability
FY	Fiscal Year
GIG	Global Information Grid
GIS	Geographic Information System
GPS	Global Positioning System



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

GUI	Graphical User Interface
HSI	Human System Interface
IA	Information Assurance
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IEC	International Electrotechnical Commission
IETF	Internet Engineering Task Force
IMO	International Maritime Organization
IOC	Initial Operational Capability
IP	Internet Protocol
IPv6	Internet Protocol Version 6
IRVMC	Inland Rivers Vessel Movement Center
ITPI	Information Technology Product Inventory
ITU-R	International Telecommunications Union Sector for Radio Communications
JTA	Joint Technical Architecture
LAN	Local Area Network
LORAN	Long-Range Aid to Navigation
LSS	Logical Shore Stations
MAGNet	Maritime Awareness Global Network
MDA	Maritime Domain Awareness
MISLE	Marine Information for Safety and Law Enforcement
MMSI	Maritime Mobile Service Identity
MSC	Maritime Safety Committee
NAIS	Nationwide Automatic Identification System
NAVCEN	Navigation System Center
NDGPS	Nationwide Differential Global Positioning System
NEC	National Electric Code
NFPA	National Fire Protection Association
NIS	Navigation Information Service
NIST	National Institute of Standards and Technology
NIST SP	National Institute of Standards and Technology Special Publication
nm	Nautical Miles
NOC	Network Operations Center
NTIA	National Telecommunications and Information Administration
OET	Office of Engineering and Technology
OneNet	DHS Enterprise Network
ORD	Operational Requirements Document
OSC	Operations Systems Center
OSHA	Occupational Safety and Health Administration
OT&E	Operational Test and Evaluation
PKI	Public Key Infrastructure
PSS	Physical Shore Stations
RF	Radio Frequency
SAML	Security Assertion Markup Language



PART III – LIST OF DOCUMENTS, EXHIBITS AND OTHER ATTACHMENTS
SECTION J – LIST OF ATTACHMENTS
J.2 – PERFORMANCE SPECIFICATION

SAR	Search and Rescue
SBU	Sensitive But Unclassified
SCC	Sector Command Centers
SLSC	Saint Lawrence Seaway Corporation
SOA	Service Oriented Architectures
SOAP	Simple Object Access Protocol
SOC	System Operations Center
SOP	Standard Operating Procedures
SOTDMA	Self-Organized Time Division Multiple Access
STEDS	SBU Tactical Information Exchange and Display Systems
SWIII	Standard Workstation III
USCG	US Coast Guard
T&E	Test and Evaluation
TCP/IP	Transmission Control Protocol/Internet Protocol
TIA	Telecommunications Industry Association
TIA/EIA	Telecommunications Industry Association/Electronics Industry Alliance
TISCOM	Telecommunication and Information Systems Command
TRM	Technical Reference Model
UI	User Interface
UNCLOS	United Nations Convention on the Law of the Sea
UTC	Universal Time Coordinate
VDL	VHF Data Link
VHF	Very High Frequency
VTS	Vessel Traffic Service
WAN	Wide Area Network
WS-Security	Web Services-Security
XML	eXtensible Markup Language

