

# United States Coast Guard Office of Navigation Systems

National Marine  
Electronics Association  
Conference & Expo

\*

October 1<sup>st</sup>, 2015  
Baltimore, MD



**"We Help Mariners Get There"**

**Expanding AIS Carriage and  
New Operating Requirements**

Jorge Arroyo | AIS Subject Matter Expert | USCG Headquarters | Washington, DC

# AIS Rulemaking Timeline [NPRM Proposed Changes in **Bold-type**]

- ✓ 07/01/03 published Temporary Interim Rule and Request for Comments
- ✓ 10/23/03 current AIS requirement (33 CFR 164.46)
- ✓ 07/01/03-01/09/04 sought AIS expansion comment
- ✓ 10/31/05 notice expansion of AIS to **all** waters
- ✓ 12/16/08 NPRM ... 4/15/09 comment deadline
  - Commercial self-propelled vessels of  $\geq 65$  feet
    - No exclusions, i.e. fishing and small passenger vessels**
  - Towing vessels  $\geq 26$  feet &  $>600$  hp
  - Vessels with  $\geq 50$  passengers (vice 150 for hire)
  - **Hi-speed passenger vessels ( $\geq 12$  pax)**
  - **Certain dredges & floating plants, &**
  - **Vessel moving certain dangerous cargoes**

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# AIS Meetings & Comment Period...

- **Public Meetings**

- **Washington, DC – March 5<sup>th</sup>, 2009**

- **30+ attendees, 11 commenters**

- **Seattle, WA – March 25<sup>th</sup>, 2009**

- **30+ attendees, 12 commenters**

- **Comment period closed: April 15<sup>th</sup>, 2009**

- **80+ submissions, 300+ comments regarding AIS**

# New AIS Carriage Requirements...

Effective March 2<sup>nd</sup>, 2015, these commercially self-propelled vessels, operating on U.S. navigable waters, must have a properly installed, operational Automatic Identification System (AIS) no later than March 1<sup>st</sup>, 2016

- vessels of  $\geq 65$  feet in length
- towing vessels of  $\geq 26$  feet in length &  $>600$  hp
- vessels certificated to carry  $\geq 150$  passengers
- dredges and ~~floating plants~~ that operate in/near a commercial channel
- vessels engaged in the movement of certain dangerous cargo, **flammable or combustible liquid cargo in bulk**

Effected Vessels by Type	2003		2015	Total Vessels
	SOLAS	Domestic		
Foreign ship >65'<300GT		1,119		1119
<i>Fishing</i>	1	-	2,906	2907
<i>Towing</i>	13	2,212	1,429	3654
<i>Passenger</i>	81	171	288	540
<i>Cargo</i>	154	77	247	478
<i>OSV</i>	55	432	151	638
<i>MODU</i>	1	-	31	32
<i>Industrial</i>	21	11	220	252
<i>Research</i>	10	11	54	75
<i>School</i>		5	10	15
<i>Tank Ships</i>	102	15	35	152
<i>Unknown</i>		16	134	150
<i>Unclassified</i>		13	326	339
<i>Dredges</i>		-	17	17
<b>U.S. Total</b>	<b>438</b>	<b>2,963</b>	<b>5,848</b>	<b>9,249</b>
<b>Total</b>	<b>4,520</b>		<b>5,848</b>	<b>10,368</b>

# Noteworthy AIS provisions...

- **Applies to all navigable waters, no exceptions.**
- **Individual deviations (waivers) are permissible, but, only for vessels:**
  - **that solely operate within a very confined area**  
e.g. shipyard, fleeting area, etc.
  - **on short & fixed schedules**  
e.g. a bank-to-bank river ferry service
  - **otherwise not likely to encounter other AIS users**

**Extends the deviation period from 1 to 5-years and broadens it to vessels on which AIS would be impractical, i.e. lack of display, power, open exposed conning position, etc.**

# Noteworthy AIS Provisions...

- **Spells out ‘effective operating conditions’ to include:**
  - the ability to reinitialize the AIS | know password
  - the accurate broadcast of an official MMSI
  - the accurate input, upkeep, and updating
  - the ability to access AIS info from conning position
- **AIS is primarily for the person controlling the vessel, who must maintain a periodic watch**
- **AIS text messaging solely in English & for navigation safety**
- **Permits the use of approved AIS Application Specific Messaging (ASM) for vessels (<1/min.)**

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# Noteworthy AIS provisions...

- **AIS does not relieve you of navigation rules signaling or radiotelephone requirements**
- **AIS (& assoc. sensors) shall remain on when:**
  - **Underway, at anchor, and at least 15 min. prior to unmooring**
  - **Except if it compromises safety or security**
  - **Securing it must be logged, reported, promptly restored**
- **Inoperative AIS is now a reportable deficiency, but, not a 'no sail' item**

**Prohibits mobile AIS from air, ashore  
or on non-self propelled vessels**

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# Noteworthy AIS provisions...

## AIS Class B devices permissible on:

- dredges,
- fishing industry vessels, and
- vessels certificated to carry <150 passengers that do not operate in:
  - Vessel Movement Reporting System area, or
  - at speeds >14 kts





## Automatic Identification System

- What is AIS?
- How AIS Works
- Types of AIS
- AIS Messages
  - AIS Base Station Report
  - Class A Position Report
  - Class A Static & Voyage Data
  - Class B Reports
  - AIS ATON Report
  - Long Range AIS Report
- Nationwide AIS (NAIS)
- AIS Requirements
- Reference Information
  - AIS Encoding Guide & LOCODES
  - Frequently Asked Questions

## Mission Areas

- Global Positioning System
- Nationwide DGPS
- Nationwide AIS (NAIS)
- AIS (Overview, Messages, etc.)
- Long Range Identification and Tracking
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- Light Lists
- Civil GPS Service Interface Committee
- LORAN C (archive)

## Subscribe / Report (free)

- Local Notice to Mariners (Weekly)
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## AIS FREQUENTLY ASKED QUESTIONS

1. What is AIS?
2. What is an MMSI, how do I get one, and how do I program my AIS?
3. What is the AIS rule and are there alternatives to the rule for small businesses?
4. Do AIS Class B devices meet current USCG AIS carriage requirements?
5. How does AIS help to increase security (and what is NAIS)?
6. When must AIS be in operation?
7. Does the installation of the AIS require additional equipment in order for the AIS to operate properly?
8. Will it be necessary to have electronic navigational charts for use with the AIS?
9. Are fishing vessels subject to AIS carriage, and, is onboard Vessel Monitoring System (VMS) an acceptable substitute for the AIS?
10. Why have some AIS units stopped broadcasting valid position reports?
11. Why am I unable to see an AIS vessels' name or other static information (dimensions, call sign, etc.)?
12. Why do I sometimes see more than one vessel with the same MMSI or vessel name (i.e. NAUT)?
13. I just purchased and installed an AIS Class B, will AIS Class A user 'see' me?
14. Do AIS Class B devices meet current USCG AIS carriage requirements?
15. Is the USCG considering expanding AIS carriage to other vessels or outside of VTS areas?
16. How can I get a copy of an AIS presentation I saw (or heard about it) that was given at...
17. Where can I get AIS data?
18. Reserved for future use.
19. What is AIS Channel Management?
20. Can I use my AIS in an emergency or for distress messaging?
21. Is the Coast Guard broadcasting AIS Aids to Navigation Reports?
22. Have an AIS question not answered here?

**Want to find out more?**

**1. What is AIS?** Per 47 CFR §80.5, AIS is a maritime navigation safety communications system standardized by the International Telecommunication Union (ITU) and adopted by the International Maritime Organization (IMO) that provides vessel information, including the vessel's identity, type, position, course, speed, navigational status and other safety-related information automatically to appropriately equipped shore stations, other ships, and aircraft; receives automatically such information from similarly fitted ships; monitors and tracks ships; and exchanges data with shore-based facilities. [Read more](#) on what it is, how it works, what it broadcasts, and, the messages it uses, etc.





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- What is the AIS rule and are there alternatives to the rule for small businesses?
- Do AIS Class B devices meet current USCG AIS carriage requirements?
- How does AIS help to increase security (and what is NAIS)?
- When must AIS be in operation?
- Does the installation of the AIS require additional equipment in order for the AIS to operate properly?

**14. Do AIS Class B devices meet current USCG AIS carriage requirements? Maybe.** Per 33 CFR 164.46(b)(2), use of an AIS Class B device, in lieu of a mandatory Class A device, is permissible, but, only on: dredges; fishing industry vessels; and, vessels certificated to carry less than 150 passengers, that do not operate in a Vessel Movement Reporting System (VMRS) area defined in Table 161.12(c) or at speeds in excess of 14 knots. See a comparison of Class A and Class B/CS AIS.

- Why am I unable to see an AIS vessels' name or other static information (dimensions, call sign, etc.)?
- Why do I sometimes see more than one vessel with the same MMSI or vessel name (i.e. NAUT...)?
- I just purchased and installed an AIS Class B, will AIS Class A user 'see' me?
- Do AIS Class B devices meet current USCG AIS carriage requirements?
- Is the USCG considering expanding AIS carriage to other vessels or outside of VTS areas?
- How can I get a copy of an AIS presentation I saw (or heard about it) that was given at...
- Where can I get AIS data?
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- What is AIS Channel Management?
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- Is the Coast Guard broadcasting AIS Aids to Navigation Reports?
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**AIS FAQ#14  
Class A/B  
Comparison  
Table**



# Comparison of AIS mobile devices...

Shipboard AIS	Class A	Class B/SO	Class B/CS
Transmit Power (Watts)	12.5 W / 2 W (low-power)	5 W / 2 W (low-power)	2 W
Primary Access Scheme	Self-organizing Time-Division Multiple Access (SOTDMA)	SOTDMA	Carrier-sense TDMA non-competing with SOTDMA units
Position Reporting Rate	Either every 2, 3 ½, 6 or 10 s based on speed and course change. Every 3 min. when ≤ 3 kts.	Either every 5, 15 or 30 s based on speed (2-14, 14-23, >23 kts) Every 3 min. when ≤ 2 kts.	Every 30 s Every 3 min. when ≤ 2 kts.
Static Data Reporting Rate	Every 6 min	Every 6 min	Every 6 min
Frequency Range	25 kHz bandwidth between 156.025 MHz to 162.025 MHz	25 kHz bandwidth between 156.025 MHz to 162.025 MHz	25 kHz bandwidth at minimum between 161.500 MHz to 162.025 MHz
Dedicated DSC Receiver for Channel Management	Yes	Yes	Time-shared
Position Source / WGS-84 to 1/10,000 of minute of arc	Internal Global Navigation Satellite System & connection to an External Electronic Positioning System (EPFS)	Internal GNSS	Internal GNSS
Digital Interfaces	2 Input-Output & Multiple Presentation Outputs	Optional	Optional
Display	Multiple Keyboard Display (MKD)	MKD	Optional
Safety Text Messaging	Receive & Transmit	Receive & Transmit	Transmit Optional, and only with non-alterable pre-configured messages
Application Specific Messaging	Receive & Transmit	Receive & Transmit (up to 3 slots)	Receive Optional, cannot Transmit
Transmit Data	All	No Rate of Turn, Navigation Status, Destination, ETA, Draft, or IMO#	No Rate of Turn, Navigation Status, Destination, ETA, Draft, or IMO#
International Electrotechnical Commission (IEC) Certification Standard	IEC 61993-2	IEC 62287-2	IEC 62287-1





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4. Do AIS Class B devices meet current USCG AIS carriage requirements?

**15. Is the USCG considering expanding AIS carriage to other vessels or outside of VTS areas?** Yes. On January 30<sup>th</sup>, 2015 the Coast Guard published a Final Rule ([80 FR 5281](#)), which on March 2<sup>nd</sup>, 2015, expands AIS carriage ([68 FR 60599](#)) to most commercial vessels (see those effected [here](#)) operating on any [U.S. navigable waters](#), and, harmonizes U.S. AIS requirements with Regulation V/19.2.4 of the Safety of Life at Sea Convention and § 102 of the Maritime Transportation Security Act of 2002. The docket containing comments submitted, supporting documents, and the regulatory analysis to this and our proposed rulemaking ([73 FR 76295](#)) can be found at [www.regulations.gov](#) [Search: USCG-2005-21869]. Printer-friendly PDF formats of these [2015 requirements](#), our [2008 proposed rule](#), an [amalgamation](#) of both, our [2003 requirements](#), and, a [chart-comparison](#) of all three.

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**See Our  
AIS FAQ #15  
For More Info  
on AIS Rules...**





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**AIS FAQ#2**  
**Note our**  
**Encoding**  
**Guide**

**2. What is an MMSI, how do I get one, and how do I program my AIS?** A unique and official 9-digit Maritime Mobile Service Identity (MMSI) number is required for every AIS station. To obtain one see our [MMSI page](#). While special attention should be taken in installing an AIS (see [IMO Safety of Navigation Circular.227, GUIDELINES FOR THE INSTALLATION OF A SHIPBORNE AUTOMATIC IDENTIFICATION SYSTEM](#)), its initial programming is relatively straightforward; please see our [USCG AIS Encoding Guide](#) for further instructions. Note, AIS information programmed into the unit (i.e. MMSI, call-sign, name, etc.) should reflect the vessel's official data as provided in its radio station license or state registration (for those vessels licensed by rule).

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After initial programming, users must ensure their AIS is always in effective operating condition and broadcasting accurately (33 CFR §164.46(d)). Failure to do so could subject a person to civil penalties not to exceed \$25,000 (46 U.S.C. 70119). Note, each USCG type-approved AIS has an internal built-in integrity tester that mitigates the need to send TEST text messages. For further guidance on the programming and use of AIS text messages please read [USCG Safety Alert 05-10](#).

20. Can I use my AIS in an emergency or for distress messaging?
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[www.navcen.uscg.gov](http://www.navcen.uscg.gov) or Search: AIS FAQs







Voyage-Related-Data...should-be-manually-inputted-as-necessary-to-always-indicate-current-conditions

- Navigation Status should indicate your current navigational status, i.e. at anchor, underway, engaged in fishing, etc.

Note, vessels engaged in towing should use:

Navigation Status '11' when towing astern, or '12' when pushing ahead or alongside.

Remember to change your status when anchored or moored. Doing so reduces the AIS reporting rate of 2-10 seconds to once every 3 minutes, which mitigates network congestion.

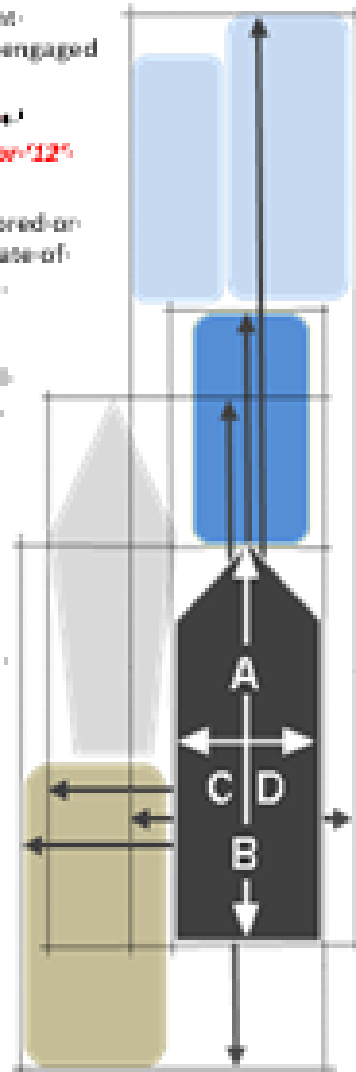
- Static Draft should indicate the vessel's actual draft. Input the vessel's maximum draft if the actual draft is unknown.

- Type of vessel should indicate a Ship Type denoted in the accompanying table.

- Dimensions should indicate the official dimensions of the vessel, in meters not feet, derived from the fore, aft, port and starboard distance to the positioning system antenna used by AIS (e.g. GPS antenna). Refer to the diagram. In this example the AIS's GPS antenna is located at the intersection of the two white lines.

U.S. Ship Type 57 (see Table) dimensions should represent the overall rectangular area of the vessel and its tow as portrayed by the dark arrow lines within the rectangles in the diagram.

- Estimated Time of Arrival to destination or voyage departure (if moored or anchored). Input Universal



## USCG AIS Encoding Guide

\*

## Vessel/ABCD Dimensions For Vessel or Vessel+Tow



2-digit numeric codes for *Type of Ship* are composed from 1<sup>st</sup> and 2<sup>nd</sup> digit columns or as defined in columns 3x or 5x. The terms used are as defined in IMO SOLAS, 46 U.S.C. 2101 or 33 CFR 140.10. Blue and/or italic text denotes amplifying text not found in the original source (ITU-R M.1371-5)

1 <sup>st</sup> digit	2 <sup>nd</sup> digit	[3x] others "engaged in"	[5x] special craft
0 – Not available	0 – All ships of this type	30 – Fishing vessels, including processors, but, not tenders (see code 'S3')*	50 – Pilot vessel
1 – Reserved for future use	<del>1 – Carrying DG, HE, or MP, IMO hazard or pollutant category X</del> <b>DO NOT USE</b>	towing system and the length of tow is under 200 meters its breadth is 25 meters (82 ft.) or less*	51 – Search and rescue vessels, i.e. USCG boats, USCG Auxiliary, assistance tugs
2 – WIG	<del>2 – Carrying DG, HE, or MP, IMO hazard or pollutant category Y</del> <b>DO NOT USE</b>	towing system and length of the tow exceeds 200 meters breadth exceeds 25 m (82 ft.)*	52 – Tugs, light boats, push-boats, towboats or workboats, that do not engage in towing
3 – Other vessels engaged in a devoted in column 3(x)	<del>3 – Carrying DG, HE, or MP, IMO hazard or pollutant category Y</del> <b>DO NOT USE</b>	engaged in dredging, or underwater operations, such as surveying, sampling, other types of scientific research, (log)*	53 – Fish, offshore or port tenders
4 – HSC (HI-speed Craft) or passenger ferries	<del>4 – Carrying DG, HE, or MP, IMO hazard or pollutant category Z</del> <b>DO NOT USE</b>	engaged in diving operations; or other types of operations in the water*	54 – Commercial response vessels with anti-pollution facilities or equipment
5 – Special craft, per column 1(x)	<del>5 – Carrying DG, HE, or MP, IMO hazard or pollutant category Z</del> <b>DO NOT USE</b>	engaged in military operations; or other types of operations	
6 – Passenger ships other than and passenger ferries; include shore supply vessels (OSV)	<del>6 – Carrying DG, HE, or MP, IMO hazard or pollutant category Z</del> <b>DO NOT USE</b>		56 – Spare—for assignments to local vessels that are engaged in towing ahead or alongside, and whose dimensions (ABCD values) represent the overall dimensions of the vessel not including its tow*
7 – Cargo (freight) ships, including articulated (ATB) and integrated tug-barge (ITB) vessels	7 – Reserved for future use	37 – Measure craft	57 – Spare—for assignments to local vessels that are engaged in towing ahead or alongside, and whose dimensions (ABCD values) represent the overall area of the vessel including its tow*
8 – Tankers, including articulated (ATB) and integrated tug tank barge (ITB) vessels	8 – Reserved for future use	38 – Reserved for future use	
9 – Other types of ship	9 – No additional information <i>99 - autonomous or remotely-operated unmanned craft</i>	39 – Reserved for future use	59 – Ships according to RR Resolution No. 18 (Mob-83)

\*Remember to also update your Navigation Status accordingly, i.e. Nav Status: 3 – restricted maneuverability; 8 – under sail; 11 – towing astern; 12 – pushing ahead/alongside, etc.  
For further information or additional copies visit [www.navcen.uscg.gov](http://www.navcen.uscg.gov) or email [cgnav@uscg.mil](mailto:cgnav@uscg.mil)

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**16. How can I get a copy of an AIS presentation I saw (or heard about it) that was given at...You can download recent presentations given by Coast Guard Office of Navigation Systems personnel here:**

- Arroyo@RTCM\_2013\_09\_24 (PDF, 520KB)
- Arroyo@GMDSS\_TF\_2013\_09\_26 (PDF, 777KB)
- Arroyo@IALA\_VTS\_Symposium\_on\_(2012\_09\_11) (PDF, 5,243KB)
- Arroyo@Mid-Atlantic\_Waterways\_Conference\_(2012-4-20) (PDF, 6MB)
- Arroyo@USACE IENCP Meeting (2012-04-19) (PDF, 7.74MB)

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**See  
AIS FAQ #16  
for Copy of this  
Presentation**

**1. What is AIS?** Per 47 CFR §80.5, AIS is a maritime navigation safety communications system standardized by the International Telecommunication Union (ITU) and adopted by the International Maritime Organization (IMO) that provides vessel information, including the vessel's identity, type, position, course, speed, navigational status and other safety-related information automatically to appropriately equipped shore stations, other ships, and aircraft; receives automatically such information from similarly fitted ships; monitors and tracks ships; and exchanges data with shore-based facilities. [Read more](#) on what it is, how it works, what it broadcasts, and, the messages it uses, etc.

## Mission Areas

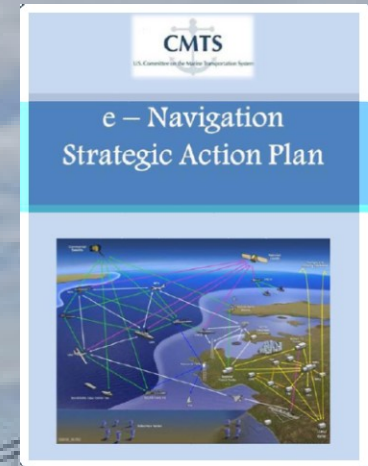
- Global Positioning System
- Nationwide DGPS
- Nationwide AIS (NAIS)
- AIS (Overview, Messages, etc.)
- Long Range Identification and Tracking
- Local Notice to Mariners
- Light Lists
- Civil GPS Service Interface Committee
- LORAN C (archive)

## Subscribe / Report (free)

- Local Notice to Mariners (Weekly)
- GPS Operational Summary (Daily)



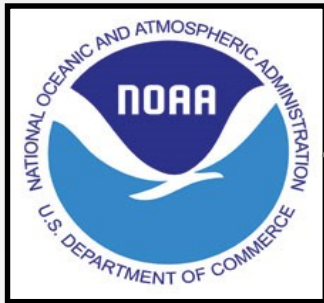
“The ultimate goal of e-Navigation efforts in the U.S. is to use timely and reliable information to make the U.S. Marine Transportation System operate better.”



2011

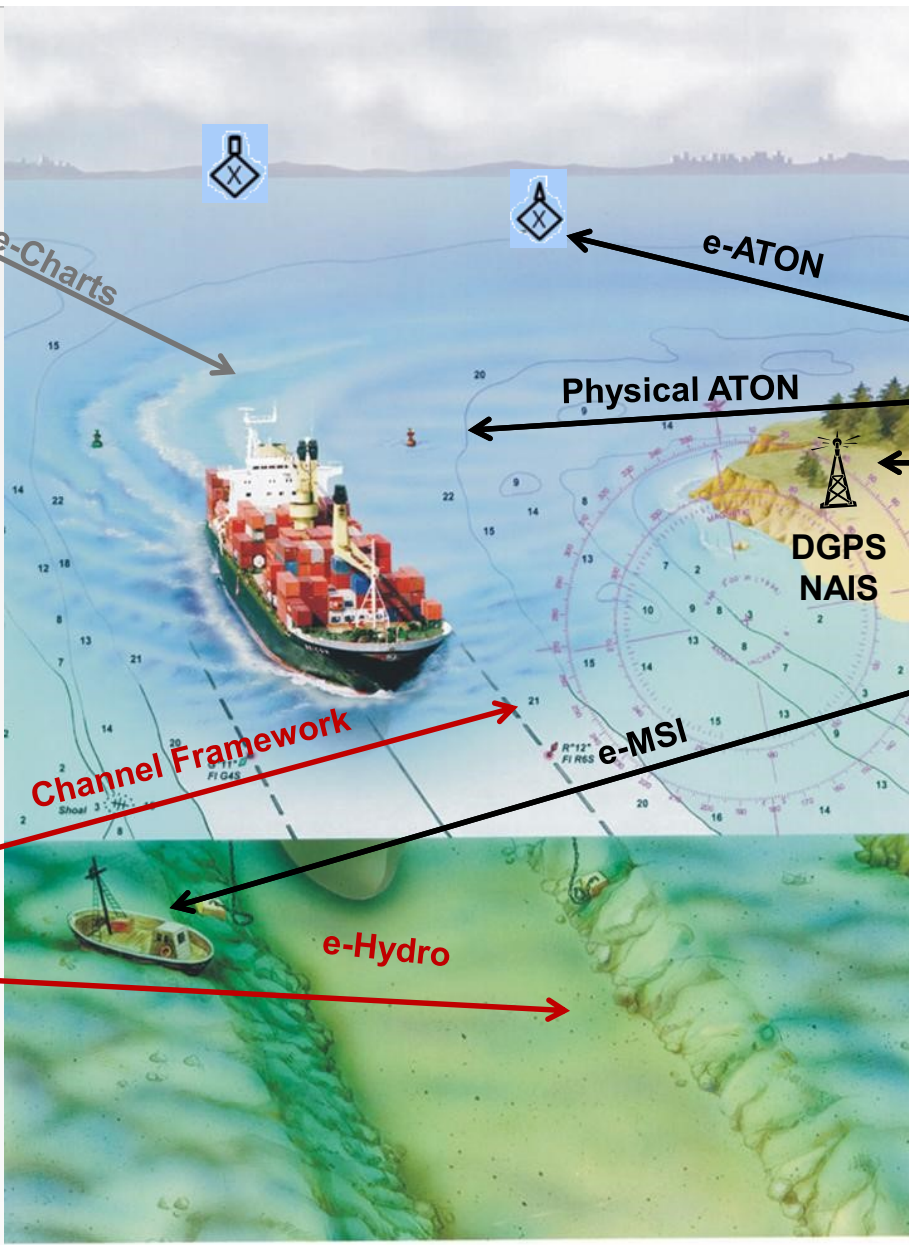
“The U.S. vision for e-Navigation is to establish a framework that enables the transfer of data between and among ships and shore facilities, and that integrates and transforms that data into decision and action information.”

# The ENAV Trident



PORTS | Weather  
ENC | RNC | POD  
Tides & Currents  
Hydrographic Survey

e-Charts



e-ATON

Physical ATON

DGPS  
NAIS

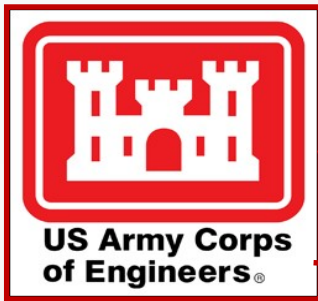
e-MSI

e-Hydro

Channel Framework



NAIS  
Light List  
Navigation Rules  
Local Notice to Mariners  
Urgent Marine Information  
Broadcasts

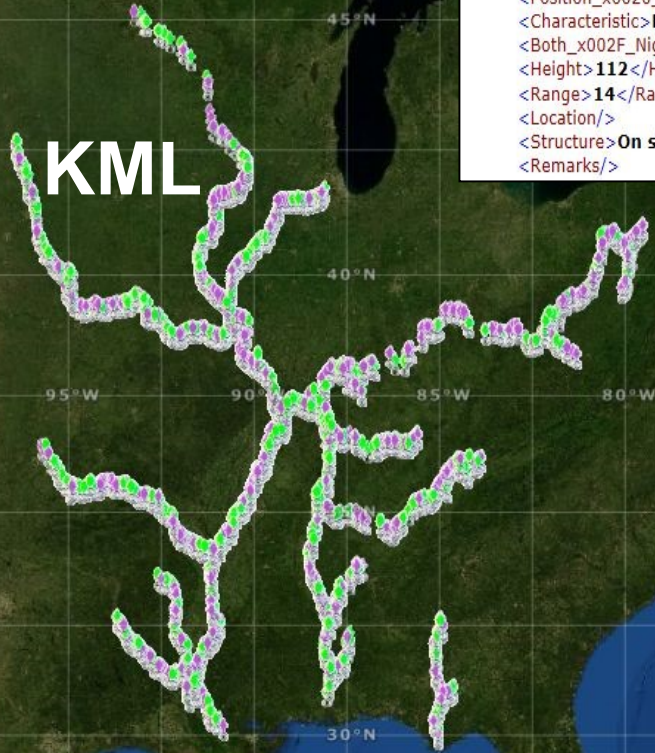
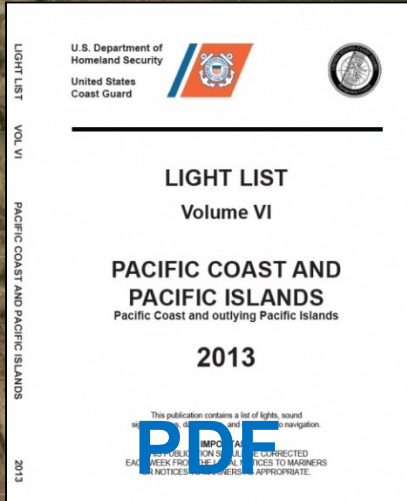


IENC  
Chart Booklets  
Hydrographic Surveys

## Shared Waterway Responsibility



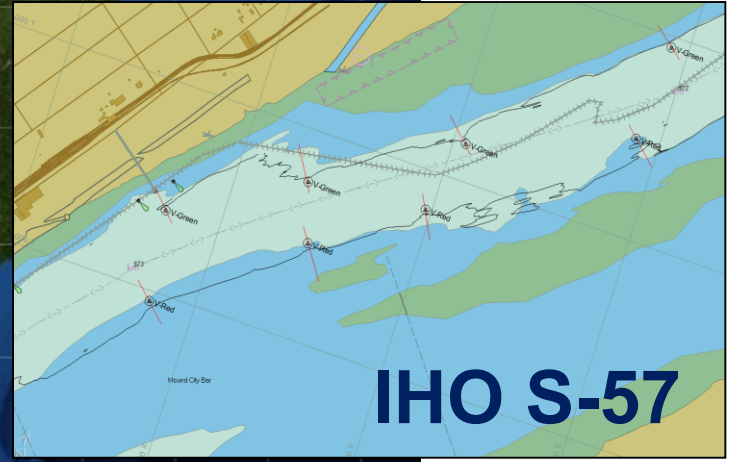
# Western Rivers Buoy Data



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  <Location/>
  <Structure>On skeleton tower. 9</Structure>
  <Remarks/>
  
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**XML**



**IHO S-57**

River No.	Name and Location	Mile	Bank	Characteristic				Structure (Up/Down)		Remarks	Mile	Latitude	Longitude
				LITCHR	SIGGRP	COLOUR	SIGPER	(1)	(2)				
<b>XLS</b>	SORIND OBJNAM (1)	OBJNAM (2)		LITCHR	SIGGRP	COLOUR	SIGPER	(1)	(2)	STATUS			



# eATONS used at last years America's Cup

C3CEN Web Site - Windows Internet Explorer provided by U. S. Coast Guard

UNCLASSIFIED

http://d05ms-c2-sccbs1/AIS\_DBO/Scripts/Login.pl

File Edit View Favorites Tools Help

Links Customize Links

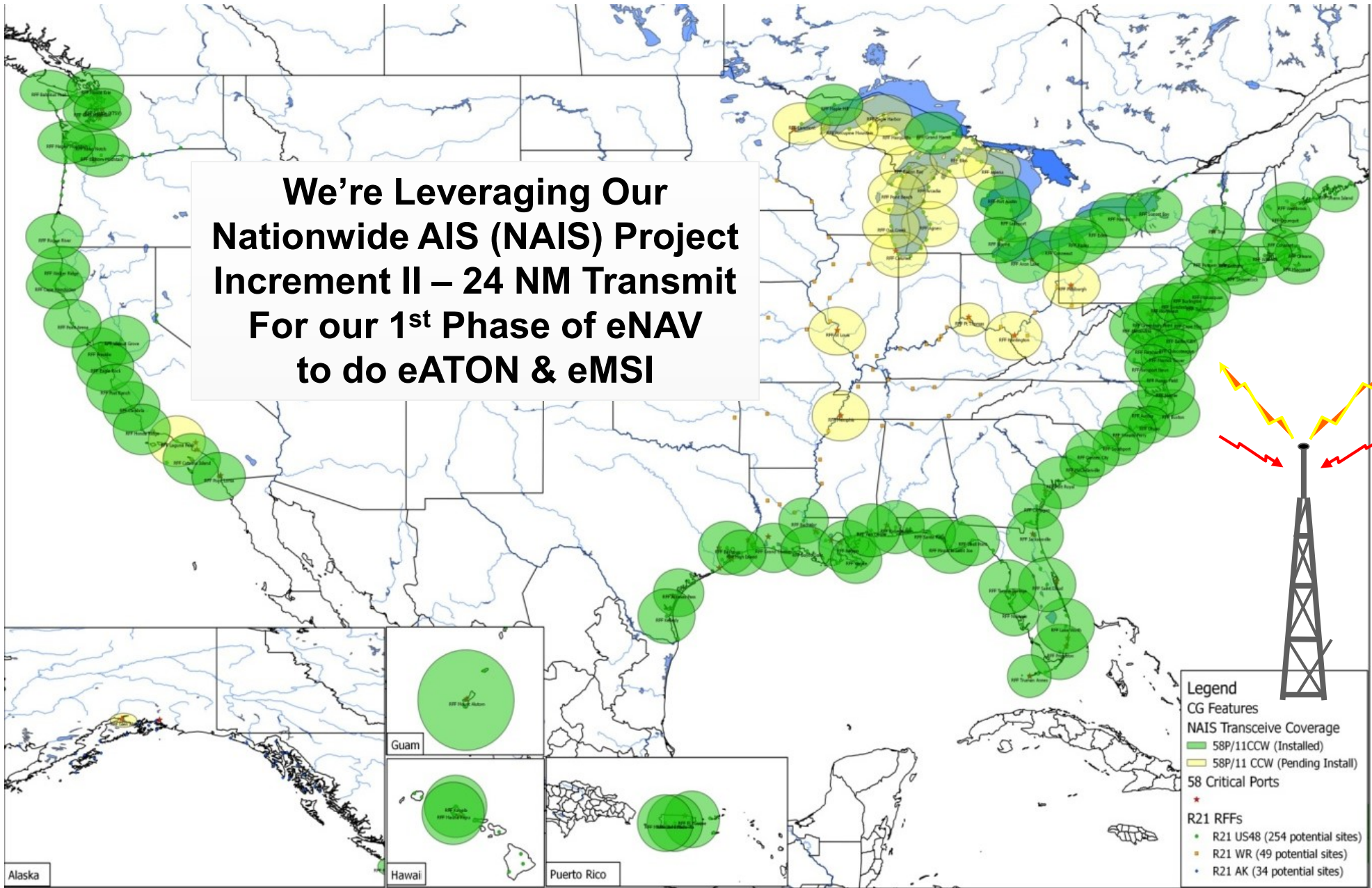
C3CEN Web Site

Page Tools

- Alarms
- Alerts
- Anomalies
- AtoN
- PSS Groups
- Messages>
- Weather
- Zones
- Aircraft
- Main Menu
- Logout



**We're Leveraging Our  
Nationwide AIS (NAIS) Project  
Increment II – 24 NM Transmit  
For our 1<sup>st</sup> Phase of eNAV  
to do eATON & eMSI**



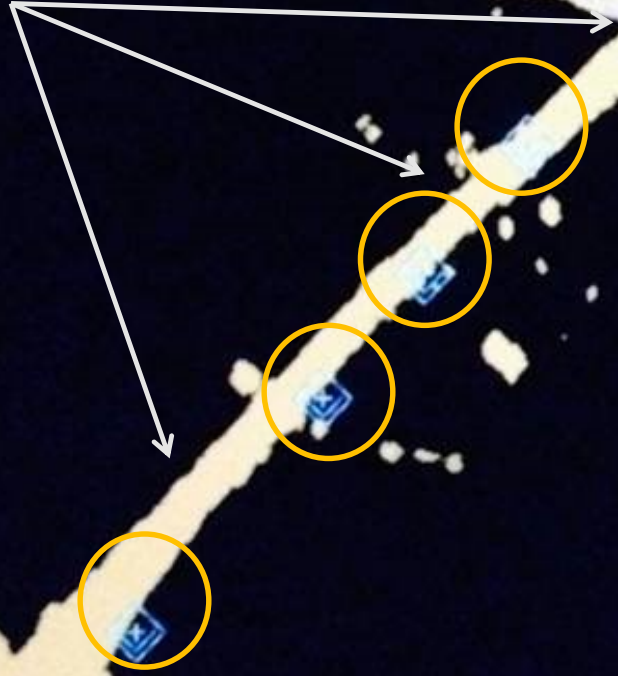




eATON provide greater visibility & AIS provide a constant bearing & range

eATON

RACONs





# NOAA PORTS Tampa & Chesapeake Bay

Control Display Vessels Charts Routes Configuration Hide Help Exit

42.4nmi X 29.0nmi | NorthUp | manual-follow | warn:OFF | user: none  
POS: AIS

Tampa Bay Environmental Report

Sensor	Wind (Gust)	Tide	Current	Temp
0 PORT MANATEE	4 ( 7)kts@142°	2.7ft✓	-.kts@----	---F
1 ST. PETERSBURG	7 ( 8)kts@146°	3.1ft✓	-.kts@----	---F
2 OLD PORT TAMPA	5 ( 8)kts@128°	3.3ft✓	-.kts@----	---F
3 MCKAY BAY ENTR	8 (10)kts@133°	3.2ft✓	-.kts@----	---F
4 BERTH 223	5 ( 7)kts@126°	-.ft--	-.kts@----	---F
5 OLD PORT TAMPA	--(--)-kts@----	-.ft--	1.2kts@214°	---F
6 SEABULK	5 ( 7)kts@118°	-.ft--	-.kts@----	---F
7 SUNSHINE SKYWA	--(--)-kts@----	-.ft--	1.3kts@238°	---F

Exit

Ready | bridge->cursor: 38.1nmi@228° | 09/11/2008 12:07:40 | BUCCANEER

# United States Coast Guard Office of Navigation Systems



# Thank You

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cgnav@uscg.mil  
1-202-372-1563

U.S. Coast Guard  
Office of Navigation Systems  
Washington, DC 20953



Homeland  
Security

