United States Coast Guard
Office of Navigation Systems

“We Help Mariners Get There”
The term **automated information system (AIS)** means an assembly of computer hardware, software, firmware, or any combination of these, configured to accomplish specific information-handling operations, such as communication, computation, dissemination, processing, and storage of information. Included are computers, word processing systems, networks, or other electronic information handling systems, and associated equipment. **Management information systems** are a common example of automated information systems. This assists in gathering information.
Automatic Identification System

The Automatic Identification System (AIS) is an automatic tracking system used on ships and by vessel traffic services (VTS) for identifying and locating vessels by electronically exchanging data with other nearby ships and AIS Base stations. AIS information supplements marine radar, which continues to be the primary method of collision avoidance for water transport.

Information provided by AIS equipment, such as unique identification, position, course, and speed, can be displayed on a screen or an ECDIS. AIS is intended to assist a vessel's watchstanding officers and allow maritime authorities to track and monitor vessel movements. AIS integrates a standardized VHF transceiver with a positioning system such as a LORAN-C or GPS receiver, with other electronic navigation sensors, such as a gyroscope or rate of turn indicator. Vessels fitted with AIS transceivers can be tracked by AIS base stations located along coast lines, or when out of range of terrestrial networks through a growing number of satellites fitted with specialist AIS receivers.

The International Maritime Organization's (IMO) International Convention for the Safety of Life at Sea (SOLAS) requires AIS to be fitted aboard international voyaging ships with gross tonnage (GT) of 300 or more tons, and all passenger ships regardless of size. It is estimated that more than 40,000 ships currently carry AIS class A equipment. In 2007, the new Class B AIS standard was introduced which enabled a new generation of low cost AIS transceivers. This has triggered multiple additional national mandates from Singapore, China, Turkey and North America affecting hundreds of thousands of vessels. In 2010, the most common vessels operating on the EU Inland Waterways were mandated to fit an Inland waterway modified and approved AIS Class A, and the entire EU fishing fleet over 15m in length were required to fit a Class A by 2014. Additionally a wide number of other countries such as China, India, USA, Singapore etc have started AIS mandate programs which require large numbers of vessels to fit an approved AIS device for safety and national security purposes.

## Contents

1. Applications and limitations
   1.1 Collision avoidance
   1.2 Vessel traffic services
   1.3 Homeland Security
   1.4 Axis (SBNP) to navigation
   1.5 Search and rescue
   1.6 Assist in investigation
Navigation Systems Regulatory Efforts

- **33 CFR 83** – Inland Navigation Rules codification
  - Effective May 2011
  - NPRM in development to address NAVSAC resolutions and 2002 COLREG amendments

- **33 CFR 164** – Navigation Equipment
  - SOLAS Chp.V & CGMT’04(ECS)
  - In development

- **33 CFR 164.46** – Expansion of AIS Carriage
DEPARTMENT OF HOMELAND SECURITY

Coast Guard

33 CFR Part 83

[Docket No. USCG–2009–0948]

RIN 1625–AB43

Inland Navigation Rules

AGENCY: Coast Guard, DHS.

ACTION: Final rule.

SUMMARY: By this final rule, the Coast Guard is placing the Inland Navigation Rules into the Code of Federal Regulations. This move is in accordance with the Coast Guard and Maritime Transportation Act of 2004, which repeals the Inland Navigation Rules as of the effective date of these regulations. Future updates of the Inland Navigation Rules will be accomplished through rulemaking rather than legislation.

DATES: This final rule is effective May 17, 2010.

ADDRESSES: Documents mentioned in this preamble as being available in the

you have questions on this rule, call e-mail Lieutenant Scott Medeiros, Office of Vessel Activities (CG–54133), telephone (202) 372–1565, e-mail Scott.R.Medeiros@uscg.mil. If you have questions on viewing the docket, call Renee V. Wright, Program Manager, Docket Operations, telephone (202) 366–9826.

SUPPLEMENTARY INFORMATION:

Table of Contents for Preamble

I. Abbreviations
II. Basis and Purpose
III. Discussion of Rule
IV. Regulatory Analyses
A. Administrative Procedure Act
B. Regulatory Planning and Review (Executive Order 12866)
C. Small Entities
D. Assistance for Small Entities
E. Collection of Information
F. Federalism
G. Unfunded Mandatos Reform Act
H. Taking of Private Property
I. Civil Justice Reform
J. Protection of Children
K. Indian Tribal Governments
L. Energy Effects
M. Technical Standards
N. Environment

1. Abbreviations

DHS Department of Homeland Security
CFR Code of Federal Regulations
NPRM Notice of proposed rulemaking

• Conduct of vessels in restricted visibility; and
• Conduct of vessels in sight of each other.

These regulations are commonly known as the “inland rules of the road.” Congress also amended Section 3 of the Inland Navigation Rules Act of 1980 to grant the Secretary of Homeland Security authority to issue inland navigation regulations. In doing so, Congress specified that repeal of Section 2 (the inland navigation rules then in effect) would not be effective until the effective date of regulations for the inland navigation rules. This guaranteed there would be no gap in application of the inland navigation rules between being removed from the United States Code and being added to the Code of Federal Regulations (CFR).

The Secretary of Homeland Security has delegated authority to develop and enforce navigation safety regulations to the Commandant of the Coast Guard through Department of Homeland Security Delegation 0170.1, Delegation to the Commandant of the Coast Guard. The Coast Guard has decided to use the authority granted by Congress and delegated by the Secretary to move the inland navigation rules to a new Part 83 of Title 33, Code of Federal Regulations.
Navigation Systems Regulatory Efforts

• 33 CFR 83 – Inland Navigation Rules codification
  • Effective May 2011
  • NPRM in development to address NAVSAC resolutions and COLREG amendments

• 33 CFR 164 – Navigation Equipment
  • SOLAS Chap.V & CGMT’04(ECS)
  • In development

• 33 CFR 164.46 – Expansion of AIS Carriage
SOLAS/ECDIS/ECS rules...

• SOLAS Chp. V changes took effect 2000
• CG&MT of 2002 mandates ECS in US
  - Should integrate AIS
• IMO mandate ECDIS on other ships
• USCG rulemaking in development
  - What ECS to mandate & for what?
  - ECDIS/ECS don’t currently integrate AIS
3 Classes

A- SOLAS ECDIS Back-up
B- ECDIS-lite
C- Software

Latest version has limited VDR capability

Version .6 to address AIS Application Specific Messaging & remote MKD functionality
Navigation Systems Regulatory Efforts

• 33 CFR 83 – Inland Navigation Rules codification
  • Effective May 2011
  • NPRM in development to address NAVSAC resolutions and COLREG amendments

• 33 CFR 164 – Navigation Equipment
  • SOLAS V & CGMT’04(ECS)
  • In development

• 33 CFR 164.46 – Expansion of AIS Carriage
Who has to have AIS?

- **Internationally Adopted & Required**
  - *IMO SOLAS Regulation V/19.2.4*
  - All ships of 300 gross tonnage or greater & passenger vessels irrespective of size on international voyage; 500 gross tonnage or greater domestically

- **Mandated by Congress**
  - *Marine Transportation & Security Act of 2002*
  - Commercial self-propelled vessels 65 feet or greater;
  - Towing Vessels over 26 feet or greater and 600 hp or more;
  - Passenger vessels as determined by USCG; and
  - those the USCG deems necessary for safety.
AIS Rulemaking [Changes in **Bold-type**]

- **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; 04/15/09, comment deadline

- Could effect 17,442 vessels/14,506 small biz’s, i.e.
  - Commercial self-propelled vessels of ≥ 65 feet
    - **No exclusions**
  - Towing vessels ≥ 26 feet and > 600 hp
  - Vessels with ≥ 50 passengers (vice 150 for hire)
  - Hi-Speed vessels with ≥ 12 passengers for hire
  - Certain dredges & floating plants, &
  - Vessel moving certain dangerous cargoes

<table>
<thead>
<tr>
<th>Estimated Expanded AIS Population</th>
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<tbody>
<tr>
<td><strong>Ships ≥65ft</strong></td>
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<tr>
<td>Freight Ship</td>
</tr>
<tr>
<td>Industrial Ship</td>
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<tr>
<td>MODU</td>
</tr>
<tr>
<td>OSV</td>
</tr>
<tr>
<td>Research Vessel</td>
</tr>
<tr>
<td>School Ship</td>
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<tr>
<td>Tank Ship</td>
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<tr>
<td>Unclassified</td>
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<td>Unknown</td>
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<td><strong>Fishing ≥65ft</strong></td>
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<tr>
<td>Documented</td>
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<tr>
<td>Undocumented (est.)</td>
</tr>
<tr>
<td><strong>Towing ≥26ft &amp; ≥600hp</strong></td>
</tr>
<tr>
<td><strong>Passenger</strong></td>
</tr>
<tr>
<td>≥65ft</td>
</tr>
<tr>
<td>&lt;65’ but ≥50 pax</td>
</tr>
<tr>
<td>&gt;30kts &amp; &gt;12 pax for hire</td>
</tr>
<tr>
<td><strong>Dredges</strong></td>
</tr>
<tr>
<td>Total (U.S.)</td>
</tr>
<tr>
<td><strong>Foreign Flag ≥65ft</strong></td>
</tr>
<tr>
<td>Total (All)</td>
</tr>
</tbody>
</table>
AIS Comment Period...

• Public Meetings
  - Washington, DC – March 5th, 2009
    • 30+ attendees, 11 commenters
  - Seattle, WA – March 25th, 2009
    • 30+ attendees, 12 commenters

• Comment period closed: April 15th, 2009

• Public Submissions
  - 80+ submitters, 70+ regarding AIS
Next Action: Final Rule

Date: March 2012

Obviously that didn’t happen...and its yet to go to OMB/OIRA Review
HOW AIS WORKS

Each AIS system consists of one VHF transmitter, two VHF DSC receivers, one VHF DSC receiver, and standard marine electronic communications links (ITC 91 ITU-RM (1983)) to shipboard display and sensor systems (AIS System). Position and time information is normally derived from an internal or external global navigation satellite system (e.g., GPS) receiver, including a medium frequency differential GPS receiver for precise position in coastal and inland waters. Other information broadcast by the AIS, if available, is electronically obtained from shipboard equipment through standard marine data connections. Heading information and course and speed over ground would normally be provided by all AIS-equipped ships. Other information, such as rate of turn, angle of heel, pitch and roll, and destination and ETA could also be provided.

The AIS transponder normally operates in an autonomous and continuous mode, regardless of whether it is operating in the open seas or coastal or inland areas. Transmissions use 9.6 kbps OOK FM modulation over 25 or 12.5 kHz channels using HDLC packet protocols. Although only one radio channel is necessary, each station transmits and receives over two radio channels to avoid interference problems and, if allowed, channels to be shifted without communications loss from other stations. The system provides for automatic collision resolution between itself and other stations, and communications integrity is maintained even in overload situations.

Each station determines its own transmission schedule (slotted), based upon data link traffic history and knowledge of future actions by other stations. A position report from one AIS station fills one of 2250 time slots established every 40 seconds. AIS stations continuously synchronize themselves to each other, to avoid overlap of slot transmissions. Slot selection by an AIS station is random within a defined interval, and tagged with a random number of between 8 and 5 frames. When a station changes its slot assignment, it pre-announces both the new location and the time out for that location. In this way new stations, including those stations which suddenly come within radio range close to other vessels, will always be received by those vessels.
**AI FREQUENTLY ASKED QUESTIONS**

1. What is AIS?
2. How is AIS broadcast?
3. What is the AIS rule and are there alternatives to the rule for small businesses?
4. How much does an AIS cost?
5. How does AIS help to increase security (and what is NAVS)?
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 on board 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 vessel’s name or other static information (dimensions, call sign, etc.)?
12. Why do 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. What is a MMSI and where can I get one for my AIS?
19. What is AIS Channel Management?
20. Can I use my AIS in an emergency or for distress messaging?
21. Have an AIS question not answered here?

1. What is AIS? Par 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 vessels’ identity, true, position, course, speed, navigational status and other safety-related information automatically to appropriately equipped shore stations, other ships, and aircraft. Receives autonomously such information from similarly-titled ships, monitors and tracks ships, and exchanges data with shore-based facilities. Read more on what it does, how it works, what it broadcasts, and the messages it uses, etc.
15. **Is the USCG considering expanding AIS carriage to other vessels or outside of VTS areas?**

Yes. On December 16th, 2008 the Coast Guard published a proposed rule (73 FR 76299) to amend the current AIS regulations, and expand AIS requirements beyond Vessel Traffic Service (VTS) areas to all U.S. navigable waters and require AIS carriage for additional commercial vessels, including commercial vessels carrying 50 or more passengers, fishing vessels 55 feet or greater, high-speed passenger vessels, and vessels carrying or posing certain dangerous cargos. See a summary of vessels affected. We invite you to visit www.regulations.gov (Search: USCG-2005-21699) to view the public comments submitted on our proposal and to register for email notifications regarding future actions on this rulemaking, and, www.reginfo.gov (RIN: 1625-AA93) for its timetable.

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:

- NOAA AIS Public Meeting in Washington, DC (25MAR09) and Seattle, WA (25MAR09).pdf (1.0MB) Washington, DC.
- Audio: mp3 (12MB) Seattle, WA audio mp3 (7.33MB).
- Array@WOC@01MAR09.ods audio mp3 (22.50MB).
- Array@TSSC@01MAR09.pdf (5.03MB).
- Array@NAVAGAC@01MAR09.pdf (Transcript and NAVAGAC Resolution re: AIS Class B carriage) (595.8KB).
- Array@RBCM@01MAR09.pdf (3.27MB).
- Array@MNCSA@01MAR09.pdf (0.16MB).

17. **Where can I get AIS data?** Although the U.S. Coast Guard operates our Nation’s AIS network (NAIS), we do not---currently---make our AIS information available to the general public. There are, however, numerous AIS networks and commercial purveyors that do provide AIS data and back information on the World Wide Web, many of which are listed on Wikipedia’s AIS webpage. Local, state and federal government agencies may request U.S. Coast Guard Nation-wide AIS data here.

18. **What is a MMSI and where can I get one for my AIS?** A unique and official Maritime Mobile Service Identity (MMSI) number is required for every AIS station, see our MMSI page for more information.

19. **What is AIS Channel Management?** One of the lesser known and potent features of AIS is its ability to operate on multiple channels of the VHF-FM maritime band. This frequency agility ensures AIS can be used even when the default channels are otherwise unavailable or compromised. In such conditions, competing authorities, such as the Coast Guard, can use an AIS basic station to re-allocate shipborne AIS devices to other more appropriate channels within a defined region(s) of 200 to 2000 square nautical miles. This can be done automatically (and without user intervention) by receipt of the AIS channel management message (AIS message 23) or manually entered via the AIS Minimal Keyboard Display (MKD) or similar input device. Once commanded or initiated, the channels management information will stay in memory for 2 weeks or until a vessel exceeds 900 nautical miles from the defined region. AIS channel management commands can only be automatically overridden via another channel management message for the same defined region or manually overridden or erased by the user via the units channel (local frequencies) management function—read more. Note, reinitializing or resetting your AIS or transmission channels will not necessarily reprogram the unit back to default channels.

20. **Can I lose my AIS in an emergency or for distress messaging?** Yes, but, be aware that AIS safety related to messages are not currently received, processed, recognized or acted upon as Global Maritime Distress Safety System (GMDSS) messages would be by the Coast Guard or other maritime first responders. Therefore, AIS should not be relied upon as the primary means for broadcasting distress or urgent communications, nor used in lieu of GMDSS such as Digital Selective Calling radios which are designed to process distress messaging. Nonetheless, AIS remains an effective means to augment GMDSS and provides the added benefit of being heard (via text messaging) by other AIS users within VHF radio range. For further guidance, see USCG Safety Alert 5-10.

21. **Have an AIS question not answered here? Please contact us.**
Future ASM developments...

- International Assoc. of Marine Aids to Navigation & Lighthouse Authorities (IALA) Guidelines & Recommendations
  - E-Navigation Committee, Portrayal Working Group
  - Maintaining an AIS ASM catalogue
- Radio Technical Commission for Maritime Services (RTCM) Standards
  - Special Committee 121 - AIS ASM
  - Special Committee 129 - Navigation Portrayal
  - Special Committee 109 – Electronic Chart Systems
- U.S. Coast Guard
  - To expand our AIS ASM test beds to Louisville KY and with USACE LOMA effort
  - To require ECS and its integration with AIS (including ASM’s)
  - Expanding transmit capability to our Nation-wide AIS (NAIS)
  - To provide NOAA PORTS via NAIS
GUIDANCE ON THE USE OF AIS APPLICATION-SPECIFIC MESSAGES

1. The Maritime Safety Committee, at its seventy-eighth session (12 to 21 May 2004), approved SN/Circ.236 on Guidance on the application of AIS binary messages as prepared by the Sub-Committee on Safety of Navigation at its forty-ninth session (30 June to 4 July 2003).

2. The Sub-Committee on Safety of Navigation, at its forty-ninth session (30 June to 4 July 2003), selected seven (7) binary messages as shown in annex 2 to SN/Circ.236 to be used as a trial set of messages for a period of four years with no change. It was noted that four additional system-related messages were identified in Recommendation ITU-R M.1371 for the operation of the system.

3. The Sub-Committee on Safety of Navigation, at its fifty-fifth session (27 to 31 July 2009), after evaluating the use of binary messages in the trial period defined in SN/Circ.236, agreed on Guidance on the use of AIS Application-Specific Messages, including messages which are recommended for international use.

4. The Maritime Safety Committee, at its eighty-seventh session (12 to 21 May 2010), concurred with the Sub-Committee’s views and approved the Guidance on the use of AIS Application Specific Messages, as set out at annex.

5. Member Governments are invited to bring the annexed Guidance to the attention of all concerned.

6. This circular revokes SN/Circ.236 as from 1 January 2013.
## IMO SN/Circ.289 ASM’s

- Clearance time to enter port
- Marine traffic signal
- Berthing data
- Weather observation report from ship
- Area notice – broadcast & addressed
- Extended ship static and voyage-related data*
- Dangerous cargo indication*
- Environmental Data
- Route information – broadcast & addressed
- Text description – broadcast & addressed
- Meteorological and Hydrographic [sensor] data
- Tidal window
<table>
<thead>
<tr>
<th>Title</th>
<th>Msg</th>
<th>DAC</th>
<th>Fl</th>
<th>Status</th>
<th>Registrant</th>
<th>Not to be used after</th>
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<tr>
<td>Monitoring aids to navigation</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>In force</td>
<td>Zemi Lite Buoy Co., Ltd</td>
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<td>Text telegram using 6-bit ASCII</td>
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<tr>
<td>Application acknowledgement</td>
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<td>1</td>
<td>replaced</td>
<td>ITU-R.M.1371-1</td>
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<td>2</td>
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<td>3</td>
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<td>4</td>
<td>In force</td>
<td>ITU-R.M.1371-1</td>
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<td>5</td>
<td>In force</td>
<td>ITU-R-M.1371-4</td>
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<td>DANGEROUS CARGO INDICATION</td>
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<td>12</td>
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<td>Tidal Window</td>
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<td>14</td>
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<td>1</td>
<td>16</td>
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<td>1</td>
<td>16</td>
<td>Deprecated</td>
<td>IMO Circ. 289</td>
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<td>Ship waypoints (WP) and/or route plan report</td>
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<td>1</td>
<td>17</td>
<td>In force</td>
<td>ITU-R-M.1371-1</td>
<td></td>
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<td>Clearance time to enter port</td>
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<td>1</td>
<td>18</td>
<td>In force</td>
<td>IMO Circ. 289</td>
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<tr>
<td>Advice of waypoints (AWP) and/or route plan of VTS</td>
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<td>ITU-R-M.1371-1</td>
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<td>Extended ship static and voyage related data</td>
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<td>In force</td>
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<td>6</td>
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<td>25</td>
<td>In force</td>
<td>IMO Circ. 289</td>
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<td>28</td>
<td>In force</td>
<td>IMO Circ. 289</td>
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</tbody>
</table>
NOAA’s
Physical Oceanographic Real-Time System
PORTS®
USACE RTCV
Real-time Current - Velocity System

Target: 101126
Latitude: 40° 30' 09.72" N
Longitude: 080° 05' 08.70" W
Time of Tx: 15:15
Average Wind Speed: N/A
Wind Gust: N/A
Air Temperature: N/A
Relative Humidity: N/A
Air Pressure: N/A
Water Level Report: -0.1 m
Surface Current Speed: 2.36 f/s
Surface Current Direction: 280°
Area Notice (Geo-referenced Information)

- **Time to Expire:** 4h 54m 55s
- **Latitude:** 42° 13’ 47.19” N
- **Longitude:** 069° 57’ 18.37” W
- **Radius:** 9260 m
- **Start Time:** 2008.10.15 16:37:00
- **Type:** Right whale detection
- **MMSI:** 3669734
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<th>Area Notice Descriptions</th>
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<td><strong>Anchorage Area:</strong> Anchorage closed</td>
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<tr>
<td><strong>Anchorage Area:</strong> Anchorage open</td>
</tr>
<tr>
<td><strong>Anchorage Area:</strong> Anchoring prohibited</td>
</tr>
<tr>
<td><strong>Anchorage Area:</strong> Deep draft anchorage</td>
</tr>
<tr>
<td><strong>Anchorage Area:</strong> Shallow draft anchorage</td>
</tr>
<tr>
<td><strong>Anchorage Area:</strong> Vessel transfer operations</td>
</tr>
<tr>
<td>Cancellation – cancel area per Msg Linkage ID</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Cluster of fishing vessels</td>
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<tr>
<td><strong>Caution Area:</strong> Derelicts (drifting objects)</td>
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<tr>
<td><strong>Caution Area:</strong> Divers down</td>
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<tr>
<td><strong>Caution Area:</strong> Fairway closed</td>
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<tr>
<td><strong>Caution Area:</strong> Fishery – nets in water</td>
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<tr>
<td><strong>Caution Area:</strong> Harbour closed</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Marine event</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Marine mammals habitat</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Marine mammals in area – reduce speed</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Marine mammals in area – report sightings</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Marine mammals in area – stay clear</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Protected habitat – no fishing or anchoring</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Protected habitat – reduce speed</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Protected habitat – stay clear</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Risk (define in Associated text field)</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Seaplane operations</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Survey operations</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Swim area</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Traffic congestion</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Underwater operation</td>
</tr>
<tr>
<td><strong>Caution Area:</strong> Underwater vehicle operation</td>
</tr>
<tr>
<td><strong>Chart Feature:</strong> Bridge closed</td>
</tr>
<tr>
<td><strong>Chart Feature:</strong> Bridge fully open</td>
</tr>
</tbody>
</table>
INTERNATIONAL STANDARD

IEC 61993-2

First edition
2001-12

2nd edition completed, publication in 2012
Includes GNSS output
Active comparison of internal GNSS and external input, will alarm when data suspect
Adds a msg 27 long range capability
Corrects DSC msg 22 issues

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
INTERNATIONAL STANDARD

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
Maritime navigation and radiocommunication equipment and systems –
Automatic identification system (AIS) –
Part 2: AIS AtoN Stations – Operational and performance requirements,
methods of testing and required test results
• Starting to see test broadcasts
• As promised, they perform much better than radar SART

Global maritime distress and safety system (GMDSS) –
Part 14: AIS search and rescue transmitter (AIS-SART) – Operational and performance requirements, methods of testing and required test results
INTERNATIONAL STANDARD

2nd edition in the works – completion 2012
To address other AIS symbols, i.e. AIS AtoN, AIS Aircraft, Base Stations, Application Specific Messaging, etc.

Maritime navigation and radiocommunication equipment and systems – Presentation of navigation-related information on shipborne navigational displays – General requirements, methods of testing and required test results
Thank You
Revised AIS Encoding Guidance Promulgated 12/01/05

**AUTOMATIC IDENTIFICATION SYSTEM (AIS) ENCODING GUIDE**

**AUTOMATIC IDENTIFICATION SYSTEM** is a valuable navigation safety radio communication tool. However, its usefulness is undermined by the broadcast of inaccurate, improper or outdated data. Mariners are reminded that U.S. regulation requires that each AIS be maintained in effective operating condition which includes accurate input and upkeep of all AIS data fields. Failure to do so may subject a vessel to civil penalties of up to $40,000 per occurrence. To avoid penalties AIS Users in the United States should ensure their system is encoded as follows:

**Static Data**...should be input manually at installation & password protected. Remember this password. You will need it to re-encode or update certain AIS fields.

- **Maritime Mobile Service Identifier (MMSI), call sign, & vessel name** should match your radio license. If you are licensed-by-rule, input @123456789 as your call-sign. Names should not include abbreviations, except public vessels, i.e. USCG, USCOC, USL, USCG, USCG, L, or precursors or designators, e.g. F/V, M/V, MV, OSV, F/V, REC, S/V, TUG. Names exceeding 20 characters (the parameter limit) should not be abbreviated or truncated; except company fleet vessels who may do so as needed, but, not their unique distinguishing characters. For example, World-wide Traders' tug 123456 should be identified and inputted as WORLDWIDE TUG 123456.

If nameless, use your state registration number preceded by (USAB) as your name, e.g. USAB12345Y2. If unnumbered (e.g. associated craft, vessel tenders), use your parent vessel's name followed by a dash (-) and a numerical designator that distinguishes you amongst others. For example, the first tender for the cruise ship Freedom of the Seas should be identified and inputted as [FREEDOM OF THE SEAS-1]. Additionally, its AIS message 248 call-sign parameter should reflect the last 6-digits of Freedom of the Seas MMSI preceded by (A), e.g. A123456.

- **IMO Number** should match your assigned IMO number. Absent an IMO assignment input your U.S. official documentation number preceded by a '1' and zeroes. e.g. 1001234567, 100000123456. Official numbers must be preceded by a leading '1' followed by either one (10) or two zeroes (100) to fill-in all the 10-digits of this parameter. If your AIS does not accommodate 10-digits input all zeroes instead.

**Dynamic Data**...should be provided via systems that are properly installed, maintained & operational:

- **Type of positioning source and accuracy** should be accurately set, i.e. GPS, surveyed, manual input, etc. The positioning source should provide: course over ground in 1/10 degrees, speed over ground in 1/10 knots, vessel position in 1/10 seconds of latitude & longitude, and degree of accuracy (whether greater or less than 10 meters).

- **Heading data** should be integrated into the AIS on vessels of 150 gross tonnage or greater; and Rate of Turn data on vessels of 500 gross tonnage or greater (per SOLAS Regulation V/59.2).

- **A Pilot Plug, on vessels required to embark pilots**, should be connected and properly wired to the AIS. It should be permanently located near a 3-prong, 120-volt, AC receptacle.

**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. Remember to change your status when anchored or moored. Doing so reduces the AIS reporting rate to once every 3 minutes vice once every 2–10 seconds. This 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: input meters, not feet. Dimensions are described in terms of distance in meters 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. Also to be used by U.S. ship type 22 (see Table) to convey the overall rectangular proportions of the vessel and its tow—as portrayed by the dark arrow lines within the rectangles in the diagram.

- **Estimated Time of Arrival** at destination or voyage departure (if moored or anchored), input Universal Time Coordinated (UTC) not local time.

**Safety-Related Text Messaging**...should be short, concise, & used only to exchange pertinent navigation safety-related information:

- AIS safety-related text messages (SRM) must be in English and solely to exchange navigation safety information.

- Although not prohibited, AIS text messaging should NOT be relied upon as the primary means for distress (MAYDAY) or urgent (PAN PAN) communications.

- Keep SRM concise and as short as possible [less than 90 characters]. The use of abbreviations is acceptable and highly encouraged; see the USCG Local Notice to Mariners, Light List and U.S. Nautical Chart No. 1 for a listing of common abbreviations.

- Testing or repair facilities, is conjunction with on-air testing, should also periodically broadcast an AIS SRM: TEST BCST. Repair testing should be kept to a minimum and not exceed an hour per day.

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1 See [http://wireless.fcc.gov/services/index.htm](http://wireless.fcc.gov/services/index.htm) (Ship Radio Stations)
2 Obtained at [www.mmsinumbers.htm](http://www.mmsinumbers.htm)
3 Per IMO SM/Circ. 227 & 224 or MMSI 4.0 Installation Guidelines
4 Find Country (ISO 3166) & United Nations Location Codes [UN/LOCODE]: www.uncode.org/efc/loc/locarea.html
5 Find U.S. Location Codes (US/LOCODE) at: www.navcen.uscg.gov/f?p=&pagename=locode
6 Any port or place in which a vessel is bound to anchor, moor, or maintain station (i.e. Outer Continental Shelf activity)
7 If AIS lacks angle brackets ([ ]) substitute with parentheses ( )
8 See 47 CFR 80.1100 Distress, urgency, and safety communications.
Maritime Mobile Service Identifier (MMSI), call sign, & vessel name should match your radio license

• There should only be one MMSI assigned to the vessel.
  – If you are licensed-by-rule, input {@@@@@@@@} as your call-sign.
  – Names should **not** include abbreviations, (except public vessels, i.e. USCG, USCGC, USACE, USS, LAPD, NYFD, etc., or precursors or designators, e.g. F/V, M/V, MV, OSV, P/V, REC, S/V, TUG.

• Names exceeding 20 characters (the parameter limit) should not be abbreviated or truncated.
  – Except fleet vessels who may do so as needed, but, not their distinguishing characters, e.g. World-wide Traders’ tug 123456 -> WORLD-WIDE TRA123456
  – If nameless, use your state registration number preceded by {USA#} as your name, e.g. USA#NY1234YZ.
  – If unnumbered (e.g. associated craft, vessel tenders), use your parent vessel’s name followed by a dash {-} and a numerical designator that distinguishes you amongst others, e.g. FREEDOM OF THE SEA-1.
  – Additionally, its AIS message 24B call-sign parameter should reflect the last 6-digits of parent’s MMSI preceded by {A}, e.g. A123456.

• **IMO Number** should match your assigned IMO number.
  – Absent an IMO assignment input your U.S. official documentation number preceded by a ‘1’ and zeroes, e.g. 1001234567, 1000123456.

Note major change for vessels without IMO# and Associate Craft
**Dimensions** should indicate the official dimensions of the vessel. Input meters, **not** feet.

- Dimensions are described in terms of distance in meters to the AIS’s GPS positioning-system antenna location.
- Vessel’s AIS’s GPS antenna is located at the intersection of the two white lines.
- U.S. *ship type 22* are to convey the overall rectangular proportions of the vessel and its tow—as portrayed.

**Dimension field can now be used to represent the a vessels tow (type22)**
Destination (including origination) should be inputted using ISO 3166 country codes and UN/LOCODE’s for international voyages; and US/LOCODE’s for voyages to any U.S. port or place as follows:

Origination>Destination using ISO 3166 country & UN/LOCODE
USNYC>NLRTM ...a New York City to Rotterdam voyage

Vessels inbound to the U.S. should also include a US/LOCODE
CNSHA>USSFO^OVCY for Shanghai to San Francisco Pier 35

Domestic voyages, US^US/LOCODE|>|>|<>|<>|<>|<>|<>|US/LOCODE
US^NYRX>NY5O ...a one-way voyage
US^NYOP><NY6L ...a scheduled route, e.g. ferry service
US^SFCX><SFCX ...voyage to nowhere & back, e.g. excursion

Use of UNLOCODE still required for International voyages, but, we now adopt USLOCODE/GUIDS for domestic voyages. Angle brackets are used to convey routes, round trips, confined ops, anchored/moored
Safety-Related Text Messaging...should be short, concise, & used only to exchange pertinent navigation safety-related information

• AIS safety-related text messages (SRM) must be in English and solely to exchange navigation safety information
  – Although not prohibited, AIS text messaging should **NOT** be relied upon as the primary means for distress (MAYDAY) or urgent (PAN PAN) communications

• Keep SRM concise and as short as possible (less than 90 characters)
  – The use of abbreviations is acceptable and highly encouraged; see the USCG Local Notice to Mariners, Light List and U.S. Nautical Chart No. 1 for a listing of common abbreviations

• Testing or repair facilities, is conjunction with on-air testing, should also periodically broadcast an AIS SRM: {TEST BCST}.
  – Repair testing should be kept to a minimum and not exceed an hour per day

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Note exhortation to use abbreviations and requirement for Test Broadcasts
2-digit numeric codes for *Type of Ship and Cargo Type* are composed from 1st and 2nd digit columns; or as defined in columns 2x, 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.1371-4).

<p>| 1st digit | 2nd digit [4x|6x|7x|8x|9x] | Codes for specific vessels operating in USA [2x] | Engaged in... Codes [3x] | Special Craft Codes [5x] |
|-----------|--------------------------------|-------------------------------------------------|--------------------------|------------------------|
| 0 – Not available DO NOT USE | 0 – All ships of this type | 20 – WIG (Wing In Ground) vessels | 30 – Fishing* | 50 – Pilot vessel |
| 1 – Reserved for future use DO NOT USE | | 21 – Engaged in towing other than barges by pushing ahead or hauling alongside (i.e. articulated tug-barges, push-boats, workboats); whose dimensions (ABCD values) solely represent the overall dimensions of the vessel* | 31 – Engaged in towing by pulling (not pushing or hauling) | 51 – Search and rescue vessels, <em>i.e.</em> USCG boats, USCG Auxiliary, assistance towers |
| 2 – WIG or other vessels denoted in column [2x] operating in U.S. waters, including the U.S. EEZ | 2 – Carrying DG, HS, or MP, IMO hazard or pollutant category B/Y; or use 41/61 if carrying &gt; 12 passengers for hire | 22 – Engaged in towing barges by pushing ahead or hauling alongside (i.e. articulated tug-barges, push-boats, workboats); whose dimensions (ABCD values) represent the overall rectangular dimensions of the vessel and its tow* | 32 – Engaged in towing by pulling (not pushing or hauling) and length of the tow exceeds 200 meters (656 ft.) | 52 – Harbor tugs |
| 3 – Other vessels engaged in actions denoted in column [3x] | 3 – Carrying DG, HS, or MP, IMO hazard or pollutant category C/Z; or use 43/63 for ferry service carrying &lt; 150 passengers | 23 – Light boats (i.e. push-boats or work boats not engaged in towing; whose dimensions (ABCD values) solely represent the vessel dimensions of the vessel*) | 33 – Engaged in dredging, or underwater operations, (<em>i.e.</em>, salvaging, surveying, but, not diving) * | 53 – <em>Fish, offshore</em> or port tenders |
| 4 – HSC or passenger vessels &lt; 100 GT, including tenders | 4 – Carrying DG, HS, or MP, IMO hazard or pollutant category D/O; or use 44/64 for ferry service carrying &gt; 150 passengers | 24 – Mobile Offshore Drilling Units (MODUs), Liftboats, Floating Production Systems (FPS), Floating Production Storage and Offloading Vessels (FPSO) | 34 – Engaged in diving operations* | 54 – <em>Commercial response</em> vessels with anti-pollution facilities or equipment |
| 5 – Special craft, per column [5x] | 5 – Reserved for future use DO NOT USE | 25 – Offshore Supply Vessels (OSV) | 35 – Engaged in military operations | 55 – Law enforcement vessels, <em>i.e.</em> USCG cutters, marine police |
| 6 – Passenger ships ≥ 100 GT | 6 – Reserved for future use DO NOT USE | 26 – Processing vessels (<em>i.e.</em> fish) | 36 – Sailing vessels* | 56 – Spare—for assignments to local vessels as designated by the USCG Captain of Port |
| 7 – Cargo <em>(freight)</em> ships, including Integrated Tug-Barge (ITB) vessels | 7 – Reserved for future use DO NOT USE | 27 – School, scientific, research or training ships | 37 – Pleasure craft (<em>recreational vessel</em>) | 57 – Spare—for assignments to local vessels involved in a marine event |
| 8 – Tankers | 8 – Reserved for future use DO NOT USE | 28 – U.S. public or governmental vessels | 38 – Reserved for future use DO NOT USE | 58 – Medical transports (as defined in the 1949 Geneva Convention and Additional Protocols) <em>or similar public safety vessels</em> |
| 9 – Other types of ship | 9 – No additional information contact <a href="mailto:naguy@uscg.mil">naguy@uscg.mil</a> prior to use | 29 – Autonomous or remotely-operated craft | 39 – Reserved for future use DO NOT USE | 59 – Ships according to RR Resolution No. 18 (Mob-83) |</p>
<table>
<thead>
<tr>
<th>Codes 2x currently denote WIG’s</th>
<th>Codes for specific vessels operating in USA [2x]</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 – All ships of this type</td>
<td>20 – WIG (Wing In Ground) vessels</td>
</tr>
<tr>
<td>21 – Carrying DG, HS, or MP, IMO hazard or pollutant category A/X</td>
<td>21 – Engaged in towing other than barges by pushing ahead or hauling alongside (i.e. articulated tug-barges, push-boats, workboats); whose dimensions (ABCD values) <strong>solely</strong> represent the overall dimensions of the vessel*</td>
</tr>
<tr>
<td>22 – Carrying DG, HS, or MP, IMO hazard or pollutant category B/Y</td>
<td>22 – Engaged in towing barges by pushing ahead or hauling alongside (i.e. articulated tug-barges, push-boats, workboats); whose dimensions (ABCD values) <strong>represent the overall rectangular dimensions of the vessel and its tow</strong></td>
</tr>
<tr>
<td>23 – Carrying DG, HS, or MP, IMO hazard or pollutant category C/Z</td>
<td>23 – Light boats (i.e. push-boats or work boats <strong>not</strong> engaged in towing; whose dimensions (ABCD values) <strong>solely</strong> represent the vessel dimensions of the vessel*</td>
</tr>
<tr>
<td>24 – Carrying DG, HS, or MP, IMO hazard or pollutant category D/O</td>
<td>24 – Mobile Offshore Drilling Units (MODUs), Liftboats, Floating Production Systems (FPS), Floating Production Storage and Offloading Vessels (FPSO)</td>
</tr>
<tr>
<td>25 – Reserved for future use</td>
<td>25 – Offshore Supply Vessels (OSV)</td>
</tr>
<tr>
<td>26 – Reserved for future use</td>
<td>26 – Processing vessels (i.e. fish)</td>
</tr>
<tr>
<td>27 – Reserved for future use</td>
<td>27 – School, scientific, research or training ships</td>
</tr>
<tr>
<td>28 – Reserved for future use</td>
<td>28 – U.S. public or governmental vessels</td>
</tr>
<tr>
<td>29 – No additional information</td>
<td>29 – Autonomous or remotely operated craft</td>
</tr>
</tbody>
</table>

*Note, column 2x changes WIG codes for specific (vessels, i.e. pushboats) use in the USA*