

To: All SIO and NB stations and Whom it may concern

From: MTPNO379 - Nautical Safety and Communication Systems

Your ref.: Our ref.: MTPNO379/BEHOF/NAUTIKK-81-Revision1

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Installation of Automatic Identification Systems (AIS) - DNV Interpretations and guidelines.

The intention of this document is to give DNV Surveyors, Owners and Yards guidelines for installation of AIS onboard DNV classed vessels.

1 DNV involvement

For DNV vessels where DNV issue the Cargo Ship Safety Equipment Certificate or the Passenger Ship Safety Certificate the AIS installation will be scope for DNV approval and survey. Deviation from these guidelines will be evaluated on a case by case basis.

DNV will require the documentation given in clause 4 for plan approval and perform an onboard survey with regard to clauses 5, 6, 7 and 8.

For other DNV classed vessels, DNV will accept the Flag States approval of the installation and only require documents for our files.

2 Carriage requirement, SOLAS Amendments 2000

All ships of 300 gross tonnage and upwards engaged on international voyages, and all passenger ships, irrespective of size, and cargo ships of 500 gross tonnage and upwards not engaged on international voyages and passenger ships irrespective of size shall be fitted with an automatic identification system (AIS) class A, as follows:

2.1 Ships constructed on or after 1 July 2002.

2.2 Ships engaged on international voyages constructed before 1 July 2002:

- Passenger ships, not later than 1 July 2003.
- Tankers, not later than first survey¹ for safety equipment on or after 1 July 2003.
- Ships, other than passenger and tankers, of 50000 gross tonnage and upwards, not later than 1 July 2004.
- Ships, other than passenger and tankers, of 300 gross tonnage but less than 50000 gross tonnage, not later than first safety equipment survey after 1 July 2004 or by 31 December 2004, whichever occurs earlier.
- Ships, not engaged on international voyages constructed before 1 July 2002, not later than 1 July 2008.

A flag State may exempt ships from carrying AISs when ships will be taken permanently out of service within two years after the implementation date.

¹ The first safety equipment survey means the first annual survey the first periodical survey or the first renewal survey for safety equipment, whichever is due first after 1 July 2003.

Note: The Diplomatic Conference on Maritime Security held in London in December 2002 adopted amendments to extant provisions to the International Convention for the Safety of Life at Sea. 1974 (SOLAS 74), accelerating the implementation of the requirement to fit AIS.

For additional information see www.imo.org

See Note 1 for requirements for ships entering United States navigable waters.

See Note 2 for requirements for ships entering St.Lawrence Seaway/Great Lakes.

See Note 3 for requirements for ship entering Panama Canal.

3 Type Approval

The AIS shall conform to IMO performance standard for AIS (Resolution MSC 74(69) Annex 3). Conformance should be documented by a valid type approval certificate issued by an accredited or recognised body. Where applicable, this type approval certificate shall be an EC type examination certificate.

4 Document requirements

4.1 Minimum documentation requirements

Following documents should be submitted for approval prior to the installation:

- Type approval certificate
- Antenna arrangement

4.2 Additional bridge class notation NAUT-OC and NAUT-AW

For ships with class notation W1, W1-OC, NAUT-AW or NAUT-OC the following additional documents shall be submitted for approval.

- Cable plan/ block diagram identifying all interfaced equipment.
- The interface ^{see Note 4} between all equipment and the AIS.
- Location of the AIS Minimum Keyboard and Display (MKD), see 5.3.1.

5 AIS Installation

Parts of the below are recommendations found in IMO Installation guideline (SN/Circ.227):

5.1 AIS VHF Antenna Installation

- The antenna should have omnidirectional vertical polarisation.
- The antenna should be placed in an elevated position that is as free as possible with a minimum of 2 meters in horizontal direction from constructions made of conductive materials. The antenna should not be installed close to any large vertical obstruction. The objective for the VHF antenna is to see the horizon freely through 360 degree.
- The antenna should be installed safely away from interfering high-power energy sources like radar and other transmitting radio antennas, preferably at least 3 meters away from and out of the transmitting beam.
- Ideally there should be only one antenna on the same level. The antenna should be mounted directly above or below the ships primary VHF antenna, with no horizontal separation and with a minimum of 2 meters vertical separation. If it is located on the same level as other antennas, they should be horizontal separated as much as possibly preferably no less than 10m.
- For cable type and lengths see manufacturer's instructions.
(Double screened coaxial cables equal or better than RG214 is recommended).

5.2 GNSS² Antenna Installation.

- The antenna should be installed where it has clear view of sky. The objective is to see the horizon freely through 360 degree with a vertical observation of 5 to 90 degrees above the horizon. Small diameter obstructions, such as masts and booms, do not seriously degrade signal reception, but such objects must not eclipse more than a few degrees of any given bearing.
- Locate the antenna at least 3 meters away from and out of the transmitting beam of high-power transmitters (e.g. Radar beam +/-12.5 degree, and/or Inmarsat systems). This includes the ships own AIS VHF antenna if it is designed and installed separately.
- If a DGNSS system is included or connected to the AIS system, the installation of the antenna shall be in accordance with IEC 61108-4, annex D
- For cable type and lengths see manufacturer's instructions.

5.3 Availability of Functions and Information.

5.3.1 Minimum Keyboard and Display unit (MKD)

The functionality of the Minimum Keyboard and Display unit (MKD) should be available to the navigator at the position from which the ship is normally operated. This can be by means of the AIS internal MKD (integrated or remote) or through the equivalent functionality on a separate display system.

Presentation and display of AIS information on RADAR, Electronic Chart and Display Information System (ECDIS), Electronic Chart System (ECS) or other systems shall comply with IMO SN Circ.217 "Interim guidelines for the presentation and display of AIS target information".

5.3.2 Additional requirements for class notation NAUT-OC and NAUT-AW:

The functionality of the Minimum Keyboard and Display unit (MKD) should be available to the navigator at the workstation for traffic surveillance and manoeuvring. This can be by means of the AIS internal MKD (integrated or remote) or through the equivalent functionality on a separate display system.

AIS system failure and operational warnings shall be incorporated in the central alarm system.

5.3.3 Pilot plug.

A pilot input/output plug is a part of an AIS class A station. A plug connected to this port should be installed on the bridge near the Pilots operating position so that a pilot can connect a personal Pilot Unit.

See Note 5 for configuration of the plug.

6 Power supply³

The AIS and converter (if installed) shall be supplied from a source of electrical power, not inferior to the SOLAS electrical power supply requirements for shipborne navigation equipment. Ref. SOLAS Ch.II-1 Part D. If the AIS are powered from the radio batteries, it must be included in the power calculations for the battery capacity.

² Global Navigational Satellite System (GNSS). GPS is today the most common and typical GNSS equipment.

³ A further requirement to connect AIS to the reserve power source of the GMDSS is under review by IMO.

7 Dynamic data input

7.1 Internal sensor

Time in UTC, from Global Navigation Satellite System (GNSS) receiver.

7.2 External sensor⁴

- Ship Position, from Electronic position fixing system, GNSS receiver
- Course Over Ground (COG), from Electronic position fixing system, GNSS receiver
- Speed Over Ground (SOG), from Electronic position fixing system, GNSS receiver
- Heading, from Gyrocompass. A converter unit (e.g. stepper to NMEA) may be needed to connect AIS if ship's gyrocompass does not provide an IEC61162 output.
- Rate of turn (If available and it includes an IEC 61162 output) may be derived from Gyrocompass, Transmitting Heading Device (THD) or rotation rate from ROT indicator (IMO Resolution A.526(13))

Interfaces should be configured as given in Note 4.

Interfacing of GNSS receivers, see Note 6.

Recommendations to converter units, see Note 7.

8 Static information

Information that should be entered at the initial installation of the AIS includes:

- Maritime Mobile Service Identity (MMSI)
- IMO vessel number
- Radio call sign
- Name of ship
- Type of ship
- Dimension of ship (length and beam)
- Location of position fixing antenna on the ship. (Aft of bow and port or starboard of centreline)
(If the internal GNSS antenna is to be used as fallback for position reporting, the internal reference point shall be stored)

⁴ The fact that AIS comes onboard does not establish a need to install additional sensors above carriage requirements.

Note 1: UNITED STATES

Ref. United States "Maritime Transportation Security Act of 2002".
Public Law 107-295-NOV.25, 2002.

§70114. The following vessels operating in navigable waters of United States shall be equipped with AIS:

- 1)A) A self propelled commercial vessel of at least 65 feet overall in length.
- B) A vessel carrying more than a number of passengers for hire determined by Secretary.
- C) A towing vessel of more than 26 feet overall in length and 600 horsepower.
- D) Any other vessel for which the Secretary decides that an AIS is necessary for the safe navigation of the vessel on waters on which the vessel operate.

§700117 e) Phase-In of AIS.

The act shall apply as follows:

- A) On and after January 1, 2003, to any vessel built after that date.
- B) On and after July 1, 2003, to any vessel built before the date in subparagraph A) as:
 - i) passenger vessel required to carry a certificate under SOLAS
 - ii) tanker
 - iii) or a towing vessel engaged in moving a tank vessel
- C) On and after December 3, 2004, to all other vessels built before the date referred to in subparagraph A)

Note 2: The St.Lawrence Seaway Management Corporation

SEAWAY NOTICE NO. 1 - 2003

AUTOMATIC IDENTIFICATION SYSTEM (AIS) EFFECTIVE MARCH 25, 2003

NOTICE IS HEREBY GIVEN THAT Effective March 25, 2003, The St. Lawrence Seaway Management Corporation will implement mandatory carriage of AIS in Seaway waters. The carriage requirements for AIS equipment will be as follows:

Automatic Identification System.

(a) Each of the following vessels must use an Automatic Identification System (AIS) transponder to transit the Seaway:

(1) each commercial vessel that requires pre-clearance in accordance with Section 22 of the Seaway Practices and Procedures and has a 300 gross tonnage or greater, has a Length Over All (LOA) over 20 meters, or carries more than 50 passengers for hire.

(2) each dredge, floating plant, or towing vessel over 8 meters in length, except only each lead unit of combined and multiple units (tugs and tows).

For more information see www.greatlakes-seaway.com/en/navigation/seaway_notices.html

Note 3: Panama Canal Authority (ACP)

The ACP requires implementation of AIS on all vessels by July 2003. Please refer to the ACP publication titled Panama Canal Security Charges, MR'S ADVISORY TO SHIPPING No. A-09-2002 of April 29, 2002

Shipboard AIS transponders shall comply with the following requirements:

a. The AIS system installed onboard ships shall be Class A AIS shipborne equipment according to IMO MSC 74 (69) Annex 3, "Recommendation on Performance Standards for a Universal Shipborne Automatic Identification Systems (AIS)", as amended.

b. The AIS equipment shall be type-approved according to standard IEC 61993-2. The Panama Canal Authority may require presentation of the type approval document.

c. The AIS equipment shall be installed according to IMO "Guidelines for Installation of Shipborne Automatic Identification System (AIS)", including the installation of a Pilot Plug. The Pilot Plug shall be close to conning position No. 1 in the navigation bridge. This plug shall be labelled "AIS PILOT PLUG", and shall have nearby a USA standard (NEMA 5-15R) 120V, AC, 3-prong power receptacle, to provide power to the pilot's laptop computer. This receptacle shall be connected to emergency power.

<http://www.pancanal.com/eng/maritime/advisories/>

Note 4:

Recommended IEC 61162 sentences

Data	IEC 61162-1 Sentence formatters	
	Preferred	Optional
Reference Datum	DTM	
Position system: Time of position Latitude/Longitude Position accuracy	GNS GLL	GGA, RMC
Speed over ground (SOG)	VBW	VTG, OSD, RMC
Course over ground (COG)	RMC	VTG, OSD
Heading	HDT	OSD
RAIM indicator	GBS	
Rate of Turn (ROT)	ROT	

Note 5:

The pilot plug should be configured as follows.

AMP/Receptacle (Square Flanged (-1) or Free-Hanging (-2), Shell size 11, 9 pin, Std. Sex 206486-1/2 or equivalent with the following terminations:

TX A is connected to Pin 1

TX B is connected to Pin 4

RX A is connected to Pin 5

RX B is connected to Pin 6

Shield is connected to Pin 9

Note 6: Suitability of GNSS receivers

1: Non type approved GNSS, normally installed before 1995.

-If the GNSS generate and output COG, SOG and position see comment 1.

-If the GNSS do not generate and output COG, SOG or position see comment 2.

2: GNSS type approved conforming with A.819(19), normally installed after 1996.

This performance standard state that the GNSS shall be provided with at least one output from which position information can be supplied. The interface should conform to the IEC 61162.

-If the GNSS generate and output COG and SOG see comment 1.

-If the GNSS does not generate and output COG and SOG see comment 2.

3: GNSS receivers installed on or after 01 July 2003 shall conform to performance standard MSC 112(73).

This performance standard is consistent with AIS interface requirements.

Comment 1:

If the GNSS installed is approved for meeting the carriage requirements for GNSS (SOLAS Chapter V Regulation 19, paragraph 2.1.6), DNV will accept this GNSS as the source of SOG, COG and Position to the AIS.

Comment 2:

Recommend to replace the GNSS receiver with a type approved GNSS, providing the required interfaces: Position, Course Over Ground and Speed Over Ground.

Note 7: Sensor Converter

1: Sensors providing IEC 61162-1 or 61162-2 interfaces.

These sensors shall be connected directly to the AIS. GNSS receivers and new Gyro compasses are normally provided with these interfaces.

2: Sensors not providing IEC 61162-1 or 61162-2 interfaces.

Typically older gyrocompass provided with stepper or synchro outputs. These installations will have to include a converter (e.g stepper or synchro to IEC 61162-1).

i) A gyro converter should be approved for this purpose.

ii) The converter should be provided with automatic means for integrity monitoring or the navigator should be able to visually monitor the output heading from the gyro converter at the position from which the ship is normally operated.

Note 8: Floating Production, Storage and Offloading unit (FPSO):

If flag state requires that SOLAS Ch.V shall apply to a FPSO, AIS shall be installed.