Maritime & Coastguard Agency

Surveyor FAQS

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Maritime & Coastguard Agency

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Following two appeals by MCA to the EC over Directive 2002/59/EC, the Commission confirms that all ro-ro passenger vessels and HSCs must be equipped with fully compliant VDRs.

The EC response reads: “Article 10 of this Directive abolishes, from 5 August 2002, exemptions regarding “voyage data recording systems” (black boxes) granted to ro-ro ferries or high speed passenger craft under Article 4(1)(d) of Council Directive 1999/35/EC.”

To this end, all vessels known to be fitted with non-compliant VDRs now have a plan to replace them. For passenger vessels other than ro-ros, we have requested operators to produce a replacement plan but this is less urgent because IMO exemptions/equivalents have been applied for the short term.

Exemptions to requirement to interface to certain items of equipment

Technically, in accordance with the rejection of our appeal (as above), exemptions to interfaces on ro-ro and HSCs cannot be granted. In practice, there will be a few situations where interfacing is near to impossible. The EC has tacitly recognised this and we may consider registering exceptional cases with them.

Retrofitting of VDR’s to existing vessels – Data Items to be recorded, associated interfacing considerations and possible requirements for exemption. (Note – depending on vessel class/size, some of the following items may not be carriage requirement).

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Items to be recorded - reference: IMO Assembly Resolution A861 (20) Clause 5.4

(This resolution/clause gives further detail of the requirement and should be read in conjunction with this paper)

1. Date and Time – Available from GNSS receiver. No perceived grounds for exemption.

2. Speed – Available in electronic format from SDME and/or GNSS receiver. No perceived grounds for exemption.

3. Ship's position – Available from GNSS receiver. No perceived grounds for exemption.

4. Heading – Available electronically from gyrocompass or Transmitting Heading Device (THD). No perceived grounds for exemption.

5. Bridge Audio – Microphones, amplifiers etc. form part of VDR fit. No perceived grounds for exemption and should not be considered.

6. Communications Audio – Easily achieved with simple buffer amplifiers attached to VHF transceiver. No perceived grounds for exemption.

7. Radar data, post-display selection –

a. All recently built radars should provide suitable interface.

b. Older radars may provide electronic output which may be converted/connected via interface unit.

c. Radars with no electronic output are likely to be very old and require replacement in near future.

d. Radars with manufacturer-specific digital coded outputs. Interfaces may need to be designed/built for these.

(Note reference 7.c.and7.d. – In these cases, it may be necessary to consider exemption for a limited period only. This is to give sufficient time to order and fit the necessary equipment. A specific date must be agreed for replacement (and connecting post-display radar to VDR). "By next survey" or "by 200X" is not acceptable.)

8. Echo Sounder –

a. If any form of electrical/electronic output is available, should be connected.

b. If no electrical/electronic output is available, **may be necessary to consider exemption.**

c. In all cases, any replacement equipment fitted in future must provide required interface and be connected to VDR.

(Note reference 8.b. – consideration to be given to restricting exemption to “home route” and not beyond the next scheduled dry-docking. If the vessel is to sail a new route, the exemption should be reviewed.)

9. Main alarms – All bridge indications will be electrical/electronic therefore interfacing easily achievable. No perceived grounds for exemption.

10. Rudder Order and Response –

a. Electric/electronic systems should provide signals which may be interfaced via suitable interface units therefore no grounds for exemption.

b. Purely mechanical systems may require exemption. However, any/all associated electrical/electronic sensor (e.g. rudder angle sensor for autopilot) should be interfaced.

11. Engine order and response –

a. Electric/electronic systems should provide signals which may be interfaced via suitable interface units, therefore no grounds for exemption.

b. Purely mechanical systems may require exemption. However, any/all associated electrical/electronic sensor (e.g. shaft/engine rpm indicator) should be interfaced.

c. Thrusters should be treated in same way as main engines.

12. Hull Opening Status - All bridge indications will be electrical/electronic therefore interfacing easily achievable. No perceived grounds for exemption.

13. Watertight and fire door Status - All bridge indications will be electrical/electronic therefore interfacing easily achievable. No perceived grounds for exemption.

14. Acceleration and hull stresses – If fitted, any equipment will have electrical/electronic readout. Signals will therefore be available which may be interfaced via suitable interface units. No perceived grounds for exemption.

15. Wind speed and direction – If fitted, any equipment will have electrical/electronic readout. Signals will therefore be available which may be interfaced via suitable interface units. No perceived grounds for exemption.

In all cases, any replacement equipment fitted in future must provide required interface and be connected to VDR.

Recording of General Alarm: Not specifically mentioned in Code of Alarms & Indicators or VDR standards therefore not essential.

Annual performance check and certification

Agreement has been reached with UK VDR manufacturers to use a standard certificate form to which will be appended the print-out of 12 hours of data. The certificate will confirm the full working condition of the VDR and include a log of any remedial action taken.

October 2004 update: **MGN 272 (M)** VOYAGE DATA RECORDER'S (VDRs) – PERFORMANCE TESTING has been published and requires that Voyage Data Recorders (VDRs) should be tested after installation and then annually. The MGN gives details of those competent to do this work and lists requirements for a 12-hour print-out of data.

See also: MGN 272a (M)

VDR interfacing issues

Racal Decca ARPA 2690 BT X and S band radars use "4-bit digital code which is impossible to be captured for recording" – Mick Williams Sperry 17.10.02.

However, possibility of using Litton Colour Decoder assembly to produce postdisplay RGB.

Question:

Paragraph 3.3 of Annex 10 of Safety of Navigation SOLAS V states that: "The responsibility issue remains complicated but the MCA would look to the authority requesting surveyor certification (ship-owner, prime contractor or 'system integrator') to take responsibility for proving / demonstrating all aspects of the VDR system to the satisfaction of the surveyor."

Can you please clarify what is intended by "surveyor certification". Does this mean that the MCA surveyor is to issue separate certification relating to the installation tests of the VDR? Or, does the word "certification" refer to the statutory certificate issued at the satisfactory completion of a survey for the issue of a Passenger Certificate or a Cargo Ship Safety Equipment Certificate.

October 2004 update: See **MGN 272 (M) and MGN 272a** for further details.

Reply:

Point 1: the text should read "... survey or certification ...." There is no intention to issue or provide a separate certificate but the complete VDR system installation should have been tested to the Surveyor's satisfaction before the Passenger Certificate or Cargo Ship Safety Equipment Certificate is issued.

Point 2: the surveyor may not be present throughout initial testing of the VDR but would be expected to assure himself that all elements of the VDR system have been tested after installation and that all data can be accurately recorded and reproduced.

These tests should cover all elements of the system from the sensing element (e.g. switch activated by the bow door) through to the ability to analyse and reproduce recorded data. The owner/installer may wish to conduct a complete system trial (e.g. open bow door/close bow door, record times and check that reproduced data reflects these) or show evidence that the mandatory alarms have been tested as far as the bridge and then that the status of lamps on the bridge is correctly recorded/reproduced by the VDR itself.

2. Radio

Radio installations comments

Under SOLAS V, can a Sat C internal GNSS rx (for example) be used to provide position to other radio equipments? What about existing GPS receivers?

Answer

Would agree with interpretation for new (radio) installations "that any equipment with an inbuilt GNSS rx is considered 'stand alone' and any other radio equipment should have its own GNSS or be connected to the ship's GNSS rx". Pragmatically, if at the fitting of a GNSS rx (by 1st survey after 2002) it is simple to provide the interface to all radio equipment, this should be done.

Where existing radio equipment is satisfactorily interfaced to another inbuilt GNSS, my view is that it would be beyond the intention of Reg 18 to force a change for that reason alone. In the event of power failure to the Sat C, the back-up would be "manually updating position at intervals not exceeding 4 hours".

For new installations, a simple check for the presence of a "Wheelmark" would be appropriate.

Existing GNSS receivers should be treated pragmatically in that a patently "Mickey Mouse" unit or installation should be brought up to standard - otherwise where the set has national type-approval no action is necessary.

Radio equipment approvals: non-Directive fishing vessels

Document MCA 287 details a process for manufacturers to gain approval for radio equipment for fitting to NDFVs. The following are approved as of 3.1.03:

- Barrett 980E Integrated HF transceiver and Class ‘E’ Controller
- Simrad RD 68 VHF/DSC Class ‘D’
- ICOM IC M-503 + DS 100 VHF RT and DSC controller
- Mc Murdo F1

Note: all type approved equipment is fully acceptable for NDFV – list retained in CIB.

3. AIS installation: (a) SN/Circ.227

Testing and Installation of shipborne AIS

To be read in association with IMO SN/Circ.227: Guidelines for the Installation of a Shipborne AIS – see Para 3(b)

Live testing of shipborne equipment ashore (if required)

Ensure that the correct licence is held.

Ensure that the MMSI used is the one given on the licence.

Ensure that programmable data fields, especially Name and IMO number, are always consistent with the MMSI in use.

Ensure that the positional data transmitted represents the true location of the equipment (on land) and not a position where the transmissions could be confused with those from a ship.

Physical installation

Ensure that entire system is installed in accordance with IMO guidelines.

Remember that the MKD is not just a display, it also contains operational controls and means for entering voyage related data. It should therefore be positioned close to the primary conning position and where it is easily accessible to the OOW.

Installation of a pilot plug is mandatory. It should be positioned close to a flat surface large enough to support the pilot's laptop computer and situated in a position from which the pilot will have a clear view ahead out of the bridge windows. An adjacent 240v power supply point is highly desirable and compulsory if the vessel is to operate in certain overseas waters/ports.

Programming

MMSI and Callsign:

a. Must always be correctly programmed on installation. If there is any doubt about the actual number/callsign to use, consult the ship's radio licence.

b. It would appear that some equipments store the MMSI in more than one memory/file. If this is the case, ensure all memory locations are programmed correctly so that there is no chance of the equipment reverting to a factory default setting whilst onboard the ship.

Ship's name and IMO number:

a. Ensure that this is entered correctly.
b. Do not precede the name with M/V, F/V, RMS, FPV or any other initials which are

not unique to that vessel. (Use of such initials causes considerable confusion when received information is stored in a database ashore.)
c. If any doubt over spelling/no. exists, consult ship's documentation.

Ship type:
In accordance with table in guidelines. If in any doubt, consult with ship's master.

Length, beam and ship's reference position:
a. Programme these using the parameters as described in guidelines/equipment installation manual. Remember that there are two reference positions, one for the EXTERNAL GNSS antenna (from which the position is normally taken) and one for the INTERNAL GNSS antenna (which may be used if the external receiver fails).
b. Ensure that figures give a reference position which is onboard the ship.

On completion of installation

If at all possible, carry out an operational check with neighbouring ship or VTS centre to establish that information is being transmitted and that values sent are correct.

Document all settings programmed into the equipment and leave a copy of this onboard the ship for future reference.

3. AIS installation: (b) draft guidelines for installation of shipborne automatic identification system (AIS)

1 General

The Automatic Identification System (AIS) Class A is defined by IMO and has been made a carriage requirement by the latest revision of SOLAS chapter V. AIS provides information that may be used for the navigation of the ship. It is therefore essential that the information provided by AIS be reliable.

The AIS itself has been standardised by the International Telecommunications Union (ITU) and the International Electrotechnical Commission (IEC) and is subject to type approval. In order to fulfil the reliability requirements of information exchange, care should be taken to ensure the AIS is correctly installed.

This document contains guidelines for manufacturers, installers, yards, suppliers and ship surveyors. It does not replace documentation supplied by the manufacturer.

The guidelines take into account the following conventions, regulations, instructions and guidelines:

IMO resolution MSC.90(73) Annex 7, Adoption of amendments to the International Convention for the Safety of Life at Sea, 1974, as amended.

IMO resolution MSC.74(69) Annex 3, Recommendation on performance standards for AIS.

ITU Radio Regulations (RR).

IEC 60092 (series), Electrical Installations on Ships.

IEC 60533 Electrical and Electronic Installations in Ships – Electromagnetic Compatibility.

1.1 Survey

Surveys on Convention ships should be carried out in accordance with the rules laid down in resolution A.746(18)
"Survey Guidelines under the harmonised system of survey and certification", and "Protocol of 1988 relating to the International Convention for the Safety of Life at Sea, 1974, as amended."

1.2 Documentation

For the AIS installation the following drawings shall be submitted:

Antenna layout

AIS arrangement drawing

Block diagram (interconnection diagram)

An initial installation configuration report should be produced during installation and kept on board.

2 AIS Installation

2.1 Interference to the Ship's VHF Radiotelephone

The AIS shipborne equipment, like any other shipborne transceiver operating in the VHF maritime band, may cause interference to a ship's VHF radiotelephone. Because AIS is a digital system, this interference may occur as a periodic (e.g. every 20 s) soft clicking sound on a ship's radiotelephone.

This effect may become more noticeable when the VHF radiotelephone antenna is located near the AIS VHF antenna, and when the radiotelephone is operating on channels near the AIS operating channels (e.g. channels 27, 28 and 86).

Attention should be paid to the location and installation of different antennas in order to obtain the best possible efficiency. Special attention should be paid to the installation of mandatory antennas like the AIS antennas.

2.2 VHF Antenna Installation

2.2.1 Location

Location of the mandatory AIS VHF antenna should be carefully considered. Digital communication is more sensitive than analogue/voice communication to interference created by reflections in obstructions like masts and booms. It may be necessary to relocate the VHF radiotelephone antenna to minimize interference effects.

To minimise interference effects, the following guidelines apply:

The AIS VHF antenna should have omnidirectional vertical polarisation.

The AIS VHF antenna should be placed in an elevated position that is as free as possible with a minimum of 2 metres 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 AIS VHF antenna is to see the horizon freely through 360°.

The AIS VHF antenna should be installed safely away from interfering high-power energy sources like radar and other transmitting radio antennas, preferably at least 3 m away from and out of the transmitting beam.

Ideally there should not be more than one antenna on the same level. The AIS VHF antenna should be mounted directly above or below the ship's primary VHF radiotelephone antenna, with no horizontal separation and with a minimum of 2 m vertical separation. If it is located on the same level as other antennas, the distance apart should be at least 10 m.

2.2.2 Cabling

The cable should be kept as short as possible to minimise attenuation of the signal. Double screened coaxial cables equal or better than RG214 are recommended.

All outdoor installed connectors on the coaxial cables should be waterproof by design to protect against water penetration into the antenna cable.

Coaxial cables should be installed in separate signal cable channels/tubes and at least 10 cm away from power supply cables. Crossing of cables should be done at right angles (90°). Coaxial cables should not be exposed to sharp bends, which may lead to change the characteristic impedance of the cable. The minimum bend radius should be 5 times the cable's outside diameter.

2.2.3 Grounding

Coaxial down-leads should be used for all antennas, and the coaxial screen should be connected to ground at one end.

2.3 GNSS Antenna installation

Class A AIS should be connected to a GNSS antenna.

2.3.1 Location

The GNSS antenna should be installed where it has a clear view of the sky. The objective is to see the horizon freely through 360° with a vertical observation of 5 to 90° above the horizon. Small diameter obstructions, such as masts and booms, do not seriously degrade signal reception, but such objects should not eclipse more than a few degrees of any given bearing.

Locate the antenna at least three meters away from and out of the transmitting beam of high-power transmitters (S-Band Radar and/or Inmarsat systems). This includes the ship's 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 should be in accordance with IEC 61108-4, Ed 1, annex D.

2.3.2 Cabling

To achieve optimum performance, the gain of the antenna pre-amplifier should match the cable attenuation. The resulting installation gain (pre-amplifier gain - cable attenuation) should be within 0 to 10 dB.

The coaxial cable between the antenna and the AIS shipborne station connector should be routed directly in order to reduce electromagnetic interference effects.

The cable should not be installed close to high-power lines, such as radar or radio-transmitter lines or the AIS VHF antenna cable. A separation of one meter or more is recommended to avoid degradation due to RF-coupling. Crossing of antenna cables should be done at 90° to minimise magnetic field coupling.

All outdoor installed connectors on the coaxial cables should be waterproof by design to protect against water penetration into the antenna cable.

2.4 Power source

The AIS should be connected to an emergency power source.

2.5 Synchronization

After installation, the AIS should be synchronised properly on UTC and that position information, if provided, should be correct and valid.

3 Bridge Arrangement

3.1 Minimum Keyboard and Display

The functionality of the Minimum Keyboard and Display (MKD) should be available to the mariner 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.

3.2 Pilot plug

A pilot input/output port is part of an AIS Class A station. A plug connected to this port should be installed on the bridge near the pilot's operating position so that a pilot can connect a Personal Pilot Unit (PPU).

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

3.3 Display system

If there is navigational equipment capable of processing and displaying AIS information such as ECDIS, radar or an integrated system available on board the ship, the AIS Class A mobile system may be connected to that system via the AIS Presentation Interface (PI). The PI (input/output) should meet the requirements of IEC 61162-2.

The display system can also include the functionality of an MKD, see 3.1.

3.4 Installation of the BIIT (Built-in Integrity Test) function

The AIS requires that an alarm output (relay) be connected to an audible alarm device or the ships alarm system, if available.

Alternatively, the BIIT alarm system may use the alarm messages output on the PI, provided its alarm system is AIS compatible.

4 Dynamic data input

4.1 External Sensors

The AIS has interfaces (configurable as IEC 61162-1 or 61162-2) for position, heading and rate of turn (ROT) sensors.

In general, sensors installed in compliance with other carriage requirements of SOLAS Chapter V should be connected to the AIS.[1] The sensor information transmitted by AIS should be the same information being used for navigation of the ship.

The interfaces should be configured as given in annex 3. Interfacing problems might occur if the existing sensors found on board do not have serial (IEC 61162) outputs.

4.2 Position, COG and SOG

GNSS sensors normally have IEC 61162 outputs for position, COG and SOG suitable for directly interfacing the AIS. However, it is important to note that:

The Geodetic Datum of the position data transmitted by the sensor is WGS 84 and that an IEC 61162 DTM sentence is configured.

AIS is able to process two reference points for its antenna position, one for external and one for an internal sensor. If more than one external reference point is used, the appropriate information needs to be input to the AIS to adjust reference point information.

4.3 Heading

A compass providing heading information is a mandatory sensor input to the AIS. A converter unit (e.g. stepper to NMEA) will be needed to connect AIS if the ship's compass does not provide an IEC 61162 output. Some ships of less than 500 gross tonnage may not carry a compass providing heading information.

4.4 Rate of Turn

All ships may not carry a Rate-Of-Turn (ROT) Indicator according to resolution A.526(13). However, if a rate-of-turn indicator is available and it includes an IEC 61162 interface, it should be connected to the AIS.

If ROT information is not available from a ROT indicator, the direction of turn may (optionally) be derived from heading information through:

- the compass itself
- An external converter unit (see paragraph 4.3)
- the AIS itself (see annex 1)

4.5 Navigational Status

A simple means should be provided for the operator to input the ship's navigational status (e.g. underway using engine, at anchor, not under command, restricted in ability to manoeuvre, etc.) information into the AIS. The AIS may be connected to the ship's navigational status lights.

5 Static Information

The AIS standards require that certain static, voyage-related, and dynamic information be entered manually, normally by means of the MKD, or by means of IEC 61162 sentences "SSD" and "VSD" via the presentation interface if such provisions exist.

5.1 Entered at initial installation of AIS

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

- Maritime Mobile Service Identity (MMSI) number
- IMO vessel number
- Radio call sign
- Name of ship
- Type of ship

Dimension/reference for position of the electronic position fixing device (EPFD) antenna (see paragraph 5.2)

Access to **MMSI**, **IMO number** and other AIS controls (like power and channel settings) will be controlled, e.g. by password.

The **Call Sign**, **Name of Ship** and **Type of Ship** should be input to the AIS, either manually using the MKD or by means of IEC 61162 sentences “SSD” and “VSD” via the PI. Type of Ship information should be in accordance with the table given in annex 2 (Table 18 from Rec. ITU-R M.1371-1).

For example, a cargo ship not carrying dangerous goods, harmful substances, or marine pollutants; would use identifier “70”. Pleasure craft would use identifier “37”. Note that those ships whose type identifier begins with a “3” should use the fourth column of the table.

Depending on the vessel, cargo and/or the navigational conditions, this information may be voyage related and would therefore need to be changed before beginning or at some time during the voyage. This is defined by the “second digit” in the fourth column of the table.

5.2 Reference point of position

The AIS stores one “external reference point” for the external GNSS antenna position and one “internal reference point” if an internal GNSS is to be used as fallback for position reporting. The locations of theses reference points have to be set during installation using values A, B, C, D; as described in paragraph 5.3.

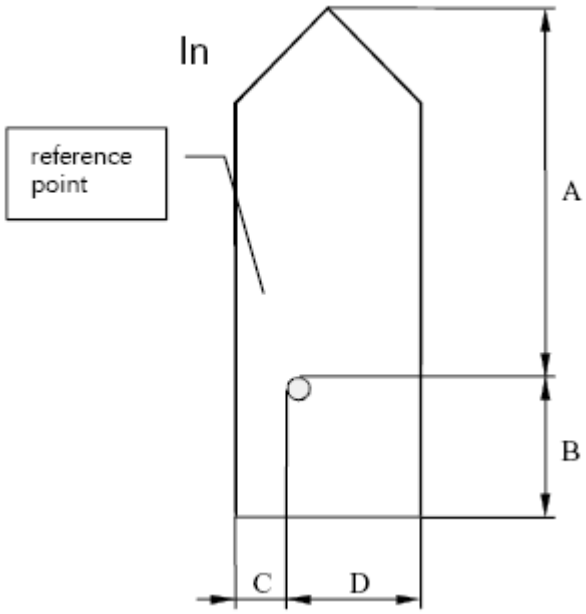
The external reference point may also be a calculated common reference position.

Additionally, the content of the Ship Static Data (“SSD”) sentence on the PI, including the “reference point for position” is being processed by the AIS, and the AIS’ memory for the “external reference point” is set in accordance with the content of this “SSD” (e.g. used by an INS).

5.3 Ship’s dimensions

Ship’s dimensions should be entered using the overall length and width of the ship indicated by the values A, B, C, and D in the following figure.

Ship’s dimensions (A+B and C+D) should be identical when entering internal and external reference points.



<u>The dimension A should be in the direction of the transmitted heading information (bow)</u>

Reference point of reported position not available, but dimensions of ship are available: A = C = 0 and B? 0 and D? 0. Neither reference point of reported position nor dimensions of ship available: A = B = C = D = 0 (=default)
For use in the message table, A = most significant field, D = least significant field

The rare case of an EPFD antenna installed in the portside corner of a rectangular bow, the values A and C would be zero. Should this be the case, one of these values should be set to 1 in order to avoid misinterpretation as “not available” because A=C=0 is used for that purpose.

	Distance (m)
A	0 – 511 ; 511 =511 m or greater
B	0 – 511 ; 511 = 511 m or greater
C	0 - 63 ; 63 = 63 m or greater
D	0 - 63 ; 63 = 63 m or greater

6 Long-range function

The AIS’ long-range function needs a compatible long-range communication system (e.g. Inmarsat-C or MF/HF radio as part of the GMDSS).

If this is available, a connection between that communication system and the Class A mobile unit can be made. This connection is needed to activate the LR function of AIS. Its input/output port should meet the requirement of IEC 61162- 2.

[1] Installation of the AIS does NOT establish a need to install additional sensors above carriage requirements.

4. Draft instructions to surveyors: ship security alert system

Requirement:

- ships on international voyages.
- new ships
- passenger ships and HSC passenger ships, not later than first survey of radio installations after 1 July 2004.
- tankers, gas carriers and cargo HSC of 500 gross tonnage and upwards, not later than first survey of radio installation after 1 July 2004.
- other cargo ships of 500 gross tonnage and upwards and MODUs, not later than first survey of radio installation after 1 July 2006.

Performance Standards - Res MSC.136(76) and Res MSC.147(77)

Type approval and wheel marking are not required. However the Ship Security Alert System should comply with the general requirements of A.694(17). There should be evidence that the EMC requirements of IEC 60945 are complied with. There should be evidence that the system will work in the environmental conditions likely to be encountered. This may be shown by evidence that the environmental conditions of IEC 60945 are complied with or that operation under the conditions likely to be encountered on the ship can be satisfactorily achieved.

If the system utilises GMDSS radio equipment there should evidence that the functionality of the GMDSS installation is not impaired. If the system uses other radio equipment there should be evidence of an appropriate radio licence. If the system works over telecommunication systems provided by third parties such as Inmarsat there should be evidence of the provider's approval.

Activation points

Two activation points are required, one on the bridge and the other elsewhere. These may be fixed or portable telephone handsets, fixed or portable keypads or fixed or portable buttons. The activation points should be protected against inadvertent activation i.e. by a cover over a button. It should not be necessary however to have to break any seals.

Automatic activation points, such as buttons, should not require any adjustments to a radio to be necessary such as channel changing etc.

The alert

The system, when activated, should not send an alert to other ships or raise an alarm on board the ship. The alert should be sent to Falmouth MRCC and contain the following information:

- a clearly distinguishable header indicating that there is a security problem (which should be distinguishable from a GMDSS alert)
- the identity of the ship (name or MMSI or other number)
- the location of the ship (lat/long or descriptive position together with time)
- an indication of the type/make/model of the system used

Falmouth MRCC will not act on an alert which has not been confirmed and may be a false activation. Confirmation should be achieved by the Company by methods such as exchange of messages with the ship or monitoring of telemetry/video information. The result of the confirmation should be sent to Falmouth MRCC.

Deactivation/Re-setting

There should be means to stop automatic repeats of alerts either on the ship or by the Company. Falmouth MRCC should be notified when the security incident is terminated.

Testing

It should be possible to test the system with Falmouth MRCC monthly. The alert message should have an associated indication to indicate that the message is a test.

AIS installation annex 1: rate of turn

The AIS provides the Rate of Turn (ROT) information to other ships in order to early detect ships manoeuvres. There are two possible parameters indicating turning of a ship derived from two different sensors (see Figure 3: ROT sensor input):

- the heading from a GYRO or THD
- the rotation rate itself from a Rate of Turn-indicator

If a Rate of Turn Indicator according to resolution A.526(13) is connected the AIS should use this information to broadcast both direction and value of turn on the VDL.

If valid ROT or HDG data is available from other external sources (Gyro, INS,...), the AIS should use this information to broadcast the direction of turn on the VDL, if greater than 5° in 30 s (might also be implemented as 2.5° in 15 s by configuration); the AIS may also derive ROT information from HDG internally for that purpose.

If no ROT information is available, the AIS should transmit default values indicating "not available". ROT data should not be derived from COG information.

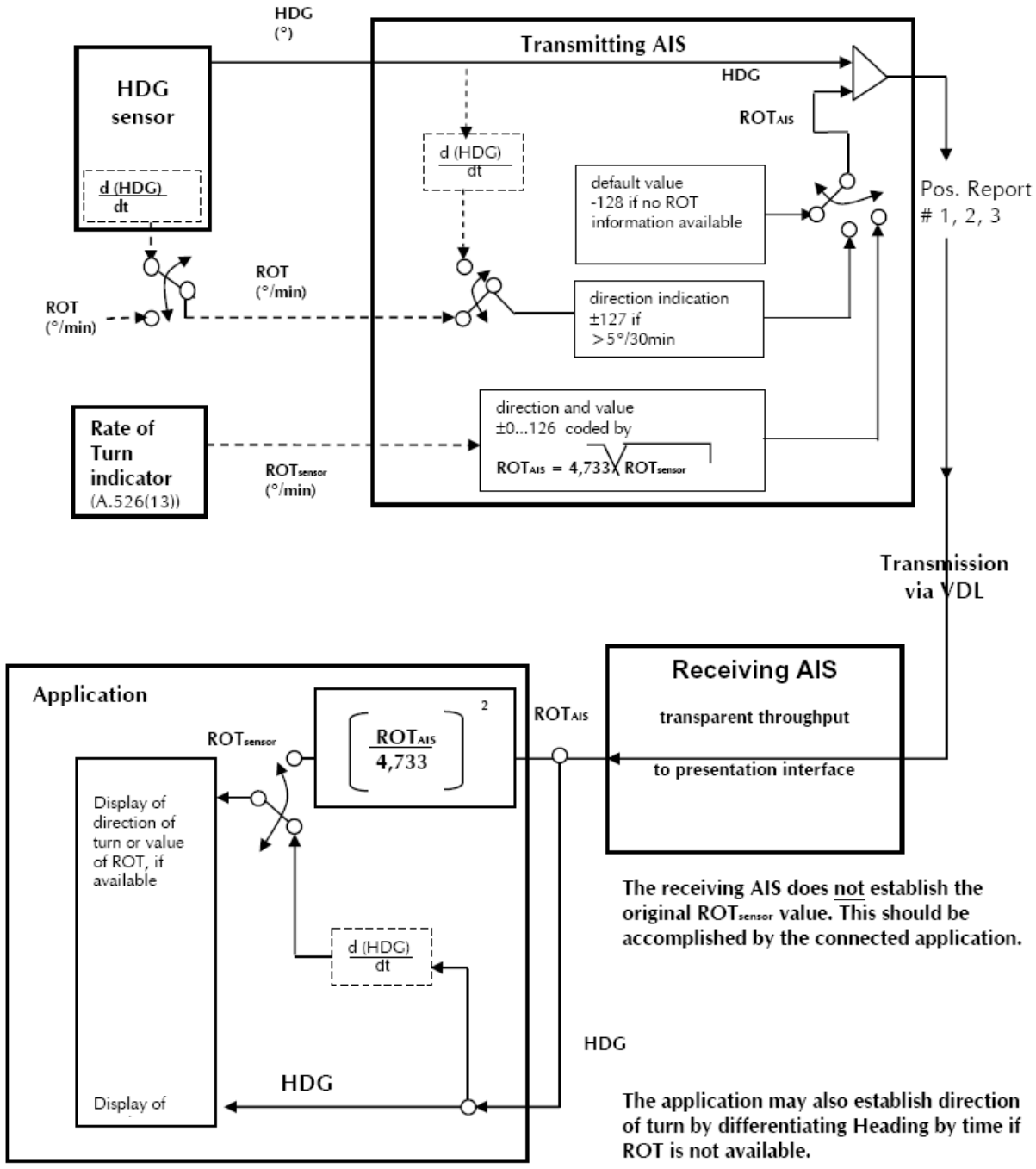
If a ship is not required to carry Turn-Indicator or if external sensor fails, the AIS should react according to following priorities:

ROT sensor fallback conditions

Priority	Affected data in msg 1, 2, 3/ Position Sensor status	contents of ROT field
1.	Rate of Turn Indicator in use[1]	0..+ 126 = turning right at up to 708° per minute or higher; 0..- 126 = turning left at up to 708° per minute or higher Values between 0 and 708°/min should be coded by $ROT_{AIS}=4.733\ SQRT(ROT_{sensor})$ degrees/min where ROTsensor is the Rate of Turn as input by the external Rate of Turn Indicator (TI). Values of 709° per minute and above should be limited to 708° per min.

2.	other ROT source in [2]	+ 127 = turning right at more than 5°/30s (No TI available) 0 no turn - 127 = turning Left at more than 5°/30s (No TI available)
3.	no valid ROT information available	–128 (80 hex) indicates no turn information available (default)

Rate of Turn sensor input overview



[1] Rate of Turn Indicator according to resolution A.526(13); determined by talker ID

[2] i.e. based on HDG information

Maritime & Coastguard Agency

AIS installation annex 2: type of ship table

Identifiers to be used by ships to report their type

Identifier No.	Special craft
50	Pilot vessel
51	Search and rescue vessels
52	Tugs
53	Port tenders
54	Vessels with anti-pollution facilities or equipment
55	Law enforcement vessels
56	Spare – for assignments to local vessels
57	Spare – for assignments to local vessels
58	Medical transports (as defined in the 1949 Geneva Convention and Additional Protocols)
59	Ships according to Resolution No 18 (Mob-83)

Other ships

First digit (*)	Second digit (*)	First digit (*)	Second digit (*)
1 - reserved for future use	0 – All ships of this type	-	0 – Fishing
2 – WIG	1 – Carrying DG, HS, or MP IMO hazard or pollutant category A	-	1 – Towing
3 - see right column	2 – Carrying DG, HS, or MP IMO hazard or pollutant category B	3 – Vessel	2 – Towing and length of the tow exceeds 200 m or breadth exceeds 25 m
4 – HSC	3 – Carrying DG, HS, or MP IMO hazard or pollutant category C	-	3 – Engaged in dredging or underwater operations
5 – see above	4 – Carrying DG, HS, or MP IMO hazard or pollutant category D	-	4 – Engaged in diving operations
	5 – reserved for future use	-	5 – Engaged in military operations
6 – Passenger ships	6 – reserved for future use	-	6 – Sailing
7 – Cargo ships	7 –reserved for future use	-	7 – Pleasure Craft
8 – Tanker(s)	8 – reserved for future use	-	8 – reserved for future use
9 – Other types of ship	9 – No additional information	-	9 – reserved for future use

DG: Dangerous Goods.

HS: Harmful Substances.

MP: Marine Pollutants.

(*) NOTE: the identifier should be constructed by selecting the appropriate first and second digits.

AIS installation annex 3: recommended IEC 61162 sentences

To connect external sensors it is recommended to configure the following sentences as indicated below.

Preferred IEC 61162-1 sensor sentences

Data	IEC 61162-1 preferred	IEC 61162-1 optional
Reference datum	DTM	
Positioning 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	