AIS
Workbook

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Contents

1. Facts about AIS

Requirements

This AIS training is conducted in accordance with Resolution A.917(22) as amended by resolution A.956(23) "Guidelines for the on-board operational use of shipborne Automatic Identification Systems", the STCW and the IMO model course 1.34. The AIS carriage requirements are contained in SOLAS regulation V/19 and the AIS performance standards are listed in the MSC.74(69) annex 3.

Class A & B and AtoNs

SOLAS Chapter V to meet the requirements of Universal Shipborne Automatic Identification System, requires all ships of 300 gross tonnage and upwards on international voyages, all ships of 500 gross tonnage not engaged in international voyages and all passenger vessels irrespective of size to carry class A AIS. Class B AIS is optional and may be used by other vessels, such as leisure and fishing vessels. The navigator should take note that class B AIS dynamic data updates will be less frequent than that of class A AIS, possibly creating apparent positional jumps on his/her display. The class B data is also more likely to be connected to inferior navigation equipment. AIS is also increasingly used to mark positions and to supply additional data about AtoNs (Aids to Navigational Systems), such as beacons, buoys, landmarks and marking the limits of channels obstructions, chartered locations. An AtoN has an AIS transponder associated with it. Some of the key advantages of AIS racons are; automatic and clear display of precise position on ground referenced radar and ECDIS, auxiliary information about the navigational aid, not radar dependant. Disadvantages include; as the AIS is a ground referenced position it depends on own ship also knowing its own precise position to be of any use, position may be lost on own ship because of failure in its primary and back-up GNSS equipment, general failure of GNSS because of intentional or unintentional jamming.

Technology has today also allowed for *synthetic AIS AtoN*, which means that the actual AIS information is transmitted to the navigational mark or other AtoN from a distance, that is the AIS does not need to be a physical part of the navigational mark. Another feature is the *virtual AIS AtoN*, where purpose data is sent for a geographical position, which is not marked by a visible physical object. Both synthetic and virtual AtoNs will be labelled as virtual on the display. The AIS AtoN will be displayed as a Diamond with crosshair, centred at the reported position on the ECDIS and radar display.

Safety messages and Binary messages

All AIS shipborne equipment is capable of receiving and transmitting safety and security related messages. These may be sent to an individual station (e.g. another ship) or broadcasted to all stations. The message length is restricted to about 160 characters. For a message to an individual station there is an automatic response given from station stating whether the message was fully received or if there was a problem.

An optional flexible message facility feature on the AIS known as *AIS Binary messages* has been developed to allow additional messages to be sent via AIS. The Binary messages are divided into two categories; international applications and regional applications. These consist of 7 messages: Meteorological and hydrological data, Dangerous cargo indication, Fairway closed, Tidal window, Extended ship static and voyage-related data, Number of persons onboard, Pseudo-AIS targets. Most shipborne AIS units have already incorporated as default; number of persons onboard, air-draught and Dangerous cargo indication.

Operating procedures, detrimental effects and use in Oil terminals

AIS should always be in operation when ships are underway or at anchor. If the master believes that the continual operation of AIS might compromise the safety or security of the ship or where security incidents are imminent, the AIS may be switched off. This may be the case where the ship is in an area known to have significant pirate activity. If the ship is operating in a mandatory ship reporting system, unless it would further compromise the safety or security, the master should report this action and the reason for doing so to the competent authority. Actions of this nature should be recorded in the ship's logbook.

All AIS units have a security mechanism that detects the disabling of the AIS. This consists of a memory function that records all periods when the AIS installation is non-functioning. The memory is not accessible by the user. As a minimum it records the last 10 times when the equipment was not functioning for more than 15 minutes.

The user should be aware that the AIS may experience faults due to bad installation or refit of other navigation or radio communication systems. Such symptoms may be noises when using VHF radio, ship name missing for the target if AIS VHF antenna is situated too close to a satellite or radar antenna, permanent information errors due to faulty wiring.

Oil transfer regulations contained within the International Safety Guide for Oil Tankers and Terminals – ISGOTT state that radio transmissions from a ship loading or discharging tankers must be limited to 1 watt maximum. It should be realised that low power operation of an AIS is set at 2 watts. Some systems do however have a 1 watt manual setting for use within oil terminals. If this setting is not provided the master

should order the AIS to be switched off during loading or discharging operations, unless port regulations override this. This consideration should also be made when berthed in other hazardous environments where explosive gases may be present.

UN/LOCODE

The AIS unit allows for the input of destination and arrival port, in the voyage related data menu. The AIS field for destination allows for free text of up to 20 characters. This results in numerous variations in the spelling of the same port, making it difficult for other ships and shore authorities to identify the port uniquely. IMO therefore recommends using the United Nations code for ports known as UN/LOCODE. E.g. a ship leaving Dubai bound for Rotterdam, would have to put in the following information on to the AIS; AE DXB > NL RTM. If the port is unknown, "?? ???" should be entered. If the port does not have a designated UN/LOCODE "XX XXX" should be used. If the port does not have an UN/LOCODE but a commonly accepted English name, the name should be preceded by "===" (3 equals signs). If only the general area of destination is known, the name of or accepted abbreviation should be used instead, preceded by "===".

Data recording

Most AIS systems today are integrated into a Radar or ECDIS system. These systems allow AIS data and alarms to be recorded. These systems also allow the recorded AIS data to be played back on a later date. There will usually also be the possibility to define the scope of recording data by message types (Class A, Class B, AtoN, SAR aircrafts, Alarms etc).

2. Exercises

All questions and exercises are scored equally; to get full score try to answer all questions as comprehensive as possible. All questions must be answered and a score of 75% is required to pass the course.

Some of the questions and exercises will require you to look into your AIS manufacture manual and other relevant documentation. **Note: All answers must be done on a separate sheet.**

Exercise #1

Describe your AIS system installation in detail.
Key words: Location of antennas, minimum key display, transmitter/receiver and integration/interface with other equipment such as: ECDIS, RADAR, GPS, Gyro etc.

Exercise #2

Objective of AIS
1. What is the main objective of AIS?
2. Describe the AIS carriage requirements.
3. What are the main advantages with AIS?
4. What are the potential dangers with AIS?
5. What is meant with the term "risk of overreliance"?

Exercise #3

Demonstrate a correct and complete start up procedure on your AIS system.
1. Describe what to check before power up of the AIS.
2. Describe what to check after start up of the AIS.
3. Describe how to check the input from the system sensors.
4. Describe what to do in case some sensors are failing.
5. Describe your AIS familiarization checklist
6. Describe the procedures that exist on your ship for AIS usage.

Exercise #4

Voyage related data and navigation status.
1. Describe step by step the procedure for how to change voyage information in your AIS system.
2. Describe the voyage data to be changed. Which optional binary messages are included on your AIS?
3. Using UN/LOCODE, how would you note; your departure e.g. port of Slagentangen in Norway and destination United States West Coast, onto your AIS voyage related data?
4. Describe how to change the navigational status.

5. When should you change the navigational status?
6. What is the purpose of changing the navigational status?

Exercise #5

AIS static and dynamic information.
1. Describe your ships static information.
2. Describe how you check your vessel's dynamic data.
3. As an operator, are you able to change the static information (explain you answer)?
4. Describe how you activate/deactivate AIS targets on the MKD, ECDIS and ARPA.

Exercise #6

How to obtain AIS operational status
1. Describe how to check the operational status of the AIS?
2. Describe how to check that your ships AIS is transmitting the correct data?
3. Explain how you would record and play back AIS data.
4. Describe how to activate the AIS self test.

Exercise #7

AIS usage
1. List some AtoNs where you may find AIS fitted.
2. Describe how you would send a security related message.
3. Is there any situation where the AIS may be turned off?
4. Describe how you would set regional operating settings on your AIS.
5. What are some of the alarms you may experience from your AIS? Name at least 4.

Exercise #8

Engineering mode/service mode
1. What is the purpose of engineering/service mode?

Exercise #9

Maintenance
1. Describe your ships maintenance routine for the AIS installation.

3. Document status

Issue no.	Date	Author	
1673 A	10.11.2004	OH	
1673 A1	15.08.2005	OH	
1673 A2	10.08.2006	OH	
1673 A3	26.02.2007	OH	
1673 A4	01.01.2007	OH	
1673 A5	01.02.2010	MB	
1673 B1	31.08.2012	MH	
1673 B2	27.01.2014	AB	
1673 B3	20.11.2014	AB	
1673 B4	29.08.2018	TT	
1673 3.0	15.11.2020	IG	

4. Changes in the document

Issue no.	Paragraph no.	Description
1673 A1	Para 1.3.3 Para 1.8 Chap. 3 last page	Changed from 6 to 4 questions and minimum 3 must be answered.
1673 A2	Para 3.1	Change INS to AIS in the first question.
1673 A3	Para 1.9	Add new paragraph, Evaluation of on board course.
1673 A4	Para 1.5-1.8	Updated with new email and text.
1673 A5	Para 1.7 Para 1.8 Para 1.9 Para 1.10 Para 3 Para 2.3	Added AIS verification check list. Changed text to candidate detail page. Added item AIS verification check list. Changed so that the candidate must sign the documentation check list. Added page with fixed candidate details and moved evaluation from Para 1.9 to Para 8 Added page AIS verification check list Changed / modified all questions Added relevant legislations and references
1673 B1	Chapter 1 Chapter 3 Chapter 3 Exercise chap. 4	Chapter 1 text changed Chapter 3 named chapter 4 Work book updated to include more theory to cover IMO's AIS model course 1.34 Modified / added questions
1673 B2		Updated 1.3, 1.8, 1.9 and 1.10.
1673 B3	Para 1.9	Removed "CBT Login ID", added "Ships flag"
1673 B4		New template
1673 3.0		New Ocean TG course template. Split procedure and workbook, changed version numbering