



## Automatic Identification System (AIS) Class B

### What is AIS?

The Automatic Identification System (AIS) is included in the International Convention for Safety of Life at Sea (SOLAS), and large ships began fitting AIS in July 2002. AIS transmits, automatically and at set intervals, dynamic information relating to the ships course, speed and heading; static information related to the ships name, length, breadth; and voyage related details such as cargo information and status (underway, at anchor).

AIS is a Very High Frequency (VHF) radio broadcasting system that transfers packets of data over the VHF data link (VDL) and enables AIS equipped vessels and shore-based stations to send and receive identification information that can be displayed on a computer or chart plotter.

This information can assist in situational awareness and provide a means to assist in collision avoidance. In addition, AIS can be used as an aid to navigation, by providing location and additional information on buoys and lights.

### The Types and Classes of AIS

There are two classes of AIS, Class A and Class B, as well as different types of AIS used for shore stations (AIS Base Stations), aids to navigation (AIS AtoN), AIS on search and rescue (SAR) aircraft and AIS search and rescue transmitters (AIS SART).

AIS Class A	Class A has been mandated by the International Maritime Organization (IMO) for vessels of 300 gross tonnage and upwards engaged on international voyages, cargo ships of 500 gross tonnage and upwards not engaged on international voyages, as well as passenger ships (more than 12 passengers), irrespective of size.
AIS Class B	Class B provides limited functionality and is intended for non-SOLAS vessels. It is not mandated by the International Maritime Organization (IMO) and has been developed for non-SOLAS commercial and recreational vessels.
AIS Base Station	Base Stations are provided by an aids to navigation authorities to enable the ship to shore / shore to ship transmission of information. Networked AIS Base Stations can assist in providing overall maritime domain awareness.

AIS aids to navigation (AtoN)	AIS AtoN provide an opportunity to transmit position and status of buoys and lights through the same VDL, which can then show up on an electronic chart, computer display or compatible radar.
AIS SART	Search and Rescue Transmitters using AIS can be used to assist in determining the location of a vessel in distress.
AIS on Search and Rescue (SAR) Aircraft	Search and Rescue Aircraft may use AIS to assist in their operations.

### Equipment Description

Each AIS Class B station consists of one VHF transmitter, two VHF receivers (AIS 1 and AIS 2), a standard marine electronic communications link and sensor input from different onboard systems. Timing and positional information comes from a GNSS (global navigation satellite system – such as GPS). Heading information may come from an additional sensor, such as a compass.

**Class B AIS Configuration**

The diagram illustrates the Class B AIS configuration. A central AIS unit (1) is connected to a GPS receiver (5) and a Compass. The AIS unit is also connected to a VHF transmitter (2) and two VHF receivers (3). The VHF transmitter and both VHF receivers are connected to a Personal Computer (4) which includes a Monitor. The Monitor displays a map with a vessel's position.

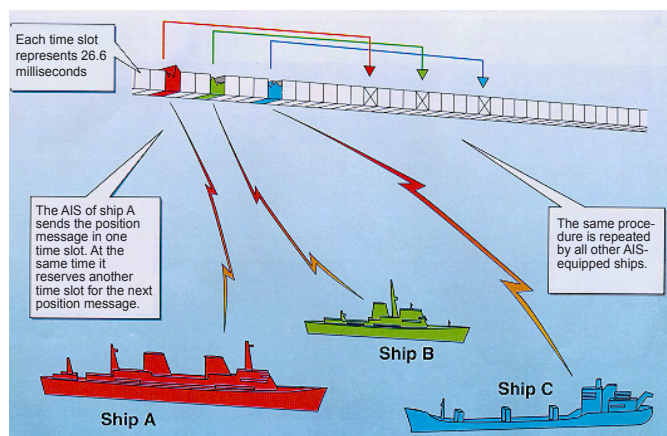
1. Each AIS system requires a VHF antenna to receive and transmit the radio signals.
2. Each AIS Class B requires one VHF transmitter to transmit the vessel information onto the appropriate timeslot.
3. Each AIS Class B requires two VHF TDMA receivers to enable the vessel to receive the information of other Class A and Class B vessels in range. If supported, the AIS Class B may include a dedicated VHF Digital Selective Calling (DSC) systems receiver for channel management.
4. The AIS unit sends and receives vessel identification information which can be displayed on a computer or chart plotter.
5. Position and timing information is normally derived from an integral or external global navigation satellite system, for example Global Positioning System (GPS) receiver. Other information broadcast by the AIS, if available, is electronically obtained from shipboard equipment through standard marine data collections.

## How it Works

AIS works in an automatic, continuous manner regardless of where the vessel is located – the high seas, coastal waters or inland waterways. AIS uses a time-division multiple access (TDMA) scheme to share the VHF frequency, also known as the VHF Data Link (VDL). There are two dedicated frequencies used for AIS – AIS 1 (161.975 MHz, also known as channel 87B) and AIS 2 (162.025 MHz, also known as channel 88B).

Each of the frequencies are divided into 2250 time slots that are repeated every 60 seconds, and the AIS units send packets of information which are transmitted on these 'slots'. At the same time AIS units in range are listening to the timeslots, and can receive the information.

AIS Class B can use carrier sense TDMA (CSTDMA) or self organising TDMA (SOTDMA). An International Electrotechnical Commission (IEC) testing standard exists for CSTDMA AIS Class B (IEC 62287-1), and a similar testing standard for SOTDMA AIS Class B is under development.



*Principles of SOTDMA*

## Message types and formats

There are a number of different AIS messages – the table on the following page identifies all the messages, and the requirement for AIS Class B to either receive or send. It should be noted that many AIS Class B unit manufacturers have included the optional aspects as per the table. Also, for messages 1, 2, 3, 4, 18 and 19, although these are noted as optional for receive and process, this actually refers to functional visibility for the user – these messages must be received and internally processed to ensure synchronisation.

Dynamic data for AIS Class B units (message 18) is sent every 30 seconds if the speed over the ground (SOG) of the craft is greater than 2 knots or every 3 minutes if the SOG is equal to or less than 2 knots.

For both AIS Class A and AIS Class B static data is transmitted once every 6 minutes. See the [AIS Class A Fact Sheet](#) for more information.

## For more information

To learn more about AIS, take the Australian Maritime Safety Authority's (AMSA) AIS interactive tutorial, found at [www.amsa.gov.au/vesseltracking](http://www.amsa.gov.au/vesseltracking). Additional information is available from [IMO](#) and the International Association of Lighthouse Authorities ([IALA](#)).

In Australia, further information can be obtained from the following IMO related documents, or by contacting the [Vessel Tracking Manager, AMSA](#).

[IMO Resolution A.917\(22\)](#)

[IMO Resolution A.956\(23\)](#)

[IMO SN Circ. 217](#)

[IMO SN Circ. 222](#)

[IMO SN Circ. 227](#)

[IMO SN Circ. 236](#)

[IMO SN Circ. 245](#)

[AMSA Marine Orders 21](#)

[AMSA Marine Notice 12/2005](#)

[AMSA Marine Notice 13/2005](#)

# Fact Sheet – AIS Class B

## Use of VDL messages by a Class B “CS” AIS (adapted from ITU-RM.1371 Series)

Message No.	Name of message	Annex 8 reference	Receive and process <sup>(1)</sup>	Transmit by own station	Remark
0	Undefined				
1	Position report (Scheduled)	§ 3.1	Optional	No	
2	Position report (Assigned)	§ 3.1	Optional	No	
3	Position report (When interrogated)	§ 3.1	Optional	No	
4	Base station report	§ 3.2	Optional	No	
5	Static and voyage related data	§ 3.3	Optional	No	
6	Addressed binary message	§ 3.4	No	No	
7	Binary acknowledge	§ 3.5	No	No	
8	Binary broadcast message	§ 3.6	Optional	No	
9	Standard SAR aircraft position report	§ 3.7	Optional	No	
10	UTC and date inquiry	§ 3.8	No	No	
11	UTC/Date response	§ 3.2	Optional	No	
12	Safety related addressed message	§ 3.10	Optional	No	NOTE – Information can also be transferred via Message 14
13	Safety related acknowledge	§ 3.5	No	Optional	Should be transmitted if the option to process Message 12 is implemented
14	Safety related broadcast message	§ 3.12	Optional	Optional	Transmit with predefined text only, see § 4.3.3.7
15	Interrogation	§ 3.13	Yes	No	Class B “CS” should respond to interrogations for Message 18 and Message 24. It should also respond to interrogations for Message 19 by a base station
16	Assigned mode command	§ 3.21	No	No	Message 23 is applicable to the “CS”
17	DGNSS broadcast binary message	§ 3.15	Optional	No	
18	Standard Class B equipment position report	§ 3.16	Optional	Yes	A Class B “CS” AIS should indicate “1” for “CS” in flag bit 143
19	Extended Class B equipment position report	§ 3.17	Optional	Yes	Transmit ONLY as response on base station interrogation
20	Data link management message	§ 3.18	Yes	No	
21	Aids-to-navigation report	§ 3.19	Optional	No	
22	Channel management message	§ 3.20	Yes	No	Use of that function may be different in certain regions
23	Group assignment	§ 3.21	Yes	No	
24	Class B “CS” static data	§ 3.22	Optional	Yes	Part A and Part B
25	Single slot binary message	§ 3.23	Optional	No	
26	Multiple slot binary message with Communications State	§ 3.24	No	No	
27-63	Undefined	None	No	No	Reserved for future use

<sup>(1)</sup> “Receive and process” in this Table means functionality visible for the user, e.g. output to an interface or display. For synchronization it is necessary to receive and internally process messages according to § 4.3.1.1; this applies to Messages 1, 2, 3, 4, 18, 19.