CLASS A AIS POSITION REPORT (MESSAGES 1, 2, AND 3)

A Class A AIS unit broadcasts the following information every 2 to 10 seconds while underway, and every 3 minutes while at anchor at a power level of 12.5 watts.

Parameter	Bits	Description
Message ID	6	Identifier for this message 1, 2 or 3
Repeat indicator	2	Used by the repeater to indicate how many times a message has been repeated. See Section 4.6.1, Annex 2; 0-3; 0 = default; 3 = do not repeat any more
User ID	30	MMSI number
Navigational status	4	0 = under way using engine, 1 = at anchor, 2 = not under command, 3 = restricted maneuverability, 4 = constrained by her draught, 5 = moored, 6 = aground, 7 = engaged in fishing, 8 = under way sailing, 9 = reserved for future amendment of navigational status for ships carrying DG, HS, or MP, or IMO hazard or pollutant category C, high speed craft (HSC), 10 = reserved for future amendment of navigational status for ships carrying dangerous goods (DG), harmful substances (HS) or marine pollutants (MP), or IMO hazard or pollutant category A, wing in ground (WIG); 11 = power-driven vessel towing astern (regional use); 12 = power-driven vessel pushing ahead or towing alongside (regional use); 13 = reserved for future use, 14 = AIS-SART (active), MOB-AIS, EPIRB-AIS 15 = undefined = default (also used by AIS-SART, MOB-AIS and EPIRB-AIS under test)
Rate of turn ROT_{AIS}	8	0 to +126 = turning right at up to 708 deg per min or higher 0 to -126 = turning left at up to 708 deg per min or higher Values between 0 and 708 deg per min coded by ROT_{AIS} = 4.733 SQRT(ROT_{sensor}) degrees per min where ROT_{sensor} is the Rate of Turn as input by an external Rate of Turn Indicator (TI). ROT_{AIS} is rounded to the nearest integer value. +127 = turning right at more than 5 deg per 30 s (No TI available) -127 = turning left at more than 5 deg per 30 s (No TI available) -128 (80 hex) indicates no turn information available (default). ROT data should not be derived from COG information.
SOG	10	Speed over ground in 1/10 knot steps (0-102.2 knots) 1 023 = not available, 1 022 = 102.2 knots or higher
Position accuracy	1	The position accuracy (PA) flag should be determined in accordance with the table below: 1 = high (<= 10 m) 0 = low (> 10 m) 0 = default

Longitude	28	Longitude in 1/10 000 min (+/-180 deg, East = positive (as per 2's complement), West = negative (as per 2's complement). 181= (6791AC0h) = not available = default)
Latitude	27	Latitude in 1/10 000 min (+/-90 deg, North = positive (as per 2's complement), South = negative (as per 2's complement). 91deg (3412140h) = not available = default)
COG	12	Course over ground in 1/10 = (0-3599). 3600 (E10h) = not available = default. 3 601-4 095 should not be used
True heading	9	Degrees (0-359) (511 indicates not available = default)
Time stamp	6	UTC second when the report was generated by the electronic position system (EPFS) (0-59, or 60 if time stamp is not available, which should also be the default value, or 61 if positioning system is in manual input mode, or 62 if electronic position fixing system operates in estimated (dead reckoning) mode, or 63 if the positioning system is inoperative)
special maneuvre indicator	2	0 = not available = default 1 = not engaged in special maneuver 2 = engaged in special maneuver (i.e.: regional passing arrangement on Inland Waterway)
Spare	3	Not used. Should be set to zero. Reserved for future use.
RAIM-flag	1	Receiver autonomous integrity monitoring (RAIM) flag of electronic position fixing device; 0 = RAIM not in use = default; 1 = RAIM in use. See Table
Communication state (see below)	19	See Rec. ITU-R M.1371-5 Table 49
Number of bits	168	

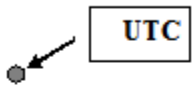
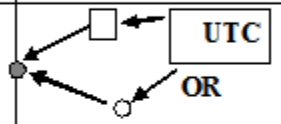
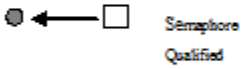
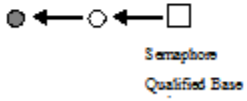
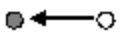
Communications State (19 bit field): The Communications State in Class A AIS Position Report messages is used in planning for the next transmission in order to avoiding mutual interference. It is inherent to the self organizing time division multiple access (SOTDMA) process. This information, along with the 6 bit time stamp information identified above, can also provide information on the existence of radio interference or other anomalies affecting reception of GPS signals in the local area. See below.

Communications State

Parameter	Bits	Description
Sync state (see below)	2	0 UTC direct (sync from own integral GPS receiver) 1 UTC indirect (own GPS unavailable - UTC sync from GPS receiver on nearby ship or base station) 2 Station is synchronized to a base station (base direct - GPS unavailable).

		3 Station is synchronized to another station based on the highest number of received stations or to another mobile station, which is directly synchronized to a base station (GPS unavailable)
Slot time-out	3	Specifies frames remaining until a new slot is selected 0 means that this was the last transmission in this slot 1-7 means that 1 to 7 frames respectively are left until slot change
Sub message	14	The sub message depends on the current value in slot time-out as described in Table 19

Comm State Sync State (2 bit field)

Sync mode of own station	Priority	Illustration	Sync state (in communication state) of own station	May be used as source for indirect sync by other station(s)
UTC direct	1		0	Yes
UTC indirect	2		1	No
Base direct	3		2	Yes
Base indirect	4		3	No
Mobile as semaphore	5		3	No

Note Class B (CSTDMA) AIS devices always transmits 11 - semaphore sync mode.

Determination of position accuracy information

Accuracy status from RAIM (for 95% of position fixes)[1]	RAIM flag	Differential correction status[2]	Resulting value of PA flag
No RAIM process available	0	Uncorrected	0 = low (>10 m)
EXPECTED RAIM error is < 10m	1		1 = high (≤ 10m)
EXPECTED RAIM error is > 10m	1		0 = low (>10 m)
No RAIM process available	0	Corrected	1 = high (≤ 10m)
EXPECTED RAIM error is < 10m	1		1 = high (≤ 10m)
EXPECTED RAIM error is > 10m	1		0 = low (>10 m)

[1] The connected GNSS receiver indicates the availability of a RAIM process by a valid GBS sentence of IEC 61162; in this case the RAIM-flag should be set to "1". The threshold for evaluation of the RAIM information is 10 m. The RAIM expected error is calculated based on "expected error in latitude" and "expected error in longitude" using the following formula:

$$EXPECTED\ RAIM\ error = \sqrt{(\text{expected error in latitude})^2 + (\text{expected error in longitude})^2}$$

[2] The quality indicator in the position sentences of IEC 61162 received from the connected GNSS receiver indicates the correction status.

(Source : International Telecommunications Union Recommendation ITU-R M.1371-5)