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**International Association of Marine Aids to Navigation  
and Lighthouse Authorities**

**LIAISON NOTE TO ITU-R WORKING PARTY 5B**

**WORKING DOCUMENT TOWARDS A PRELIMINARY  
DRAFT REVISION OF RECOMMENDATION ITU-R M.1371**

During its last E-NAV committee meeting, held 17-21 September 2017, IALA reviewed the Recommendation ITU-R M.1371. Accordingly, IALA propose additions and modifications to the Recommendation ITU-R M.1371.

**Summary of Revisions**

The IALA ENAV Committee reviewed a number of editorial and technical changes proposed for ITU-R M.1371-5. These changes include: changing the name 'Limited Base Station' to 'AIS Coast Station' and amending Message 11 to reflect the change; ensuring that an AIS Airborne Station does not become semaphore; clarifying the number of spare bits in IFMO using message 26 to ensure byte alignment; defining 'garbled' slot; amending reporting rate when a vessel is changing course; updating EPFS descriptors to reflect the implementation of Beidou Navigation Satellite Service (BDS); removing superfluous text for burst mode devices; adding an extended capability reference for messages 1, 2 and 3; and providing source identification harmonization.

The following changes are proposed for integration in the review of ITU-R M.1371-5. A track changes version, with these proposed changes identified, is provided in the Attachment.

**Details of Revisions**

**Change the name "Limited Base Station" to "AIS Coast Station"**

**Background and rationale**

Change of name is required to differentiate the full base station controlling the VDL and AIS Coast Station which should not be allowed to have control over the VDL.

**Proposal**

Meeting suggests to replace the reference of "Limited Base Station" to read "AIS Coast Station" in ITU-R M.1371 future edition Annex 1 Clause 2.1.3 as follows:

"2.1.3 ~~Limited base station~~AIS Coast Station (no VHF data link control functionality)"

## Message 11 in the AIS Coast Station (“ACS”)

### Background and rationale

AIS Coast Station shall not be regarded as Base Station by a receiving AIS station. The ACS shall thus autonomously transmit Message 11 rather than Message 4.

### Discussion

Message 11 is identical of Message 4 but may currently only be transmitted on request by Message 10. This should be changed to allow autonomous transmission by ACS. It is further necessary to change the occurrences of “limited base station” to read “AIS coast station”.

### Proposal

Amend Annex 8 clause 3.2 as follows:

“3.2 Message 4: Base station report

Message 11: coordinated universal time and date response

Should be used for reporting UTC time and date and, at the same time, position. A base station should use Message 4 in its periodical transmissions. Message 4 is used by AIS stations for determining if it is within 120 NM for response to Messages 20 and 23. A mobile station should output Message 11 only in response to interrogation by Message 10.

Message 11 is only transmitted by AIS Coast Station (ACS) or as a result of a UTC request message (Message 10). The UTC and date response should be transmitted on the channel, where the UTC request message was received.

...”

### AIS SAR airborne station should not become the semaphore

#### Background and rationale

AIS SAR airborne station should not become the semaphore due to the likelihood that an airborne station is a fast moving target and thus not a suitable synchronization source.

#### Proposal

Meeting suggests to amend Annex 2 Clause 3.1.3.3.2 as follows:

“3.1.3.3.2 Mobile station operation as a semaphore

When a mobile station determines that it is the semaphore (see § 3.1.1.4 and § 3.1.3.4.3), it should decrease its reporting interval to MAC.SyncMobileRate. It should remain in this state until the semaphore qualifying conditions have been invalid for the last 3 min. The Class B “SO” and AIS SAR aircraft station should not act as the semaphore.”

### Clarify the number of spare bit in IFM0 using Message 26 to ensure byte alignments

#### Background and rationale

The definition of IFM0 using Message 26 as described in ITU-R M.1371-5 Annex 5 is not in compliance with the definition of Message 26 in ITU-R M.1371-5 Annex 8 section 3.24 Table 82.

In the definition of Message 26, a field of four spare bits exists in front of the commstate for byte alignment. This field is missing in ITU-R M.1371-5 Annex 5 section 5.1 Table 28.

## Proposal

Meeting suggests two changes ( a) and b) ) as follows:

a) amend Annex 5 Table 28 as follows:

TABLE 28

### International function message 0 using Message 26, broadcast or addressed binary message

Parameter	Number of bits	Description
Message ID	6	Identifier for Message 26; always 26
Repeat indicator	2	Used by the repeater to indicate how many times a message has been repeated. See § 4.6.1, Annex 2; 0-3; 0 = default; 3 = do not repeat any more
Source ID	30	MMSI number of source station
Destination indicator	1	0 = Broadcast (no Destination ID field used) 1 = Addressed (Destination ID uses 30 data bits for MMSI)
Binary data flag	1	Always 1
Destination ID	0/30	Destination ID if used.
Spare	0/2	Spare (if Destination ID used)
DAC	10	International DAC = $1_{10} = 0000000001_2$
FI	6	Function identifier = $0_{10} = 000000_2$
Text sequence number	11	Sequence number to be incremented by the application. All zeros indicates that sequence numbers are not being used
Text string	6- <del>942936</del> /972	6-bit ASCII as defined in Table 47, Annex 8. When using this IFM, the number of slots used for transmission should be minimized taking into account Table 29. For Message 26 the maximum is <del>942936</del> for Addressed or 972 for Broadcast.
<del>Spare</del> <u>Padding</u> bits	Max 7	Not used for data and should be set to zero. The number of bits should be either 1, 3, 5 or 7 to maintain byte boundaries. NOTE 1 – When a 7-bit spare is needed to satisfy the 8-bit byte boundary rule, the 6-bit spare will be interpreted as a valid 6-bit character (all zeros is the “@” character). This is the case when the number of characters is: 3, 7, 11, 15, 19, 23, 27, etc.
<del>Spare</del>	<del>4</del>	<del>Not used. Should be set to zero. Reserved for future use.</del>
Communication state selector	1	0 = SOTDMA communication state follows 1 = ITDMA communication state follows
Communication state	19	SOTDMA communication state (see § 3.3.7.2.1, Annex 2), if communication state selector flag is set to 0, or ITDMA communication state (§ 3.3.7.3.2, Annex 2), if communication state selector flag is set to 1
Total number of application data bits	128-1 064/ 96-1 064	128-1 064 bits for Addressed, or 96-1064 bits for Broadcast.

b) amend Annex 8 Table 82 as follows:

TABLE 82

Parameter	Number of bits	Description		
Message ID	6	Identifier for Message 26; always 26		
Repeat indicator	2	Used by the repeater to indicate how many times a message has been repeated. Refer to § 4.6.1, Annex 2; 0-3; default = 0; 3 = do not repeat any more		
Source ID	30	MMSI number of source station		
Destination indicator	1	0 = Broadcast (no Destination ID field used) 1 = Addressed (Destination ID uses 30 data bits for MMSI)		
Binary data flag	1	0 = unstructured binary data (no Application Identifier bits used) 1 = binary data coded as defined by using the 16-bit Application identifier		
Destination ID	0/30	Destination ID (if used)		If Destination indicator = 0 (Broadcast); no data bits are needed for the Destination ID. If Destination indicator = 1; 30 bits are used for the Destination ID and 2 spare bits for byte alignment.
Spare bits	0/2	Spare (if Destination ID used)		
Binary data	Broadcast Maximum 104	Application identifier (if used)	16 bits	Should be as described in § 2.1, Annex 5
	Addressed Maximum 72	Application binary data	Broadcast Maximum 88 bits Addressed Maximum 56 bits	Application specific data <sup>(1)</sup>
Binary data added by 2nd slot	224	Allows for 32 bits of bit-stuffing <sup>(1)</sup>		
Binary data added by 3rd slot	224	Allows for 32 bits of bit-stuffing <sup>(1)</sup>		
Binary data added by 4th slot	224	Allows for 32 bits of bit-stuffing <sup>(1)</sup>		
Binary data added by 5th slot	224	Allows for 32 bits of bit-stuffing <sup>(1)</sup>		
Spare	4	<del>Needed for byte alignment</del> Not used. Should be set to zero. Reserved for future use.		
Communication state selector flag	1	0 = SOTDMA communication state follows 1 = ITDMA communication state follows		
Communication state	19	SOTDMA communication state (see § 3.3.7.2.1, Annex 2), if communication state selector flag is set to 0, or ITDMA communication state (§ 3.3.7.3.2, Annex 2), if communication state selector flag is set to 1		
Maximum number of bits	Maximum 1 064	Occupies up to 3 slots, or up to 5 slots when able to use FATDMA reservations. For Class B “SO” mobile AIS stations the length of the message should not exceed 3 slots. Class B “CS” mobile AIS stations should not transmit		

<sup>(1)</sup> Binary data should always end to the byte boundary.

## Definition of garbled slot

### Background and rationale

The AIS Repeater standard (IEC 62320-3) uses the concept of garbled slots. The definition of garbled slots is missing in ITU-R M.1371 and should be incorporated there.

### Proposal

Meeting suggests amending Annex 2 Clause 3.1.6 as follows:

#### “3.1.6 Slot state

Each slot can be in one of the following states:

- Free: meaning that the slot is unused within the receiving range of the own station. Externally allocated slots that have not been used during the preceding three frames are also Free slots. This slot may be considered as a candidate slot for use by own station (see § 3.3.1.2).
- Garbled: A slot shall be considered garbled if it contains no decodable message and has an RSSI a receiver signal strength indicator of greater than 16 dB above the noise floor background noise (see Annex 7 § 4.3.1.3) Garbled slots are only considered different from Free slots in the AIS repeater station.
- Internal allocation: meaning that the slot is allocated by own station and can be used for transmission.
- External allocation: meaning that the slot is allocated for transmission by another station.
- Available: meaning that the slot is externally allocated by a station and is a possible candidate for slot reuse (see § 4.4.1).
- Unavailable: meaning that the slot is externally allocated by a station and cannot be a candidate for slot reuse (see § 4.4.1).”

## Reporting rate when changing course

### Background and rationale

There is no means to determine if the vessel is changing course when there is no heading sensor available. As an alternative, the COG can be used to determine when the vessel is changing course.

### Proposal

Modify the following paragraphs of Annex 2 section 4.3.1.2:

“When a ship changes course, a shorter reporting interval should be required according to Table 1, Annex 1. R<sub>r</sub> should be affected by changing course as described in this paragraph.

A change of course should be determined by calculating the mean value of the heading information (HDG) for the last 30 s and comparing the result with the present heading. When HDG is unavailable, the Course Over Ground (COG) may be used in place of the HDG when the vessel has a Speed Over Ground (SOG) greater of equal to 5 knots. If HDG is unavailable and SOG less than 5 knots, the R<sub>r</sub> should not be affected.

If the difference exceeds 5°, a higher R<sub>r</sub> should be applied in accordance with Table 1, Annex 1. The higher R<sub>r</sub> should be maintained by using ITDMA to complement SOTDMA scheduled transmissions in order to derive the desired R<sub>r</sub>. When 5° is exceeded, the reporting interval should be decreased beginning with a broadcast within the next 150 slots (see § 3.3.4.2.1) using either a scheduled SOTDMA slot, or a RATDMA access slot (see § 3.3.5.5).

The increased R<sub>r</sub> should be maintained until the difference between the mean value of heading and present heading has been less than 5° for more than 20 s.

If no longer able to determine change of course heading information is lost during normal operation, the reporting schedule should revert to the default reporting interval, unless a new transmission schedule is ordered by assigned mode command.”

## Description of EPFS Information in AIS Messages

### Background and rationale

The BeiDou Satellite Navigation System (BDS) has been recognized by the International Maritime Organization (IMO) as a component of the World Wide Radio Navigation System (WWRNS). As such, there is a requirement to include reference to BDS as an EPFS.

In addition to the inclusion of BDS, it is proposed to amend parameter descriptor 3 from 'Combine GPS / Glonass' to 'Combined GNSS'.

### Proposal

Meeting proposes to amend Annex 8, Table 51, 52, 71, 73 and 79 as follows:

TABLE 73

Parameter	Number of bits	Description
Type of electronic position fixing device	4	0 = Undefined (default) 1 = GPS 2 = GLONASS 3 = Combined <del>GPS/GLONASS GNSS</del> 4 = Loran-C 5 = Chayka 6 = Integrated Navigation System 7 = surveyed. For fixed AtoN and virtual AtoN, the charted position should be used. The accurate position enhances its function as a radar reference target 8 = Galileo <u>9 = Beidou Navigation Satellite System (BDS)</u> <del>9</del> <u>10</u> -14 = not used 15 = internal GNSS

## Remove superfluous text for burst mode devices

### Discussion

The text in section 2.1.6 which references using AIS technology with AIS SART, MOB AIS or EPRIB AIS is confusing and superfluous. These devices are a sub-set of devices that use burst transmissions per Recommendation ITU R M.585 (97MID0000 MMSI format). This text should be removed.

### Proposal

Modify Annex 1 section 2.1.6, 2.1.7, and 2.1.8 as follows:

#### “2.1.6 Automatic identification system search and rescue transmitter

The AIS SART station should transmit Message 1 and Message 14 using the burst transmissions as described in Annex 9.

~~The Messages 1 and 14 should use a user ID 970xxyyyy (where xx = manufacturer ID 01 to 99; yyyy = the sequence number 0000 to 9999) and using~~ Navigational Status 14 when active, and Navigational Status 15 when under test.



~~Other devices using AIS technology such as man overboard (MOB) devices and emergency position indicating radio beacons (EPIRBs) should not be subsets of AIS SART stations, because these devices do not conform with all the requirements for these stations.~~

The Message 14 should have the following content:

When active: SART ACTIVE

Under test: SART TEST

#### 2.1.7 Man overboard-automatic identification system

When the burst transmission technology in Annex 9 is integrated within an MOB, its Message 1 and Message 14 transmissions should comply with § 2.1.6, ~~except that its user ID should be 972xxxxxx~~ and its Message 14 should have the following content:

When active: MOB ACTIVE

Under test: MOB TEST

#### 2.1.8 Emergency position indicating radio beacon-automatic identification system

When the burst transmission technology in Annex 9 is integrated within an EPIRB, its Message 1 and Message 14 transmissions should comply with § 2.1.6, ~~except that its user ID should be 974xxxxxx~~ and its Message 14 should have the following content:

When active: EPIRB ACTIVE

Under test: EPIRB TEST”

### Added Extended Capability report to Message 1, 2, 3

#### Discussion

The AIS need to be able to announce when it has extended capabilities.

#### Proposal

Modify Annex 8, Table 48 as follows:

TABLE 48 (END)

Parameter	Number of bits	Description
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 manoeuvre indicator	2	0 = not available = default 1 = not engaged in special manoeuvre 2 = engaged in special manoeuvre (i.e. regional passing arrangement on Inland Waterway)
<del>Spare</del> <u>Extended Capabilities</u>	3	<del>Not used. Should be set to zero.</del> 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 50

Parameter	Number of bits	Description
Communication state	19	See Table 49
Number of bits	168	

## Source identification harmonization

### Discussion

The reference to the source identification for VDL messages is inconsistent. The following field identifiers are used, e.g. User ID, Source ID, Source Station ID, ID, and Station ID. The description for this field need to also be harmonized. These references should be harmonized such that source of the VDL transmission uses a common ID defined in RR.

### Proposal

Amend the Parameter field for the transmitting station to use “Station ID” in Annex 8 for the following tables: 48, 51, 52, 54, 56, 57, 59, 60, 61, 63, 66, 67, 68, 70, 71, 72, 73, 75, 76, 78, 79, 80, 82, and 84.

Parameter	Number of 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 § 4.6.1, Annex 2; 0-3; 0 = default; 3 = do not repeat any more
<del>User</del> <u>Station</u> ID	30	<del>Unique identifier such as MMSI number</del> <u>MMSI number of source station of message (see Article 19 of the RR and Recommendation ITU-R M.585)</u>

## Actions requested

IALA kindly asks ITU-R WP 5B to take into consideration these proposals in their further work on the revision of Recommendation ITU-R M.1371.

**Attachment:** 1



ATTACHMENT

PRELIMINARY  
Draft Recommendation ITU-R M.1371

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