



Acquisition Directorate

Research & Development Center

U.S. National Committee TC80 Technical Advisory Group FY14 Support

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September 2014

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TABLE OF CONTENTS

1 USNC TC80 TAG FY14 Support 1

1.1 Activity Report - March 2014 1

1.2 Activity Report - April 2014 2

1.3 Activity Report - May 2014 5

1.4 Activity Report - June 2014 11

1.5 Activity Report - July 2014..... 18

1.6 Activity Report - August 2014..... 28



LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS

AIS	Automatic Identification System
ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
ASM	Application Specific Messages
ATON	Aids to Navigation
BAM	Bridge Alert Management
CDV	Committee Draft for Vote
CIRM	Committee International Radio-Maritime
COG	Course Over Ground
COMSAR	Sub-Committee on Radiocommunications and Search and Rescue
CS	Carrier Sense
CSTDMA	Carrier-Sense Time Division Multiple Access
dBm	Decibel-milliwatts
DGNSS	Differential Global Navigational Satellite System
DLM	Data Link Management
DQPSK	Differential Quaternary Phase-Shift Keying
DSC	Digital Selective Calling
DVB	Digital Video Broadcasting
ECB	Configure Broadcast Schedules for Base Station Messages, Command
ECDIS	Electronic Chart Display & Information System
ENAV	Electronic Navigation
EPIRB	Emergency Position Indicating Beacon
ESA	European Space Agency
ETRI	Electronics and Telecommunications Research Institute
ETSI	European Telecommunications Standards Institute
FATDMA	Fixed Access Time Division Multiple Access
FCC	Federal Communications Commission
FDIS	Final Draft International Standard
FIPS	Federal Information Processing Standards
FSR	Frame Summary Report
GHz	Gigahertz
GMDSS	Global Maritime Distress and Safety System
GMSK	Gaussian Minimum Shift Keying
GNSS	Global Navigational Satellite System
GPS	Global Position System
HSC	High Speed Craft
Kb/s	Kilobits per second
kHZ	Kilohertz
Km	Kilometre
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities



USNC TC80 TAG FY14 Support

ICS	Integrated Communication System
IEC	International Electrotechnical Commission
IMEA	International Marine Electronics Association
IMO	International Maritime Organization
INS	Integrated Navigation Systems
IRCS	Integrated radiocommunication system
ITRF	International Terrestrial Reference Frame
ITU	International Telecommunication Union
MHz	Megahertz
MID	Marine Identification Digits
MMSI	Maritime Mobile Service Identity
MOB	Man Overboard
MRCC	Maritime Rescue Coordination Centre
MSG	Message
MSI	Maritime Safety Information
MSLD	Marine Survivor Locator Device
MSSA	Multi-channel Slot Selection Access
NAIS	Nationwide Automatic Identification System
NAVCEN	(USCG) Navigation Center
NBDP	Narrow Band Direct Printing
NCSR	Communications and Search & Rescue
NM	Nautical Mile
NMEA	National Marine Electronics Association
NTIA	National Telecommunications and Information Administration
OMB	Office of Management and Budget
PFD	Power Flux Density
PNT	Position, Navigation, and Time
PVT	Position, Velocity, and Time
QAM	Quadrature Amplitude Modulation
RAIM	Receiver Automated Integrity Monitoring
RATDMA	Random Access Time Division Multiple Access
RDC	(USCG) Research & Development Center
RI	Reporting Interval
RF	Radio Frequency
RSSI	Received Signal Strength Indicator
RTCM	Radio Technical Commission for Maritime Services
SART	Search And Rescue Transmitter
SAT	Satellite
SFTP	Secure File Transfer Protocol
SOG	Speed Over Ground
SOLAS	Safety of Life at Sea
SOTDMA	Self-Organized Time Division Multiple Access
TAG	Technical Advisory Group
TC	Technical Committee
TDMA	Time Division Multiple Access



USNC TC80 TAG FY14 Support

UNCTAD	United Nations Conference on Trade and Development
USCG	United States Coast Guard
USNC	United States National Committee
UTC	Coordinated Universal Time
VDE	VHF Data Exchange
VDES	VHF Data Exchange System
VDL	VHF Data Link
VHF	Very High Frequency
VSI	VDL Signal Information
VTS	Vessel Traffic System
W	Watt
WMO	World Meteorological Organization
WP	Working Party
WRC	World Radio Conference



1 USNC TC80 TAG FY14 SUPPORT

Contained within this document are the March through August USNC TC80 TAG FY14 Support activity reports. They were originally provided as part of the RDC Project 2419 monthly status report. They are being provided here for work sponsor archive and reference use. The USNC September activity report will be provided in the RDC (Project 2419) September monthly status report - distributed in mid October.

1.1 Activity Report - March 2014

- IEC TC80 documents listed below were distributed for formal voting and comment by the US National Committee Technical Advisory Group and by the Coast Guard. TAG comments on the draft standards and decisions on voting will be formally submitted to ANSI prior to the voting due date.

Document	Voting Due Date
80/731/NP Global maritime distress and safety system (GMDSS) - Part 16: Integrated radiocommunication system (IRCS) - Operational and performance requirements, methods of testing and required test results	16 May 2014
80/726/CDV IEC 62320-3 Ed.1: Maritime navigation and radiocommunication equipment and systems - Automatic identification systems - Part 3: AIS Repeater Station - Minimum operational and performance requirements, methods of testing and required test results	16 May 2014

During March, analysis of the revised ITU-R M.1371-5 was performed:

- Rec. ITU-R M.1371-5. ITU’s changes to this fundamental AIS standard are largely clarifications to existing requirements, but do include recognition of the two new AIS search and rescue transmitter (SART) functions for an AIS man-overboard (MOB) device and an AIS emergency position-indicating beacon (EPIRB) locating beacon. This version clarified that Message 1-3 Nav Status 15 = not undefined = default is also used by AIS-SART, MOB-AIS and EPIRB-AIS under test.
- AIS on craft associated with a parent vessel will now include the last 6 digits of the MMSI of the parent vessel in its Static Message transmissions.
- Message 19 Extended class B equipment position report was determined not to be needed and will no longer be used in future Class B AIS SOTDMA equipment. Message 24 will be used for both Class B AIS SOTDMA and Carrier Sense (CS) equipment designs in the future.
- NMEA mnemonic manufacturer codes are now specified for Message 24B.
- Message 27 long range (satellite) broadcast message position report are specified as required for Class A and Class B “SO” shipborne mobile equipment outside base station coverage; transmission slot access method changed from RATDMA to multi-channel slot selection access (MSSA), using the AIS terrestrial channels (AIS 1, AIS 2 or regional channels) to select a slot, but with transmission on Channels 75 and 76.

- Further updates to this M.1371 standard is not expected to occur for at least 2-4 years. However follow-on updates to related IEC AIS certification standards as a result of changes made in Rec. ITU-R M.1371-5 can be expected.
- Note that the above changes may not be reflected in current AIS Mobile equipment already deployed on commercial vessels for many years. RDC is unaware of any carriage requirement in place that mandates updates to existing Class A AIS shipboard equipments, most of which have been designed to ITU-R M.1371-1.
- **Recommendation:** The Rec ITU-R M.1371-5 static message coding scheme change for craft associated with a parent ship should largely resolve a long-standing problem on how to adopt Rec ITU-R M.585-6 requirements for coding MMSIs on such craft in the US. With this change, “daughter” craft should be freed to be coded with the same type of ship MMSI identity as the parent craft, and M.585-6 should be revised to eliminate the need for a special MMSI category for “daughter” craft. To avoid confusion however, both parent and daughter craft should where possible be assigned MMSIs having the same maritime identification digits (MID) country code.

1.2 Activity Report - April 2014

- During April, performed analysis of the following standards:
 - 80/726/CDV IEC 62320-3 Ed.1: Maritime navigation and radiocommunication equipment and systems - Automatic identification systems - Part 3: AIS Repeater Station - Minimum operational and performance requirements, methods of testing and required test results:

There is relatively little specified regarding AIS repeater technical requirements in ITU-R Rec. M.1371-5 or IALA A-124, consequently this IEC standard will be critical to the design and performance of the system. A probable security concern was identified in using the VDL with inadequate encryption to configure the repeater. Additionally, an AIS repeater can potentially overburden the VDL in a given area and compromise its integrity for the use of AIS, particularly for services such as vessel traffic services and other safety and security-related applications outside of inter-ship navigation. Consequently, ITU-R Rec. M.1371-5 Annex 2 §4.6 states in part that *“In order to implement this (AIS repeater) function efficiently and safely, the competent authority should perform a comprehensive analysis of the required coverage area and user traffic load, applying the relevant engineering standards and requirements.”*

While the USNC TC80 TAG decided to support this standard with comments being drafted by Shine Micro, NMEA and RDC, a recommendation will be made instead to vote against the standard pending resolving the configuration security issue.
 - 80/731/NP Global maritime distress and safety system (GMDSS) - Part 16: Integrated radiocommunication system (IRCS) - Operational and performance requirements, methods of testing and required test results:

This draft standard is brief, consisting only of six pages including boilerplate. While IEC 61162 is included as a normative reference, no specific data interface requirement is yet included. Specifying specific data interface requirements for the various components of GMDSS may be one of the most important benefits of this standard. The draft includes

operational requirements but not yet any technical or interfacing requirements, or tests procedures for meeting requirements. While the Safety of Life at Sea (SOLAS) convention requires ships carry GMDSS components, it does not require ships carry an IRCS - such as described by this draft standard. An IRCS is a convenient means for ship builders, and other GMDSS installers, to ensure that a ship meets the full SOLAS requirements for GMDSS. Nevertheless, an IRCS can become more of a nuisance than a benefit due to its size and prominence on a ship's bridge - as it was on the Coast Guard's National Security Cutter.

The standard and IMO Res A.811 of 18 Dec 1995 would require that the IRCS:

1. Have facilities for automatically updating ship's position and time data in addition to the provision for manual input of this data, a problem with DSC equipped radios on small craft but not so much on SOLAS regulated shipping.
2. Include detecting facilities such that failure of any part of the IRCS activates an alarm.
3. Be protected against the effects of computer viruses.
4. Have an identical user interface and an identical access to each function for different sensors.

While no IRCS system has been marketed since the IMO performance standard was issued 19 years ago, this new work item is in apparent response to Sailor who desires to now market such a system. The USNC TC80 TAG decided to vote against this new work proposal since it would hinder integration of GMDSS into eNav and is premature until completion of IMO GMDSS Modernization Review.

- 80/733/FDIS IEC 62288 Ed.2: Maritime navigation and radiocommunication equipment and systems - Presentation of navigation-related information on shipborne navigational displays - General requirements, methods of testing and required test results:

The USNC IEC TC80 TAG recommended that the US vote against this final draft standard since it excludes certain symbology dropped from the standard as a result of CDV comments received during its voting stage. If opposition is supported by at least four other national committees, the standard would then need to be re-circulated as a CDV to address the problems raised.

- **Digital Selective Calling (DSC):**

- The ITU is expected to approve the draft update the DSC standard Rec. M.493-13 when Working Party 5B11 next meets during the weeks of May 19th and May 26th. At the 2014 CIRM/RTCM conference, the IEC TC80 Secretary Mr. Kim Fisher briefed on the status of TC80 standards, mentioning the need to update the GMDSS DSC standard IEC 61097-3. Mr. Fisher later privately suggested that he would be agreeable with the USCG RDC submitting the draft 61097-3/-300 standard once updated with the changes to Rec. M.493-13 approved by ITU. The draft Rec. M.493-13 includes two major changes: (1) recognition of DSC equipped VHF handhelds; and, (2) requirement for an integral global navigational satellite system (e.g. GPS) in Class D & E radios (non-GMDSS VHF and HF) and VHF handhelds. Neither change affects IEC 61097-3. Minor revisions to Rec. M.493-13 include certain clarifications such as self-cancellation of distress alerts and auto channel switching, which would affect IEC 61097-3.



- **Cybersecurity:**

- On February 12, 2013 the President issued an Executive Order on improving critical infrastructure cybersecurity. Sec. 7 (a). Baseline Framework to Reduce Cyber Risk to Critical Infrastructure states that “The Secretary of Commerce shall direct the Director of the National Institute of Standards and Technology (the "Director") to lead the development of a framework to reduce cyber risks to critical infrastructure (the "Cybersecurity Framework").... The Cybersecurity Framework shall incorporate voluntary consensus standards and industry best practices to the fullest extent possible. The Cybersecurity Framework shall be consistent with voluntary international standards when such international standards will advance the objectives of this order, and shall meet the requirements of ... OMB Circular A-119, as revised.” On February 12, 2014 the President announced the launch of the Cybersecurity Framework.
- IEC TC80, RTCM, IMO, ITU and NMEA develop maritime voluntary consensus standards affecting critical infrastructure as defined by Sec. 2 of the Executive Order. Over 90% of world trade is transported by sea. According to the United Nations Conference on Trade and Development (UNCTAD) in 2012, this totaled some 8.7 billion tons (45,000 billion ton miles), of which about 33% was oil, 27% was bulk (ore, coal, grain and phosphates), the remaining 40% being general cargo. International and national standards which affect the navigation and safety communications of all ships engaged in this trade generally do not address the cybersecurity risk, nor are participants in these standards activities, including government participants, generally skilled in cybersecurity technology. The international press has reported on the vulnerability of systems built to these standards. It is therefore urgently recommended that members of standards organizations developing maritime radiocommunications and navigation standards, including the Coast Guard, provide appropriately skilled cybersecurity technical experts as representatives.

- **Administrative:**

- IEC TC80 documents listed below were distributed for formal voting and comment by the US National Committee Technical Advisory Group (TAG) and by the Coast Guard. TAG comments on the draft standards and decisions on voting will be formally submitted to ANSI prior to the voting due date.
 - Drafted agenda and prepared for and administered annual TC80 TAG meeting at RTCM Assembly April 29, 2014. Agenda and summary record for this meeting are available upon request.
 - Drafted formal comments on draft update to OMB Circular A-119 Federal Participation in the Development and Use of Voluntary Consensus Standards and Conformity Assessment Activities due at OMB on May 12th, 2014. RTCM and NMEA agreed to become joint sponsors of these comments with the TC80 TAG. The document is in signature and will be filed when signature is completed.
- IEC TC80 Document status as of 30 April 2014 (analyses will be provided prior to voting due dates):



Document	Date Voting Closes	Comments Expected
80/731/NP Global maritime distress and safety system (GMDSS) - Part 16: Integrated radiocommunication system (IRCS) - Operational and performance requirements, methods of testing and required test results	16 May 2014 <i>Note: nominations also due</i>	Yes
80/726/CDV IEC 62320-3 Ed.1: Maritime navigation and radiocommunication equipment and systems - Automatic identification systems - Part 3: AIS Repeater Station - Minimum operational and performance requirements, methods of testing and required test results	16 May 2014	RDC Shine Micro NMEA
80/733/FDIS IEC 62288 Ed.2: Maritime navigation and radiocommunication equipment and systems - Presentation of navigation-related information on shipborne navigational displays - General requirements, methods of testing and required test results	13 June 2014	Yes

1.3 Activity Report - May 2014

- During May, performed analysis of the following standards:
 - Rec. ITU-R M.1371-5 Changes to AIS Messages. While the March 2013 report included a summary of changes made in the AIS standard Rec M.1371-5, the following is a more detailed review of specific substantive changes to messages broadcast by AIS. These changes are important as they could cause confusion to mariners using AIS displays whose software has not been updated to accommodate changes made by this standard. To help avoid this problem, Message 5 was revised to identify whether the AIS unit complies with the -5 version of this standard.
 - RDC estimates that support for revised messages and specifically message 5 will occur between 6 and 15 years for the SOLAS fleet and sooner for non-SOLAS vessels. Fortunately, the message 5 information helps in tracking the growth of the fleet's use of 1371-5.
 - ITU-R M.1371-5. AIS Messages, 1, 2, 3, 5, 18, 19, 21, and 24 have been changed. A detailed listing of the changes is available upon request. The updated AIS Messages can be found on the AIS Messages pages in the USCG NAVCEN website URL at: <http://www.navcen.uscg.gov/?pageName=AISMessages>.
 - RTCM Standard 11901.1, Annex E AIS Type Maritime Survivor Locating Devices, 4 June 2012. FCC WT Docket 14-36 proposes to adopt RTCM's petition to allow these Man-Overboard AIS devices to be certified, marketed and sold in the US.

This AIS MSLD device is designed to transmit ITU-R M.1371-4 Annex 9 compliant Burst Transmission (i.e. AIS SART) for a minimum of 12 hours. The radiated power is at least 27 dBm (500 mW). This is intended to equate to a nominal radiated output power of 1 W with a -3 dB tolerance to allow for antenna gain characteristics and temperature variations.



The AIS MSLD device transmits messages in a burst of 8 messages once per minute. The SOTDMA (Self-Organizing Time Division Multiple Access) communication state of Message 1 is used to pre-announce its future transmissions. The device transmits Message 1 “Position report” with the Navigational Status set to 14 and Message 14 Safety related broadcast message with the text “MOB ACTIVE”. Message 14 is transmitted nominally every 4 min and replaces one of the position reports on both channels. Transmissions alternate between VHF channels AIS 1 and AIS 2.

While time synchronization is derived from the internal global navigational satellite system (GNSS) unit, the device continues transmission even if the position and time synchronization from the positioning system is lost or fails. The internal GNSS receiver is designed to meet the following requirements of IEC 61108: position accuracy; acquisition; re-acquisition; receiver sensitivity; RF dynamic range; position update; effects of specific interfering signals, but with a minimum update of once per minute; provide a resolution of one ten-thousandth of a minute of arc; and, use WGS 84 datum.

The user ID (MMSI) for an AIS MSLD device is 972xyyyyy, where xx = manufacturer ID 01 to 99; yyyy = the sequence number 0000 to 9999. After being programmed by the manufacturer, it is not possible for the user to change the unique identifier of the AIS MSLD AU.

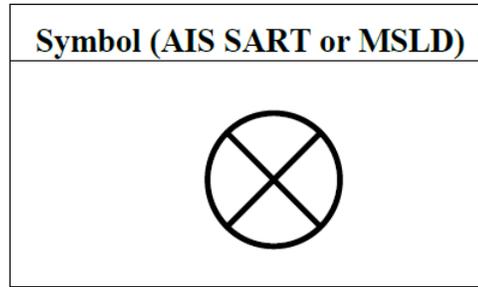
In the normal mode of operation, the device provides an indication that is visible to the user that a valid GNSS position has been obtained and is being transmitted as a part of the message. If the GNSS position is subsequently lost and is no longer being transmitted, this fact will be indicated to the user.

The International Maritime Organization does not recognize AIS SART or MSLD signals as a distress alert, but instead as only an aid in locating a vessel or person in distress. The IMO Maritime Safety Committee consequently has “invited Member States to advise manufacturers to affix product labels to the AIS-SART, EPIRB-AIS and AIS MOB equipment, clearly indicating that these AIS devices must be regarded as location aids in emergency situations and not as distress alert systems”.

Devices using AIS technology cannot of themselves be used to alert all stations of a person in distress, but it is an excellent aid for locating a person in distress. Conversely, devices using DSC technology can alert all stations of a person in distress, but its location is presented as coordinates on a VHF radiotelephone and not easily transferred to a ship navigation display. Devices combining digital selective calling (DSC) and AIS technology avoid this limitation. If a manufacturer chooses to build an MSLD system to the RTCM standard that functions as both an AIS and a DSC device, the unit transmitting both AIS and DSC messages will transmit one common user ID. If a conflict occurs during AIS and DSC transmission time, the AIS transmission will be given priority and the DSC transmission shall be delayed. RTCM standard SC119.1 MSLD includes both a DSC (Annex A) and an AIS (Annex E) component. An update to SC119.1 Annex A (DSC) was adopted on 31 April, 2014 and will be published shortly.

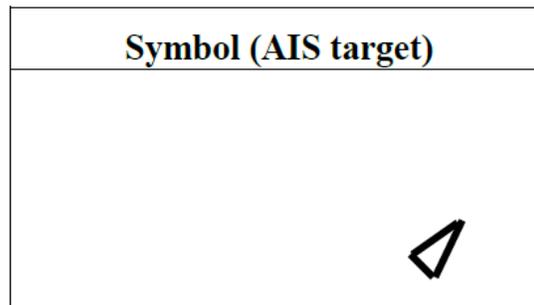
Transmissions from AIS MSLD devices will be displayed on ship’s navigation display. Such devices may be indicated on a newer (e.g. IEC 62288) graphical display of AIS by a circle with an “X” inside it, as shown below:





If selected, the operational mode should be indicated as received from AIS Message 14 (e.g. SART ACTIVE, SART TEST, MOB ACTIVE, MOB TEST, EPIRB ACTIVE, EPIRB TEST) in the associated AIS object dialog5.

Alternatively, the device may be indicated on an older graphical display of AIS as a normal “sleeping” AIS target (isosceles triangle - as shown below), taking into account that the triangle may be oriented by Course over Ground (COG).



- 80/731/NP Global maritime distress and safety system (GMDSS) - Part 16: Integrated radiocommunication system (IRCS) - Operational and performance requirements, methods of testing and required test results.

Although the April report noted that the USNC TC80 Technical Advisory Group, which met April 29, decided to vote against this report, the TAG, after further discussion, decided to vote for it provided it instead lead to the integration of GMDSS into e-Navigation. Comments specified that it not be based upon a nearly 20 year old IMO Assembly Resolution that addressed integrating communications equipment but not interfacing or integrating that equipment with navigational equipment, and not incorporate old technology - some of which, such as HF NBDP, is no longer in practical use. Instead, it should focus on specification of a system architecture that could support, anticipate, and perhaps guide IMO’s on-going GMDSS modernization effort. The TAG proposed that the work plan include the use of IMO SN.1/Circ.288, MSC/Circ.982 and COMSAR/Circ.32 as primary references - at least in addition to Res. A.811(19), if not in place of it. It also proposed that the plan provide means for interface/integration with current and future systems to be considered for inclusion in the GMDSS in the course of GMDSS Modernization.

The TAG proposed this IEC GMDSS IRCS effort consider the work:

- In relation to bridge alert management Res. MSC.302(87) and A.1021(26).
- In relation to presentation displays MSC.191(79) and IEC 62288 ED2.
- In relation to interfaces the IEC 61162 series.

If successful this effort could be a practical means to begin modernizing the GMDSS.

- 80/733/FDIS - IEC 62288 Ed2: Maritime navigation and radiocommunication equipment and systems – Presentation of navigation-related information on shipborne navigational displays – General requirements, methods of testing and required test results.

The first edition of this display presentation standard was adopted July 2008. This second edition accommodates changes in IMO requirements which have come into effect since that time. Changes include a new requirement added for merging AIS targets from multiple sources and further guidance on testing added to Annex D. A new Annex G has been added for testing of colors, intensity and flicker. Symbology changes in Annex A include: AIS AtoN symbols; added AIS-SART information - including Man-Overboard device and EPIRB location; wheel over position symbol redefined; new symbols added for AIS SAR aircraft; AIS SAR vessel; maritime safety information (e.g. NAVTEX); and, AIS application specific messages. Voting on this final draft international standard closes on 13 June, 2014.

At the US National Committee Technical Advisory Group meeting, held on 30 April, it was recommended we vote against this standard because of the decision to remove the AIS base station symbol as a result of committee draft for voting (CDV) comments. Both Australia and Denmark voted to eliminate it from the draft standard. Denmark voted to eliminate it because it uses the same basic symbol as an AtoN and "it is highly questionable if an AIS Base station and its position is relevant to the navigation of vessels". Australia voted to eliminate it because "at the present time, there has been no discussion regarding the navigational significance of an AIS base station". Australia also questioned "what a mariner might do with the information presented?" Australia said it was "interested in learning more about the possible navigational significance of an AIS base station and/or an AIS repeater station, which would necessitate the inclusion of the symbol in the IEC 62288 standard." The recently approved radar standard IEC 62388 Ed2 however does require the radar to handle and display AIS messages including Message 4 (AIS base station) for AIS targets.

Mr. Jorge Arroyo (CG-NAV) indicated that there is navigational significance in displaying the AIS base station symbol on a navigation display. Base stations can be used to broadcast ATON reports, VTS targets (see §5.5.4.1 of the standard), traffic signals, mandatory routes, clearances, waterway closures, safety notices, etc. The only way to truly ascertain whether you are in range of these broadcasts is by also seeing the base station on the display (AIS MSG 4). Portraying base stations will also reduce unnecessary outage reports. If operators don't see a base station (symbol), then they don't have an outage, they would know that they are just out of range. If they see a base station, but not an ATON or other expected pertinent navigation information, then an outage likely exists - which should be reported. There is no other effective way of ascertaining this other than needlessly asking the Coast Guard whether they were broadcasting the information.

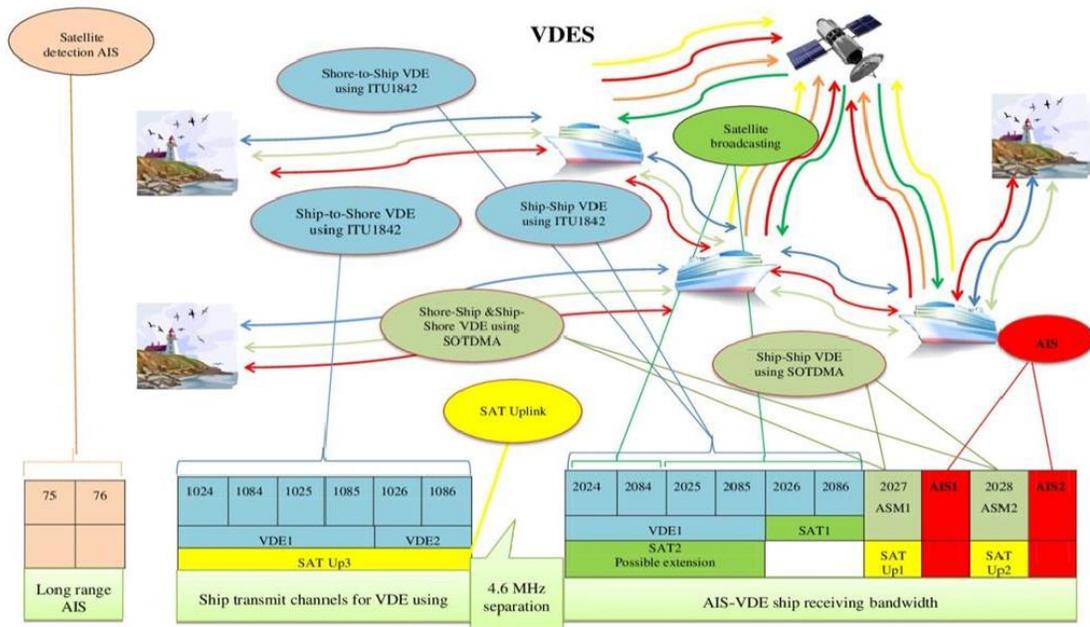
- Preliminary Draft New Recommendation or Report ITU-R M.[VDES] Technical characteristics for a VHF data exchange system (VDES) in the VHF maritime mobile band:

ITU-R WP5B is developing this preliminary standard based upon work by IALA's e-Navigation Committee AIS and Communications Working Group. The system standard will be incomplete until a Recommendation is adopted. If this document is published initially as a report, it would indicate either that the system standard is incomplete or that a consensus does not yet exist to publish it as a Recommendation. The VDES is a multi-channel expansion of the AIS system



intended to allow significant expansion of a variety of AIS functions on frequencies separate from the primary AIS collision avoidance frequencies AIS 1 and 2. This expansion includes provisions for application specific messages, including encrypted messages such as blue force tracking, satellite uplinks and satellite downlinks, and wide-bandwidth inter-ship and ship-shore communications capability for e-Navigation applications yet to be developed. The European Space Agency (ESA) in particular has become interested in VDES development and its potential for enabling satellites to provide AIS AtoN and maritime safety information display capability on ships operating in the Arctic region through the use of satellites rather than through a shore-based infrastructure. The international interest in VDES technology seems to be largely based upon a standardized means enabling maritime authorities to instantly provide updated navigational information to mariners through their AIS systems interconnection with ECDIS, radar and other shipboard navigational display systems. An updated version of this draft standard should be available once WP5B completes its current session on 30 May. An update should be available in next month's (June) report.

VDES functions and frequency usage are illustrated pictorially below.



- **Administrative:**

- IEC TC80 documents listed below were distributed for formal voting and comment by the US National Committee Technical Advisory Group and by the Coast Guard. TAG comments on the draft standards and decisions on voting will be formally submitted to ANSI prior to the voting due date.

Completed formal comments on draft update to OMB Circular A-119 Federal Participation in the Development and Use of Voluntary Consensus Standards and Conformity Assessment Activities due at OMB on May 12th, 2014. Signed jointly by USNC IEC TC80 TAG, RTCM and NMEA and filed with OMB on 5 May. The document addressed inclusion of the FCC, updating or regulations incorporating standards by reference, easing federal participation in standards organizations, and cybersecurity recommendations similar to that noted in the April Monthly report.



USNC TC80 TAG FY14 Support

Submitted formal vote and US comments on IEC 62320-3 AIS repeater committee draft for voting: Voted against primarily for cyber security reasons, recommending they reference FIPS-192 and provide for 256 bit AES encryption. Note that the previously adopted AIS AtoN standard has the same problems the AIS repeater draft standard has. An amendment to the two standards to improve encryption may be necessary if the working group agrees.

Negotiated a change in US position from Against to In Favor and submitted formal vote, nominations and comments regarding the Integrated Radiocommunication System (IRCS) standard new work item (80/731/NP).

- o IEC TC80 Document status as of 31 May, 2014:

Document	Date Voting Closes	Comments Expected
80/733/FDIS IEC 62288 Ed.2: Maritime navigation and radiocommunication equipment and systems - Presentation of navigation-related information on shipborne navigational displays - General requirements, methods of testing and required test results	13 June 2014	TAG is considering voting against or submitting a proposed amendment

- o ITU Study Group 5B maritime radiocommunications and navigation standards status as of 31 May, 2014:

Document	Expected publishing date	Comments Expected
Preliminary Draft Revision Of Recommendation ITU-R M.493-13 Digital selective-calling system for use in the maritime mobile service	Spring 2015	No US comments for May 2014 WP5B ----- Possible US comments8 in Oct 2014 WP5B
Preliminary Draft New Recommendation or Report ITU-R M.[VDES] Technical characteristics for a VHF data exchange system (VDES) in the VHF maritime mobile band	unknown	US submitted Doc 5B/587 on 13 May consequential to IALA ENAV Committee's AIS/COMMS working group

- o RTCM radiocommunication and navigation standards status as of 31 May, 2014:

Document	Expected publishing date	Comments Expected
RTCM 11901.1, Standard for Maritime Survivor Locating Devices. Includes AIS capability. Annex A DSC update adopted 30 APR 14.	Published June 4, 2012 New Annex A published o/a Jun 14	no
RTCM 11000.3 Standard for 406 MHz Satellite Emergency Position-Indicating Radiobeacons (EPIRB).	Published June 12, 2012 Amendment TBD	AIS EPIRB homing update pending



1.4 Activity Report - June 2014

- Documents for IEC TC80 currently in voting status:
 - There are currently no TC80 documents in voting status.
- During June, performed analysis of the following standards:
 - Preliminary Draft New Recommendation or Report ITU-R M.[VDES] Technical characteristics for a VHF data exchange system (VDES) in the VHF maritime mobile band:
 - Recommendation ITU-R M.1842-1: Characteristics of VHF radio systems and equipment for the exchange of data and electronic mail in the maritime mobile service RR Appendix 18 channels.
 - EN 302 307: Digital Video Broadcasting (DVB); Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite application. Part II: S2-Extensions (DVB-S2X) - DVB Document A83-2.
 - IEC 62288 Ed2: Maritime navigation and radiocommunication equipment and systems – Presentation of navigation-related information on shipborne navigational displays – General requirements, methods of testing and required test results. (80/733/FDIS).
 - IEC 62940 Maritime navigation and radiocommunication equipment and systems - Integrated communication system (ICS) – Operational and performance requirements, methods of testing and required test results new work program.
 - Report ITU-R M.2287-0 Automatic identification system VHF data link loading, Dec 2013.
 - IALA Recommendation A-124 On The AIS Service Edition 2.1 December 2012, Appendix 18 VDL Load Management, Edition 1, December 2011.
 - RTCM Standard for Maritime Survivor Locating Devices, RTCM Standard 11901.1, Annex A DSC and Annex E AIS Type MSLD System (currently under consideration for adoption by Notice of Proposed Rulemaking by the FCC, WT Docket 14-36).
 - RTCM SC 131 Draft Performance Standards for Shipborne Combined Receiver Equipment Using Multiple Radio navigation Systems.
 - Preliminary Draft Revision of Recommendation ITU-R M.493-13 Digital selective calling system for use in the maritime mobile service.
 - 80/733/FDIS - IEC 62288 Ed2: Maritime navigation and radiocommunication equipment and systems – Presentation of navigation related information on shipborne navigational displays – General requirements, methods of testing and required test results.

This final draft international standard (FDIS) was unanimously adopted on 20 June, 2014 and will be available from IEC and ANSI as a published international standard by about August. A draft amendment to reinstate the AIS base station symbol removed during the committee draft for voting process has been prepared; although the TC80 Secretary implied he'd oppose its distribution absent IMO explicitly agreeing to add base station symbology. Recommend coordination with other TC80 members before proceeding further.

USNC TC80 TAG FY14 Support

- Preliminary Draft New Recommendation or Report ITU-R M.[VDES] Technical characteristics for a VHF data exchange system (VDES) in the VHF maritime mobile band:

The May 2014 session of ITU-R WP5B considered three spectrum channeling plans for the VDES concept, taken from input contributions from the International Association of Lighthouse Authorities (IALA), a multi-country European group and Canada. In reviewing the three plans, the group considered six operational scenarios that could reflect the intended use of VDES:

 - Search & Rescue Communications: An MRCC wishes to use VDES to send out a Mayday relay and request nearby ships report their SAR capabilities using a standardized format.
 - Broadcast of maritime safety information: “Could also include broadcasting of virtual aids to navigation type of information”.
 - Automated reporting of encrypted IMO Convention on Facilitation of International Maritime Traffic forms.
 - VTS service portfolio: VTS requesting and ships sending reporting line information to VTS.
 - Download of updated digital safety publication (<100kb).
 - Ship-ship route exchange: Ship transmits waypoints of next 30 min of planned active route.

The primary considerations relate to the protection of the integrity of the function of the AIS system and the potential effects on other services, or other maritime services such as VHF voice communications. During the deliberations it became clear that voice VHF service would, if not addressed, have a significant impact on the effectiveness of the VDES as well as the existing AIS. This concern became the primary factor in selecting the preferred channel plan. After review, the international working group of experts supported Channel Plan A - as it supports the elaborated Use Cases and fulfils the criteria requirements. The ITU-R World Radio Conference scheduled for late 2015 is expected to make the final decision.

1024 157.200	1084 157.225	1025 157.250	1085 157.275	1026 157.300	1086 157.325	2024 161.800	2084 161.825	2025 161.850	2085 161.875	2026 161.900	2086 161.925	2027 161.950	AIS1 161.975	2028 162.000	AIS2 162.025
VDE1						VDE1						ASM1		ASM2	
SAT up3						SAT Downlink						SAT up1	AIS1 uplink	SAT up2	AIS2 uplink

- ASM 1 (161.950) and ASM 2 (162.000) are non-navigation application specific messages (ASM).
- VDE 1 lower legs (channels 1024... 1085) are ship-shore VDE (VHF data exchange).
- VDE 1 upper legs (channels 2024... 2085) are shore-ship and ship-ship VDE.
- SAT up1 (161.950) and SAT up 2 (162.000) are used for receiving ASM by satellite.
- SAT up3 (channels 1024... 1086) is a ship-satellite VDE uplink.
- SAT Downlink (channels 2024... 2086) is the satellite-ship VDE downlink.



- Recommendation ITU-R M.1842-16: Characteristics of VHF radio systems and equipment for the exchange of data and electronic mail in the maritime mobile service RR Appendix 18 channels describes the terrestrial communications link for the VDES system. It contains four annexes (VHF data system examples):
 - Annex 1 requires one 25 kHz channel, $\pi/4$ DQPSK at 28.8 kb/s or $\pi/8$ D8-PSK at 43.2 kb/s.
 - Annex 2 uses 4-level GMSK at 21.1 kb/s in one 25 kHz channel.
 - Annex 3 requires 50 kHz channels (two adjacent 25 kHz channels) comprising 16 equal power subcarriers in the 50 kHz bandwidth with a 16-QAM modulation of each subcarrier, as described in ETSI EN 300 392-2 v.3.2.1, providing 153.6 kB/s.
 - Annex 4 is similar to Annex 3, requiring 100 kHz channels (four adjacent 25 kHz channels) comprised of 32 equal-power subcarriers in the 100 kHz bandwidth with a 16-QAM modulation of each subcarriers, as described in ETSI EN 300 392-2 v.3.2.1, providing 307.2 kb/s.

Annex 2 describes a terrestrial VHF system operated by Telenor of Norway and can be disregarded here. Annexes 1 and 2 contain an error in reference to data interface (RS232 (NMEA)) and should be corrected to IEC 61162 at the next opportunity.

Annex 4 describes the VDES VDE 1 (terrestrial VHF data exchange 1) duplex link shown in the VDES channel diagram above. VDES ship-shore, shore-ship and ship-ship data capacity would be 307.2 kb/s capacity, thirty-two times the capacity of each of the current AIS channel. Because VDES provides a duplex service, transmissions from ship would not in any way reduce the data capacity of transmissions from shore base stations.

The Korean Electronics and Telecommunications Research Institute (ETRI) reported⁸ to IALA in April 2014 on their successful testing of ITU-R Rec. M.1842 Annex 4 data transmission validating a transfer speed of the specified 307.2 kb/s with transmission power 34 dBm (2.5W) and coverage of up to 120 km from Muju Dukyu Mountain in Saemangeum, S. Korea.

In order to protect the integrity of the AIS VHF data link (VDL), ITU-R WP5B considered it beneficial to move AIS application specific messages (ASM) to the two channels ASM1 and ASM2 designated in the chart above. If adopted, ASM transmissions, particularly those unrelated to navigation such as encrypted position reports used in blue force tracking, would move to these channels. ITU-R WRC-15, the World Radio Conference scheduled for November 2015 would decide the matter. The ASM channel modulation scheme has not yet been determined, but would likely include an adaptive capability for both 9.6 kb/s GMSK (the current AIS modulation scheme) and Rec M.1842-1 Annex 1 $\pi/4$ DQPSK at 28.8 kb/s.

- EN 302 307, Digital Video Broadcasting (DVB): Second generation framing structure, channel coding and modulation systems for Broadcasting, Interactive Services, News Gathering and other broadband satellite application. Part II- S2-Extensions (DVB-S2X) DVB Document A83-2:

VDES use of a satellite downlink will require a spectrum allocation amendment to the ITU-R Radio Regulations, possible only at an ITU-R World Radio Conference. Since the bands are shared by other non-maritime users it will also require an amendment to Appendix 5 Annex



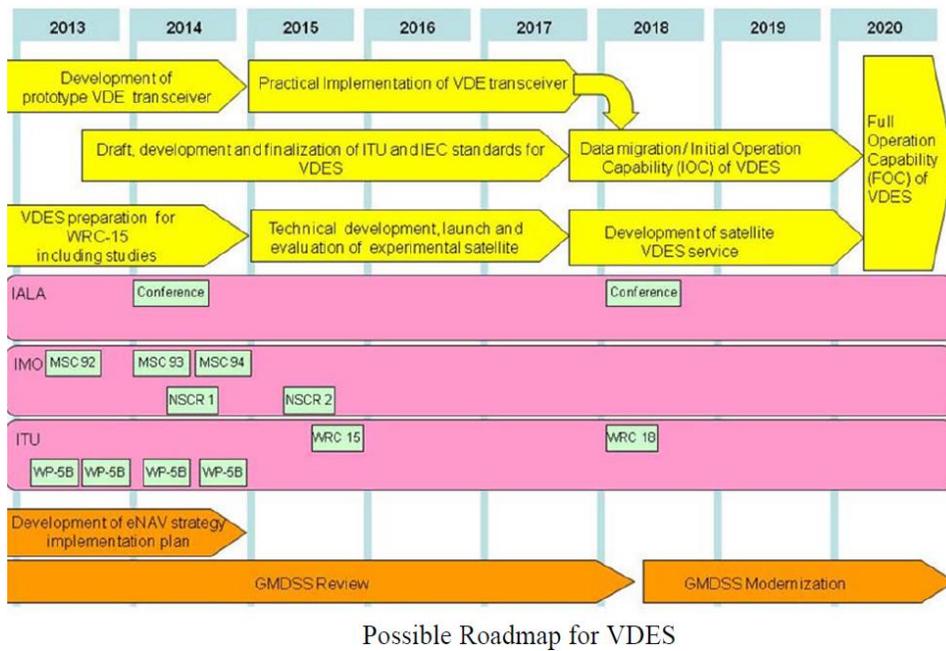
1, Coordination thresholds for sharing between mobile satellite systems (space to earth) and terrestrial services in the same frequency bands. WP5B is in fact proposing such amendments to be considered at WRC-15. WP5B meeting in May 2014 after consulting with WP5A (mobile) and WP5C (fixed) decided to recommend a power flux density (PFD) mask on VDES satellite downlink transmissions be limited to the following in order to protect terrestrial (e.g. land mobile) systems operating in the same frequency band:

$$PFD(\theta^\circ)_{(dBW/(m^2 * 4 kHz))} = \begin{cases} -149 + 0.16 * \theta^\circ & 0^\circ \leq \theta < 45^\circ; \\ -142 + 0.53 * (\theta^\circ - 45^\circ) & 45^\circ \leq \theta < 60^\circ; \\ -134 + 0.1 * (\theta^\circ - 60^\circ) & 60^\circ \leq \theta \leq 90^\circ. \end{cases}$$

Where θ is the angle of arrival of the incident wave above the horizontal plane (degrees).

This proposed VDES satellite downlink PFD, some 6-10 dB more restrictive than that proposed by France and the European Space Agency, but that limit has been agreed by the three key working parties at ITU-R Study Group 5 (WP5A land mobile, WP5B maritime and WP5C fixed). This agreement by the three working groups ITU-R goes a long way toward assuring adoption of a VDES satellite downlink capability at ITU-R WRC15 in November 2015.

This DVB-S2X digital video broadcasting standard is a candidate for VDES because of its ability to meet a strict PFD limit such as is being proposed and in its ability to provide a 240 kb/s downlink (and uplink) capability. No decision on its use has yet been made. A means for allowing transmissions to and from satellite and terrestrial shipborne/base station transmissions to share the same frequency spectrum would be needed and also has not yet been decided.



- **New work item - IEC 62940** Maritime navigation and radiocommunication equipment and systems - Integrated communication system (ICS) – Operational and performance requirements, methods of testing and required test results.

First meeting is scheduled for 23-24 Sept at BSI London, chaired by Peter Andersen of Cobham. Mr. Andersen's stated aim for the standard "is to develop a standard for an integrated radio communication system, very much like what we have for INS. With an integrated radio communication system (IRCS) we enable the option to have a common interface between the INS and the IRCS. When e-navigation starts to materialize it will be necessary to move much information between the communication equipment, the INS, and properly also the administration systems onboard. With the communication system integrated the interfacing will be much easier, both to make, but also to control." Joe Ryan will be attending. It is recommended that a draft input in response to issues raised in the voting document be prepared and circulated to the TAG for review and approval.

The US National Committee position on this initiative is to "support this new work item proposal, which should lead to the integration of GMDSS into e-Navigation. It should not be based upon a nearly 20 year old IMO Assembly Resolution that addresses integrating communications equipment, but does not address interfacing or integrating that equipment with navigational equipment and incorporates old technology - some of which (such as HF NBDP) is no longer even in practical use. Instead, it should focus on specification of a system architecture that could support, anticipate and perhaps guide IMO's on-going GMDSS modernization effort. We propose the work plan include the use of IMO SN.1/Circ.288, MSC/Circ.982 and COMSAR/Circ.32 as primary references (at least in addition to Res.811 (19) if not in place of it). We also propose that the plan provide means for interface/integration with current and future systems to be considered for inclusion in the GMDSS in the course of GMDSS Modernization.

"We propose this effort consider work:

- In relation to bridge alert management Res. MSC.302(87) and A.1021(26).
- In relation to presentation displays MSC.191(79) and IEC 62288 ED2, and
- In relation to interfaces the IEC 61162 series.

"We propose this work also include the GMDSS and general requirements of Res. A.617(15) Implementation of the NAVTEX system as part of GMDSS, Res. A.694(17) General Requirements for GMDSS and Navigation Aids, Res. A.813(19) General EMC Rqmt all ships equipment, Res. MSC.68(68) Amend GMDSS PS Annex10, and IEC 60945."

- **AIS Loading**

- Report ITU-R M.2287-0 Automatic identification system VHF data link loading, Dec 2013: This report has four stated purposes, to:
 - Provide an assessment of AIS VDL loading in a high vessel traffic area;
 - Identify how VDL loading affects the various AIS functions;
 - Support ITU-R WRC15 studies on additional channels to mitigate VDL loading, and;
 - Consider as an example two additional channels to mitigate future AIS VDL loading.



ITU-R reports, while not having the status of an ITU-R Recommendation, are generally used to supported spectrum allocation changes. However, this report also addresses the presence and effects of AIS VDL loading. It recognizes IALA Recommendation A-124 – “Automatic Identification System (AIS) Shore Station and Networking Aspect relating to the AIS Service” in establishing an AIS VDL loading threshold of 50%, which states that when exceeded,

- Safety (the reduced ability of the shipborne AIS to find free slots) is impaired; and
 - Information exchange (the reduced ability of the AIS shore infrastructure to exchange information with the shipborne AIS) as required by IMO is impaired.
- IALA Recommendation A-124 on the AIS Service, Edition 2.1 December 2012, Appendix 18 VDL Load Management:

Rather than documenting existing AIS VDL loading as does ITU-R Report M.2287, this appendix to the IALA report describes VDL loading and the measures that should be considered by competent authorities to prevent or correct VDL overloading. The first chapter looks at the definition and impacts of VDL Loading, then the subsequent chapter discusses the prevention of VDL Overloading, the third chapter refers to VDL Load Management, and finally, the Appendix concludes with Mitigation Methods for Garbling.

Significantly the Recommendation concludes that VDL loading approaching 50% on any channel (375 targets within a 50 nautical mile range of an AIS shore station) be the criteria for which a competent authority starts close monitoring of the VDL. The Recommendation, however, does note that ship-to-ship transmissions will likely not be impacted by VDL overloading due to mobile stations’ ability for intentional reuse of occupied slots. ITU-R WP5B determined “AIS VDL loading studies have concluded that loading levels in some high traffic areas have already exceeded the critical level of 50% and many more are expected to exceed this level in the foreseeable future. The proposed solution to this problem is the designation of RR Appendix 18 channels for ASM”.

- **Administrative:**

- Internet secure file transfer protocol (SFTP) repository available of TC80 standards work:
 - RDC has made available an SFTP repository available to all TC80 technical advisory group (TAG) members, which because of its agency membership with ANSI includes the U.S. Coast Guard. The SFTP site is hosted at: ra3.rdc.uscg.gov, Port: 51522, User: “iecstandards”; Password: available upon request.
- The SFTP site includes the following directories accessible by TAG members:
 - **Repository.** Published, watermarked IEC TC80 standard are available here, as well as a few other standards related to TC80. Copyright rules limit use of these standards to support of standards activities.
 - **TC80_temp_docs.** TC80 working documents (e.g. CDV and FDIS drafts and voting results) going back to ~1999 (these documents are removed from the IEC website after about 6 months).
 - **Stdswork.** TAG members can create folders in this directory for transferring documents to other TAG members too large for email.



USNC TC80 TAG FY14 Support

- Status of international maritime radiocommunication and navigation standards:
IEC TC80 Document status as of 30 June (analyses will be provided prior to voting due dates):

Document	Date Voting Closes	Comments Expected
80/733/FDIS, 62288 Ed.2 Presentation standard	13 June 2014	Voted 10 June 2014 IN FAVOR
There are currently no TC80 documents in voting status		

ITU Study Group 5B maritime radiocommunications and navigation standards status as of 30 June 2014:

Document	Expected publishing date	Comments Expected
Preliminary Draft Revision Of Recommendation ITU-R M.493-13 Digital selective-calling system for use in the maritime mobile service	Spring 2015	No US input at May2014 WP5B. Possible US input at Oct 2014 WP5B
Preliminary Draft New Recommendation or Report ITU-R M.[VDES] Technical characteristics for a VHF data exchange system (VDES) in the VHF maritime mobile band	unknown	IALA eNav Committee. AIS/Comms WG plans to further develop this draft.

RTCM radiocommunication and navigation standards status as of 30 June 2014:

Document	Expected publishing date	Comments Expected
RTCM 11901.1, Standard for Maritime Survivor Locating Devices. Includes AIS capability. Annex A DSC update adopted 30 APR 14.	Published June 4, 2012 New Annex A published o/a Jun 14	no
RTCM 11000.3 Standard for 406 MHz Satellite Emergency Position-Indicating Radiobeacons (EPIRB).	Published June 12, 2012 Amendment TBD	AIS EPIRB homing update pending
Minimum Performance Standards for Marine eLORAN Receiving Equipment, Revision 2.02 DRAFT, 19 July 2013	TBD	
RTCM 13100.0 Multi-system Shipborne Navigation Receivers	Spring 2014 - CD Winter 2015 - CDV	
RTCM 13100.1 annex addressing Receiver Automated Integrity Monitoring (RAIM)	Summer 2015 - CD Fall 2015 - CDV	
RTCM 13100.2 annex addressing interference related to GNSS receivers	Spring 2016 - CD Summer 2016 - CDV	
RTCM 13100.3 annex addressing generic terrestrial receivers	Winter 2016 - CD Spring 2017 - CDV	



1.5 Activity Report - July 2014

- Standards in analysis:
 - 80/736/CDV: IEC 62320-1 Ed2: Maritime navigation and radiocommunication equipment and systems - Automatic identification system (AIS) - Part 1: AIS Base Stations - Minimum operational and performance requirements, methods of testing and required test results.
 - Preliminary Draft New Recommendation or Report ITU-R M. [VDES] Technical characteristics for a VHF data exchange system (VDES) in the VHF maritime mobile band.
 - RTCM SC 131 Draft Performance Standards for Shipborne Combined Receiver Equipment Using Multiple Radio-navigation systems.
 - IEC 62940 2014-07 CD Maritime navigation and radiocommunication equipment and systems -Integrated communication system (ICS) – Operational and performance requirements, methods of testing and required test results new work program.
 - Preliminary Draft Revision of Recommendation ITU-R M.493-13 Digital selective-calling system for use in the maritime mobile service.
 - IMO SN.1/Circ.243/Rev.1:2014, Amended Guidelines for the presentation of navigation related symbols, terms and abbreviations, 23 May, 2014.
 - IEC 62288 Edition 2: Maritime navigation and radiocommunication equipment and systems – Presentation of navigation-related information on shipborne navigational displays –General requirements, methods of testing and required test results. (80/733/FDIS). Published July, 2014.
- Documents for IEC TC80 currently in voting status:
 - 80/736/CDV: IEC 62320-1 Ed2 AIS Base Stations
- During July, performed analysis of the following standards:
 - **Draft IEC 62320-1 Ed2**: Maritime navigation and radiocommunication equipment and systems - Automatic identification system (AIS) - Part 1: AIS Base Stations - Minimum operational and performance requirements, methods of testing and required test results. 80/736/CDV. Committee draft for voting closing date is 10 October, 2014.

Highlights of the changes include new data interface sentences (in alignment with NMEA 0183 v4.10) and inclusion of NMEA 0183 Tag Blocks while retaining compatibility with the legacy data interface sentences; a required specification and test for measurement of received signal strength indicator (RSSI) of received messages; tests of the newer Messages 24B, 25 and 26; a requirement for functions and control of the use of long range Message 27; a requirement that propagation delay be taken under consideration when UTC indirect is used; removal of the 12.5 kHz option; an extension of the emission mask further in frequency from the carrier frequency; an extension of the upper limit of the spurious emission measurement from 2 GHz to 4 GHz; improved tests of the Message 22 channel management function; and, inclusion of a test of Message 17 based on RTCM SC104 input.

The following is a summary of differences between the existing standard 62320-1 Ed.1/Amd.1 and the Edition 2 standard which would replace it:

§2. Normative References: IEC 61993-2 (Class A AIS) added. Rec ITU-R M.1084-2 (VHF channels), ITU-T O.153 Basic parameters for the measurement of error performance at bit rates below the primary rate and IALA Clarifications to ITU-R M.1371 removed. The reference to RTCM SC104, unchanged from Edition 1, is archaic and needs to be updated. The current standard is RTCM 10402.3, Standard for Differential GNSS (Global Navigation Satellite Systems) Service, Version 2.3 with Amendment 1 (May 21, 2010). The generic reference a perpetually current standard would be to RTCM 10402.x or RTCM 10402. The perpetually current reference should be the one included in the CDV comments.

§4. Functional layout of an AIS Base Station: 4.5 Base station input/output sentence formatters. Changes from Amd.1 are picked up, with certain new sentences (e.g. BCG and BCL) replacing older ones (e.g. BCE and BCF, respectively). A table of legacy data interface sentences is provided. As in Edition 1, IEC 61162-1 is the only data interface normative reference included.

§5. Functional definition of the radio interface of the AIS Base Station: 5.1 Physical layer general requirements. Added required capability to measure Received Signal Strength Indicator (RSSI) of received messages. Minimum channel width and spacing changed from 12.5 kHz to 25 kHz. 5.3 Table 5 – Minimum required TDMA transmitter characteristics requirements included in §9 test section are moved to this section, including Edition 1 Figure 12 Power vs time mask and Figure 13 Definition of timings. Carrier power specified: 30 dBm (1w) nominal, reduced from 2w in the previous standard, 41 dBm (12.5 kHz) maximum, unchanged from the previous standard. Note, in the U.S. 50w maximum is allowed from VHF maritime coast stations/base stations. “Condition” column added, modulation spectrum revised, modulation accuracy revised, power by time revised and spurious emissions added. Power vs Time Mask added (Figure 4). 5.4 Table 7 – Minimum TDMA receiver characteristics revised to add Maximum error at high input levels and accuracy of RSSI measurement. A test of the RSSI requirement is included in Section 10.

§6. Requirements for AIS Base Station: 6.2 The requirement that every message transmitted on the VDL shall be passed using the sentence linking method has been removed. A requirement has been added that propagation delay be taken under consideration when UTC indirect is used. 6.3 Table 9 – Base Station response to input messages from the VDL was changed to allow VDL output of Messages 4 or 24A/B, removing Messages 17, 20, 22 and 23. A new Table 10 – Required content of FSR and VSI output was added. A separate test for RTCM SC104 input data via the dedicated optional DGNSS port was added in section 10.6. Table 11 – Base Station response to ABM, BBM and AIR input on the PI was added as a new requirement. New paragraphs describing the requirements for scheduled transmission of Message 24A, and of Message 26 were added. Operational settings for bandwidth was removed and control of long-range broadcast Message 27 as well as functions related to long range Message 27 were added to the requirements for management of mobile AIS stations by AIS base station. 6.5 A new section default settings after reset and Table 13 – settings after reset command were added as a new requirement.



§7. Functional definition of the presentation interface of the AIS Base Station: 7.2 introduces TAG Block functions defined in Table 14 and Annex D, adding a Unix time parameter, output and input source information, etc. to interface sentences used by this system. Compatibility is maintained with the legacy interface sentences included in Edition 1 of the standard.

§8. Tests of AIS Base Stations – Method of measurement and required results: Transmitter transient frequency (frequency difference) maximum value of absolute measurement uncertainties of ± 250 Hz was dropped from the test methods. Otherwise, little change was made to this section.

§9. Physical radio tests: 9.1.2. A transmitter shutdown procedure verification demonstrating that an automatic transmitter hardware shutdown procedure is implemented was added to this edition. 12.5 kHz channel tests for equipment capable of operating on narrowband channels were eliminated. 9.2.3 Modulation spectrum slotted transmission (spurious emissions test). The modulation emission spectrum measurement was increased from ± 25 kHz to ± 62.5 kHz, at which the emission mask requires emissions be suppressed by at least 70 dB. While the emission mask itself remained unchanged, the range which emissions were measured was increased. 9.3.5 Spurious response rejection test. An additional step repeating the test with the lowest frequency measured was added to the procedure. 9.4 Conducted spurious emissions at the antenna from the receiver and from the transmitter - the upper test range was extended from 2 GHz to 4 GHz.

§10. Functional tests for Base Station: 10.1 Pre-setup updates in data interfaces sentences added. A new pre-setup for base station independent mode was added, based upon the dependent mode setup, then applying slot reservations for own Messages 4 and 20. 10.2.1.6 - Channel management (MSG 22) has been strengthened by including tests that the regional operating areas are correctly stored, that channel management messages are retained and MSG22 is retransmitted within two minutes, that the unit removes the 8 area settings (or sets the in-use flag of the stored areas to 0) and that the unit ceases transmission of the channel management messages. 10.2.1.10/11 Tests of assigned mode MSG 16 and group assignment MSG 23 separated and clarified. 10.2.1.12 Test of scheduled transmission of Message 24A to provide base station name added. 10.2.1.13 Test of scheduled transmission of Message 26 (Multiple slot binary message with communications state) added, configured for up to 4 transmission schedules with different content. 10.2.2 Test of addressed and broadcast messaging revised to include single and multiple slot binary Messages 25 and 26. 10.3. Selection of transmission slots (Intentional slot reuse [link congestion]), in which a test of RATDMA transmission to ensure only free slots are used for transmission was added. 10.4 Legacy support added to verify “that the legacy sentences BCE, BCF, CAB are correctly supported in addition to the new sentences BCG, BCL and RST. This test also verifies that the sentences ACM, AGA, ASN, DLM, ECB and SPO which have an additional “Sentence status flag” field are accepted without the Sentence status flag field”. 10.5 TAG Block encapsulation test added to replace previous test of Comment block encapsulation. 10.6 Test of optional functions added, including test of external synchronization source and test of Message 17 based on RTCM SC104 input.



Annexes: Two new normative annexes were added, AIS Base Station sentences and IEC 61162-1 sentences modified for use with AIS Base Station, with the previous standard's informative annex, Proposed additional IEC 61162 AIS sentences, was retained as a normative annex of Legacy AIS Base Station sentences.

- **IMO Draft performance standards for multi-system shipborne navigation receivers.** Australia, France, the Republic of Korea, the United States, the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and the Committee International Radio-Maritime (CIRM) jointly submitted a draft performance standard to IMO's Navigation, Communications and Search & Rescue (NCSR) 1st session; which met 30 June through 4 July, 2014. This draft standard was developed in cooperation with RTCM's work on its draft Standard 13100.00. While the submitted proposal had support at NCSR, the subcommittee workload precluded work on it during the meeting and completion of the draft was deferred to their next session scheduled for 9 through 13 March, 2015.
- **Global Maritime Distress & Safety System Modernization.** RTCM and USCG-sponsored GMDSS Task Force met on 31 July, 2014 with a planned informal follow-on meeting to complete a table on Table of GMDSS Effectiveness and Candidate Future Systems for submission to IMO's GMDSS Modernization Correspondence Group chaired by Mr. Robert Markle. The USCG C4IT Services Center is scheduling an off-site meeting to discuss GMDSS Modernization, IEC Integrated Communication System project and a Vision for Future Maritime Communications on 11 September, 2014. That second meeting will include a discussion on representation at the IEC 62940 Integrated Communication System TC80 project team meetings.
- **Preliminary Draft Revision of Recommendation ITU-R M.493-13 Digital selective-calling system for use in the maritime mobile service.** ITU-R WP5B meets in Geneva 27 October to 7 November to complete work on this standard and send it forward for adoption. While the current draft changes has been reviewed and is largely supportable, certain changes being proposed particularly in Europe would if implemented cause significant problems and should warrant a no vote from the U.S. For example:
 - WP5B sent a liaison to CIRM regarding this standard, noting "The Working Party has a special interest in the experience of CIRM members producing such equipment in respect of the usability regarding implementation and operation of the Annexes 3 and 4." These two Annexes were developed by a working group led by Mr. Jon Turban to address a need for a standardized human interface in GMDSS equipment, the lack of which was the cause of inconsistent operation and general complaints regarding DSC by users and by IMO. UK members including key TC80 officers have long opposed these annexes, although they have been long supported by ETSI TG26.
 - Some European delegates oppose MOB devices using DSC open loop all-ships distress calls; and Denmark has proposed devices use a newly defined closed loop urgency individual and group alert function. ETSI TG26 has confirmed this proposed new protocol to be incompatible with existing DSC equipped radios - particularly Class D radios. If ITU-R M.493 limits MOB devices to this new protocol, DSC devices including RTCM SC119 MSLD devices following this standard could not be interoperable with existing radios and thus would be unusable. Australia is planning an input opposing this change which the U.S. is planning to co-sponsor.



- The draft revision to ITU-R M.493 protocol Tables 4.1 through 4.10.2 added a “not allowed” category to the existing undefined category, which previously had been considered optional. One very significant impact of this change would be to prohibit use of the position request and position acknowledgment functions, required for GMDSS equipment and commonly provided on Class D equipment.
- Regarding own ship identity, the current standard requires that “Once stored, it should not be possible for the user to change the MMSI without advice from the manufacturer”. The current “three strikes” rule used by manufacturers for entering own MMSI into a radio causes more problems than it corrects. The RTCM GMDSS Task Force is considering asking that this requirement be softened, allowing own MMSI to be reset when a radio is sold or moved to another vessel.

- Administrative:

Some 16 new AIS message description web pages were newly posted or updated this month on the USCG NAVCEN’s AIS website [AISMessages](#), consequential to the new updated Rec. ITU-R M.1371-5. This webpage is intended to be a quick reference of AIS messages. A PDF document [Data Broadcasted from Each AIS Station Type](#) was also updated to reflect M.1371-5 changes.

A current listing of TC80 documents and the voting register, including published new standards, new work programs and draft standards being voted, vote closing date, and how the US voted, is now publicly available in Acrobat PDF form, linked from [mtlec](#). Note, items marked in red indicate a pending vote.

IEC standards and IEC voting documents are being posted at RDC’s Secure FTP (SFTP) site ra3.rdc.uscg.gov available to all IEC TC80 TAG members - including any USCG employee. Password information is available upon request.

Document 80/736/CDV IEC 62320-1 Ed.2 AIS Base station was posted by IEC on 4 July and distributed to TC80 TAG members. Comments on the CDV draft will be collected in September for submission to ANSI prior to the 10 October, 2014 closing date.

- Status of international maritime radiocommunication and navigation standards:

- IEC TC80 Document status as of 31 July, 2014 (analyses will be provided prior to voting due dates):

Document	Date Voting Closes	Comments Expected
80/736/CDV 62320-1 Ed2 AIS Base Station	10 Oct, 2014	TBD

- ITU Study Group 5B maritime radiocommunications and navigation standards status as of 31 July 2014:

Document	Expected publishing date	Comments Expected
Preliminary Draft Revision Of Recommendation ITU-R M.493-13 Digital selective-calling system for use in the maritime mobile service ¹	Spring 2015	No U.S. input May 2014 WP5B. Possible U.S. input Oct 2014 WP5B
Preliminary Draft New Recommendation or Report ITU-R M.[VDES] Technical characteristics for a VHF data exchange system (VDES) in the VHF maritime mobile band	unknown	IALA eNav Cmte. AIS/Comms WG2 plans to further develop this draft

- RTCM radiocommunication and navigation standards status as of 31 July 2014:

Document	Expected publishing date	Comments Expected
RTCM 11901.1, Standard for Maritime Survivor Locating Devices. Includes AIS capability. Annex A DSC update adopted 30 APR 2014.	Published June 4, 2012 New Annex A to be published summer 2014	no
RTCM 11000.3 Standard for 406 MHz Satellite Emergency Position-Indicating Radiobeacons (EPIRB).	Published June 12, 2012 Amendment TBD	AIS EPIRB homing update pending
Minimum Performance Standards for Marine eLORAN Receiving Equipment, Revision 2.02 DRAFT, 19 July 2013	TBD	-
RTCM 13100.0 Multi-system Shipborne Navigation Receivers	Spring 2014 - CD Winter 2015 - CDV	-
RTCM 13100.1 annex addressing Receiver Automated Integrity Monitoring (RAIM)	Summer 2015 - CD Fall 2015 - CDV	-
RTCM 13100.2 annex addressing interference related to GNSS receivers	Spring 2016 - CD Summer 2016 - CDV	-

AIS Presentation Symbols

- **IMO SN.1/Circ.243/Rev.1:2014**: Amended Guidelines for the presentation of navigation related symbols, terms and abbreviations, 23 May, 2014. This recently released revised Circular replaces SN.1/Circ.243:2004 and SN/Circ.243/Add.1:2008. The recently voted IEC 62288 Ed.2 Presentation standard was not able to incorporate the new Circular as a normative reference, but instead incorporated the older circular and its addition. It is however effectively included in the standard.

SN.1/Circ.243/Add.1:2008 simply added the AIS SART symbol. SN.1/Circ.243/Rev.1:2014 added Table 4.1: Improved symbols for portrayal of AIS AtoN and Table 4.3 – Portrayal of AIS AtoN indicating the absence of a charted Physical AtoN, replacing two AIS AtoN symbols (real and virtual position) with 18 new symbols.

IEC 62288 Ed.2 intentionally deviates from Circ.243 and its amendments in several cases for valid reasons. IEC 62288 Ed.2 symbols not recognized by IMO do not include a reference to “SN243” in the Symbol Graphic(s) column. In fact, the IEC standard adds 50 new symbols not referenced to Circ.243. For example, Table A.1 – Own ship symbols in the IEC standard:

- An own ship “stern line” symbol was created.
- An own ship “velocity vector – stabilization indicator” symbol was created.
- An own ship “past track – past positions” symbol was created.

In Table A.2 Radar and AIS symbols:

- “Sleeping AIS target” and “Activated AIS target” symbols, neither reported heading nor course-over-ground, were added.
- Associated targets (i.e. activated AIS targets associated with tracked radar symbols) represented by AIS target symbols, or alternatively by radar target symbols, were added.
- Associated target velocity vectors were added.
- Predicted areas of dangers for radar targets, AIS targets and associated targets were added.



- AIS SAR aircraft was added
- AIS SAR vessel was added, enabled by a ship transmitting AIS Message 5 ship type 51.
- Distance to run was added
- Planned position was added
- Visual limit of lights was added.
- Wheel-over lines were added.
- Tidal streams were added.
- Mariner danger highlights were added.
- Alarm highlights (graphical indication in a chart of an alarm condition) and caution highlights were added.
- Danger bearings were added.
- Radar (internally generated) test target was added.
- Maritime Safety Information (MSI) areas were added, initiated by NAVTEX or by an AIS application specific message (ASM) function identifier 22 or 23. Although not mentioned, this symbol may also be initiated by Inmarsat C SafetyNET.
- Meteorological information using WMO symbology were added, initiated by an AIS application specific message (ASM) function identifier 26 or 31.
- Tidal and water level information symbols were added, initiated by an AIS application specific message (ASM) function identifier 31.
- Signal stations were added, initiated by an AIS application specific message (ASM) function identifier 19.
- Route information broadcast were added, initiated by an AIS application specific message (ASM) function identifier 28 or 28.
- Berthing data were added, initiated by an AIS application specific message (ASM) function identifier 20.
- Clearance time to enter port was added, initiated by an AIS application specific message (ASM) function identifier 18.
- Area notice was added, initiated by an AIS application specific message (ASM) function identifier 22 or 23.
- Air gap (clearance between the water surface and the bridge) was added, initiated by an AIS application specific message (ASM) function identifier 26.
- Environmental report was added, initiated by an AIS application specific message (ASM) function identifier 26 or 31.

Despite IMO SN.1/Circ.243/Rev.1:2014 not being listed as a normative reference in IEC 62288 Ed.2, all of the AtoN symbols included in the Circular are included in the IEC standard. IEC 62288 Ed.2 appears compliant with the 2014 edition of the Circular. Nevertheless, the IEC standard includes several symbols not included in the Circular.

The IMO Circular defines POB (person overboard), but makes no use of it in its defined symbology. On the other hand, the Circular does not define MOB (man overboard), yet uses and defines, as an example, it in association with an Event Mark. IEC 62288 Ed.2 makes no mention of POB, uses the term MOB in

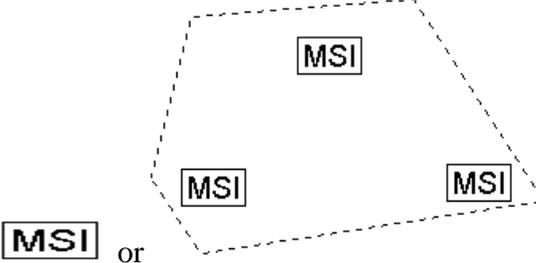
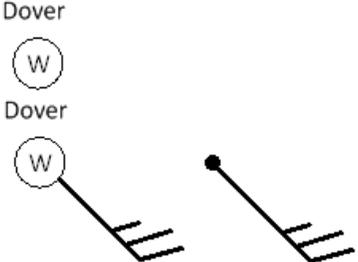
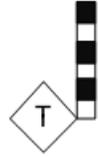


USNC TC80 TAG FY14 Support

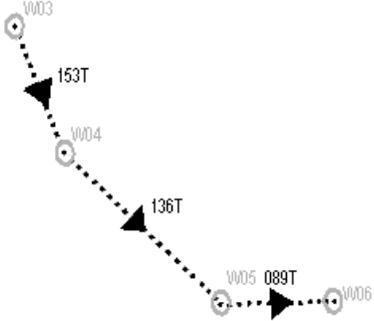
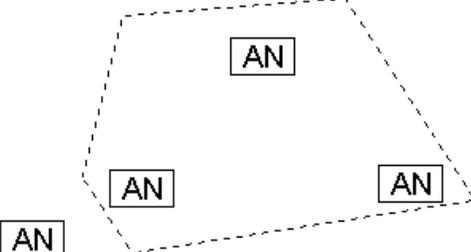
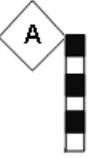
association with both an Event Mark and an AIS SART, but does not include its definition in Table B-1. Since IMO recognizes a SART only for locating a vessel or person in distress and not for alerting a ship to a distress situation, the IEC standard required the display color of the SART symbol to be blue, the same color used by aids to navigation, meteorological, tidal, and signal station symbology. The IEC standard allows the user to filter the presentation of the AIS SART

The symbol for an AIS base station was removed from the IEC standard in the committee draft for vote (CDV) stage when its deletion was proposed by Denmark and Australia and agreed by the maintenance team convener and the TC80 secretary. A draft amendment to IEC 62288 has been prepared to reintroduce this requirement but has not been submitted pending decision by the Coast Guard and the TC80 TAG.

- **AIS Application Specific Message-initiated Navigation Display Presentation Symbology.** The chart below lists the IEC 62288 Ed.2 identified symbology which can be generated by AIS Application Specific Messages transmitted from an AIS base station or by a VHF Data Exchange System (VDES):

ASM Function Identifier	Symbol Name
17	VTS-generated AIS ship targets – presented as AIS targets
22, 23	Maritime Safety Information, MSI 
26, 31	Meteorological information 
31	Tidal and water level information 
19	Signal station 

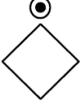
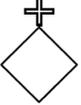
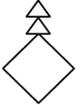
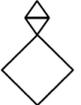
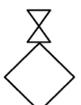
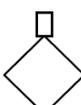
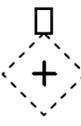
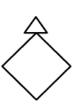
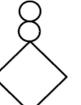
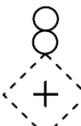


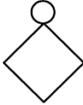
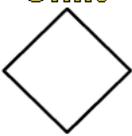
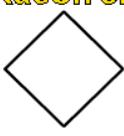
27, 28	Route information broadcast 
20	Berthing data 
18	Clearance time to enter port 
22, 23	Area notice 
26	Air gap 
26, 31	Environmental report 

- **IEC 62288 Ed.2 Aids to Navigation Symbology:** AIS Message 17 (AIS Aids to Navigation Report) received from AIS base stations by AIS-equipped ships having SOLAS-mandated IEC 62288 Ed.2-compatible electronic chart displays will overlay the following types of physical and virtual aids to navigation symbols symbology:

<p>Physical AIS AtoN:</p> <p>Basic shape </p>	<p>Virtual AIS AtoN:</p> <p>Basic shape </p>
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Racon			
Emergency wreck mark		Emergency wreck mark	
North cardinal mark		North cardinal mark	
East cardinal mark		East cardinal mark	
South cardinal mark		South cardinal mark	
West cardinal mark		West cardinal mark	
Port hand mark		Port hand mark	
Starboard hand mark		Starboard hand mark	
Isolated danger		Isolated danger	
		Safe water	

<p>Safe water </p> <p>Special mark </p> <p>(IALA dictionary, top marks)</p> <p>Off Posn  Unlit  Racon err </p> <p>Off position Lights failure Racon failure</p>	<p>Special mark </p> <p>(IALA dictionary, top marks)</p> <p>Missing </p> <p>Intended location of missing AtoN</p>
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Once IEC 62288 Ed.2-compliant navigation display equipment is installed on ships, agencies operating AIS base stations will be able to immediately display the symbols above as well as aids-to-navigation symbols identified in the IEC standard on ships in range of these base stations. The significance of these changes cannot be overstated. It allows maritime authorities to transmit hydrological, meteorological, navigation warnings and information instantly and graphically on ships navigational display from any AIS base station, and when VHF data exchange system (VDES)-equipped shipborne AIS is available, from satellites.

1.6 Activity Report - August 2014

- Standards in analysis:
 - Rec. ITU-R M.1371-5 Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band (2/2014).
 - 80/736/CDV: IEC 62320-1 Ed2: Maritime Navigation and Radiocommunication Equipment and Systems - Automatic Identification System (AIS) - Part 1: AIS Base Stations - Minimum Operational and Performance Requirements, Methods of Testing and Required Test Results.
 - Preliminary Draft New Recommendation or Report ITU-R M.[VDES] Technical characteristics for a VHF data exchange system (VDES) in the VHF maritime mobile band.
 - RTCM SC 131 Draft Performance Standards for Shipborne Combined Receiver Equipment Using Multiple Radionavigation Systems.

- IEC 62940 2014-07 CD Maritime navigation and radiocommunication equipment and systems -Integrated communication system (ICS) – Operational and performance requirements, methods of testing and required test results new work program.
- Preliminary Draft Revision of Recommendation ITU-R M.493-13 Digital selective-calling system for use in the maritime mobile service.
- IEC 61193-2 Ed.2 Maritime Navigation and Radiocommunication Equipment and Systems - Automatic Identification System (AIS) - Part 2: Class A Shipborne Equipment of the Automatic Identification System (AIS) - Minimum Operational and Performance Requirements, Methods of Testing and Required Test Results.
- IEC 62287-1 Ed.2 Maritime Navigation and Radiocommunication Equipment and Systems – Class B Shipborne Equipment of the Automatic Identification System (AIS) - Part 1: Class B – Carrier-Sense Time Division Multiple Access (CSTDMA) Techniques.
- Documents for IEC TC80 currently in voting status:
 - 80/736/CDV: IEC 62320-1 Ed2 AIS Base Stations.
- During August, performed analysis of the following standards:
 - **Rec. ITU-R M.1371-5** Changes additional to AIS Messages: While the May 2014 monthly report included a review of changes made to AIS Messages, the following is a review of the rest of the changes made in this edition of the standard. These changes not only affect the operation of new AIS systems, they also affect, and will require updates to, existing IEC certification standards. These AIS IEC standards are largely based upon the M.1371-4 version of this standard. This review does not include changes of clarification or changes already reported in the earlier review of AIS Messages.
 - Annex 1 Operational characteristics:
 - §2.1.6 AIS SARTs. New statement “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 to all the requirements for these stations” is imprecise in its intent. Its intent appears to be to limit AIS SART manufacturer, marketing and use to the purposes prescribed and to the existing standards published by IMO and ITU. For example, this phrase may be targeting AIS SARTs not conforming to IMO performance standards that are being sold as emergency devices, and SART-like devices are being sold as low cost shipborne AIS units.
 - §2.1.7 and §2.1.8 specifically recognizes MOB and EPIRBs use of SARTs.
 - §3 Identification. AIS transmission now prohibited unless “appropriate” own-ship MMSI is entered.
 - §4.2.1 Reporting interval changes. Long range messages, further described in Annex 4, have a reporting interval of 3 minutes. A new column “Increased reporting interval” was added to Table 2 affecting Class B (SO) reporting intervals on ships travelling faster than 14 knots in areas of high VDL loading.
 - §5 Frequency band. New satellite uplink frequency channels explicitly included.



- Annex 2 TDMA technical characteristics:

Table 5 TDMA transmitter characteristics. Added “extreme” category loosening transmitter test sequence and modulation accuracy, derived from Annex 9 Figure 88 requirements for burst transmissions (AIS SARTs) in the previous edition of ITU-R M.1371. Note that “extreme” is not defined anywhere in this Recommendation but it appears to refer to performance at extreme power supply conditions. Slotted modulation mask is more strictly and carefully defined.

§3.1.3.3.2 Class B (SO) cannot act as semaphore.

§3.2.2.8 Increased propagation delay buffer by 2 bits, increasing protection from propagation delay from 100 to 120 nm. The 2 bits were taken from the now-deleted repeater delay. This change may provide increased range in congested VDL environments particularly from base stations.

§4.1.8 Priority of channel management commands. Reduced time required to clear memory of channel management regions not being updated from five weeks to 24 hours. Also the most distant region rather than the oldest region would now be cleared if no free memory exists for new channel management regions.

§4.3.1.3 Navigational status. Reporting rate reduction to 3min for ship’s navigational status of “not under command or aground” was removed. Requirement for transmission of MSG 3 interleaved after 3 minutes with MSG 5 was also removed.

§4.5 Base station. Base stations prohibited from responding to MSG 22 or DSC channel management command.

§4.6.2 Duplex repeater mode. Duplex repeaters are no longer allowed.

§4.6.3.1 (Simplex) repeater receive messages. Repeaters are to use appropriate rather than received access schemes in their retransmissions necessary to reduce VDL loading.

§5.2.1 Conversion to transmission packets. The previous five-slot restriction for transmitting Messages 6, 8, 12, and 14 (binary and safety related messages) is reduced to three slots, except where FATDMA is used, and this restriction now includes Message 25. Message 25 was also added to the 20-slot-per frame restriction, whereby if the total slots occupied by Messages 6, 8, 12, 14, and 25 exceed 20 slots per frame an AIS mobile is prohibited from sending any of these messages. This restriction could be interpreted as applying to all received transmissions found in the frame map, but IEC 61993-2 Ed.2 §16.6.4 has interpreted this as applying only to transmissions from one’s own AIS unit. To put this change into perspective, transmissions of safety-related messages will now be restricted to 90 ASCII characters, 85 if addressed, unless the ship is operating in an area where an AIS base station has enabled FATDMA slots.

- Annex 3 AIS Channel Management by DSC:

§1.2 General. Note added requiring Digital Selective Calling (DSC) channel management commands ending with either an “EOS” or “RQ” be recognized.

- Annex 4 Long-range applications:
 - §3.3 Transmission method. Multi-channel slot selection access (MSSA) slot access scheme introduced (was previously RATDMA). Use of channels 75 and 76 for this purpose is clearly identified.
 - §3.3.2 Access scheme. MSSA is simply applying the existing SOTDMA access scheme in use for operating on AIS 1 and 2 for transmitting Message 27 on channels 75 and 76. Since an AIS unit's reception is blinded whenever the unit transmits on any frequency, MSSA will prevent the AIS from transmitting at all during time slots when the unit expects to receive messages from other AIS stations.
 - §3.3.3 AIS shore station qualifier. The purpose of this section is to allow national authorities to prevent AIS-equipped ships operating in its waters from transmitting long range Message 27. The previous version of the standard required Class A units to cease transmitting this message whenever it received Message 4 with the control setting "off" for the transmission of Message 27. In this version, Class A, and now Class B(SO), units also must receive Message 4 with the control setting "off" and Message 23 with station type 10 to define the "base station coverage area", and be within the Message 23 defined coverage area, before Message 27 will stop transmitting. National authorities have no right to prevent AIS units operating outside its national waters from transmitting long range messages. Class B(CS) and AIS SART devices do not transmit the long range Message 27.
- Annex 5 Application Specific Messages:
 - §5.1 International function message 0: Text using 6-bit ASCII. Two new Tables 27 and 28 have been added, describing IFM 0 using Message 25, broadcast or addressed binary message and IFM 0 using Message 26, broadcast or addressed binary message, respectively. Tables 27 and 28 subdivides the binary field described in Messages 25 and 26 into fields for designated area code (DAC), Function Identifier (FI), text sequence number and text string. Table 29 has been modified adding new columns for Messages 25 and 26 addressed and broadcast binary estimated numbers of slots. These changes enable Messages 25 and 26 to be used for transmitting 6-bit ASCII text.
- Annex 6 Sequencing of transmission packets:

No change from M1371-4.
- Annex 7 Class B CSTDMA:
 - §2.1.1 Capabilities of the Class B "CS" AIS and §2.1.2.3 Interrogation mode. Procedures for responding to interrogations from base stations with Message 19 removed since Message 19 is no longer needed. References to Message 19 were removed throughout this annex.
 - §4.2.2.1 Transmitter parameters. The same changes made to Annex 2 Table 5 TDMA transmitter characteristics were made to Table 35 here. Added "extreme" category loosening transmitter test sequence and modulation accuracy slotted modulation mask more strictly and carefully defined.



§4.2.3 Receiver parameters. The frequency range of 50 – 520 MHz was removed from the spurious response rejection of unwanted signals specification in Table 36.

§4.3.3.6 VHF data link message use. Table 42 Use of VDL messages by a Class B “CS” AIS was changed to require Class B units process Message 4 reports received from a base station so that they might obey “the 120 NM rule”. Message 4 is used by AIS stations for determining if it is within 120 NM for response to Messages 20 and 23.

- Annex 8 AIS Messages:

Covered in May 2014 Monthly Report.

- Annex 9 Requirements for stations using burst transmissions (i.e. AIS SARTs):

§3 Transmitter requirements. Similar changes made to Annex 2 Table 5 TDMA transmitter characteristics were made to Table 88 here. Retained existing “extreme” category in transmitter test sequence and modulation accuracy. Slotted modulation mask more strictly and carefully defined.

- **Standards requirements for entering own ship Maritime Mobile Service Identity (MMSI)**

ITU-R, and consequently the FCC, requires that the identity used on AIS and DSC equipment be based upon the ship station license under which the equipment is licensed. In the U.S. this identity is assigned by the FCC (or NTIA for federal vessels) as part of the ship’s radio station license, or in cases of boats whose use of radios is licensed by rule by third parties such as BOAT U.S. having an agreement with the FCC and Coast Guard. Consequently manufacturers cannot preload own-ship MMSI into the equipment unless the purchaser first provides the manufacturer with the registered identity. All DSC and AIS equipment used on a particular ship must therefore have the same MMSI.

Vessel owners are held responsible for ensuring not only that the proper MMSI is obtained and entered into the newly purchased device, but also into older radios whenever either the radio or the boat in which the radio is installed is transferred or sold. In such cases radios which had had the proper MMSI entered must now have a different new MMSI entered. Since the current owner is held responsible for ensuring that the radio has the proper MMSI entered, reasonable means should be provided to enable that owner to meet this requirement even if the radio was originally purchased over the Internet and the warranty is expired. If reasonable means do not exist to change the MMSI of a radio when it is sold or transferred, then the radio will inevitably be used having the MMSI of its previous user. For this reason, standards restrictions on entering own-ship MMSI into shipboard AIS and DSC equipment have become a problem. The following summarizes existing standards requirements for Class A, B (CS) and B (SO) AIS and Class A (SOLAS) and D (small vessel) DSC:

- *Class A AIS*

ITU-R M.1371-5:

Annex 1 §3 Identification. For the purpose of identification, the appropriate maritime identities should be used, as defined in Article 19 of the Radio Regulations (RR) and Recommendation ITU-R M.585. Recommendation ITU-R M.1080 should not be applied with respect to the 10th digit (least significant digit). AIS stations should only



transmit if an appropriate maritime mobile service identity (MMSI) or unique identifier is programmed.

IEC 61193-2 Ed.2:

6.4 Identification (A3/5). For the purpose of ship and message identification, the appropriate Maritime Mobile Service Identity (MMSI) number shall be used. The unit shall be supplied with a default MMSI of “000000000” (this is not a valid MMSI).

The unit shall check that any programmed MMSI is between 200000000 and 799999999 or between 982000000 and 987999999 otherwise the unit shall reject the programming and be not capable of transmitting. However, a reset to the default value “000000000” shall be accepted, but the unit shall not be capable to transmit with this MMSI.

6.11.4 Data protection:

The following data shall be protected from unauthorized modification (for example by password):

- MMSI; ...
- *Class B (CS) AIS*

ITU-R M.1371-5:

Annex 1 §3 Identification. For the purpose of identification, the appropriate maritime identities should be used, as defined in Article 19 of the Radio Regulations (RR) and Recommendation ITU-R M.585. Recommendation ITU-R M.1080 should not be applied with respect to the 10th digit (least significant digit). AIS stations should only transmit if an appropriate maritime mobile service identity (MMSI) or unique identifier is programmed.

Annex 7 §3.5.4: It should not be possible for the user to alter the MMSI once programmed.

IEC 62287-1 Ed2:

6.4 Identification. For the purpose of ship and message identification, the appropriate Maritime Mobile Service Identity (MMSI) number shall be used. The unit shall only transmit if an MMSI has been programmed (see 6.5.1.2).

The unit shall be supplied with a default MMSI of “000000000” that is not a valid MMSI. The unit shall check that the programming MMSI is between 200000000 and 799999999, otherwise the unit shall reject the programming and not be capable of transmitting.

6.7.2 Static data input:

Means shall be provided to input and verify the static data prior to use. It shall not be possible for the user to alter the MMSI once programmed.

FCC regulation (USA only):

47 CFR §80.231 Technical Requirements for Class B Automatic Identification System (AIS) equipment.



(a) Class B Automatic Identification System (AIS) equipment must meet the technical requirements of IEC 62287-1 (incorporated by reference, see §80.7).

(b) In addition to the labels or other identifying information required under §§2.925 and 2.926 of this chapter, each Class B AIS device shall include a conspicuous label that includes: Instructions on how to accurately enter into the device and confirm static data pertaining to the vessel in which the device is or will be installed; and, the following statement "WARNING: It is a violation of the rules of the Federal Communications Commission to input an MMSI that has not been properly assigned to the end user, or to otherwise input any inaccurate data in this device." Instructions on how to accurately enter and confirm static data in the device shall also be included in the user's manual for the device. The entry of static data into a Class B AIS device shall be performed by the vendor of the device or by an appropriately qualified person in the business of installing marine communications equipment on board vessels. In no event shall the entry of static data into a Class B AIS device be performed by the user of the device or the licensee of a ship station using the device. Knowingly programming a Class B AIS device with inaccurate static data, or causing a Class B AIS device to be programmed with inaccurate static data, is prohibited.

- *Class B (SO) AIS*

ITU-R M.1371-5:

Annex 1 §3 Identification. For the purpose of identification, the appropriate maritime identities should be used, as defined in Article 19 of the Radio Regulations (RR) and Recommendation ITU-R M.585. Recommendation ITU-R M.1080 should not be applied with respect to the 10th digit (least significant digit). AIS stations should only transmit if an appropriate maritime mobile service identity (MMSI) or unique identifier is programmed.

IEC 61193-2 Ed.2:

6.4 Identification. For the purpose of ship and message identification, the appropriate Maritime Mobile Service Identity (MMSI) number shall be used.

The unit shall be supplied with a default MMSI of "000000000" that is not a valid MMSI. The unit shall check that any programmed MMSI is between 200000000 and 799999999 or between 982000000 and 987999999 otherwise the unit shall reject the programming and not be capable of transmitting.

6.7.2 Static data input:

Means shall be provided to input and verify the static data prior to use. It shall not be possible for the user to alter the MMSI once programmed.

- *Class A/B (SOLAS) DSC*

ITU-R M.493-13 §12.4: Once stored, it should not be possible for the user to change the MMSI without advice from the manufacturer.

IEC 61097-3 §3.3.5: (609 11.6) Self-identification data shall be stored in the DSC unit in a non-volatile memory, and be easily verified. It shall not be possible for the user easily to change these data.



- *Class D (non SOLAS) DSC*

ITU-R M.493-13 §12.4: Once stored, it should not be possible for the user to change the MMSI without advice from the manufacturer.

IEC 62238:

5.4 Ships identity – MMSI and Group MMSI

The equipment shall be capable of storing permanently the ship's 9-digit Maritime Mobile Service Identity (MMSI) number which shall be inserted automatically in the call. The 10th digit shall be added automatically and set to zero.

It shall not be possible to transmit a DSC call until the ship's MMSI has been stored.

After the MMSI has been stored, it shall not be possible to change the identity number using any combination of operator controls. The ship's MMSI shall be readily accessible to the operator, either displayed at equipment power-up, or by a simple action of the operator.

Facilities shall be provided to permit the operator to program and store a Group MMSI number to enable the equipment to recognize calls addressed to both the ship's MMSI and the Group MMSI. These facilities shall limit the number of operator programmable digits to 8 and the leading zero shall be automatically inserted by the equipment.

- **Use of shipboard AIS on land**

Note that because of the MMSI programming limitations IEC has imposed on Class A, B(CS) and B(SO) AIS devices, it is no longer possible to encode these devices with a coast station identity necessary to allow its identity to indicate that the emission source is from land. Coast station MMSIs must start with a zero.

- **Draft RTCM/IMO performance standards for multi-system shipborne navigation receivers**

Australia, France, Republic of Korea, United States, International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) and the Comité International Radio-Maritime (CIRM) submitted a draft performance standard for multi-system shipborne navigation receivers proposal to IMO's Navigation and Search & Rescue Subcommittee at its 30 June through 4 July session. The proposal was developed in cooperation with RTCM SC131 and had substantial support at IMO. The Subcommittee decided that since time was needed to include changes in organization of the performance standard using a modular concept recognized by IMO, to include a functional, goal-based performance standard for resilience and integrity of position, velocity and time (PVT) within multi-radionavigation equipment and position, navigation and time (PNT) within integrated navigation systems (INS) as proposed by Germany, approval would be deferred to the next session of the Subcommittee during 9 through 13 March, 2015.

Once IMO adopts the standard, IEC is expected to distribute a new work item proposal for a certification standard based upon this IMO performance standard. GNSS systems included in the multi-system standard would require in addition their own IEC certification standard.



Highlights of the draft performance standard would require that the combined radionavigation receiver equipment should:

1. Operate using at least two IMO-recognized GNSS civil access navigation signals.
2. Provide the option to operate using terrestrial radionavigation system(s), e.g. eLoran.
3. Have the facilities to process IMO-recognized augmentation signals and/or augmentation data fed to it. Multi-source integrity monitoring is envisioned to be a cross-check between independent PVT sources.
4. Be capable of processing the above signals and combining them as best as possible to provide a single PVT solution, including:
 - Position in latitude/longitude, referenced to an implementation of an ITRF with co-ordinates in degrees and minutes to a precision reflective of the accuracy of the position information, up to four decimal places;
 - Course over ground to a precision reflective of the accuracy of the calculated course information, relative to true north, up to one decimal place;
 - Speed over ground to a precision reflective of the accuracy of the calculated speed information, up to two decimal places; and
 - Time, referenced to UTC to one tenth of one second.
5. Be capable of providing position, velocity and time solution to the required accuracy within:
 - 5 min where there is no valid satellite almanac data (cold start);
 - 1 min where there is valid satellite almanac data (warm start);
 - 2 min, when subjected to a power interruption or loss of signals of < 60 s;
 - At least once every 0.5 s for High-Speed Craft in compliance and at least once every 1 s for conventional vessels;
6. Provide a caution or a warning if after 2 s (for HSC) or 3 s (for conventional vessels) performance of the PVT solution (e.g. accuracy and integrity) cannot be assessed “with respect to each navigation phase”, or new PVT data has not been calculated;
7. Provide a warning if after 5 s (for HSC) or 7 s (for conventional vessels), new PVT data has not been calculated;
8. Dead reckoning is not permitted: “If it is not possible to provide a new position update at the next scheduled update, output the last plausible position, SOG, COG, and the time of the last valid fix, with indication of this state so that no ambiguity can exist, until position update is resumed.”
9. Be capable of operating satisfactorily with typical in-band and out-of band radiofrequency interference.
10. Provide an indication of augmentation status, including:
 - The receipt of augmentation signals;
 - The validity of the signals received;



- Whether augmentation is applied to the position in the PVT solution; and
- The identification of the augmentation signal(s).

11. Display position, COG and SOG, time and the PVT solution source(s);

- IEC 61162 compliant interfacing is required for:
 - Data from which the PVT solution (i.e. including position information, COG, SOG, time, PVT source(s) - available and used, assessment of phase(s) of navigation for which performance requirements are met, and augmentation information) can be provided;
 - Data from which all available sources can be provided (e.g. to an Integrated Navigation System [INS] for enhanced assessment of PVT information);
 - An interface for alert management (i.e. with the Bridge Alert Management [BAM] or INS);
 - Capability to accept the input of augmentation signals from at least one source per Recommendation ITU-R M.823.
 - Normally closed contact indicating equipment failure.
- **Review of 80/736/CDV: IEC 62320-1 Ed2: AIS Base Stations Annex A (Normative) AIS**

General CDV comments:

§2. Normative references. The reference to RTCM SC104, unchanged from Edition 1, is archaic and needs to be updated. The propose reference is RTCM 10402, Standard for Differential GNSS (Global Navigation Satellite Systems) Service.

Base station sentences:

The listing of NMEA 0183 data interface sentences in Annex A AIS base station sentence is compared against NMEA 0183 Version 5.00 DRAFT version 20140319.

- ACM – AIS Base Station addressed channel management command: OK
- ADS – Automatic device status: OK
- AGA – AIS Base Station broadcast of a group assignment command: Not OK

Footnote #2; #10 is reserved for future use in the NMEA 0183 V5.0 20140319 draft. Annex A defines “10 = This sentence defines a Base Station coverage area with respect to ITU Message 27 broadcasts for Class A and Class B “SO” mobile stations (See ITU 1371 Message 4 and Message 27).”

NMEA 20130319 draft missing footnote #7 against MSG 23 Longitude 2 – E/W: “7) The resolution of the latitude and longitude fields shall be fixed at 1 decimal place of minutes (1/10 of a minute). If a higher resolution is provided to an AIS unit, the receiving AIS unit shall truncate to 1/10’s of minute.”

- ASN – AIS Base Station broadcast of assignment command: OK
- BCG – Base Station configuration, general command: OK
- BCL – Base Station configuration, location command: Not OK

Footnote #7, against BCL sentence heading in NMEA 0183 V5.0 20140319 draft not included in CDV.

0 = Class A and Class B “SO” mobile stations stops transmission of Message 27 within an AIS base station coverage area.

1 = Request Class A and Class B “SO” mobile stations to transmit Message 27 within an AIS base station coverage area.

- DLM – Data link management slot allocations for Base Station command: OK
- ECB – Configure broadcast schedules for Base Station messages, command: OK

Note that both the CDV and the 20140319 NMEA version footnote #2 refers to ITU-R M.1371-1, Annex 1, §4.2.1, Table 1B and footnote #1, a now dated version of the AIS standard series M1371. This footnote #1 applies in that older standard to Table 1B “Reporting intervals for equipment other than Class A shipborne mobile equipment” and states “The base station rate should increase to once per 3 1/3 s after the station detects that one or more stations are synchronizing to the base station (see § 3.1.3.3.1, Annex 2).” The appropriate reference in the current standard ITU-R M.1371-5 is Annex 1 §4.2.1 Table 2 footnote #1, which states “The base station’s reporting interval (RI) should decrease to 3 1/3 s after the station detects that one or more stations are synchronizing to the base station (see § 3.1.3.3.1, Annex 2).” The statement is explanatory and should not appreciably affect the application of this sentence.

- FSR – Frame summary of AIS reception: OK (note, spurious word “Figure” in footnote #1)
- RST – Equipment Reset Command: OK
- SID – Set an equipment’s identification and command: OK
- SPO – Select AIS device’s processing and output command: OK
- TFR – Transmit feed-back report: OK

Note that the NMEA 20140319 0183 draft version includes in footnote #2, which reads “For details concerning proper use, see IEC 62320-1.”

- TPC – Transmit slot prohibit command: OK
- TSA – Transmit slot assignment: Not OK

Note that the NMEA 20140319 0183 draft version includes: “(For details concerning proper use, see IEC 62320-1.)” in the heading and in footnote #2. The NMEA 20140319 draft also includes the statement “(See Section 7.7)” in the heading regarding use of TAG Block sentence grouping. That reference is not included in the CDV.

Section 7.7 Sentence-Grouping (associated lines) - “line-linking” in NMEA 20140319 0183 draft is an essential part of the specification and should be referenced, not deleted.

- TSR – Transmit slot prohibit status report: OK

Although the required sentence TSP – Transmit slot prohibit is not include in Normative Annex A AIS Base Station Sentences, it is included in the Normative Annex B Legacy AIS Base Station sentences.

- VSI – VDL signal information: OK

Note there may be some confusion regarding footnote #5) statement “0 = requested data field but not available (See SPO Sentence)” applied against Signal-to-noise ratio (dB) and Signal strength (dBm) of received VDL message in both the 20140319 NMEA 0183 and the CDV version, since 0 dB and dBm may possibly be measured values.

- **Proposed preliminary draft corrigendum to Recommendation ITU-R M.1371-5,** *Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile frequency band.*

A draft corrigendum to ITU-R M.1371-5 addressing an incorrect figure reference in Annex 8 Message 5 (ship static information) and Message 21 (AtoN), including a corrected figure for Message 21 was completed and submitted to USCG CG-NAV and -652, who subsequently submitted it to the IALA ENAV Communications Working Group.

GMDSS Functional Requirements Effectiveness Table was drafted, reviewed by GMDSS Task Force Workshop which in turned submitted it to the chairman of the IMO GMDSS Modernization correspondence group. The purpose of the document is intended to ultimately support the work of the IEC TC80 Project Team developing the Integrated Communication System standard.

- Administrative:

- Status of international maritime radiocommunication and navigation standards:
 - IEC TC80 Document status as of 31 August, 2014 (analyses will be provided prior to voting due dates):

Document	Date Voting Closes	Comments Expected
80/736/CDV 62320-1 Ed2 AIS Base Station	10 Oct 2014	Yes

- ITU Study Group 5B maritime radiocommunications and navigation standards status as of 31 August, 2014:

Document	Expected publishing date	Comments Expected
Preliminary Draft Revision Of Recommendation ITU-R M.493-13 Digital selective-calling system for use in the maritime mobile service	Spring 2015	Drafting US input to Oct 2014 WP5B
Preliminary Draft New Recommendation or Report ITU-R M.[VDES] Technical characteristics for a VHF data exchange system (VDES) in the VHF maritime mobile band	unknown	IALA eNav Cmte. AIS/Comms WG2 plans to further develop this draft
Preliminary Draft Revision Of Recommendation ITU-R M.1460-1, Technical and operational characteristics and protection criteria of radiodetermination radars in the frequency band 2 900-3 100 MHz	Spring 2015	USWP5B Oct 2014 US is recommending its adoption



- RTCM radiocommunication and navigation standards status as of 31 August, 2014:

Document	Expected publishing date	Comments Expected
RTCM 11901.1, Standard for Maritime Survivor Locating Devices. Includes AIS capability. Annex A DSC update adopted 30 APR 14.	Published June 4, 2012 New Annex A to be published summer 2014	no
RTCM 11000.3 Standard for 406 MHz Satellite Emergency Position-Indicating Radiobeacons (EPIRB).	Published June 12, 2012 Amendment TBD	AIS EPIRB homing update pending
Minimum Performance Standards for Marine eLORAN Receiving Equipment, Revision 2.02 DRAFT, 19 July 2013	TBD	-
RTCM 13100.0 Multi-system Shipborne Navigation Receivers	Spring 2014 - CD Winter 2015 - CDV	-
RTCM 13100.1 annex addressing Receiver Automated Integrity Monitoring (RAIM)	Summer 2015 - CD Fall 2015 - CDV	-
RTCM 13100.2 annex addressing interference related to GNSS receivers	Spring 2016 - CD Summer 2016 - CDV	-

