



3913/7142419  
2014-1205  
23 July 2014

## MEMORANDUM

From: J.E. Fletcher  
Environment & Waterways Branch Chief, CG RDC

To: COMDT (CG-652)  
COMDT (CG-761)

Subj: COMPLETION OF RDC PRODUCT "TECHNICAL INPUTS TO INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) 61162-1 & 61162-3 INTERFACE STANDARD AND 62320 AIS STANDARDS" (2419) (UDI 1451)

1. The United States Coast Guard (USCG) Research and Development Center (RDC) is pleased to provide notification of technical inputs to International Electrotechnical Commission (IEC) 61162-1 & 61162-3 Interface Standard and 62320 & 61993 Automatic Identification System (AIS) Standards. The IEC 61162-1 and 61162-3 standard contains the requirements for data communication between maritime electronic instruments, navigation and radiocommunication equipment when interconnected via an appropriate system. The IEC 62320 series of shore station AIS standards contains the operational and performance requirements, methods of testing and required test results for AIS Base Stations, Aids to Navigation (AtoN) Stations, and AIS Repeater Stations. The 61993-2 Class A Shipborne AIS equipment standard contains the minimum operational and performance requirements, methods of testing and required test results, and identifies interfaces to be used with other equipment as a means to receive and display data.

2. Incorporation of USCG requirements within the IEC international standards development processes is an economical direct approach to guide industry development of safe marine electronic products and services (including AIS technology) that will satisfy USCG operational performance, budget, and technical needs, and satisfy International Maritime Organization (IMO) Safety Of Life At Sea (SOLAS) operational safety and performance needs.

Specific to FY14, RDC technical inputs for the IEC 61162-1 & 61162-3 Interface Standards and IEC 62320 & 61993 series of AIS Standards included:

### **IEC 61162-1 Maritime navigation and radiocommunication equipment and systems – Digital interfaces - Part 1: Single talker and multiple listeners:**

- RDC has taken the lead in the development of a Search and Rescue (SAR) Return Link message (new 0183/61162-1 RLM data sentence) for Copas/Sarsat. This message will be used to inform the persons in distress that their distress beacon signal has been received by SAR authorities. The first draft has been completed with a finalized message to be completed in FY15. The completed message will be able to provide limited

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information/instruction beyond a basic acknowledgement. The work is based upon the Galileo Open Service Signal in Space Interface Control Document Issue 1.2. Other Global Navigation Satellite Systems (GNSS) are expected to be capable of supporting this in the future. This is related to Global Maritime Distress and Safety System (GMDSS) and previous Inmarsat-C SafetyNet interface efforts (for CG-652).

Background: The International Cospas-Sarsat Program is a satellite-based SAR distress alert detection and information distribution system, best known for detecting and locating emergency beacons activated by aircraft, ships and backcountry hikers in distress. The International Cospas-Sarsat Program began as a joint effort between Canada, France, United States of America (USA), and the former Union of Soviet Socialist Republics (USSR) in 1979. It was formally constituted as an intergovernmental organization in 1988 through the International Cospas-Sarsat Program Agreement signed by the four “Parties” to the Agreement: Canada, France, USA and the former USSR. The Russian Federation replaced the USSR as Party to the Agreement in January 1992. Including the four Parties to the Agreement, 41 states and 2 organizations (the Participants) are now currently formally associated with the program and actively participate in the management and the operation of the Cospas-Sarsat system.

- Reviewed and contributed on a draft IEC 61162-1 proposal for sentence named “Heel and Roll Measurements” (HRM) for International Organization for Standards (ISO) specified inclinometer equipment. Publication of final HRM specification by National Marine Electronics Association (NMEA) is anticipated to be during 2015.
- Reviewed and contributed on a draft IEC 61162-1 proposal for sentence named ROV - containing three-axis speed and position information for underwater vessels. Publication of final ROV specification by NMEA is anticipated to be during 2015.
- Reviewed and contributed to the NMEA proposed Heave (HVE) sentence.
- Reviewed and completed “Man Over Board” (MOB) sentence for use in future edition IEC 61162-1.
- Reviewed and completed INMARSAT Maritime Safety Information sentences SM1, SM2, SM3, SM4 and SMB for use in future edition IEC 61162-1. These sentences will also be used in the Committee Draft for Voting (CDV) of IEC 61174 Ed.4 Electronic Chart Display & Information System (ECDIS).
- Reviewed and completed clarifications to the GNS, ROR, and TRC sentences for use in future edition IEC 61162-1.
- Finalized new NMEA 0183 Talker IDs for the following GNSS’:
  - GB - Beidou Navigation System.
  - GQ - QXSS (Quasi Zenith Satellite System).
  - GI - IRNSS (Indian Regional Navigation Satellite System).
- IEC 61924-2 had mistakenly reused the “ACM” sentence formatter previously defined for AIS Base Stations. Worked with the Technical Committee (TC) 80 Secretary to resolve in an expedient manner. New sentence formatter of “ACN” is proposed for the Integrity

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Navigation Standard (INS). Identified and provided input for three corrigendums (INS, VDR, and RADAR) to address the change from sentence ACM to ACN.

- Developed a SOLAS section for NMEA 0183 and the procedures and methods for updating it by IEC TC80. Multiple documents were completed and will be sent out for international voting to determine if the 5<sup>th</sup> edition of 61162-1 will reference the proposed SOLAS section in the NMEA 0183 standard. Sentences supporting AIS are the biggest challenge as there are differences between many of the “draft” AIS sentences IEC published versus the finalized AIS sentences published by NMEA. International voting is expected to occur during FY15.

**IEC 61162-3 Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 3: Serial data instrument network:**

- Prepared IEC 61162-3 A2 Ed.1: Amendment 2 to IEC 61162-3: Maritime navigation and radiocommunication equipment and systems – Digital Interfaces - Part 3: Serial data instrument network. The amendment updates the normative references for NMEA 2000 Main Document, NMEA 2000 Appendix A and NMEA 2000 Appendix D to a later version. The amendment further updates the normative reference for NMEA 2000 Appendix B to a later version which includes the following new parameter groups:
  - 126983 - Alert
  - 126984 - Alert response
  - 129041 - AIS AtoN report
  - 130316 - Temperature- extended range

And the following revised parameter groups:

- 126992 - System time
- 128259 - Speed, water referenced
- 128267 - Water depth
- 129285 - Navigation- route/WP information
- 129033 - Time and date
- 129038 - AIS Class A position report
- 129039 - AIS 40 Class B position report
- 129040 - AIS Class B extended position report
- 129550 - GNSS differential correction receiver
- 129793 - AIS UTC and date report
- 129794 - AIS Class A static and voyage related data
- 129796 - AIS acknowledge
- 129798 - AIS SAR aircraft position report
- 129800 - AIS UTC/date inquiry
- 129801 - AIS addressed safety related message
- 129802 - AIS safety related broadcast message

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- 129803 - AIS interrogation
- 129804 - AIS assignment mode command
- 129805 - AIS data link management message
- 129806 - AIS channel management
- 129807 - AIS group assignment
- 129809 - AIS Class B “CS” static data report, Part A
- 29810 - AIS Class B “CS” static data report, Part B

The amendment further adds a new informative Annex B which shows the relationships between IEC 61162-1 sentences and IEC 61162-3 parameter group numbers.

- Assisted TC80 Secretary with comment resolution to the IEC 61162-3 A2 Ed.1: Amendment 2 described above. International voting was positive and this Amendment is now in the process of being published by IEC.
- Introduced and reviewed the NMEA 2000 Inverter Status Parameter Group Number (PGN) corrigendum, NMEA 2000 Heartbeat PGN corrigendum, and the NMEA 2000 PGN 126208 corrigendum, and the draft NMEA 2000 Heave PGN.

#### **IEC 61993-2 Class A and 62320 Shore Station Series of AIS Equipment Standards:**

- Completed and provided a draft corrigendum to NMEA containing updates to NMEA 0183 v4.10 for the ABK, AGA, and BCL sentences supporting the second edition of the IEC 62620-1 Base Station Standard. NMEA published the corrigendum in October 2013.
- Completed and provided a draft amendment to NMEA containing legacy IEC AIS Base Station interface sentences no longer maintained by IEC and not to be used for new designs. These include the BCE, BCF, CAB, and TSP sentences, and also an early version of the Technical Advisory Group (TAG) Block protocol named Comment Block. The second edition of the IEC 62320-1 Base Station Standard should reference NMEA and use other approved NMEA sentences for these functions. NMEA published the amendment during October 2013.
- Completed and provided a draft amendment to NMEA containing three interface sentences supporting AIS Class A Mobile (IEC 611993-2) and AIS Repeater Stations (IEC 62320-3). The sentences are: EPV – Command or Report Equipment Property Value; SPW – Security Password Sentence; and, TRL – AIS Transmitter Non-Functioning Log. NMEA has published this amendment.
- Reviewed the status of IEC 62320-1 with respect to referencing NMEA 0183. In response to the TC80 Secretary’s resistance to referencing NMEA 0183 within the AIS Base Station, AIS AtoN Station, and AIS Repeater shore equipment standards, pointed out that a precedent for referencing other than IEC/ISO standards in the IEC directive (Clause 6.2.2 of 2013) had been established. 62320-1 Ed. 2.0 AIS Base Station standard was reviewed. During the following meeting the TC80 Secretary required Working Group 15 (WG15) to copy, paste, and reformat over 30 sentences directly from the NMEA 0183 standard instead of referencing the NMEA 0183 standard. Such actions by IEC may result in negative votes from member countries.

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- Assisted WG15 with its cycle for maintenance refresh for AIS AtoN standard 62320-2 Ed. 1.0. Due to engineering complexity of this document, WG15 is expected to require additional sessions prior to release for CDV vote (i.e. mid-2015). Future development of a document on Limited AIS Base Station may be considered. The idea is that a Limited Base Station may be based on AIS AtoN technology.
- Participated in discussions to amend IEC 61993-2 Ed. 2.0 to meet the performance standard on Bridge Alert Management Systems MSC 302 (87). What is needed is a definition describing how the Bridge Alert Management Systems needs to be incorporated in an AIS Class A station. This work is expected to be completed in FY15.

3. Benefits realized from this work include:

- Provides USCG acquisition and regulatory decision makers with international reference standards that support future acquisitions and regulatory actions.
- Ensures that the integrity and interpretation of AIS derived information remains uncorrupted throughout its data flow; and serves to provide a valid source of AIS data for use in shipboard safety, navigation, and shore based control systems.
- Reduces the occurrences of maritime incidents due to failure of shipboard navigation and control systems.
- Improves waterway efficiency and safety through the advancement of marine technology, use of live shipboard information and shore based control systems.
- Reduces the overall cost to implement and operate advanced safety, navigation, and control systems aboard both private and government vessels.
- Supports the current international effort called E-navigation. This IEC effort is focused on harmonizing the collection, integration, exchange, presentation, and analysis of marine information, on board and ashore, by electronic means to enhance berth to berth navigation and related services for safety and security at sea and protection of the marine environment.

4. The RDC is continuing with planned participation in development of national and international marine electronics interface standards (including AIS equipment). Work continues on the further enhancements and additions to both IEC and NMEA Standards. This work gives the USCG a voice in the change processes at NMEA & IEC, Radio Technical Commission for Maritime Services (RTCM), International Marine Electronics Association (IMEA), International Telecommunications Union (ITU), and International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA); and provides the USCG with an avenue for introducing necessary technical improvements benefiting the USCG operations and Nationwide AIS service.

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5. It continues to be a pleasure to work with you on this project. If you have any questions or comments, please contact my project lead, Mr. Lee Luft, (860-271-2685) or email at [Lee.A.Luft@uscg.mil](mailto:Lee.A.Luft@uscg.mil). For information about the CG RDC, including access to our current project portfolio, please scan the below code with your iOS or Android device to access our website.

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