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INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (OF UNESCO)

JOINT WMO / IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)

SHIP OBSERVATIONS TEAM

FIFTH SESSION

GENEVA, SWITZERLAND, 18-22 MAY 2009

SOT-V/Doc. III-4.4
(30.03.2009)

ITEM III-4.4

Original: ENGLISH

TECHNOLOGY CHALLENGES

(Submitted by Julie Fletcher, VOSP Chairperson)

Summary and purpose of the document

This document is addressing technology challenges for the VOS. It includes the SOT's participation in the IMO Correspondence Group on AIS (Automatic Identification System) Binary Messages, Long Range Identification and Tracking (LRIT), the implications of the European Union's restrictions on the use and transportation of Mercury (replacing Mercury-in-glass thermometers), and solutions to address the lack of floppy drive facilities in some PCs and some Inmarsat terminals.

ACTION PROPOSED

The Team will review the information contained in this report, and comment and make decisions or recommendations as appropriate. See part A for the details of recommended actions.

Appendix: None

- A - DRAFT TEXT FOR INCLUSION IN THE FINAL REPORT

III-4.4.1 Julie Fletcher, Chairperson of the VOS Panel, reported on some technology challenges for the VOS, including the SOT's participation in the IMO Correspondence Group on AIS (Automatic Identification System) Binary Messages, Long Range Identification and Tracking (LRIT), the implications of the European Union's restrictions on the use and transportation of Mercury (replacing Mercury-in-glass thermometers), and solutions to address the lack of floppy drive facilities in some PCs and Inmarsat terminals.

Automatic Identification System (AIS)

III-4.4.2 Ms Fletcher recalled that the Automatic Identification System (AIS) was a system used by ships and Vessel Traffic Services (VTS) principally for identification and locating vessels. The AIS provides a means for ships to exchange ship data electronically including identification, position, course, and speed, with other nearby ships and VTS stations.

III-4.4.3 In addition to the ship details routinely sent ashore in binary AIS messages; investigations are now underway to determine whether additional variables, such as weather data, could be included in the AIS message. Sarah North (UK MetOffice) has been appointed as SOT representative to the AIS Correspondence Group on the AIS Binary Messages. The Panel will continue to monitor the AIS situation with respect to using it to send meteorological data in the future (***action, Sarah North, SOT-VI***).

Replacement of Mercury Thermometers

III-4.4.4 At the SOT-IV, the Panel was advised of proposals by the European Union to ban, from 2011, mercury exports and the marketing of mercury in certain types of thermometers. The SOT Members within the European Union were invited to consider the implications of the restrictions on the use of mercury, and Members based outside the European Union were invited to investigate whether similar restrictions apply in their countries. Countries need to plan for the replacement of mercury thermometers on observing ships.

III-4.4.5 The panel was advised that the Netherlands has already switched to using alcohol thermometers, while France is using the Vaisala HM34 on their remaining manual VOS. The UK and Germany are still testing and assessing alternative options. Australia advised that they could continue to source mercury thermometers from their German supplier under the current regulations.

III-4.4.6 The Team urged the NMHSs to comply with national regulations regarding mercury use and assess the options to replace mercury thermometers on their VOF in the future (***action, SOT members, ASAP***).

Lack of floppy drive facilities in INMARSAT terminals

III-4.4.7 Changing technology means that floppy drive facilities are not always available on PCs or Inmarsat terminals for the transfer of TurboWin observations for transmission. The Team encouraged PMOs to become familiar with other transmission methods, such as, an email. (***action, PMOs, ongoing***)

III-4.4.8 The Team invited VOS operators and PMOs to provide ships with clear instructions on how to send data via an email (***action, PMOs, ongoing***). It further invited NMHSs receiving observations by this method or by non-LES, methods to ensure that the reports are inserted onto the GTS for global distribution (***action, NMHSs, ongoing***).

- B - BACKGROUND INFORMATION

1. Background

1.1 The application of new and developing technologies, have implications for VOS, as they must be applied in ways that are workable, and globally consistent with regard to the national and international regulations. This document addresses some of these technology issues.

2. Automatic Identification System (AIS)

2.1 Background

2.1.1 The Automatic Identification System (AIS) is a system used by ships and Vessel Traffic Services (VTS) principally for identification and locating vessels. The AIS provide a means for ships to exchange ship data electronically, including identification, position, course, and speed, with other nearby ships and VTS stations. The AIS is intended to assist the vessel's watch keeping officers and allow maritime authorities to track and monitor vessel movements. It works by integrating a standardized VHF transceiver system with an electronic navigation system, such as a LORAN-C (LOng RAnge Navigation Version C) or GPS receiver, and other navigational sensors on board ship (eg gyrocompass, rate of turn indicator, etc).

2.1.2 The International Maritime Organization's (IMO) International Convention for the Safety of Life at Sea (SOLAS) requires the AIS to be fitted aboard international voyaging ships with gross tonnage (GT) of 300 or more tons, and on all passenger ships regardless of size. It is estimated that more than 40,000 ships currently carry the AIS class A equipment.

2.1.3 For long range tracking system on ships, less frequent transmission can be achieved by the use of Long-Range Identification and Tracking System (LRIT) for ship trading outside the coastal AIS (VHF or A1) Radio range.

2.2 AIS Application

2.2.1 The AIS transponders automatically broadcast information from ships, such as their position, speed, and navigational status, at regular intervals via a VHF transmitter built into the transponder. The information originates from the ship's navigational sensors, typically its global navigation satellite system (GNSS) receiver and gyrocompass. Other information, such as the vessel name and VHF call sign, is programmed when installing the equipment and is transmitted regularly. The signals are received by the AIS transponders fitted on other ships or on land based systems, such as the VTS systems.

2.2.2 In addition to the ship details that are routinely sent ashore in binary AIS messages, investigations are now underway to determine whether additional variables, such as weather data, could be included in the AIS message. Sarah North (UK MetOffice) was appointed as SOT representative to the AIS Correspondence Group on the AIS Binary Messages. In the initial communication with the Chair of the IMI Correspondence Group on the AIS Binary Messages, Sarah explained the VOS Scheme, and the data collected, and expressed interest in receiving more information about how the binary AIS messaging system might be used or expanded to collect and report meteorological parameters in the future.

2.2.3 The VOS panel will follow these developments with interest, and thanks Sarah for the work she is doing on the AIS.

Action:

- To monitor the AIS situation with respect to using it, to send meteorological data in the

future.

3. Replacement of Mercury Thermometers

3.1 At the SOT-IV, the Panel was advised of proposals by the European Union to ban mercury exports and the marketing of mercury in certain types of thermometers from 2011. The SOT Members, within the European Union, were invited to consider the implications of restrictions on the use of mercury. Members based outside the European Union were invited to investigate whether similar restrictions would apply in their countries. Countries needed to plan for the replacement of mercury thermometers on observing ships, and to consider the provision of mercury spillage kits on ships where mercury remains in use.

3.2 Current Status

3.2.1 Within the European Union, countries have been looking at the options available to replace the mercury thermometers on their VOS. The Netherlands has already begun using spirit thermometers in the sling psychrometer used by their VOS, while France is using the Vaisala HM34 on their remaining manual VOS ships. The UK and Germany are still exploring replacement options. The Deutscher Wetterdienst (DWD) has tested several types of electronic thermometers in their laboratory and tried a few on their ships. Initial results have been promising, but the electronic thermometer and humidity device needs to be exposed outside the wheelhouse for about ten minutes before reading, to allow the humidity sensor to stabilize. It is important that instruments can be easily replaced on ships or rotated back to the laboratory for recalibration, so consideration is being given to instruments, which have removable sensors with integrated calibration units.

3.2.2 Outside of the European Union, Australia has taken advice from its German thermometer manufacturer. The manufacturer advised that their mercurial thermometers are for ‘commercial and industrial use’ and as no alternatives for these exist, ie that there is no adequate replacement, then the mercury thermometers can continue to be used in the laboratory and industry for temperature measurement.

3.3 Action:

- That NMS comply with national regulations regarding mercury use and assess the options to replace mercury thermometers on their VOF in the future.

4. Lack of floppy drive facilities in INMARSAT terminals

4.1 Many ships reporting under the VOS scheme still transmit their observations, via INMARSAT C communications to a Land Earth Station (LES), by means of a Special Access Code (SAC) under an arrangement where the cost of the message is charged to the NMS in the country operating the LES.

4.2 The electronic logbook software, TurboWin, enables an observer to compile an observation copy it to a floppy disk, then insert the floppy disk into the INMARSAT terminal to upload the observation for transmission. One of the advantages of this process is that it avoids transcription errors that can occur when an observation is manually typed in.

4.3 As technology advances the PMOs, are finding that they are loading the TurboWin software on to PCs that do not have floppy drive facilities. This problem can be overcome by use of a USB floppy disk drive, or using another transmission method such as email. Even when a PC has a floppy disk drive, some of the newer INMARSAT terminals do not have a floppy drive facility, so the observation cannot be transferred to the INMARSAT terminal. The option for these ships is to send their reports by email.

4.4 If VOS agree to use email to transmit their observations, the cost of the communication will be borne by the ship. The cost is very small and most VOS ships agree willingly to use the email option. Most NMSs will have local protocols regarding the receipt of observations by email, so clear instructions detailing the email address and formatting must be provided to VOS to ensure reliable receipt of message.

4.5 NMS, which receive observations from ships at sea by email, must arrange to insert these observations onto the GTS for global consumption. Historically, only NMS operating LES were inserting ship observations onto GTS, but, with increasing methods of communication, more NMSs may be receiving observations directly from their VOF, and these reports need to be collated and distributed in GTS bulletins.

4.6 Actions:

(a) Ensure PMOs are familiar with all options for sending observations, other than by INMARSAT C.

(b) Ensure that ships are provided with clear instructions on where and how to send observations by email.

(c) Ensure that ship observations received by non-LES methods are inserted on to the GTS.

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Appendix: None