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**DEVELOPMENT OF AMENDMENTS TO SOLAS CHAPTERS IV AND V AND
PERFORMANCE STANDARDS AND GUIDELINES TO INTRODUCE VHF DATA
EXCHANGE SYSTEM (VDES)**

Consideration on VDES and its introduction to SOLAS

Submitted by JAPAN

SUMMARY

Executive summary: This document provides the view of Japan on the introduction of VDES in SOLAS, especially regarding the Chapter IV and proposes the establishment of the correspondence group for this agenda item.

Strategic direction, if applicable: 2

Output: 2.28

Action to be taken: Paragraph 16

Related documents: MSC.74(69), A.1001(25), MSC.1/Circ.1595, SN.1/Circ.289, SN.1/Circ.243/Rev.2 & Corr.1 and COMSAR.1/Circ.46

Background

1 Japan, Norway and Singapore submitted the new work proposal to introduce the VHF Data Exchange System (VDES) into SOLAS Chapter V, as an equivalent of AIS, to MSC 102, but MSC 102 deferred the consideration of the proposal due to COVID-19.

2 MSC 103 agreed to include the proposal into the post-biennial agenda and to amend not only Chapter V but also Chapter IV, assigning the NCSR Sub-Committee as the associated organ.

3 After MSC 103, Japan has considered how to amend SOLAS Chapter IV, which provides radiocommunication requirements for ships and GMDSS, and found some issues to overcome, with the consideration of NCSR.

AIS and GMDSS

4 VDES was developed by using AIS technology and contained AIS in its component. AIS is positioned as SOLAS Chapter V equipment and is not recognised as GMDSS except AIS-SART. For example, COMSAR.1/Circ.46 clearly mentioned "AIS text messaging is not part of the GMDSS." Therefore, Japan considers that if VDES would be used in GMDSS, re-positioning of AIS in GMDSS should be considered.

Dissemination and display of MSI

5 VDES was developed to implement e-navigation, and e-navigation SIP (MSC.1/Circ.1595) identified several Maritime Services in the context of e-navigation that are related to GMDSS such as Maritime Safety Information Service, Meteorological Information Service, Search and Rescue Service.

6 Japan considers that the simplest way of disseminating MSI and SAR related information by VDES is using AIS Application Specific Messages (AIS ASM) defined by SN.1/Circ.289 since VDES has dedicated ASM channels for the migration of AIS ASM. The symbols of ASM are already defined by SN.1/Circ.243/Rev.2 but the MSI symbol was deleted by SN.1/Circ.243/Rev.2/Corr.1. In addition, AIS ASM is not recognised in GMDSS.

7 Japan understands that IHO and WMO are now developing MSI-related S-100 based Product Specifications such as S-124 and S-412. However, the S-100 based Product Specification data volume is several megabytes and too big to be sent by VDES. Therefore, if VDES handles S-100 information data, the conversion technology should be developed.

Satellite VDES

8 VDES has satellite component and is capable of global coverage if enough satellites are deployed. There are already some providers announcing a plan of global coverage of VDES service and such a service can be used for the dissemination of MSI and SAR related information as an EGC service.

9 Japan believes that VDES has a great advantage compared with other mobile satellite services since VDES can exchange data not only between ships and satellites, but also between ships and ships, and between ships and shores, directly with one antenna. However, VDES satellite channels are allocated as secondary allocation while the current Recognized Mobile Satellite Service (RMSS)s are allocated as primary allocation in the current Radio Regulations.

10 Furthermore, the VDES satellite channels allocated by the Radio Regulations Appendix 18. However, the use of VDES satellite downlink channels is subject to agreement in some countries by the Radio Regulations Article 5, and their use in surrounding areas is also affected.

11 In addition, the Resolution A.1001(25) *Criteria for the provision of mobile satellite communication systems in the global maritime distress and safety system (GMDSS)* requires RMSS to provide capabilities of distress calls/alerts but VDES satellites due to be deployed at this point do not have capabilities of distress calls/alerts. Therefore, if a VDES satellite is used in GMDSS, it could not be used as RMSS by the Organization but used as supplementally means of GMDSS.

Introduction of VDES in SOLAS Chapter IV

12 From the above issues, Japan is of the view that the use of VDES in GMDSS by amending SOLAS Chapter IV is premature at this point, instead the VDES should be used as

a substitute for AIS in SOLAS Chapter V in order to gain enough experience and knowledge for use in GMDSS in future.

Performance standards

13 Based on our view, Japan developed the preliminary draft performance standards for VDES as set out in Annex 1. Japan understands that the development of the performance standards heavily relies on whether to introduce VDES in only SOLAS Chapter V or both Chapters IV and V. Therefore, this preliminary draft performance standards should be considered solely on our view.

14 In addition to the performance standards, Japan believes that the guidance documents for the use of VDES should also be developed based on the Sub-Committee's decision for whether to introduce VDES in only SOLAS Chapter V or both Chapters IV and V.

15 For the development of performance standards and guidance documents, Japan believes that the establishment of a correspondence group is necessary and if the Sub-Committee agrees to the establishment of a correspondence group, Japan is willing to coordinate the correspondence group. The draft terms of reference are attached as Annex 2.

Action requested to the Sub-Committee

16 The Sub-Committee is requested to consider the issues above and decide as appropriate especially the establishment of a correspondence group.

ANNEX 1

PRILIMINARY DRAFT PERFORMANCE STANDARDS FOR SHIPBORNE VHF DATA EXCHANGE SYSTEM (VDES)

1 Scope

1.1 These performance standards specify the requirements for the shipborne VHF DATA EXCHANGE SYSTEM (VDES), which integrates the function of the automatic identification system (AIS), application specific message (ASM), terrestrial component of VHF data exchange (VDE-TER) and satellite component of VHF data exchange (VDE-SAT).

1.2 *e-navigation strategy implementation plan – update 1* (MSC.1/Circ.1595) identifies VDES as one of required regulatory framework and technical requirements for implementation (tasks) for solution 2 (Means for standardized and automated reporting).

1.3 The VDES should support [GMDSS and] e-navigation by the following functions:

- .1 [receiving MSI and SAR related information support data]
- .2 in a ship-to-ship mode for improving safety, security and efficiency of navigation and protection of marine environment;
- .3 as a means for littoral States to send and obtain information about a ship and its passenger and cargo; and
- .4 as a meteorological service, ice patrol service, search and rescue service, hydrographic service, ships' routing, ship reporting system, vessel traffic service and aids to navigation tool.

1.4 The VDES should be capable of providing information exchange between ships, authorities and services, automatically with minimal involvement of ship's personnel and with a high level of availability and security.

1.5 The installations, in addition to meeting the requirements of the ITU Radio Regulations, applicable ITU-R Recommendations and the general requirements set out in resolution A.694(17), should comply with the following performance standard.

2 Functionality

2.1 The general functions of the VDES (see Figure 1) are as follows:

- .1 The VDES should have AIS and ASM functions and may have VDE-TER or VDE-TER and VDE-SAT as an optional function, so there are three categories of VDES as follows;
 - Basic VDES: AIS + ASM;
 - Medium [High speed/ Littoral] VDES: AIS + ASM + VDE-TER; and
 - Full [Long range/ Global] VDES: AIS + ASM + VDE-TER + VDE-SAT.

- .2 The VDES should give its highest priority to the AIS position reporting and safety related information.
- .3 The VDES should provide flexibility for the users to prioritize some applications and, consequently, adapt some parameters of the transmission (robustness or capacity) while minimizing system complexity.
- .4 The VDES should give its transmission priority order as first AIS, second ASM and third VDE.
- .5 The VDES should be capable of various modes of operation including the autonomous, assigned and polling modes.
- .6 The VDES should be capable of exchanging data between maritime stations, ship-to-ship, ship-to-shore, shore-to-ship, ship-to-satellite and satellite-to-ship.
- .7 The VDES should be capable of updating its software/firmware.

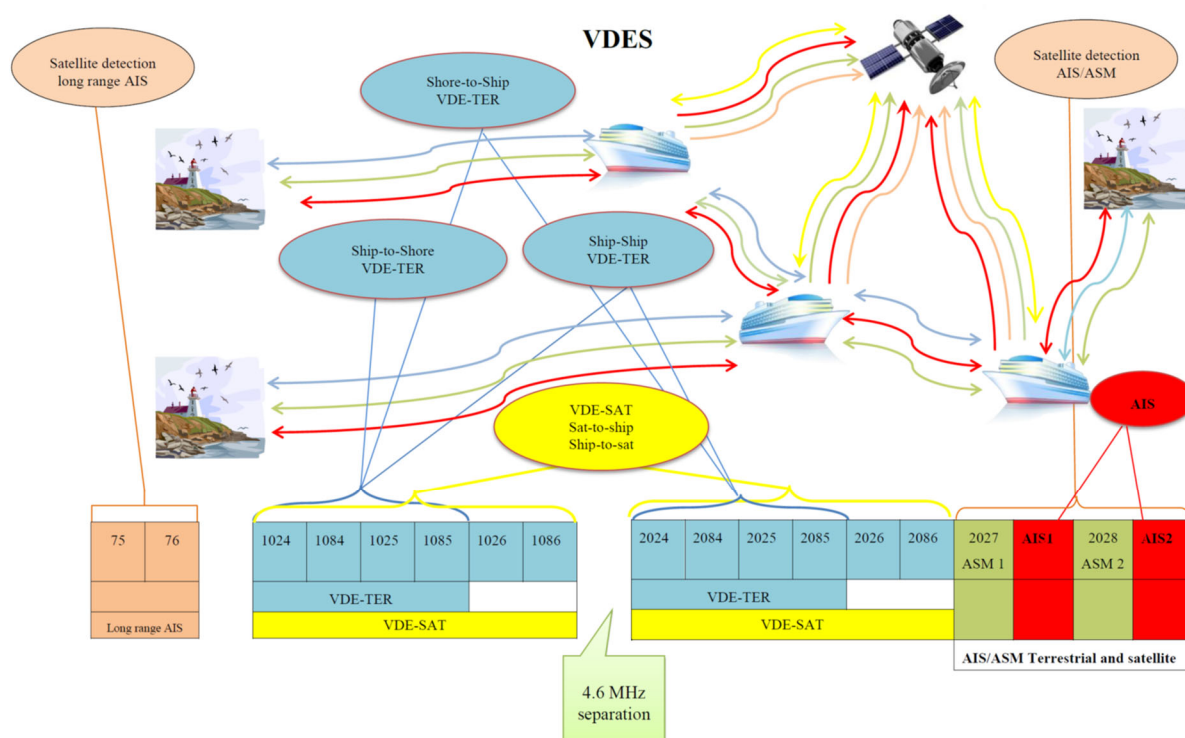


Figure 1 – VDES functions

2.2 The AIS function of VDES should comply with the requirements set out in resolution MSC.74(69), annex 3, as may be amended.

2.3 The ASM function of VDES should comply with the recommendations of SN.1/Circ.289, as may be amended, and regionally registered by authorities or International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA).

2.4 The VDE-TER function of VDES should provide an efficient terrestrial data transfer link enabling a wide variety of applications for the safety, security and efficiency of navigation, protection of marine environment and others related to the maritime community.

2.5 The VDE-SAT function of VDES should provide an efficient satellite data transfer link enabling a wide variety of applications for the safety, security and efficiency of navigation, protection of marine environment and others related to the maritime community.

3 Capability

3.1 VDES should have one multi-channel transmitter and receiver capable of simultaneously supporting the functions specified in this performance standard in addition to the components specified in resolution MSC.74(69), annex 3, as may be amended.

3.2 In addition, VDES should be capable of:

- .1 receiving and processing digital messages and interrogating calls;
- .2 transmitting additional safety information on request; and
- .3 operating continuously while under way, moored or at anchor.

4 User interface

To enable a user to input, access, select, output and display the information on a separate system, the VDES should provide an interface conforming to an appropriate international marine interface standard.

5 Identification

5.1 All VDES stations should be uniquely identified with a unique numerical identifier as defined by the following:

- .1 If the unique identifier has a range which is less than or equal to 999999999, then this number is defined by the appropriate Maritime Mobile Service Identity (MMSI); and
- .2 If the unique identifier has a range which is greater than 999999999, then this number is free form.

6 Information

6.1 Information provided by the VDES are AIS information, safety/security related information and other information.

6.2 AIS information is defined by resolution MSC.74(69), annex 3, as may be amended and should be sent by AIS part of VDES.

6.3 Safety/security related information is provided by a competent authority or a ship including application specific message described at paragraph 2.3 and should be sent by ASM or VDE (both terrestrial and satellite) part of VDES.

6.4 Other information is information other than AIS and safety/security related information, and should be sent by VDE (both terrestrial and satellite) part of VDES (See IALA G1117).

6.5 Safety/security information sent by VDE (both terrestrial and satellite) part should be prioritized over other information.

7 Cyber security

Since VDES is networked with other navigational/communication equipment or system onboard, appropriate cyber security measures conforming to international standards such as IEC 61162-460:2018 and IEC 63154:2021 should be provided.

8 Permissible initialization period

The system should be operational within 2 minutes from switching on.

9 Power supply

The VDES and associated sensors should be powered from the ship's main source of electrical energy. In addition, it should be possible to operate the VDES and associated sensors from an alternative source of electrical energy.

10 Technical characteristics

10.1 The equipment should be designated for operation on channels selected from and in accordance with Appendix 18 to the Radio Regulations.

10.2 The technical characteristics of the VDES such as variable transmitter output power, operating frequencies, modulation, access scheme, and data transmission method should comply with the most recent version of the Recommendation ITU-R M.2092.

10.3 It is recommended to refer to IALA G1117 for the use of VDES other than AIS and safety/security related information.

ANNEX 2

Draft Terms of Reference for the Correspondence Group on VDES

The correspondence group is instructed to:

- .1 develop performance standards and necessary documents needed for the introduction of VDES into SOLAS Chapter V;
- .2 develop amendments of SOLAS Chapter V;
- .3 identify IMO instruments needed to be revised by the introduction of VDES and develop the revisions; and
- .4 submit the report to the Sub-Committee.