



Technical Circular

No.: 021/2026

Date: 14th October 2026

Subject: VHF Data Exchange System (VDES).

1. The IMO Maritime Safety Committee, at its 111th session adopted amendments to SOLAS Chapter V introducing the VHF Data Exchange System (VDES) to be carried as an alternative shipborne navigational equipment and system to the Automatic Identification System (AIS). The amendment is scheduled to enter into force on **1 January 2028**.
2. The MSC 111 also adopted performance standards for shipborne VDES (MSC.593 (111)) and approved guidelines for its onboard operational use (MSC.1/Circ. 1699). Carriage of VDES under these provisions is voluntary.
3. VHF Data Exchange System (VDES) is a maritime communication system designed to enhance the exchange of digital information between ships, shore-based authorities, and other maritime users. It builds on the existing Automatic Identification System (AIS) and expands the capabilities of VHF radio communications to support a wider range of maritime data services.
4. **The primary objectives of VDES are to:**
 - Provide enhanced digital data communication between ships and shore stations.
 - Improve maritime safety, navigation, and situational awareness.
 - Support the exchange of maritime safety information (MSI), navigational warnings, and other operational information.
 - Facilitate the digitalization of maritime operations, including e-navigation and ship-shore information exchange.
5. **Main components of VDES:**

VDES equipment integrates following components and their functions:

- AIS (Automatic Identification System): Used primarily for ship identification, tracking, and the exchange of safety-related information.
- ASM (Application-Specific Messages): Supports the exchange of application-specific maritime information between ships and shore stations.
- VDE-TER (Terrestrial VHF Data Exchange): The terrestrial component of VDES that enables digital data exchange between ships and shore stations, as well as between ships, using VHF radio links.

- VDE-SAT (Satellite VHF Data Exchange): The satellite component of VDES that enables digital data exchange between ships and satellites, extending maritime data communication beyond the coverage of terrestrial VHF networks.

6. Potential applications and benefits:

VDES can support a range of maritime applications, including:

- E-navigation: Exchange of navigational data, route-related information, and maritime service information.
- Ship–shore communication: Digital exchange of voyage, port, and operational information.
- Safety and security: Improved information exchange and potential authentication of AIS messages to help address AIS spoofing.
- Satellite communication: Extended data-exchange coverage beyond the range of terrestrial VHF infrastructure.
- Maritime digital services: Support for digital maritime services and more efficient information exchange between ships and maritime authorities.

7. Difference between AIS and VDES:

Feature	AIS	VDES
Primary purpose	Ship identification, tracking and safety-related information	Broader maritime digital data exchange
Data capacity	Relatively limited	Higher data capacity
Communication	Primarily terrestrial AIS transmissions, with satellite reception also used for tracking	Terrestrial and satellite data exchange
Capabilities	Position reports, identity and voyage-related information	AIS plus additional data-exchange capabilities and applications

VDES is designed to complement and extend AIS capabilities rather than simply replace its traditional functions.

8. For detailed information, refer attached IMO Resolutions and Circular.

Enclosure:

1. IMO Res. MSC. 583 (111)
2. IMO Res. MSC. 592 (111)
3. IMO Res. MSC. 593 (111)
4. IMO Circular – MSC.1/Circ. 1699 - Guidelines for the onboard operational use of shipborne VHF Data Exchange System (VDES)

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ANNEX 3

**RESOLUTION MSC.583(111)
(adopted on 21 May 2026)**

**AMENDMENTS TO CHAPTERS IV AND V, AND THE APPENDIX OF
THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO article VIII(b) of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), concerning the amendment procedure applicable to the annex to the Convention, other than to the provisions of chapter I,

HAVING CONSIDERED, at its 111th session, amendments to the Convention proposed and circulated in accordance with article VIII(b)(i) of the Convention,

1 ADOPTS, in accordance with article VIII(b)(iv) of the Convention, amendments to the Convention, the text of which is set out in the annex to the present resolution;

2 DETERMINES, in accordance with article VIII(b)(vi)(2)(bb) of the Convention, that the said amendments shall be deemed to have been accepted on 1 July 2027, unless, prior to that date, more than one third of the Contracting Governments to the Convention or Contracting Governments the combined merchant fleets of which constitute not less than 50% of the gross tonnage of the world's merchant fleet have notified the Secretary-General of their objections to the amendments;

3 INVITES Contracting Governments to the Convention to note that, in accordance with article VIII(b)(vii)(2) of the Convention, the amendments shall enter into force on 1 January 2028 upon their acceptance in accordance with paragraph 2 above;

4 REQUESTS the Secretary-General, for the purposes of article VIII(b)(v) of the Convention, to transmit certified copies of the present resolution and the text of the amendments contained in the annex to all Contracting Governments to the Convention;

5 ALSO REQUESTS the Secretary-General to transmit copies of this resolution and its annex to Members of the Organization which are not Contracting Governments to the Convention.

ANNEX

**AMENDMENTS TO THE INTERNATIONAL CONVENTION FOR THE
SAFETY OF LIFE AT SEA, 1974**

**CHAPTER IV
RADIOCOMMUNICATIONS**

**Part B
Undertakings by Contracting Governments**

Regulation 5

Provision of radiocommunication services

- 1 The following new paragraph is added after the existing paragraph 2:

"3 Each Contracting Government undertakes to use all operational recognized mobile satellite services in their area of responsibility when disseminating maritime safety information and search and rescue related information via the Enhanced Group Call service."

**CHAPTER V
SAFETY OF NAVIGATION**

Regulation 4

Navigational warnings

- 2 Regulation 4 is replaced by the following:

"Each Contracting Government shall take all steps necessary to ensure that, when intelligence of any danger is received from whatever reliable source, it shall be promptly brought to the knowledge of those concerned and communicated to other interested Governments, with due regard to regulation IV/5.3.*"

* Refer to the *Guidance on the IMO/IHO World-Wide Navigational Warning Service* (resolution A.706(17), as amended)."

Regulation 5

Meteorological services and warnings

- 3 The chapeau of paragraph 2 is replaced by the following:

"2 In particular, Contracting Governments undertake to carry out, in co-operation, the following meteorological arrangements, with due regard to regulation IV/5.3:"

Regulation 18

Approval, surveys and performance standards of navigational systems and equipment and voyage data recorder

- 4 In the footnote to paragraph 2, the following new entry is added:

"Performance standards for shipborne VHF data exchange system (VDES) (resolution MSC.593(111));"

5 Paragraph 9 is replaced by the following:

"9 The automatic identification system (AIS) or VHF data exchange system (VDES) shall be subjected to an annual test. The test shall be conducted by an approved surveyor or an approved testing or servicing facility. The test shall verify the correct programming of the ship static information, correct data exchange with connected sensors as well as verifying the radio performance by radio frequency measurement and on-air test using, e.g. a Vessel Traffic Service (VTS). A copy of the test report shall be retained on board the ship."

Regulation 19

Carriage requirements for shipborne navigational systems and equipment

1 Application and requirements

6 Paragraph 1.2.3 is replaced by the following:

"1.2 Ships constructed before 1 July 2002 shall:

.3 be fitted with the system as required in paragraph 2.4; and"

2 Shipborne navigational equipment and systems

7 Paragraph 2.4 is replaced by the following:

"2.4 All ships of 300 gross tonnage and upwards engaged on international voyages and cargo ships of 500 gross tonnage and upwards not engaged on international voyages and passenger ships irrespective of size shall be fitted with an automatic identification system (AIS) or VHF data exchange system (VDES), as follows:

.1 AIS or VDES shall:

.1 provide automatically to appropriately equipped shore stations, other ships and aircraft information, including the ship's identity, type, position, course, speed, navigational status and other safety-related information;

.2 receive automatically such information from similarly fitted ships;

.3 monitor and track ships; and

.4 exchange data with shore-based facilities;

.2 the requirements of paragraph 2.4.1 shall not be applied to cases where international agreements, rules or standards provide for the protection of navigational information; and

.3 AIS or VDES shall be operated taking into account the guidelines adopted by the Organization.* Ships fitted with AIS or VDES shall maintain AIS or VDES in operation at all times except where international agreements, rules or standards provide for the protection of navigational information.

* Refer to the *Revised guidelines for the onboard operational use of shipborne Automatic Identification Systems (AIS)* (resolution A.1106(29)) and *Guidelines for the onboard operational use of shipborne VHF data exchange system (VDES)* (MSC.1/Circ.1699)."

Regulation 19-1

Long-range identification and tracking of ships

8 Paragraph 4.2 is replaced by the following:

"4.2 Ships, irrespective of the date of construction, fitted with an automatic identification system (AIS) or VHF data exchange system (VDES), as defined in regulation 19.2.4, and operated exclusively within sea area A1, as defined in regulation IV/2.1.15, shall not be required to comply with the provisions of this regulation."

APPENDIX

CERTIFICATES

Record of equipment for passenger ship safety (Form P)

9 In the table for "Details of navigational systems and equipment", item 4.1 is replaced by the following:

"4.1 Automatic identification system (AIS) or VHF data exchange system (VDES)"

Record of equipment for cargo ship safety (Form E)

10 In the table for "Details of navigational systems and equipment", item 4.1 is replaced by the following:

"4.1 Automatic identification system (AIS) or VHF data exchange system (VDES)"

Record of equipment for cargo ship safety (Form C)

11 In the table for "Details of navigational systems and equipment", item 4.1 is replaced by the following:

"4.1 Automatic identification system (AIS) or VHF data exchange system (VDES)"

ANNEX 13

RESOLUTION MSC.592(111) (adopted on 21 May 2026)

INTRODUCTION OF VHF DATA EXCHANGE SYSTEM (VDES) INTO THE IMO REGULATORY FRAMEWORK

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

TAKING INTO ACCOUNT resolution MSC.583(111) by which the Committee adopted amendments to chapter V and the appendix (Certificates) of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), introducing the VHF data exchange system (VDES) as an alternative shipborne navigational equipment and system to the automatic identification system (AIS),

TAKING ALSO INTO ACCOUNT resolution MSC.593(111) on *Performance standards for shipborne VHF data exchange system (VDES)* and MSC.1/Circ.1699 on *Guidelines for the onboard operational use of shipborne VHF data exchange system (VDES)*,

RECOGNIZING that AIS is one of the four components of VDES, which allows the existing AIS to coexist with VDES,

RECOGNIZING ALSO that existing AIS requirements, guidelines and recommendations should be considered as also applicable to the AIS component of VDES,

RECOGNIZING FURTHER that any additional functionalities or communication capabilities provided by VDES beyond its AIS component, even if offering similar functions or services to AIS, are not to be considered equivalent to AIS nor a substitute for the AIS equipment required under SOLAS regulations,

HAVING CONSIDERED, at its 111th session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue, at its twelfth session,

1 DECIDES that, in order to facilitate the introduction and implementation of the VHF data exchange system (VDES) into the IMO regulatory framework, references made to the carriage and use of "automatic identification system" or "AIS" in the IMO regulatory framework should also be understood as references to the AIS component of VDES, as defined in resolution MSC.593(111) on *Performance standards for shipborne VHF data exchange system (VDES)*;

2 INVITES Member States and international organizations to apply the above decision in the implementation and use of VDES.

ANNEX 14

**RESOLUTION MSC.593(111)
(adopted on 21 May 2026)**

**PERFORMANCE STANDARDS FOR
SHIPBORNE VHF DATA EXCHANGE SYSTEM (VDES)**

THE MARITIME SAFETY COMMITTEE,

RECALLING Article 28(b) of the Convention on the International Maritime Organization concerning the functions of the Committee,

RECALLING ALSO resolution A.886(21), by which the Assembly resolved that the functions of adopting performance standards and technical specifications, as well as amendments thereto, shall be performed by the Maritime Safety Committee on behalf of the Organization,

RECALLING FURTHER resolution MSC.570(109), by which the Committee adopted revised *Performance standards for a universal shipborne automatic identification system (AIS)* to improve the safety of navigation,

TAKING INTO ACCOUNT resolution MSC.583(111) by which the Committee adopted amendments to chapter V of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), introducing a VHF data exchange system (VDES) as an alternative shipborne navigational equipment and system to comply with the existing requirements of the automatic identification system (AIS),

TAKING ALSO INTO ACCOUNT MSC.1/Circ.1699 on *Guidelines for the onboard operational use of shipborne VHF data exchange system (VDES)*,

RECOGNIZING that AIS is one of the four components of VDES, which allows the existing AIS to coexist with VDES,

HAVING CONSIDERED, at its 111th session, the recommendation made by the Sub-Committee on Navigation, Communications and Search and Rescue at its twelfth session,

1 ADOPTS *Performance standards for a shipborne VHF data exchange system (VDES)*, set out in the annex to the present resolution;

2 RECOMMENDS that Governments ensure that shipborne VDES equipment conforms to performance standards not inferior to those specified in the present resolution.

ANNEX

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) for the use of VDES equipment on board vessels.

1.2 The VDES equipment integrates four components and their functions. These components are the automatic identification system (AIS) component, the application-specific messages (ASM) component, the terrestrial component of VHF data exchange (VDE-TER) and the satellite component of VHF data exchange (VDE-SAT).

1.3 VDES should be capable of providing information exchange between ships, ships and shore authorities and services, automatically with minimal involvement of the ship's personnel and with a high level of availability and security.¹

1.4 VDES should be capable of providing the following functions:

- .1 exchanging data to improve safety, security and efficiency of navigation and protection of the marine environment;
- .2 means for coastal States to request and obtain information about a ship and its cargo and/or passengers;
- .3 means for providing Maritime Services in the context of e-navigation; and
- .4 means for standardized and automated reporting in accordance with MSC.1/Circ.1595² and MSC.1/Circ.1610,³ as amended.

1.5 The installations, in addition to meeting the requirements of the Radio Regulations, applicable ITU-R Recommendations and the general requirements set out in resolutions A.694(17)⁴ and MSC.191(79),⁵ as amended, should comply with these performance standards.

2 Equipment functionalities

2.1 The general functions of VDES equipment (see figure 1) are as follows:

¹ High level of security can be achieved by implementing authentication of data and encryption where necessary.

² *E-navigation Strategy Implementation Plan – Update 1.*

³ *Descriptions of Maritime Services in the context of e-navigation.*

⁴ *Recommendation on general requirements for shipborne radio equipment forming part of the Global Maritime Distress and Safety System (GMDSS) and for electronic navigational aids.*

⁵ *Recommendation on performance standards for the presentation of navigation-related information on shipborne navigational displays.*

- .1 The AIS component should not be interfered with by other communication means within the VDES, ensuring accurate AIS position reporting and the provision of safety-related information;
- .2 VDES should allow the flexibility to prioritize some applications and, consequently, adapt some parameters of the transmission (robustness or capacity) while minimizing system complexity;
- .3 VDES should give its highest priority to AIS position reporting and safety-related information, followed by second priority to ASM, third priority to VDE-TER and then to VDE-SAT;
- .4 The AIS component of VDES should be capable of providing all modes of operation as described in Recommendation ITU-R M.1371;
- .5 VDES should be capable of exchanging data between ship-to-ship, ship-to-shore, shore-to-ship, ship-to-satellite and satellite-to-ship;
- .6 VDES should be capable of implementing software/firmware updates;
- .7 VDES should be capable of separately disabling VDE-SAT, VDE-TER, or ASM;
- .8 VDES should be capable of changing its transmission power from the default setting to a low setting (1 W) or stopping transmission except for the AIS component when operations such as loading or discharging dangerous cargo require it; and
- .9 VDES should be capable of temporarily disabling VDE-SAT transmission when receiving a message from an AIS or VDES shore station within its coverage area.

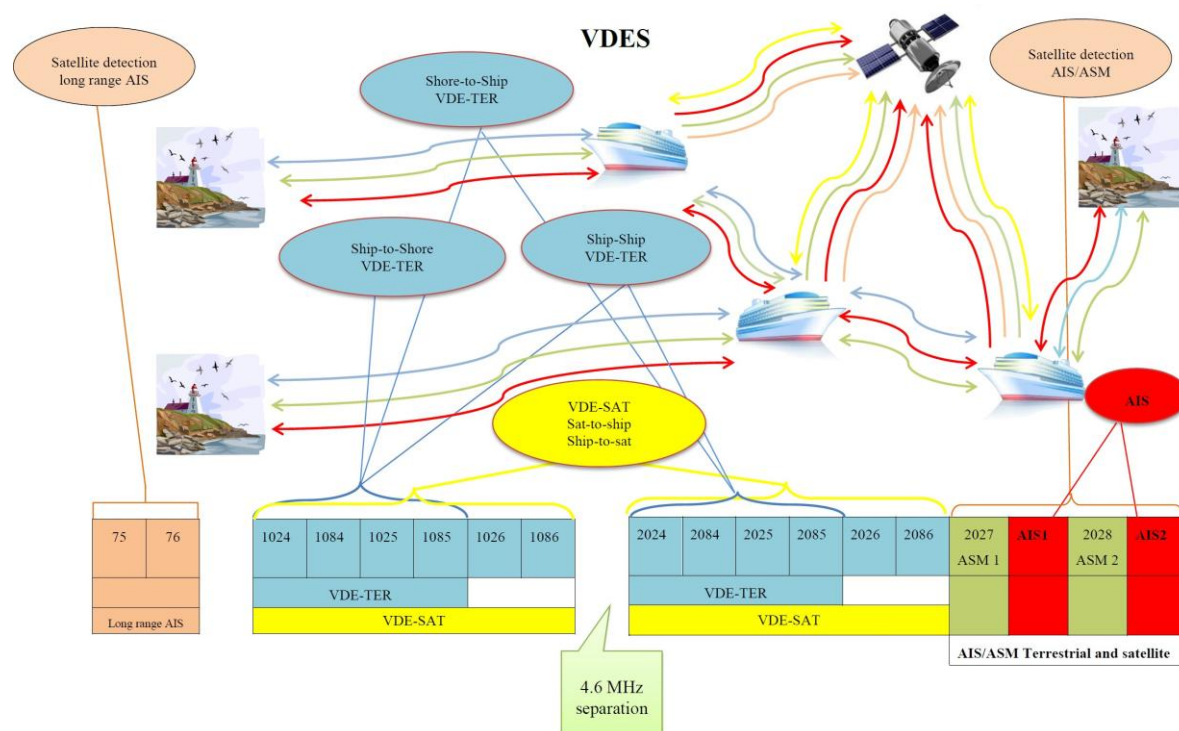


Figure 1: VDES functions

2.2 The AIS component of VDES should comply with the requirements set out in resolution MSC.570(109) and Recommendation ITU-R M.1371.

2.3 The ASM component of VDES should provide a robust and efficient terrestrial data transfer link, enabling the transmission of a wide variety of messages, including application-specific messages currently transmitted by AIS.⁶ These messages should be encoded in accordance with Recommendation ITU-R M.1371 annexes on *Application-specific messages* and *Automatic identification system messages*, as well as Recommendation ITU-R M.2092 annex on *Common technical elements of VDES* and the technical characteristics should meet the requirements specified in Recommendation ITU-R M.2092 annex on *Technical characteristics of the application-specific message channels for the VDES in the VHF maritime band*.

2.4 The VDE-TER function of VDES should provide an efficient terrestrial data transfer link. The technical characteristics should comply with Recommendation ITU-R M.2092 annex on *Common technical elements of VDES* and with the annex on *Technical characteristics of VHF data exchange-terrestrial in the maritime mobile band*.

2.5 The VDE-SAT function of VDES should provide an efficient satellite data transfer link. The technical characteristics should meet the requirements specified in Recommendation ITU-R M.2092 annex on *Common technical elements of VDES* and in the annex on *Technical characteristics of VHF data exchange-satellite operating in the VHF maritime mobile satellite band*.

3 Capability

3.1 VDES should support the functions of ASM, VDE-TER and VDE-SAT specified in this performance standard in addition to the AIS functions specified in resolution MSC.570(109).

3.2 In addition, VDES should be capable of:

- .1 selecting the communication component which is controlled through the user interface;
- .2 receiving digital data according to Recommendation ITU-R M.2092 and output through the user interface;
- .3 transmitting digital data according to Recommendation ITU-R M.2092 as input via the user interface; and
- .4 operating continuously under all modes of operation.

4 User interface

4.1 The human-machine interface should include a keyboard and display for configuration, monitoring and control.

4.2 To enable a user to access, select and display the information on a separate system, the VDES should be provided with at least one interface conforming to an appropriate international marine interface standard.⁷

⁶ See SN.1/Circ.289 and those identified by IALA List of reference for ASM.

⁷ IEC 61162 series, as applicable.

5 Identification

Shipborne VDES stations should be uniquely identified with a unique numerical identifier as defined by the most recent version of Recommendation ITU-R M.585 on *Assignment and use of identities in the maritime mobile services*.

6 Information

6.1 VDES information consists of AIS, ASM and other information.

6.2 AIS information is defined by resolution MSC.570(109) and should be exchanged by the AIS component of VDES.

6.3 Other information is information other than AIS and ASM, and should be exchanged by VDE-TER and VDE-SAT components of VDES.⁸

7 Security

7.1 Cybersecurity

Since VDES is networked with other navigational/communication equipment or systems on board, appropriate cybersecurity measures conforming to international standards such as IEC 61162-460 and IEC 63154 should be provided.

7.2 Integrity and authentication

- .1 VDES should be capable of verifying a digital signature to ensure the integrity of the data and the identity of the sender; and
- .2 VDES should be capable of providing authentication of AIS messages.

8 Operational readiness time

VDES should be operational within two minutes of being switched on by the user.

9 Power supply

VDES and associated equipment should be powered by the ship's main and emergency sources of electrical energy. In addition, it should be possible to operate VDES and associated equipment from a reserve source of electrical energy.

⁸ *Guidelines for the onboard operational use of shipborne VHF data exchange system (VDES)* (MSC.1/Circ.1699).

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MSC.1/Circ.1699
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**GUIDELINES FOR THE ONBOARD OPERATIONAL USE OF
SHIPBORNE VHF DATA EXCHANGE SYSTEM (VDES)**

1 The Maritime Safety Committee, at its 111th session (13 to 22 May 2026), adopted by resolution MSC.583(111), amendments to chapter V of the International Convention for the Safety of Life at Sea, 1974 ("the Convention"), introducing a VHF data exchange system (VDES) as an alternative shipborne navigational equipment to comply with the existing requirements of the automatic identification system (AIS). Relevant performance standards for VDES were also developed and disseminated by resolution MSC.593(111).

2 Recognizing that AIS is one of the four components of VDES, which allows the existing AIS to coexist with VDES, with a view to providing timely guidance for the onboard operational use of VDES, the Committee approved the *Guidelines for the onboard operational use of shipborne VHF data exchange system (VDES)* set out in the annex.

3 Member States are invited to bring these Guidelines to the attention of all concerned, and to take into account the Guidelines when using shipborne VDES for operational use.

ANNEX

GUIDELINES FOR THE ONBOARD OPERATIONAL USE OF SHIPBORNE VHF DATA EXCHANGE SYSTEM (VDES)

Purpose

1 These guidelines have been developed for the safe and effective use of the shipborne VHF data exchange system (VDES), in particular to inform the mariner and shore-based station operators about the operational use, limits and potential use of VDES, including the international sharing of VDES applications. Consequently, VDES should be operated taking into consideration the information contained within these guidelines.

2 VDES has four components comprising Automatic Identification System (AIS), Application-Specific Messages (ASM), VHF Data Exchange terrestrial (VDE-TER) and VHF Data Exchange satellite (VDE-SAT).

3 The AIS component of VDES is equivalent to AIS as defined in SOLAS regulation V/19 and should be operated and used in accordance with the *Revised guidelines for the onboard operational use of shipborne automatic identification systems (AIS)* (resolution A.1106(29)).

4 Although VDES is capable of transmitting and receiving digital data on safety/security related information, the frequencies allocated for VDES are not used for distress and safety communication under the Global Maritime Distress and Safety System (GMDSS) that are protected by the ITU Radio Regulations, including appendix 15. Moreover, the frequencies used by VDE-SAT (Earth-to-space and space-to-Earth) are allocated only on a secondary basis. The user should not consider the data and information received by VDES as GMDSS information.

5 VDES itself is a communication equipment that exchanges digital data between other VDES stations. VDES equipment may be connected with other navigational equipment or systems, such as radar, Electronic Chart Display and Information System (ECDIS) and Integrated Navigation System (INS) and may also be connected to other equipment, such as an onboard computer, in order to work as a communication system. Therefore, these guidelines are aimed at users, operators and stakeholders of VDES both on board and ashore, providing guidance to ensure the safe and efficient operational use of VDES as a whole communication system.

6 AIS is a stand-alone system that is also a component of VDES. However, any additional functionalities or communication capabilities provided by VDES beyond its AIS component, even if offering similar functions or services to AIS, are not to be considered equivalent to AIS under SOLAS regulations.

CAUTION

Not all ships carry AIS or VDES.

The officer of the watch (OOW) should always be aware that other ships, in particular leisure craft, fishing boats and warships, and some coastal shore stations including Vessel Traffic Service (VTS) centres, might not be fitted with VDES even when transmitting AIS information.

The OOW should always be aware that AIS or VDES fitted on other ships, under certain circumstances, may be switched off on the master's professional judgement.

7 The SOLAS Convention requires AIS or VDES to be fitted on certain ships. In addition, specific ship types (e.g. warships, naval auxiliaries and ships owned/operated by Governments) are not required to be fitted with AIS or VDES. Also, small ships (e.g. leisure craft, fishing boats) and certain other ships may be exempt from carrying AIS or VDES. Moreover, ships fitted with AIS or VDES might have the equipment switched off. Users should note that the information provided by AIS or VDES may not be complete and may not accurately represent the location and movement of all shipping in the vicinity. Caution on the inherent limitations of AIS or VDES and their use in collision avoidance should therefore be observed.

Objective of VDES

8 VDES is intended to enhance the safety of life at sea, the safety and efficiency of navigation and the protection of the marine environment by means of exchange of data between maritime stations, ship-to-ship, ship-to-shore, shore-to-ship, ship-to-satellite and satellite-to-ship. Therefore, the purpose of VDES is to exchange digital data between ships, ship-to-shore directly or via satellite in addition to fulfilling the requirements of AIS. The digital data exchanged by VDES will be processed using applications installed in other equipment or systems connected to VDES and portrayed on appropriate displays such as ECDIS.

Description of VDES

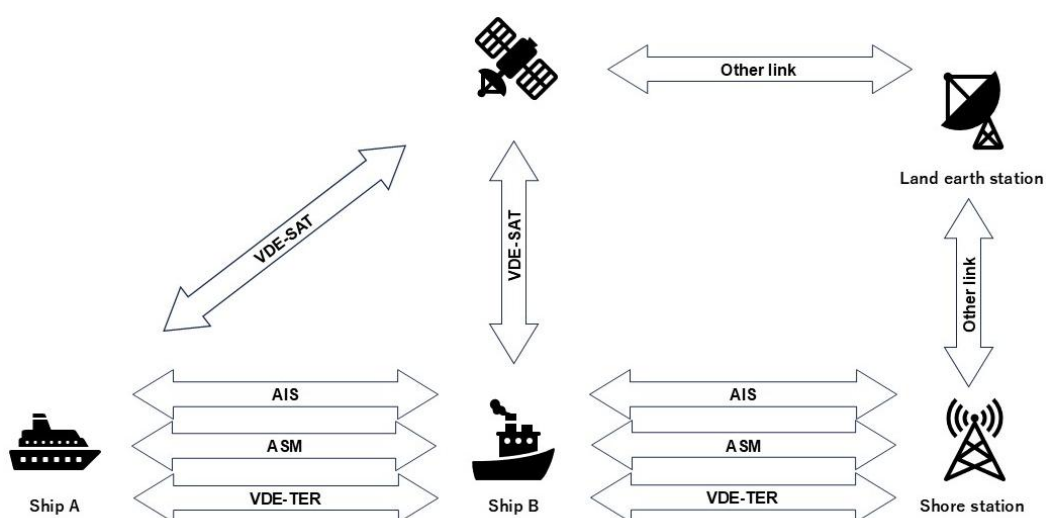


Figure 1 – VDES overview

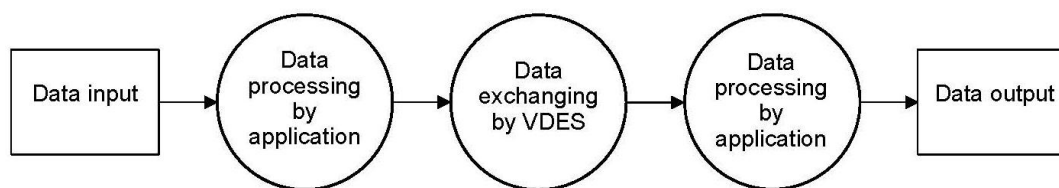


Figure 2 – Data flow using VDES

9 VDES can exchange digital data by automatically selecting one of its four components between ship and ship, ship and shore and ship and satellite (see figure 1). The data exchanged by VDES will be processed by an application installed in the external equipment or systems for human-to-machine or machine-to-machine communication (see figure 2).

10 VDES should give the highest priority to the AIS position reporting and safety-related information.

11 VDES generally achieves higher data transmission rates than AIS by employing wider bandwidths and advanced modulation methods. In a 100 kHz channel, VDE-TER, specifically, achieves a maximum raw data rate up to 32 times greater than AIS.

12 VDES is able to communicate with other VDES stations within VHF range. However, when advanced modulation methods are used, the range may be reduced. Additionally, when the transmission power of shipborne VDES is set to low (1 W) or disabled (except for AIS) for safety reasons such as port or harbour operations, the communication range may be reduced or limited to AIS-only communication.

13 VDE-SAT has the potential to offer global coverage, contingent on satellite orbits and the number of satellites deployed, and the availability of earth/ground stations. If VDE-SAT is used, then interference to terrestrial signals needs to be considered in relation to the service area of the VDE-SAT.

Application-Specific Messages (ASM)

14 VDES, like AIS, can send and receive Application-Specific Messages (ASM) using AIS channels (AIS 1 and AIS 2). For ASM, reference should be made to the *Guidance on the use of AIS Application-Specific Messages* (SN.1/Circ.289) and the *Guidance for the presentation and display of AIS Application-Specific Messages information* (SN.1/Circ.290).

15 VDES contains a designated ASM component using designated VHF channels (ASM 1 and ASM 2) with a transmission rate of 19.2 kbps, which is higher than AIS. This ASM component was originally designed to migrate ASM in AIS to the ASM component of VDES in order to avoid overload of AIS VHF Data Link (VDL).

16 Therefore, administrations are encouraged to use VDES ASM when overload of AIS VDL is observed. However, since not all ships carry VDES even when transmitting AIS information, the administrations should take careful consideration before using VDES ASM.

Operational use of VDES

17 The use of VDES is implemented by the operation of the external equipment or system using its applications. Therefore, the ship's crew should be familiarized with the operation of the equipment or system in accordance with regulation I/14 of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) and the International Safety Management (ISM) Code. In addition, the shoreside users should be familiarized with its operation through education and training on the equipment and system.

Human-machine interface

18 Navigational information sent via VDES and presented on a display for navigation-related data should comply with the *Performance standards for the presentation of navigation-related information on shipborne navigational displays* (resolution MSC.191(79), as amended) and the *Interim guidelines for the harmonized display of navigation information received via communication equipment* (MSC.1/Circ.1593). The symbols used in the display are defined in the *Guidelines for the presentation of navigation-related symbols, terms and abbreviations* (SN.1/Circ.243, as revised), or other relevant international standards;¹ therefore, the user should be familiarized with these symbols.¹

Messages and applications

19 Messages exchanged through VDES are AIS messages defined in the most recent version of the Recommendation ITU-R M.1371, ASM messages defined in the *Guidance on the use of AIS application-specific messages* (SN.1/Circ.289), or messages regionally or locally registered by authorities or the International Organization for Marine Aids to Navigation (IALA)² and other data or message structure approved by the authorities.

20 In order to ensure the worldwide harmonized implementation of message exchange among VDES, these data or message structures should be approved by the authority and the authority is encouraged to share the data or message structure with its associated application to other authorities.

21 A core capability of VDES is to provide secure AIS functionality by ensuring the integrity and authenticity of transmitted AIS messages. VDES also supports the use of virtual aids to navigation (vAtoN), extending their coverage by utilizing satellite capabilities. In addition to these core functions, VDES can be used as a communication platform for various other services, contributing to improved maritime safety, security and operational efficiency.

22 When a message is related to Maritime Services in the context of e-navigation listed in the *E-navigation strategy implementation plan – update 1* (MSC.1/Circ.1595), the authority is encouraged to contact the domain coordinating body before submitting to the Organization for coordination with other similar messages in order to avoid the duplication of similar messages.

23 Applications to the messages should be developed in accordance with the *Guideline on software quality assurance and human-centred design for e-navigation* (MSC.1/Circ.1512).

Cybersecurity

24 In order to ensure appropriate cyber risk management on VDES, the user should understand and comply with the *Guidelines on maritime cyber risk management* (MSC-FAL.1/Circ.3, as revised).

25 In order to secure communication through VDES, it is recommended to utilize digital identities to authenticate and encrypt messages (when necessary), ensuring data integrity and trust between users of the system.

¹ IHO Publication S-52 – Specifications for Chart Content and Display Aspects of ECDIS and S-101 – Portrayal Catalogue (see appendix 1) and S-98 and IEC 62288/Ed.3.

² IALA Guideline R0144 and G1095 Harmonized Implementation of Application-Specific Messages (ASM).

Integrity and Authentication

26 When VDES is used for ensuring the integrity of the data and the identity of the sender by verifying the digital signature, the provision of the digital signature should be implemented by the authority.

Reference documents

- International Convention for the Safety of Life at Sea, 1974, chapter V.
 - *Revised guidelines for the onboard operational use of shipborne automatic identification systems (AIS)* (resolution A.1106(22)).
 - *Introduction of VHF data exchange system (VDES) into the IMO regulatory framework* (resolution MSC.592(111)).
 - *Performance standards for shipborne VHF data exchange system (VDES)* (resolution MSC.593(111)).
 - ITU Radio Regulations, appendix 18, table of transmitting frequencies in the VHF maritime mobile band.
 - Technical characteristics for a VHF data exchange system in the VHF maritime mobile band (The most recent version of Recommendation ITU-R M.2092).
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