

Radiocommunication Study Groups



Source: Recommendation ITU-R M.2092-0

Reference: WRC-19 agenda item 1.9.2

Report ITU-R M.2435-0

Subject: Consequential revisions to the VHF data exchange system (VDES) recommendation

Document 5B/-E

3 April 2020

English only

United States of America, Denmark, ESA, Netherlands, Ireland, [Japan, Norway, France, IALA, Sweden, Republic of Korea, UK, Poland, Uganda, Canada, Mexico, Argentina, Bahamas, Romania, ...]

Preliminary Draft Revision of Recommendation ITU-R M.2092-0

Technical characteristics for a VHF data exchange system in the VHF maritime mobile band

1. Introduction

The WRC 2019 revised Appendix 18 and Article 5 of the Radio Regulations to add the satellite component to the VHF data exchange system (VDES) which had been conditionally approved in WRC 2015. Adding the satellite component to the VDES also consequentially revised the frequency channel plan for the terrestrial component of the VDES, in order that the two VDES components, terrestrial and satellite could operate simultaneously using the same frequencies. This required the adoption of a revised operating system that would deconflict the two VDES components and provide interference-free simultaneous operations.

During the period between WRC 2015 and WRC 2019, the VDES technical working groups of subject matter experts, national administrations and manufacturers organized under the International Electrotechnical Committee (IEC) and the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) performed extensive studies and field testing of both satellite (refer to Report ITU-R M.2435-0) and terrestrial components of VDES and studies in preparation for the WRC-2019 and the consequential revisions to Recommendation ITU-R M.2092-0 that would necessarily follow.

This proposed Preliminary Draft Revision to Recommendation ITU-R M.2092-0 is the product of:

- the extensive field testing of both terrestrial and satellite functions performed during the period between WRC 2015 and WRC 2019 and
- the consequences of the decisions made at WRC 2019.

2. Document structure is consequentially revised

The original document structure has been revised to accommodate the necessary changes associated with the revisions made by the WRC-19 and the extensive testing of the VDES implementation as described in the current version of Recommendation ITU-R M.2092-0. These changes are required due to the revised frequency plan, a revised operating system and the inclusion of the satellite component of VDE. Annexes A to E are revisions of Annexes 1 to 7 as described below:

ANNEX A: Common Technical Elements of VDES

This annex is a revision of Annex 1. It describes the common technical elements of the VDES.

ANNEX B: Characteristics of the ASM Channels in the VHF Maritime Mobile Band

This annex is a revision of Annex 2. It describes the technical characteristics of the channels used for Application Specific Messages (ASM). In order to improve the efficiency of the ASM transmissions and to protect the original function of AIS, these messages will be moved from the AIS channels to these ASM channels. The ASM channels also support a satellite uplink.

ANNEX C: Characteristics of the VDE-Terrestrial in the VHF Maritime Mobile Band

This annex is a revision of Annex 3. It describes the technical characteristics of the terrestrial component of VDES (VDE-TER), which provides an efficient terrestrial data transfer link enabling a wide variety of applications for the maritime community.

ANNEX D: Characteristics of the VDE-SAT Service in the VHF Maritime Mobile Band

This annex is a merger and a revision of Annex 4 for the satellite downlink and Annex 5 for the satellite uplink. It describes the technical characteristics of the satellite component of VDES (VDE-SAT), which provides an efficient satellite data transfer link enabling a wide variety of applications for the maritime community.

ANNEX E: Resource Sharing Method for VDES Terrestrial and Satellite components

This annex is a revision of Annex 6 which describes the sharing of the resources, time and frequencies, between the terrestrial and the satellite components of the VDES. The revision of the current sharing scheme is consequential to the decisions made by WRC-19. It describes the characteristics for both the VDE-TER and VDE-SAT components of the VDES to share the available spectrum such that interoperability between services is achieved and AIS is respected.

NOTE: Annex 7 “Original design considerations to validate the VDES concept” is proposed to be deleted because it is not relevant to this revision of the recommendation.

3. Operational characteristics are consequentially revised

The operational characteristics have been revised consequential to decisions made by WRC-19 and the extensive testing performed in the period between WRC-15 and WRC-19. The revised operating system and its operational characteristics are described as follows:

In general, the VDES should meet the following:

- The system should give its highest priority to the AIS position reporting and safety related information.
- The system installation should be capable of receiving and processing the digital messages and interrogating calls specified by the recommendation.
- The system should be capable of transmitting additional safety information on request.

- The system installation should be able to operate continuously while under way, moored or at anchor.
- The system should use time-division multiple access (TDMA) techniques, access schemes and data transmission methods in a synchronized manner as specified in the Annexes.
- The system should be capable of various modes of operation, including the autonomous, assigned and polled modes.
- The system should provide flexibility for the users in order to prioritize some applications and, consequently, adapt some parameters of the transmission (robustness or capacity) while minimizing system complexity.
- The system should support the use cases identified in Report ITU-R M.2371.
- The VDES on board ship stations should have one multi-function transmitter and a multi-channel and multi-function receiver capable of simultaneously supporting the functions specified in this recommendation. These functions include AIS, ASM, VDE-TER and VDE-SAT.

4. General description of VDES

The VDES provides a variety of means for the exchange of data between maritime stations, ship-to-ship, shore-to-ship, ship-to shore, ship-to-satellite and satellite-to-ship. The VDES is a multi-component system comprised of both the VDE-TER and VDE-SAT components, application specific messages (ASM), and the automatic identification system (AIS) in the VHF maritime mobile band (156.025-162.025 MHz). The VDES functions are illustrated pictorially in Figure 1.

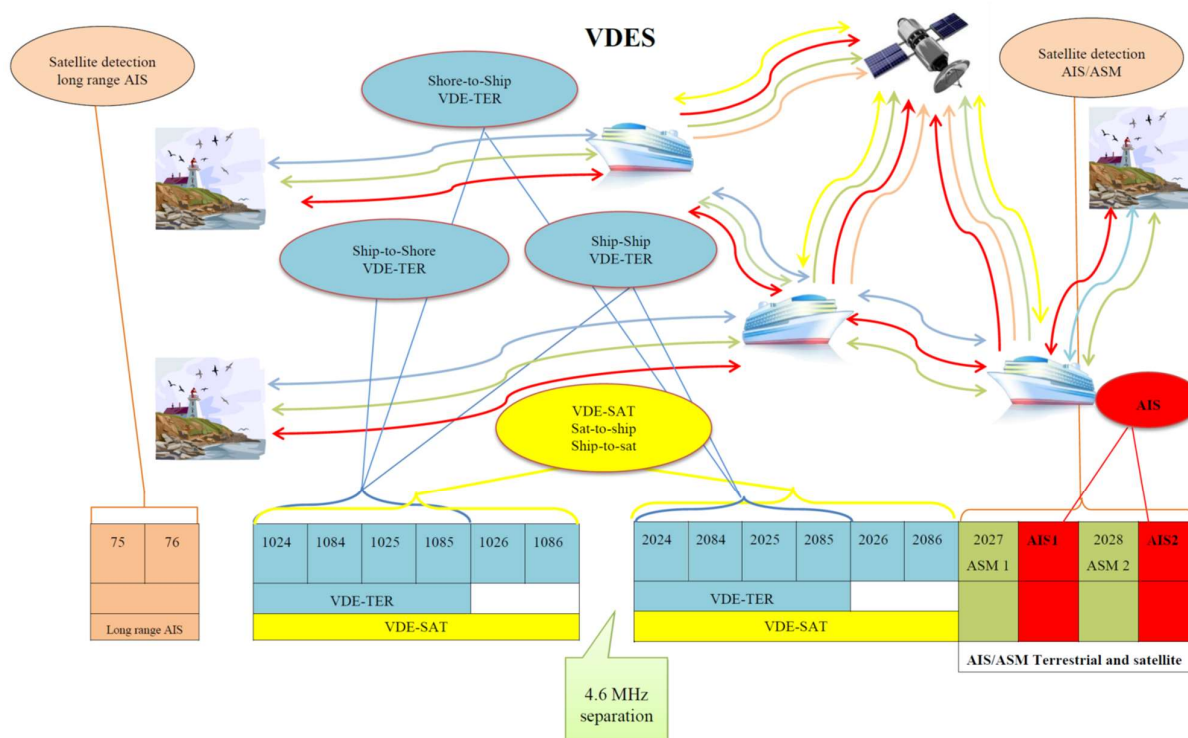
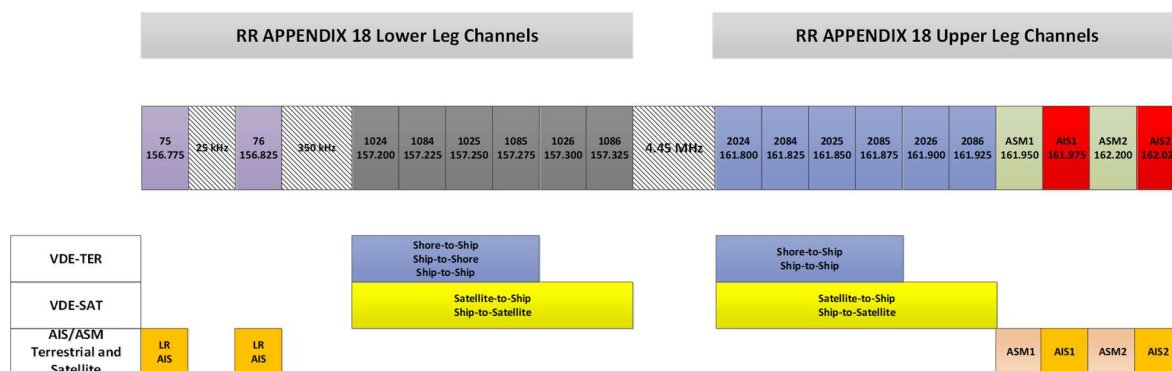


Figure 1 - VDES functions illustrated

5. VDES channel usage is revised in accordance with the revisions made by WRC-19 to RR Appendix 18

The channel usage between terrestrial stations and between satellite and terrestrial stations is described in Figure 2.



- AIS 1 and AIS 2 are AIS channels, used in accordance with Recommendation ITU-R M.1371, and are also used for receiving AIS messages by satellite.
- Channels 75 and 76 of Appendix 18 of the RR are used for receiving AIS messages by satellite for long range tracking.
- ASM 1 and ASM 2 are the channels used for ASM, and are also used for receiving ASM by satellite.
- The channels 1024, 1084, 1025 and 1085 are identified for ship-to-shore, shore-to-ship and ship-to-ship VDE, but ship-to-satellite and satellite-to-ship VDE may be possible without imposing constraints on ship-to-shore, shore-to-ship and ship-to-ship VDE.
- The channels 2024, 2084, 2025 and 2085 are identified for shore-to-ship and ship-to-ship VDE, but ship-to-satellite and satellite-to-ship VDE should be possible without imposing constraints on shore-to-ship and ship-to-ship VDE.
- The channels 1026, 1086, 2026 and 2086 are identified for ship-to-satellite and satellite-to-ship VDE and are not used by the terrestrial component of VDE.

6. Proposal

The signatory national administrations and international organizations propose that Working Party 5B consider this Preliminary Draft Revision of Recommendation ITU-R M.2092-0 (embedded file) at their July 2020 meeting.



PDR Rec. ITU-R
M.2092-0 rev.3.docx