Guideline on coordinated use of satellite VDES frequencies, Logical Channels and spreading code among satellite VDES operators

Approved by the 6th meeting of Working Group 1 on 19.03.2025 and by the VDES Alliance Board on 05.05.2025.

# Introduction

The VDES Alliance strives to be a global association consisting of maritime authorities, organizations, and industry members, who cooperate in testing and promoting the use of VHF Data Exchange (VDES) technologies.

VDES is a much faster AIS with terrestrial VDE and global coverage with satellite VDE. The VDES Alliance drives global VDES integration and testing efforts to enable services facilitated by VDES to be used by as many stakeholders as possible as soon as possible.

To help VDES adoption by the maritime community, the VDES alliance members also cooperate on marketing of the VDES technology and strive to develop methods for efficient use of the VDES technology. This guideline has been created by VDES Alliance contributing members.

## Scope of this document

This document provides guidelines for coordinated use of satellite VDES frequencies, Logical Channels and spreading code among satellite VDES operators. Whereas VDES Alliance Guideline G-1001 provide information on how satellite VDES operators should coordinate their use of satellite details, such as satellite ID, network ID, roaming ID etc, which allow clear distinction between VDES satellites and their operators, this guideline provide information on how satellite VDES operators should coordinate use of the available frequency resources to avoid interference on the transmission link between VDES satellites.

## Revision Information

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| Date | Version | Considered by | Comment |
| 2025-03-19 | 1 | WG1-6 (2025-03) | Approved by WG1 |
| 2025-05-05 | 1 | VDES Alliance Board | Approved by the Board |

## References

1. Recommendation ITU-R M.2092-1: Technical characteristics for a VHF data exchange system in the VHF maritime mobile band
2. VDES Alliance Guideline G-1001: Guideline on definition, assignment, and use of VDES satellite details
3. ITU Radio Regulations

#  Definition of key terms

This section defines the key terms used in this Guideline such as satellite VDES frequencies, Logical Channels and spreading code.

## Satellite VDES frequencies

The term satellite VDES frequencies refers to the frequencies that in the Radio Regulations are allocated to the Maritime Mobile-Satellite Service (MMSS) according to footnote **5.228AB** and **5.228AC** and identified for the satellite component of VDE in Appendix **18** for systems operating in accordance with most recent version of Recommendation ITU-R M.2092.

The satellite VDES frequencies are the same frequencies identified for the terrestrial component of VDE, and are within two frequency ranges in the maritime VHF band, 157.1875-157.3375 MHz and 161.7875-161.9375 MHz. See the latest version of Recommendation ITU-R M.2092 for details on the use of the satellite VDES frequencies.

Use of satellite VDES frequencies may be coordinated within a VDES satellite network by the network operator and among VDES satellite network operators to avoid interference situations among VDES satellites.

## Logical Channels

The physical frequencies used for satellite VDES are divided into Logical Channels. See the latest version of Recommendation ITU-R M.2092 for details on the use of Logical Channels by satellite VDES operators.

Use of Logical Channels may be coordinated within a VDES satellite network by the network operator and among VDES satellite network operators to avoid interference situations among VDES satellites.

## Spreading code

Some of the waveforms defined for use in satellite VDES utilize spreading code for increased robustness and probability of correct signal demodulation. See the latest version of Recommendation ITU-R M.2092 for details on the use of the satellite VDES spreading codes.

Use of the spreading code may also allow the use of the same logical channels on the same frequency simultaneously by VDES satellites, while each satellite signal still is possible to demodulate by a VDES receiver. Thus, use of spreading code may be coordinated within a VDES satellite network by the network operator and among VDES satellite network operators to avoid interference situations among VDES satellites.

## Service area

VDES Alliance Guideline G-1001 defines Service area as:

“The Service areas are areas where the VDES satellite regularly provides services and data exchange can be expected to be possible within a reasonable time.

The Service areas of a VDES satellite are assigned by the VDES satellite operator, and should be designated using well-known names of relevant sea areas or according to the International Maritime Organization (IMO) definition of NAVAREAs.

Service areas may be coordinated within a VDES satellite network by the network operator and among VDES satellite network operators to manage coverage and facilitate network sharing between VDES satellites and network operators.”

# Coordination among satellite VDES operators

This section provides guidelines for coordinated use of satellite VDES frequencies, Logical Channels and spreading code.

Satellite VDES operators are encouraged to coordinate and agree among themselves how they use satellite VDES frequencies, Logical Channels and spreading code for satellites with overlapping service areas. Satellite VDES operators should approach discussions on coordinated operations with the concept of fair use and access in mind, while taking due concern and consideration to existing operations and service provision. Noting that through cooperation and coordinated use of the available resources higher data throughput, performance and availability is possible for the concerned satellite operators.

## Satellite VDES frequencies

Satellite VDES operators may coordinate use their use of satellite VDES frequencies through different approaches, including frequency division and time division.

### Coordinated use of frequencies through frequency division

Satellite VDES operators may coordinate their use of satellite VDES frequencies by formal or informal agreement on use of the available frequencies in a shared manner by dividing the available frequency channels between them.

Examples of such coordinated use through frequency division include agreement between satellite VDES operator A and satellite VDES operator B to use frequencies as follows:

Example 1: Satellite VDES operator A will use the RR Appendix 18 lower leg frequencies identified for VDES, channels 1024, 1084, 1025, 1085, 1026 and 1086, while Satellite VDES operator B will use the RR Appendix 18 upper leg frequencies identified for VDES, channels 2024, 2084, 2025, 2085, 2026 and 2086.

Example 2: Satellite VDES operator A will use the four lowest channels identified for VDES in both lower and upper leg of RR Appendix 18, channels 1024, 1084, 1025, 1085, 2024, 2084, 2025 and 2085, while Satellite VDES operator B will use two upper channels identified for VDES in both lower and upper leg of RR Appendix 18, channels 1026, 1086, 2026 and 2086.

The above are just examples to illustrate the concept. Coordinated use of the satellite VDES frequencies through frequency division can be arranged in any permutation possible between two or more satellite VDES operators, both static and dynamic, considering the minimum bandwidth needed for satellite VDES transmissions according to the most recent version of Recommendation ITU-R M.2092.

### Coordinated use of frequencies through time division

Satellite VDES operators may coordinate their use of satellite VDES frequencies by formal or informal agreement on use of the available frequencies in a shared manner by dividing the available transmission and receive time between them.

Examples of such coordinated use through time division include agreement between satellite VDES operator A and satellite VDES operator B to use frequencies as follows:

Example 1: Satellite VDES operator A will use the satellite VDES frequencies between 00:00UTC and 12:00UTC, while Satellite VDES operator B will use the satellite VDES frequencies between 12:00UTC and 00:00UTC.

Example 2: Satellite VDES operator A will use the satellite VDES frequencies for one hour every third hour, while Satellite VDES operator B will use the satellite VDES frequencies for the remaining time.

The above are just examples to illustrate the concept. Coordinated use of the satellite VDES frequencies through time division can be arranged in any permutation possible between two or more satellite VDES operators, both static and dynamic, considering any minimum time needed for efficient satellite VDES operations according to the most recent version of Recommendation ITU-R M.2092.

## Logical Channels

Satellite VDES operators may coordinate their use of satellite VDES Logical Channels by formal or informal agreement on use of the available Logical Channels in a shared manner by dividing the available Logical Channels between them.

Example of such coordinated use include agreement between satellite VDES operator A and satellite VDES operator B to use Logical Channels as follows:

Example 1: Satellite VDES operator A will use the satellite VDES Logical Channels 1 and 2, while Satellite VDES operator B will use the remaining satellite VDES Logical Channels.

The above are just an example to illustrate the concept. Coordinated use of the satellite VDES Logical Channels can be arranged in any permutation possible between two or more satellite VDES operators, both static and dynamic, considering any minimum Logical Channel resources needed for efficient satellite VDES operations according to the most recent version of Recommendation ITU-R M.2092.

It is understood that logical channel coordination is beneficial for those satellites which provide overlapping service areas, using the same VDES frequencies, spreading codes, etc. Furthermore, it is noted that, logical channels are defined by each satellite operator and announced in the Satellite Bulletin Board. Use of logical channels normally require a resource request and a resource allocation managed by the satellite which defines the logical channels.

## Spreading code

Satellite VDES operators may coordinate their use of satellite VDES Spreading codes by formal or informal agreement on use of the available spreading codes in a shared manner by dividing the available spreading codes between them.

Example of such coordinated use include agreement between satellite VDES operator A and satellite VDES operator B to use spreading codes as follows:

Example 1: Satellite VDES operator A will use a specified set of the satellite VDES spreading codes, while Satellite VDES operator B will use the remaining satellite VDES spreading codes.

The above are just an example to illustrate the concept. Coordinated use of the satellite VDES spreading codes can be arranged in any permutation possible between two or more satellite VDES operators, both static and dynamic, considering any constraints on use of spreading codes required for efficient satellite VDES operations according to the most recent version of Recommendation ITU-R M.2092.

## Service area

Satellite VDES operators may coordinate their use of satellite VDES resources geographically by formal or informal agreement on satellite VDES operations over service areas in a shared manner by dividing the available service areas between them.

Example of such coordinated service area operations include agreement between satellite VDES operator A and satellite VDES operator B to operate over different service areas as follows:

Example 1: Satellite VDES operator A will operate and provide services to specified geographical areas, such as one or more NAVAREAs or other to be defined service areas, while Satellite VDES operator B will operate and provide services elsewhere.

The above are just an example to illustrate the concept. Coordinated satellite VDES operations to service areas can be arranged in any permutation possible between two or more satellite VDES operators, both static and dynamic, considering any minimum or maximum service area size needed for efficient satellite VDES operations according to the most recent version of Recommendation ITU-R M.2092.

## Combined and hybrid coordination approach

Satellite VDES operators may use a combined and hybrid coordination approach for efficient use satellite VDES resources. A combined and hybrid coordination approach involves a formal or informal agreement between satellite VDES operators on satellite VDES operations through the combination of two or more of the resource sharing approaches listed above.

Example of such combined and hybrid coordination approaches include agreement between satellite VDES operator A and satellite VDES operator B to operate as follows:

Example 1: Satellite VDES operator A will operate and provide services to specified geographical areas, such as one or more NAVAREAs, or other to be defined service areas, using the satellite VDES Logical Channels 1 and 2 on the RR Appendix 18 lower leg frequencies identified for VDES, channels 1024, 1084, 1025, 1085, 1026 and 1086, for one hour every third hour, while Satellite VDES operator B will operate and provide services to the specified service areas using the remaining logical channels, frequencies and time available.

The above are just an example to illustrate the concept. Coordinated satellite VDES operations can be arranged in any permutation possible between two or more satellite VDES operators, both static and dynamic, considering any minimum or maximum resources needed for efficient satellite VDES operations according to the most recent version of Recommendation ITU-R M.2092.