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Draft Guidelines on VDES resource sharing and coordination/cooperation

# 1 Summary

Work item of “Develop Guidelines on VDES resource sharing and coordination/cooperation” has been approved by the Council in 2022 for a work of DTEC, as shown in the list of IALA Committee work programme 20223-2027 with the following description:

“Develop a guideline that provides framework of VDES resource sharing and coordination / cooperation for VDES satellites providers, VDES land-stations and VDES users to realize smooth and effective VDES communications on both official and private communications.”

This document provides the fourth draft of the Guidelines to be considered and discussed at DTEC4, possibly within WG3. It is necessary to develop message protocols for various VDES use cases in order to realize VDES resource sharing and cooperation/coordination.

## 2 RELATED DOCUMENTS

IALA G1060, G1117,

ITU-R M2092-1

ENAV EM1 5.1.3.1, DTEC1- 5.1.3.5. DTEC2-5.2.3.4, DTEC3-5.2.3.2

# 3 Background

WRC 2019 agreed to allocate VHF channels to VDES including for VDES satellite communications. In near future, there will be available several VDES satellites and VDES land stations world-wide.

Maritime development of digital transformation (Maritime DX) has been started in maritime sectors (maritime transport and logistics), and standardization activities for digital data exchanges between ships and land-based station has started in the internationally, for example, at International Organization for Standardization (ISO).

In recent years, activities for establishment of VDES communications, that include both terrestrial and satellite communications, has started.

Maritime Safety Committee (MSC) of International Maritime Organization (IMO), at its 103rd session (MSC103) held in May 2021 agreed a new work item for introduction of VDES into the International Convention of Safety of Life at Sea (SOLAS) and will start the actual consideration from 2023 at the Sub-Committee on Navigation, Communication, Search and Rescue (NCSR) of IMO for two years. This will allow VDES as an alternative of AIS and furthermore as a communication way for maritime safety and e-navigation.

10th session of NCSR (NCSR10) met in June 2024, and developed draft amendment to SOLAS chapter V for use of VDES as an alternative of AIS, as well as draft performance guidelines of VDES for such purpose. NCSR10 also discussed other use of VDES, such as use for maritime emergency and safety communications. However, NCSR10 agreed that, before considering mandatory installation of VDES equipment onboard ships, it would be necessary to consider and determine the purpose of use of VDES. In the other words, NCSR10 recognized that any clear proposal for use cases of VDES within GMDSS would be required to use VDES within GMDSS, so that amendments to SOLAS chapter IV for GMDSS could be started.

11th session of NCSR (NCSR11) will meet in May 2025 and will finalize the draft amendments to SOLAS chapter V to make use of VDES as an alternative of AIS. It is also expected that NCSR11 will finalize the draft IMO performance standard for VDES for use under the amendments of SOLAS chapter V.

IALA has developed Guidelines on VHF Data Exchange System (VDES) – IALA G1117 and its third edition has been published since December 2022. This guideline provides many potential uses of VDES, such as use for MASS (Maritime Autonomous Surface Ships), Position, Navigation and Timing, Search and rescue communications, safety related information exchange, Ship routing, Vessel traffic services, charts and publication, route exchanges, logistic services, maritime domain awareness and disaster response. These usages of VDES can be realized by service providers. These usages also can be provided by a team of providers by collaboration, particularly in case to provide usages worldwide.

In these circumstances, IALA shall lead the collaboration on VDES communication services for establishment of international cooperation and resource sharing and management on VDES terrestrial and satellite communications, taking into account the possible use cases prescribed in IALA G1117.

he development of Guidelines for VDES resource sharing and coordination/cooperation has been added as a work item of DTEC Committee for 2023-2027.

# 4 Discussion

After DTEC1, activities on development for establishment of VDES communication systems both terrestrial and satellite VDES in some regional areas.

International activities for establishment of VDES alliance has been on-going. The alliance may provide an actual implementation of VDES resource sharing.

There is an increasing demand of ship-land (company) communication for monitor and control of the ships from land-based stations (company offices/control stations), VDES is one of the expected communication tools for this purpose.

In the above use cases, long-distance communication between ships and land-based stations will become necessary. Therefore, VDES resource sharing and cooperation will be beneficial.

DTEC3 also recognized another proposal for establishment of Guidelines for VDES shore infrastructures proposed by the Republic of Korea, and agreed to avoid any duplication of contents of the Guidelines of resource sharing and guidelines on land-based infrastructures.

Taking into account the issues above, the forth draft of Guidelines on VDES resource sharing and coordination/cooperation has been developed and attached in Annex to this document for the consideration of the DTEC Committee.

# 5 Action requested of the Committee

The Committee is invited to:

1. Consider, possibly at WG3 the draft guidelines on of VDES resource sharing and coordination and cooperation, attached to the annex of this document;
2. continue the task group to develop the guidelines with the coordinator of Japan (Mr. Koichi Yoshida, OPRI Japan; yoshida@rime.jp) for further development of the guidelines; and
3. take actions as appropriate.

Any comments and proposals are welcome to

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\* \* \*

ANNEX

Preliminary draft

Guidelines for VDES Resource sharing coordination and cooperation

Draft04:2025-02

# 1 BACKGROUND

VDES communication shall follow ITU-R M.2092-1. IALA G1117 provides many possible usages of VDES. Under these circumstances. It would be beneficial to share and coordinate VDES resources (land-based stions, satellite stations) In order to realize the usages of VDES.

The distance of direct communication of VDES is limited due to the characteristic of VHF. Development of VDES (ship stations, land stations, satellites) have been started by different developers for various use cases. In order to realize such use cases and extend the communication distance and capability, cooperation and coordination among VDES systems is anticipated.

IALA initiated a new task “Develop a Guideline for VDES resource sharing and coordination/cooperation” proposed by Japan in 2021. The objective of the task is to develop a guideline that provides framework of VDES resource sharing and coordination / cooperation for VDES satellites providers, VDES land-stations and VDES users to realize smooth and effective VDES communications on both official and private communications.

# 2 Purpose of the document

This document provides guidelines on methodology of VDES resource sharing, coordination and cooperation to those who wish to join such international activities as voluntary basis. This document does not provide regulatory or obligatory framework on operation of VDES.

# 3 Related documents

1. ITU-R M.2092-1, *Technical characteristics for a VHF data exchange system in the VHF maritime mobile band,* February 2022
2. IALA G1117, *VHF Data Exchange System (VDES) Overview,* December 2022
3. IALA G1181, *VDES VHF Data Link (VDL) Integrity Monitoring*, December 2023
4. IALA G…….. VDES Authentification Guidelines
5. IALA G…….. Guidelines for VDES shore Infrastructure

# 4 Definitions

For the purpose of this guidelines, definitions in ITU-R M2092-1 and IALA G1117 and followings apply:

(to be developed while developing the guidelines)

[resource]

[participants]

# 5 PARTICIPATIONS to resource sharing and coordination/cooperatioN

# 5.1 Principle

Since VDES communication can be used both official communication for safety on sea and marine environment protection and private communication, among VDES satellites, ships, vessels, crafts and land-based station. It is also important to protect the freedom and confidentiality of the VDES communication in the resource sharing and coordination/cooperation.

# 5.2 Participation

The resource sharing and coordination/cooperation of VDES communication can be established among those who wish to participate based on the principle in 5.1.

# 6 METHODS FOR VDES RESOURCE SHARING and COORDINATION/cooperation

## 6.1 Basic concept

The international coordination and cooperation on VDES resource sharing can be implemented by various types of bodies (governmental organizations, NGOs, private sectors) which operate VDES communications. Such bodies that wish to coordinate and cooperate VDES communication should provide specifications of their system (e.g., terrestrial stations, satellites) and coordinating methodologies (e.g., roaming or other methods).

Some of the examples of the cooperations will be as follows:

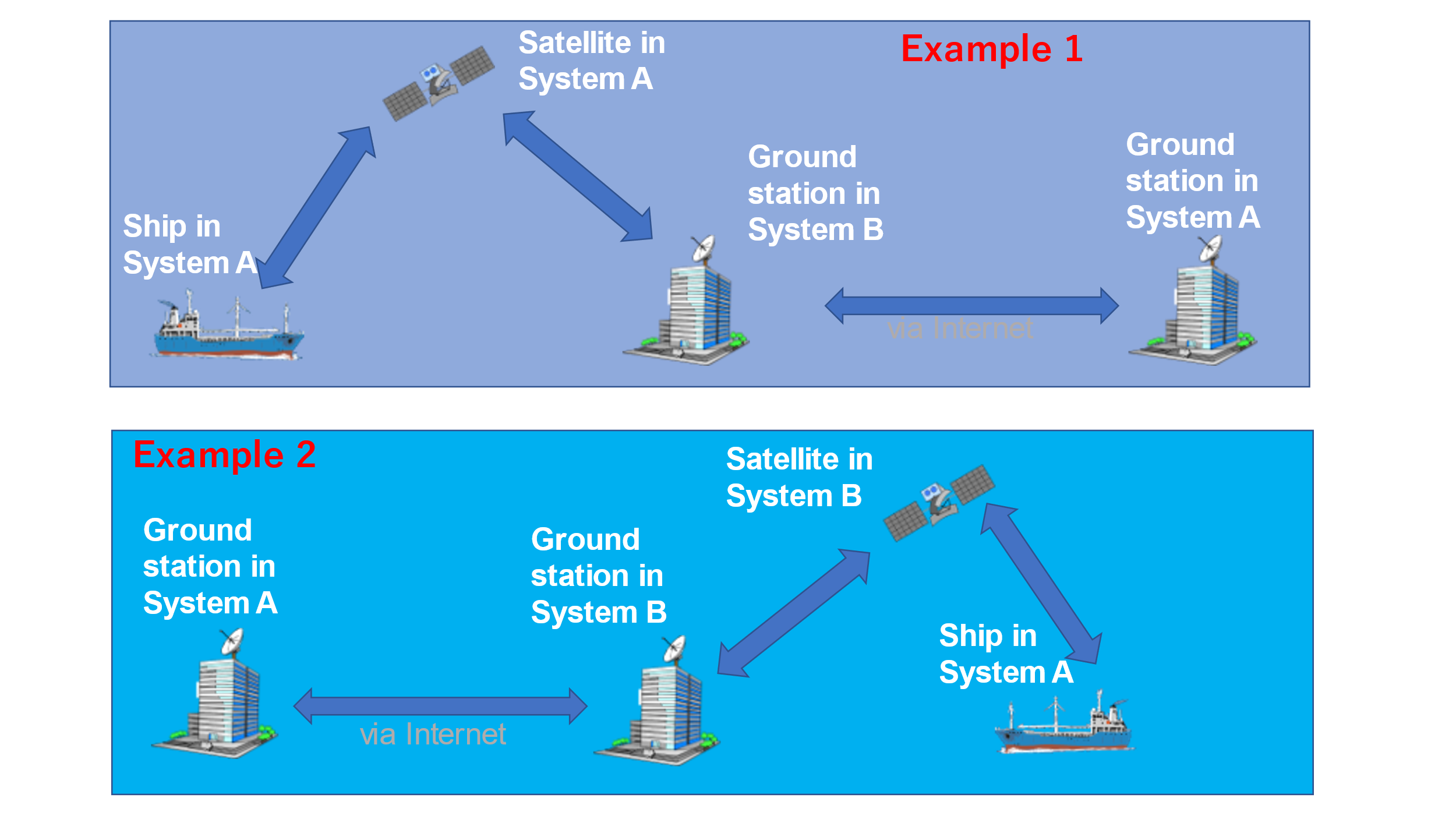
Example 1: A ship joining VDES system A communicates with a satellite of VDES system A. The contents of the communication are downloaded from the satellite to a land-based station of another VDES system under the coordination/cooperation agreement. The contents of the communication are transferred to a land-based station of VDES system A through internet. See Figure 1 Example 1.

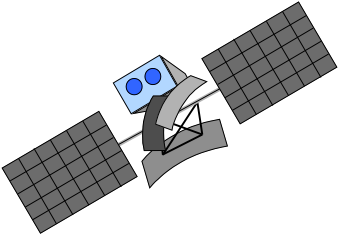
Example 2: A ship joining VDES system A can communicates with a satellite of VDES system B under the coordination/cooperation agreement. The contents of the communication are downloaded from the satellite to a land-based station of VDES system B. The contents of the communication are transferred to a land-based station of VDES system A through internet. See Figure 1 Example 2.

Example 3: A ship joining VDES system A can communicates with a satellite of VDES system B under the coordination/cooperation agreement. The contents of the communication are downloaded from the satellite of VDES system B to a land-based station of VDES system A under the coordination/cooperation agreement. See Figure 1 Example 3.

Example 4: A ship joining VDES system A can communicates with a ship joining VDES system B under the coordination/cooperation agreement. The ship joining VDES system transfer the message from the ship joining VDES system A to a land-based station of VDES system B under the coordination/cooperation agreement. Then, contents of the communication are transferred to a land-based station of VDES system A through internet. Or a ship joining VDES system A can directly communicates with a land-based station of VDES system B. See Figure 1 Example 4.

Communication and data transfer between land-based stations should follow the Guidelines for shore infrastructure [5].





**Satellite in System B**

**Example 3**

**Ground station in System A**

**Ship in System A**

**Ship in System A**

**Ship in System A**





**Example 4**

**Ship in System B**



**Ground station in System B**

**Ground station in System A**

**Ship in System A**





Figure 1

Examples of VDES coordination/cooperation

## 6.2 Communication Protocols

The bodies participating to the resource sharing and coordination/cooperation of VDES communications shall follow IRU-R M2092-1, and shall share the following items:

1 protocol of communication to be shared;

2 Coverage of land-based stations (control station of communication);

3 specifications of land-based stations (control station of communication);

4 protocols of communication of satellites;

5 protocol of communication between/among land-based stations (via internet)

[6 more to add if necessary]

## 6.3 Technical requirements/specifications for VDES resource sharing and coordination/cooperation

**6.3.1 Architecture of messages**

The participants of VDES resource sharing and coordination/cooperation shall be capable of handling of VDES messages that follow IALA G1117and ITU-R M2092-1.

It would be preferable to establish agreements among/between the participants on what architecture of messages would beused/handled.

Architecture of messages should follow IALA G 1117 (clause 2.2.1).

Authentication of messages should follow IALA G1117 (clause 2.2.2) and IALA Guidelines on VDES Authentication [4].

NOTE: For consideration and development of VDES resource sharing and coordination/cooperation, the Guidelines should specify technical methods and procedures of VDES resource sharing that realize the VDES communication exchanges (various usage of VDES based on IALA G1117) among the member of the body. This may include upper layers of protocols of VDES communications based on the ITU-R M2092-1. Such technical consideration and development may require participation of scientists/engineers and take a longer period. However, it also may require a development of onboard satellite system beforehand the implementation of the international cooperation on VDES resource sharing, therefore, the technological methods and procedures of VDES communication for resource sharing should be conducted as soon as possible.

An additional draft is to be added at DTEC4).

Points of consideration (possibly be discussed at DTEC4 WG3).

* Protocol of VDES messages to shared and coordinates shall follow ITU M2092-1. The basic concept is described in ANNEX B and C of IALA G1117.
* Protocols of AIS and ASM are specified in ITU M1371-5 and M2092-1.
* Protocol of VDE for various use cases would be developed. Protocol of VDE for use cases should be shared within IALA, preferably by recommendation documents.
* VDES satellites and land-based station should have capability of handling protocols of VDE of use cases, and the performance/capability should be shared among the bodies joining the resource sharing and cooperation/coordination of VDES.
* Protocol of communication between/among land-based stations should be established.

## 6.4 Operational requirements/specifications for VDES resource sharing and coordination/cooperation

NOTE1: For consideration and development of VDES resource sharing and coordination/cooperation, the Guidelines should specify operational methods and procedures of VDES resource sharing that realize the VDES communication exchanges (various usage of VDES based on IALA G1117) among the member of the body.

NOTE2: it would be beneficial and necessary to have input from VDES alliance.

(An additional draft is to be added at DTEC4).

Points of consideration (possibly be discussed at DTEC4 WG3).

* Methods and protocol of communication between/among land-based stations should be established.
* Notification method of occurring of VDES data transferring should be developed.
* (more consideration on operation)

# 7 METHODS AND PROCESS of ESTABLISHMENT OF AGREEMENT ON VDES RESOURCE SHARING AND COORDINATION and Cooperation

(to be developed)

**8 IMPLEMENTAION OF VDES RESOURCE SHARING AND COORDINATION AND COOPERATION**

(to be developed)

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1. Leave open if uncertain [↑](#footnote-ref-2)