Input paper: [[1]](#footnote-1) ENAV23-3.1.17

Input paper for the following Committee(s): check as appropriate Purpose of paper:

**□** ARM **□** ENG **□** PAP **x** Input

**x** ENAV **□** VTS **□** Information

Agenda item [[2]](#footnote-2) 3

Technical Domain / Task Number 2

Author(s) / Submitter(s) China Maritime Safety Administration

Recommended to add Independent field about IP-Port to VDES Messages To support VDES service gateway addressing mode application

# Summary

The E-Navigation application service and VDES are in a heterogeneous network, and the data interaction between the VDES application terminal and the E-Navigation application service needs to be established by establishing a VDES service gateway. This proposal mainly discusses the addressing mode of the VDES service gateway, and proposes to further improve the VDES message structure to achieve a wider application of VDES.

## Purpose of the document

The Committee is invited to consider this proposal.

# Background

The standard specifications of ITU M.2092 and IALA G1139, which are closely related to VDES, have been developed. The shipboard connectivity test has also been tested and verified internationally, but the VDES communication solution of E-Navigation Application Service has not been fully considered. In view of the fact that E-Navigation application service and VDES are in heterogeneous networks, data interaction needs to be established by VDES service gateway. The China Maritime Safety Administration and the E-Navigation project construction experience propose the following VDES service gateway solution.

# Discussion

The shipboard application terminal needs to access the E-Navigation Service，First, look up the E-Navigation Service URL and calling method on the MCP. Then Service invocation send destination service identifier, interface and related parameters to the VDES shore-based system. VDES application terminal can transmit messages to nearby Base Station with MMSI of Base Station.MMSI can be obtained from the base station bulletin board message or ASM 6\_message.

In order to achieve the link between the ship and the shore, the "Destination ID" in VDE and ASM messages in VDES must be the MMSI of nearby VDES Base Staion, After the shipborne terminal data enters the VDES shore-based system, the data payload needs to be further sent to the corresponding service interface for processing. Since the "Destination ID" has been used to identify the Base Station, the service interface needs to be distinguished in the data payload. There are two options for service interface identification. One is to use the virtual MMSI for identification. The other is to use the IP:Port in the IP network to identify it. The following section discusses how to identify the service destination address in the data payload.

1. VDES communication using virtual MMSI as service identifier

Since the IP:Prot is used as the unique identifier in the IP network, for example Internet. if design the virtual MMSI to identify the service in the VDES, you need to create the IP:Port-virtual MMSI mapping table. The virtual MMSI can refer to the specific service. To implement the IP:Port-virtual MMSI conversion function need VDES service gateway. The VDES service gateway interprets virtual MMSI with the VDES data payload by a fixed number of bytes. Therefore, it is recommended to use the virtual MMSI instead of the MRN. The virtual MMSI, interface, parameters, etc. need to be provided in the data payload of the VDES. The VDES shore-based system determines the direction of message routing based on IP:port which convert from virtual MMSI contained in the data payload.

According to the operating mode of the MCP, the service should be registered and released first. Currently The IP:Port-virtual MMSI mapping method is not considered in IALA G1139. In addition, MCP cannot be Internet center. More and more services cannot be registered in the MCP. There are no other Internet services registered in the MCP, Since the virtual MMSI is not allocated, the shipborne terminal cannot access these destination services.

2.The use of general IP: Port as a service identification VDES communication

If the data payload directly uses the IP\_destination:Prot identifier service interface in the VDES Messages, the VDES service gateway can also interprets the IP\_destination and Prot with fixed byte data, and encapsulates it into the TCP/IP packet as the destination address and port parameters. The VDES service gateway use VDES service gateway IP and allocates a object-session port for the each VDES message, encapsulates it as a source IP address and port parameter into a TCP/IP packet. At this point, the VDES service gateway can create IP\_destination: Prot - IP\_source: Prot - MMSI mapping table is used to track and process the returned data.

The VDES service gateway puts the encapsulated TCP/IP packets into the IP network for routing. The packet arrives at the destination server in the IP network. After the server provides the service response, the TCP/IP data packet is also generated. The feedback data is returned to the VDES service gateway in the IP network. The VDES service gateway searches for the local IP\_destination: Prot - IP\_source: Prot - MMSI mapping , can know about MMSI of the original initiating terminal, and the VDES packet is re-encapsulated use the destination MMSI, to implement the conversion from the IP network to VDES network.

Aftershipboard receiving the VDES message, the VDES shipborne terminal can also convert the VDES network into a TCP/IP data packet , thereby realizing a shipboard from the VDES network-IP network. In this way, VDES supports multiple shipboard applications for different devices.

3. It is recommended to add independent dedicated field about IP:Port in the VDES message of the destination server.

Adding the IP:Port of the server for independent identification to the VDES message is very necessary and can bring beneficial benefits:

* The VDES service gateway does not need to interpret the data payload, and finally can transmit the encrypted data.
* Support VDES shipborne terminals to concurrently access different destination services simultaneously, without causing data interference;
* Support VDES shipborne terminals to access internet services, can enlarge VDES application domain;
* Support multiple shipborne terminals on the ship to share VDES communication services at the same time, which is convenient for E-Navigation system application expansion.

# References

1. IALA G1139

# Action requested of the Committee

The Committee is requested to consider the proposals and take action as appropriate.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)