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

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

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

Agenda item [[2]](#footnote-2) 11

Technical Domain / Task Number 2 …………………………………

Working Group WG3

Author(s) / Submitter(s) Korean Register of Shipping

AIS/ASM/VDE Message Classification between VDES-TER Station and external service provider or message data generator

# Summary

This paper suggests and provides relevant information on the method of using the port number of the Transport Layer header as means of identifying the message type for selecting the radio channel transmission path when transmitting/receiving the AIS, ASM and VDE messages between the external service provider and the terrestrial VDES station.

## Purpose of the document

The purpose of this paper is to provide contents of research related to measures to identify AIS, ASM and VDE messages conveyed to the terrestrial VDES station.

## Related documents

* ITU-R M.2092-0: Technical Characteristics for a VHF data exchange system in the VHF maritime mobile band
* IALA Guideline 1117 Ed.1: VHF data exchange system (VDES) overview
* IEC 61162 Series: Maritime navigation and radio communication equipment and systems — Digital interfaces

# Background

ITU Standard for VDES(VHF Data Exchange System), Recommendation ITU-R M.2092-0 was approved in WRC-15. This Recommendation provides the technical characteristics of a VDES which integrates the functions of VHF data exchange(VDE) and application specific messages(ASM) and the automatic identification system (AIS) in the VHF maritime mobile band. It is assumed that VDES will provide radio-communication capability to support IMO’s e-navigation strategy including ship-to-shore and shore-to-ship data exchange.

Republic of Korea has initiated a new development project to establish the test-bed for implementation of e-navigation strategy which is targeting mainly the domestic vessels within Korean coastal sea areas from 2016. This project will be completed by 2020 and VDES system is one of the parts of e-navigation project. Development of the VDES system is currently in progress.

According to Recommendation ITU-R M.2092-0, VDES is composed of 3 physical channels(AIS, ASM, VDE). However, unlike the physically separated transmission/reception radio channels, the transport layer that generates AIS, ASM, and VDE messages consists of one physical channel using the Ethernet line between the external application service providing equipment and the VDES station. When 3 types of AIS, ASM, and VDE messages are transmitted using this Ethernet line, the VDES station needs to classify such messages to assign them to physical channels. Therefore, criteria and method for classifying messages at the VDES Station are required.

# Identification vdes Message Type

## VDES message data path

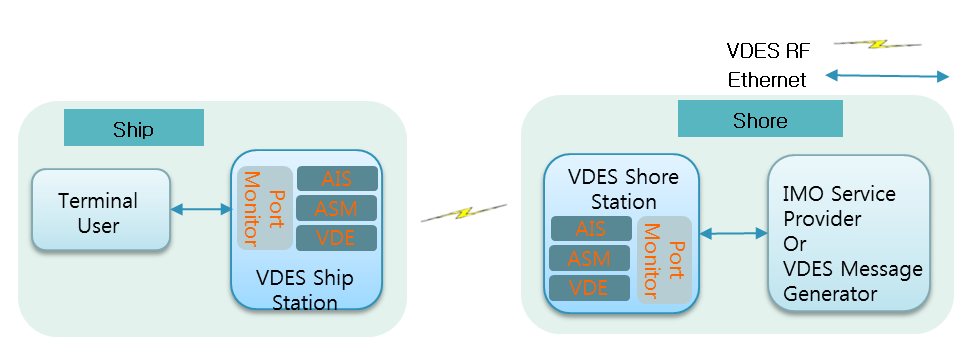


Figure 1. VDES system message pathway

VDES system is composed of ship and shore sides as shown in Fig.1. VDES shore station and ship station can identify the VDES messages which is generated by the terminal user and service provider into AIS, ASM, VDE using TCP/IP port number. It is assumed that VDES station is integrated by AIS, ASM and VDE in a transceiver according to ITU-R M.2092-0.

Main features are as following:

* Exchange messages from VDES shore station and service provider
* Exchange messages from VDES ship station and terminal user
* Exchange messages from VDES shore station and ship station through maritime RF channel.

## Classification of VDES messages

In the process of transmission and classification VDES message, when VDES station is entered messages through the Ethernet line with TCP/IP protocol, it is assumed that external application service provider or terminal user functions as a server, VDES station as a client.

**Ethernet Payload Input for VDES STATION :**

Application Payload

TCP/UDP

Header[PORT#]

IP

Header

Ethernet\_MAC Header

Etherent\_PHY Header

Figure 2. Ethernet frame structure input VDES station

When VDES messages are generated, should be marked the port number according to application data type. VDES station can classify input message to AIS, ASM, VDE as TCP/IP port number indication as shown Fig. 2 and assign the message to appropriate RF channel.

In case that the VDES messages are made by service provider or VDES message generator, the port number of message should be marked according to application data types(ex. AIS, ASM, VDE). It will help for VDES station to classify messages to AIS, ASM, VDE by using TCP/IP port number indication as shown Fig.2 and assign the identified messages to appropriate RF channel.

This process is specifically described in the fig.3 between shore station and application service provider server. This figure is explained about VDES shore station and external application service provider function as TCP/IP server and client. The shore station can identify VDES messages to AIS, ASM, VDE using the TCP/IP port number. The TCP/IP port number is marked by application service provider. VDES station can assign the transceiver channel with using this port information

Figure 3. TCP/IP server-client model example

Shore Station

<Client>

Application Service Provider

<Server>

TCP/IP

Socket

#60035

#60033

AIS Message, T/RX

ASM Message, T/RX

VDE G-Message, T/RX

VDE M-Message, T/RX

VDE U-Message, T/RX

#60034

VDE B-Message, T/RX

#600xx

TBD Message, T/RX

TCP/IP

Socket

#60030

#60031

#60032

#60035

#60033

#60034

#600xx

#60030

#60031

#60032

In the Table 1, TCP/IP port number and socket information is described. These are only examples showing how to use TCP/IP port number. It should be confirmed to harmonize with the IEC 61162-xxx and other related interface recommendation.

|  |  |  |
| --- | --- | --- |
| Port No. | Socket Name | Description |
| 60030 | AIS Message Socket | AIS message or corresponding data T/RX |
| 60031 | ASM Message Socket | ASM message or corresponding data T/RX |
| 60032 | VDE General Data Socket | VDE general message or corresponding data T/RX |
| 60033 | VDE Multicast Data Socket | VDE multicast message or corresponding data T/RX |
| 60034 | VDE Broadcast Data Socket | VDE broadcast message or corresponding data T/RX |
| 60035 | VDE Unicast Data Socket | VDE unicast message or corresponding data T/RX |
| 600xx | TBD | TBD |

Table 1. TCP/IP define in VDES presentation interface example

# Conclusion

This paper includes the method of classifying and processing AIS, ASM, and VDE messages at the VDES station for those generated by an external application service provider or a terminal user. Especially, when exchanging messages with TCP / IP protocol through wired Ethernet, AIS, ASM, and VDE messages are sorted for each port as a server/client model to mitigate the complexity of presentation interface, and it can be made possible to allocate to the designated radio channel without any additional identified information of each message.

# References

1. DNV GL Strategic, “SHIP CONNECTIVITY.” April 2015.
2. “Smart Grid Reference Architecture,” CEN-CENELEC-ETSI Smart Grid Coordination Group, Nov. 2012.
3. “NCSR 1-28 - Report to the Maritime Safety Committee, Annex 7” International Maritime Organization, Sub-Committee on navigation communications and search and rescue, Jul. 2014.
4. “MSC85-26, Report Of The Maritime Safety Committee On Its Eighty-Fifth Session, Addendum 1, paragraph 9,” Jan. 2009.
5. EfficienSea2 Project (No 636329) Deliverable D3.1 “Analysis Report on Maritime communication and infrastructure”

# Action requested of the Committee

The Committee is requested to review the information and take appropriate action. Hopefully, it would be applied to adopt IEC 61161-xxx for VDES PI.

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