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□ ENAV	□ VTS		□ Information

Agenda item	7.3 Connectivity
Author(s) / Submitter(s)	Secretariat

Draft proposal for VDES operational test-bed

1   BACKGROUND

The developments in maritime radio technology, including the introduction of software defined radios (SDR), coupled with enhanced capabilities for digital data exchange over existing VHF marine band spectrum, enabled the development of the VHF Data Exchange System (VDES). VDES builds on the experience gained through the development of AIS, and also provides the capability to transmit to a specific vessel (addressed); to all units in the vicinity (broadcast); to a group of vessels (addressed); or to a fleet of vessels (addressed). The VHF Data Exchange System is a digital data communications system that provides support for e-navigation developments as well as GMDSS modernization.

The development of VDES has occurred over a number of years, with clarification of technical details to ensure effective use of the terrestrial spectrum for VDE and ASM, as well as the satellite reception of ASM, as allocated by the International Telecommunications Union at the World Radio Conference 2015.

VDES is a system which includes AIS (no change); Application Specific Message (ASM) frequencies (allocated at WRC-15); VHF Data Exchange (VDE) Frequencies – Terrestrial (allocated at WRC-15); and VDE Frequencies – Satellite (under consideration for WRC-19).   To date, the focus of the activity has been on the lower layers of the Open Systems Interconnection (OSI) Model (**Erreur ! Source du renvoi introuvable.**).
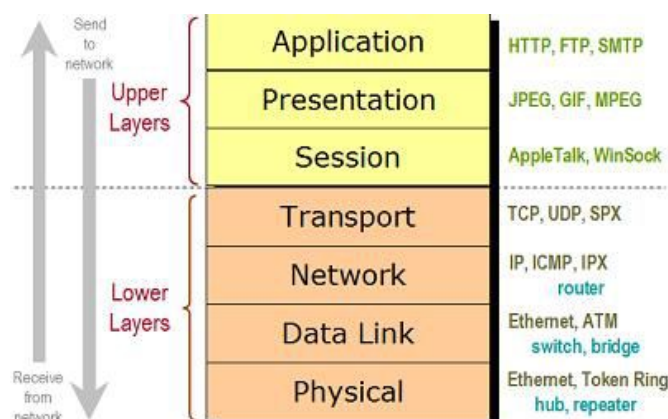

Figure 1 – OSI model

2   PROPOSAL

VDES technology has reached a point of maturity where units can be envisioned for practical implementation. As with AIS, the benefit of VDES will be seen when authorities provide data through VDES and ships are able to receive, and effectively display, the data. All aspects of the test-bed would look at the human centred design aspects, taking into account IMO MSC.1/Circ.1512 Guideline on software quality assurance and human centred design for e-navigation.

A three-step practical test bed is proposed. The test bed would focus on the upper layers of the OSI Model, looking at the operational aspects of VDES. The goal would be to confirm not only the data transmission using the agreed protocols, but also the practical aspects of transmission, reception and use of the data at an operational level. The proposal includes simulation of operational data throughput; implementation of VDES in portable pilot units with data from a shore station (shore/ship) and data to support port operations (ship/shore); implementation of onboard units with sensor input for automated ship-ship/ship-shore data transmission.

The test-bed objectives would include: verification of transmission; visualisation of information; integration of information in operations; and other aspects of human centred design for the higher levels of the OS layer.

2.1   Step 1 – Operational Simulation

Using a suitable maritime simulation facility, transmission of data of two to three use cases, using the agreed ASM frequencies.

2.2   Step 2 – Onboard operations - PPU

Working with a shore authority and a pilotage organisation, develop 2-3 PPUs with VDES and visualisation capability to operate with a VDES shore unit. Building on the simulation activity, transmit data for same, or similar, use cases.

2.3   Step 3 – Onboard operations – VDES unit

Working with a shore authority and identified test vessels, install VDES on two to three vessels; integrate with sensor data and simple vessel report templates from the vessels. Test-bed focus on weather sensors, state of health sensors for specific equipment, and report templates.

Data exchange ship/ship for weather data; ship/shore for weather, equipment sensor and template exchange.

Format use to include existing or developing S-100 series, where possible. This could include the new Port CDM format, for example.

3   REQUIRED

The test-bed requirements include: technical and operational input; test equipment; coordination of activities; and monitoring and analysis of results.

Funding sources: [?? Note – VDES unit costs probably in the range of 5K per – including pelican case, antenna, cabling / exclusive of shipping and handling charges (based on discussions with stone three)]

Access to simulation: [CSmart, the Netherlands? This would provide some Carnival support, could be 'in kind' support]

Technical expertise: [stone three / IMIS Global? Kongsberg, ???]

Operational expertise: [port authority; pilots; VTS; ??]

4   THE PANEL IS REQUESTED TO

Consider the draft proposal for VDES operational test-bed.