

Input paper for the following Committee(s):

- ARM ENG PAP
 ENAV VTS

Purpose of paper:

- Input
 Information

Agenda item

7.3 Connectivity

Sub item

7.3.1 VDES status and the attitude of coastal authorities

Author(s) / Submitter(s)

Personal communication to DSG

The progress of VDES and the influence of AIS and mandatory carriage

1. DATE

22nd June 2018.

2. DEVELOPMENTS

VDES has a revised VDE Link Layer being proposed and the ASM Link Layer is to be completed with few significant test beds or trials being deployed that use the total suite of AIS, ASM and VDE ship and shore station features.

3. PROGRESS IN THE COMMUNICATIONS AND MARITIME ENVIRONMENT

Progress is being made in the wider communications and maritime environment through:

1. The relentless progress of cellular telephone data technologies (LTE and now 5G) in terms of features, roll out and reducing costs continues
2. The drive to have autonomous vessels that are using proprietary solutions to satisfy operational and safety requirements

4. VDES CONCERNS

In discussion with maritime authorities and other maritime AIS centric network operators, the following concerns continue to be raised:

1. The lack of VDES progress with AIS, ASM and VDE ship and shore stations sides not yet being available in a single, viable unit that can be integrated and tested in the field
2. The lack of a readily available 'Killer Application' (R-Mode seems not to be mature enough today (June 2018) to claim the 'Killer Application' title and drive the mandatory carriage goal)
3. No solid and feature rich AIS technology shore or ship side foundation available to build on (see item 5 below)

The VDES technology for both ship and shore side needs to be finalised and trialled. Commercially viable VDES pilots need to be launched with early adopter users who have a good business case for its implementation. Mandatory Carriage of VDES continues to be a primary driver for global VDES adoption.

5. AIS AS THE FOUNDATION

5.1. The current issues with AIS

The current issues with AIS implementation include:

1. The lack of implementation on both the ship and shore side of the full suite of AIS features and messages that includes (by my reckoning) more than 190 separate messages and more than 200 separate information fields
2. The primary issues that seem to be at the root cause of the issue noted in 1) above are:
 - a. No Human Machine Interface (HMI) on the bridge of the vessel that allows the reception, display and response to a large portion of the 196 messages including those AIS messages contained in IMO Circular 289
 - b. The lack of a suitable HMI on the ship results in authorities not being willing to invest in the shore side infrastructure to transmit and receive the many Application Specific Messages and IMO Circular 289 messages that are within the AIS technology
3. It has long been an issue that the AIS environment contains faulty data (the extent of this issue is described in the except a paper and included as Appendix A). This could be because of one or more of the following:
 - a. Wrong AIS unit configuration
 - b. Wrong data input to the AIS by the vessel crew (i.e. Destination and ETA)
 - c. Faulty AIS installation
 - d. Faulty AIS message reception and decode of AIS data using unqualified AIS equipment (including low cost AIS receivers).

If AIS is the foundation of the VDES technology and VDES is to add value to the maritime domain by primarily enabling the transmission of Application Specific Messages and thus taking the load of the current AIS1 and AIS2 channels, then the issues highlighted above in 1), 2) and 3) above will need to be rapidly addressed.

The scale and effects of Autonomous Maritime Radio Devices (AMRD) on AIS needs to be considered. This could include making sure that the AMRD solutions take entire VDES ecosystem (ship and shore side) into account.

5.2. Potential solutions

The potential solutions include:

1. Working with ECS and ECDIS manufacturers to include all IMO Circular 289 AIS messages plus the Application Specific Messages listed on the IALA web site
2. Ensure that there is short term, low cost solution to get from the current Class A AIS Minimum Keyboard Display (MKD) to a feature rich HMI on an integrated bridge. This could include separate PCs / tablets / similar technology to decode and manage the AIS Circular 289 messages
3. Ensure that maritime authorities work with the maritime community to ensure proper AIS configuration, installation, operation and maintenance (and AIS software upgrade when and if required)
4. Support AIS authorities to implement the wide range of features and messages that are already available in AIS improving the information available to the mariner enabling their safety
5. Ensure that VDES is seen as:
 - a. A technology that includes both ship and shore side AIS, ASM and VDE
 - b. The natural extension of a well-developed and used shore side AIS service to the mariner
 - c. A candidate for mandatory carriage
6. Making sure that VDES gains momentum in test bed, trial and pilot phases leading to wider scale (global) adoption

7. Establishing an operations group that looks at the deployment, support and promotion of AIS (and all its current features) and then, as it becomes viable, VDES on both the ship and shore side with AIS as the basic building block of VDES

6. APPENDIX A - MAPPING GLOBAL SHIPPING DENSITY FROM AIS DATA

In a paper entitled: 'Mapping Global Shipping Density from AIS Data' by Lin Wu, Yongjun Xu, Qi Wang, Fei Wang and Zhiwei Xu of the Institute of Computing Technology, Chinese Academy of Sciences, Beijing, China and the University of Chinese Academy of Sciences, Beijing, China, the following statement is to be noted:

This paper analysed shipping density at a global scale with just over 2.5 years of data. The results of pre-processing showed that, among 1 998 200 distinct MMSIs recorded, 1 607 664 were suspicious: the average number of AIS messages broadcast by each of them was only 11.3. The remaining 390 536 MMSIs were used by 491 346 vessels.

The above indicates that only 390,536 MMSIs (19%) of 1,998,200 distinct MMSIs recorded over a period of 2.5 years were usable for their purpose.