Document Revisions (Title style)

International Association of Marine Aids to Navigation and Lighthouse Authorities

***AISM***Association Internationale de Signalisation Maritime ***IALA***

10, rue des Gaudines

78100 Saint Germain en Laye, France

Telephone: +33 1 34 51 70 01 Fax: +33 1 34 51 82 05

e-mail: [contact@iala-aism.org](mailto:iala-aism@wanadoo.fr) Internet: [www.iala-aism.org](http://www.iala-aism.org)

**IALA Recommendation**

**[X-###]**

**On**

**Introduction of VDES and protection of the AIS**

**Edition 0.0**

**DRAFT October 2014**

**[Previous Edition / Date Issued]**

Revisions to the IALA Document are to be noted in the table prior to the issue of a revised document.

|  |  |  |
| --- | --- | --- |
| **Date** | **Page / Section Revised** | **Requirement for Revision** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

IALA Recommendation on Introduction of VDES and protection of the AIS

(Recommendation X-####)

THE COUNCIL:

**RECALLING** the AIS system was harmonized by IALA to support Safety of Navigation, the efficiency of maritime transport and the protection of the environment;

**RECOGNISING** that the increasing use of ASM on the AIS frequencies, and the increasing number and diversity of AIS like devices is posing a threat to the original purpose of the AIS;

**NOTING that** VDES is under development;

**RECOGNISING** WRC15 under Agenda item 1.16 [is expected to]allocated frequencies for digital data exchange in accordance with the current draft recommendation for VDES;

**RECOGNISING ALSO** that future ASM would likely use an efficient modulation scheme identified in ITU-R M.1842, not necessarily GMSK;

**RECOGNISING** **FURTHER** that future ASM modulation may be variant, possibly on a slot basis, but would most likely use the same AIS slot structure;

**NOTING FURTHER that** ASM channels do not necessarily need to duplicate transmissions on both channels;

**CONSIDERING that** two alternate channels could in the short term be approved in the US or other regions for use of ASM using the current modulation scheme used by AIS;

**ALSO CONSIDERING that** radios do exist that could, with software modifications, transmit and receive ASM on alternate channels using GMSK modulation identical to AIS;

**CONCLUDES that** A transition from the current use of ASM which utilize AIS GMSK modulation on alternate channels to a future design use of ASM will be required; and

**RECOMMENDS** IALA members consider, that if equipment is being developed and licensed to support communication of ASM on additional ASM frequencies, in the iterim period before formal approval of the VDES recommendation (I-e- the period between the approval to use of these frequencies at WRC15 and issue of the ITU recommendation for VDES) that such equipment should be required to constrain its operation, to require a software update to further its operation, when an ITU recommendation for VDES enters into force.[do we need to (can we) specify an expiry date?] and take into account the considerations in ANNEX B.

.

Table of Contents

[Document Revisions (Title style) 1](#_Toc401145519)

[Table of Contents 4](#_Toc401145520)

[Index of Tables 4](#_Toc401145521)

[Index of Figures 4](#_Toc401145522)

[Annex (Title style) 5](#_Toc401145523)

[1 Introduction 5](#_Toc401145524)

[1.1 Heading 2 5](#_Toc401145525)

[1.1.1 Heading 3 5](#_Toc401145526)

[1.1.2 Heading 3 5](#_Toc401145527)

[2 Background 5](#_Toc401145528)

[2.1 Heading 2 again 5](#_Toc401145529)

[2.1.1 Heading 3 again 6](#_Toc401145530)

[3 Purpose 6](#_Toc401145531)

Index of Tables

[Table 1 Title required (Title goes above the table) 4](#_Toc216497068)

Index of Figures

[Figure 1 Title required (Title goes below the figure) 4](#_Toc216497075)

Annex A

**Rationale for recommendation of transition arrangements**

# Introduction

VHF Data Exchange System (VDES) is a technological concept developed by the IALA e-NAV Committee and now widely discussed at ITU, IMO and other organizations. VDES was originally developed to address emerging indications of overload of VHF Data Link (VDL) of AIS and simultaneously enabling a wider seamless data exchange for e-navigation, potentially supporting the modernization of GMDSS, both processes that are currently developed by IMO. VDES is capable of facilitating numerous applications for safety and security of navigation, protection of marine environment, efficiency of shipping and others. VDES will prospectively have a significant beneficial impact on the maritime information services including Aids to Navigation and VTS in the future.

* 1. Related documents

IALA Guideline (1095) on Implementation of Application Specific Messages;

IMO SN.1/Circ.289

WRC-15 Agenda Item 1.16

Rec. ITU-R M.1371-5

Rec. ITU-R M.1842-1

RTCM SC121 (ASM)

RTCM 12301.1 (digital small messages on VHF channels)

FCC 2014 NPRM on Parts 80 & 95, WT Docket 14-36 (incorporates RTCM 12301.1)

Draft IALA Guideline on VHF Data Exchange System

Design Considerations for VDES

# Discussion

## Primary purpose of AIS

AIS is a mandated system on board ships that meet carriage requirements to provide collision avoidance and ship identification. It is also comprised of shore infrastructure to monitor and manage the VDL. The AIS system gives ships and shore authorities the ability to quickly identify ships and their movements with the intention to ensure safe passage of all vessels through their waters.

## Additional use of AIS

Although the primary purpose of AIS is collision avoidance and identification of ships, it also has additional capabilities. Currently AIS is also used for Aids to Navigation (AtoN), Search and Rescue (SAR), additional safety related information, and several other message types that share additional information about ships or shore infrastructure. The AIS system supports these functions including Application Specific Messages (ASM) that allow for free form data packet exchanges with limitations.

## Threats to AIS

Understanding the power and flexibility of ASMs, and the potential for significant growth in this area, we begin to understand the threat this will pose to the basic purpose of AIS, collision avoidance and identification. This is already a problem in some areas, however it will occur more and more frequently with the implementation of new AIS devices such as the increase of Class B use. The issue will increase further with the implementation of e-Navigation and regional programs, unless mitigation steps are taken.

Further, the misleading use of AIS devices to meet other needs than originally intended, such as the use of AIS devices resembling a Class B or AIS SART or MOB device for tracking of fishing nets or oil spills, indicates that the AIS as a system is endangered by it’s widespread availability and inherent versatility.

The IALA ENAV committee recognize that future VDL loading as a serious potential problem, and has taken steps to protect the primary purpose of AIS by initiating the development of the communication platform necessary (VDES) to support e-Navigation.

## Problems and possible solutions

In the last few years IALA ENAV committee has analysed the use of AIS and the possible threats to the AIS system. Possible threats to AIS at the moment recognised are:

1. Intensive use of ASM’s now or in the near future;
2. Altering behaviour of AIS by authorities(AIS-Service Management);
3. Using AIS as a Short Message Service (SMS).
4. Use of AIS devices for applications outside the original purpose. It should be noted that, because of the versatility and flexibility of AIS, the market is producing AIS-like devices used to track fishing nets, very small vessels, icebergs, etc. These devices are causing significant disturbances to the AIS system. For example AIS MOB (man overboard) devices are being used for diving excursions. Such use is likely to cause undue distraction causing false alerts. In essence, AIS has become a victim of its own success.
5. Different national interpretation of approval requirements

By taking into account these threats, IALA e-Navigation Committee started by taking some actions to protect the AIS and also make the needed communication definitions to support e-Navigation. Some of the actions taken have been:

1. Made authorities aware of the threats. This was done with liaison note to COMSAR e-NAV10-26, liaison notes to MSC e-NAV9-4 and e-NAV7-4, which discussed the protection of the VDL. As a result IMO has issued Resolution MSC. 347(91).
2. Shared information about ASM’s. In addition to the standard messages in ITU-R M.1371series, there is also a collection of ASM’s. ([www.e-navigation.nl](http://www.e-navigation.nl));
3. Created a Guideline (1095) on Implementation of Application Specific Messages;
4. Frequencies were requested from ITU for the future and near future. ITU has fully supported this initiative and allocated frequencies for test use of the VDES;
5. Working toward a new robust communication system for maritime safety of navigation (VDES).
   1. Need for a transition solution

Although there are currently many ways to exchange data, most of these systems only work near shore infrastructure and need a subscription for the service so they are more expensive. Furthermore they require extra equipment on board and/or on shore.

As we progress toward a solution to the issues that we face, AIS will continue to be the inexpensive and widely available system until such a time that VDES is fully operational around the world.

For the time being, to protect the main purpose of AIS, it is proposed to move ASMs, and AIS-like devices, off the AIS1 and AIS2 frequencies.

The currently estimated roadmap for the development of VDES indicates, that a final ITU recommendation is not likely to be in place approximately until the end of 2017.

In the future the VDES is expected to resolve this problem. However in the interim period between the availability of frequency allocations for ASM and VDE, and the finalization of an ITU recommendation for the VDES, a transition mechanism offloading the AIS is needed.

4 channel AIS radios do exist that could be used to move some of the ASM to the two ASM channels which would serve to improve ASM communications and to reduce VDL loading of AIS channels in high traffic areas. If these were implemented with software, it would enable 4 channel AIS radios to employ AIS modulation to use the additional channels. This scheme, would provide a way forward for administrations in urgent need of reducing the escalating load on AIS datalink, during the ITU allowed test period for ASM and VDES.

1. ANNEX B

# To be developed