ENAV20-11.18.1

**Draft Deliverable 1.12-1**

**Report on Review of IALA documentation related to VHF Data Exchange System – proposed changes and text**

# DOCUMENT STATUS

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## Document History

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## Review

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# Introduction

In WP1 of EfficienSea 2, IALA leads Task 1.3: Coordinating standardization of solutions. IALA manages the work In Task 1.3, preparing reports and deliverables in conjunction with the other members of the Task Group (CIRM, UKHO).

# Document

This document provides a general overview and detailed review of the IALA documentation that may require amended to refer to, or include, VHF Data Exchange System (VDES).

The document includes proposed amendments to IALA documents, including draft text to be used as appropriate.

# Proposed future structure

Noting the review of existing AIS related documentation, it is apparent that there is opportunity to review, revise and consolidate information to better serve the needs of the IALA membership.

The revised IALA documentation structure includes:

**Standards**: IALA Standards form a framework, implementation of which by all coastal states will harmonize marine aids to navigation worldwide. IALA standards cover technology and services and are non-mandatory.

**Recommendations**: IALA Recommendations specify what practices shall be carried out in order to comply with a Recommendation, and may be referenced, in full or in part, in an IALA Standard.

**Guidelines**: IALA Guidelines describe how to implement practices normally specified in a Recommendation.

**Manuals**: IALA Manuals provide a broad overview of a large topic or identify specific elements for general use – for example, IALA NAVGUIDE; IALA VTS Manual; IALA Maritime Buoyage System and IALA Dictionary.

**Model Courses**: IALA Model Courses provide guidance on the training of AtoN related personnel (VTS, AtoN Managers, AtoN Technicians)

The typical relationship with Standards, Recommendations and Guidelines highlights the hierarchal aspect of the documentation – whereby the higher level documents are developed to provide guidance to decision makers on a specific topic, while the lower level documents provide operational and technical details required to implement the element.

## VDES specific documentation

For VDES (which includes AIS) the structure proposed is:

IALA Standard – Digital Communications Technologies

IALA Recommendations / Guidelines[[1]](#footnote-1):

|  |  |  |
| --- | --- | --- |
| Recommendation | Implementation of VDES shore service (based on existing A-123) | Use of VDES in provision of Aids to Navigation Services (based on existing A-126 / note how this relates to O-143) |
| Guidelines | Overview of VDES (operational and technical aspects) | Management and monitoring of VDES (based on existing 1050) |
|  | Networking aspects of VDES (based on existing A-124 series) | Use of VDES for aids to navigation and information exchange (includes authorisation based on existing 1062, 1072, 1081, 1084, 1098 – consolidation) |

A transition process will be required to reach this, with steps identified to address the status of existing documentation and outcomes of recent IALA events / meetings regarding consolidation and enhancement of documentation.

## AIS / VDES related documentation

The following documents are identified for review:

* Verify how A-126 and O-143 interact (overlap?)
* Verify how V-145 and Guideline 1114 interact
* Review e-Nav-140 to confirm how this fits with V-145 and Guidelines 1113 and 1114
* Review Guideline 1033 – confirm if still relevant / valid.
* Review Guideline 1046 – confirm if still relevant / or if information could be included in another document
* Review Guideline 1058 for possible consolidation with 1057; note similar concepts to 1078 and 1104.
* Review and merge Guidelines 1062, 1072, 1081 and 1084 (outcomes of Korea Virtual AIS AtoN workshop)

## General comments:

* When an IALA document is withdrawn, recommend leaving reference on the website to the document number with indication of withdrawn, and date the document was removed.
* When an IALA document is superseded by another document or has been merged in a new document, recommend leaving reference on the website to the document number, with indication of what document has superseded / combined with and the date this was done.
* Where documents are related – such as V-128 and associated guidelines, recommend including the reference on the website and, if possible, providing a ‘grouped’ reference with notification on the left-hand panel. Reference to the appropriate guideline(s) / recommendation(s) should also be included in the document revisions section.
* Update VTS training link on the left-hand panel of the IALA documents website to include a landing page with all related VTS training documents.

# VDES sample text for IALA Documents

## Recommendations

Generic text provided – it will be required to verify slight amendments to fit with specific recommendations.

* Add in a ‘Recognising Further’ statement with recommendation text:

**Recognising Further** that the International Telecommunications Union (ITU), at the World Radio Conference 2015, approved a standard for the VHF Data Exchange System (VDES), Recommendation ITU-R M.2092-0.

* Add in a ‘Noting Further’ statement with recommendation text:

**Noting Further** that IALA has developed Guideline #### - an Overview of VDES.

* Add in a ‘Recommends further statement with the recommendation text and adapt to suit the recommendation:

**Recommends further** that National Members and other appropriate authorities providing aids to navigation services note the developments of VDES and the implications for provision of *[AIS and VDES shore based services] [VTS]...*

List of Recommendations to be amended is provided in Table 1 – note additional text requirements for specific recommendations as per the table.

Table – List of IALA Recommendations to be amended to include reference to VDES

| Doc Type / Number | Doc Name | Key points | Amendment Required? | When | Priority – H, M, L |
| --- | --- | --- | --- | --- | --- |
| IALA Documents[[2]](#footnote-2) - Recommendations | | |  |  |  |
| A-123 Ed.2 - June 2007 | Provision of shore based AIS | Highlights the requirement for members to establish AIS shore stations to respond to the SOLAS Chapter V, Reg. 19 (2.4) indication that AIS ship units can exchange information with the shore. | Yes – review required in general (old document); reflect VDES base station. Do minor update now / put in transition framework for more details as VDES BS develop. | Short term  &  Mid term | H |
| A-124 Ed. 2.1 (base document) - December 2012 | Networking aspects of AIS (main document) | Indicates technical elements of networking AIS shore stations as part of an AIS service.  Series of appendixes refer. | Yes – for immediate time, update to ref VDES; put in transition framework for more details as VDES develops further. Suggest general overhaul of the A-124 series to be more streamlined and reduce extraneous references to appendixes that have never been developed / are unnecessary. | Short term  &  Mid term | H |
| A-124 Appendix 0 Ed 1 - December 2012 | References, Glossary of Terms and Abbreviations | As indicated | Yes – add in VDES definition now; put in transition framework for additional definitions in future.  More general – verify how this fits with IALA Dictionary – consider discontinuing if details fit in Dictionary. | Short term  Longer term | H |
| A-124 Appendix 1 Ed 1 - December 2011 | Basic AIS Services | Presents the basic aspects of AIS as a defined set of items – supports interaction between the AIS and other shore-based technical services / links to the IALA Common Shore-Based System Architecture (CSSA). | Yes – add in overview para of VDES now; put in transition framework for more complete revision as VDES develops. | Short term  &  Mid term | H |
| A-124 Appendix 4 Ed 1 - December 2011 | Interaction and data flow model of the AIS Service | Looks at the AIS aspects within overall data flow considerations. | Yes – add in overview para of VDES now; put in transition framework for more complete revision as VDES develops. Data flow more generally within the digital radio context (including VDES, which includes AIS) will need further review and development. | Short term  &  Mid term | H |
| A-124 Appendix 5 Ed 1 - December 2011 | Interfacing model of the AIS Service | Identifies all interface points of the AIS Service, both M2M and HMI elements. | Yes – add in overview para of VDES now; put in transition framework for more complete revision as VDES develops. Interface points more generally within the digital radio context (including VDES, which includes AIS) will need further review.  Note – how does this fit with CSSA developments? | Short term  &  Mid term | H |
| A-124 Appendix 9,10 & 11 Ed 1 - December 2012 | Functional Description of the AIS Service Components | Core document for the functional description of AIS. | Yes - add in overview para of VDES now; put in transition framework for more complete revision as VDES develops. Functional descriptions for all aspects will evolve in VDES.  Confirm how this fits with use cases for VDES – functional description of VDES. | Short term  &  Mid term | H |
| A-124 Appendix 12 Ed 1 - December 2012 | Co-location issues at AIS Physical Shore Stations and on-site infrastructure considerations | Covers the possibility of an AIS-PSS being co-located with other AIS equipment, or  with non-AIS equipment suites which may or may not utilize shared antennas and/or network connectivity. | Yes - add in overview para of VDES now; put in transition framework for more complete revision as VDES develops. VDES development is looking at options re co-location or equipment, antennae, etc. | Short term  &  Mid term | H |
| A-124 Appendix 14 – Ed 2 - December 2011 | FATDMA Planning and Operation of an AIS Service | Provides information on why, and how, to do FATDMA planning. | Yes - add in overview para of VDES now; put in transition framework for more complete revision as VDES develops. | Short term &  Mid term | M |
| A-124 Appendix 17 – Ed 1 - December 2011 | Channel Management by an AIS Service | Provides information on channel management, noting that channel management is an activity that requires careful planning. | In essence, Yes – add in overview para of VDES now. However, noting the ongoing discussions re channel management, put into a transition framework to verify if required in the future. | Short term  &  Longer term | M |
| A-124 Appendix 18 – Ed 1 - December 2011 | VDL Load Management | Presents considerations and best practices when conducting AIS VDL Load management. | Yes – update to reflect the input to ITU on AIS VDL load issues / impacts and add in section on VDES. This could be a new section 6 – coming after additional design considerations. | Short term | H |
| A-124 Appendix 19 – Ed 1 - December 2011 | Satellite AIS Considerations | Presents the concepts of Sat AIS reception. | Yes – add in overview para on VDES, noting specifically Sat aspects. Include section on ASM developments post WRC-2015 (sat reception).  More general considerations re Sat aspect of VDES. | Short term  &  Longer term | H |
| A-126 – Ed. 1.5 – June 2011 | Use of AIS in marine aids to navigation service | Notes opportunities for using AIS to assist in the provision of an AtoN service. | Yes – add in overview para on VDES | Short term | M |
| V-103 ed2.1 - December 2013 | Training and Certification of VTS Personnel | Includes a series of model course (V-103/1; V-103/2; V-103/3; V-103/4; and V-103/5) | V-103 Ed 2.1 – no  V-103/1 – Yes (where AIS referenced)  V-103/2 – no  V-103/3 – Yes (where AIS referenced)  V-103/4 – no  V-103/5 – Yes (where AIS referenced / include in table1) | Short term  Short term  Short term | M  M  M |
| V-145 Ed 1 - June 2011 | The Inter-VTS Exchange Format (IVEF) service | Presents IVEF as a common framework for the exchange of vessel traffic information / vessel traffic image between shore-based e-navigation system. | Yes – mid-term time frame (link to AIS Shore side update A-123; A-124 appendixes) | Mid-term | L |
| O-138 – Ed. 1- Dec 2007 | The Use of GIS and Simulation by AtoN Authorities | Links to Reg 13 of SOLAS re AtoN and notes the benefits of GIS and simulation techniques in assisting AtoN authorities in assessing the requirement for, and provision of, AtoN. | Yes – add in overview para noting the link to AIS within the document. | Short term | M |
| O-139 – Ed 2 – December 2013 | Marking of man-made offshore structures | Identifies options to mark the increasing number of man-made structures as sea – including those that may be isolated or in groups, and in various locations. | Yes – add in overview para on VDES. | Mid-term | M |
| O-143 – Ed 1.1 – May 2013 | Provision of virtual AtoN | Recognises the value of virtual AtoN, as well as the issues and concerns. Also notes the need to display information. (Guideline 1081 refers). | Yes – add in overview para on VDES. | Mid-term | M |
| e-Nav-142 – Ed 1 – December 2009 | Maritime Data Sharing ‘IALA-NET’ | Recognises the development of vessel tracking technologies and capabilities and recommends that National Members participate in IALA-NET. | Yes – short reference to VDES, noting AIS is part of VDES. Also, as VDES develops, requirement for / desire to share information is expected to grow. | Short term  &  Longer term | L |
| e-Nav-144 – Ed 1 – June 2011 | Harmonized implementation of application specific messages (ASM) | Refers to chapters V, Regulation 4, 10 and 13 of SOLAS as well as link to ITU. Highlights the need to harmonise ASMs and notes that IALA holds a registry of ASMs. | Yes - add in overview para on VDES. | Short term | M |
| e-Nav-146 – Ed 1 – December 2011 | Strategy for maintaining racon service capability | Notes the development of NT Radars; the changes in development of S-band radars (not to trigger Racons – IMO MSC Resolution 192(79); the potential role of AIS. | Yes – amend section 5.6 – non-radar technology. Could also include text in section 6 – strategy. | Short term | M |

# Guidelines

Paragraphs to be used as appropriate in the specific guidelines, noting the need to tailor to each specific topic. List of Guidelines to be amended is provided in Table 1 – note additional text requirements for specific recommendations as per the table.

Where appropriate, link to other IALA or E2 documentation on VDES (IALA Guideline #### VDES Overview; IALA Guideline #### VDES Technical Overview; Doc X – Maritime Digital Communications Strategy; etc.)

Reference to tables or figures in this document has not been formatted, noting this will be done when the text is captured in the relevant IALA Guideline.

## Draft text for Guidelines

General overview, links to e-Navigation

The current environment for maritime navigation is complicated, unsynchronised and un-ergonomic. Navigational and communications equipment are not designed to specifically integrate with each other, creating difficulties which lead to frustrations for the mariner and can result in creating dangerous situations. Maritime Communications Systems are evolving to embrace enhanced digital capabilities within the existing framework of maritime mobile spectrum allocations.

The VDES should improve the safety of life at sea, the safety and efficiency of navigation, and the protection of marine environment and enhance maritime safety and security. These goals will be achieved through efficient and effective use of maritime radiocommunications, incorporating the following functional requirements:

1. As a means of AIS.
2. As a means of radiocommunications equipment through exchange of digital data between ship and ship, ship and shore including satellite via AIS, Application Specific Messages (ASM) and VHF Data Exchange (VDE).
3. As a means of applications external to the VDES equipment itself. These applications use AIS, ASM or VDE separately or combined.

Almost every e-Navigation solution currently foreseen depends upon efficient and robust ship-ship, ship-shore or shore-ship electronic data transfer. Existing communications systems may, in many places, be adequate to serve these needs, but it may be necessary to develop new methods to realise the full potential of e-Navigation. The performance requirements, in particular data capacity, for communications systems to support e-Navigation are, in many cases, unknown and are likely to change over time.

VDES is seen as an effective and efficient use of radio spectrum, building on the capabilities of AIS and addressing the increasing requirements for data through the system. While VDES will include AIS as it currently exists, new techniques providing higher data rates than those used for AIS is a core element of the enhanced capabilities of VDES. Furthermore, VDES network protocol is optimized for data communication so that each VDES message is transmitted with a high confidence of reception.

Anticipated use of VDES

Table XX provides an overview of the anticipated use for VDES as a complete system which includes AIS, ASM and VDE.

*Table XX*  ***– Example of anticipated VDES communications including AIS, ASM, and VDE***

|  | ***VHF Data Communications (including ASM and VDE)*** | | ***AIS*** | |
| --- | --- | --- | --- | --- |
| **Sub-group** | ***Data communications for ASM*** | ***Data communications for VDE*** | ***AIS for safety of navigation*** | ***AIS long range*** |
| **Radio channels** | * *Channels 27 and 28* * *World-wide dedicated channels (WRC-15 target)* | * *Channels 24, 84, 25, 85, 26, 86 for VDE* | * *AIS-1 & AIS-2 (simplex)* | * *Channels 75 and 76 (simplex)*   *(as agreed at WRC-12)* |
| **Functionality** | * *Marine safety information* * *Marine security information* * *SSRMs* * *General purpose information communication* | * *General purpose data exchange* * *Robust high speed data exchange* * *VDE satellite uplink and downlink (to be confirmed WRC-19)* | * *Safety of navigation* * *Maritime locating devices* | * *Satellite detection of AIS* * *Possible support of future SAR* |
| **Message types** | * *IMO SN.1/ Circ.289 international application specific messages* * *Regional application specific messages* * *Base Station* | * *To be defined* | * *Vessel identification* * *Vessel dynamic data* * *Vessel static data* * *Voyage related data* * *Aids to Navigation* * *Base Station* | * *Satellite detection of AIS* * *Possible support of future SAR* |
| **Sub functionality** | * *Area warnings and advice* * *Meteorological and hydrographic data* * *Traffic management* * *Ship-shore data exchange* * *Channel management* | * *High message payload* * *VDE satellite uplink and downlin0 (to be confirmed WRC-19)k* | * *Ship to ship collision avoidance* * *VTS* * *Tracking of ships* * *Locating in SAR* * *VDL control (by Base Station)* | * *Detection of vessels by coastal states beyond range of coastal AIS base stations* |

Outcomes of WRC-2015 VDES

At the World Radio Conference 2015 the International Telecommunications Union identified 6 frequencies in the VHF maritime mobile band for the use of digital data transfer. The frequencies form part of the developing VHF Data Exchange System (VDES). With the ability to group the new frequencies together to provide a larger band for data transfer, the VDES will enhance digital data functionality in the future.

Implementation of VDES has commenced, building on the allocation of spectrum at WRC-15 where the ITU approved a standard for VDES, Recommendation ITU-R M.2092-0. A remaining outstanding issue is the approval of the satellite component for the VDE channels which is targeted for approval at WRC-19.

System Concept

The VDES concept was originally proposed to address emerging indications of overload of the VHF Data Link (VDL) of AIS and simultaneously enable a wider seamless data exchange for e-navigation, potentially supporting the modernization of GMDSS. In addition, VDES could support the increasing communications requirements identified through the development of E-Navigation, as documented in the E-Navigation Strategic Implementation Plan (SIP).

The purpose of e-navigation is to enhance berth-to-berth navigation and related services for safety and security at sea and protection of the marine environment. E-navigation seeks to enhance maritime safety through simplification and harmonization of information. In addition, e-navigation seeks to facilitate and increase efficiency of maritime trade and transport by improved information exchange.

The system concept, including VDES functions and frequency usage are illustrated pictorially in Figure YY (full system, including Satellite allocations)



Figure YY - VDES functions and frequency use – full system

Applications related to VDES

The applications related to the VDES address the following assumptions and dependencies:

1. ASM and VDE operate within the existing AIS environment.
2. VDES respects and supports requirements for GMDSS communications, including SAR, urgency, and safety related messages.
3. VDES applications are uniquely identified.
4. The VDES related applications operate in a manner that ensures there is no unnecessary repetition of messaging.

Frequency allocation

VDES incorporates AIS, AIS Long Range, Application Specific Messages (ASM) and VHF Data Exchange (VDE). The frequencies agreed at WRC-15 are identified below. While the VDE frequencies were agreed for terrestrial use, the intention is to have these available for satellite use (as noted in the table). The frequencies will be highlighted at WRC-19, following extensive studies between WRC-15 and WRC-19.

The baseline for VDES spectrum allocation is according to the frequency utilisation plan illustrated in Figure X



Figure X - VDES functions and frequency use

Table XX presents the channel allocation of VDES.

| Channel number in RR Appendix 18 | Transmitting frequencies (MHz) for ship and coast stations | |
| --- | --- | --- |
| Ship stations (ship-to-shore)  (long range AIS)  Ship stations (ship-to-satellite) | Coast stations  Ship stations (ship-to-ship)  Satellite-to-ship |
| AIS 1 (87B) | 161.975 | 161.975 |
| AIS 2 (88B) | 162.025 | 162.025 |
| 75 (long range AIS) | 156.775 (ships are Tx only) | N/A |
| 76 (long range AIS) | 156.825 (ships are Tx only) | N/A |
| 2027 (ASM 1) | 161.950 (2027) (SAT Up1) | 161.950 (2027) (SAT Up1) |
| 2028 (ASM 2) | 162.000 (2028) (SAT Up2) | 162.000 (2028) (SAT Up2) |
| 24/84/25/85 (VDE 1)  24  84  25  85 | 100 kHz channel  (24/84/25/85, lower legs, merged)  Ship-to-shore  Ship-to-satellite (SAT Up 3) | 100 kHz channel  (24/84/25/85, upper legs, merged)  Ship-to-ship, Shore-to-ship  Satellite-to-ship under certain conditions (SAT2 possible extension) |
| 157.200 (1024) | 161.800 (2024) |
| 157.225 (1084) | 161.825 (2084) |
| 157.250 (1025) | 161.850 (2025) |
| 157.275 (1085) | 161.875 (2085) |
| 26/86  26  86 | 50 kHz channel  (26/86, lower legs, merged) VDE 2  Ship-to-satellite (SAT Up3) | 50 kHz channel  (26/86, upper legs, merged)  Satellite-to-ship (SAT 1) |
| 157.300 (1026) VDE 2, SAT Up3 | 161.900 (2026) (SAT 1) |
| 157.325 (1086) VDE 2, SAT Up3 | 161.925 (2086) (SAT 1) |

Table XX – Channel allocation for VDES

VDES Technical aspects

The VDES includes:

1. Antenna(s), capable of transmitting and receiving data through terrestrial and satellite link.
2. An AIS as set out in resolution MSC.74(69) ANNEX 3.
3. A multi-function data communication and timing process that is interoperable with AIS, ASM and VDE.
4. A multi-function transmitter, capable of operating on the designated AIS, ASM and VDE frequencies.
5. Multi-function receivers, capable of operating on the designated AIS along with ASM and/or VDE frequencies.
6. A means to automatically input data from other sources.
7. A means to automatically output data to other devices.
8. A means of ensuring the integrity of the data.
9. A means to automatically or manually update the device software as needed.
10. Functionality of built in test equipment (BITE).

VDES itself, as a transport layer, has no defined method of managing presented load. This will be addressed by bulletin board which will announce which traffic can be presented at any particular time. This could be priority based (e.g. priority 1 to 32 essential services and 33 to 64 for non-essential services) or simply be essential versus non-essential services based.

The transfer of data using VDES should consider that the available VDES data transfer capacity is shared by all users within the coverage range of a VDES base station. Data transfers are recommended to be limited to messages that can be transferred within a short time frame (measured in seconds) within the system being used (channel bandwidth, modulation type and base station design dependent).

VDES shore infrastructure

As VDES includes AIS, existing shore side infrastructure for AIS will continue to be effective. When planning equipment maintenance cycles, upgrading or installing new shore based infrastructure, IALA Members and other appropriate authorities providing aids to navigation should keep in mind the development and implementation of VDES. To future proof installations, action can be taken to install software defined radios (SDRs) that are capable to addressing the technical aspects of VDES. In addition, access to information for display, monitoring and recording purposes should take into account the frequency allocations and additional expected data throughput.

For VDES operation:

* vessels will need to have a VDES transmitter / receiver capability (including HMI and integration) and the appropriate antenna. AIS is integral to VDES. There will need to be a transition period with AIS / VDE / ASM implementation.
* Shore stations need to update AIS shore service with VDES transmitter/receiver capability, HMI / integration with other shore technologies; and appropriate antenna.
* VDES will require installation of software definable radios (SDRs) which enables the grouping of spectrum.

OSI 7 layer implementation

The VDES shore side infrastructure considers the following:

1. OSI 7 layer implementation
2. System Topology Concept
3. Radio frequency performance
4. ASM and VDE packet format
5. VDES base station connection
6. The Terrestrial Bulletin Board (TBB)

The VDES architecture should utilize the open systems interconnection layers 1 to 4 (physical layer, link layer, network layer, transport layer) as illustrated below in table X.

|  |  |
| --- | --- |
| Layer | Description |
| 1 | Application layer |
| 2 | Presentation layer |
| 3 | Session layer |
| 4 | Transport layer |
| 5 | Network layer |
| 6 | Link layer |
| 7 | Physical layer |

Table X- Seven layer OSI model

Power requirement

[suitable text for expected electric load change with VDES – specific to IALA Guideline 1067-1]

VDES and Aids to Navigation

As VDES includes AIS, VDES will have a similar role to play in the provision of aids to navigation. In addition, VDES incorporates ASM frequencies, which can be used to support the provision of information through the system. Some aspects of existing AIS use, including some information provided through AIS to support aids to navigation, can be moved from the core AIS 1 and AIS 2 to the new frequencies. Examples can include the AtoN authority monitoring requirements (status of health of the AtoN); and information on hydrography / meteorology that is being provided for the authority and not directly provided to the mariner.

Within a VDES environment it may be possible to have information provided through multiple frequencies to address the needs of the different user groups. For example, base information on the AtoN could be provided through AIS (for ship use) and monitoring information on the AtoN could be provided through VDE or ASM (depending on data packet size).

Table - List of IALA Guidelines to be amended to include reference to VDES

| Doc Type / Number | Doc Name | Key points | Amendment Required? | When | Priority – H, M, L |
| --- | --- | --- | --- | --- | --- |
| IALA Documents[[3]](#footnote-3) - Guidelines | | |  |  |  |
| 1008 – Ed 2 – June 2009 | Remote control and monitoring of aids to navigation | Provides advice on how to develop an effective, modern system when a management decision has been made to employ electronic monitoring. | Yes – currently includes AIS AtoNs noting monitoring options. In VDES there could be effective monitoring opportunities.  Put in transition framework for more revision as VDES develops | Short term  &  Long term | M |
| 1033 – Ed 1 – Dec 2003 | Provision of AtoN for different classes of vessels, including high-speed craft | Responds to developments in larger and faster vessels, and the need to provide appropriate AtoN. This includes provision of AtoN for HSC and other different classes of vessels. | Yes – noting the possibility for VDES to assist with additional AtoN aspects to support different classes of vessels.  Recommend the document is reviewed as a whole to determine if still valid / update. | Mid term | M |
| 1046 – Ed 1 – June 2005 | Response plan for the marking of new wrecks | Developed after the wreck of the Ticolor, noting the need to mark wrecks in a timely and effective manner. Introduces the Emergency Wreck Marking Buoy. | Yes – references the use of AIS in different sections.  Could introduce a generic para on VDES initially, noting the document has not been reviewed since 2005. | Short term  &  Longer term | M |
| Guideline 1050  Dated: December 2005 | Management and monitoring of AIS | Looks at the management and monitoring of AIS information. Incudes limitations of AIS, use of AIS information for accident investigations, use of AIS data for planning and evaluation processes, design and implementation of AIS data storage, handling and processing systems. | Yes – requires amending.  Need to look at value of the document noting it hasn’t been updated since 2005 / compare with A-124. | Mid term  &  Longer Term (possible remove?) | M |
| 1057 – Ed 1 – December 2007 | Use of GIS by AtoN Authorities | Notes the use of Geographic Information Systems (GIS) may assist in effective AtoN planning, including evaluation and validation; ensuring that funds are invested wisely in new technology. Includes the use of AIS information as input data. | Yes – a generic para that notes AIS as part of VDES. In future, data from VDES may be able to provide additional information.  Note – document is likely due for review / revision soon. Could combine with 1058 | Short term  &  Mid term (if document full revision) | L |
| 1058 – Ed 2 – June 2011 | Use of simulation as a tool for waterway design and AtoN | The purpose of simulation for AtoN design, planning and evaluation is to identify and mitigate the risks (quantitatively) for the mariner operating in a specific waterway, channel and port area. It also includes evaluation (qualitatively) of channel layout, placement and technical specification of AtoN and manoeuvring aspects. (makes reference to 1057)  Simulation offers a relatively low cost method to help ensure that the AtoN solution provided meets the users’ requirements in an effective and efficient manner. | Yes – a generic para that notes AIS as part of VDES. In future, data from VDES may be able to provide additional information.  Could look to combine 1057/1058. Note similar concepts in 1078 and 1104. | Short term | L |
| 1062  Dated: December 2008 | AIS as an aid to navigation | Additional guidance on the use of AIS as an aid to navigation. Supports Recommendation A-126 | Yes – add in overview para on VDES,  Review and revise throughout based on developments of VDES | Short term  &  Longer term | M |
| 1067-1 – Ed 1  Dated May 2009 | Total Electric Loads of AtoN | Provides guidance when planning to power an existing or a new AtoN, including electronic AtoN (i.e. AIS AtoN) | Yes – add in overview para on VDES. Note power requirements for future VDES base stations. | Short term  &  Longer term | M |
| 1069  Dated: May 2009 | Synchronisation of lights | Provides guidance on the provision of synchronised lights as part of an AtoN system for marking channels, waterways, and specific areas with regard to improving the conspicuity of AtoNs, especially in areas where good conspicuity of aids to navigation is difficult to achieve due, for instance, to background lighting. | Yes – generic para on VDES, noting the possibility of using VDES to assist with synchronisation in the future. | Mid term | M |
| 1070  Dated: December 2009 | VTS role in managing restricted or limited access areas | Looking at when, and how, VTS manages traffic in restricted areas. | Yes – generic para on VDES, noting AIS part of VDES.  Could be options to enhance management of restricted areas in the future with VDES | Short term  &  Longer term | L |
| 1077  Dated: December 2009 | Maintenance of AtoN | Notes that maintenance is required to ensure that Aids to Navigation (AtoN) equipment and systems continue to perform at the levels required by mariners to safely navigate the world’s waterways. A maintenance system should be adopted to ensure that AtoN assets deliver the desired performance while minimizing Total Ownership Cost. | Yes – generic para on VDES, noting AIS part of VDES / VDES base stations future link with AtoN. | Mid term | M to L |
| 1078  Dated: June 2011 | The use of AtoN in the design of fairways | Notes the objective is to define a suitable AtoN mix that enables safe and efficient vessel passage in the most cost effective way for AtoN providers. | Yes – generic para on VDES, noting AIS is part of VDES.  Could look to combine 1057/1058. Note similar concepts in 1078 and 1104. | Short term  &  Longer term | L |
| 1079  Dated: Dec 2009 | Establishing and conducting user consultancy by AtoN authorities | Highlights the value in establishing and conducting user consultation when planning new AtoN or changes to their existing provision of AtoN. It is not restricted to the use of physical AtoN and other types of AtoN, such as VTS, AIS and applicable parts of e-Navigation should be considered. | Yes – generic para on VDES, noting AIS is part of VDES. | Short term | H |
| 1081 Ed 1.1  Dated: May 2013 | Provision of virtual aids to navigation | Provides guidance on the use of virtual AtoN risks and benefits, criteria for application, notification process, display, etc.  Notes the concept of virtual AtoN has roots in AIS but future means of transmission and presentation may evolve. AIS should not be construed as limiting virtual AtoN to that system. | Yes – add in generic para of VDES, noting AIS part of VDES. | Short Term | H |
| 1082  Dated: June 2016 | An overview of AIS | Provides an introduction to AIS at an overview level for shore authorities and references relevant documentation where further information can be found. | Yes – generic para on VDES, noting AIS part of VDES. | Short term | H |
| 1084  Dated: June 2011 | Authorisation of AIS AtoN | Refers to A-126 and Guideline 1062. Identifies a procedure to authorise AIS AtoN. | Yes – generic para on VDES, noting AIS is part of VDES. Note link to ITU and unique ID as this develops.  Recommend this is merged with Guideline 1062 in the future. | Short term  &  Longer term | M |
| 1085  Dated: June 2012 | Standard format for electronic exchange of AtoN product information | AtoN authorities are making wide use of various database centric online asset management systems for managing AtoN equipment. Once the information on a particular product is entered into the database the information can be accessed by all relevant stakeholders within an organisation.  If AtoN equipment information was provided by manufacturers electronically in an agreed format it would be able to be loaded easily into the AtoN authority’s systems, saving time and eliminating data entry errors. | Yes - generic para on VDES, noting AIS is part of VDES.  Review as a whole to see if there is any impact from VDES on the PIF. | Short term  &  Longer term | M |
| 1086  Dated: June 2012 | Global sharing of maritime data and information | Promotes IALA-Net. | Yes - generic para on VDES, noting AIS is part of VDES. | Short term | L |
| 1089  Dated: December 2012 | Provision of VTS (INS, TOS and NAS) | Gives guidance on the delivery of the three different types of services provided by a VTS; Information Service (INS), Traffic Organization Service (TOS) and Navigational Assistance Service (NAS). This guideline also aims to achieve consistency in the provision of the services worldwide in order to avoid confusion about the delivery of VTS services for the mariner trading between various jurisdictions. | Yes - generic para on VDES, noting AIS is part of VDES. | Short term | L |
| 1095  Dated: May 2013 | Harmonised implementation of ASMs | References IMO documents, ITU document and regional message. Provides means to harmonize establishment. | Yes – generic para on VDES, noting AIS is part of VDES.  As VDES developments, some ASMs will move off AIS 1 and AIS 2. Complete revision of guidance on ASM will be required.  Note inconsistent use of ‘z’ in harmonised / harmonized. | Short term  &  Longer term | H |
| 1096  Dated: May 2013 | Anticipated user e-Navigation requirements from berth to berth, for AtoN authorities. | Written prior to the release of the IMO e-Navigation implementation plan. References AIS, including AIS related to AtoN. | Yes – generic para on VDES, noting AIS is part of VDES.  May need to review as a whole now IMO has released the SIP. | Short term | M to H |
| 1097  Dated: May 2013 | Technical features and technology relevant for simulation of AtoN | Makes reference to guideline 1058, notes that 1097 provides greater technical guidance, supplementing 1058. | Yes – generic para on VDES, noting AIS is part of VDES.  Recommending reviewing both 1058 and 1097 with a view to merging in the future. | Short term | M to L |
| 1098  Dated: May 2013 | Application of AIS AtoN on buoys | Offers guidance regarding specification, installation and maintenance. Compliments A-126. | Yes – initially a generic overview, but future will require a full revision noting the different message types referenced (including binary / ASMs).  Recommend reviewing how this fits with guidelines 1095, 1085, 1084, 1081, 1077, 1067-1, 1062 | Short term  &  Longer term | H |
| 1101  Dated: December 2013 | Auditing and assessing VTS | Provide guidance for competent authorities and VTS authorities to meet their obligations under SOLAS for the establishment and operation of VTS. In particular, it aims to provide guidance for auditing and assessing a VTS and the subsequent on-going assessment and evaluation | Yes – generic para on VDES, noting AIS is part of VDES. | Short term | L |
| 1104  Dated: December 2013 | Application of maritime surface picture for risk assessment and provision of AtoN | This document provides guidance on the use of GIS to assess the requirement and impact of AtoN in the area of interest. It covers incorporation of charting overlays with new dangers and amplification of existing dangers. Automatic Identification System (AIS) data will be used to determine traffic profile and volume. | Yes – generic para on VDES, noting AIS is part of VDES.  Recommend review / merge with guidelines 1078, 1058, 1057. |  | L |
| 1105  Dated: December 2013 | Harmonized portrayal of e-Navigation related information | The objective of this document is to provide guidance on how to achieve a "*harmonized presentation*" of information ashore with the presentation on board in the e-Navigation context | Yes – generic para on VDES, noting AIS is part of VDES.  Recommend reviewing /confirming relationship with guideline 1088 | Short term | M |
| 1106  Dated: December 2013 | Producing an IALA S-100 Product Specification | Aims to provide a common understanding of what is needed to implement products in the S-100 registry. Notes the IALA Domain within the IHO Registry is being created to provide standardized information in fields such as ATON, VTS and AIS support of the e-Navigation initiative. | Yes - generic para on VDES, noting AIS is part of VDES.  Future – will need to verify how VDES fits with S-100 overall. This can be done as VDES develops, to ensure compatibility of systems.  Recommend verifying how this fits with guideline 1088. | Short term  &  Mid term | M |
| 1108  Dated: December 2013 | Challenges of providing AtoN services in polar regions. | Address the specific challenges in implementing AtoN in polar regions, noting the areas are changing fast and can be expected to lead to new, seasonal shipping routes opening. | Yes – generic para on VDES, noting AIS is part of VDES. Can also note the development of VDES satellite aspect – may be opportunity to use this to support the work at ITU leading to WRC-19. . | Short term | M |
| 1111  Dated: May 2015 | Preparation of operational and technical performance requirements for VTS systems. | Provides a common source of information to assist Competent Authorities and VTS Authorities in the preparation and establishment of operational and technical performance requirements. | Yes – generic para on VDES, noting AIS is part of VDES. Can include guidance for the possible future of VDES base stations / link with ASM.  section 3 (AIS) will need full revisions as VDES develops. | Short term  &  Longer term | M |
| 1113  Dated: May 2015 | Design and implementation principles for harmonised system architectures of shore based infrastructure | This Guideline establishes relevant principles for the design and implementation of harmonised shore-based technical system architectures. Identifies consequences from the international context for design and implementation of harmonised bore-based technical system architecture; identifies principles for seamless and traceable system engineering requirements; introduces the CSSA (see guideline 1114… note – 1114 is not referenced in 1113). | Yes – a general overview and integration text as appropriate – this will be a key document for review and update as VDES develops. There is a general requirement to consider VDES with regards to all forms of data exchange / formats for common shore-based system architecture.  Need to confirm how this fits with 1114  Number is missing from header after page 1 (yellow highlight). | Short term  &  Longer term | M |
| 1114  Dated: May 2015 | Technical specification for the Common Shore-based System Architecture (CSSA) | A best practice representation of a system layout which was designed, amongst other reasons, as an system engineering response to the prompt for a common technical shore-based system harmonised for e-Navigation (incl. its Human-Machine-Interfaces)’ as implied by IMO’s overarching architecture for e-Navigation | Yes – a general overview and integration text as appropriate – this will be a key document for review and update as VDES develops. | Short term  &  Longer term | M |

1. Note – these are specific VDES documents. VDES will also be referenced in other IALA documents. [↑](#footnote-ref-1)
2. Additional IALA documentation available includes Manuals, IALA dictionary and proceedings from VTS Symposiums and IALA conferences. [↑](#footnote-ref-2)
3. Additional IALA documentation available includes Manuals, IALA dictionary and proceedings from VTS Symposiums and IALA conferences. [↑](#footnote-ref-3)