VDES – VHF Data Exchange System Overview
AIS – a successful story

- IMO introduced AIS in 2002
- Mandatory for SOLAS vessel
- other users like fishing fleet, inland shipping, recreational vessel, etc.
- AIS equipment like AIS AtoN, AIS SART, AIS MOB, EPIRB AIS, „innovative use“
- AIS shore based infrastructure for VTS, ship reporting, others
- AIS tracking by satellite

-> More than 100,000 AIS stations globally
AIS – a successful story
AIS – a successful story

- expanding use of AIS technology causes significant load of the AIS channels
- emerging high VDL loading in busy areas
  - Gulf of Mexico 64%
  - Korea 40%
  - Japan 40%
- future introduction of e-Nav with the expected need for more data exchange

-> existing AIS will not be able to cope future requirements for data exchange
VDES concept addresses the need for additional capacity for digital data exchange

- protecting the original function of AIS identification, position reporting and tracking
- provides capability for maritime data exchange for safety, security, efficiency and the protection of the environment
- globally interoperability and availability
- dedicated to maritime safety communication

-> support of e-Nav, maritime data communication and modernization of GMDSS
VDES concept

VDES concept integrates several function of VHF Data Exchange: AIS

Function of AIS: - Automatic Identification System -

Satellite
detection AIS
AIS remains unchanged for its original purpose

- **functions:**
  - identification of ships
  - position reporting and tracking
  - navigational ship data
  - support of search and rescue

- **technical characteristic:**
  - radio channel AIS 1, AIS2, Ch 75 and CH 76
  - all tailored messages, e.g. msg 1,2,3,4,5,9,18,21,23
  - some ASM remains, at least for transitional phase
  - channel management might be restricted

-> AIS stays as it is, however considers other functions of the VDES
VDES concept integrates several functions of VHF Data Exchange: AIS + ASM

Function of ASM: - Application Specific Messages -
Most of the existing application specific messages and new messages will be moved to new channels called ASM

- **functions:**
  - IMO defined ASM
  - regional ASM
  - allows for “real” communication including acknowledgement
  - high reliability of message reception

- **technical characteristic:**
  - radio channel ASM 1, ASM2,
  - higher capacity than AIS channels
  - message structure as for msg 6,7,8,12,13,14,25,26

-> ASM with more capacity and better reliability of message delivery
VDES concept integrates several functions of VHF Data Exchange: AIS + ASM + VDE

Function of VDE: VHF Data Exchange - Terrestrial -

AIS today
VDES concept
VDES applications
Roadmap
VDES concept: – VDE terrestrial–

VHF Data Exchange provides higher capacity data transmission with different message structure than AIS and ASM

• functions:
  – higher capacity data exchange
  – terrestrial exchange ship<->ship and ship<->shore
  – allows for “real” communication including acknowledgement
  – high reliability of message reception

• technical characteristic:
  – 6 international radio channel
  – additional regional channels
  – channel merging for higher data rate

-> VDE terrestrial for higher volume data exchange
VDES concept integrates several functions of VHF Data Exchange: AIS + ASM + VDE + Sat

Function of VDE: - VHF Data Exchange – Satellite –
- Uplink -
VDES concept integrates several functions of VHF Data Exchange: AIS + ASM + VDE + Sat

Function of VDE: - VHF Data Exchange – Satellite – Downlink -
VDES concept: – VDE satellite –

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VDE satellite provides VHF Data Exchange beyond the radio coverage range of a shore infrastructure or where no shore infrastructure exists.

- **functions:**
  - data exchange outside shore station range
  - data exchange ship<->satellite<->shore
  - satellite uplink and satellite downlink
  - allows for “real” communication including acknowledgement

- **technical characteristic:**
  - satellite with VDE capability
  - shares channels with VDE terrestrial
  - satellite have VDE receiver and transmitter

-> VDE satellite enables global coverage including polar regions
VDES applications

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<th>VDES is designed to provide a higher, robust and global data exchange in the maritime VHF mobile band</th>
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<td>VDES can support all services which require data exchange between ships and between ships an shore</td>
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<td>VDES applications</td>
<td>VDES aims to support:</td>
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<td>Roadmap</td>
<td>• AIS</td>
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<td>• ASM exchange</td>
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<td>• e-Navigation</td>
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<td>• enhanced maritime communication</td>
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<td>• modernized GMDSS</td>
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# IALA Plan for future VHF Data Communication

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<th>Sub-group</th>
<th>VHF Data Communications (including VDE)</th>
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<td><strong>Sub-group</strong></td>
<td><strong>Data communications using existing AIS protocol</strong></td>
<td><strong>Data communications using ITU standard protocol</strong></td>
<td><strong>AIS for safety of navigation</strong></td>
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<td><strong>Radio channels</strong></td>
<td>• Channels 27 and 28&lt;br&gt;• World-wide dedicated channels (WRC-15 target)</td>
<td>• Channels 24, 84, 25, 85, 26, 86</td>
<td>• AIS-1 &amp; AIS-2 (simplex)</td>
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<tr>
<td><strong>Functionality</strong></td>
<td>• Marine safety information&lt;br&gt;• Marine security information&lt;br&gt;• SSRMs&lt;br&gt;• General purpose information communication</td>
<td>• General purpose data exchange&lt;br&gt;• Robust high speed data exchange</td>
<td>• Safety of navigation&lt;br&gt;• Maritime and inland distress and safety communications (Subject to inclusion in GMDSS Modernization by IMO)</td>
</tr>
<tr>
<td><strong>Message types for AIS protocol</strong></td>
<td>• IMO SN.1/ Circ.289 international application specific messages&lt;br&gt;• Regional application specific messages&lt;br&gt;• Base Station</td>
<td></td>
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</tr>
<tr>
<td><strong>Sub functionality</strong></td>
<td>• Area warnings and advice&lt;br&gt;• Meteorological and hydrological data&lt;br&gt;• Traffic management&lt;br&gt;• Ship-shore data exchange&lt;br&gt;• Channel management</td>
<td>• High message payload</td>
<td>• Ship to ship collision avoidance&lt;br&gt;• VTS&lt;br&gt;• Tracking of ships&lt;br&gt;• Locating in SAR&lt;br&gt;• VDL control (by Base Station)</td>
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## VDES support of e-Navigation

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**e-Navigation aims to enhance berth to berth navigation and related services for safety and security at sea and for the protection of the marine environment**

**Supported IMO prioritized e-Nav solutions**
- **standardized and automatic reporting**
  - use internationally standardized messages like ASM “Extended ship static and voyage related date”, “Dangerous cargo indication”
- **improved reliability, resilience and integrity of navigation information**
  - Met-hydro data, tidal window, area notice, berthing data, clearance time to enter port
- **improved communication of VTS Service Portfolio**
  - route information, navigational intention,
For the modernization of GMDSS IMO may consider the functions of VDES

- position information by AIS
- assisting SAR operation AIS SART, AIS MOB, EPIRB AIS
- global coverage through satellite
- capability for promulgation of MSI like Navigational warnings, Notices to Mariner, ice boundary
- receiving acknowledgement from ships
- via terrestrial and satellite downlink and uplink

-> requires robust and reliable data exchange capability in machine readable form
VDES roadmap

AIS today
VDES concept
VDES applications
Roadmap

2013
Development of prototype VDE transceiver

2014
Draft, development and finalization of ITU and IEC standards for VDES

2015
Practical implementation of VDE transceiver

2016
VDES preparation for WRC-15 including studies

2017
Technical development, launch and evaluation of experimental satellite

2018
Migration/Initial Operation Capability (IOC) of VDES

2019
Development of satellite VDES service

2020
Full Operation Capability (FOC) of VDES

IALA Conference

IMO MSC 92 MSC 93 MSC 94 NSCR 1 NSCR 2

ITU WP-5B WP-5B WP-5B WP-5B

Workshop VDES 20.-24.2014 Tokyo

Development of eNAV strategy implementation plan

GMDSS Review

GMDSS Modernization

Wir machen Schiffahrt möglich.

WSV.de
Thank you for your attention

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Wir machen Schifffahrt möglich.