VDES

WP2.1

05-04-2018
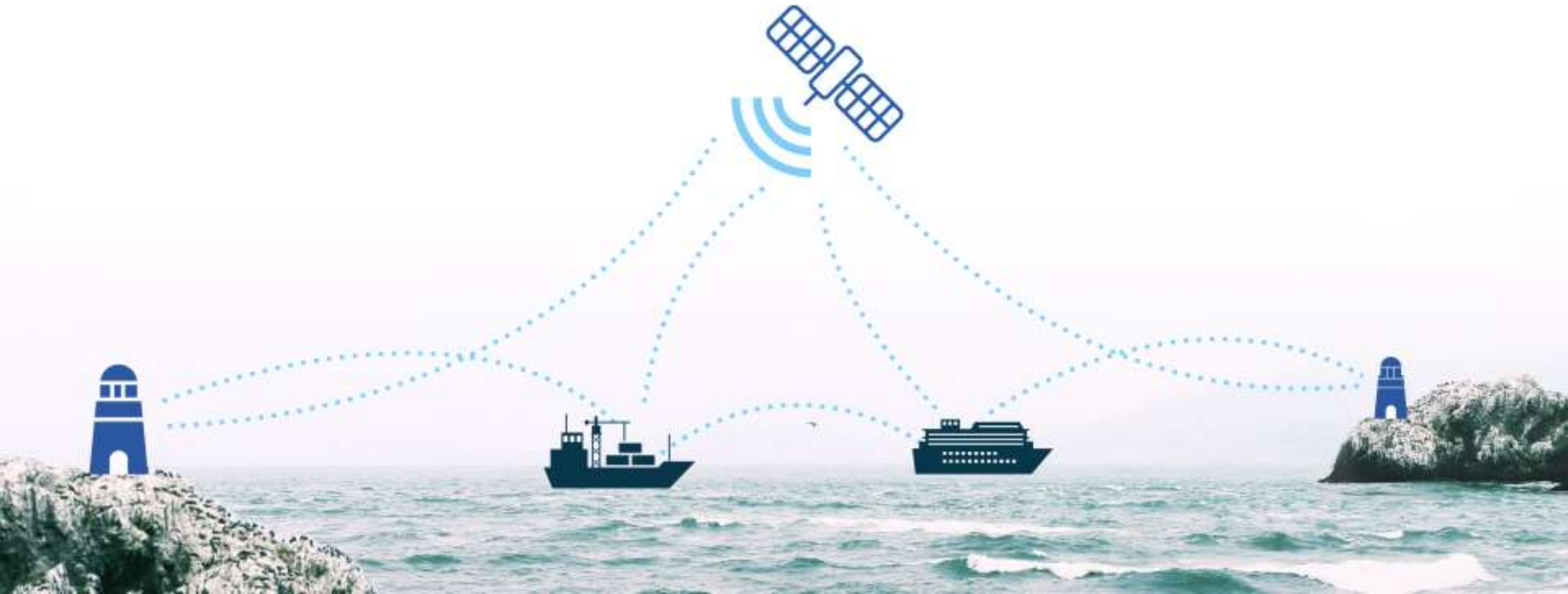Speaker: Peter Andersen

Our goal:

Specification and testing of VDES on-air parameters
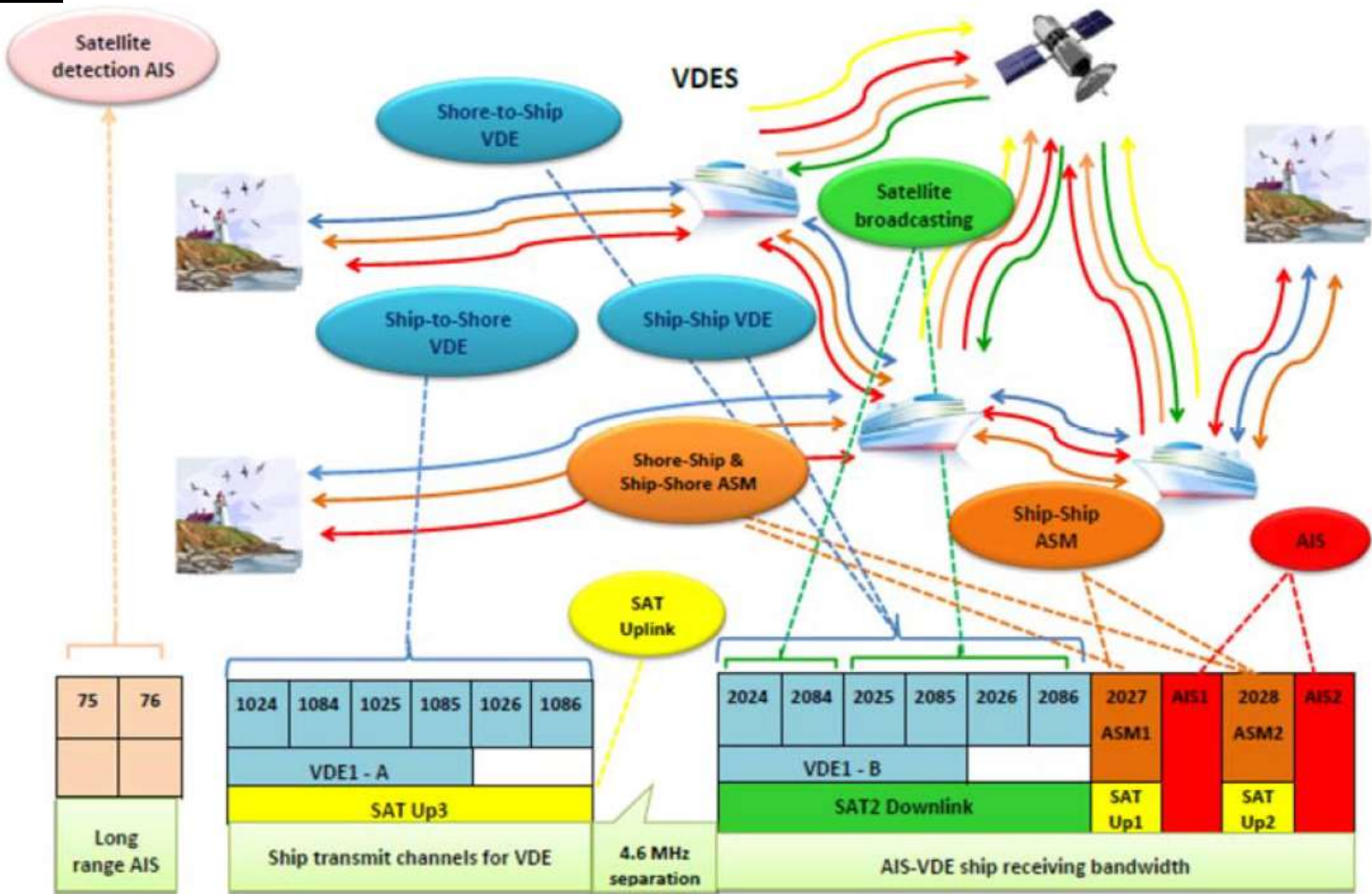
A communication channel
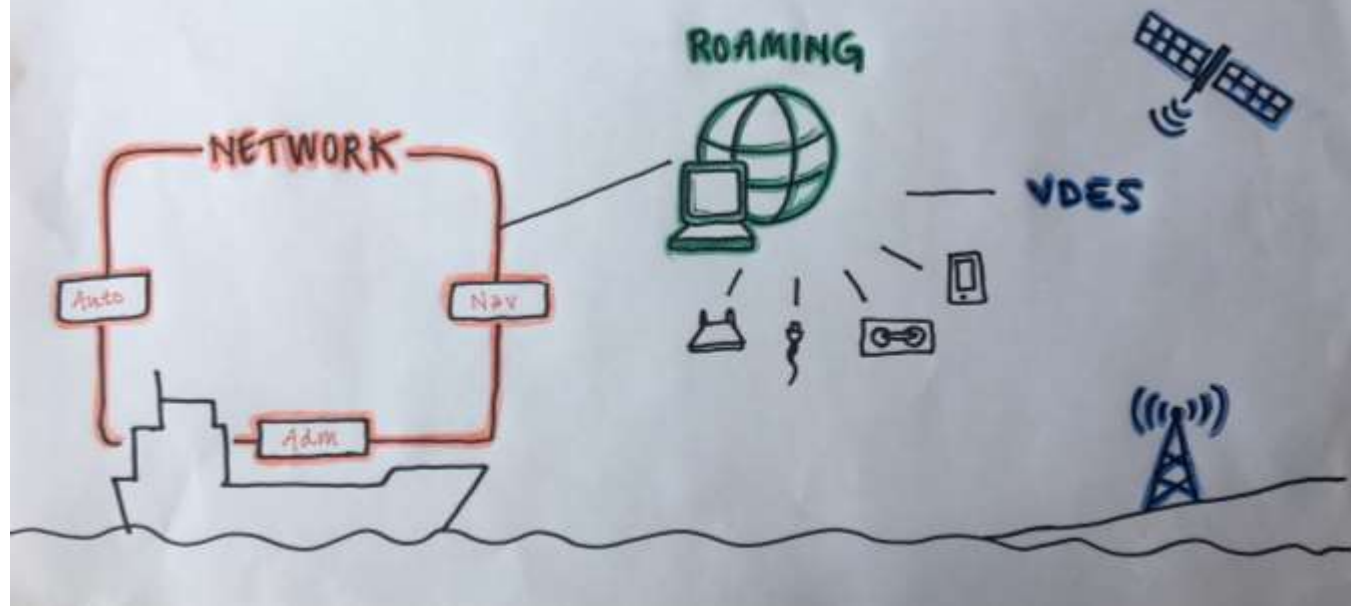
VDES

- New data transceiver on the VHF band
  - Works terrestrial and over satellite
  - Works with Data speed up to 302,7 kbps
  - Works AIS, ASM, VDE together called VDES
  - Works point to point
  - Works multicast
  - Works broadcast
  - Communication channels do not support IP (internet protocol)

The next generation AIS

EFFICIENSEA

Satellite detection AIS

Shore-to-Ship VDE

VDES

Satellite broadcasting

Ship-to-Shore VDE

Ship-Ship VDE

Shore-Ship & Ship-Shore ASM

Ship-Ship ASM

AIS

SAT Uplink

75	76

Long range AIS

1024	1084	1025	1085	1026	1086

VDE1 - A

SAT Up3

Ship transmit channels for VDE

4.6 MHz separation

2024	2084	2025	2085	2026	2086	2027 ASM1	AIS1	2028 ASM2	AIS2

VDE1 - B

SAT2 Downlink

SAT Up1

SAT Up2

AIS-VDE ship receiving bandwidth
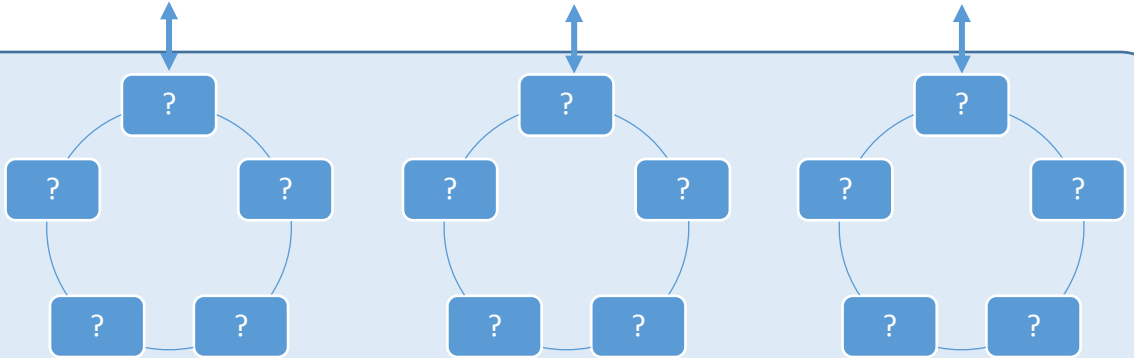
VDES development time plan
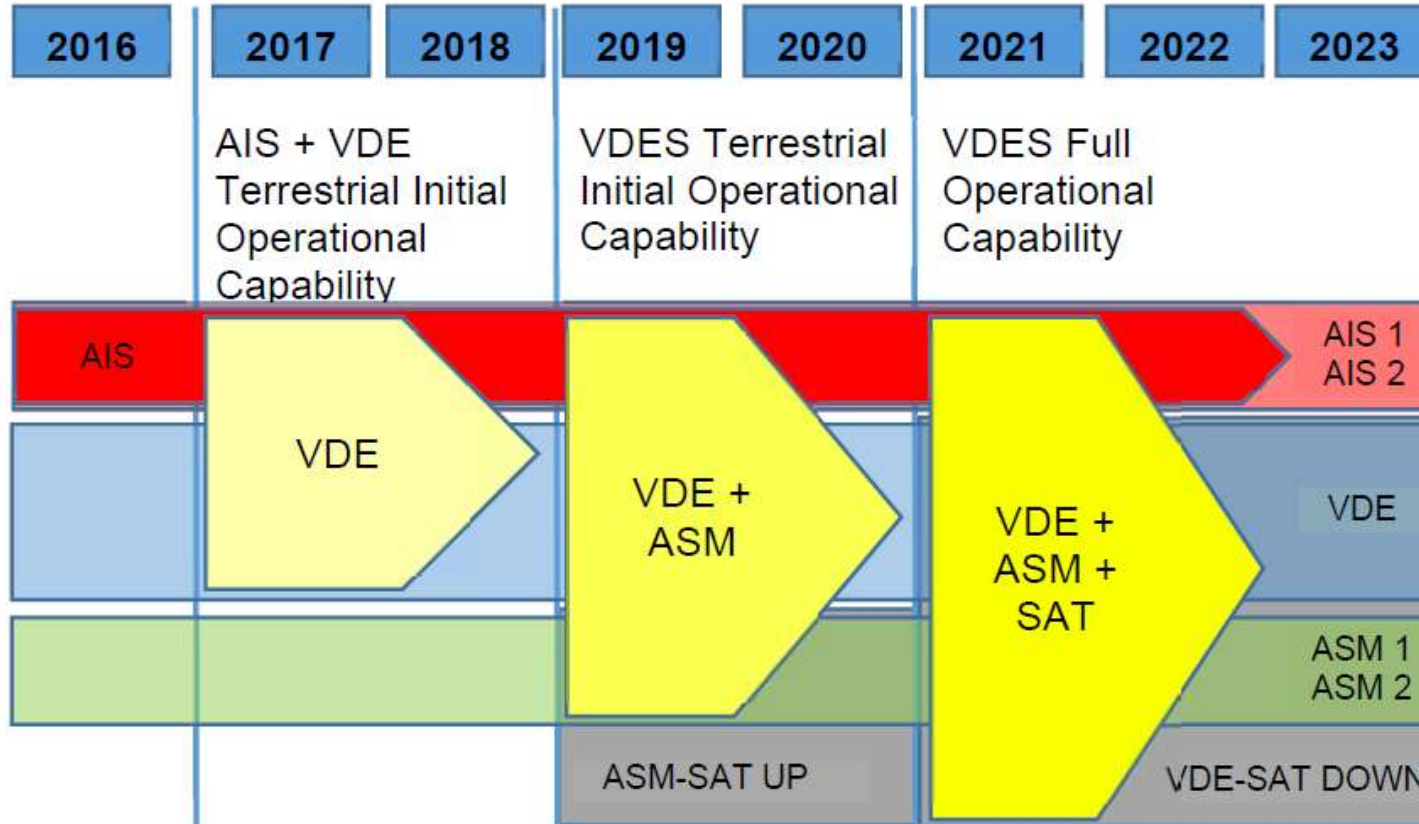
The first "VDE" installation

The first on air test

- Purpose

  Test covarage area in the real environment

Antenna height	Maximum theoretical ranges (for BER=10^{-5})		Maximum measured ranges	
	18m	23m	18m	23m
Range at π/4 QPSK (MCS-1)	58,4 km	62,9 km	≈35,5 km	≈38 km
Range at 16 QAM (MCS-5)	30,9 km	33,3 km	≈25,2 km	≈29 km

Standardization

- ITU-R M.2092-0 has been published. High level

- ITU-R M.2092-1 (VDE terrestrial) is ready from IALA to be forwarded to ITU 5B for final work.
  - Describes the terrestrial part, and can be used as background for an IEC test standard

- IEC PWI 80 -35 ED1 place holder made for project group

- ITU-R M.2092-2 is planed for autumn 2018
  - Includes the satellite part.

- IALA Guideline 1117 about VDES is available

The second on air test

- Purpose
  - Test synchronization and data throughput

  - The challenge is to use Complex modulation forms, in a cost efficient product for a low quantity market.

- Conclusion today, (last on air test is in two weeks)
  - This is doable, a VDES can be made as an efficient communication tool.
  - The work shows areas for improvement in synchronization

VDES capabilities

- Facts
  - AIS, like we know it
  - ASM, new channels to remove load from the AIS channels as they are getting overloaded in some areas.
  - VDE terrestrial, intended for data communication.
    - TDMA, shared bandwidth, more users less bandwidth (max 302,7 kbps)
  - VDE satellite
    - Few and small LOE satellites.
    - Use the same channels as terrestrial but with low signal level

The regulatory stuff

- We have the draft ITU recommendation for VDES terrestrial ready

- IEC is ready to start the test standard

- ITU has made the VHF channels needed available from 2017

- IMO has decided to allow continued used of these channels for ports operation and other purpose up to 2024

ITU-R
Radiocommunication Sector of ITU

Recommendation ITU-R M.2092-0
(10/2015)

Technical characteristics for a VHF data exchange system in the VHF maritime mobile band

M Series
Mobile, radiodetermination, amateur and related satellite services

USE

- Constant update of dynamic issues in relation to port operation.

- Reporting

- Distribution of local area information

- Receiving information from intelligent buoys

- Coordination tool at off shore projects

- Coordination tool in fishing

- And much more

From now onwards

- We have a proven concept

- Important
    - Without channels it is difficult to use a radio
        - Like a train without rails

- The investment is relatively small
    - Do we have interesting services we also have an efficient and low cost solution
    - No airtime cost

- The start will be in well defined areas, like a port, or a VTS area