



MASSIVE challenge on the Impact of MASS on Aids to navigation

Harmen van Dorsser

PROGRAM MANAGER FUTURE VTS

ha.dorsser@portofrotterdam.com

+31 (0)6 51583105

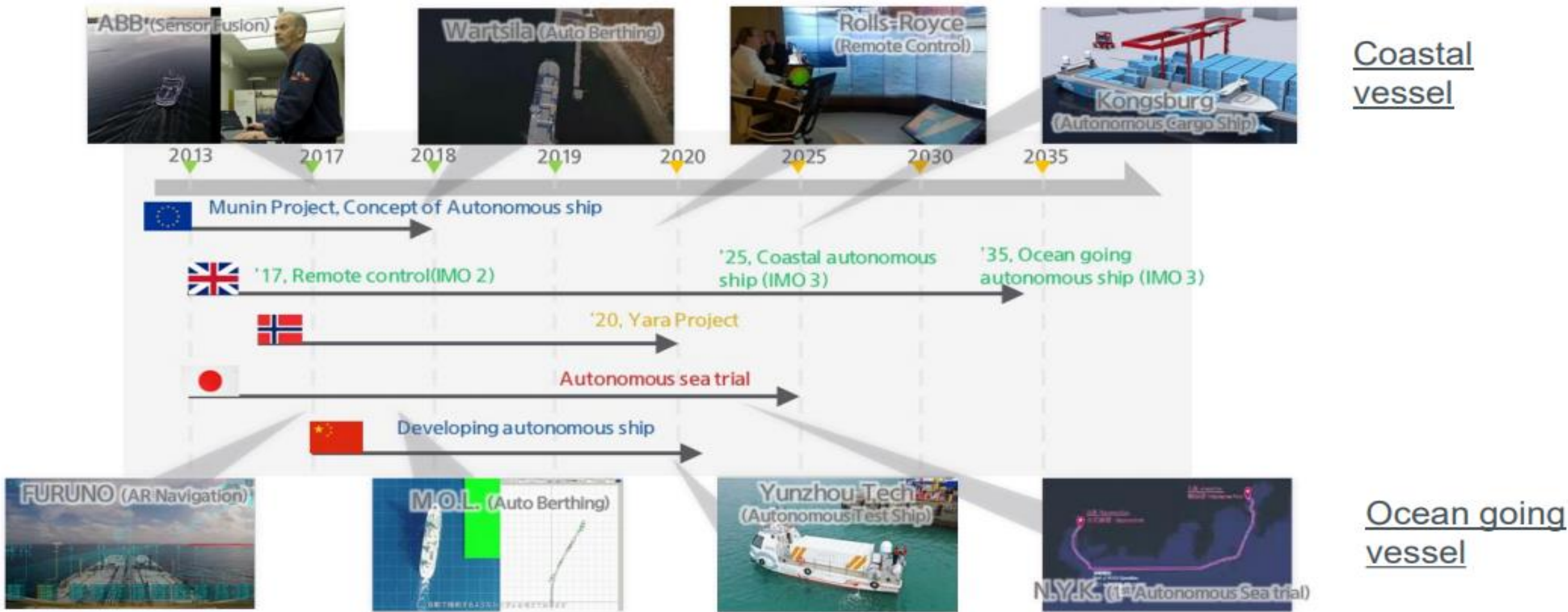


Ministerie van Infrastructuur
en Waterstaat



**Port of
Rotterdam**

Development of MASS projects



Development of MASS related networks



Development on MASS regulations.

Looking back...
MSC VIII (March 1964)...

INTER-GOVERNMENTAL MARITIME
CONSULTATIVE ORGANIZATION



IMCO

MSC
9 Mt
Ori

MARITIME SAFETY COMMITTEE COMMITTEE - 8th sess
Agenda item 11

AUTOMATION IN SHIPS

Note by the Secretariat

Instruments to be considered

COLREGs 1972
CSC 1972
LL 1966
LL PROT 1988
SAR 1979
SOLAS 1974
SOLAS AGR 1996
SOLAS PROT 1978
STCW 1978
STCW-F 1995
STP 1971
SPACE STP 1973
TONNAGE 1969

MARPOL 73/78
FAL 1972
SUA 2005
SALVAGE 1989
OPRC 1990
CLC 1969
NUCLEAR 1971
HNS 1996
...

Early results...
(as per Swedish preps)

	Degree 1	Degree 2	Degree 3	Degree 4
SOLAS II-1	IV	II		
SOLAS II-2	IV			
FSS Code	IV			
FTP Code	IV	IV	IV	IV
SOLAS III	IV			
LSA Code	IV	IV	IV	IV
SOLAS IV	II			
SOLAS V	II			
SOLAS VI	IV			
IMSBC Code	IV			
Grain Code	IV			
CSS Code	IV			
SOLAS VII	IV			
IMDG Code	IV			
IBC Code	IV			
INF Code	IV			
IGC Code	IV			
SOLAS IX	IV	IV	II	II
ISM Code	IV	IV	II	II
SOLAS XI-1	IV			

I = Interpretation
II = Amendment
III = New
IV = Non above

	Degree 1	Degree 2	Degree 3	Degree 4
RO Code	IV	IV	IV	IV
ESP Code	IV	IV	IV	IV
CI Code	IV			
SOLAS XI-2	IV			
ISPS Code	IV	IV		IV
SOLAS XII	IV			
SOLAS XIII	IV	IV	IV	IV
SOLAS XIV	IV	IV	IV	IV
Polar Code	IV	IV	IV	IV
COLREG	I			II
TONNAGE 69	IV	II	II	II
SAR 79	IV	II	II	II
STCW		II+II	II+II	IV
STCW-F		II+II	II+II	IV
CSC 72	IV	IV	IV	IV
LL 1966	II	II	II	II
LL PROT 88	IV	IV	IV	IV
IS Code	IV	II	II	II
III Code	IV	II	II	II



MASS concepts

THE FUTURE IS NOW

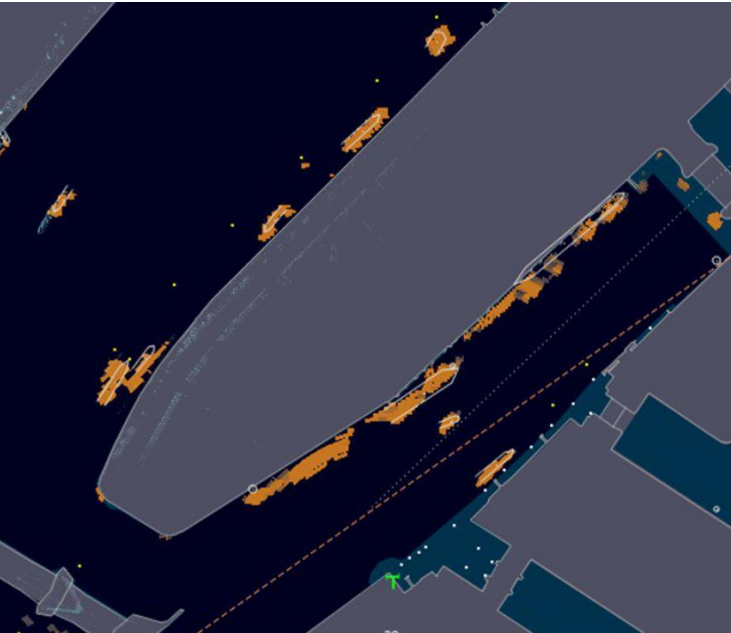


FUTURE VTS

Council 71



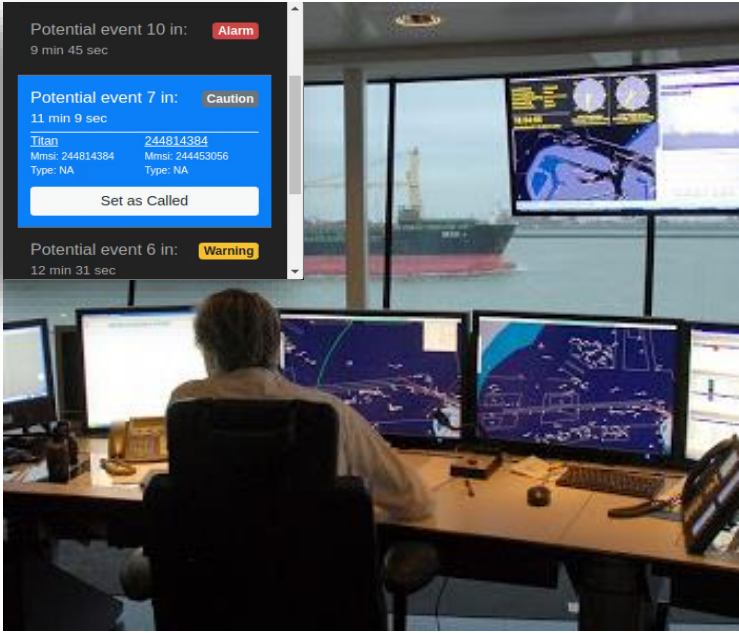
Development of digital situational awareness



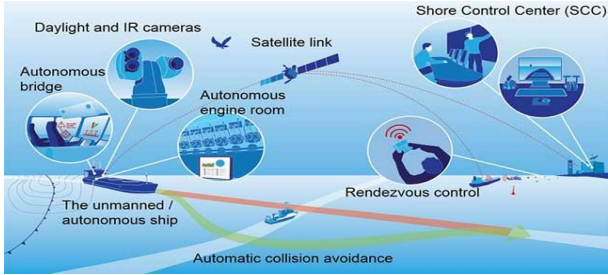
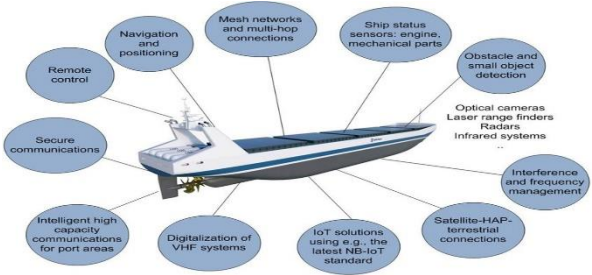
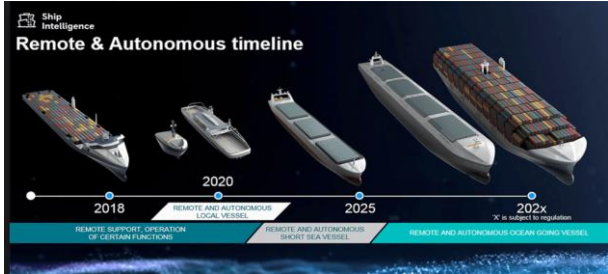
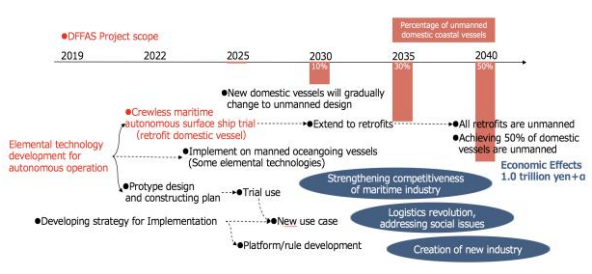
Connectivity and Interacting objects



Human behaviour and advanced decision support



PAP council agreed that coordination on the impact of MASS Aids to Navigation is needed



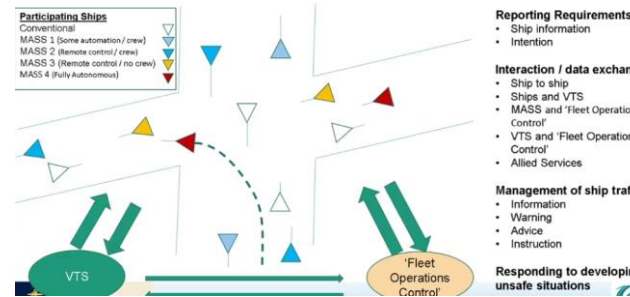
LOTS OF IDEAS FOR ROLE AUTHORITIES



14TH IALA Symposium
Enhanced Maritime Safety and Efficiency by Connectivity
12 - 16 April 2021 Rotterdam | Netherlands



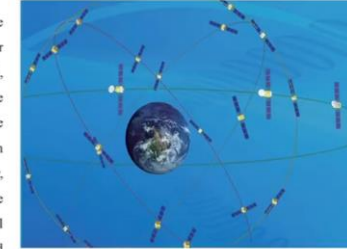
Mr Noguchi
VTS as a data hub



Mr Trainor
VTS as a coordinator

3.2.6 Long-term planning for China VTS in the future.

In a long period of time, China VTS will further improve the layout of the VTS system, build VTS center and radar station in the blind spots. It will integrate VTS, AIS, LRIT, CCTV and other monitoring systems to improve the dynamic supervision of ships and information service level of VTS, it will realize VTS regional networking in key associated waters such as the Yangtze River Estuary, the Pearl River Estuary, and the Bohai Bay, and realize continuous tracking of ships across regions; and it will achieve full coverage of VTS in coastal port waters and important inland waters.



Mr Jin
VTS as a command centre



Expected FUTURE VTS SERVICES

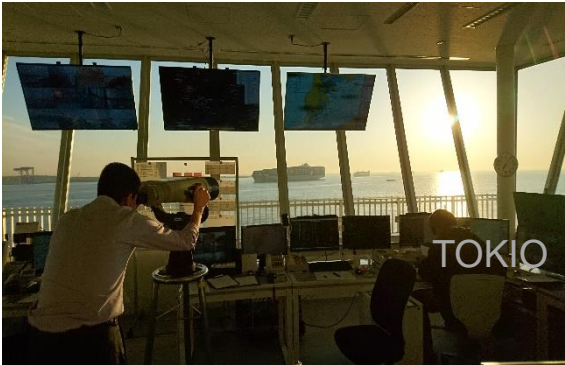
- Guarantee the information position of participants
- Validation and authentication of participants
- Monitoring agreements between participants

SITUATIONAL AWARENESS

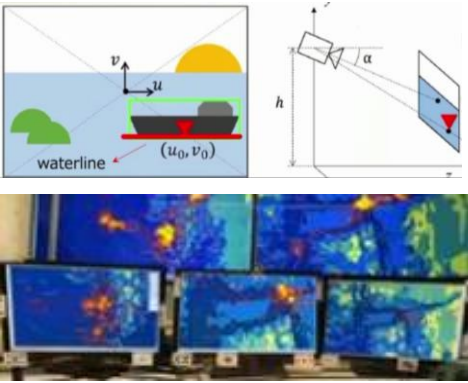
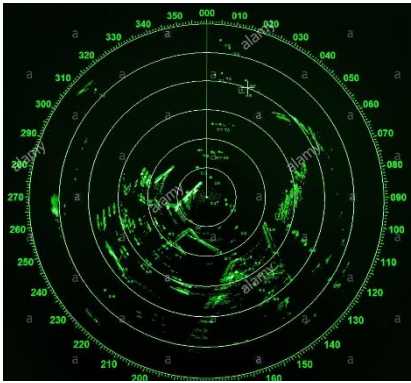
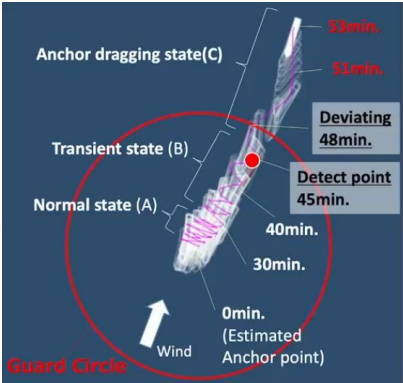
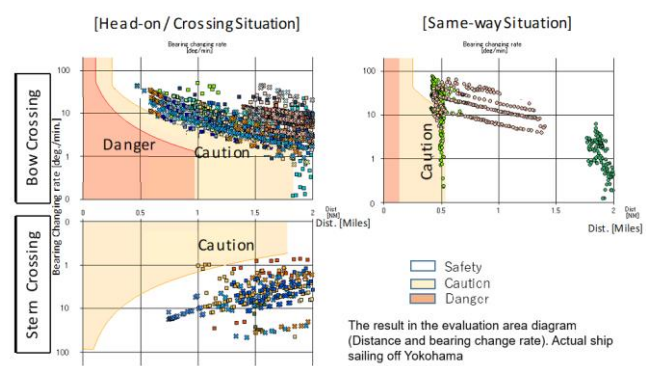
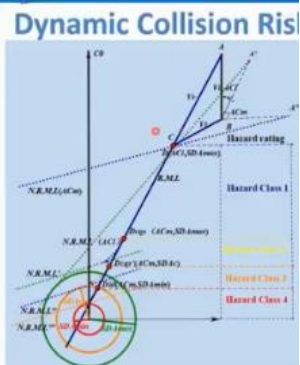
Riskmodels, collision support and artificial intelligent systems



14TH IALA Symposium
Enhanced Maritime Safety and Efficiency by Connectivity
12 - 16 April 2021 Rotterdam | Netherlands



Waterway Risk Model					
Vessel Conditions	Traffic Conditions	Navigational Conditions	Waterway Conditions	Immediate Consequences	Subsequent Consequences
Deep Draft Vessel Quality	Volume of Commercial Traffic	Winds	Visibility Impediments	Personnel Injuries	Health and Safety
Shallow Draft Vessel Quality	Volume of Small Craft Traffic	Water Movement	Dimensions	Petroleum Discharge	Environmental
Commercial Fishing Vessel Quality	Traffic Mix	Visibility Restrictions	Bottom Type	Hazardous Materials Release	Aquatic Resources
Small Craft Quality	Congestion	Obstructions	Configuration	Mobility	Economic



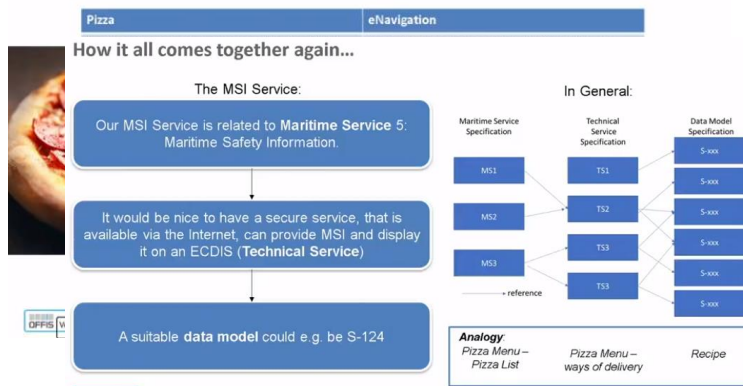
INTERACTING OBJECTS

Services, systems and technologies, standards used, and with that the need for accuracy, trust and vulnerability



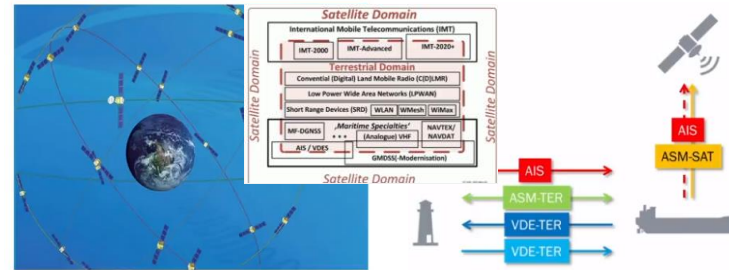
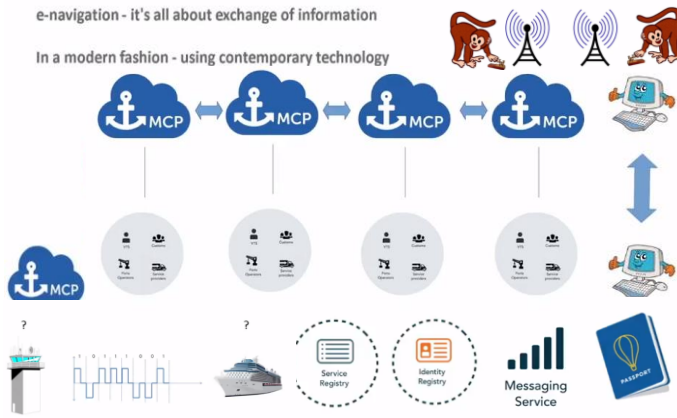
14TH IALA Symposium
Enhanced Maritime Safety and Efficiency by Connectivity
12 - 16 April 2021 Rotterdam | Netherlands

The Pizza Analogy: Part I



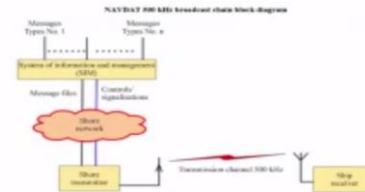
e-navigation - it's all about exchange of information

In a modern fashion - using contemporary technology

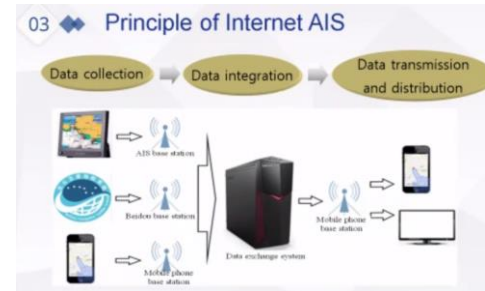


Navigational Data - NAVDAT

- narrow bandwidth marine safety information system
- complements NAVTEXT – e.g. broadcast of MSI,
- Data rate:
NAVDAT 10-25 kbit/s
NAVTEXT 100 bit/s



Communication Technology	Data rate	Infrastructure	Coverage	Transmission	Maritime / Public
NAVDAT	10-25 kbit/s	Based on NAVTEX	250/300NM	Broadcast	Maritime
VDES VDE	307 kbit/s	VHF Data link, RR App 18	Ter: Line of sight, approx 15 to 65NM	Addressed / broadcast	Maritime
VDES ADM	19.2 kbit/s	VHF Data link, RR App 18	Line of sight, approx 15 to 65NM	Addressed / broadcast	Maritime
WiFi (IEEE 802.11ac)	1,300 kbit/s	Routers/Access points	50m	Addressed	Public
Digital VHF	9.6 - 19.2 kbit/s	Base stations/mobile radios	Line of sight, approx 10NM-65NM	Addressed	Maritime
IMT-4G (including LTE)	600 Mbit/s	4G Base stations	5-30km (3-4 NM)	Addressed	Public
IMT-5G	1,200 Mbit/s	5G base stations	5-30km (3-4 NM)	Addressed	Public
Satellite					
Intersat C	600 kbit/s	Satellite service	Global, spot beams	Addressed / broadcast	Maritime
Intersat GX	50 Mbit/s	Satellite on Ka band	Global, spot beams	Addressed / broadcast	Industry
Intersat	< 134 kbit/s	Satellite on L band	Global, dependent on constellation	Addressed / broadcast	Industry / Plan Maritime



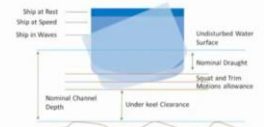
Data Accuracy and Trust



Radars
Weather sensors
AIS / ASM / VDE
IMT / IMT2020
Tide sensors
Current sensors
UKC sensors



- Is the AIS / ASM / IMT message valid?
- Are the vessel dynamic data accurate?
- Are the MetOcean data accurate?
- What is the data acquisition latency?
- Is there a detailed audit trail?



intelligent navigation services system

intelligent shipping system

e-Navigation Test-bed in China

provide various users with comprehensive, digital and intelligent e-Navigation application services

external factors

I cannot prevent anything. Have a plan ready when something like this happens.

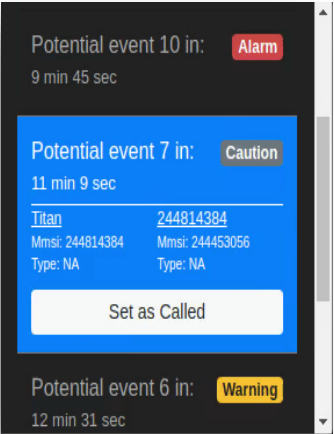
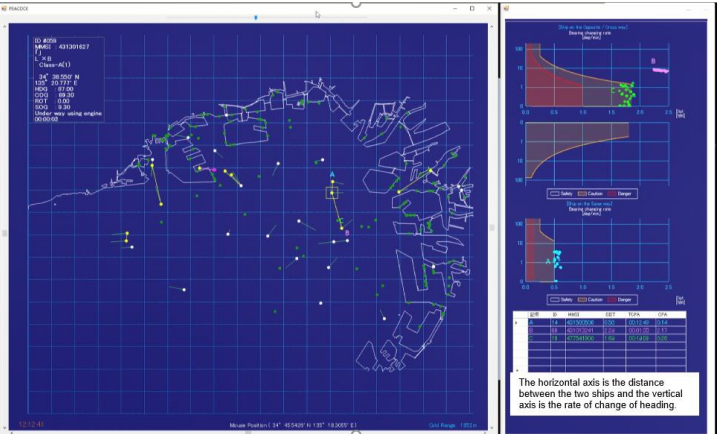
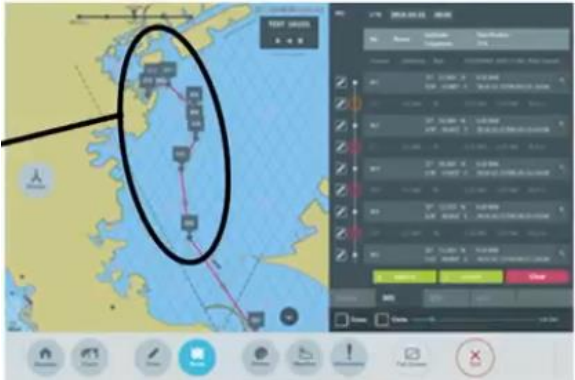
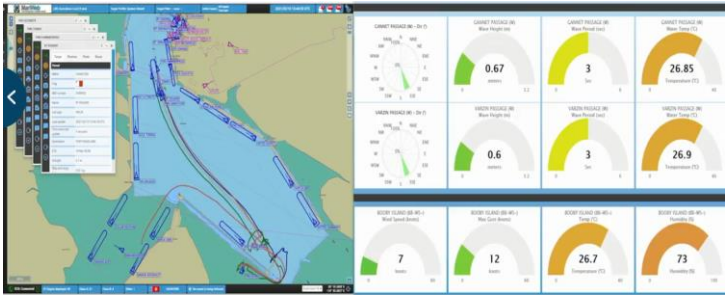


HUMAN MACHINE INTERFACE

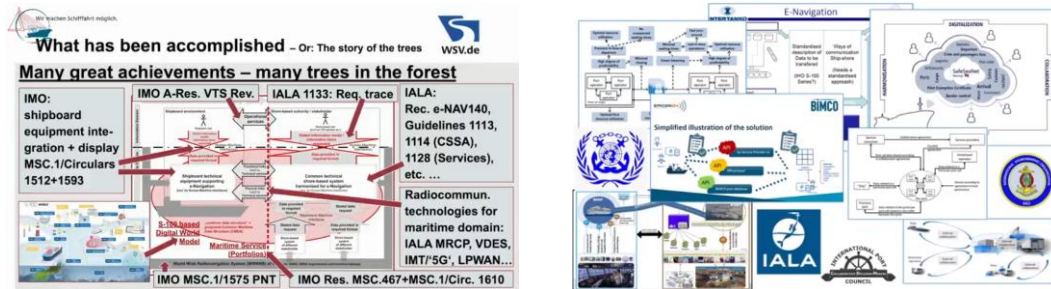
Decision support that overcomes “the Data Daze”



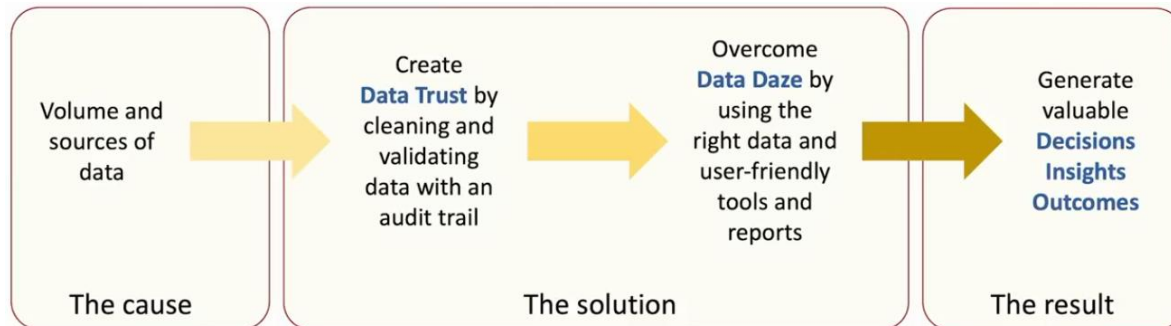
14TH IALA Symposium
Enhanced Maritime Safety and Efficiency by Connectivity
12 - 16 April 2021 Rotterdam | Netherlands



THE CHALLENGE to all go in the same direction



Mr Oltman: “Lots of trees are planted but we lost the view on the forest”



Mr Batty : “Lots of data are shared but how to create valuable decision in ...”



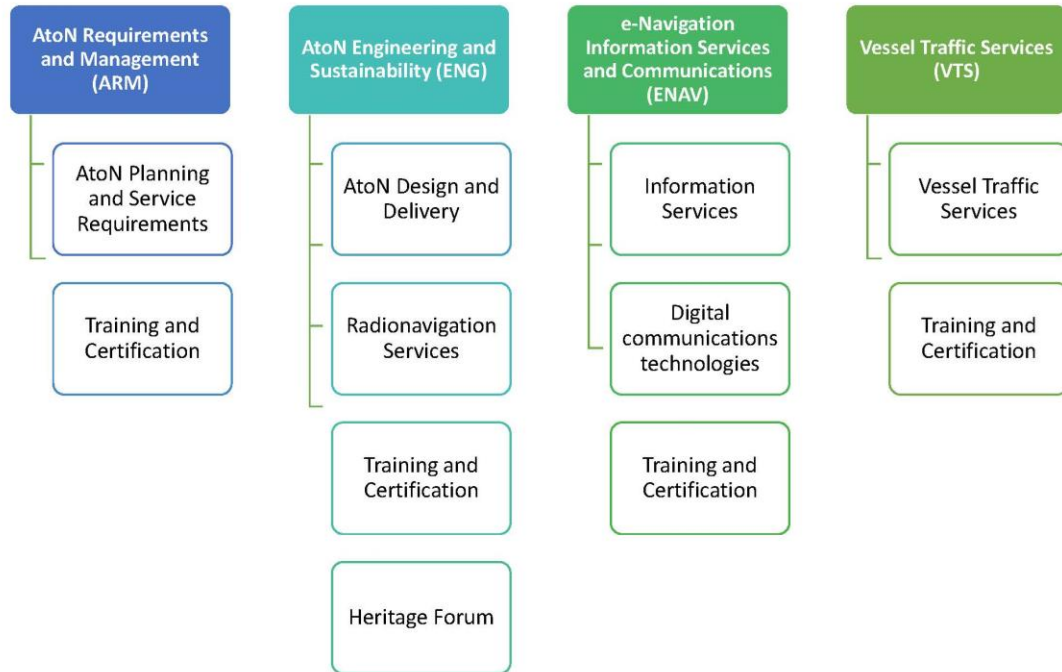
14TH IALA Symposium
Enhanced Maritime Safety and Efficiency by Connectivity
12 - 16 April 2021 Rotterdam | Netherlands



“We have let our imaginations fly”,
but how to fly into a harmonised
direction.

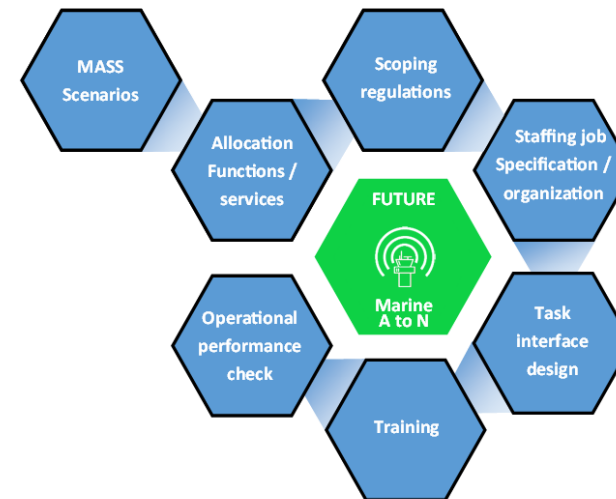
MASSIVE CHALLENGES FOR AIDS TO NAVIGATION

Many things to solve, and needed to be solved by many



MASS TASKGROUP

SUPPORTED BY MASSPORT NETWORK



CHAired BY



Ministerie van Infrastructuur en Waterstaat

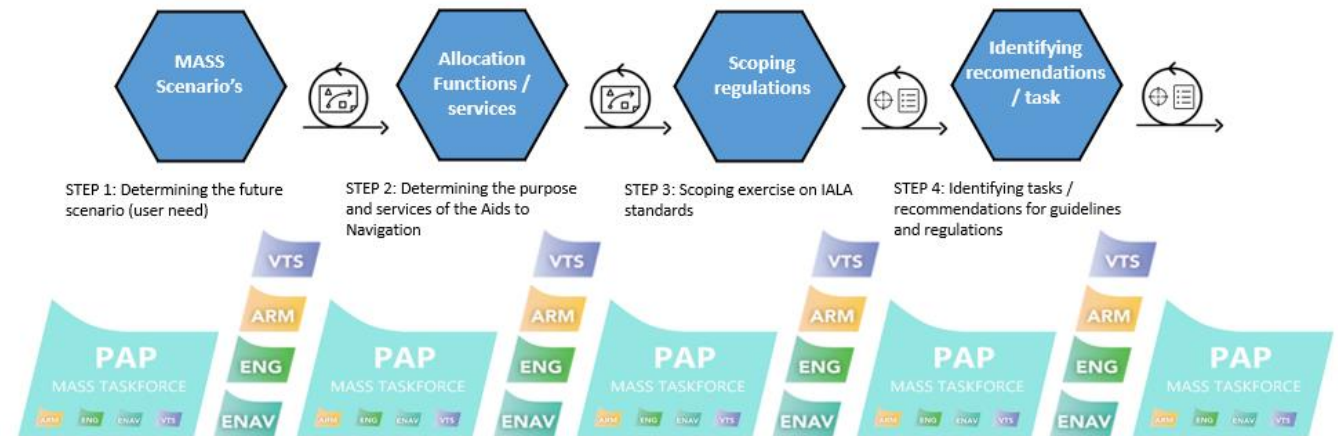
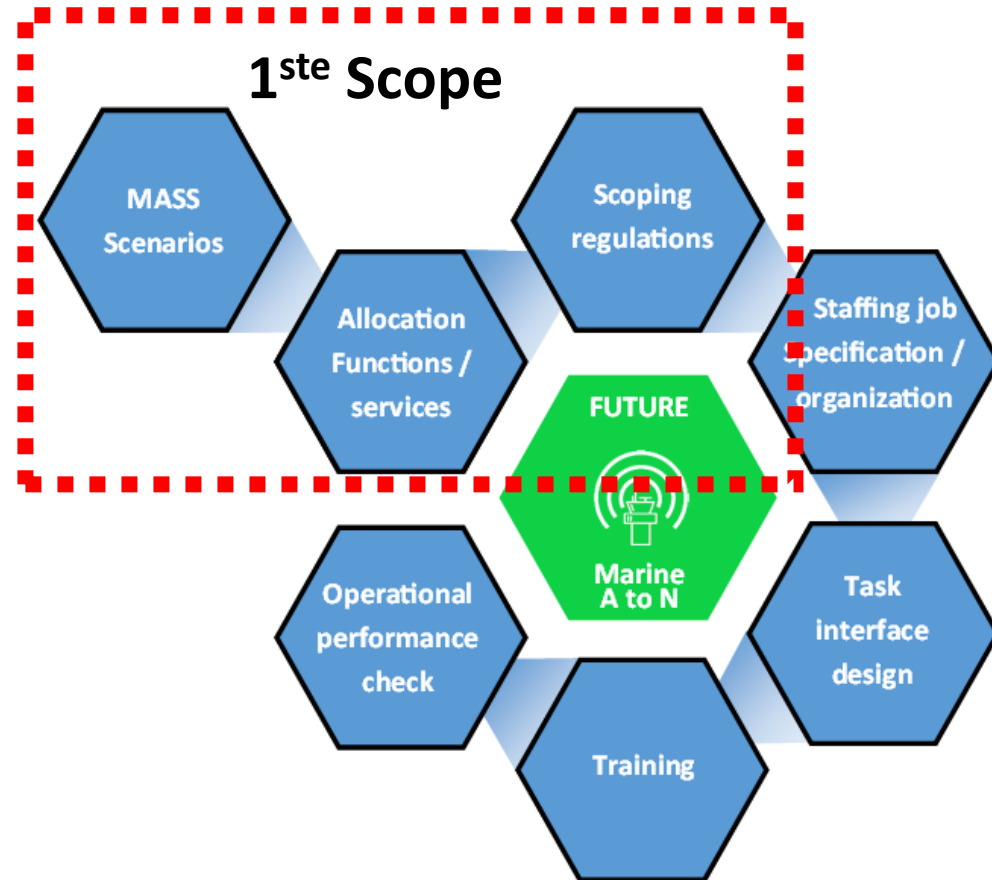


Ministerie van Infrastructuur en Waterstaat



Port of Rotterdam

Methodology to Structure, coordinate and put IALA in the lead.



IALA FUTURE VTS WORKGROUP DISCUSSION PAPER

“Scenarios based on a certain degree of digitalized services provided by VTS Authorities”

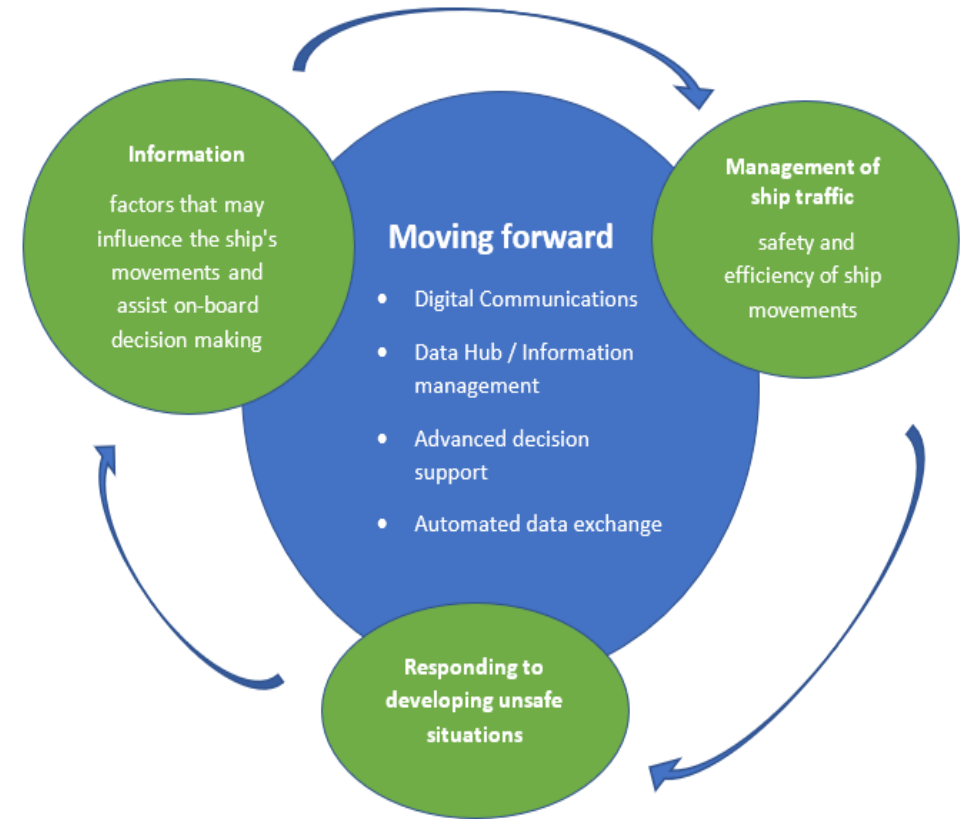


STEP 1: Determining future scenario's

Discussion paper Scenarios future VTS (IALA Future VTS workgroup)

The purpose of VTS is to *“contribute to safety of life at sea, VTS safety and efficiency of navigation and the protection of the environment within the VTS area by mitigating the development of unsafe situations through”*:

- “the provision of timely and relevant information on factors that may influence the ship's movements and assist on-board decision making”;
- “the monitoring and management of ship traffic to ensure the safety and efficiency of ship movements”;
- and
- “responding to developing unsafe situations”.



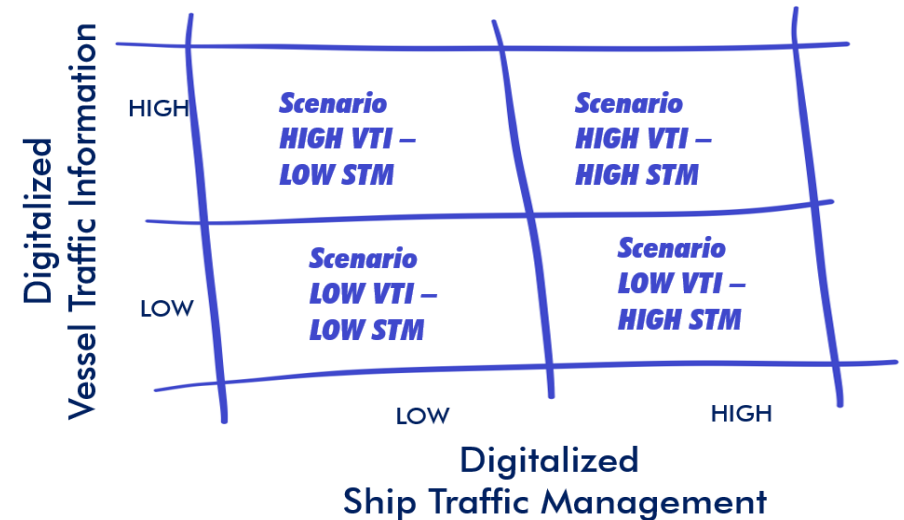
Scenarios based on a certain degree of digitalized services provided

Digitalized VTS services

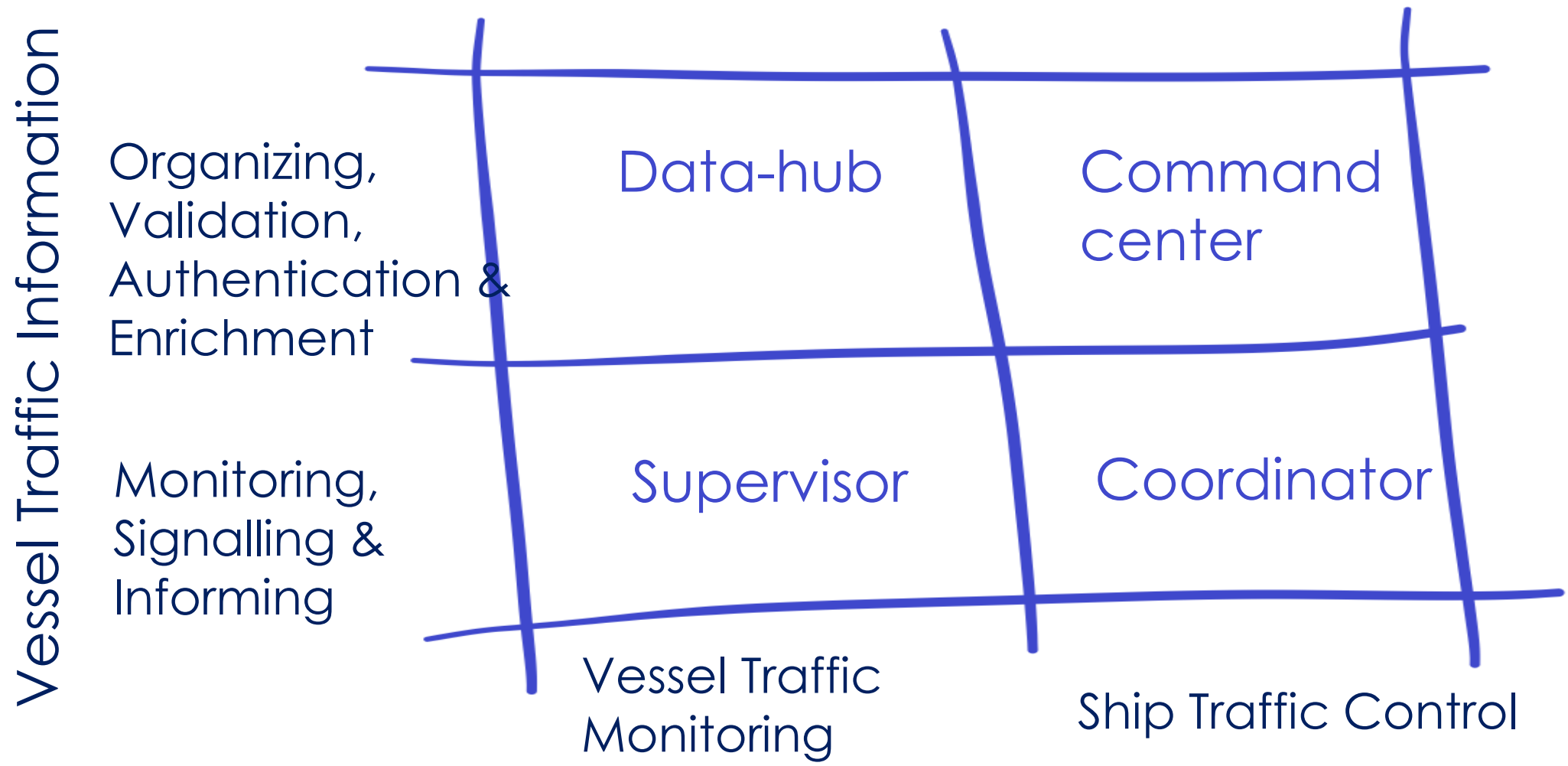
The new guideline explicitly describes data exchange and automated reporting as appropriate, “*where these are available*”, and with that it is plausible that with the introduction the pace of digital information services will depend on the digitization rate of the VTS authority.

Digitalized Ship traffic Management

Ship traffic management concepts for route exchange are developed and tested by several parties. There has been discussion on the scope of the route exchange systems and the role of participants; would it be monitoring, advisory, assistance or full control? These different Traffic management services will have effect on the role on Aid to Navigation in the Future and the freedom of navigation.



Scenarios future Vessel Traffic Services





FUTURE AtoN START TOGETHER AND MAKE IT HAPPEN

Harmen van Dorsser MSc

Projectmanager VTS Innovation Lab
ha.dorsser@portofrotterdam.com
+31 (0)6 5158 3105

