



En finger i jorden;  
Går operativ e-navigasjon etter planen?  
Og hvor går den i så fall?

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# e-Navigation...?

**DEFINITION (IMO MSC);** «The harmonized collection, integration, exchange, presentation and analysis of marine information onboard and ashore by electronic means to enhance berth to berth navigation and related services for safety and security at sea and protection of the marine environment»

## Concept of IMO's Strategy Implementation Plan (SIP)



### Five prioritized solutions..

S4 – **Integration and presentation**  
of available information  
in graphical displays  
received via communication equipment

**Collect, Integrate, Present,  
Analyze and Exchange;**

**What is the status?**

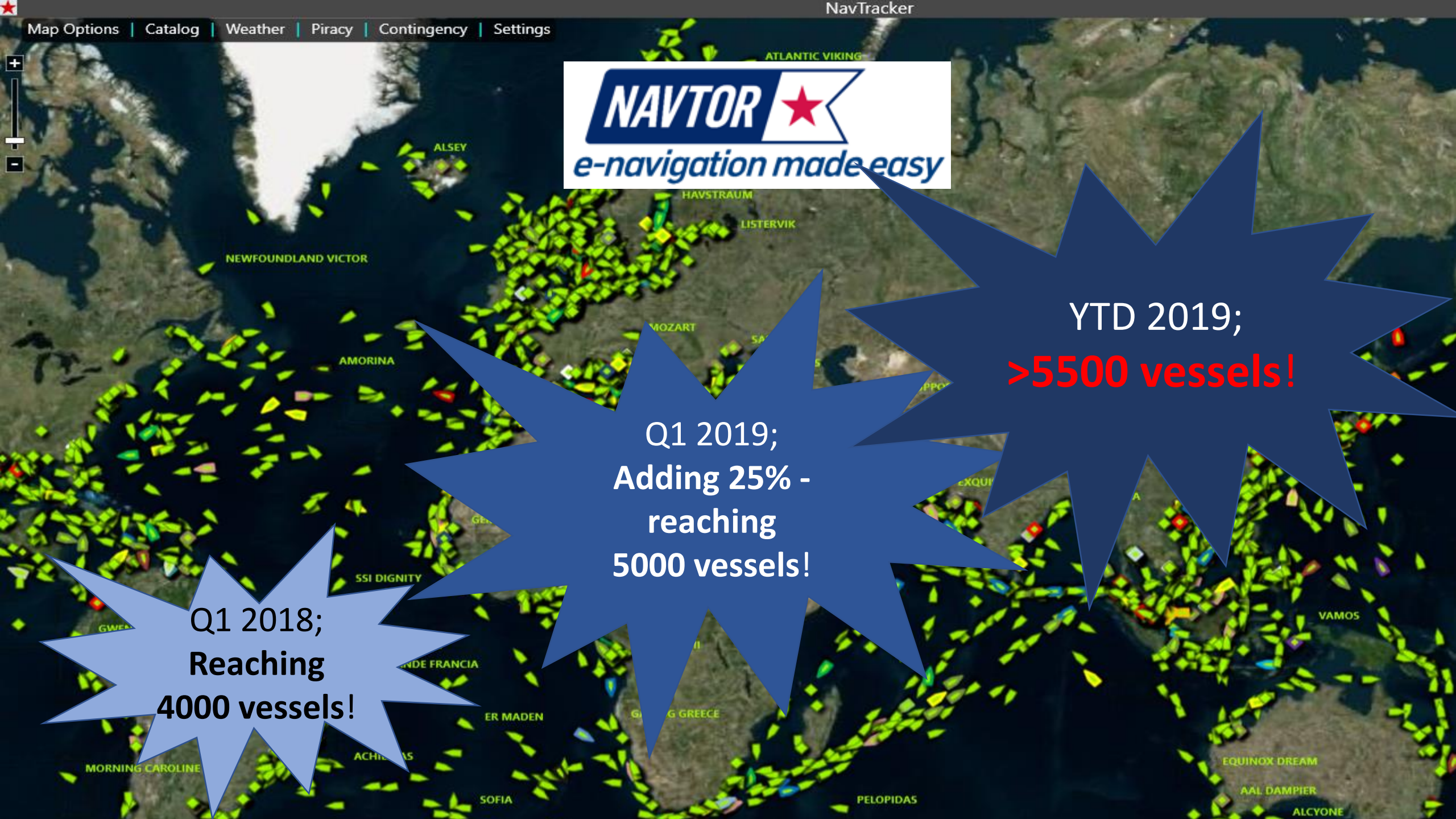
A circular diagram showing various maritime services. The services are represented by colored circles with labels: P4 (blue), MSP5 (yellow), P6 (yellow), TUG (red), and MSI (blue). Each label is accompanied by a small image representing the service: P4 shows a satellite map, MSP5 shows a world map, P6 shows a ship, TUG shows a tugboat, and MSI shows a ship's deck.A photograph of a ship's bridge, showing a person at the helm and various electronic displays.A small icon representing a custom service, showing a person and a document.The logo for the Maritime Service Portfolio (MSP), consisting of a yellow circle with the letters 'MSP' and the text 'Maritime Service Portfolio' next to it.



YTD 2019;  
**>5500 vessels!**

Q1 2019;  
Adding 25% -  
reaching  
5000 vessels!

Q1 2018;  
Reaching  
4000 vessels!



# All segments, world-wide



CARGO



CRUISES



TANKERS



OFFSHORE



# Digital Charts & Publications

NavTracker  
NavStick

(+Paper Charts and Publ.)

# e-Navigation solutions

NavTracker  
NavBox  
NavStation  
OEM – Collaboration  
(by SDK & GECDIS)

## In-house R&D and External Projects



e-navigation  
Intelligent Ship  
Traffic Management



Horizon 2020  
European Union Funding  
for Research & Innovation



ECSEL Joint Undertaking  
Electronic Components and Systems for European Leadership



Forskingsrådet

Maritim virksomhet og offshore operasjoner (MAROFF)



e-Navigation made easy

# What have NAVTOR and the industry done..?

## COLLECT & INTEGRATE

NavStation – Planning Station

1. NavStation Desktop
2. ENC
3. Route Planning
4. ADP
5. AENP
6. Weather Overlay
7. NAVAREA Warnings
8. Passage Planning
9. Mooring Assistant

## PRESENT & ANALYSE

PP – UKC Section  
ATT is used automatically

Water level	Water density	Connections
Take from ATT as optimal	Water density (affecting ship's draught)	Microtopographical conditions (wind, atmospheric pressure)
Not use ATT if: <b>ADMIRALT</b>	Increase of draught due to list	Water level
	Wave action	Not use ATT if: <b>ADMIRALT</b>
	CATZOC (hydrographic survey reference)	
	Area of influence of A.S. & S. (sea view)	
	Total corrections	
	Depth Actual at passing point	
	Block Coefficient C <sub>b</sub>	
	Speed	
	Squat	
	Dynamic draught (includes actual draught)	
	ENC - Under Keel Clearance	
	Minimum UKC required by Company	
	In the Company minimum UKC (if fitted)	

## EXCHANGE & CYBER-SEC

Seamless, Automatic Updating of Navigational Data

**NavBox**

AIS / GPS

**Cyber Security**  
DNV-GL Type Approved  
IEC 61162-460 Gateway

END USER FEEDBACK  
=> NEW INOVATIONS

IMO; Collect, Integrate, Present, Analyze and Exchange

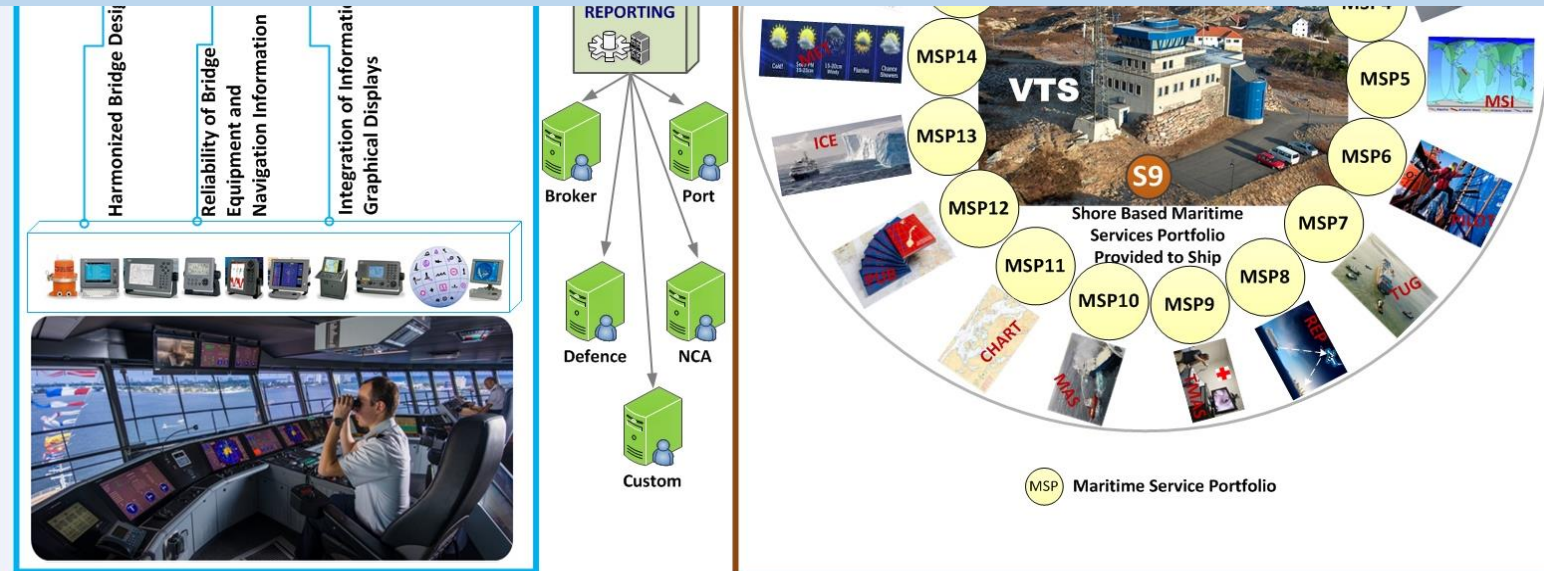
# e-Navigation...?

Do NAVTOR need a e-Nav Manager any more...?

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Five prioritized solutions..

S4 – Integration and presentation of available information in graphical displays received via communication equipment



# What next?

- “protection of the marine environment”
- The answer is in fact common between most stakeholders, next milestone for international shipping is **GREEN shipping**, and
  - IMO has expressed it clearly; we aim for a 30% reduction in GHG by 2030 (and 50% by 2050, and hopefully more before...)
  - Our End-users and Customers ask for the green shipping, including cost savings and fuel reductions
- NAVTOR’s has already planned for Nav**Green** some time, and most of our ongoing and planned R&D are focusing along the Nav**Green** line;



# NavGreen

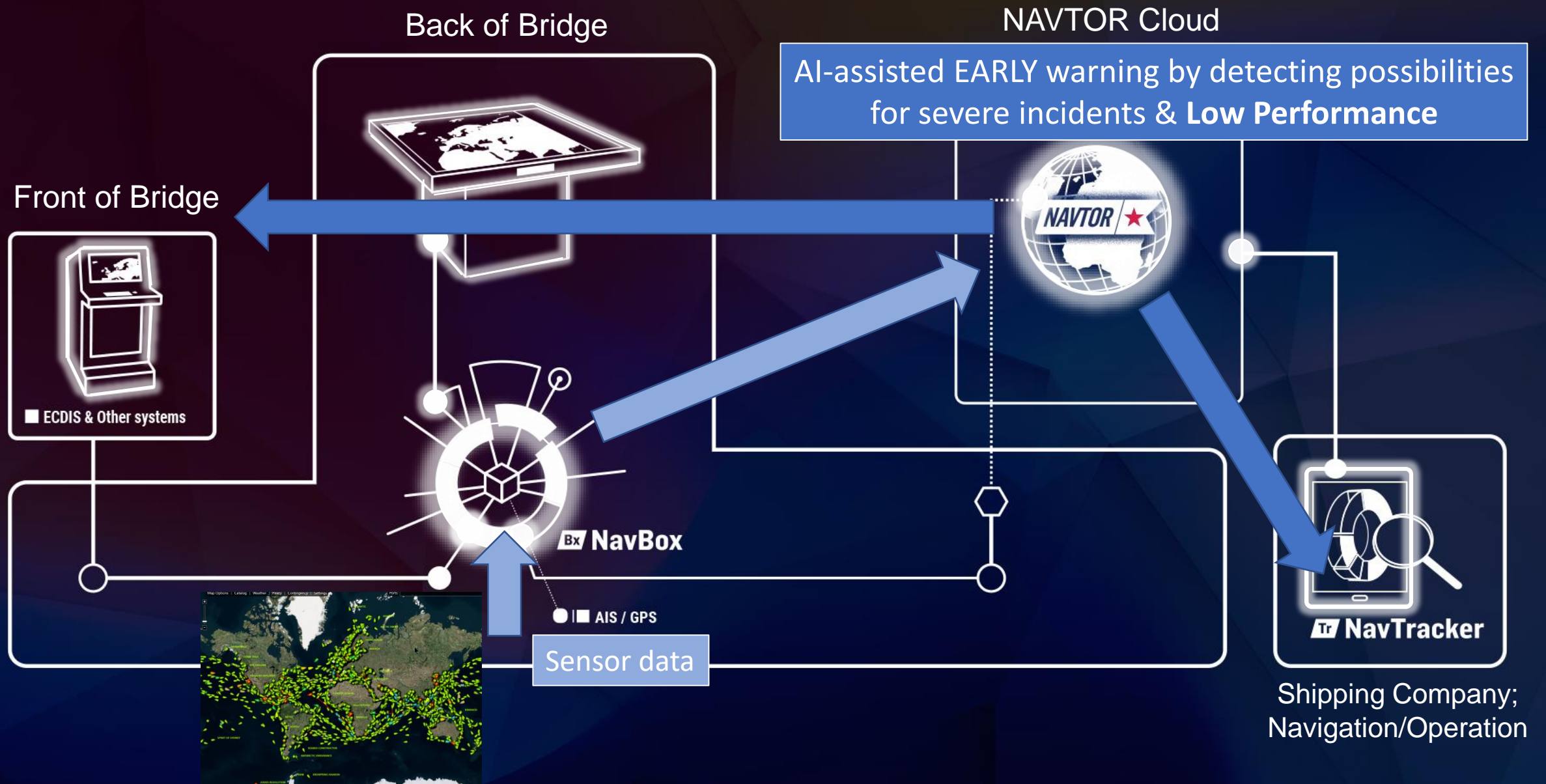
- Data catch; two new EU- project proposals (EU)
- Cyber-security; CySIMS-Service Evaluation (NFR)
- Platform exchange; Maritime Data Space (NFR)
- Intelligent analytics; HANSA (EU)
- Fleet-Management incl. Monitoring and Decision support  
NavFleet (NFR)
- In addition continue to improve & simplify work on board, e.g. automatic reporting  
SESAME-2 (NFR)



Horizon 2020  
European Union Funding  
for Research & Innovation



# Platform for AI assisted decision support



# Platform for AI assisted decision support

Back of Bridge

NAVTOR Cloud

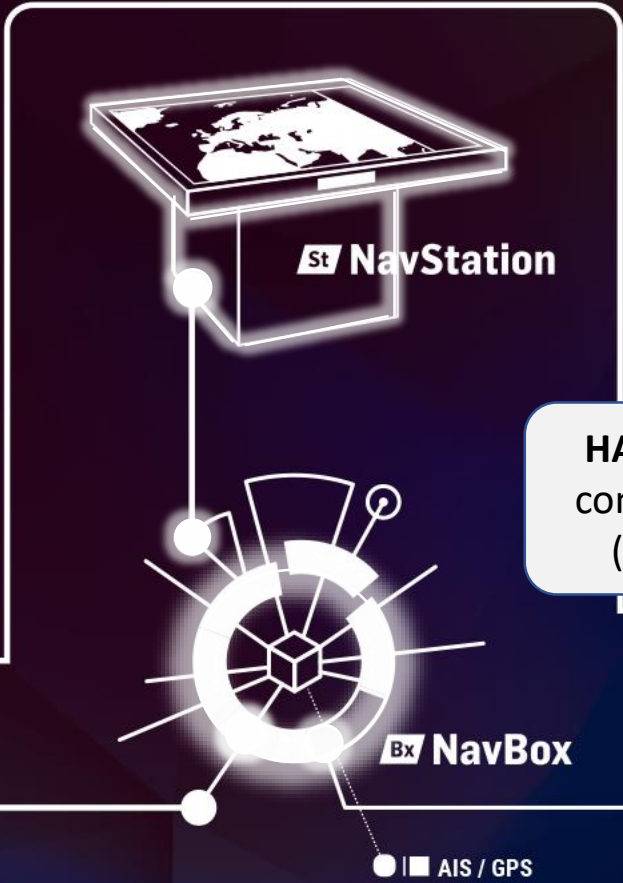
AI-assisted EARLY warning by detecting possibilities for severe incidents & **Low Performance**

**TRANSACT (EU-PP)**; Transform Safety Critical and Performance -info into decision support by **AI solutions for end-users (shore / vessel)**

**HANSA (EU-MarTERA)**; Establish concept of Recommended Routes (for planning and monitoring)

**NavFleet (NFR)**; Fleet Monitoring and Decision System (Safety and Performance)  
Shipping Company;  
Navigation/Operation

Front of Bridge



**eVDR (EU-PP)**; A new VDR solution to provide *data stream* to shore (e.g. cameras, radar, live ECDIS,..)

**CySIMS (NFR)**; Demo of **Cyber Security** standards for IMO (based on IRIS in Aviation)



# Cyber Security for Merchant Shipping – Service Evolution



- CySiMS (2015-2018); RCN funded project that developed **specifications for a new public key system for the maritime world**. The results have been met with much interest in IMO and become an **official IALA2 standard**.
- Urgent need to develop these specifications further into a complete system and complete an extensive **cost**-benefit analysis.
- The key issues CySiMS-SE (april19-mars21) will address are;
  - How to deal with certificate updates when ships are offline for long periods of time.
  - Cost-effective distribution of private keys on smart cards to the relatively low number of commercial ships (<100 000).
  - How to transfer certificate caches to the on-ship equipment on both the bridge and administrative local network (overcome separation requirements).



# Thank you!

*Questions or comments,  
please?*

