“eNavigation starts with eVoyagePlanning”:
Information exchange, dynamic routing and knowledge transfer.

Current status and potential solutions?

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Jeppesen Norway AS

A philosopher AND mariner story?

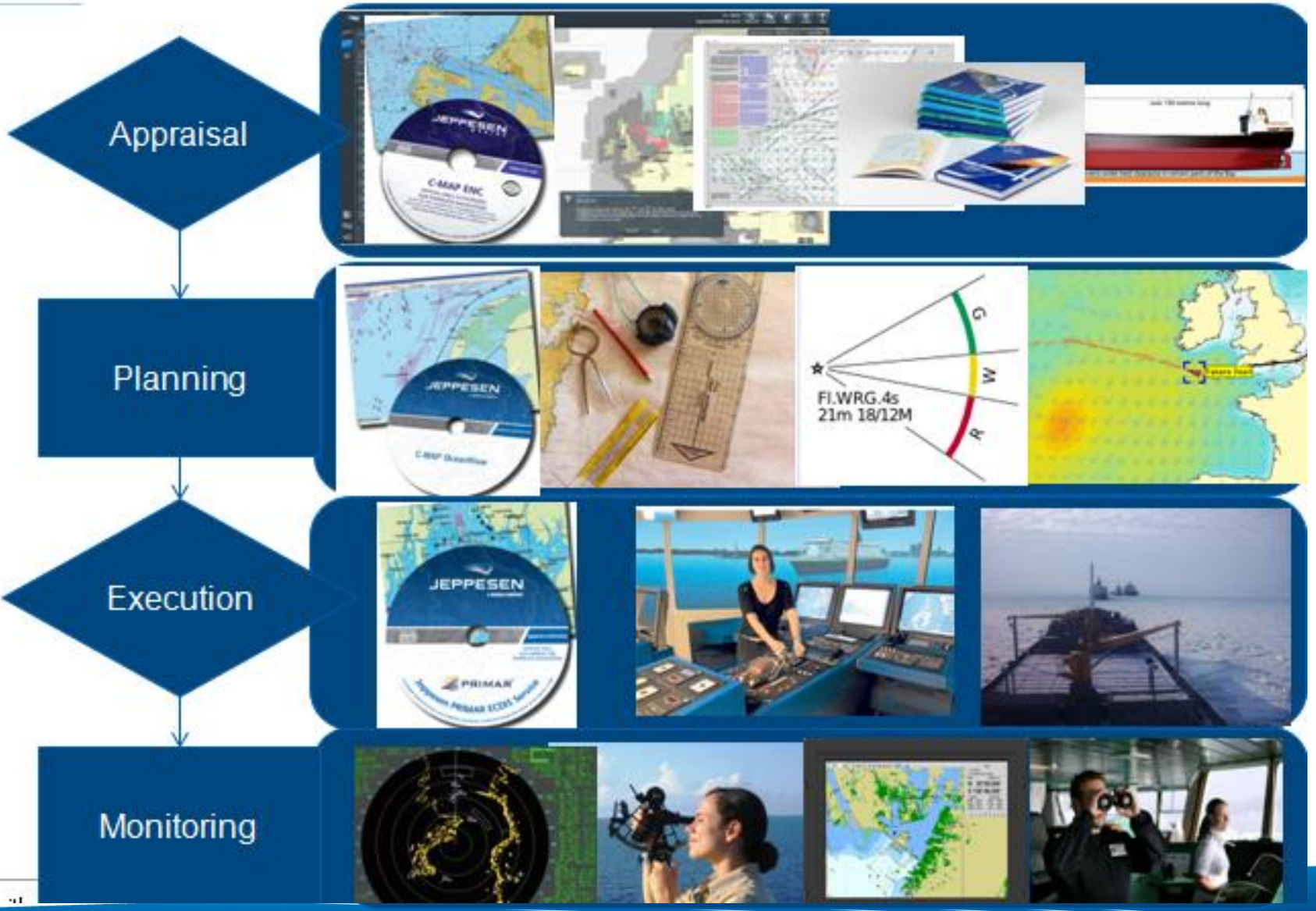
- **Philosopher = Mariner? Plato: “Stargazers”**
- **Norwegian fjords – SAR Ambulance/Rescue Seaman**
- **West Africa, North Sea: Cadet, DPO and OOW (1 week as Ch. Officer)…**
- **“Voyage Plan rig move Jackup Nigeria – Ghana”**
  - Paper charts
  - Piracy
  - Wave >4 m, <7 s period….
  - Approx 2 days work…. Could be done in 15 minutes!
  - Great training – BUT **TIME FOR QUALITY ASSURANCE?**

- **Never intended to go ashore (WANTED D1).**
- **Asked to go ashore; Marine Logistics Coordinator, and then Product Manager.**

User Needs – User Wants?

IMO Res A.893 Annex 25

Guidelines for Voyage Planning – process:



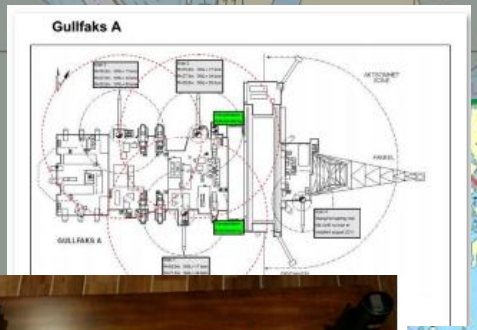
The appraisal of a Voyage Plan:

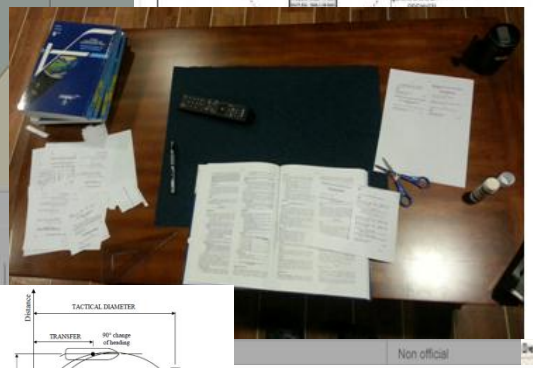
IMO Requirements for voyage/passage plans:

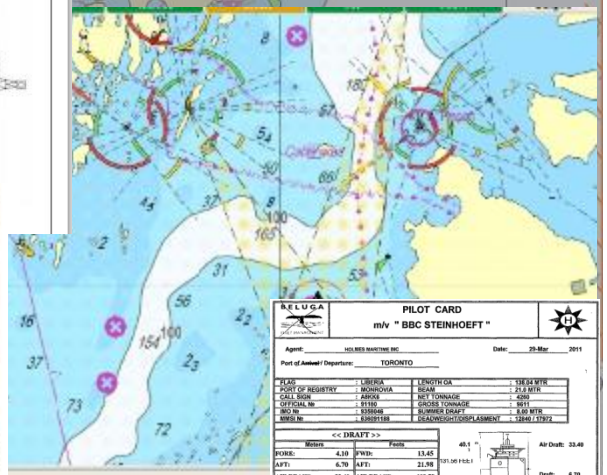
What's the safest (and most cost effective) scheduled route Berth to Berth?

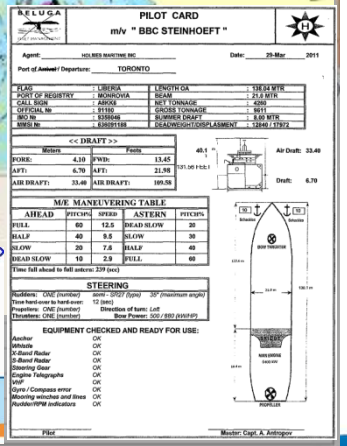
Considering:

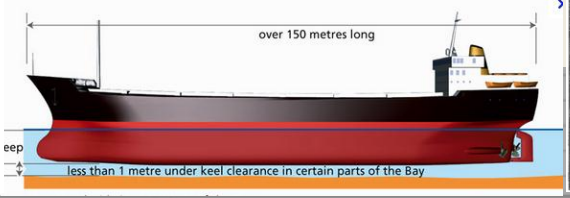
- Available NavAids
- Weather/tide/currents
- Under Keel Clearance
- Reporting
- Events
- Pilots
- Charts
- Nautical Publications
- Watch keeping
- Engine mode
- Operations underway
- Contingency plans
- ……











The wheel of “eNavigation”

Business interest, marine spatial planning/coordination and vessel operations

Plan Voyage
(e)Nautical Management
(e)Voyage Planning

Load Ship

Cast Off
Conning

Passage Plan
(e)PassagePlan
Reporting

Harbor Maneuvering
(e)Navigation
Positioning

Chartered

Standby
(e)Nautical management

Coastal
(e)Navigation
Optimization

Fleet Management
Business intelligence
Fleet efficiency

Vessel operations:
Management, maintenance, performance and
Navigational planning and execution.

Marine Coordination
Vessel Traffic **Service** (VTS)
Marine spatial Planning (MSP)

Discharge
Reporting
Voyage Analyze

Ocean Passage
(e)Navigation
Optimization

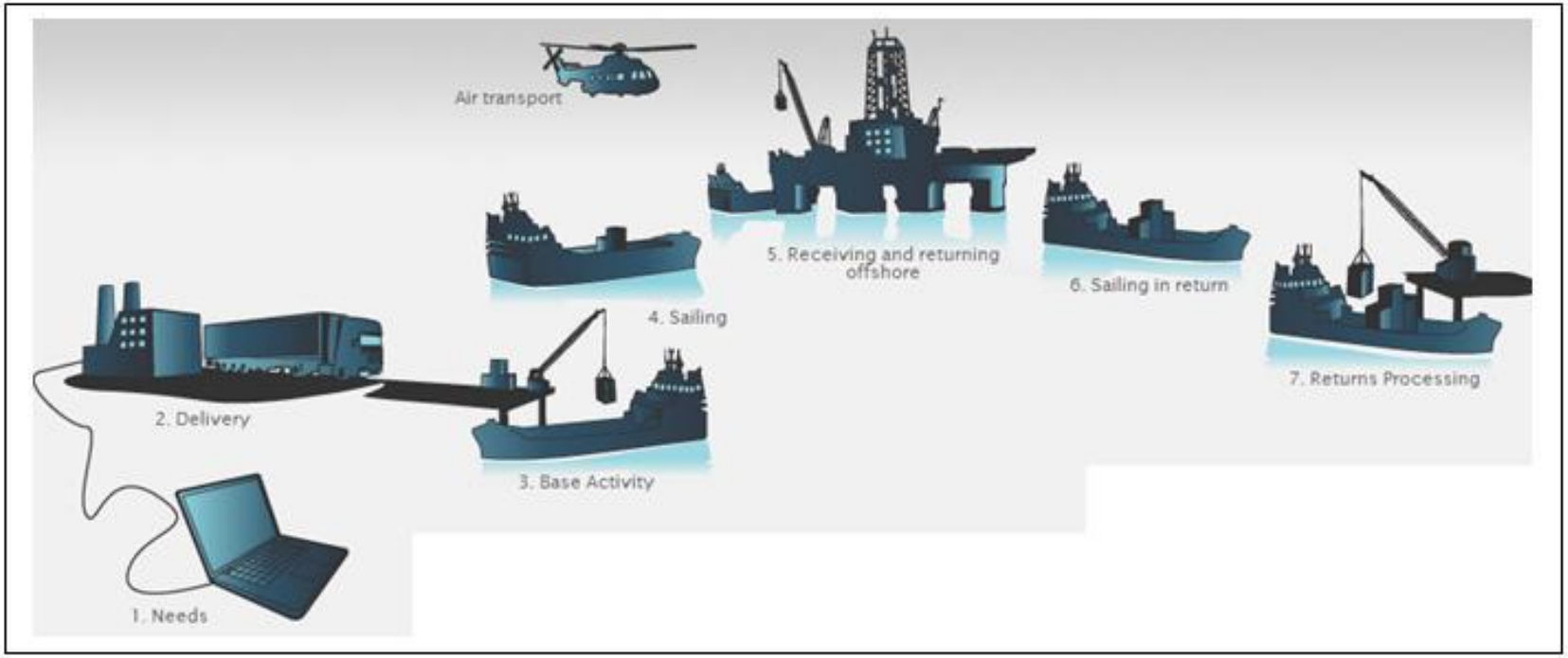
Berthing
Conning

Coastal
(e)Navigation
Optimization
Reporting

Approach
(e)Navigation
Reporting

Harbor Maneuvering
(e)Navigation
Conning

Typical ship logistics “Offshore”



IMO NAV58, annex 4 (5,6?)
Proposed eNavigation solutions

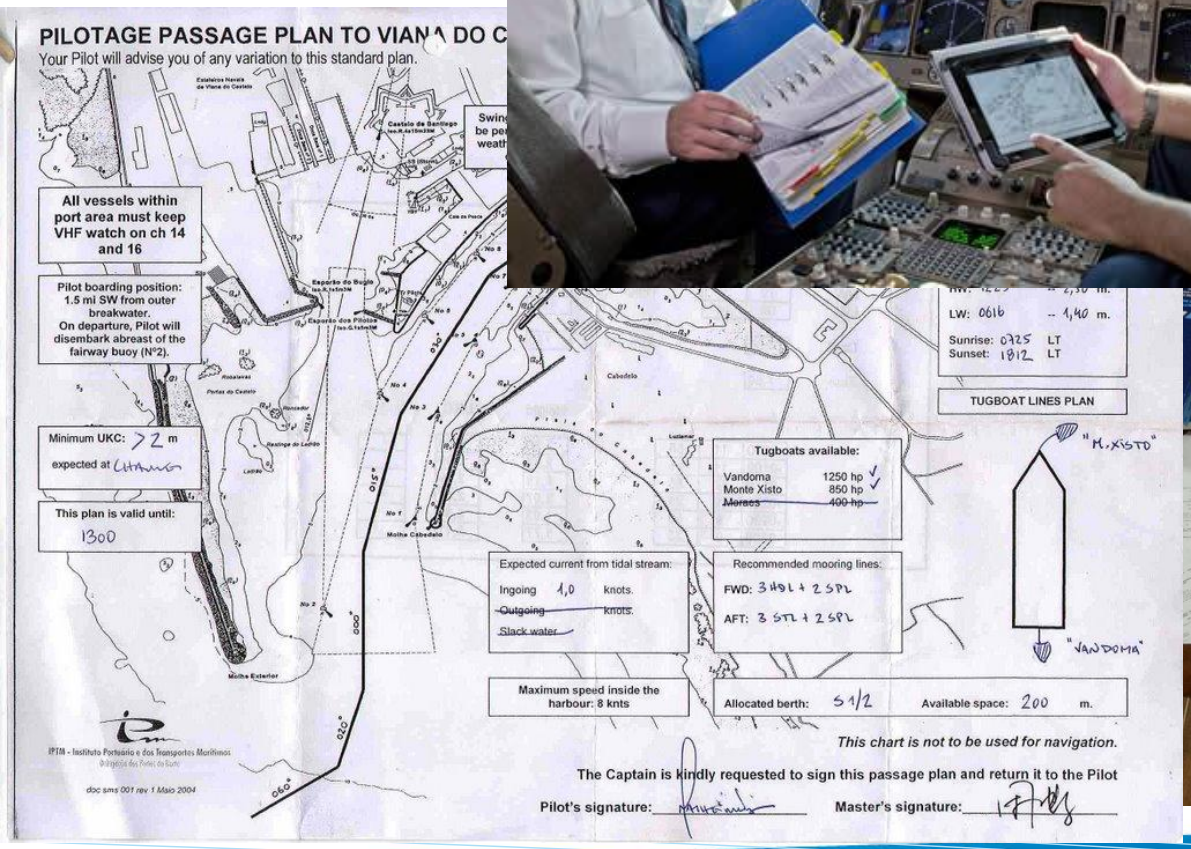
1. Improved, harmonized and **user-friendly bridge design**
2. Means for **standardized and automated reporting** for **shipboard users**
3. Improved **reliability, resilience and integrity of bridge equipment and navigation information**
4. **Integration and presentation of available information in graphical displays** on board received via communication equipment
5. **Information Management**
6. Improved access to relevant **information for Search and Rescue (SAR)**
7. Improved reliability, resilience and integrity of **navigation information provided by shore-based users**
8. Improved and harmonized **shore-based systems and services**
9. Improved **communication of VTS service portfolio**
10. Improved, harmonized and **user-friendly shore-based design**
11. Means **for standardized and automated reporting for shore-based users**
12. Integration and presentation of **available information in graphical displays** received via communication equipment for **shore-based users**
13. **Information Management for shore-based users**
14. **Exchange of route segment**
15. **Exchange of voyage plan**

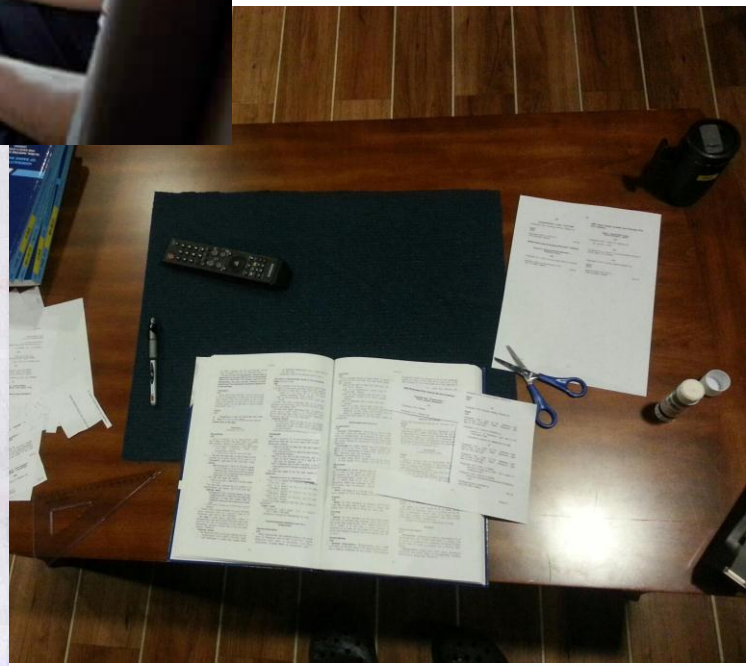
System requirements:
Harmonized
User friendly
Automated
Graphical Integration

Functional requirements:
Information Management
Reporting Management
VTS Service Portfolio
Search and Rescue
Route and Voyage Plan Exchange

For who?
Ship AND Shore side users!

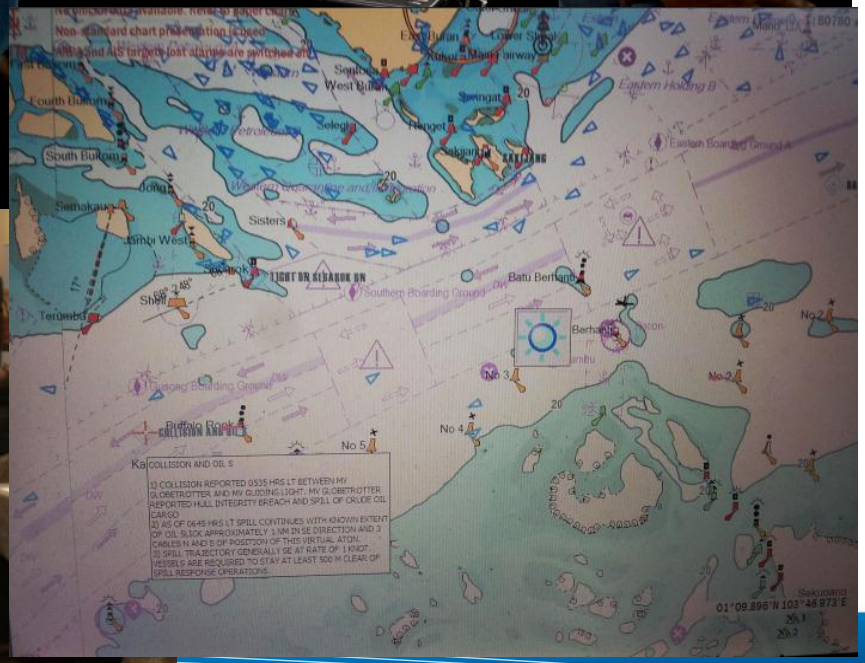
Data or Information?



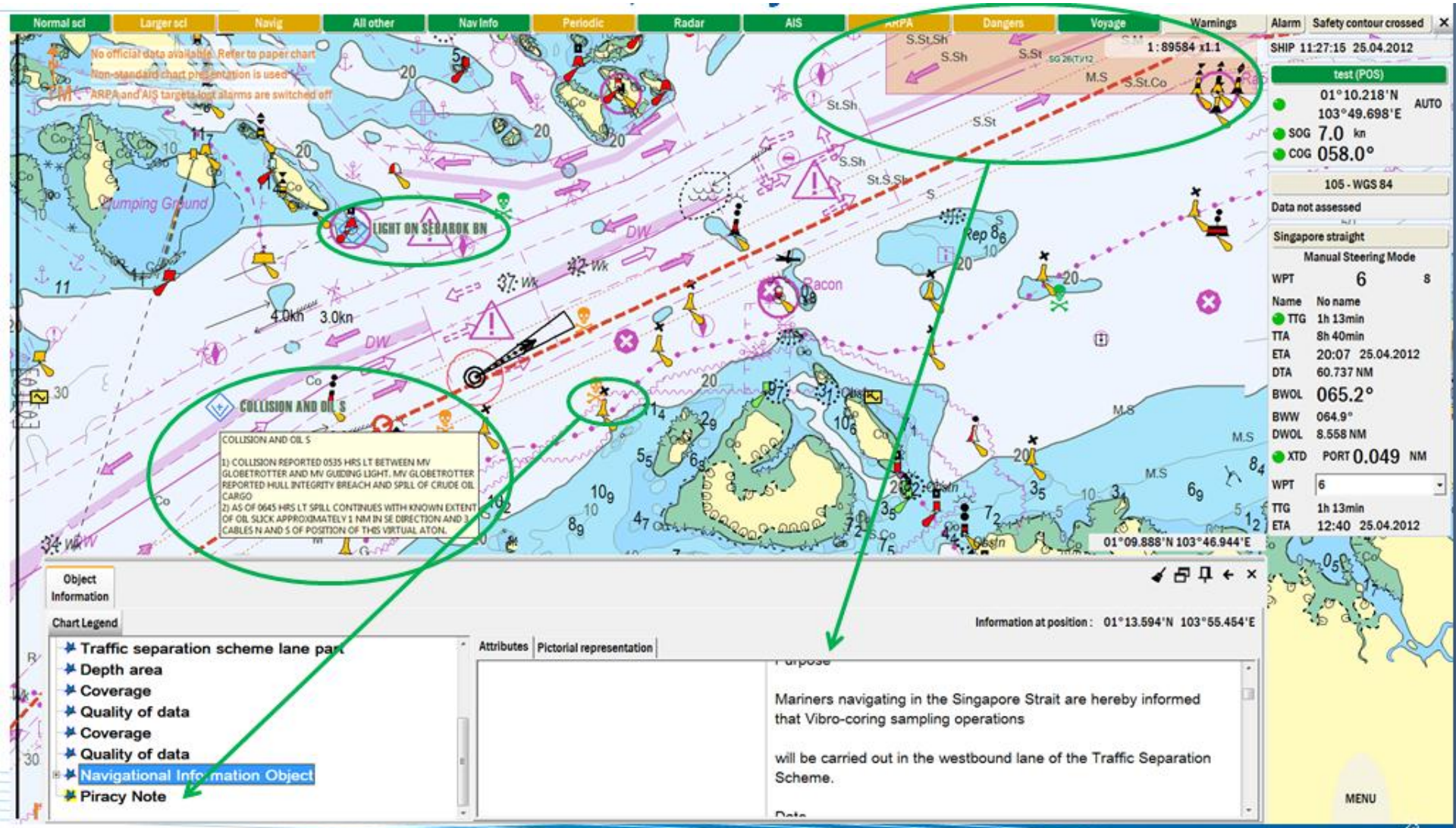


IMO/MEH/NCA ”S100” testbed, Singapore 2012

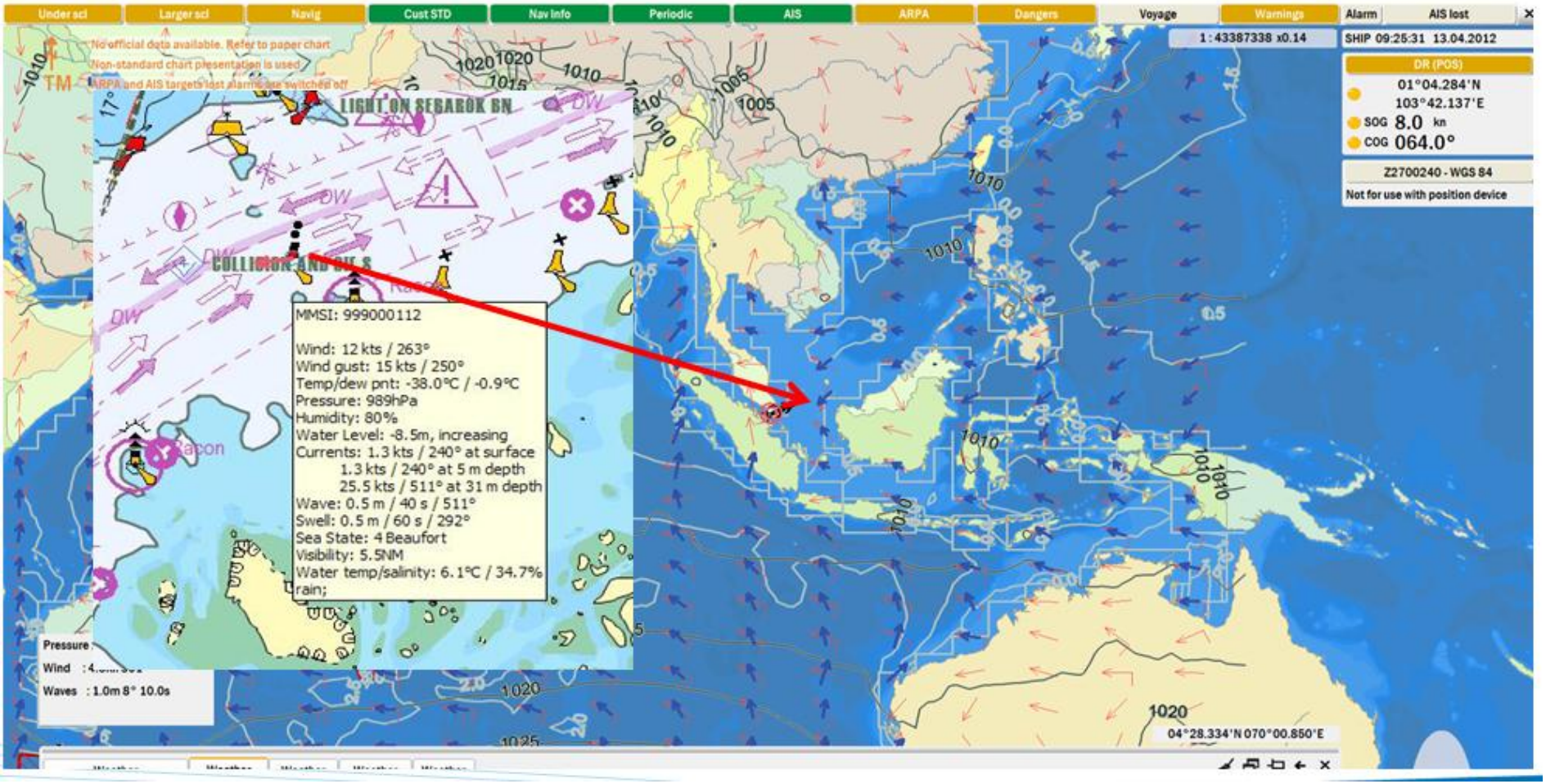
Jeppesen and Kongsberg Norcontrol providing the ”future” of situational awareness in navigation?



Singapore MEH test bed case 1:
Situation awareness based on current and new infrastructure (VTS, AIS, S100, Jeppesen SENC/DC).



Singapore MEH test bed case 2:
Sharing of METHYD information through AIS/Jeppesen DC based on the “S100” format.



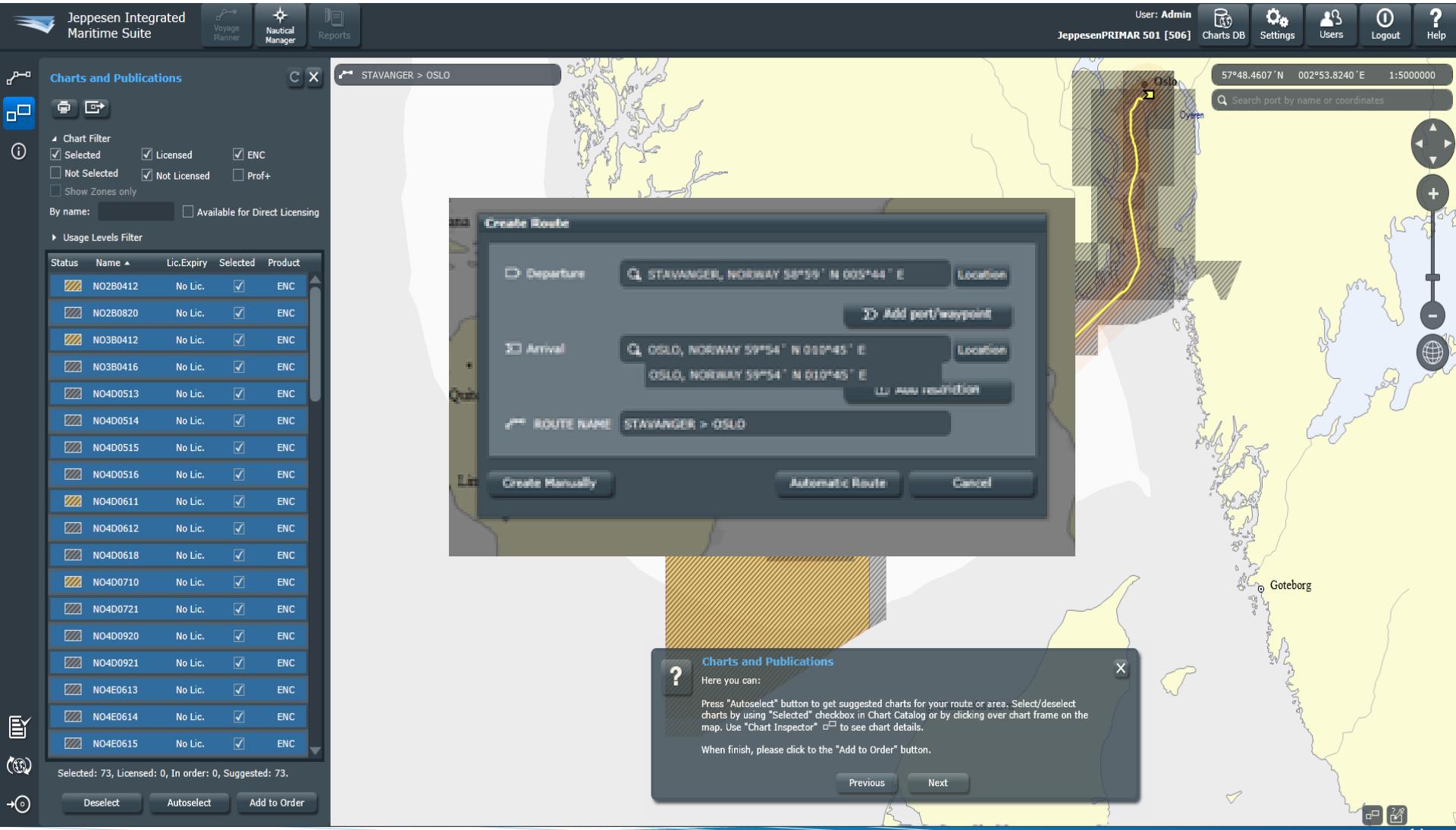
Above: Combination of Jep. Weather forecast, and AIS METHY

How do we achieve the vision of eNavigation when starting with eVoyagePlanning?

Ease of updating and synchronization:
Information to be available where and when it is needed.

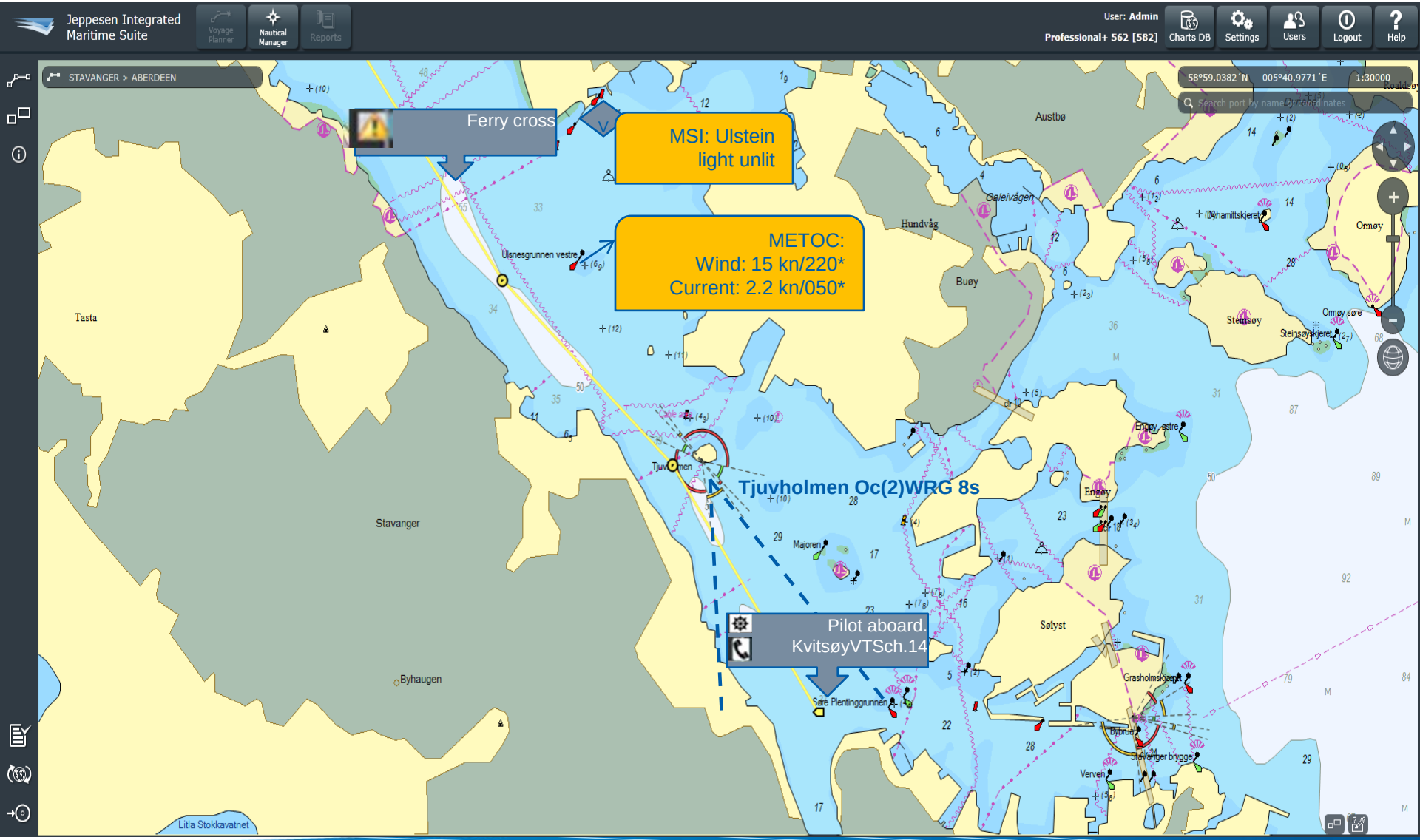
Tools for Nautical Management:

Automatic Routing based on industrial routes, wizard “chart picking”, object inspection, updating, ordering, quoting and PDF reporting.

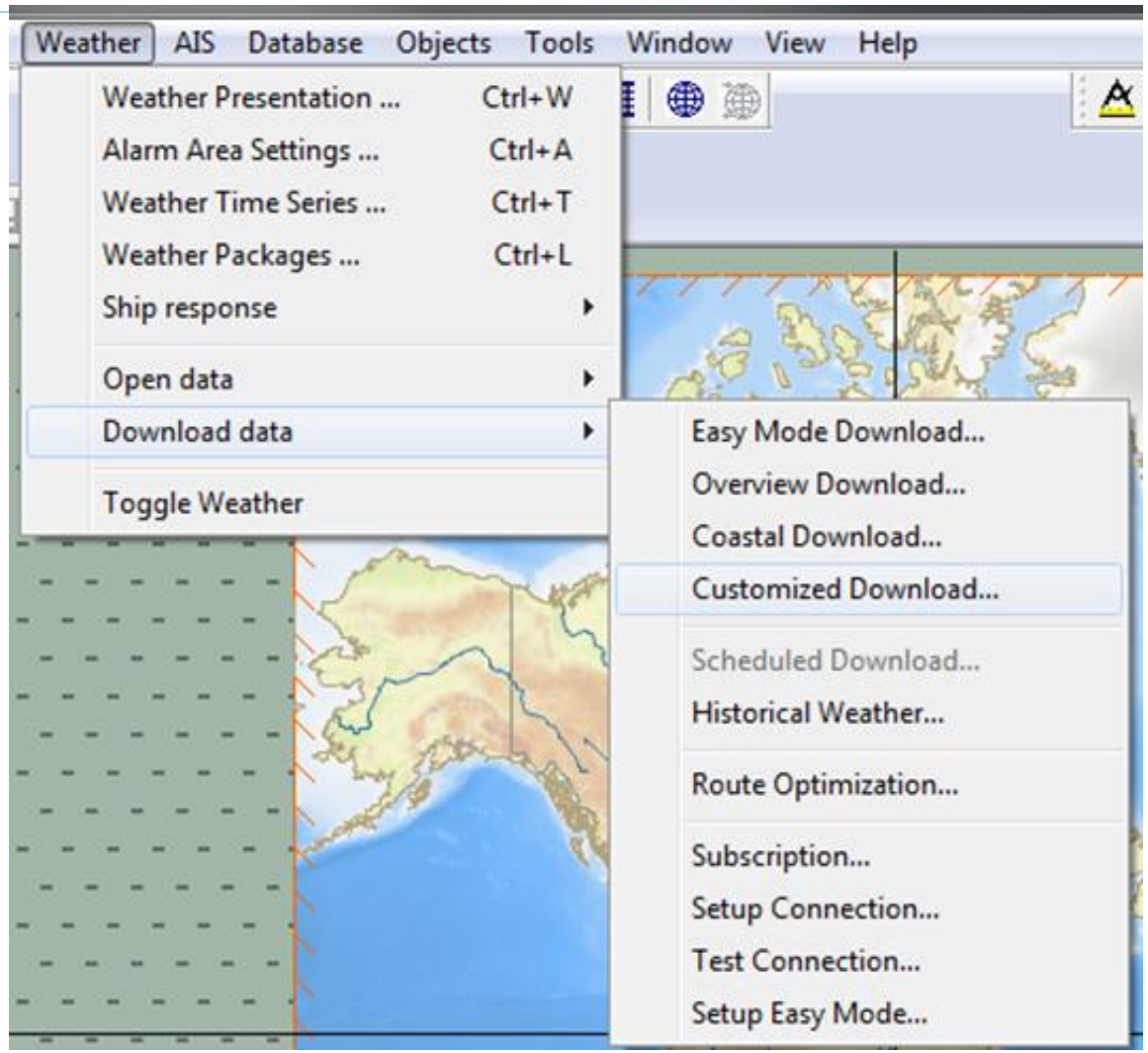


On chart information:

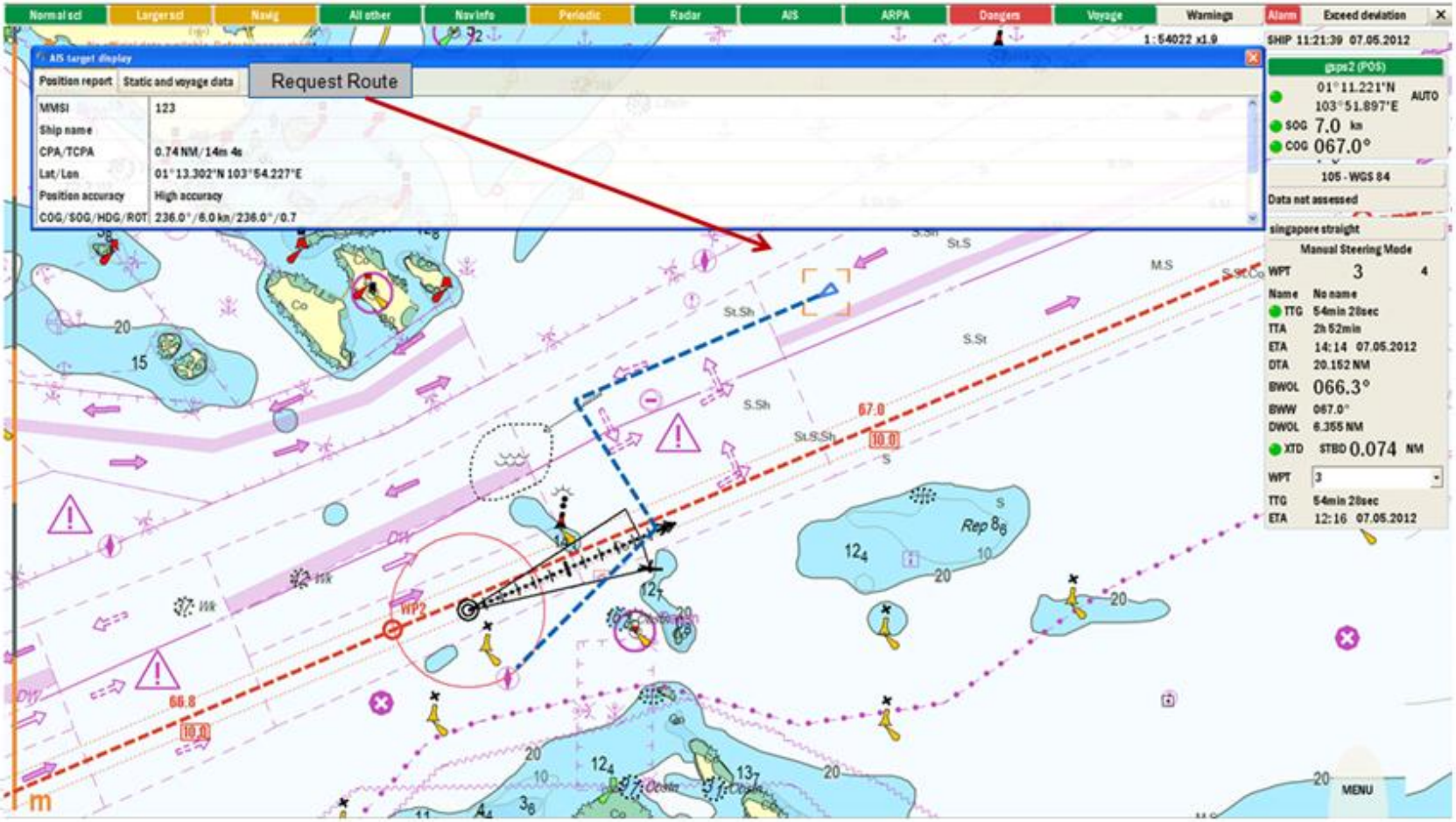
Information linked from hydrographic, AND dynamical data with clear Voyage Plan events (“Mariner Notes”, MSI, METHYD etc).



Weather and optimization “on request” For screen only, or for route



Route exchange and monitor
Direct or through Jeppesen ShipRoutes.



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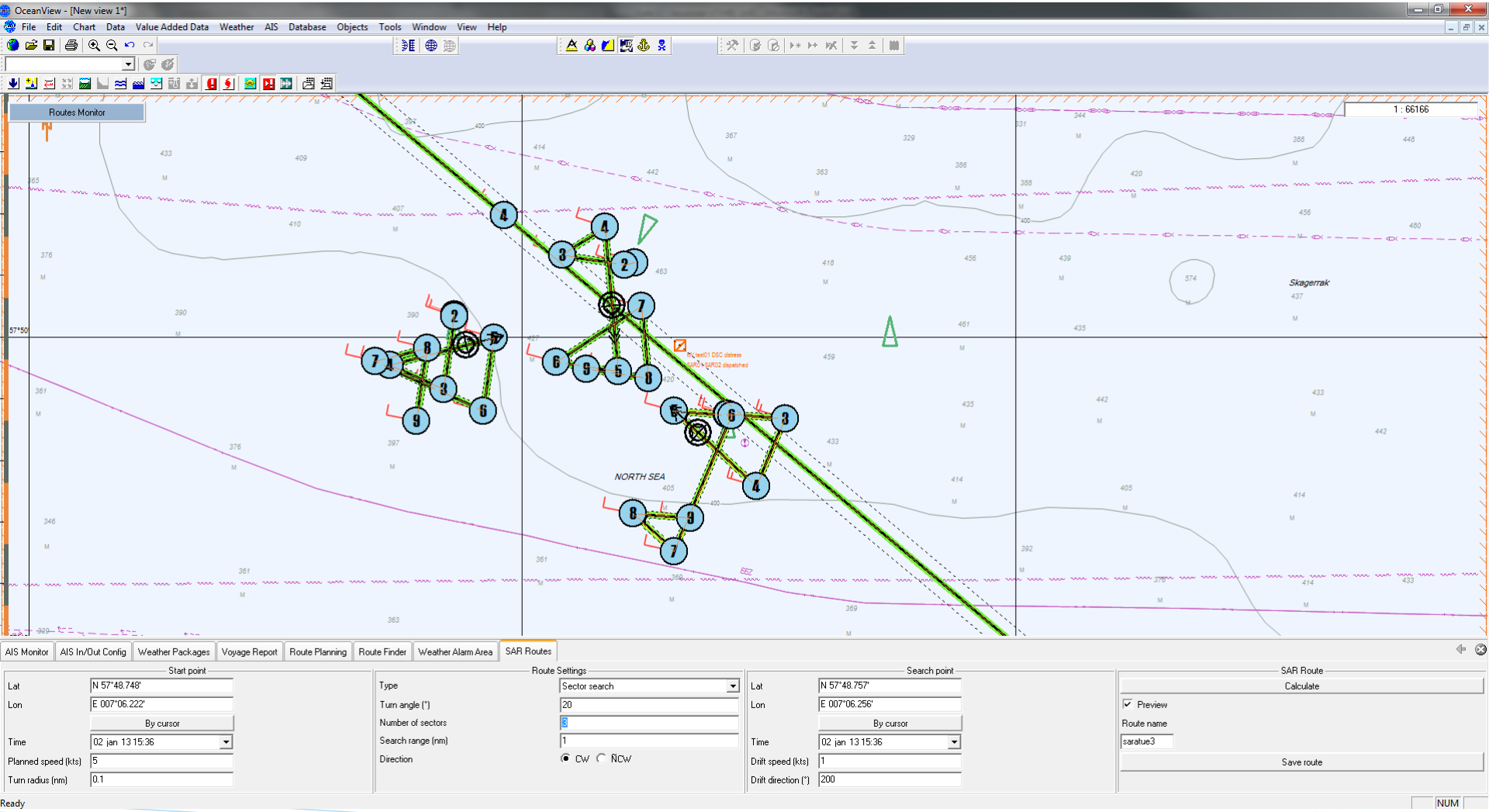
SAR Automated routing:
From IAMSAR, AIS, POS, and route exchange availability:



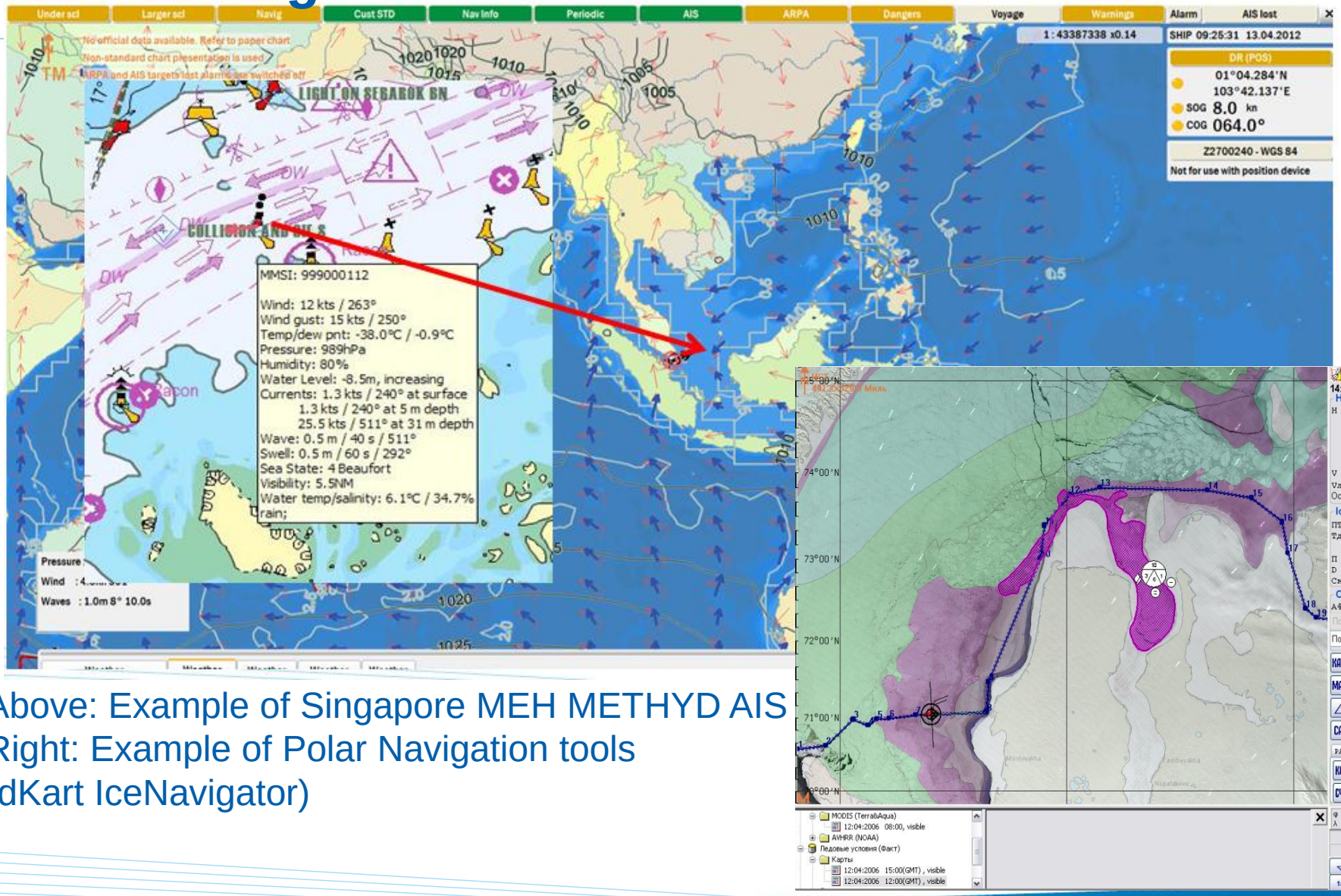
Weather and Piracy:

Combine weather alarm area and piracy incident to find “more secure” route:

Setting Environmental threshold:

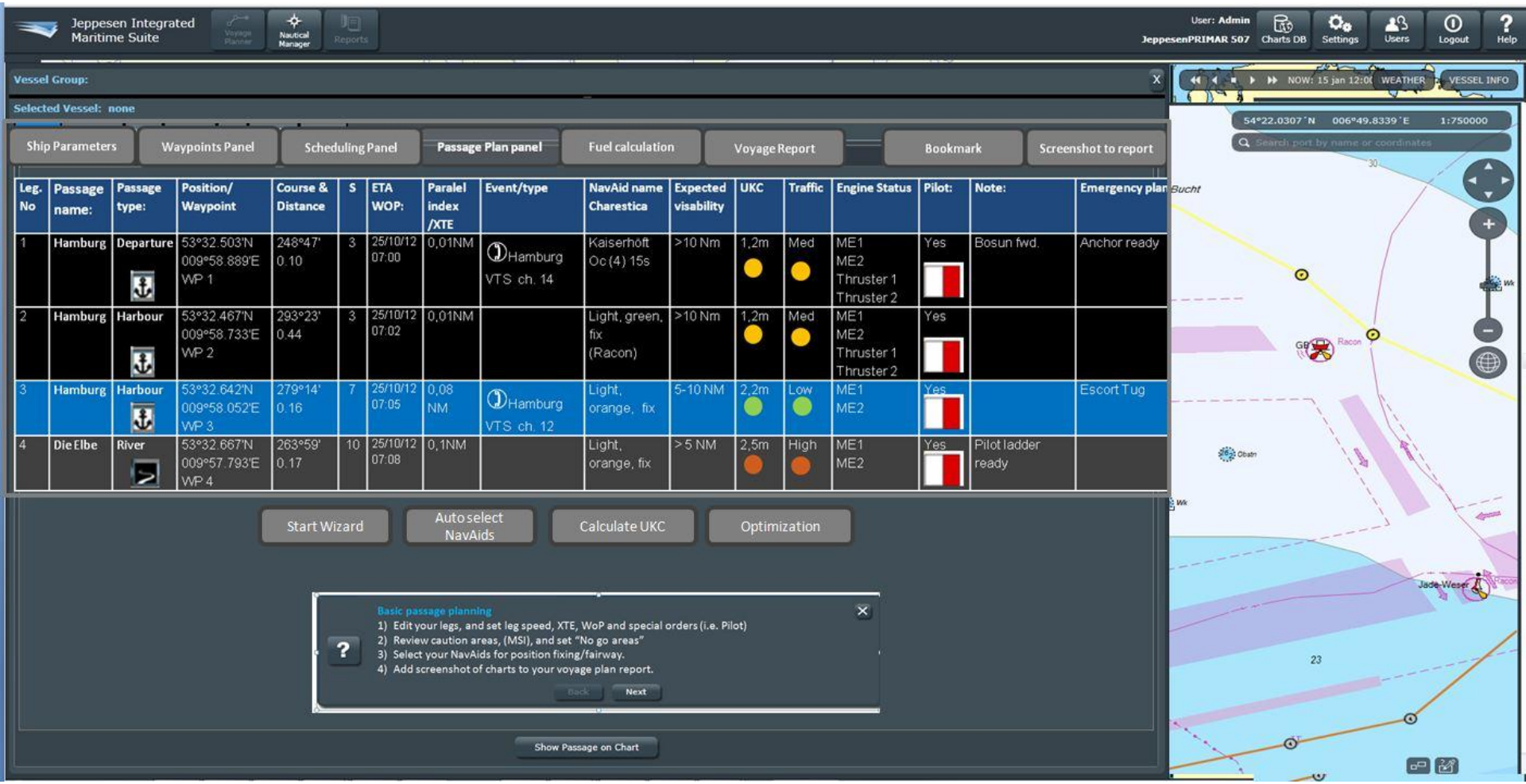
>2m Wave Hs:
“Limit” for Piracy boarding operations – “Securer” corridor.

More dynamic information exchange = safer navigation and situational awareness.



Above: Example of Singapore MEH METHYD AIS
Right: Example of Polar Navigation tools (dKart IceNavigator)

Dynamical Passage Plan tables, information where and when it is needed.



Printed report, or in “S10x”

Available in paper form, and in “S10x”; harmonized and exchanged with relevant stakeholders via an international VoyagePlan DB.

Voyage/Passage Plan

04-Oct-2012

Applicable to:

Vessel name:	My Ship
IMO number:	1234567
MMSI number:	987654321
Licence keys (eTokens):	JNS eT 00036
Chart Database Version:	JeppesenPRIMAR 503
Route name:	HAMBURG > ISTANBUL

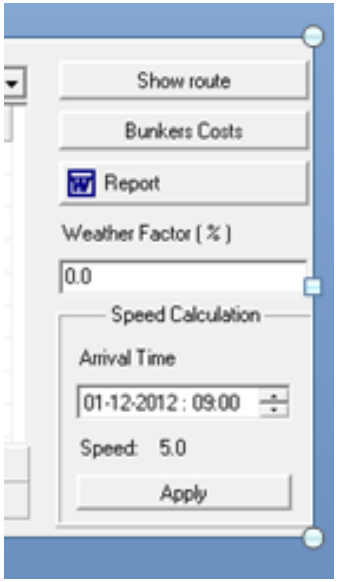
ɐe plan.

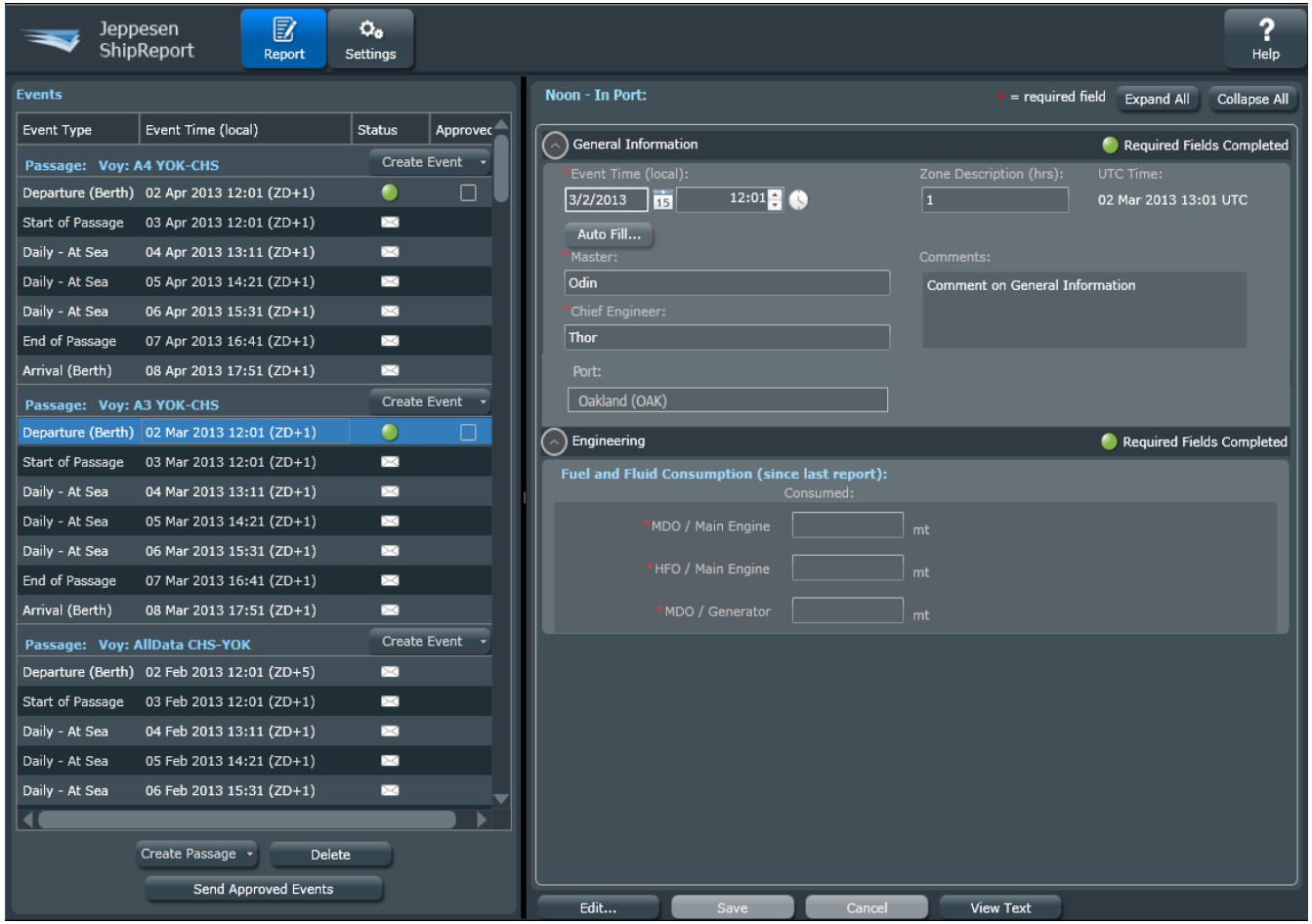
From: Position/Waypoint Postion interval	Course & Distance	Paralel index information	Leg information/ order	NavAid to be used	UKC	Expected traffic/situation	Engine Status	Actual position	Time:	Remarks
53°32.503'N 009°58.889'E WP 1	248°47' 0.10			T						
53°32.467'N 009°58.733'E WP 2	293°23' 0.44									
53°32.642'N 009°58.052'E WP 3	279°14' 0.16									
53°32.667'N 009°57.793'E WP 4	263°59' 0.17									
53°32.649'N 009°57.506'E WP 5	251°58' 0.47									
53°32.505'N 009°56.762'E WP 6	268°51' 0.75									
53°32.490'N 009°55.502'E WP 7	268°48' 0.76									
53°32.474'N 009°54.225'E WP 8	273°10' 1.10									
53°32.535'N 009°52.373'E WP 9	286°34' 3.64									
53°33.570'N 009°46.529'E WP 10	278°13' 4.43									
53°34.202'N 009°39.172'E WP 11	301°4' 1.33									
53°34.889'N 009°37.252'E WP 12	316°22' 1.83									
53°36.213'N 009°35.125'E	307°45' 2.09									

(Automated passage plan from OceanView, with some added columns.
Chart overview from Nautical Manager.)

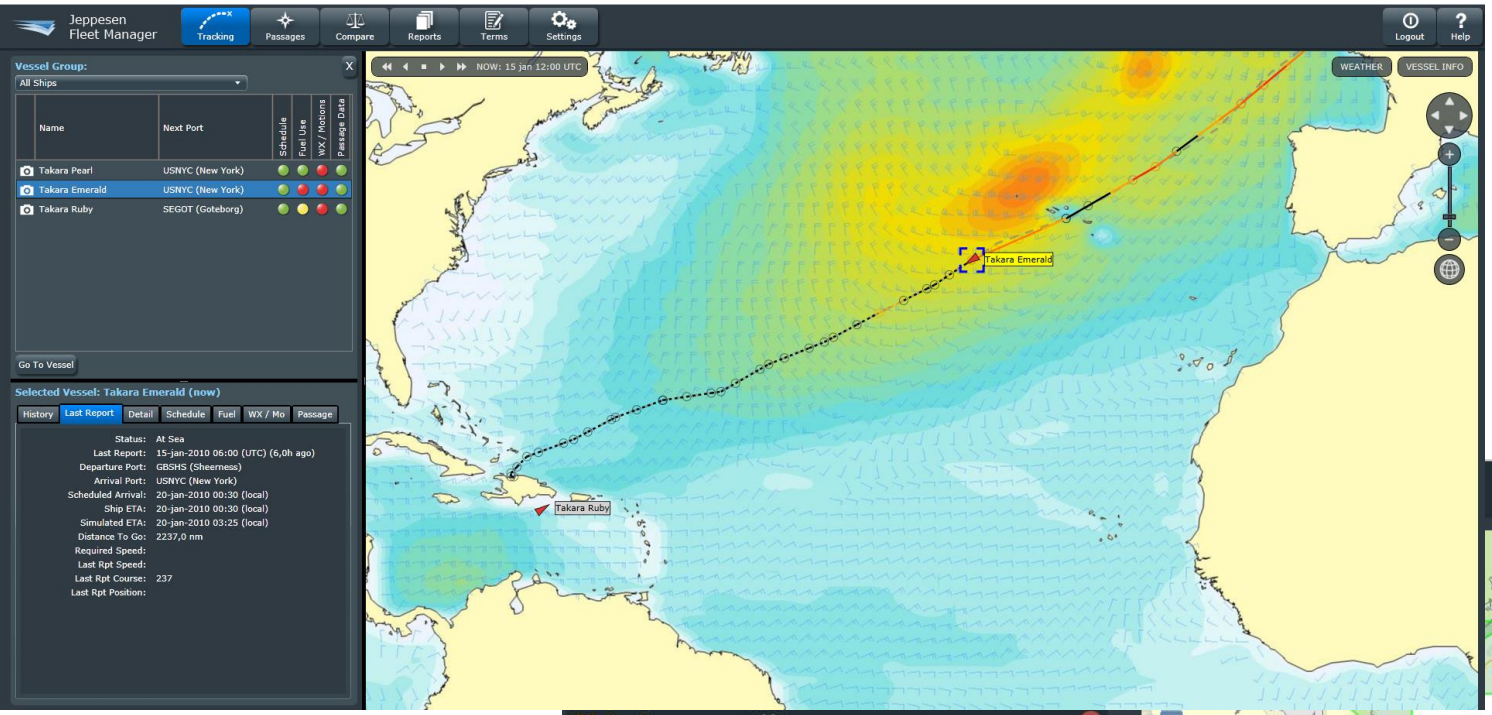
Ship reporting:
SEEMP, Just in Time Arrival, Optimization and Performance

E-Navigation/eVoyagePlanning also to comply with ALL reporting schemes:
Need for tools to comply and document operations.



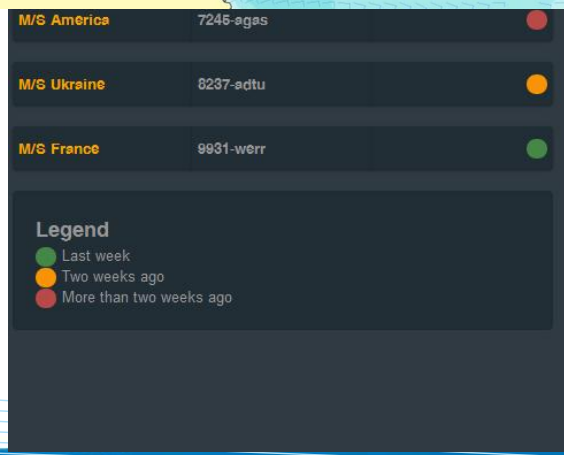


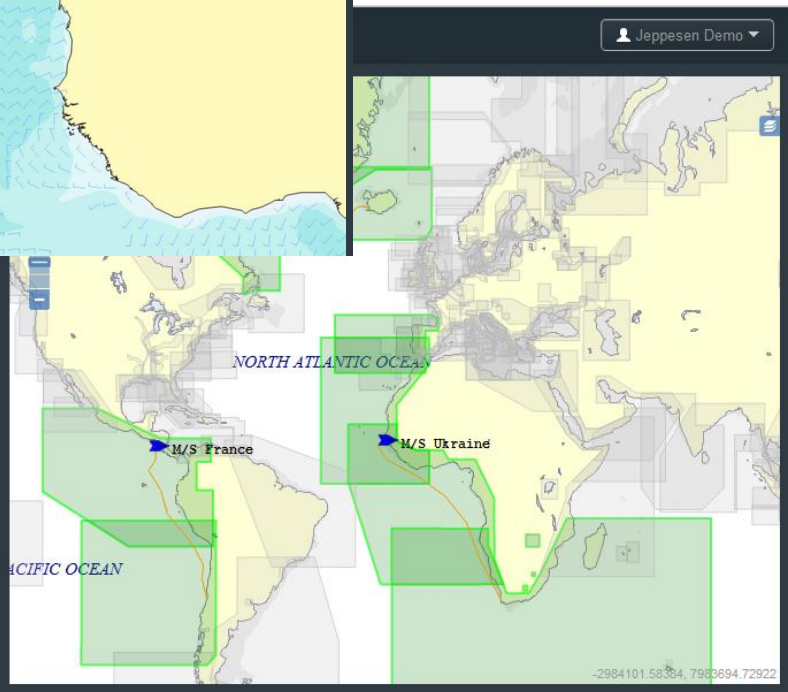
Ship tracking and performance reporting; onboard and shore side solutions?



"FleetManager":
combining different tracking solutions (Jeppesen and 3. party) with performance and ship reporting.

"Pay as you sail" tracking:
DNV approved for ENC licensing
(Independent standalone tracker)





eVoyagePlanning and the Marine Service Portfolio (MSP):

Data from the "MSP Cloud" support eVoyagePlanning and "eNavigation" industry to provide most efficient transfer and information management.

Shipboard:
Nautical Management
Voyage planning, Optimization, Reporting and Contingency
ECDIS/INS – Safe execution of Navigation

Information Management

Com's

Data compilation/security

Information exchange platforms

MSP
(Maritime Service Portfolio)

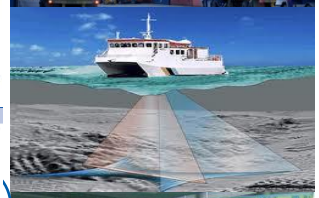
IMO

IALA AISM

MONA LISA

DANISH MARITIME AUTHORITY

KYSTVERKET



Fleet Management:
Operational and Contingency support
Resource Management
Tracking and performance

Authorities and Ports:
Marine Safety and Security,
Resource management,
Marine Coordination
Marine Spatial Planning

Some risks and possible mitigation?

- **Adoption of Voyage/Passage Plan exchange and Collaboration:**
- **Focus on traffic coordination rather than traffic management.**
- **ROI as a result of improved safety in reduced collision/weather damage/grounding risks.**
- **ROI as a result of better efficiency (improved weather routing, less waiting time in harbor).**

- **ENC coverage and availability in critical areas (Gap closing)**
  - **World coverage ENC's are made available to ALL distributers (not exclusively).**
  - **Distribution through RENC's or direct agreements.**
  - **Very good collaboration with i.e. Far east Asian HO's to ensure this vision. (Gap closing with Malaysian ENC now available through SENC).**
  - **Jeppesen has extensive experience in supporting HO's ENC production.**

- **Obtaining and updating maritime information (charts, weather etc).**

(Charts in raw "S57" are normally 9 DVD's and takes hours to days to load).

  - **SENC distribution can reduce compilation in ratio 1:5-9, also more secure.**

A multiplatform "NextGen" S100 standard may further mitigate the risk.

Some risks and possible solutions continue

- **Overflow and overload of critical navigational system (i.e. ECDIS)**
  - **Own system (INS) to handle additional data; open for innovation and integration.**
  - **System for eVoyagePlanning; get information where and when it is needed already in the planning phase.**

- **Human factors: work overload, fatigue, increased traffic.**
  - **Systems should provide common workflow for voyage planning/optimization and nautical management.**
  - **As many automatic algorithms as possible, giving the ship navigational officers more time to verify and quality assurance the output before reaching a decision.**

Proposed action points for “eVoyagePlanning”:

1) **Investigate current systems and architecture for routing and exchange:**
   - Automatic routing based on industrial recommended routes. Weekly updates.
   - Route exchange solutions pr today (formats and application?)
   - Automatic SAR routing and exchange (between OSC and SAR vessels).
   - “Best practices” for data compilation and exchange.

2) **Gap analyze and closing:**
   - Infrastructure for **route exchange** (Jeppesen supports 18+ formats)
   - Need for highlight **Voyageplan exchange**: ROI in increased safety and efficiency (can be made available only for “approved parties” like “LRIT”.
   - **“NextGen” VTS** should **support route exchange and collaboration on voyage plans** (Putting the “S” into “Vessel Traffic Service”.

3) **Moving ahead:**
   - Define “S10x” formats for route and voyage plan exchange (ongoing)
   - Define minimum common architecture, User Interface and implementation strategy
     (Does the industry already have options available?)
     (Jeppesen Navigational kernel (SDK) and Datacenter: approx 90 % OEM penetration).

MONA LISA MOTORWAYS & ELECTRONIC NAVIGATION BY INTELLIGENCE AT SEA ?

eNavigation starts with eVoyageplanning;

Going from reactive (navigation) to proactive (planning and preparation).

Thank you!

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