

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

Current status and potential solutions?

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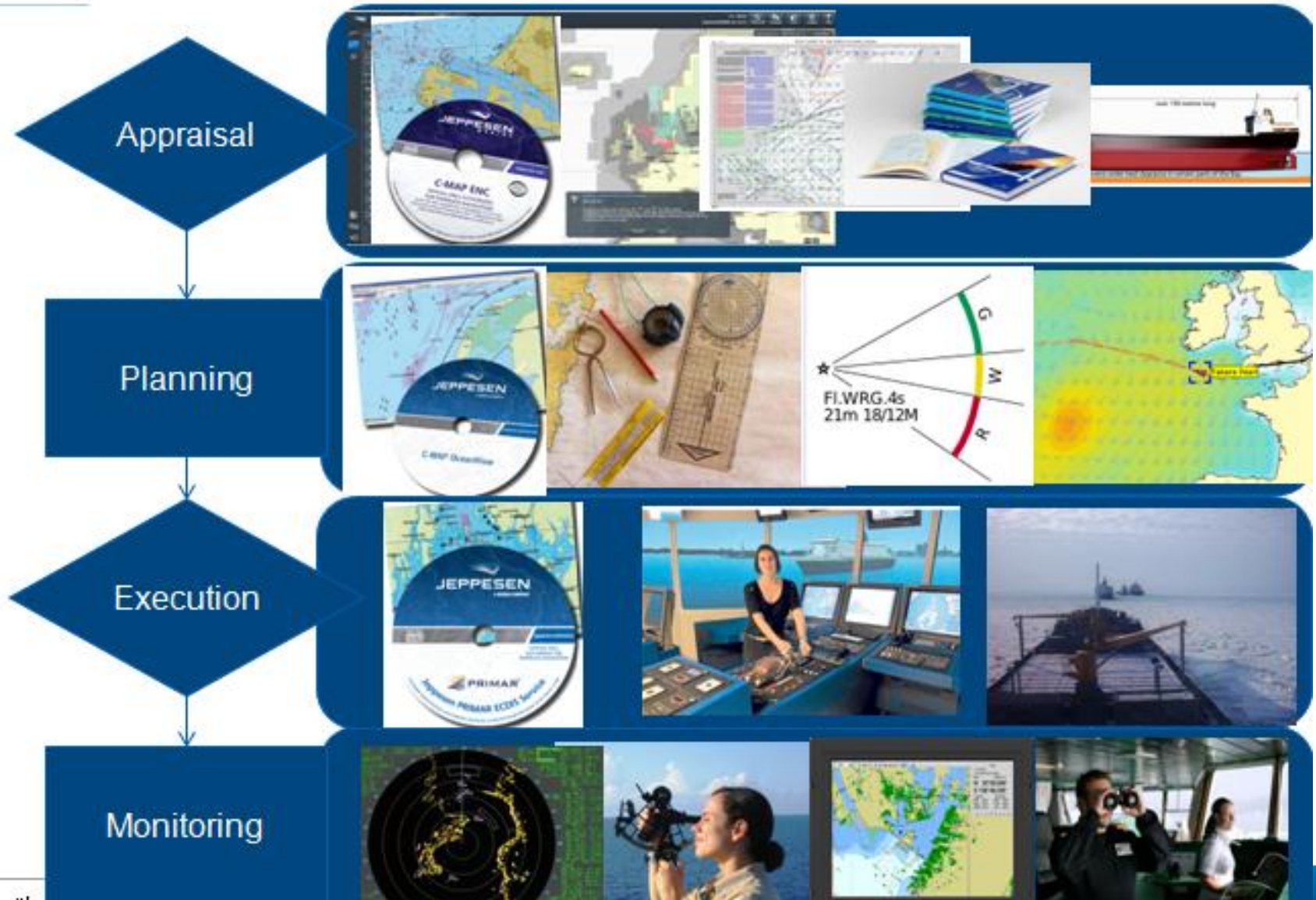
A philosopher AND mariner story?

- **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

Gulfaks A

PILOT CARD		m/v "BBC STEINHOEF"	
Agent:	HOLLER MARINE INC.	Date:	25-Mar-2011
Port of Arrival/Departure:	TORONTO		
PLANS:	1: 1300A	1: 1300B	1: 1300C
PORT OF REGISTRY:	MONROVIA	NET TONNAGE:	214 GRT
CALL SIGN:	APR03	GROSS TONNAGE:	400
CAPTAIN:	CHONGE	NET TONNAGE:	400
REG. NO.:	13000	NET TONNAGE:	400
REG. NO.:	13000	NET TONNAGE:	400
REG. NO.:	13000	NET TONNAGE:	400

M/V MANEUVERING TABLE			
AHEAD	PIVOTAL	ASTERN	PIVOTAL
STEEL	40	12.5	30
HALF	40	9.5	30
LOW	20	7.5	40
BELOW LOW	10	5.0	40

STEERING	
Maximum One (number)	30° (maximum angle)
Procedure One (number)	12 (times)
Procedure One (number)	12 (times)

EQUIPMENT CHECKED AND READY FOR USE:	
Anchor	OK
Mooring	OK
1st Head Hoist	OK
2nd Head Hoist	OK
Steering Gear	OK
Engine	OK
Engine Telegraph	OK
DPF	OK
Signs / Compass error	OK
Measuring instruments and lines	OK
Plumber/P/W indicators	OK

TACTICAL DIAMETER

TRANSFER 90° change of heading

TURNING CIRCLE

Path of ship's post

Drift angle

Roller motion

Distance

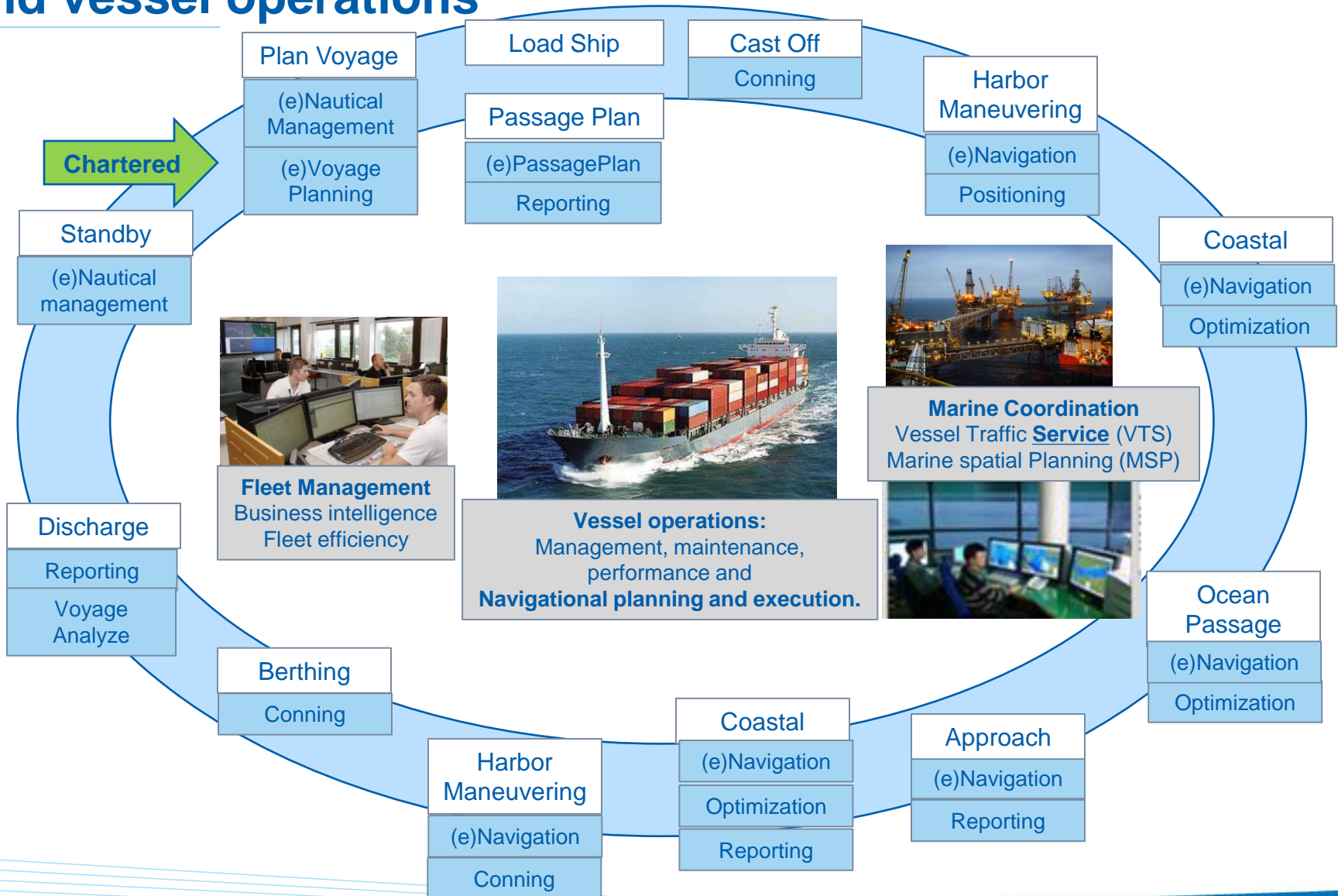
Approach Course

over 150 metres long

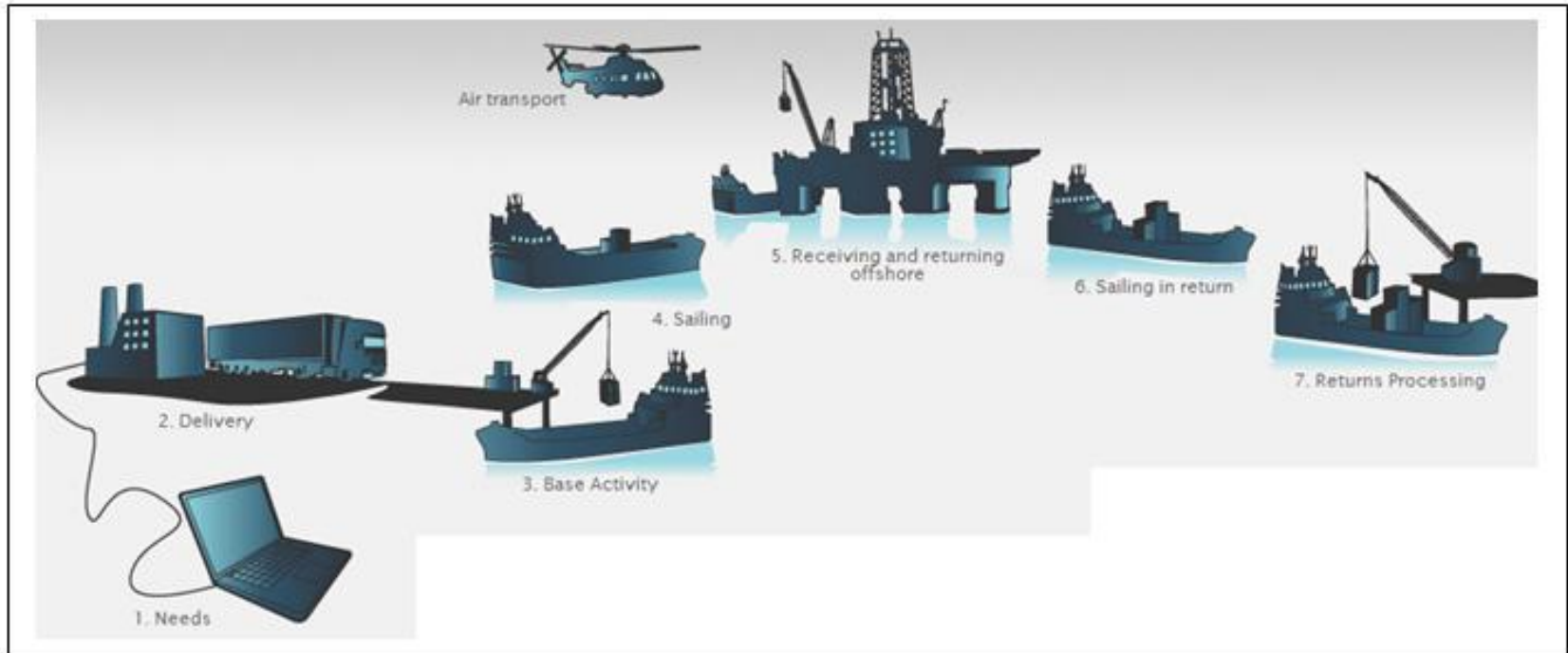
less than 1 metre under keel clearance in certain parts of the Bay

The wheel of "eNavigation"

Business interest, marine spatial planning/coordination and vessel operations



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?

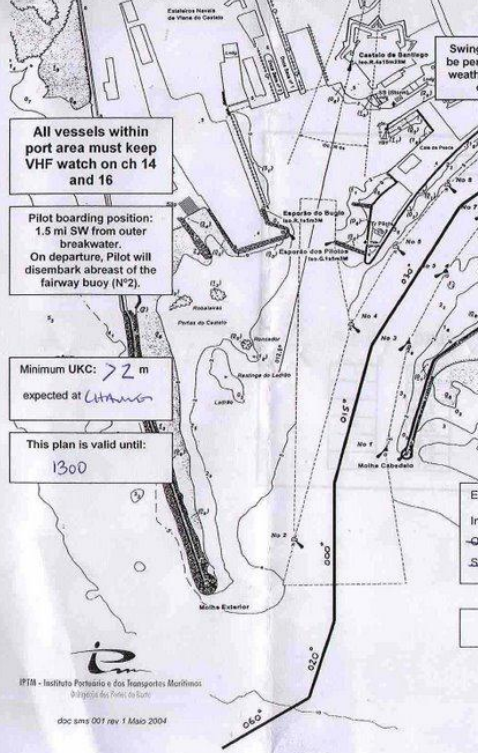
Ship AND Shore side users!

Data or Information?



PILOTAGE PASSAGE PLAN TO VIAN DO C

Your Pilot will advise you of any variation to this standard plan.



All vessels within port area must keep VHF watch on ch 14 and 16

Pilot boarding position: 1.5 mi SW from outer breakwater. On departure, Pilot will disembark abreast of the fairway buoy (N°2).

Minimum UKC: > 2 m expected at *Littoran*

This plan is valid until: 1300

Expected current from tidal stream:
 Ingoing 4,0 knots.
 Outgoing _____ knots.
 Slack water _____

Maximum speed inside the harbour: 8 knts

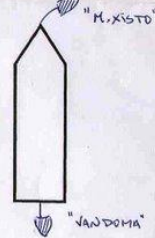
Tugboats available:
 Vandoma 1250 hp ✓
 Monte Xisto 850 hp ✓
 Moraes 400 hp

Recommended mooring lines:
 FWD: 3 H9L + 2 SPL
 AFT: 3 SPL + 2 SPL

Allocated berth: 5/12 Available space: 200 m.

LW: 0616 - 4,40 m.
 Sunrise: 0725 LT
 Sunset: 1912 LT

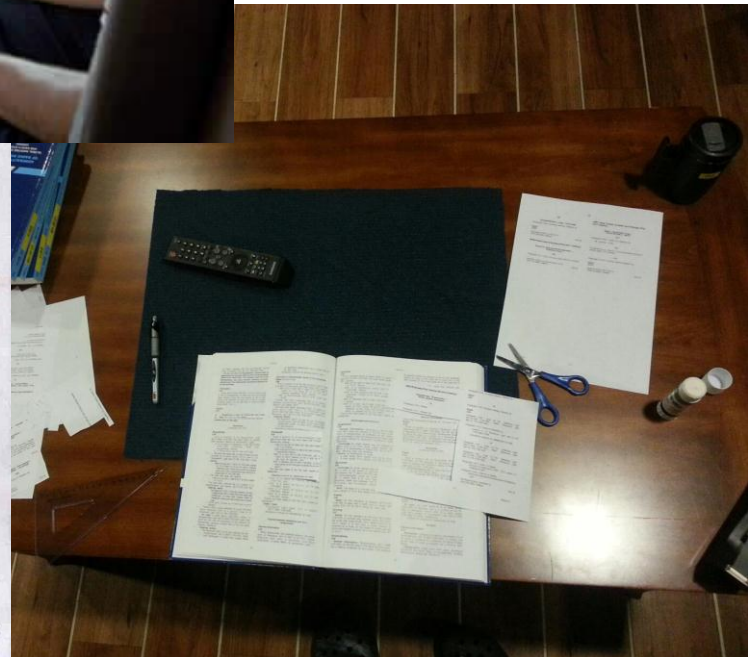
TUGBOAT LINES PLAN



This chart is not to be used for navigation.

The Captain is kindly requested to sign this passage plan and return it to the Pilot

Pilot's signature: *[Signature]* Master's signature: *[Signature]*

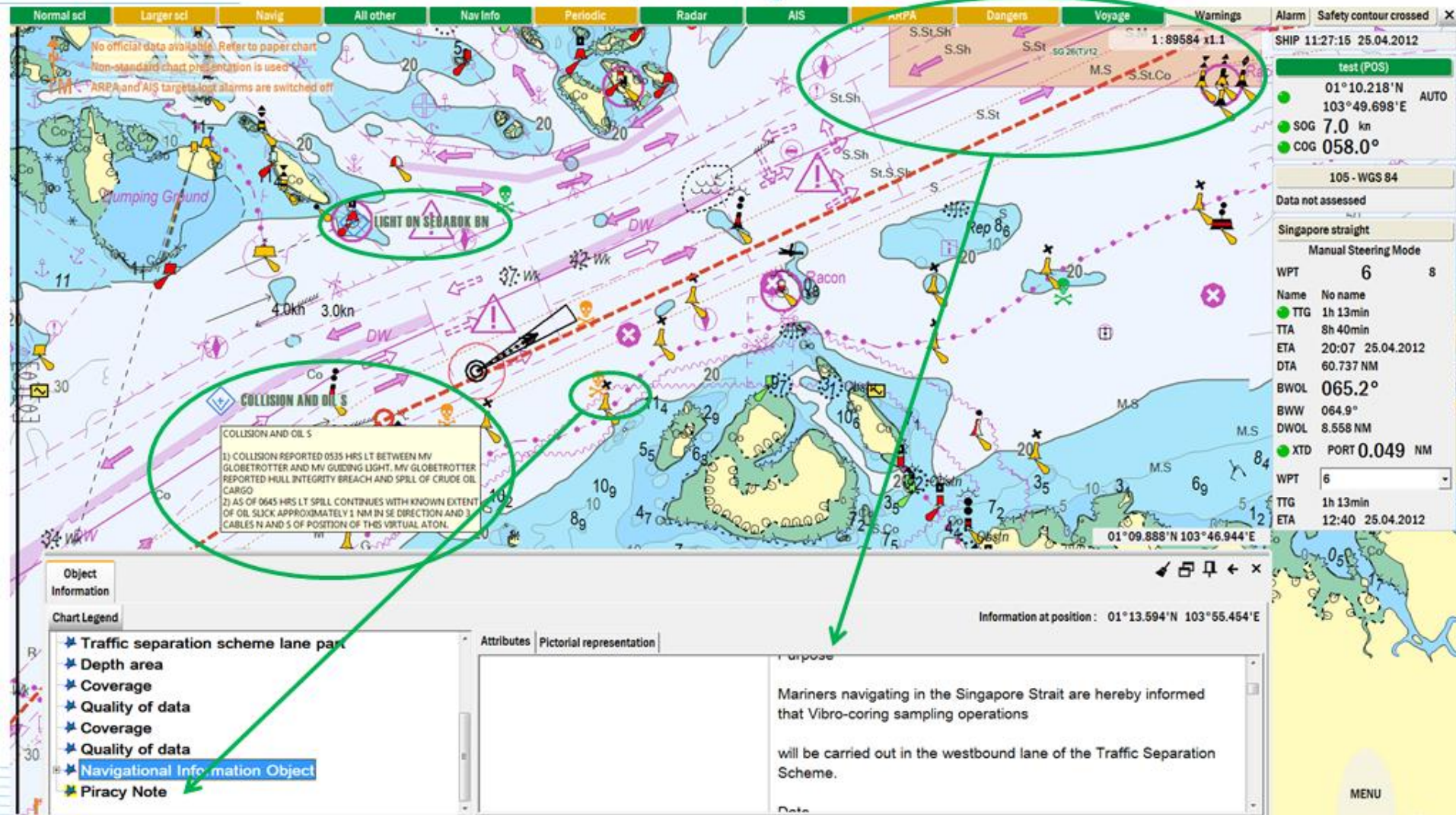


IMO/MEH/NCA "S100" testbed, Singapore 2012

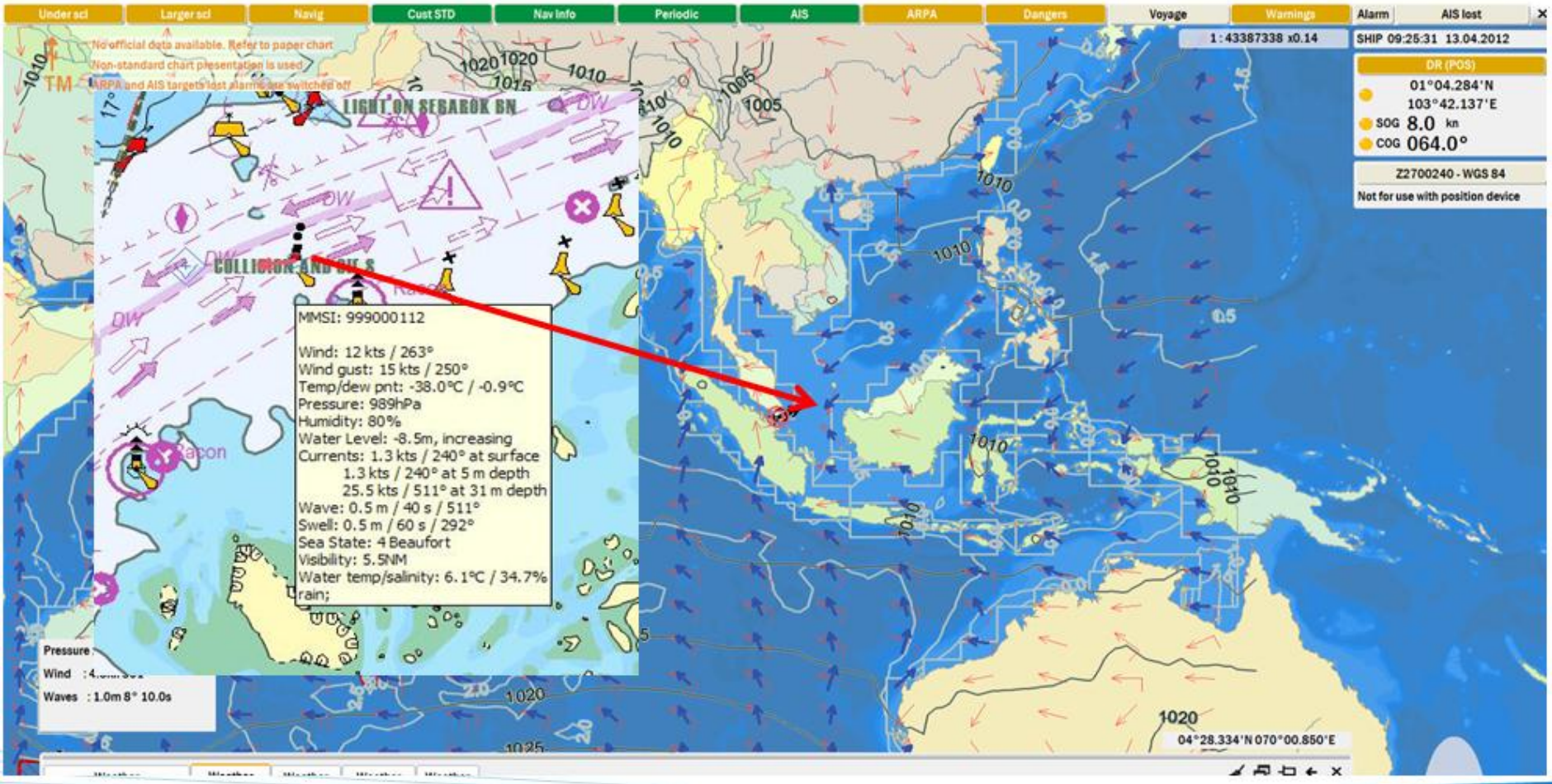
Jeppesen and Kongsberg Norcontrol providing the "future" of situational awareness in navigation?



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.

Synchronize Orders and Updates ✕

Licenses

Get new licenses **Synchronize with Jeppesen**

Send orders

Updates

Check updates Share route/voyage plan

Get NtM updates Send optimization request

Get Full update Get weather for route

Latest version: 517 Get weather for screen

Download size: 7,65 MB Maritime Safety Information

Last check: 15-JAN-2013 12:17 UTC

Requests

📁 34 15-JAN-2013 12:15 UTC

Sent by: Admin

Details:

- **NtM updates**
Database: Professional+
Status: completed
Updated: 15-JAN-2013 12:18 UTC
- **Check updates**
Database: All
Status: completed
Updated: 15-JAN-2013 12:17 UTC
- **Licensing**
Database: All
Status: completed
Updated: 15-JAN-2013 12:17 UTC
- **Poseidon data**
Database: All
Status: completed
Updated: 15-JAN-2013 12:16 UTC

Tools for Nautical Management:

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

The screenshot displays the Jeppesen Integrated Maritime Suite interface. At the top, the navigation bar includes 'Jeppesen Integrated Maritime Suite', 'Voyage Planner', 'Nautical Manager', and 'Reports'. The user is logged in as 'Admin' on 'JeppesenPRIMAR 501 [506]'. The main area shows a nautical chart with a route from Stavanger to Oslo. A 'Create Route' dialog box is open, showing the route name 'STAVANGER > OSLO' and buttons for 'Create Manually', 'Automatic Route', and 'Cancel'. A 'Charts and Publications' information dialog is also open, providing instructions on how to use the 'Autoselect' button and the 'Add to Order' button.

Charts and Publications

Chart Filter

- Selected
- Licensed
- ENC
- Not Selected
- Not Licensed
- Prof+
- Show Zones only

By name: Available for Direct Licensing

Usage Levels Filter

Status	Name	Lic.Expiry	Selected	Product
<input checked="" type="checkbox"/>	N02B0412	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N02B0820	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N03B0412	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N03B0416	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04D0513	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04D0514	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04D0515	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04D0516	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04D0611	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04D0612	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04D0618	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04D0710	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04D0721	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04D0920	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04D0921	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04E0613	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04E0614	No Lic.	<input checked="" type="checkbox"/>	ENC
<input checked="" type="checkbox"/>	N04E0615	No Lic.	<input checked="" type="checkbox"/>	ENC

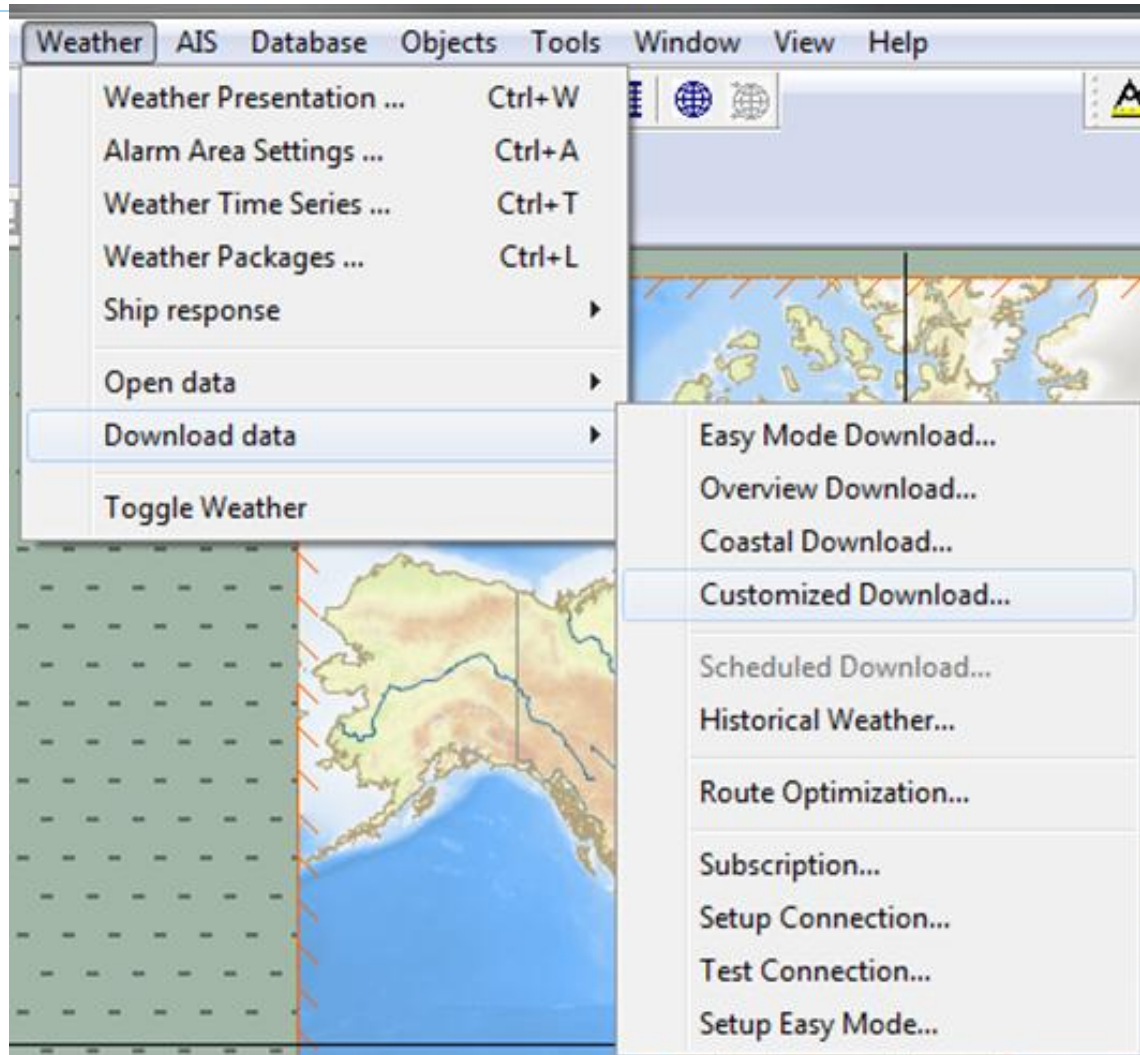
Selected: 73, Licensed: 0, In order: 0, Suggested: 73.

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

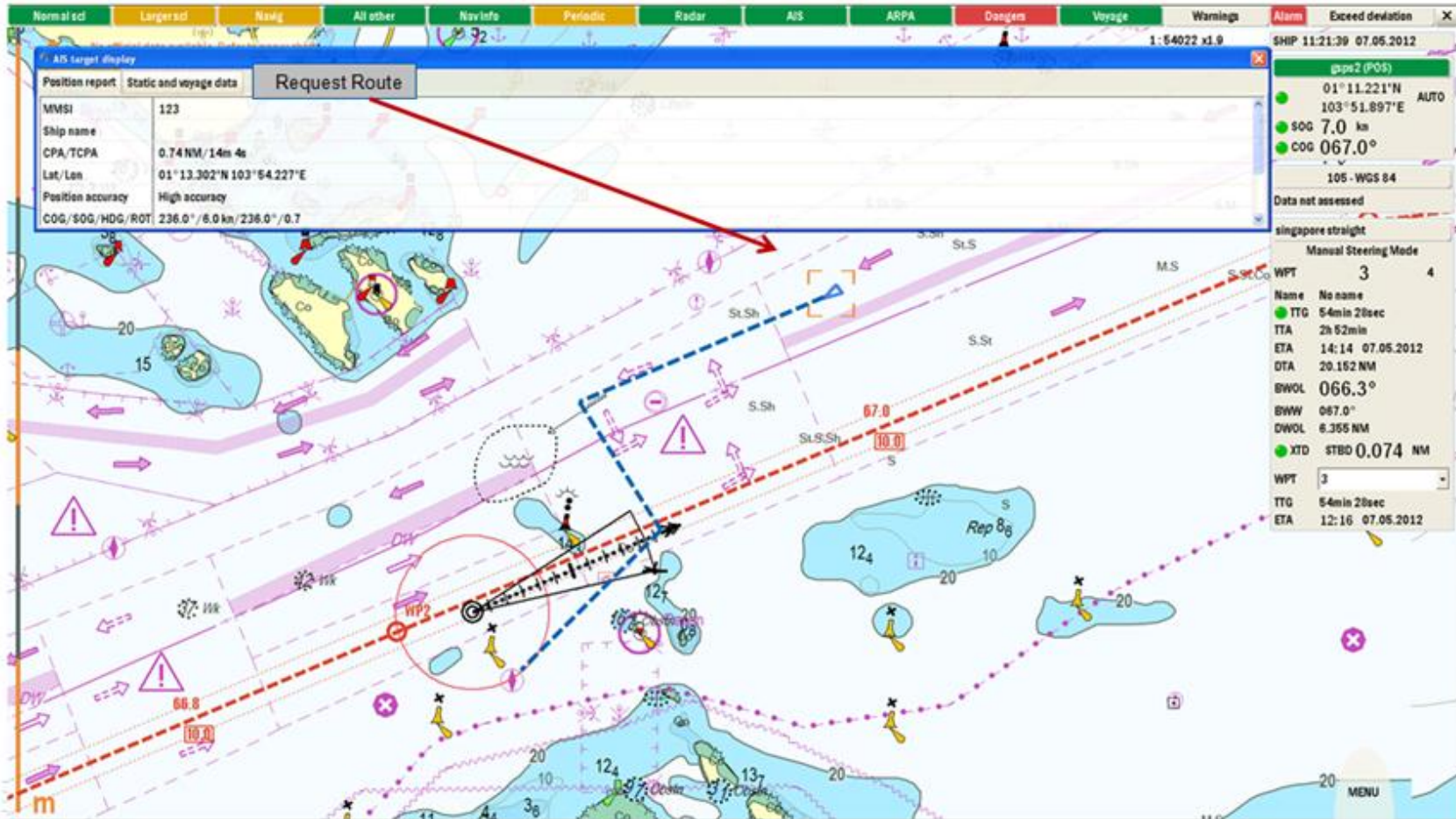


Weather and optimization “on request”

For screen only, or for route



Route exchange and monitor Direct or through Jeppesen ShipRoutes.



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

Start point

Lat	N 57°48.748'
Lon	E 007°06.222'
By cursor	
Time	02 jan 13 15:36
Planned speed (kts)	5
Turn radius (nm)	0.1

Route Settings

Type	Sector search
Turn angle (°)	20
Number of sectors	8
Search range (nm)	1
Direction	<input checked="" type="radio"/> CW <input type="radio"/> NCW

Search point

Lat	N 57°48.757'
Lon	E 007°06.256'
By cursor	
Time	02 jan 13 15:36
Drift speed (kts)	1
Drift direction (°)	200

SAR Route

Calculate	
<input checked="" type="checkbox"/> Preview	
Route name	sarathue3
Save route	

Weather and Piracy:

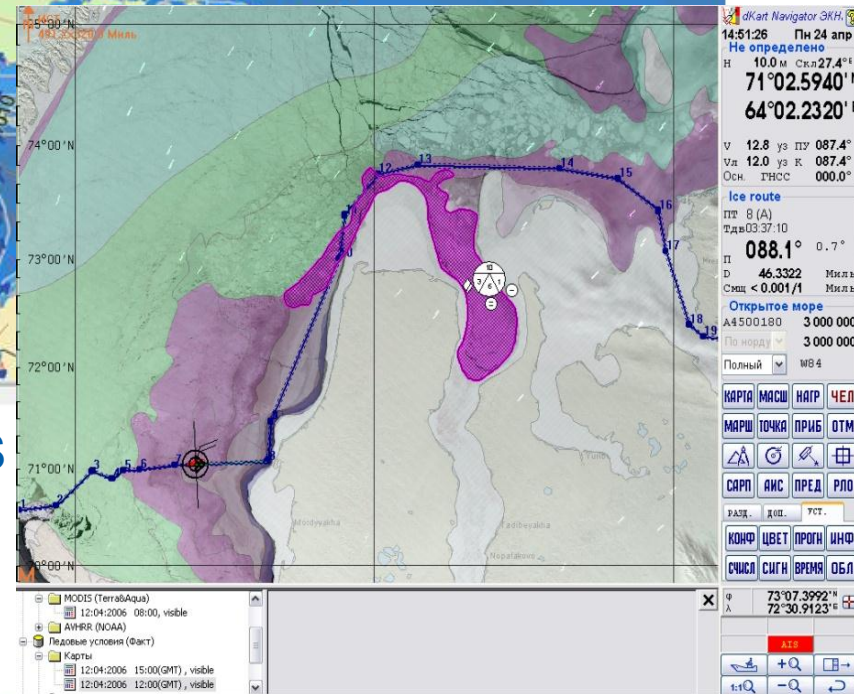
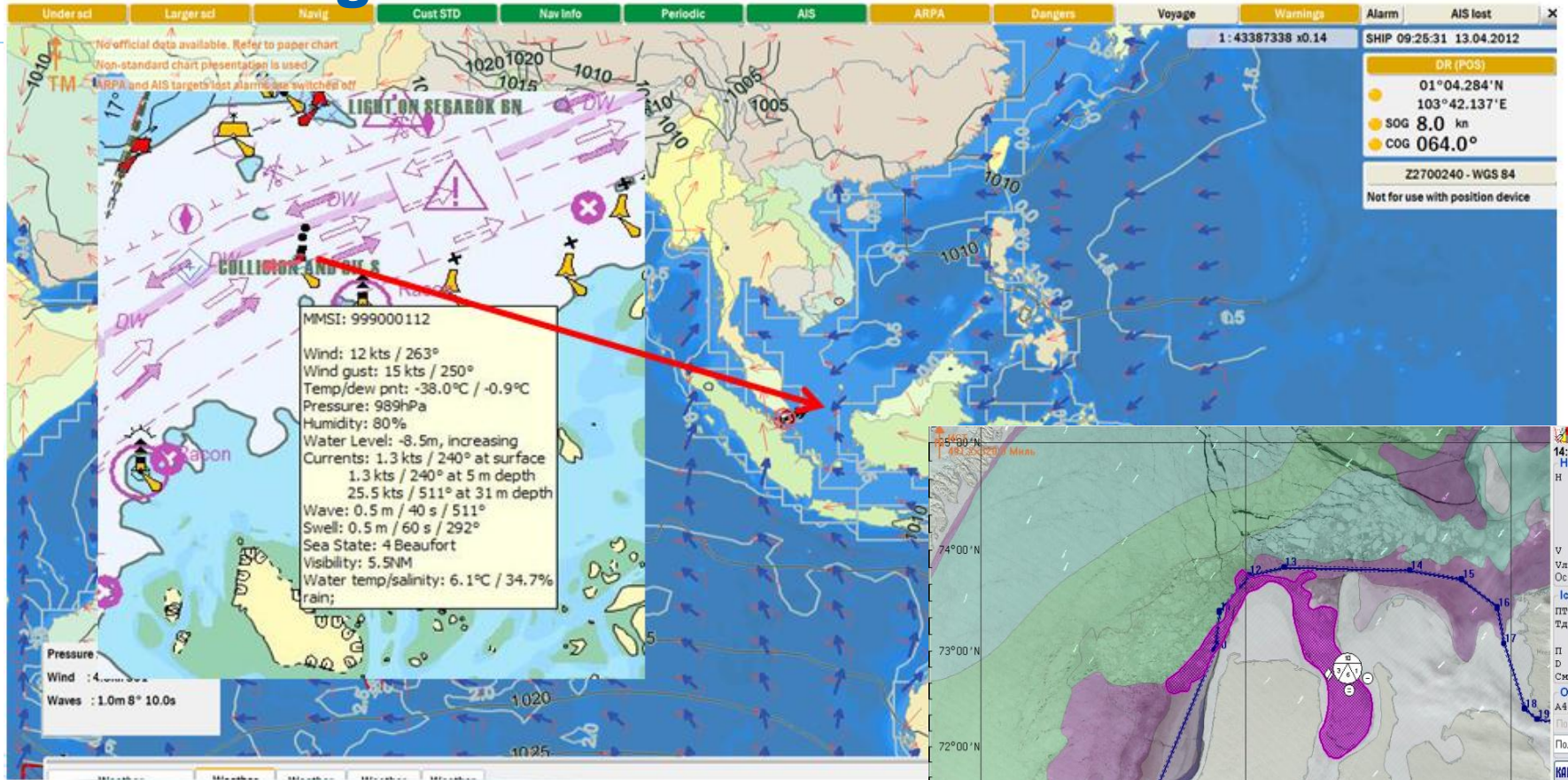
Combine weather alarm area and piracy incident to find “more secure” route:



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.

Jeppesen Integrated Maritime Suite

User: Admin | Charts DB | Settings | Users | Logout | Help

Vessel Group: | NOW: 15 Jan 12:00 | WEATHER | VESSEL INFO

Selected Vessel: none

Ship Parameters | Waypoints Panel | Scheduling Panel | **Passage Plan panel** | Fuel calculation | Voyage Report | Bookmark | Screenshot to report

Leg. No	Passage name:	Passage type:	Position/ Waypoint	Course & Distance	S	ETA WOP:	Paralel index /XTE	Event/type	NavAid name Charestica	Expected visibility	UKC	Traffic	Engine Status	Pilot:	Note:	Emergency plan
1	Hamburg	Departure	53°32.503'N 009°58.889'E WP 1	248°47' 0.10	3	25/10/12 07:00	0,01NM	Hamburg VTS ch. 14	Kaiserhoft Oc (4) 15s	>10 Nm	1,2m	Med	ME1 ME2 Thruster 1 Thruster 2	Yes	Bosun fwd.	Anchor ready
2	Hamburg	Harbour	53°32.467'N 009°58.733'E WP 2	293°23' 0.44	3	25/10/12 07:02	0,01NM		Light, green, fix (Racon)	>10 Nm	1,2m	Med	ME1 ME2 Thruster 1 Thruster 2	Yes		
3	Hamburg	Harbour	53°32.642'N 009°58.052'E WP 3	279°14' 0.16	7	25/10/12 07:05	0,08 NM	Hamburg VTS ch. 12	Light, orange, fix	5-10 NM	2,2m	Low	ME1 ME2	Yes		Escort Tug
4	Die Elbe	River	53°32.667'N 009°57.793'E WP 4	263°59' 0.17	10	25/10/12 07:08	0,1NM		Light, orange, fix	> 5 NM	2,5m	High	ME1 ME2	Yes	Pilot ladder ready	

Start Wizard | Auto select NavAids | Calculate UKC | Optimization

Basic passage planning

- 1) Edit your legs, and set leg speed, XTE, WoP and special orders (i.e. Pilot)
- 2) Review caution areas, (MSI), and set "No go areas"
- 3) Select your NavAids for position fixing/fairway.
- 4) Add screenshot of charts to your voyage plan report.

Back | Next

Show Passage on Chart

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**

je plan.

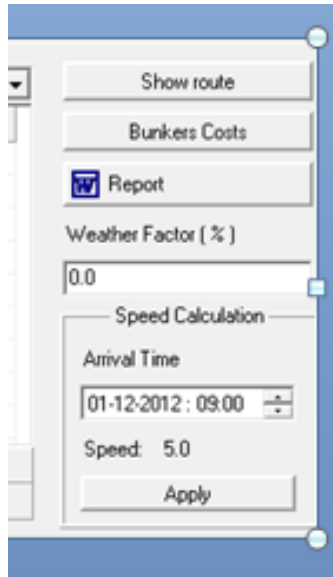
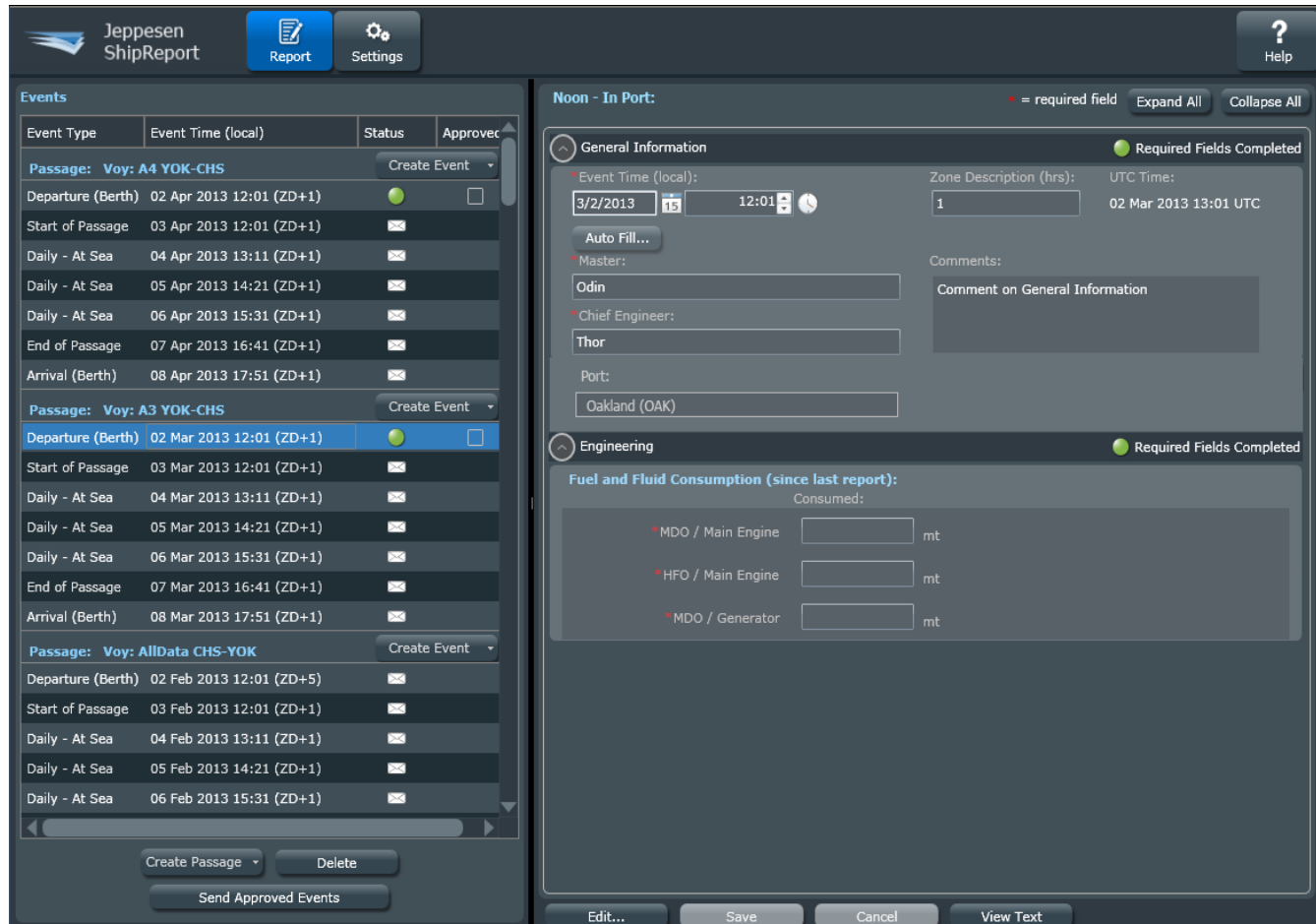
From: Position/Waypoint Position interval	Course & Distance	Paralel index information	Leg information/order	NavAid to be used	UKC	Expected traffic/situation	Engine Status	Actual position	Time.	Remarks
53°32.503'N 009°58.889'E WP 1	248°47' 0.10			T						
53°32.467'N 009°58.733'E WP 2	293°23' 0.44									
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.

The screenshot shows the Jeppesen ShipReport software interface. The top left has the Jeppesen logo and 'ShipReport' text. There are 'Report' and 'Settings' buttons. A 'Help' icon is in the top right. The main area is split into two panels.

Events Panel: A table listing events for three passages. The first passage is 'Voy: A4 YOK-CHS' with events from 02 Apr to 08 Apr 2013. The second is 'Voy: A3 YOK-CHS' with events from 02 Mar to 08 Mar 2013. The third is 'Voy: AllData CHS-YOK' with events from 02 Feb to 06 Feb 2013. Each event row includes 'Event Type', 'Event Time (local)', 'Status', and 'Approve' checkboxes.

Noon - In Port Panel: A detailed view for a 'Noon - In Port' event. It includes:

- General Information:** Event Time (local) 3/2/2013 12:01, Zone Description (hrs) 1, UTC Time 02 Mar 2013 13:01 UTC. Fields for Master (Odin), Chief Engineer (Thor), and Port (Oakland (OAK)).
- Engineering:** Fuel and Fluid Consumption (since last report) section with input fields for MDO / Main Engine, HFO / Main Engine, and MDO / Generator, each with a unit of 'mt'.

Buttons at the bottom include 'Edit...', 'Save', 'Cancel', and 'View Text'.

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

Vessel Group: All Ships

Name	Next Port	Schedule	Fuel Use	WX / Pollution	Passage Data
Takara Pearl	USNYC (New York)	●●●●●	●●●●●	●●●●●	●●●●●
Takara Emerald	USNYC (New York)	●●●●●	●●●●●	●●●●●	●●●●●
Takara Ruby	SEGOT (Goteborg)	●●●●●	●●●●●	●●●●●	●●●●●

Selected Vessel: Takara Emerald (now)

History | **Last Report** | Detail | Schedule | Fuel | WX / Mo | Passage

Status: At Sea
 Last Report: 15-Jan-2010 06:00 (UTC) (6,0h ago)
 Departure Port: GBSMS (Sheerness)
 Arrival Port: USNYC (New York)
 Scheduled Arrival: 20-Jan-2010 00:30 (local)
 Ship ETA: 20-Jan-2010 00:30 (local)
 Simulated ETA: 20-Jan-2010 03:25 (local)
 Distance To Go: 2237,0 nm
 Required Speed:
 Last Rpt Speed:
 Last Rpt Course: 237
 Last Rpt Position:

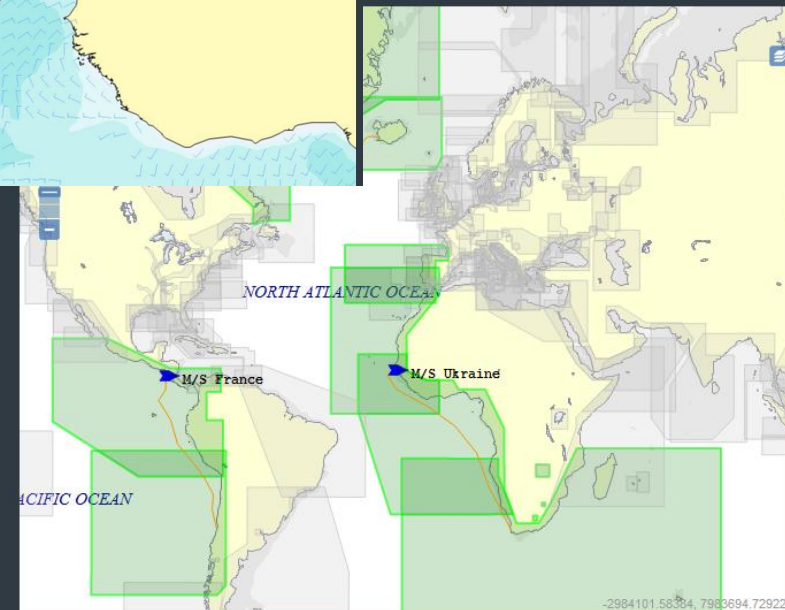
“FleetManager”:
 combining different tracking solutions (Jeppesen and 3. party) with performance and ship reporting.

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

M/S America	7246-ages	●
M/S Ukraine	8237-adtu	●
M/S France	9831-werr	●

Legend

- Last week
- Two weeks ago
- More than two weeks ago

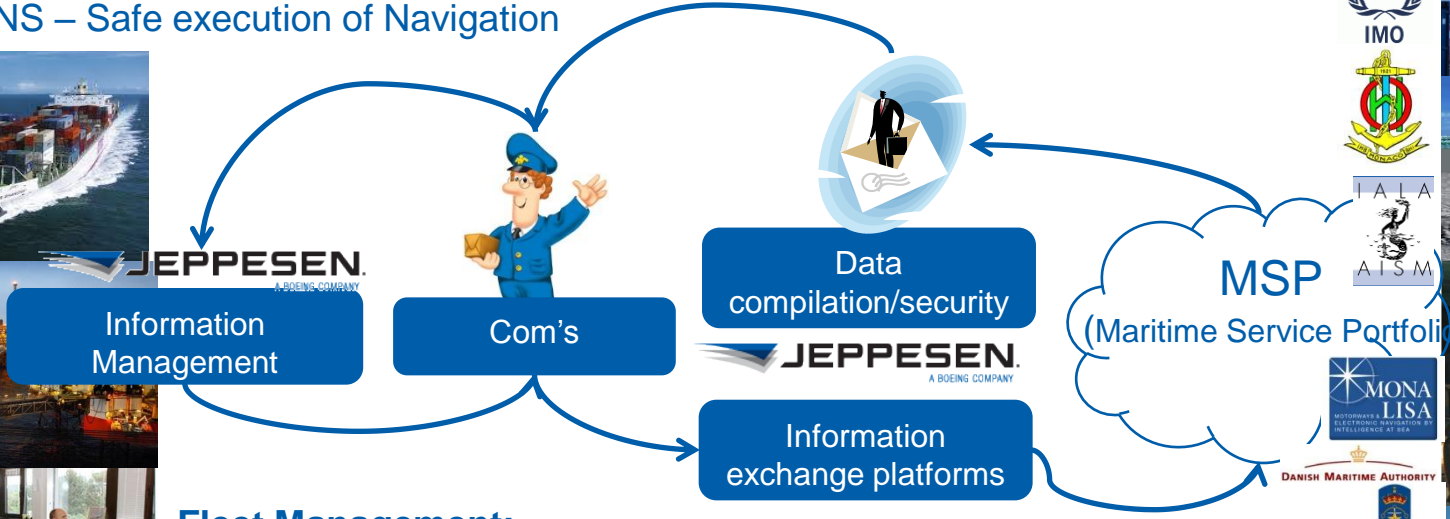
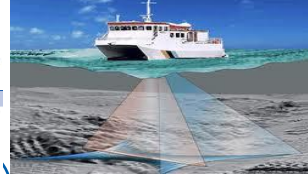


eVoyagePlanning and the Marine Service Portfolio (MSP):

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



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 distributors (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).



eNavigation starts with eVoyageplanning;

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

Thank you!



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