



SAIHC 10 Industry Day

The way towards e-Navigation

Integrated Intelligent Information to improve Navigational Awareness.

Michael Bergmann

Director Jeppesen Maritime Industry

President CIRM

18 September 2013



Jeppesen by the Numbers



Global

40	Jeppesen locations in 20 countries
195	Countries/territories providing source data
3,300	Jeppesen employees
150,000	Jeppesen charts (air & sea)
1,400,000	NavData records in our database
5,000,000	Unique pages of documents
850,000,000	Sheets printed, annually



Aviation

650	Airlines served by Jeppesen
48,000	Pilots trained w/ Jeppesen courseware, annually
70,000	Jeppesen flight plans provided, daily
83,000	Jeppesen weather briefs provided, daily
250,000	Crew managed with Jeppesen tools, daily
1,000,000	Pilots worldwide using Jeppesen



Journey Planning

2,400,000	Travelers benefiting from Jeppesen real-time optimization, daily
------------------	---



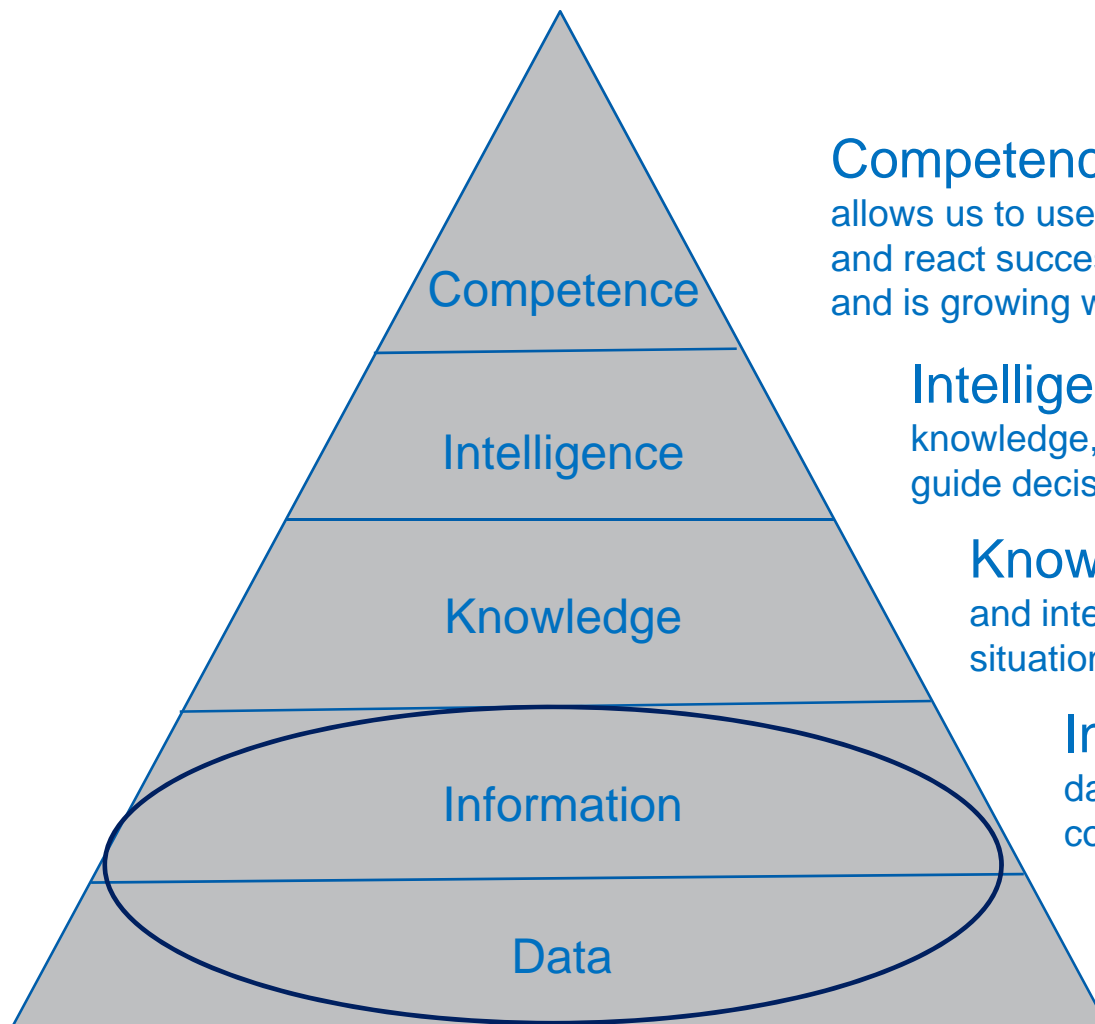
Marine

7,500	Commercial vessels using Jeppesen
42,000	Digital navigation charts in Jeppesen library
1,000,000	Leisure boat customers

Data or Information?



Integration of Data: The Pyramid of Competency



Competence — the ability to do a job properly. It allows us to use our intelligence for doing wise decisions and react successfully based on situational awareness and is growing with experience on the job to be done.

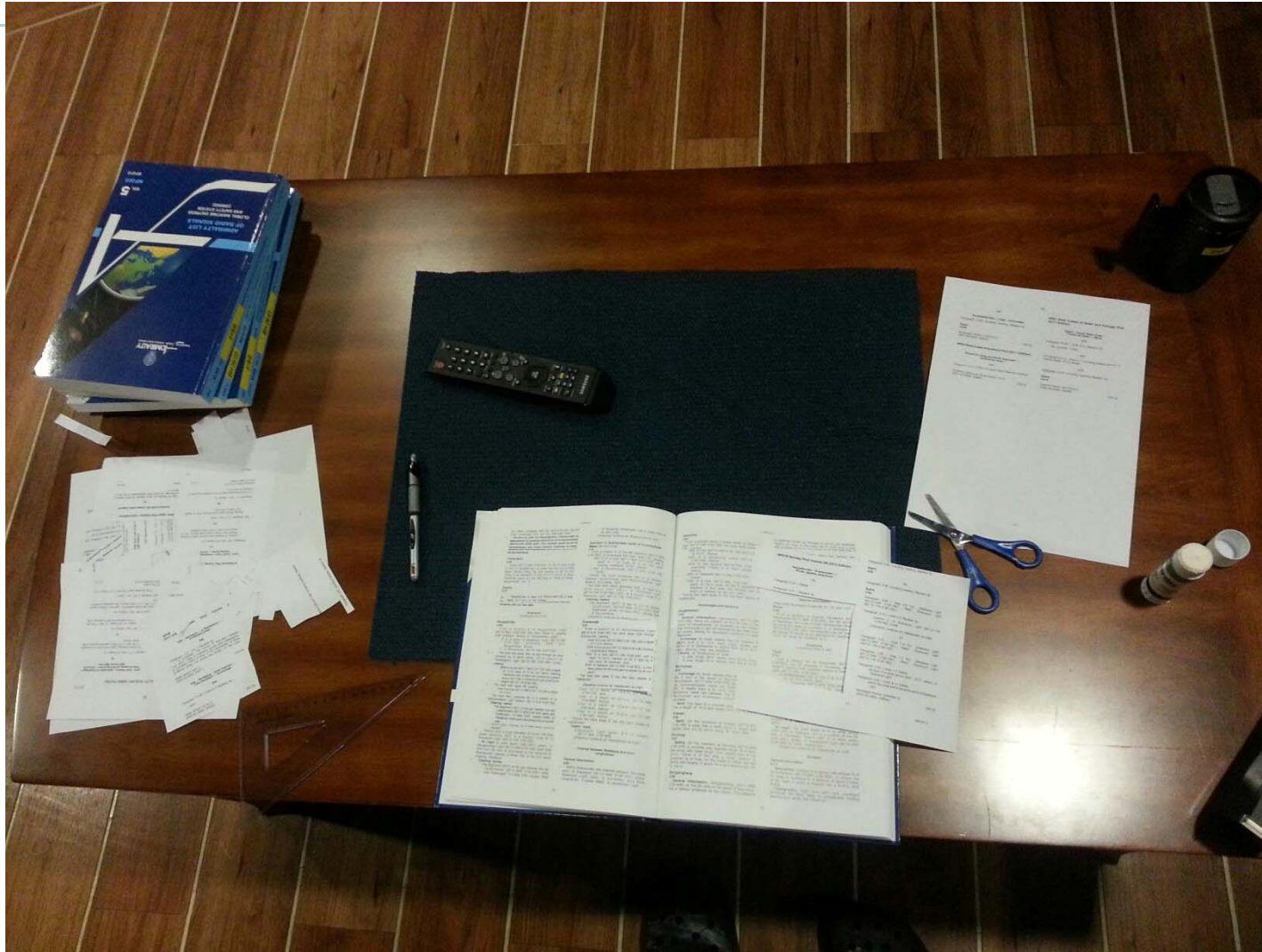
Intelligence — The full collection of past and present knowledge, which allows us to assess new situations and guide decisions

Knowledge — all what has been detected, learned and internalized and has developed in insight and situational understanding

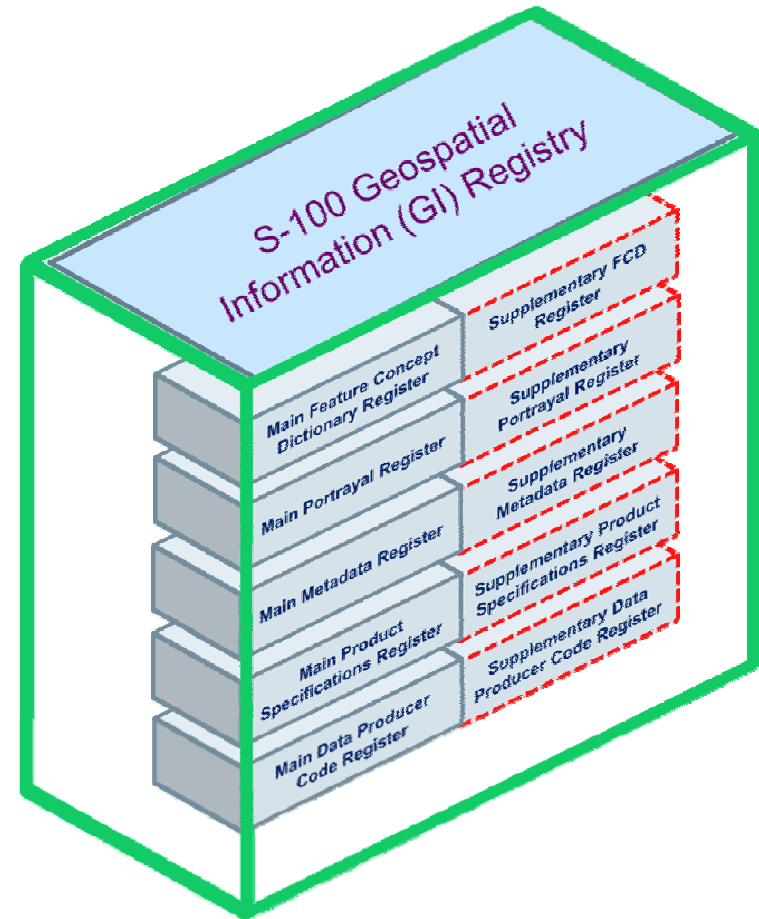
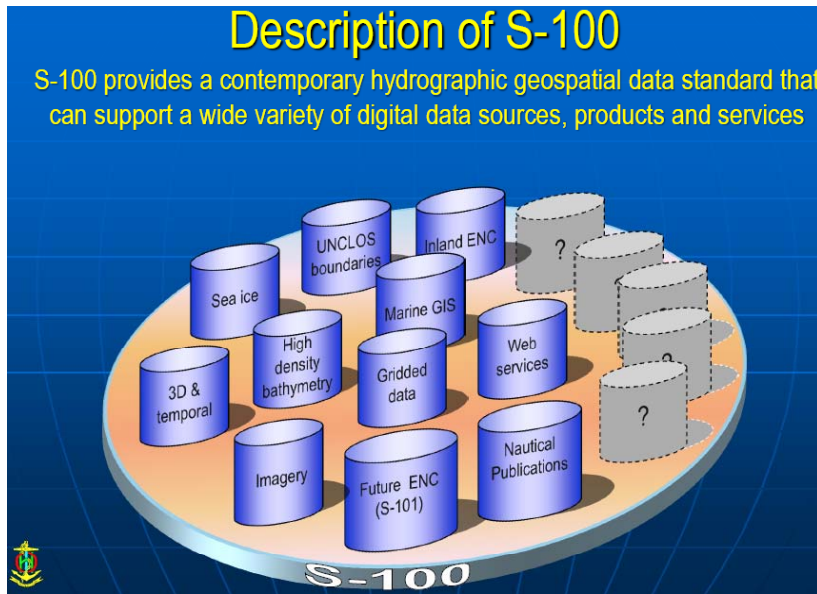
Information — integrated and processed data, which is useful and meaningful for the data consumer

Data — collection of facts, which may be compiled, but by themselves do not have a specific meaning or usability

Updating?



IHO GI Registry within Common Maritime Data Structure



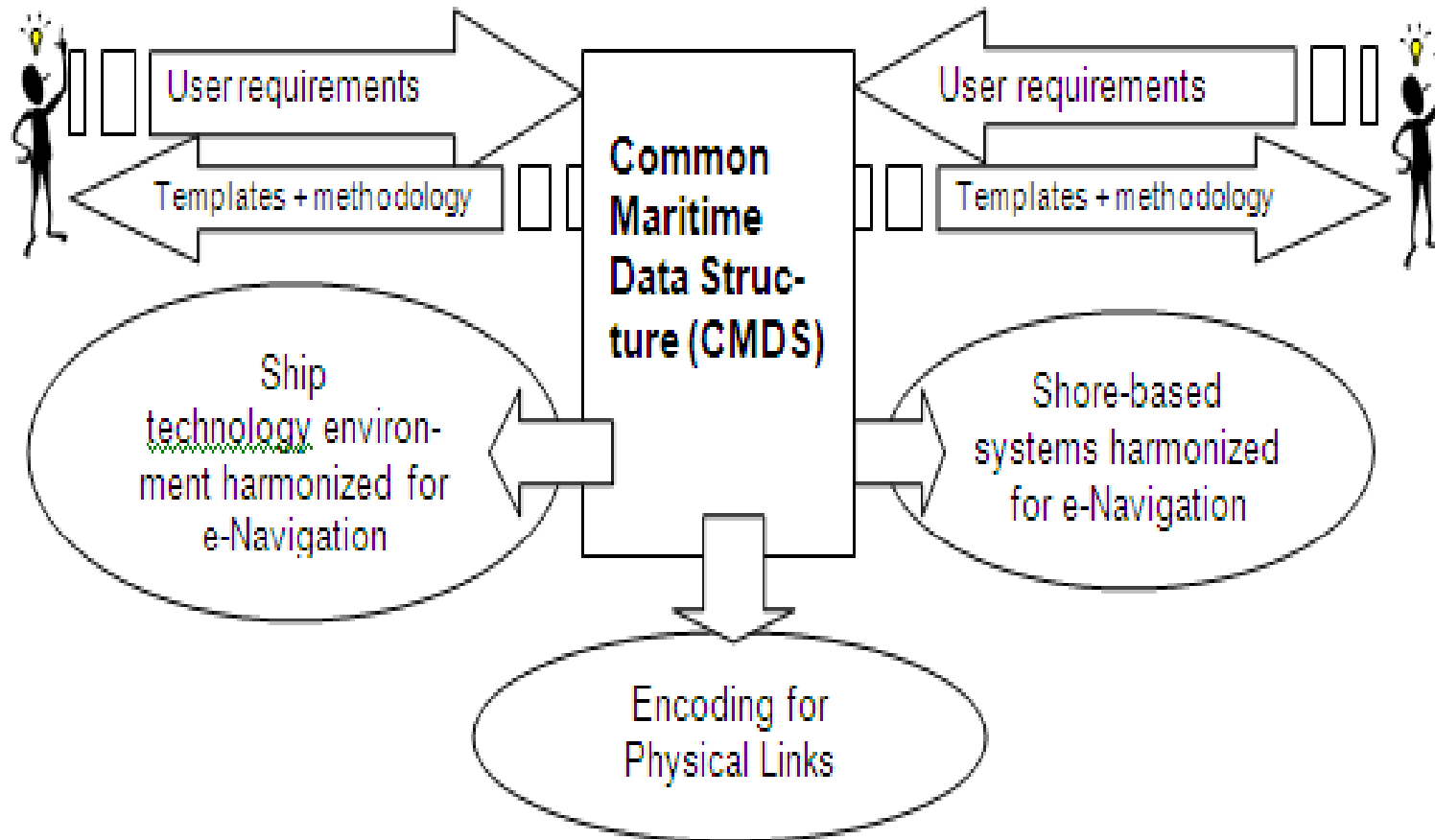
*Gilles Bessero, Director IHB
e-Navigation Underway Conference 30 Jan 2013*

**IHO GI Registry is the desired
CMDS data model by
key e-Navigation Stakeholders**

*Barrie GREENSLADE, UKHO, Chair IHO TSMAD WG
Joint IALA e-Nav / IHO Workshop, 4-6 May 2011, Taunton*

Common Maritime Data Structure

The Basis of the e-Navigation Architecture



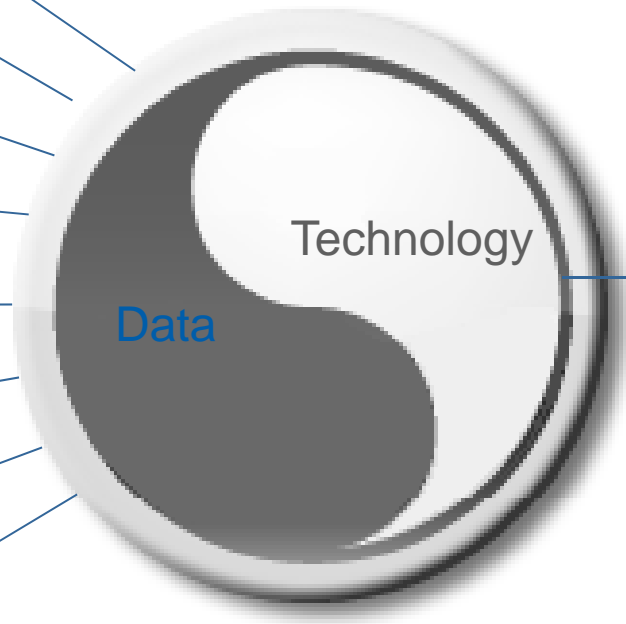
Scope and Impact of the Common Maritime Data Structure
IALA e-Navigation 'Picture Book' 12/2011, Figure 5

Data Integration Framework for e-Navigation

Data Provision Framework



Data Integration Framework



Delivery —

Information System Framework

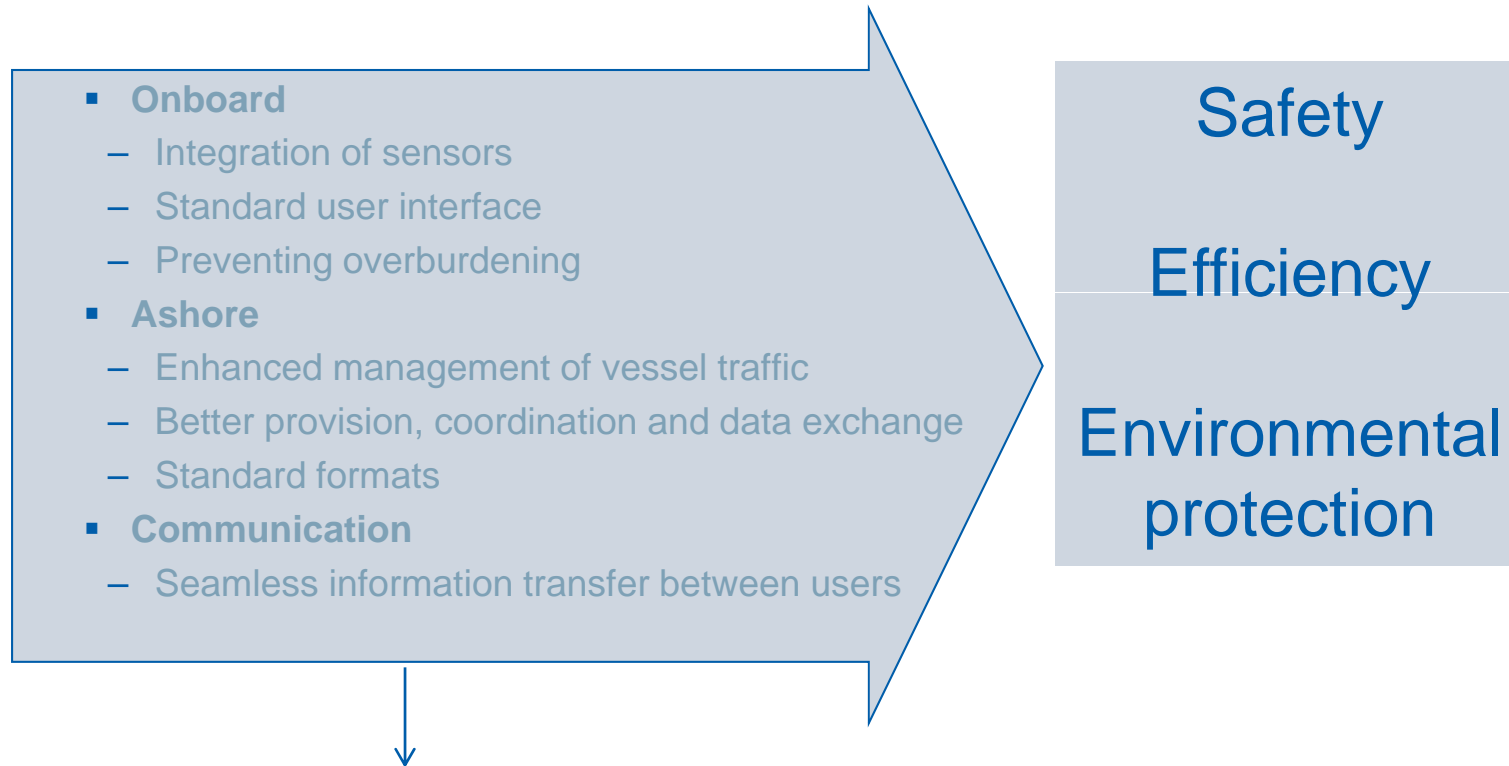


HO = Hydrographic Office
ODP = Official Data Provider
NPD = Non-Official Data Provider

ECDIS and eNavigation, the same?

- **ECDIS (Electronic Chart Display Information System) - mandate:**
 - implemented from mid 2012 – 2018. Impacting SOLAS fleet.
- **Is eNavigation demanding something more?**
 - IMO/IALA vision states that eNavigation is “harmonized creation, collection, integration, exchange and presentation of maritime information on board 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”
- **Are we risking cluttering of the “single window” with data overflow?**
 - Are there solutions that can combine both “data collection” and Intelligent Integrated Information?

E-Navigation, a journey, not a destiny



Based upon a common “language”: “S100”, and “Single Window” concept

(From Director General NCA, Kirsti Slotsvik presentation at MSC90)

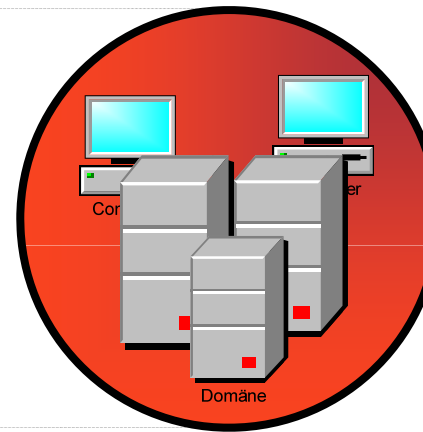
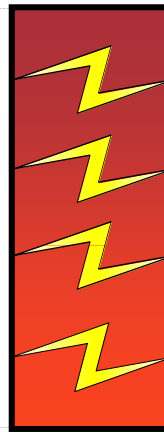
Data in e-Navigation

“e-navigation is the harmonised collection, integration, exchange, presentation and analysis of maritime 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”

(IMO MSC 85/26 Annex 20)



**“harmonized collection,
integration, exchange,
presentation and analysis
of maritime information
onboard”**



**“harmonized collection,
integration, exchange,
presentation and analysis
of maritime information
ashore”**

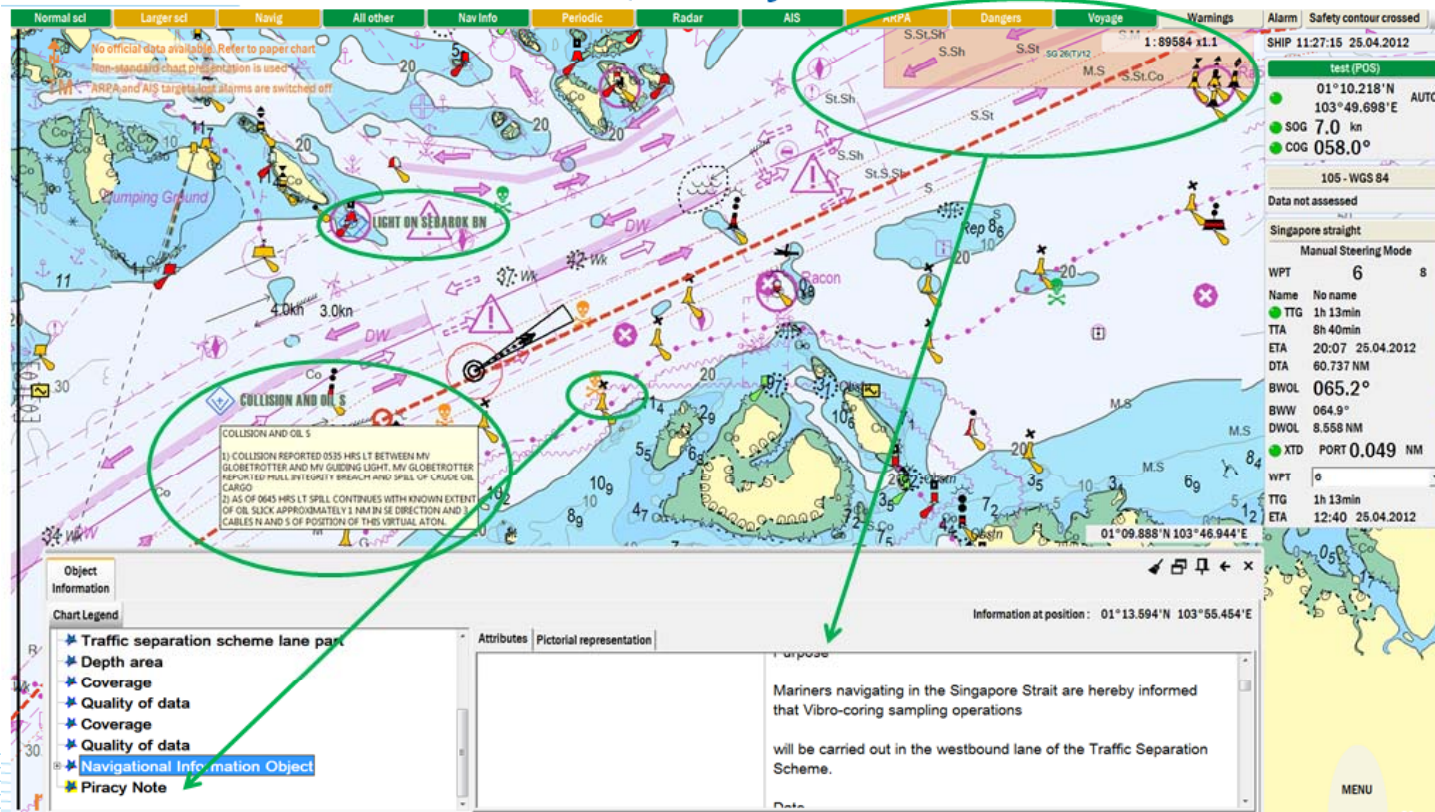
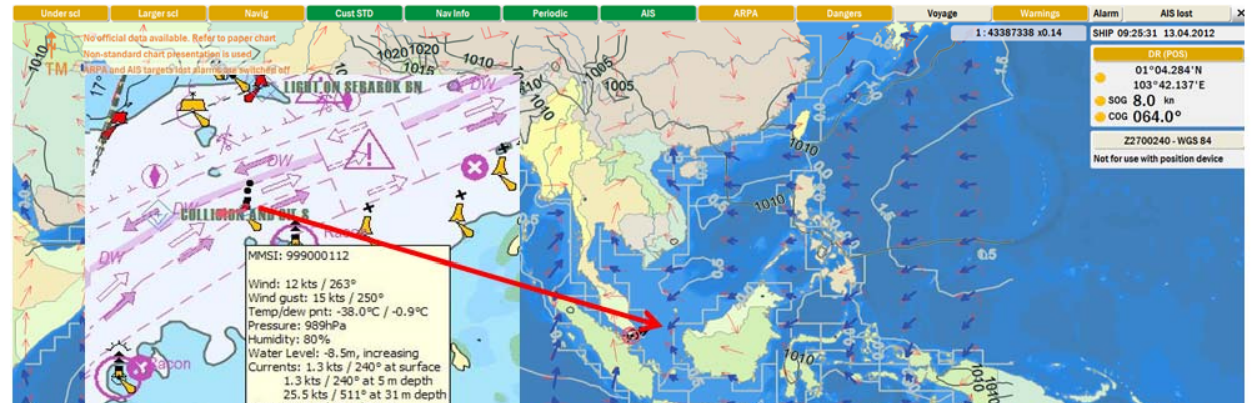
IALA e-Navigation ‘Picture Book’ 12/2011, Figure 1

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

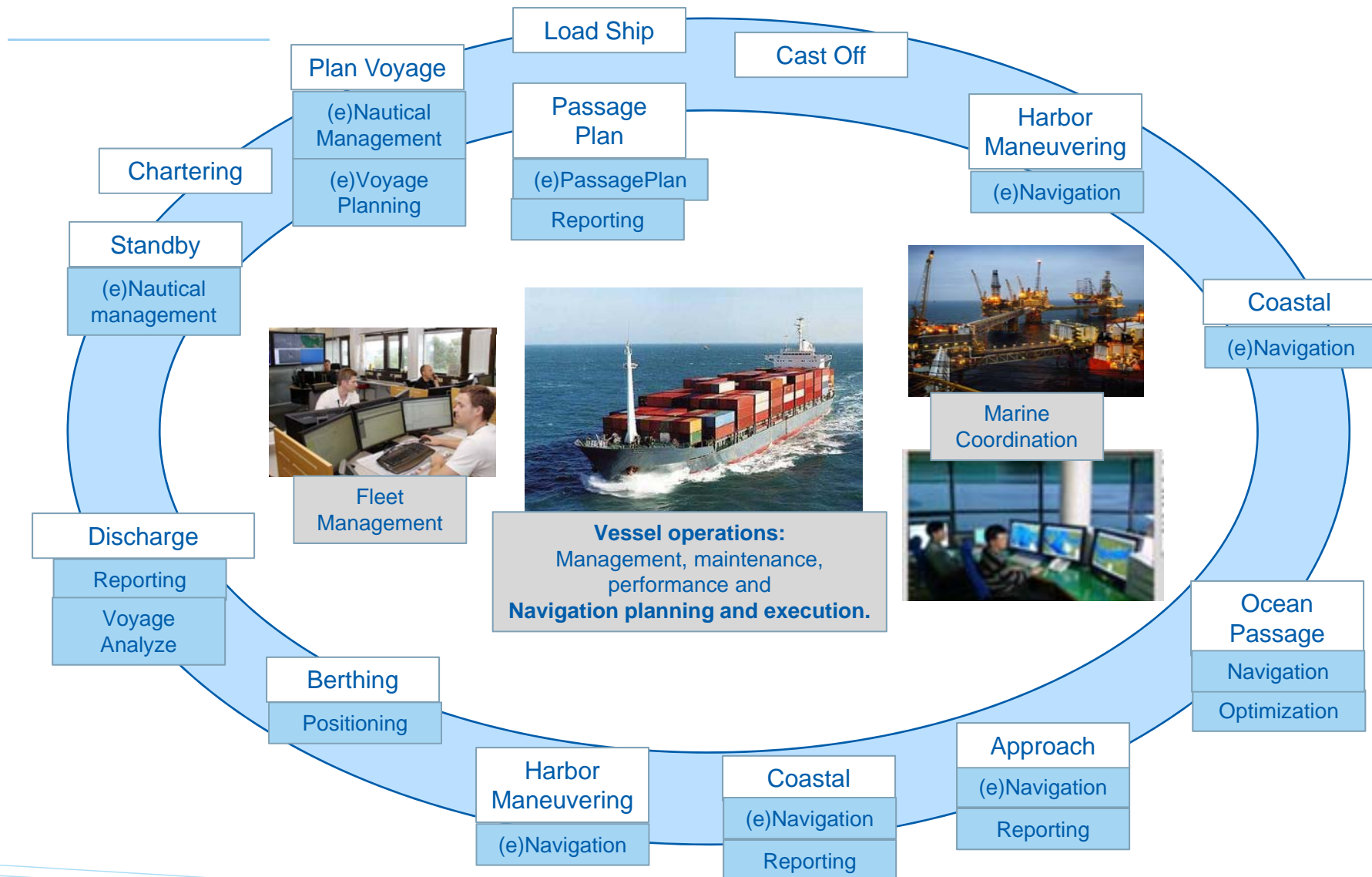
Jeppesen and Kongsberg Norcontrol providing the "future" of navigational awareness?



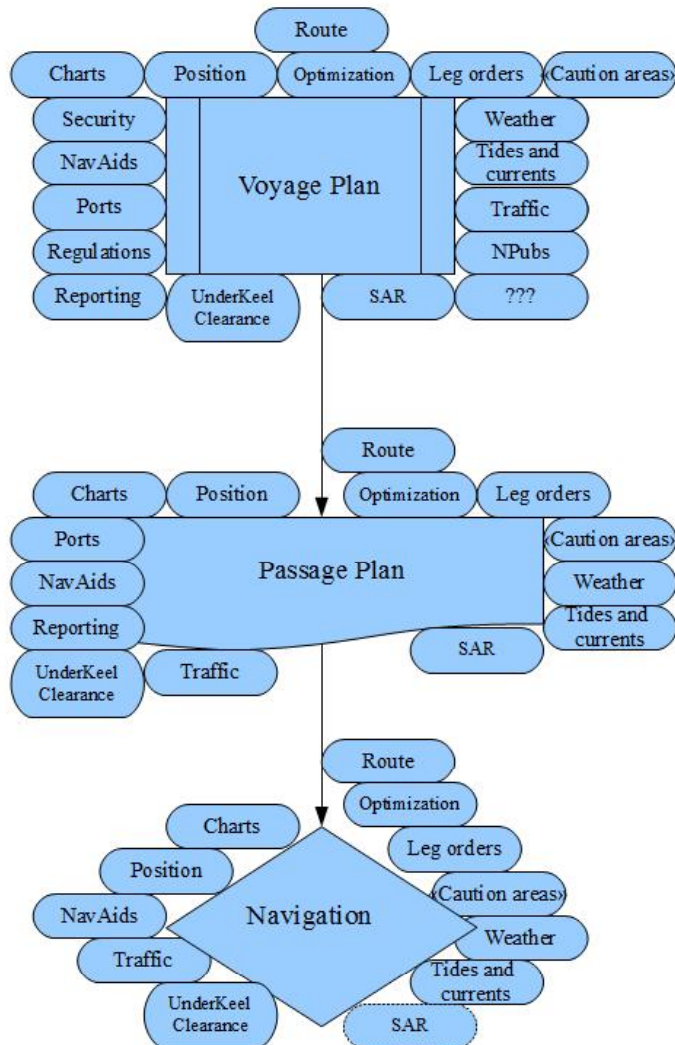
Starting the journey



The circle of vessel operations in “eNavigation”



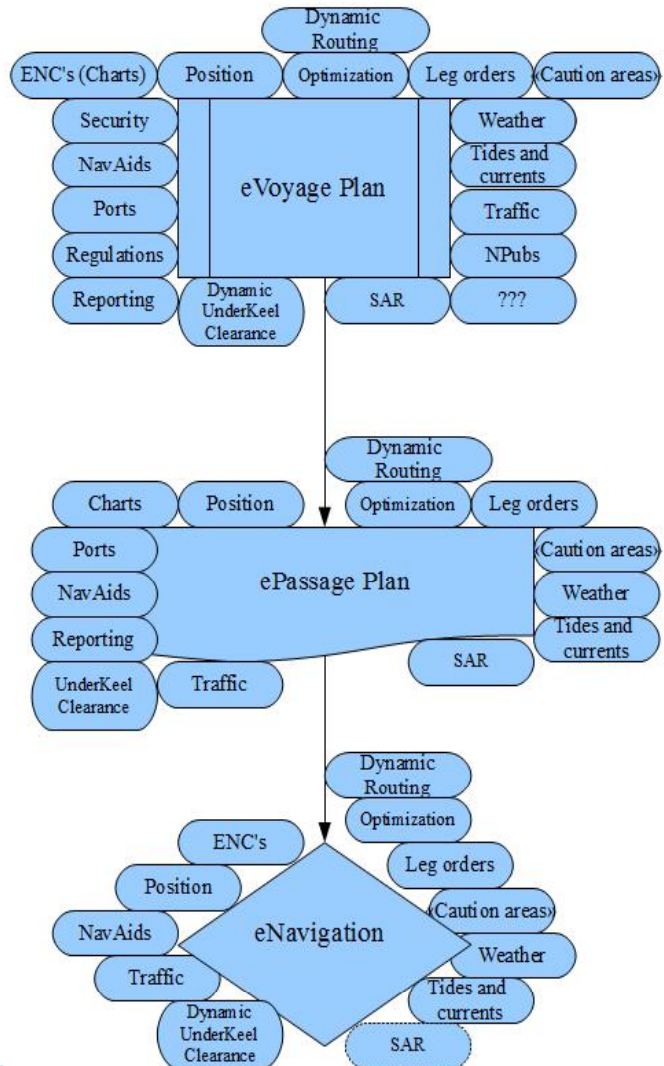
Navigation starts with “Voyage Planning”



- Guidelines in IMO res. A893 and A.999 (Polar).
 - Main objective: plan a safe and efficient voyage, considering operational conditions for berth to berth navigation.
 - Basis for execution of Navigation. Changing conditions demands quick decisions based on the plans.

- Increased demand for information – or data?
 - Are the navigational officers becoming more “data collectors” then decision makers?

eNavigation starts with “eVoyage Planning”



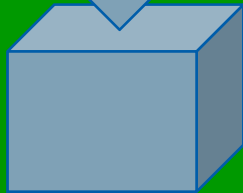
- Is eNavigation increasing the workload rather than reducing it? (Licensing and update of charts (ENC's), maintaining hardware, communication issues?).
- “The Single Window”: risk of cluttering the “full picture”?
- More data to be collected, updated, and reported?

Our know how



Centralized administration:

- digital charts, ENC and paper production
- distribution and update
- print on demand
- Notice to Mariners
- Temporary & Preliminary notices
- Navigation Area
- Marine Safety Information



Onshore:

- Navigation and Meteorological Area
- Marine Safety Information
- Remote Pilotage
- Route Exchange
- Route Optimization for trafficked areas or fuel consumption
- Search and Rescue routing and exchange
- International Ship Port Security information
- Piracy data
- Meteorological and Hydrographic "real time" information
- Reporting



On the Bridge:

- ECDIS/INS
- Charts
- NavArea/MetArea,
- Marine Safety Information
- Route Exchange
- Dynamic under keel clearance

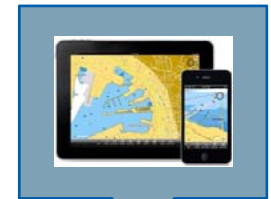
Back of Bridge:

- Chart management
- NtM/T&P updates
- ISPS information
- Nautical Information
- Voyage planning
- Generate, optimize and exchange route
- Reporting



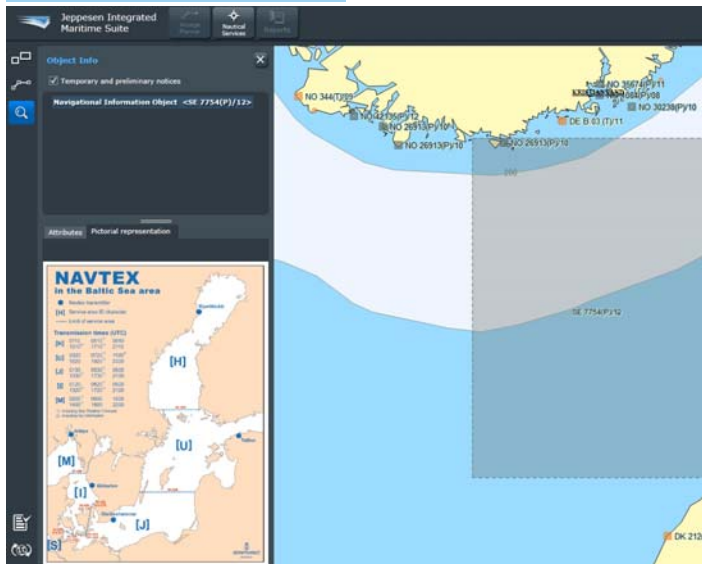
Mobile:

- Vessel Traffic Management Information
- fleet management
- tracking
- professional charts inspection
- reporting



eVoyagePlanning is here already!

Providing solutions for Integrated Intelligent Information:

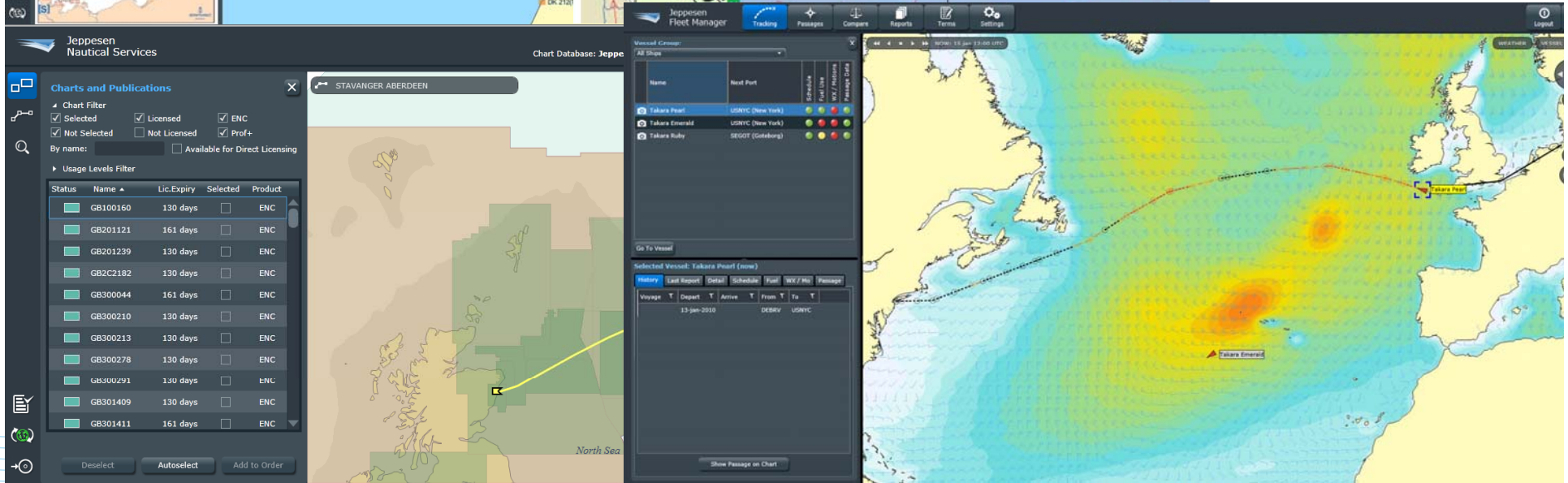


Statistical it is a lower probability for piracy when Hs > 2 m (more dangerous for the pirates for boarding).

Piracy Incident last 6 weeks (armed robbery/attack)

"Alarm zone" Hs > 2m "Safe area"??

Jeppesen Database gets instant incident update from Bergen Risk Management



Vision: Provide the best (e)Voyage Planning workflow

Less time spent on data collection, more time spent on decisions based on Integrated Intelligent Information.

The screenshot displays the Jeppesen Integrated Maritime Suite interface. At the top, it shows the user as 'Admin' and the chart database as 'Professional+ 535'. The main map area shows a route from Stavanger to Aberdeen, with various navigational markers and overlays. A sidebar on the left, titled 'The Nautical Wizard', contains several menu items: Edit legs, Set leg speed/orders, Caution Areas, Set "NO GO" area, Select NavAid (AtoN), Route Exchange, Add chart screen to report, Reporting, Weather, Optimization, Next, Back, Advanced Options, Choose View, Save, Open, and Cancel. The map itself features several callouts: 'MSI: Cable operations' near Ulsneset, 'ISPS: Increased security' near Stavanger, and 'NavArea: Dredging in Galeivågen' near Austbo. The map also shows depth contours, buoy locations, and other navigational data.

eVTMIS – Vessel Traffic Monitor Information System

eVoyagePlanning to marine coordination and Fleet Management

The image illustrates the eVTMIS system architecture and its application. On the left, a diagram shows data sources (Radar, CCTV, VTS) feeding into the dKart Port Monitoring Display (ODU), which is connected to a dKart Port Data Base. This system is linked to various maritime services (ARPA, VHF, AIS). The top right shows the Jeppesen Fleet Manager interface with a map of the North Atlantic. The bottom left shows a detailed navigation chart with a 'Positioning' dialog box. The bottom right features the 'Jeppesen MSI/NavArea Administration' form, which is used to create and manage Maritime Safety Information (MSI) and Navigational Area (NavArea) notices.

Jeppesen MSI/NavArea Administration

Welcome to Jeppesen "SafeShip" MSI/NavArea administration

Name of object: VIBRO-CORING SAMPLING IN WEST BOUND LANE OF THE TRAFF. MSI NavArea

Object information: Purpose: Mariners navigating in the Singapore Strait are hereby informed that Vibro-coring sampling operations will be carried out in the westbound lane of the Traffic Separation Scheme. Vessels involved in the operations will display the appropriate day and night signals and will stand by on VHF Ch. 14 and 12 and shall follow any traffic information given by Vessel Traffic Information Service (VTIS). Navigational Broadcast: Navigational warning broadcast will be promulgated by VTIS on VHF Ch 09 and NAVTEX to inform vessels of the dredging operation. Mariners are to maintain a listening watch for the above safety information. Caution: Mariners are advised to: (a) navigate with caution and proceed at slow speed when approaching the area; and (b) keep well clear of the working vessels. Full details are in the accompanying text description file.

MSI position(SALA nr): NA Geometr: Circular Diameter: Square Length: Width:

NavArea Geographical limits: 103.9622833 1.2 103.9669000 1.2 103.9666833 1.2 103.9021833 1.2

DateStart: 01.03.2012 DateStop:

NTM/TMP: This function can be activated if the MSI/NavArea notice is also a recommended Notice to Mariner (NTM)/Temporary or Preliminary Notice (TMP):

Permanent NTM Temporary NTM Preliminary NTM

Charts affected (if available): SP1/GP1, 202, 502, 4041

Source Name (i.e. Norwegian Coastal Adm): SO

Send to: VTS Hydrographic office Jeppesen MSI/NavArea service

Some risks and possible solutions?

- **ENC coverage and availability in critical areas**
 - **Proposed Solution:**
 - World coverage ENC's are made available to ALL qualified distributors (not exclusively).
 - Distribution through RENC's or direct agreements.
 - Jeppesen has extensive experience in supporting HO's ENC production (dKart tools).

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

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

 - **Proposed Solution:**
 - SENC distribution (e.g. CM93/3) World Wide Chart database; 1 DVD/10 min to Load. NTM's and full chart updates can be obtained in minutes (depending on com's).
 - "NextGen" S100 standard will further mitigate the risk.

Some risks and possible solutions continue

- **Overflow and overload of critical navigational system (i.e. ECDIS)**
 - **Proposed Solutions:**
 - 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.**
 - **Proposed Solution:**
 - 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 check the output before reaching a decision.

HCD ASPECTS IN DEFINING DATA GUIDELINES

- **Situational centric data filtering and selection**
 - Filter data necessary to generate information needed in a given situation
 - Select the data for display, which will help increase knowledge

- **Integration of related data points**
 - Combine related data content
 - Identify data integration parameters to allow full integration
 - Create integrated information layer

- **Information Rendering**
 - Define rendering parameters based on HCD guidelines
 - Apply rendering algorithms to display a usable HMI



THANK YOU !
michael.bergmann@jeppesen.com