JEPPESEN
A BOEING COMPANY

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

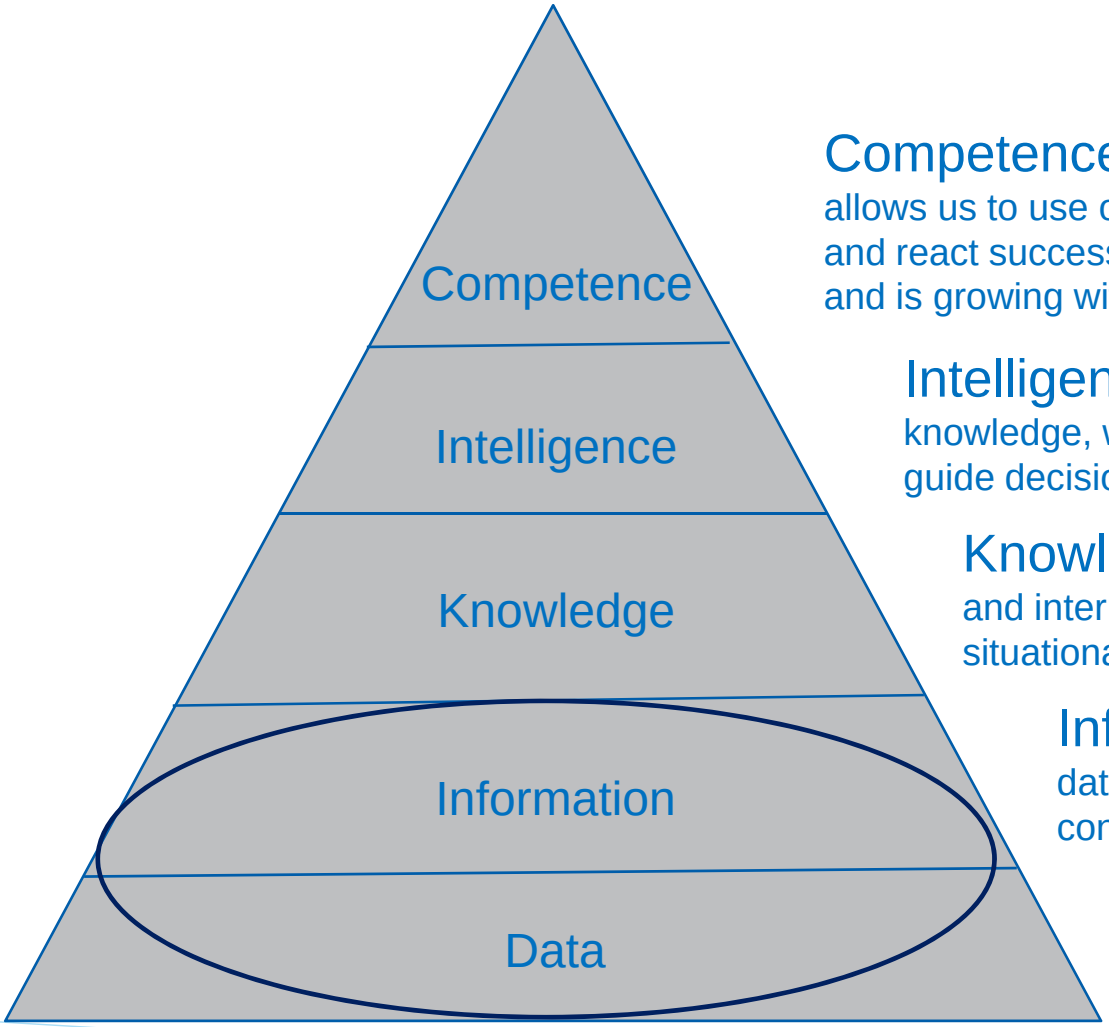
2,400,000	Travelers benefiting from Jeppesen real-time optimization, **daily**

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.

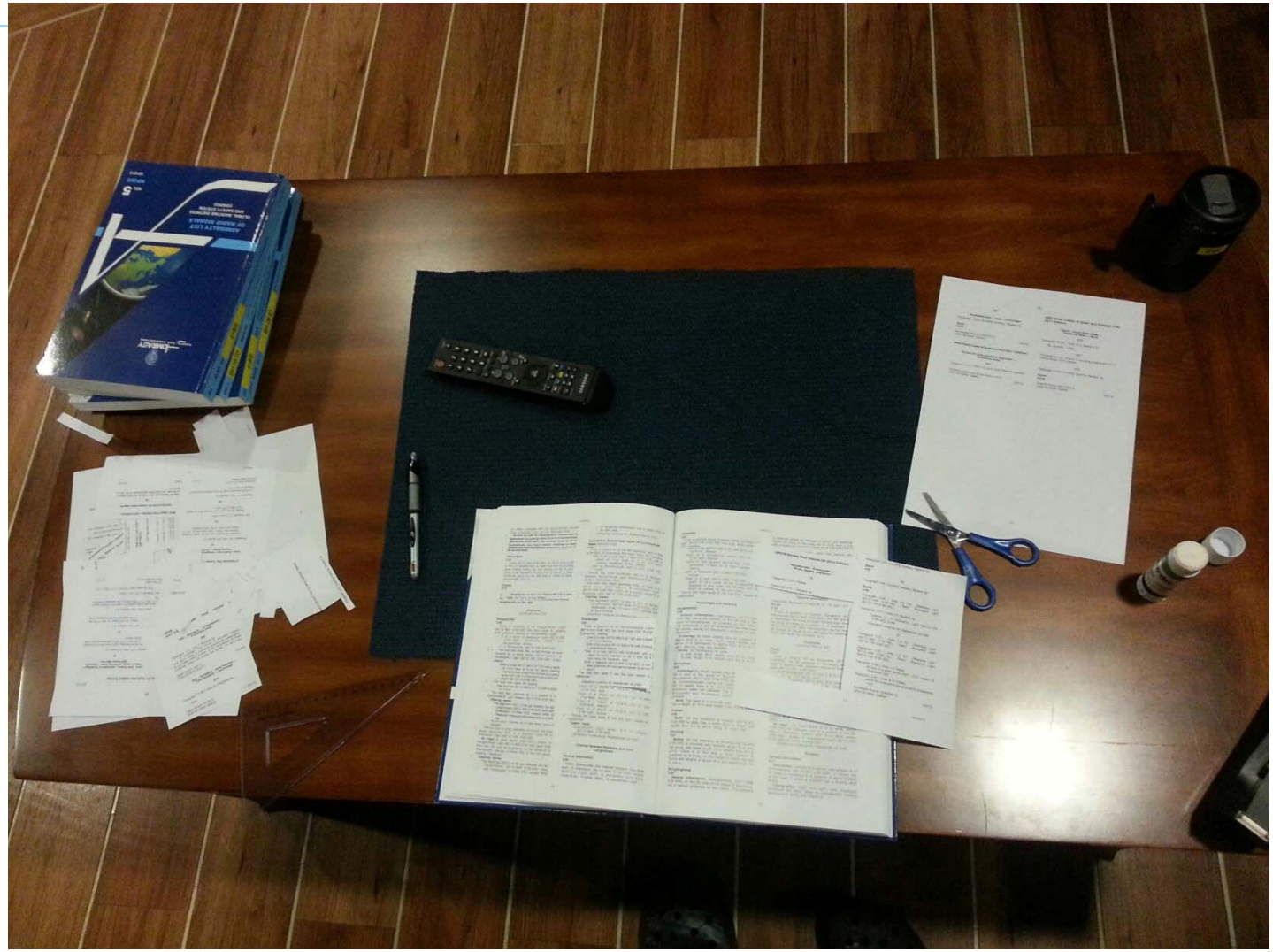
Intelligence – The full collection of past and present knowledge, which allows us to assess new situations and guide decisions

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

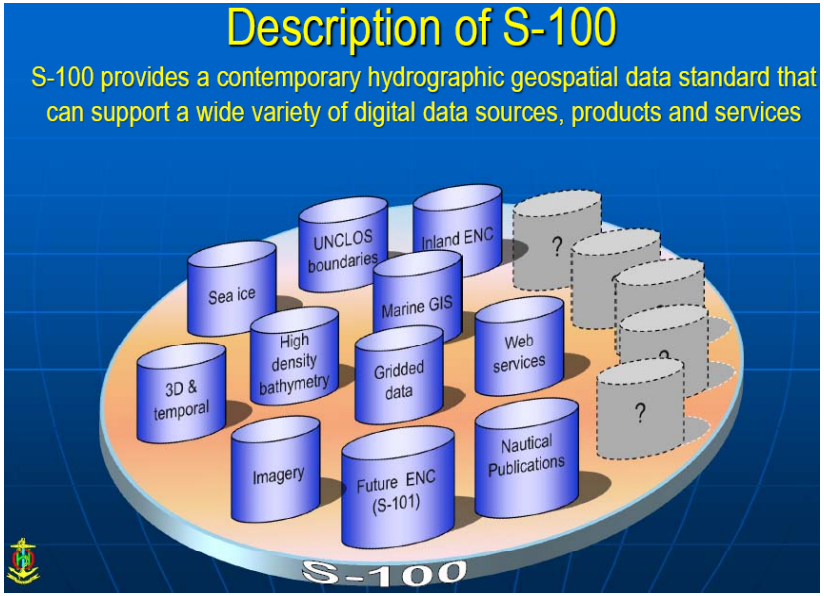
Information – integrated and processed data, which is useful and meaningful for the data consumer

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

Updating?

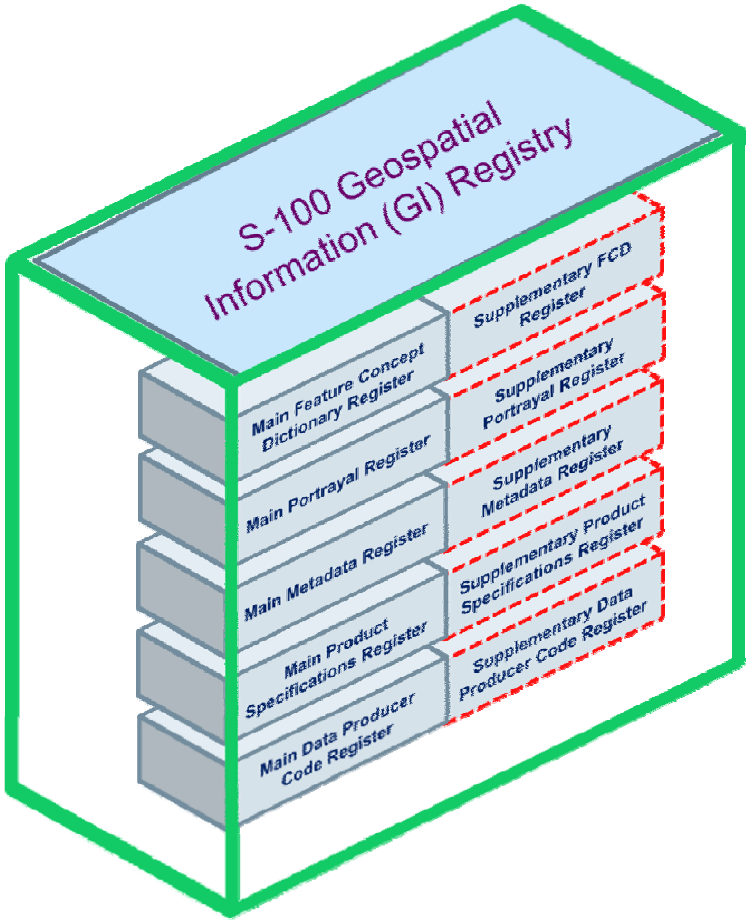


IHO GI Registry within Common Maritime Data Structure



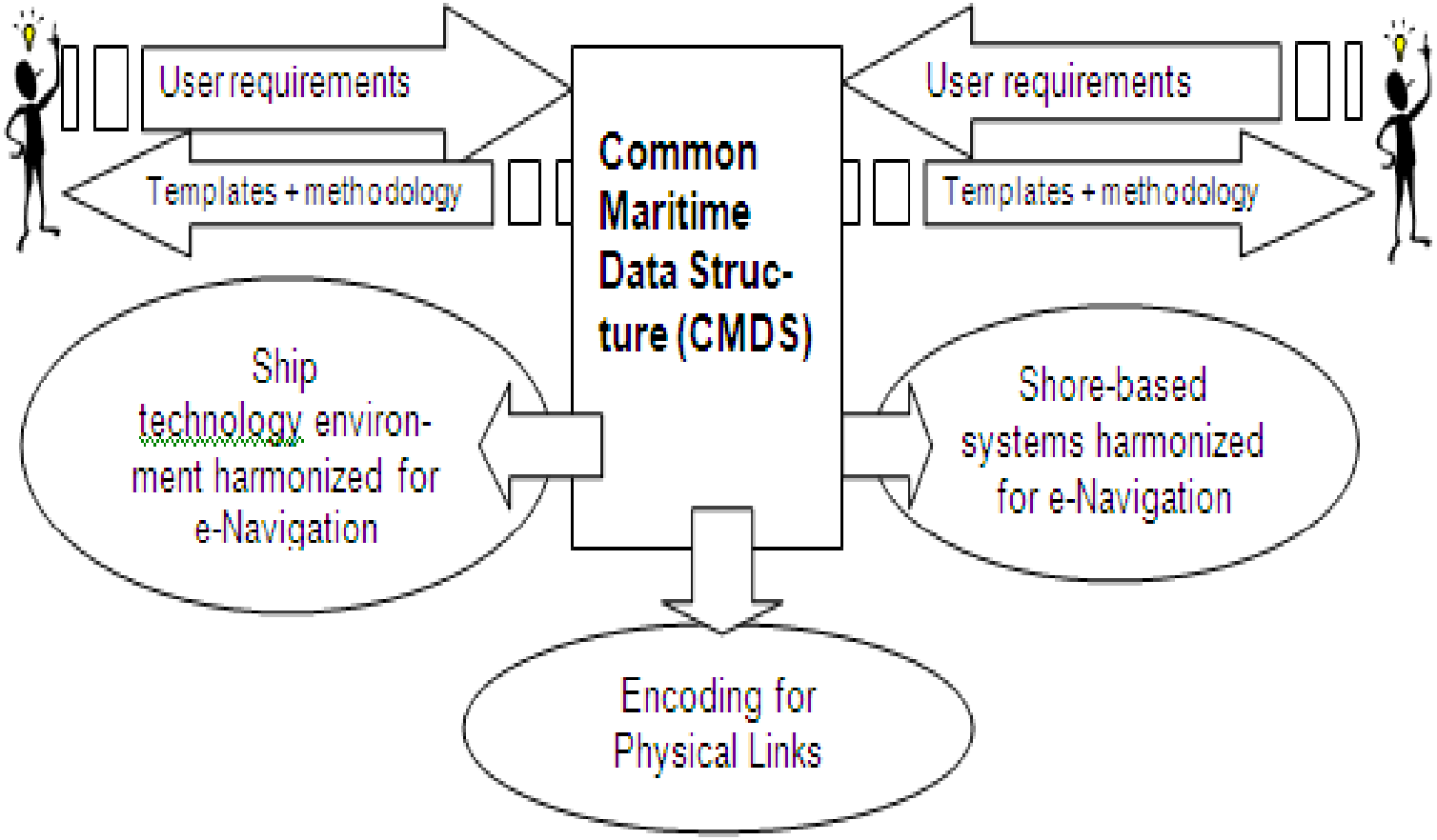
Gilles Bessero, Director IHB
e-Navigation Underway Conference 30 Jan 2013

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 20ll, Taunton

Common Maritime Data Structure
The Basis of the e-Navigation Architecture



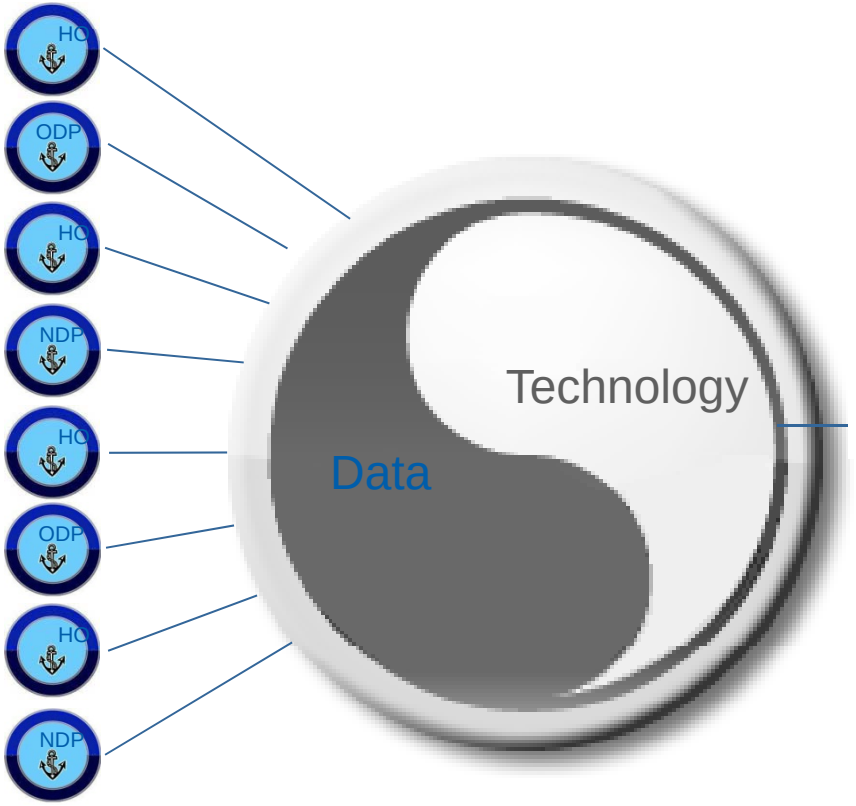
Scope and Impact of the Common Maritime Data Structure
IALA e-Navigation 'Picture Book' 12/2011, Figure 5

Data Integration Framework for e-Navigation

Data Provision Framework

Data Integration Framework

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

- **Onboard**
  - Integration of sensors
  - Standard user interface
  - Preventing overburdening
- **Ashore**
  - Enhanced management of vessel traffic
  - Better provision, coordination and data exchange
  - Standard formats
- **Communication**
  - Seamless information transfer between users

Safety

Efficiency

Environmental protection

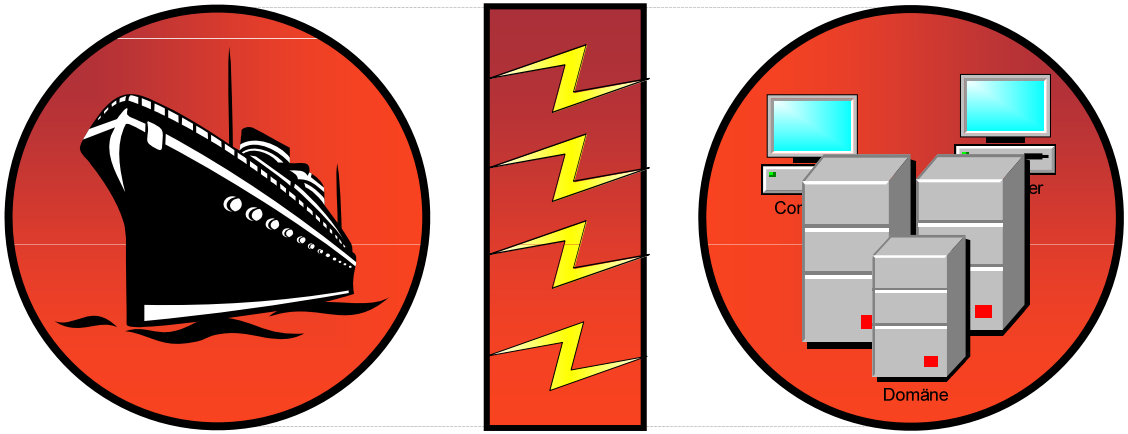
Based upon a common “language”: “S100”, and “Single Window” concept

(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)



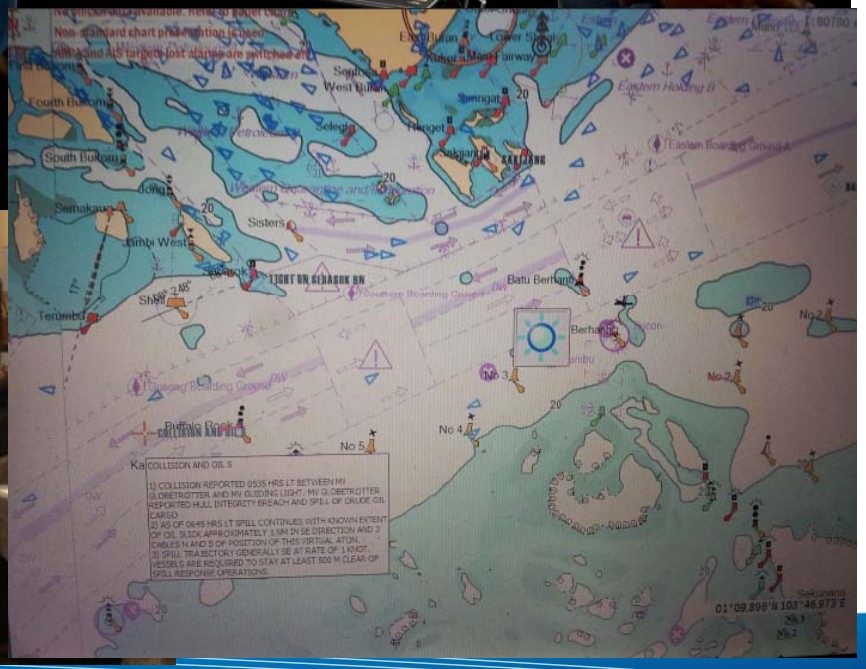
"harmonized collection, integration, exchange, presentation and analysis of maritime information *onboard*"

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

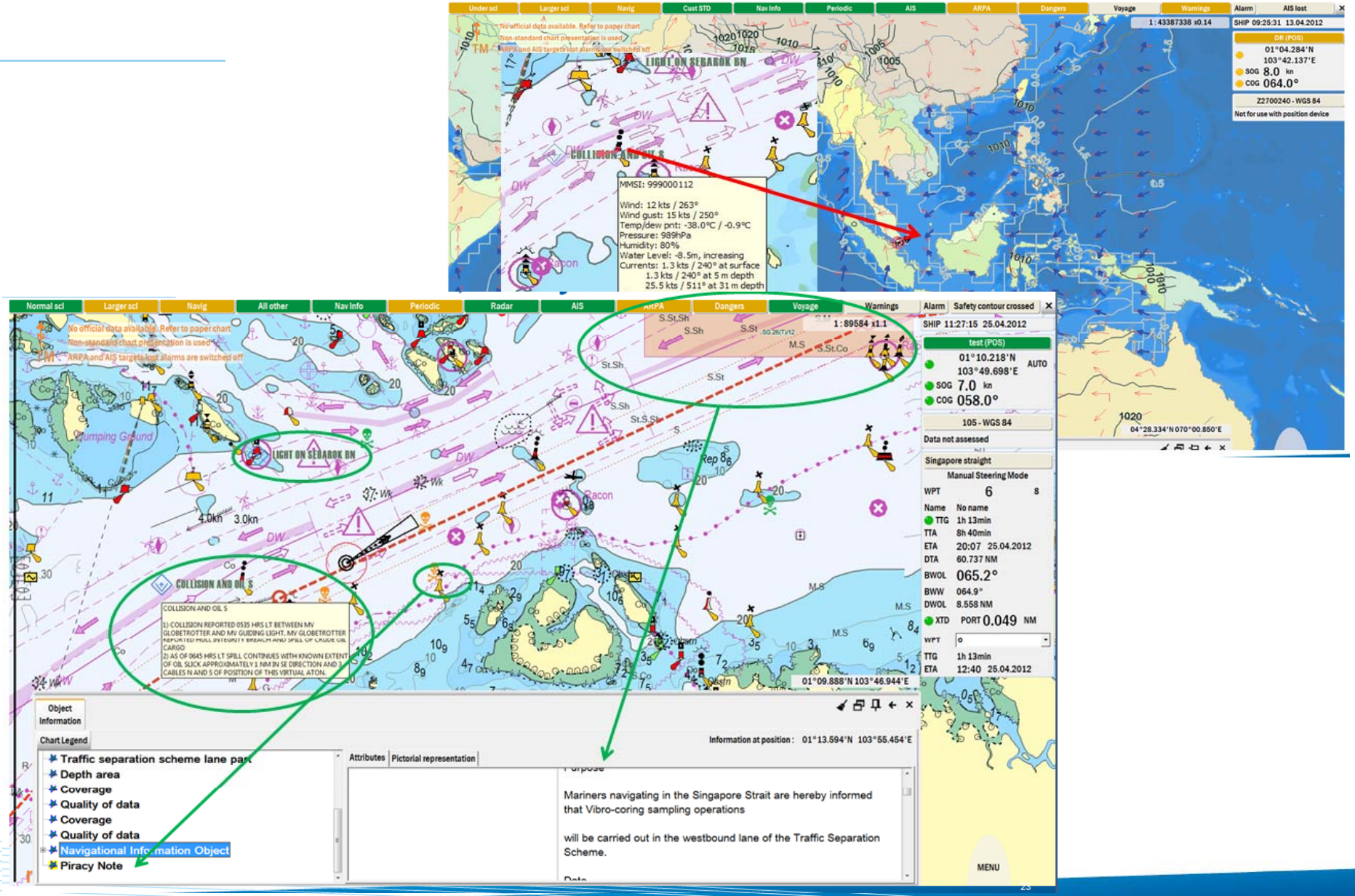
IALA e-Navigation 'Picture Book' 12/2011, Figure 1

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”

Load Ship

Cast Off

Plan Voyage

(e)Nautical Management

(e)Voyage Planning

Passage Plan

(e)PassagePlan

Reporting

Harbor Maneuvering

(e)Navigation

Chartering

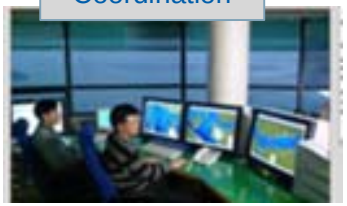
Standby

(e)Nautical management

Fleet Management

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

Marine Coordination



Coastal

(e)Navigation

Ocean Passage

Navigation

Optimization

Approach

(e)Navigation

Reporting

Coastal

(e)Navigation

Reporting

Harbor Maneuvering

(e)Navigation

Berthing

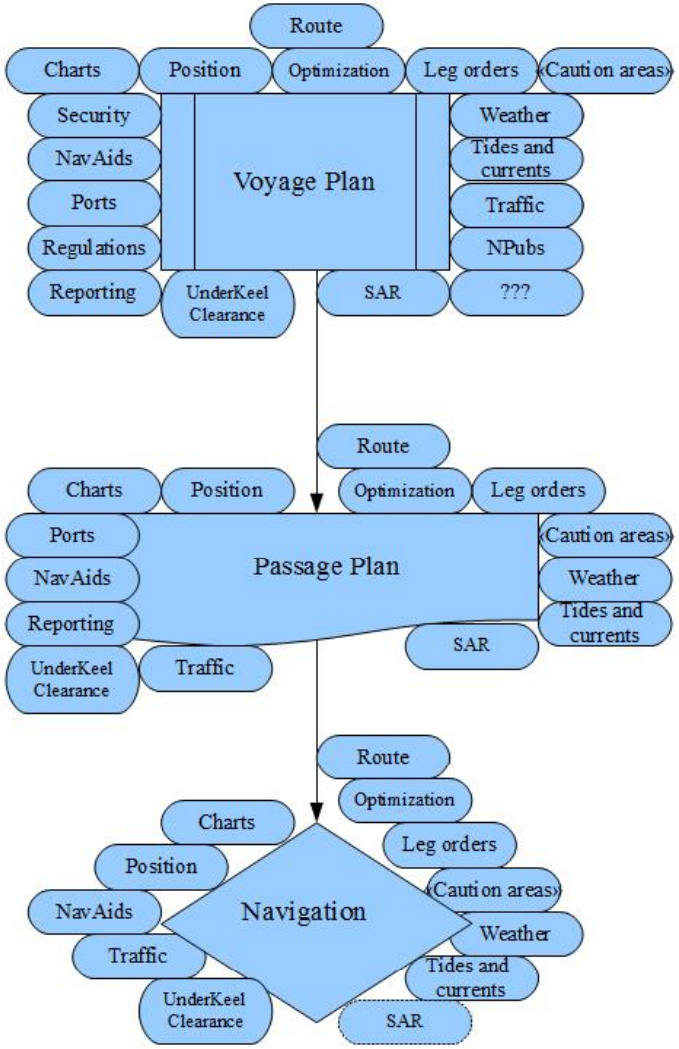
Positioning

Discharge

Reporting

Voyage Analyze

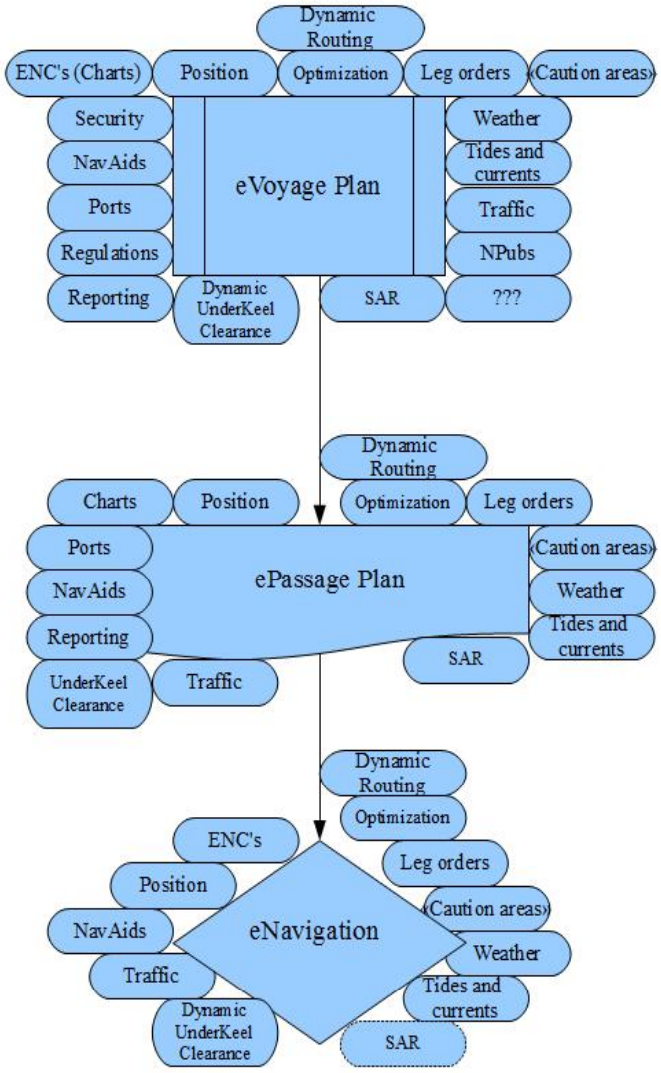
Navigation starts with “Voyage Planning”



- **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 <u>data</u>** 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:

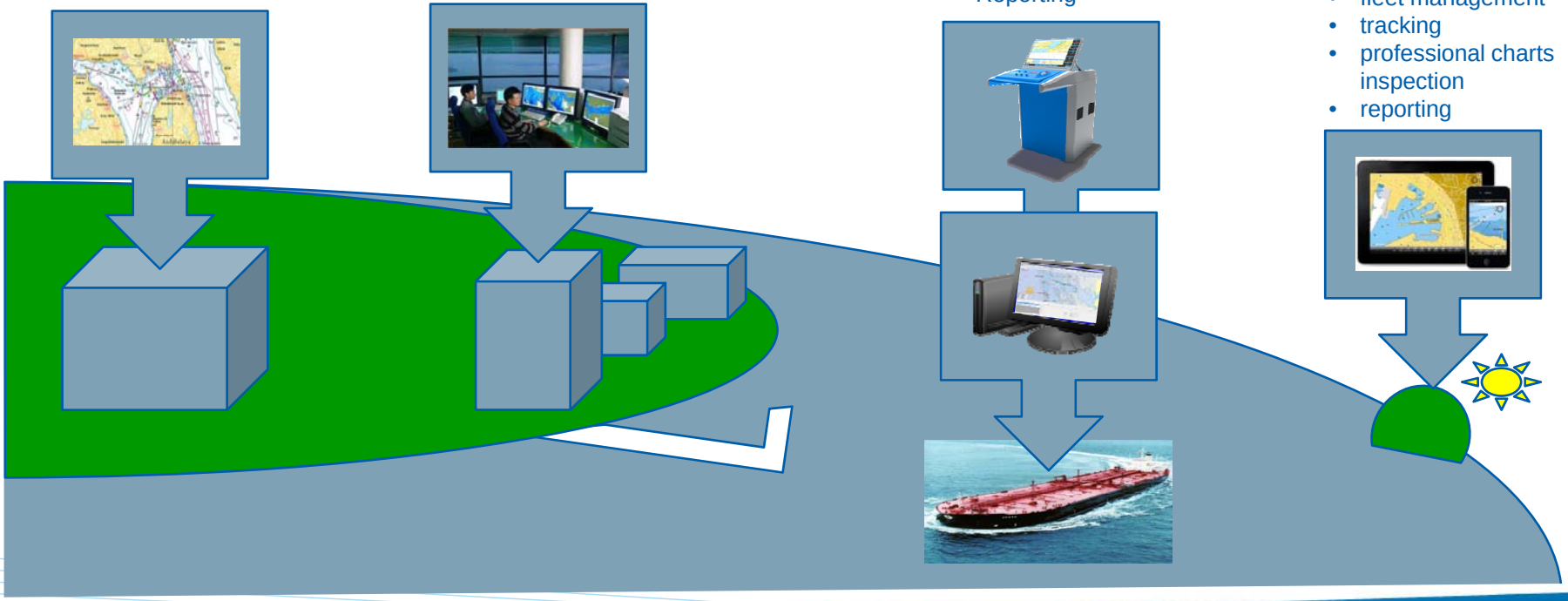
- ECDIS/INS
- Charts
- NavArea/MetArea,
- Marine Safety Information
- Route Exchange
- Dynamic under keel clearance

Back of Bridge:

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

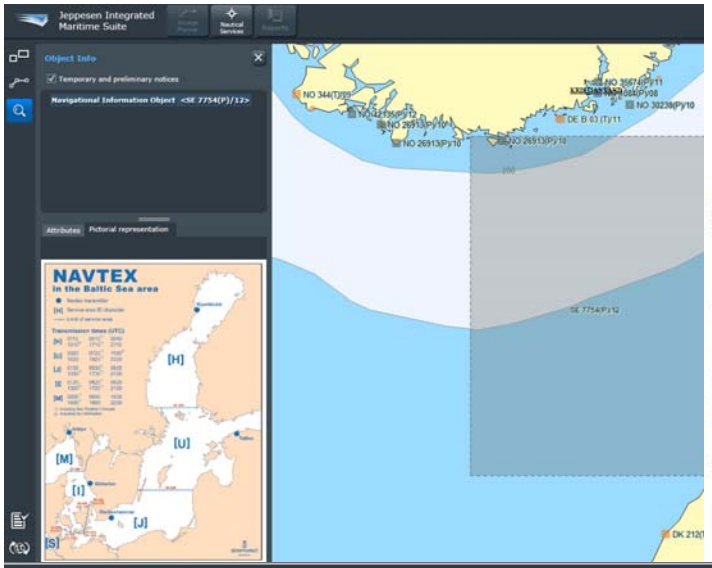
Mobile:

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



eVoyagePlanning is here already!

Providing solutions for Integrated Intelligent Information:

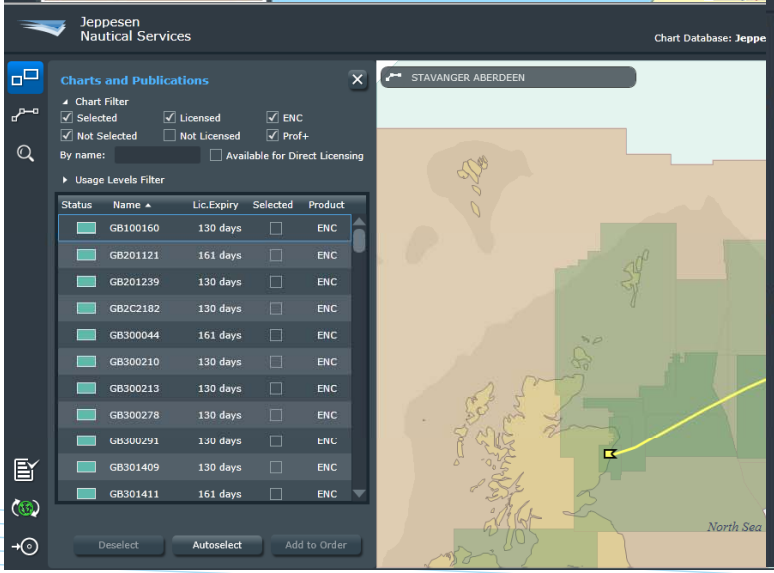


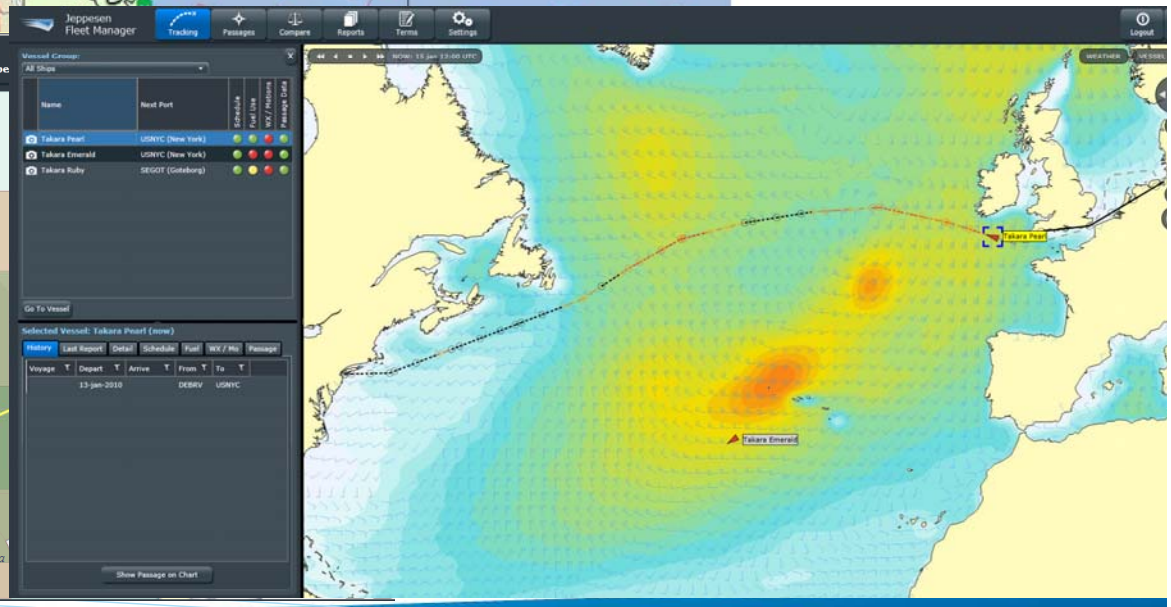
Statistical it is a lower probability for piracy when Hs>2 m(more dangerous for the pirates for boarding).

Piracy Incident last 6 weeks(armed robbery/attack)

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

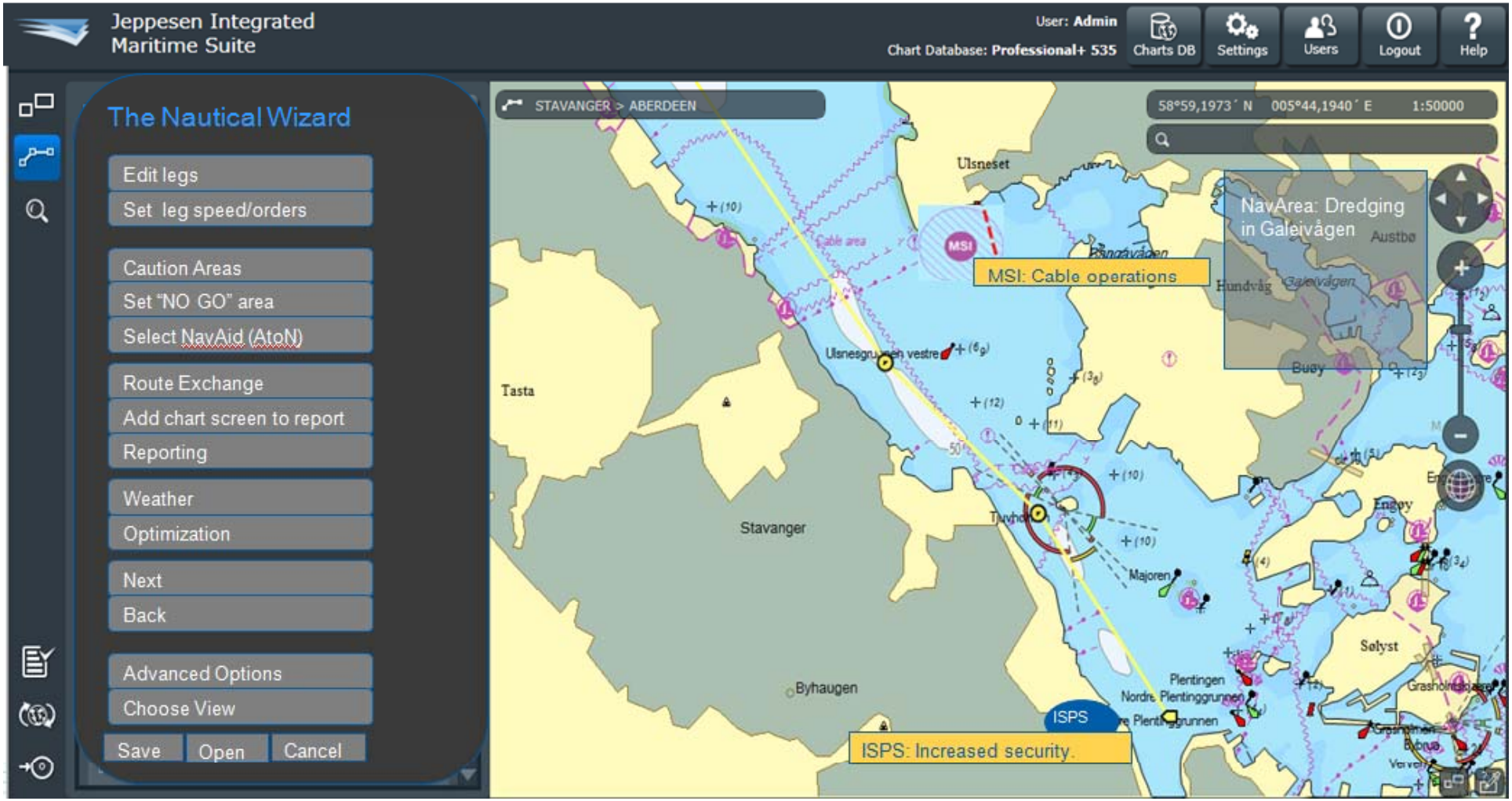
Jeppesen Database gets instant incident update from Bergen Risk Management





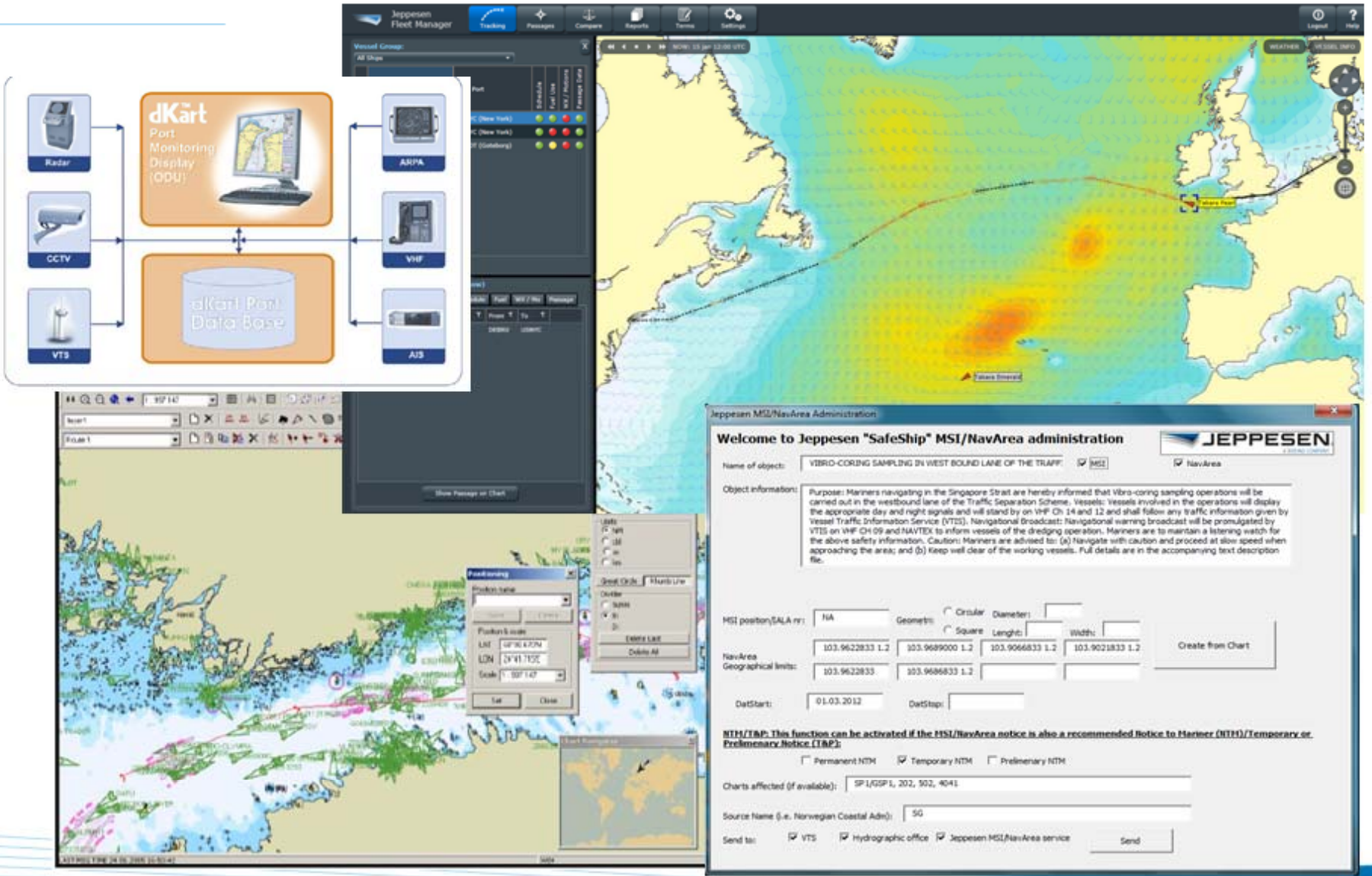
Vision: Provide the best (e)Voyage Planning workflow

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



eVTMIS – Vessel Traffic Monitor Information System

eVoyagePlanning to marine coordination and Fleet Management



Some risks and possible solutions?

- **ENC coverage and availability in critical areas**
  - **Proposed Solution**:
    - World coverage ENC's are made available to ALL qualified distributers (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 !

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