SAFEPORT: Project presentation

SAFEPORT is partially funded by the European Commission and the project is carried out in the context of the Galileo FP7 R&D programme supervised by European GNSS Supervisory Authority

Title

Safeport

Date:

17.04.2012

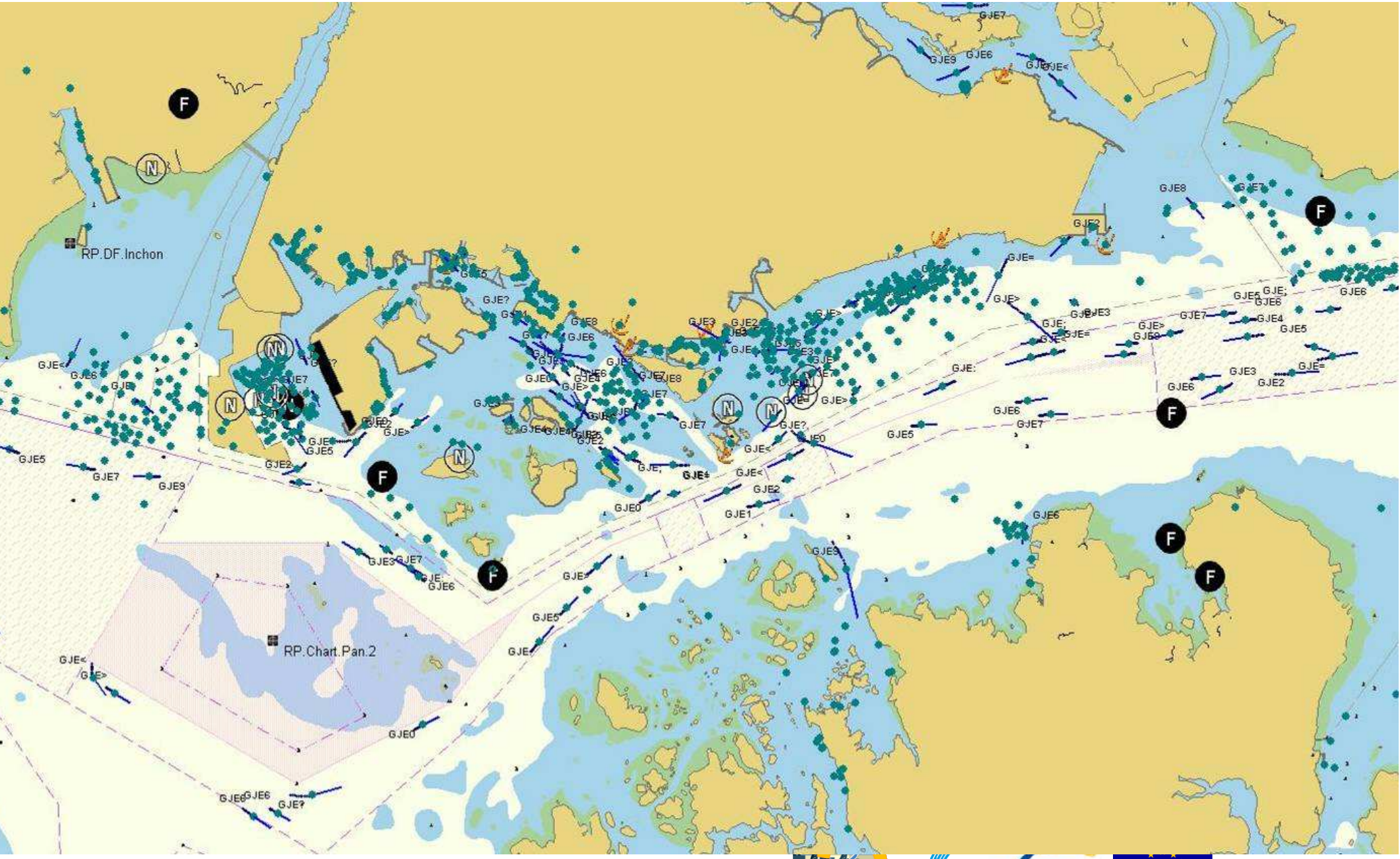
Location:

Venice Nereus conference

Presenter:

Dr Benjamin Hodgson
(bhodgson@bmtmail.com)

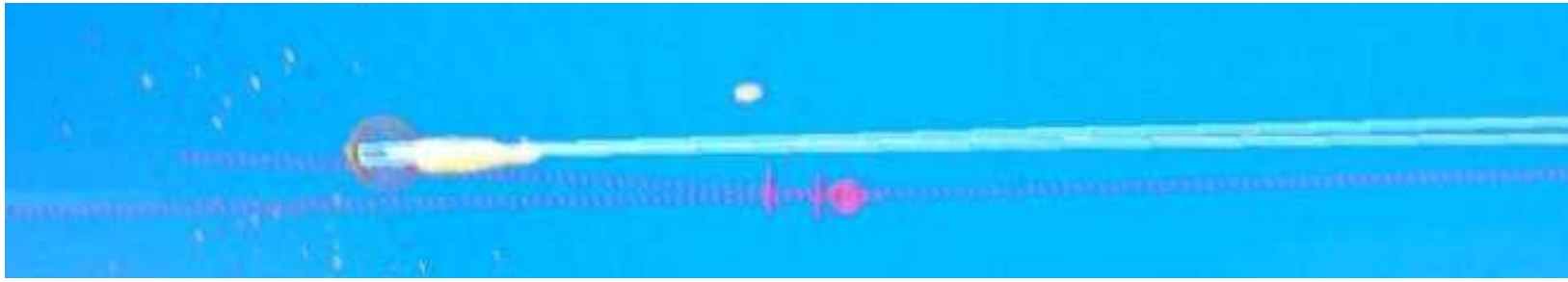
Current situation: Traffic management challenge



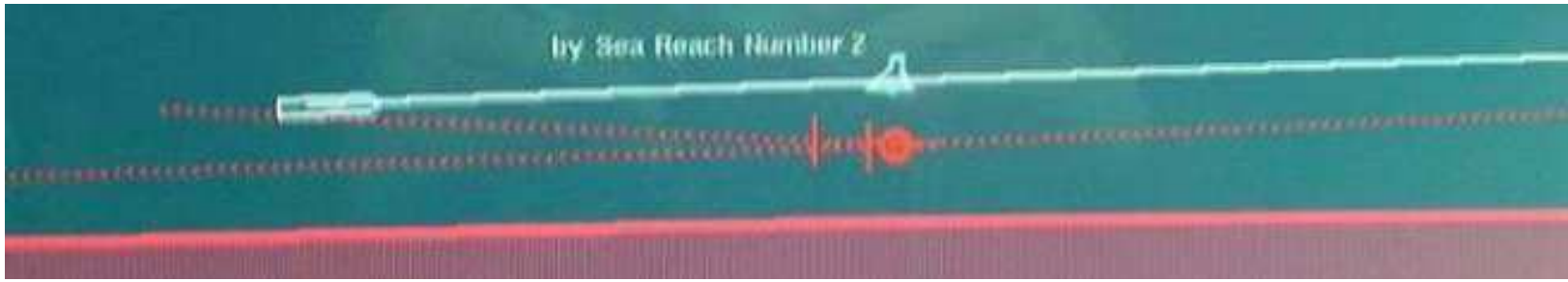
Current situation: AIS/GPS

Vunerable to: Jamming, Spoofing,Lying

Radar picture



ECDIS based on GPS



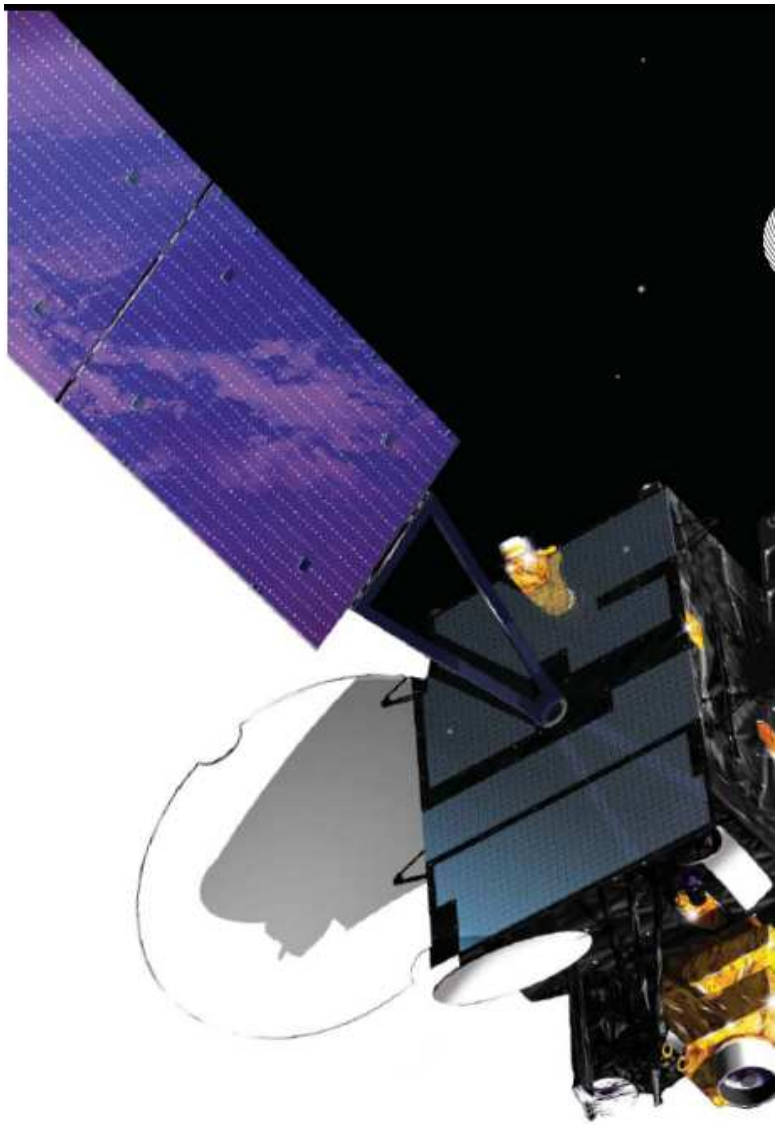
Safe Port Operations using EGNOS safety of life Services

Enhancing security

Encrypt and authenticate position reports (Anyone can broadcast AIS reports claiming to be any ship)

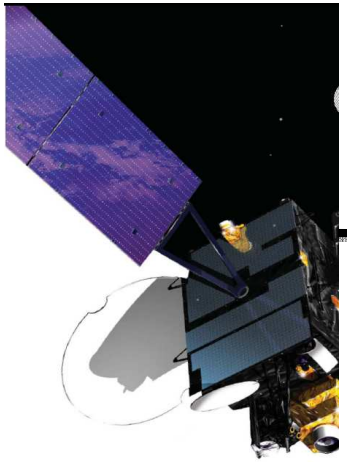
Protect against GPS jamming and spoofing

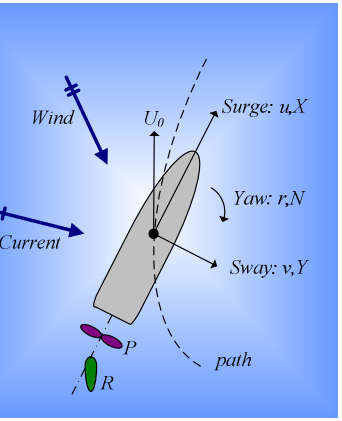
Guarantee on accuracy of position information using EGNOS protection level (Galileo).

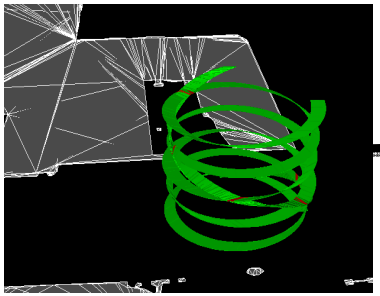


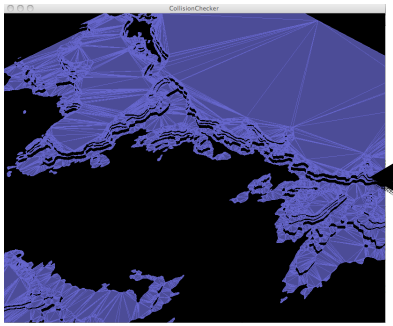
Enhancing cooperation

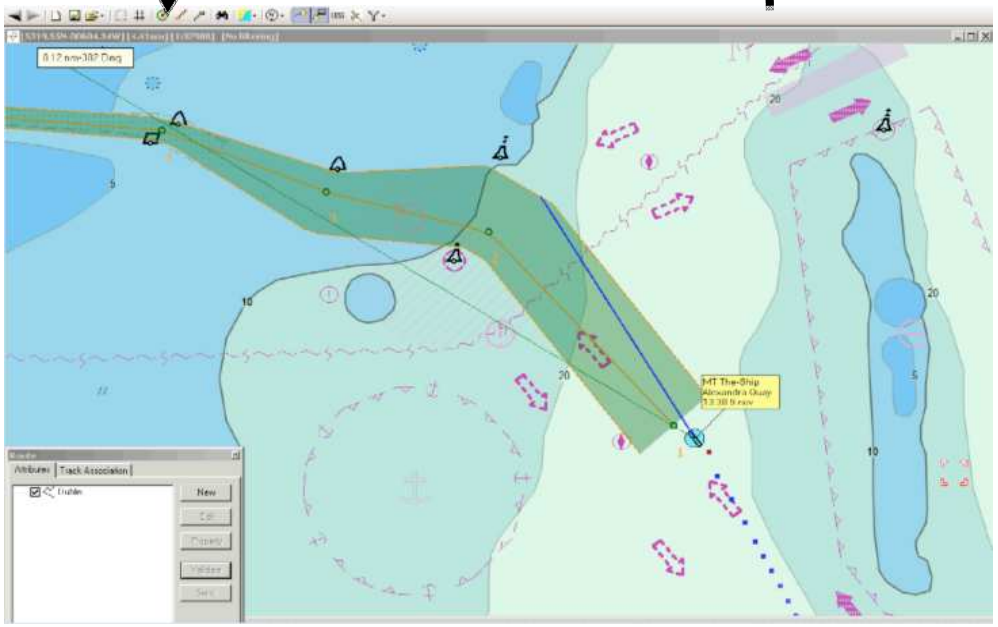
- Electronic communication between pilot and VTS
- Ships agree to follow channel in space & time
- Channels are validated to ensure they are safe and do not conflict




Wind
U_0
Surge: u,X
Yaw: r,N
Current
Sway: v,Y
P
path
R





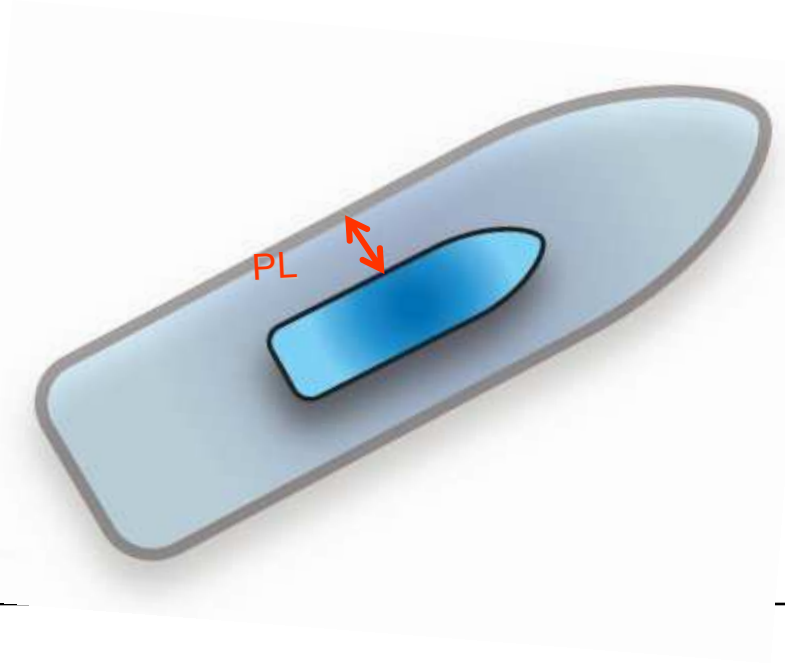



SEVENTH FRAMEWORK
PROGRAMME

GSA

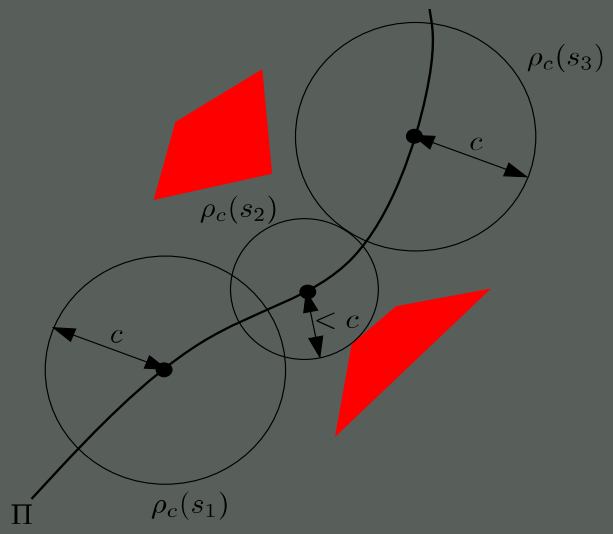
Safepilot

The algorithm for PL computation has been enbedded in the hardware of the Pilot Portable Unit (SafePilot) which include two professional GPS devices, a processing unit and a tablet for the HMI.

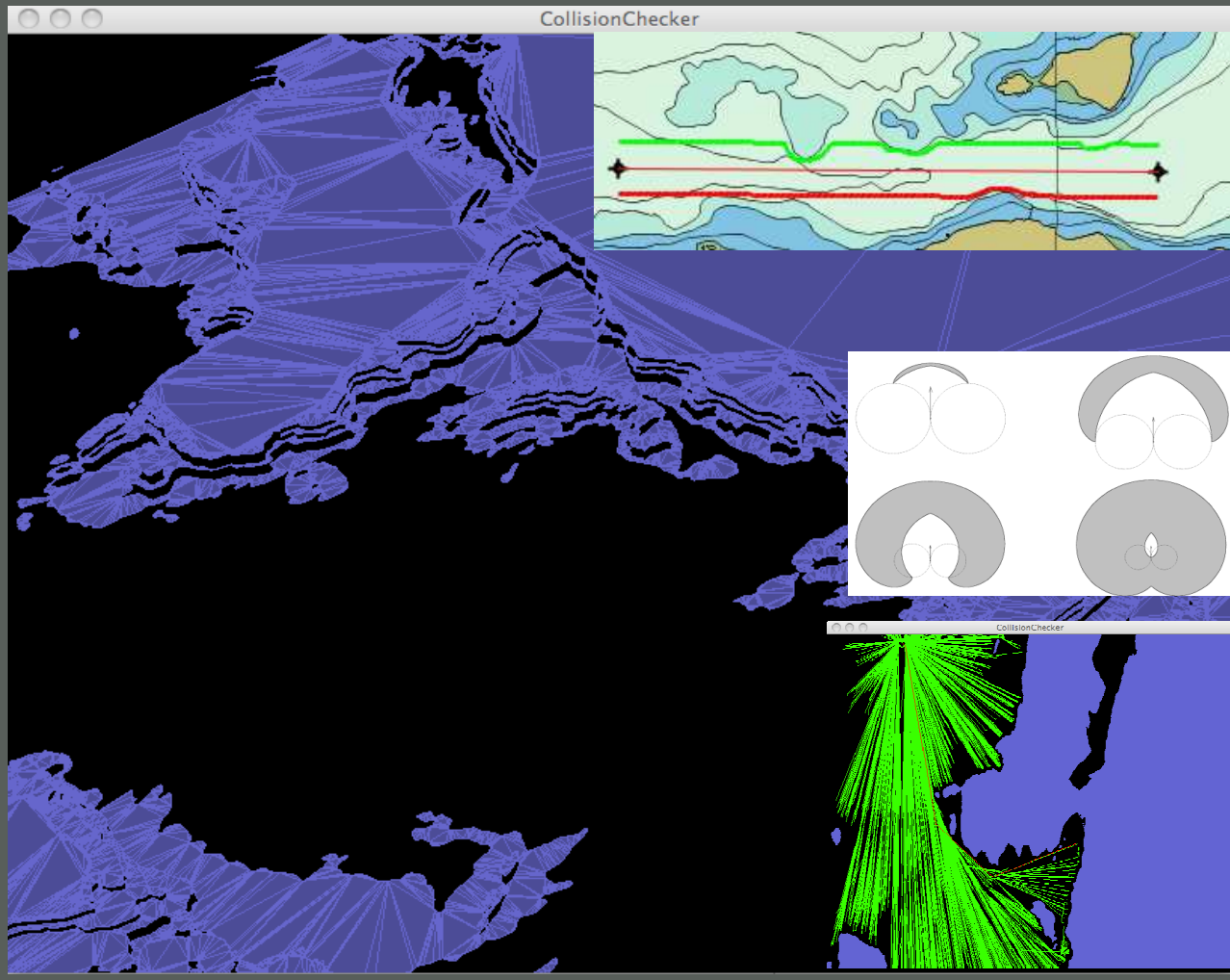


Validation: Static Path

- Land
- Restricted areas
- Regulations
- Dynamic Under Keel clearance
- Feasible manoeuvres



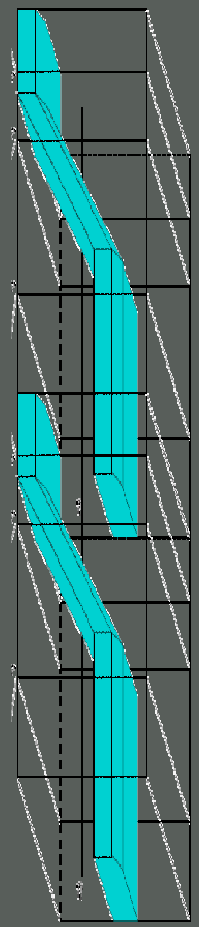
Depth

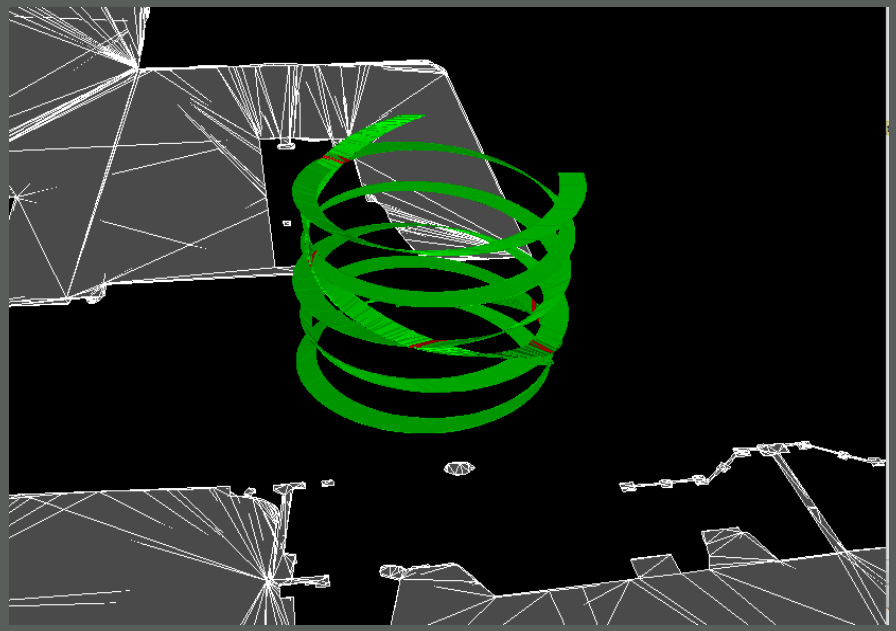


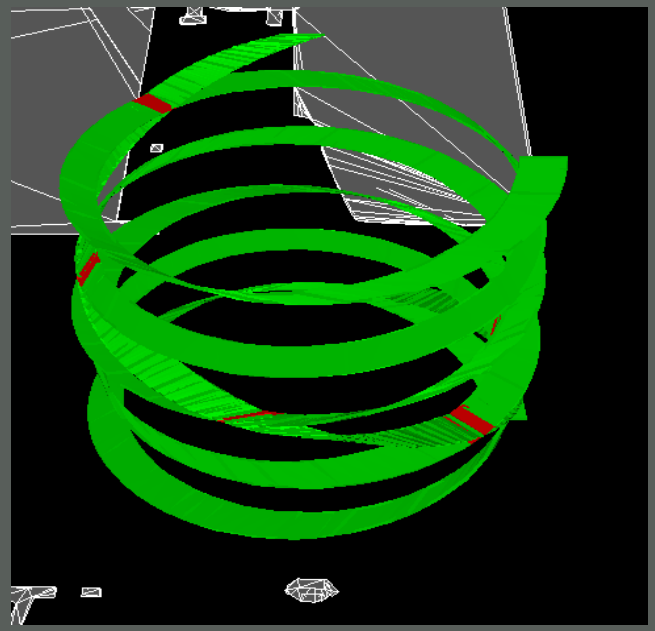
Tested with S57
Needs Detailed Bathymetric information

Validation: Dynamic Path

Time

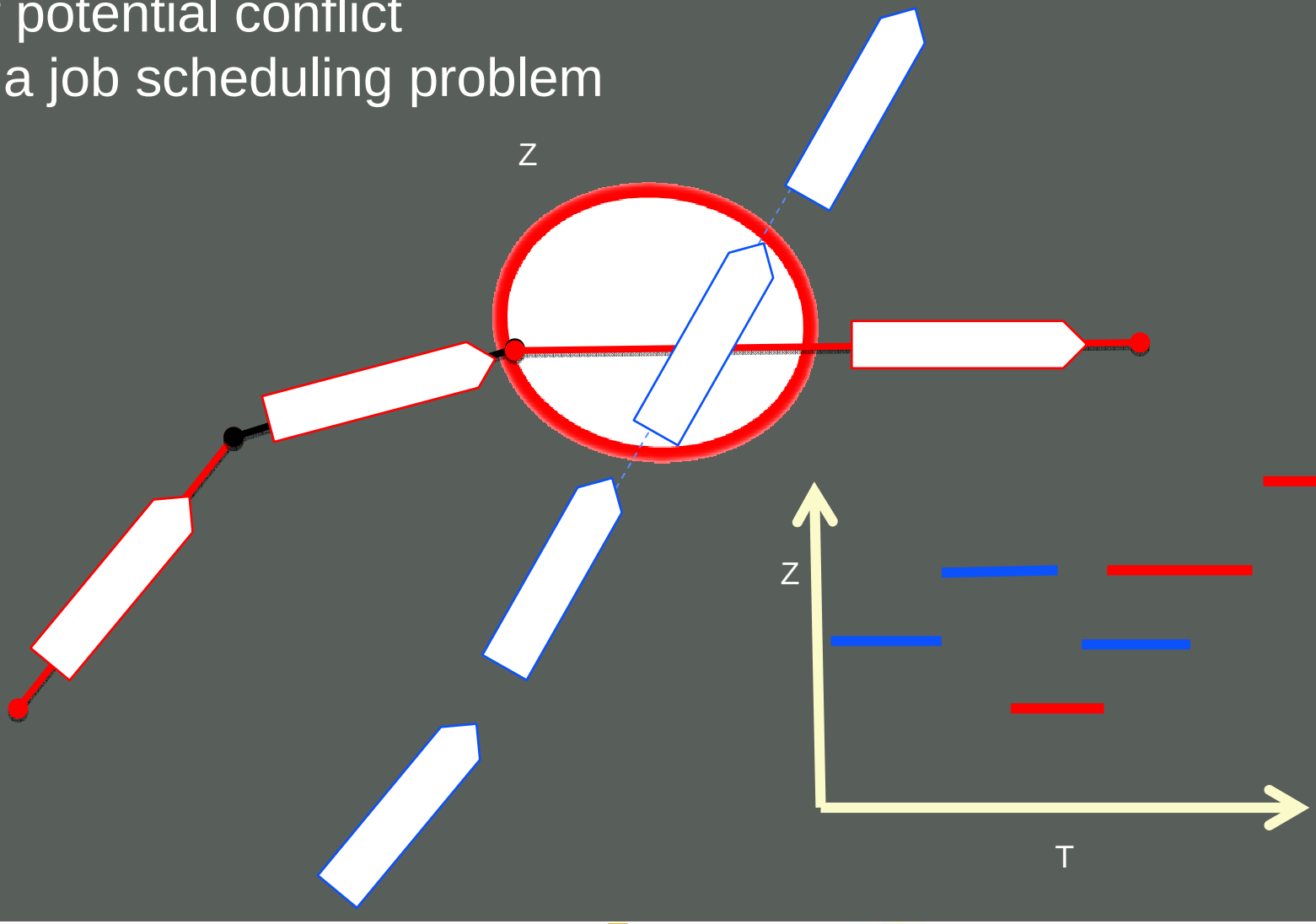


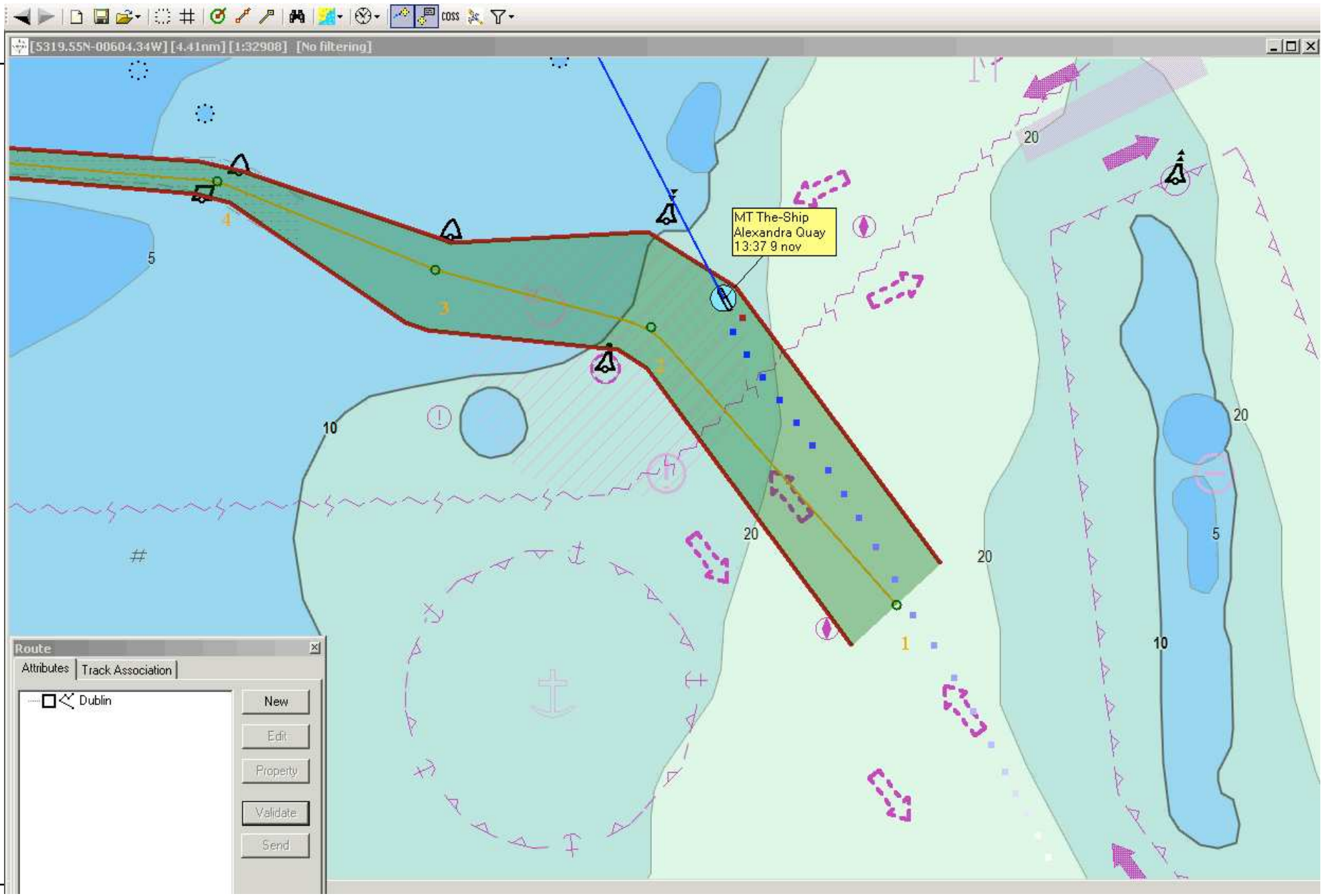




Planning: Dynamic slot allocation

- Geographic paths are fixed
- Identify areas of potential conflict
- Reduces this to a job scheduling problem




[5319.55N-00604.34W] [4.41nm] [1:32908] [No filtering]
MT The-Ship
Alexandra Quay
13:37 9 nov
Route
Attributes
Track Association
Dublin
New
Edit
Property
Validate
Send

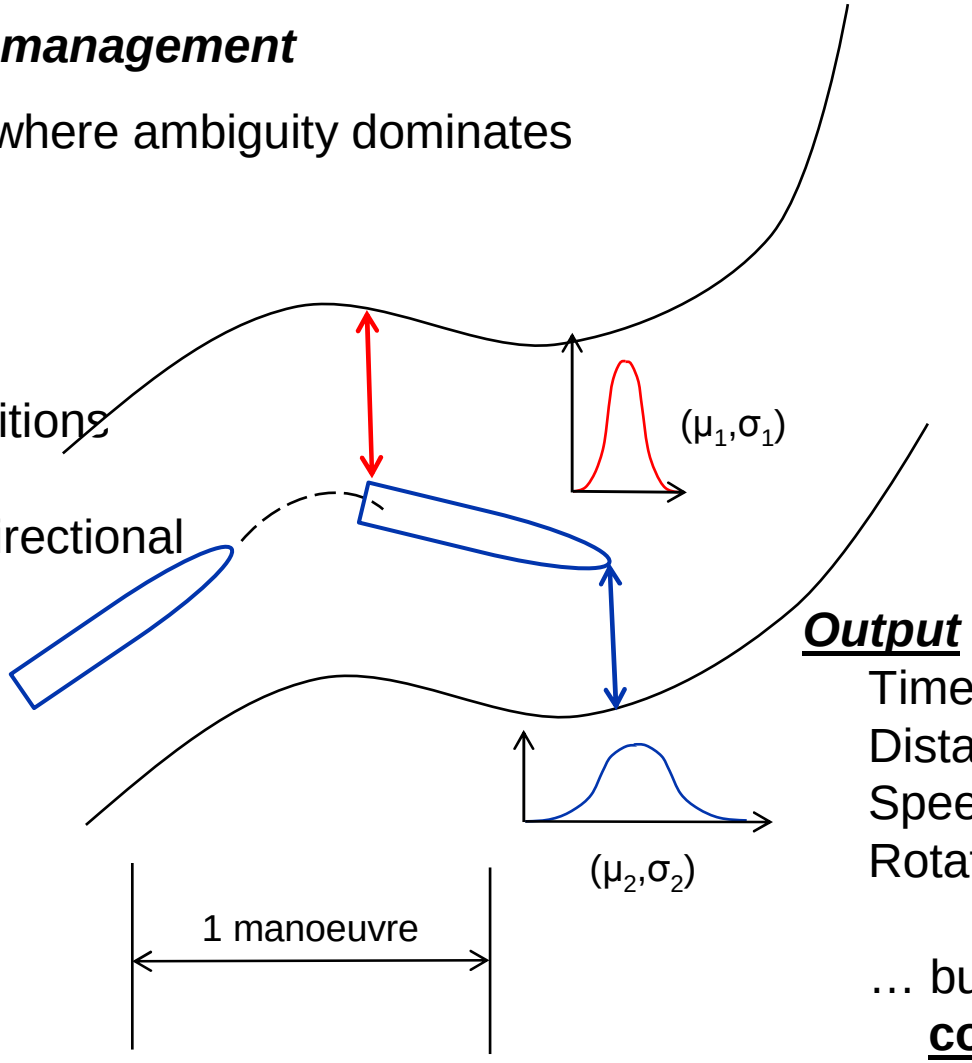
Additional functionality

Probabilistic mode – *Uncertainty management*

Assessment of a situation in cases where ambiguity dominates

- ***Input / scenario***
  - o Approaching speed
  - o Displacement and draught
  - o Rapidly changing wind conditions
  - o "Non-responsive" crew
  - o Large ships have inherent directional instability
  - o Etc.

… and combinations of the above.



Output

Time
Distance
Speed
Rotational speed

… but with a given **confidence level**

E-Navigation benefits of SafePort….

- Digital information exchange
- Traffic Organization (TOS)
- Navigational Assistance (NAS)
- Maneuvering Support
- Vessel monitoring

Galeleo/EGNOS including it's SOL service is a vital component Making GNSS based systems more reliable, (WAAS-EGNOS) the uptake of the technology can increase.

Future work: Beyond Safeport

Large scale E navigation test case to prove and improve

Focus on: latency, security, robustness.

Hybrid communications system to extend concept into open sea.

Satellite communications

Shore based communications

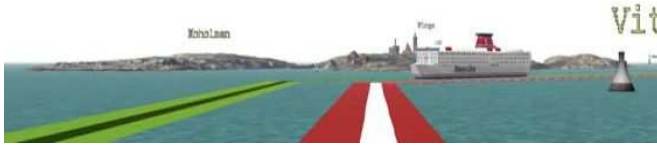
Ship 2 Ship communications

Incorporate live global met ocean data.

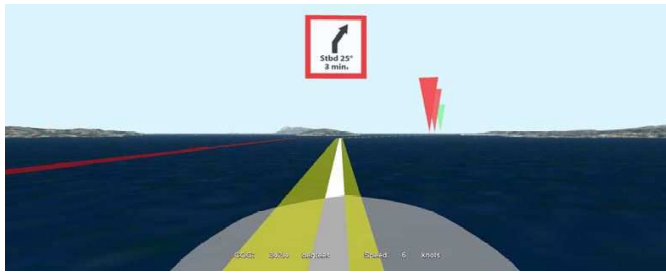
Integrate with ship systems

Long term vision

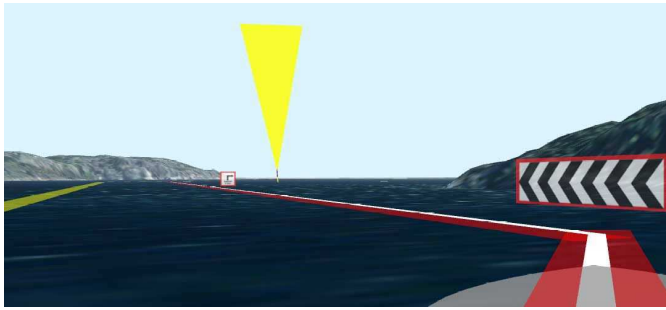
All global maritime traffic is actively managed



Safe management of traffic

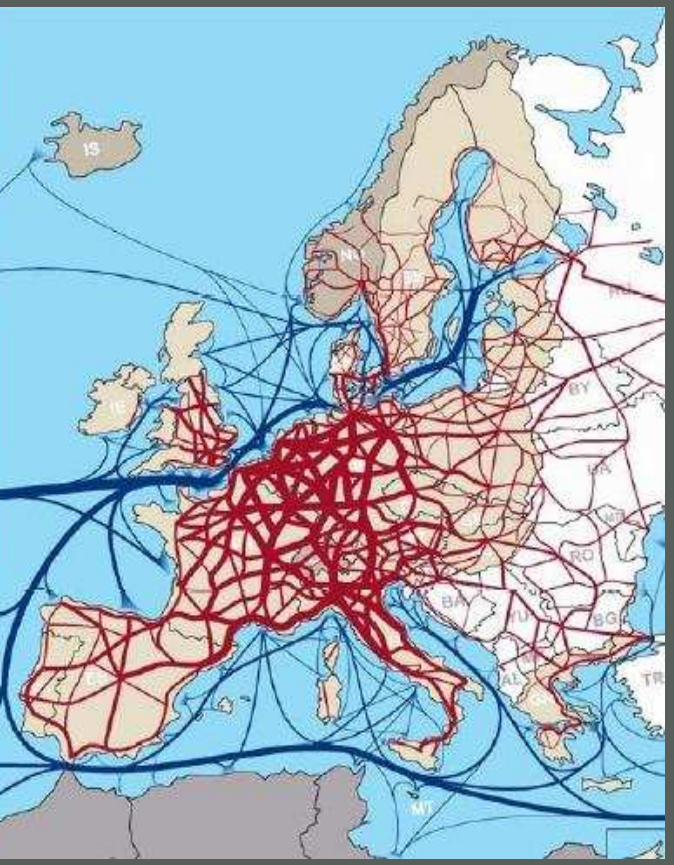


Real time coordinated optimization.

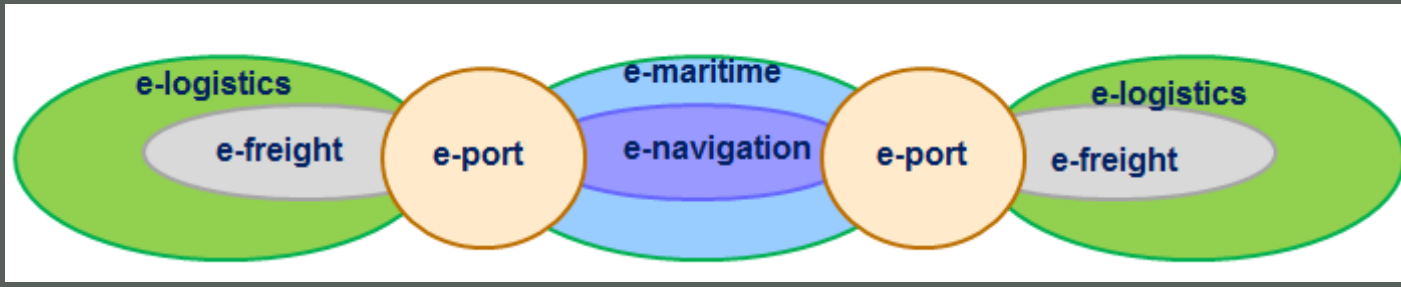


- Port slot times
- Integration with rest of logistics network

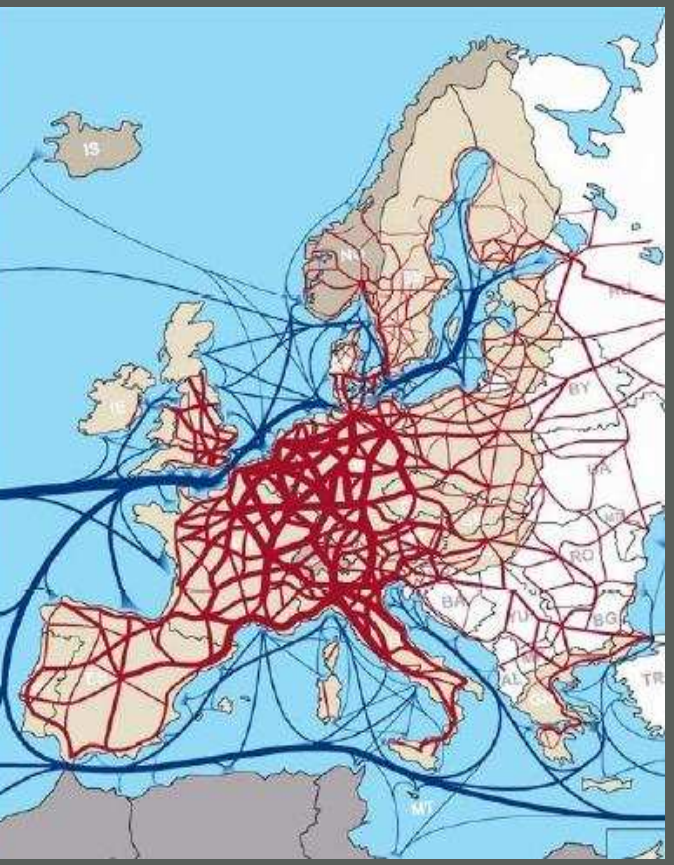
Future: vision



Hinterland | Port | Maritime Transport | Port | Hinterland



Future: vision



Given:

- Status of vessels
- Status of cargo
- Weather

& Some models

- Transport requirements

Optimise:

- On time delivery
- Fuel consumption
- Safety

For multiple (possibly competing) agents

Future: vision

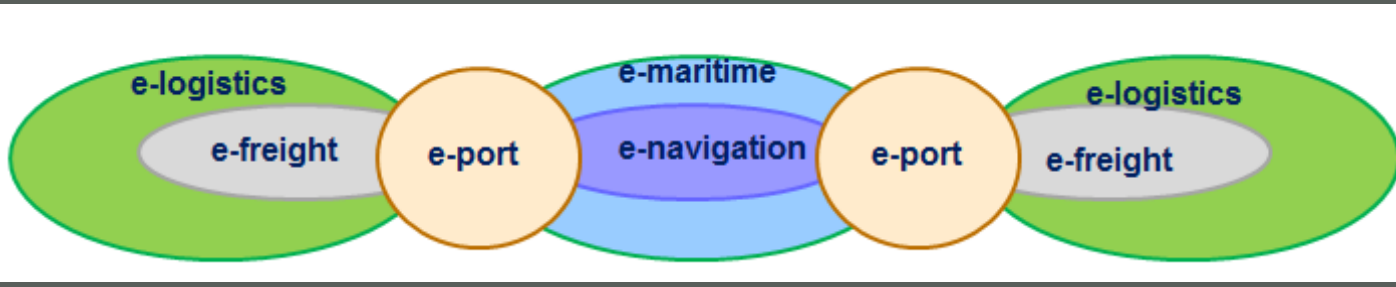
On-board systems

Coms management system

Global Monitoring & services

Services

Hinterland | Port | Maritime Transport | Port | Hinterland



Global : Monitoring
Global : Information sharing
Global : Optimisation

Thank you

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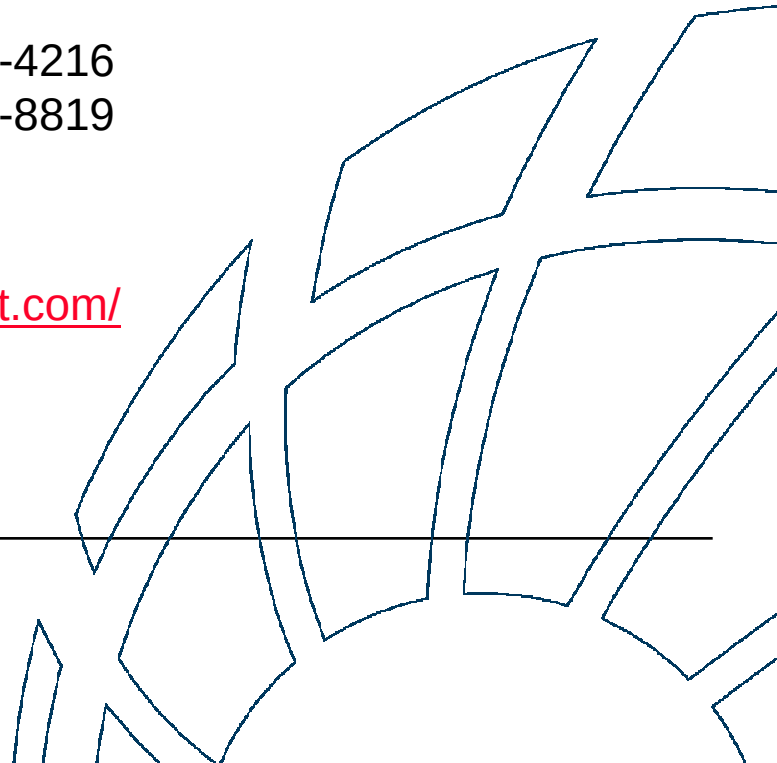

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