



The Nordic Institute of Navigation (NNF) www.nornav.org

non-profit, independent and a non-political organization for professionals working within the field of navigation. The focus of NNF is on all aspects of positioning and navigation related to marine, air, land, and space based applications. Special interests lie in e-Nav and indoor navigation.

- 25 companies as corporate members**
- 32 individual members**

NNF is working to:

- improve qualifications of professionals within navigation, among other things by aiming at better educational opportunities**
- improve safety for personnel, the environment, and for financial assets dependent on positioning and navigation**
- improve the efficiency and thereby to reduce costs within applications relying on positioning and navigation**

Proof-of-Concept Demonstrator to Improve Safety of Maritime Navigation in the Baltic Sea



based on a paper presented at the European Navigation Conference (ENC) 2017

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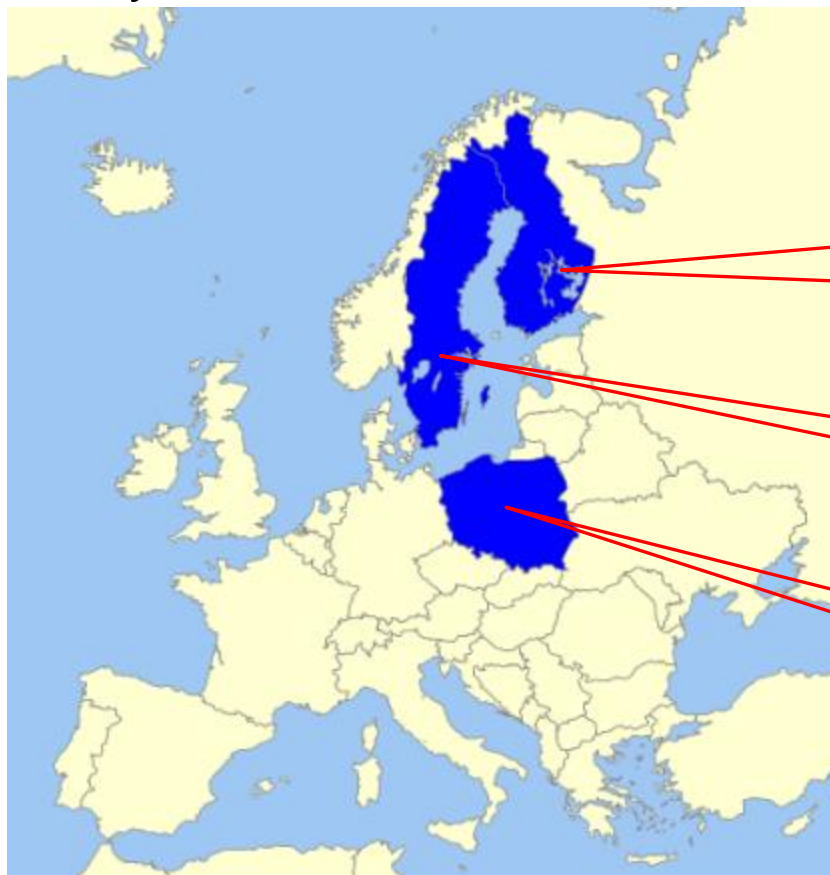


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EU BONUS ESABALT

Enhanced Situational Awareness to Improve Maritime Safety in the Baltic



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FINNISH GEOSPATIAL
RESEARCH INSTITUTE
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FURUNO FINLAND



SSPA Your Maritime
Solution Partner



BONUS

SCIENCE FOR A BETTER FUTURE OF THE BALTIC SEA REGION



EUSBSR
EU STRATEGY
FOR THE BALTIC
SEA REGION

POLICY AREA 'SAFE'

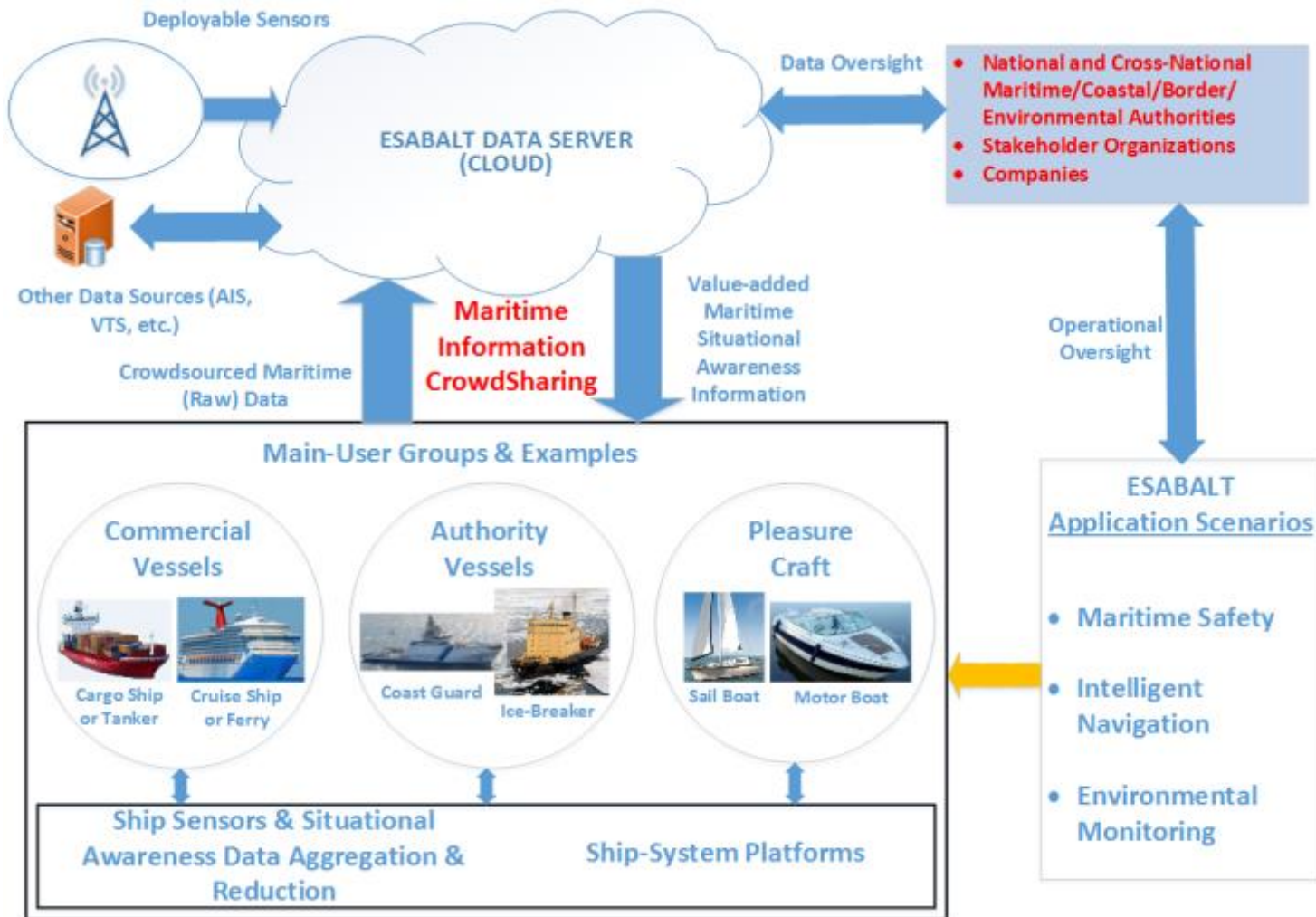


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EU BONUS ESABALT...

- ❖ ...was a feasibility study funded by the EU BONUS program
- ❖ ...about an open mechanism for the crowd-sharing (crowdsourcing + sharing) of maritime information for the benefit of all maritime stakeholders in the Baltic Sea Region
- ❖ ... ships, maritime personnel (ship crews, coast guard, search & rescue, VTS, etc.) and sensor stations are the primary source and beneficiaries of the information
- ❖ ... information which is critical for enhancing maritime safety & security, environmental monitoring, and emergency response
- ❖ More information at: www.ESABALT.org

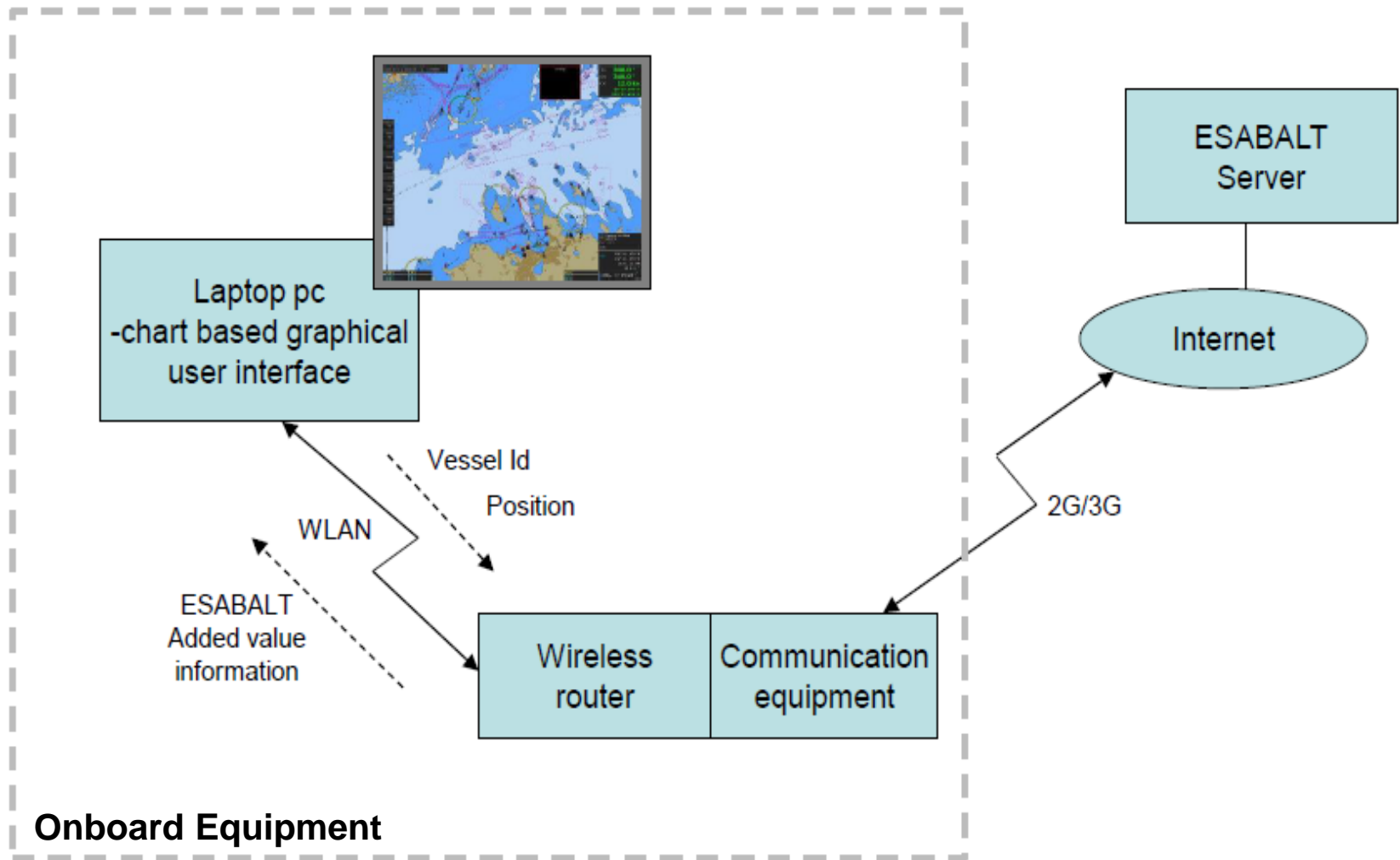
System Architecture



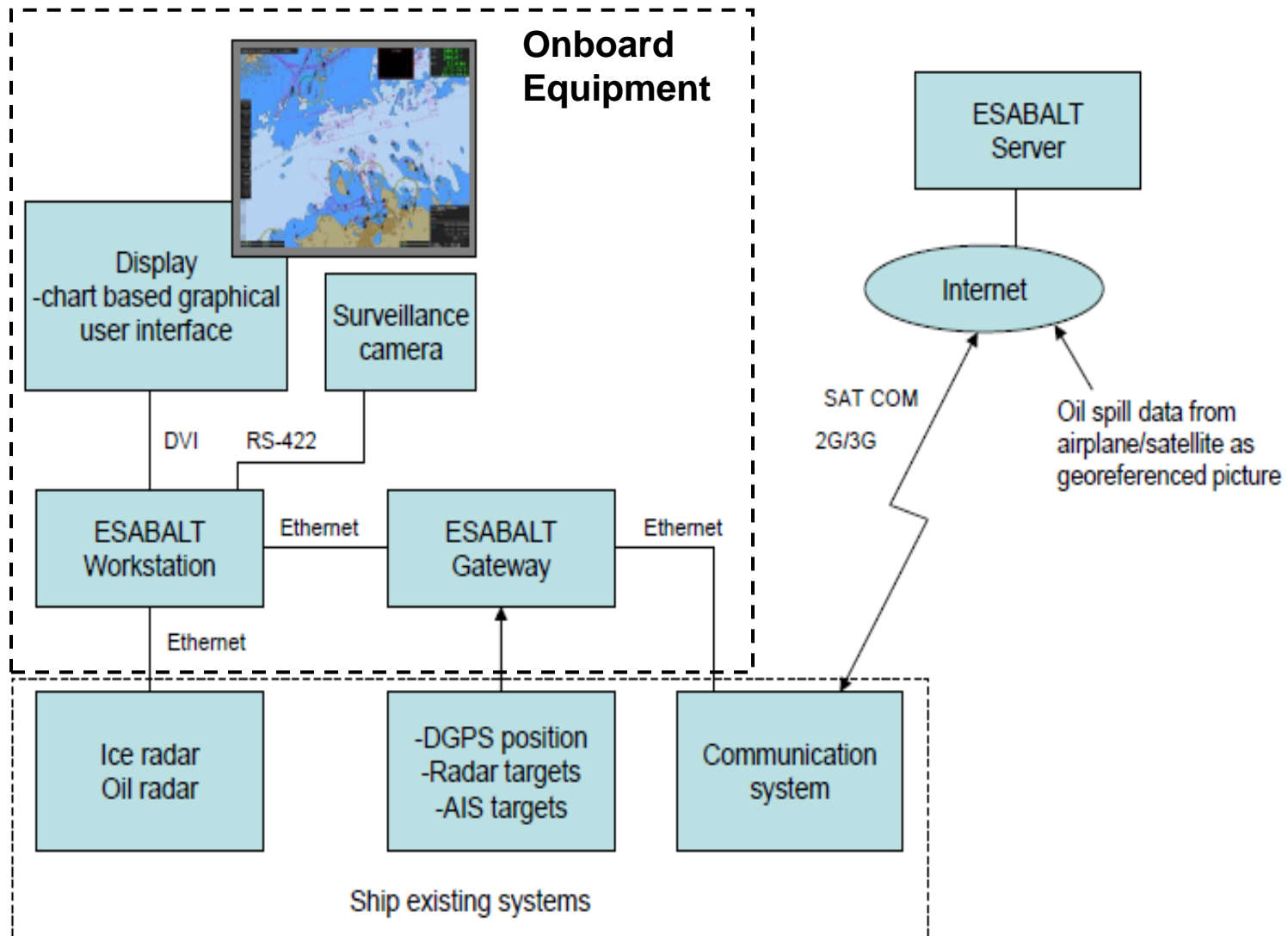
Proof-of-Concept Demo – Experimental Set-up and Scenarios

- ❖ ESABALT benefit investigated under three scenarios:
 - ❖ Scenario 1: Oil spill recovery operations
 - ❖ Scenario 2: Assisting Multiple Vessels in Distress
 - ❖ Scenario 3: Assisting in the Aftermath of SATNAV Signal Jamming
- ❖ Simulation equipment:
 - ❖ Furuno FFSC- 200 software platform
 - ❖ Furuno navigation simulator Navisimu
 - ❖ Furuno Finland FICE-100 ice radar
 - ❖ Furuno Finland FOIL-200 oil radar
 - ❖ Dash-board camera
 - ❖ Live ships data from AIS receiver
 - ❖ Simulated 'other' vessels using the Navisimu simulator
- ❖ The ESABALT application can be implemented also as a thin-client for use in personal navigation and communication devices, such as tablet computers and smart-phones

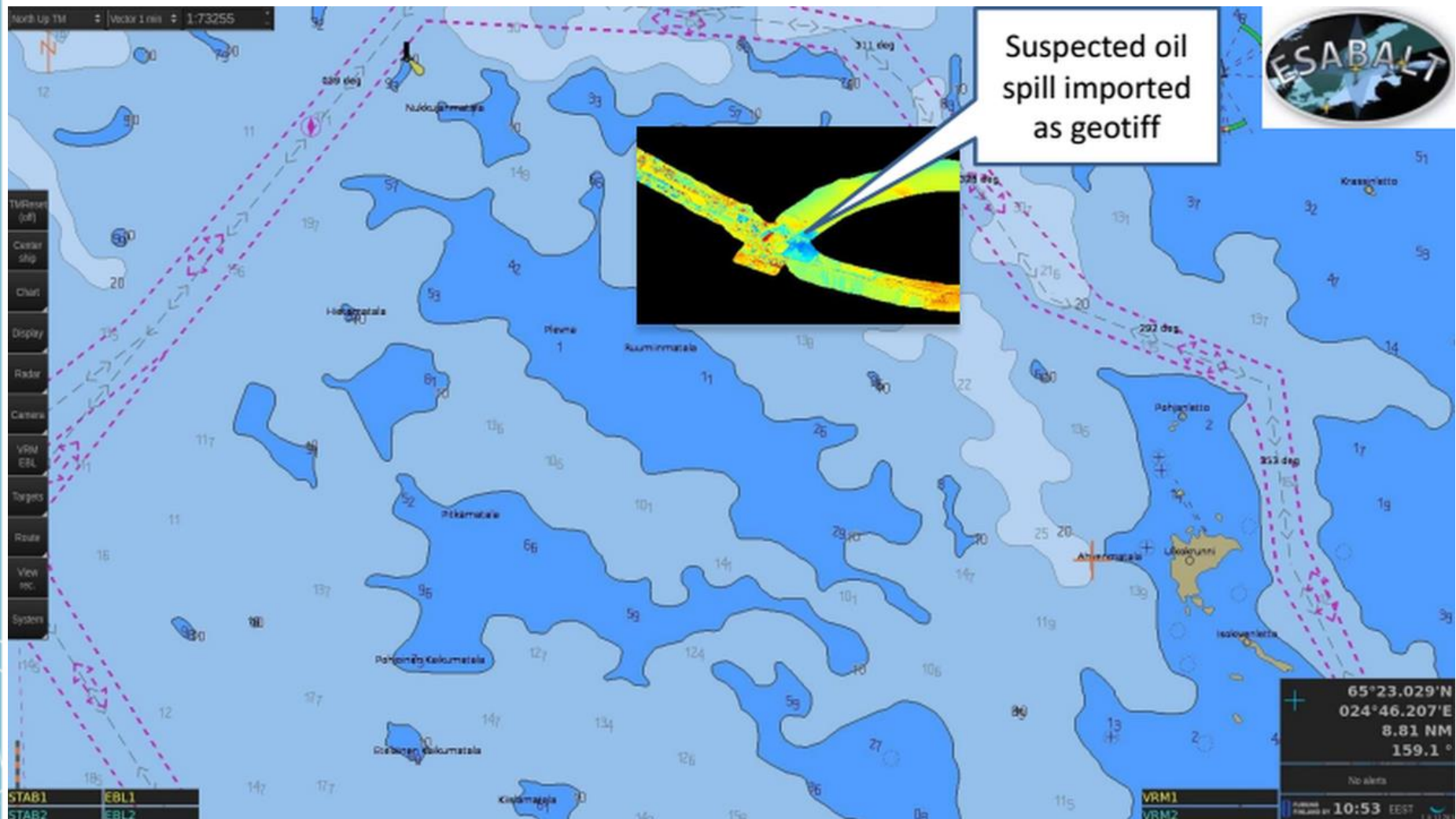
ESABALT for Small Boats



ESABALT for Commercial Vessels

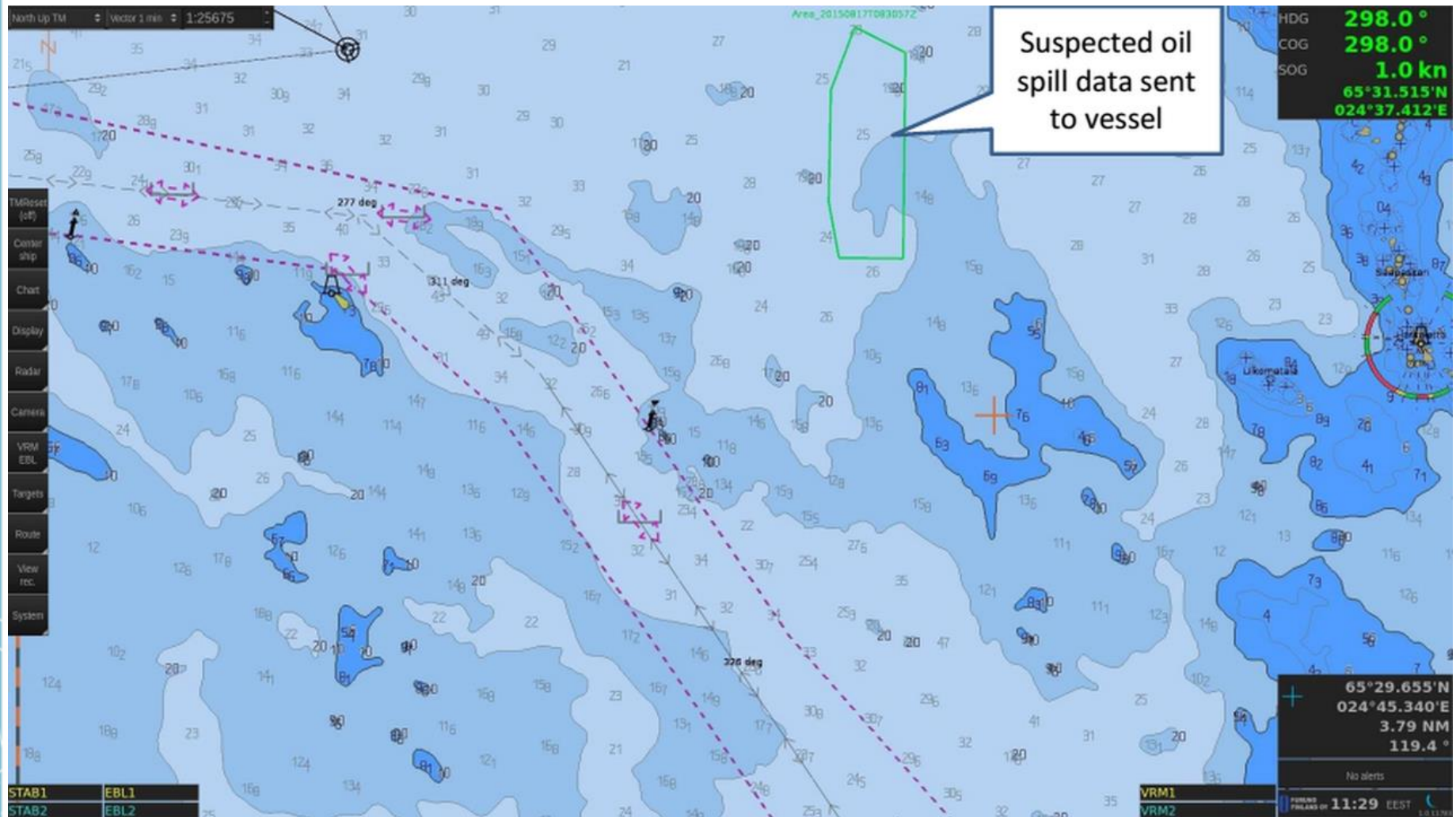


Scenario 1: ESABALT benefits in oil spill recovery operations



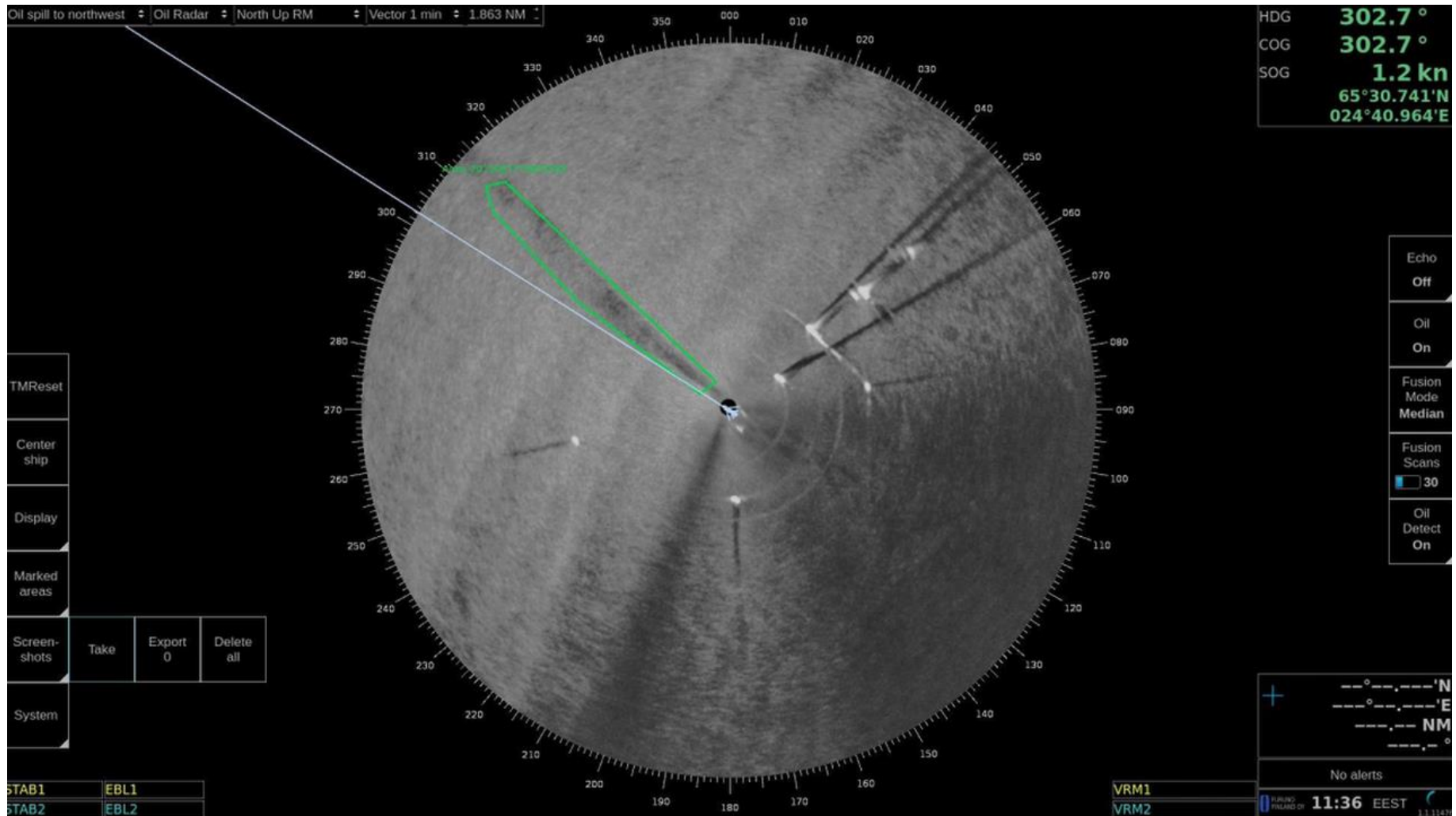
(a) A georeferenced picture presented on GUI

Scenario 1: ESABALT benefits in oil spill recovery operations



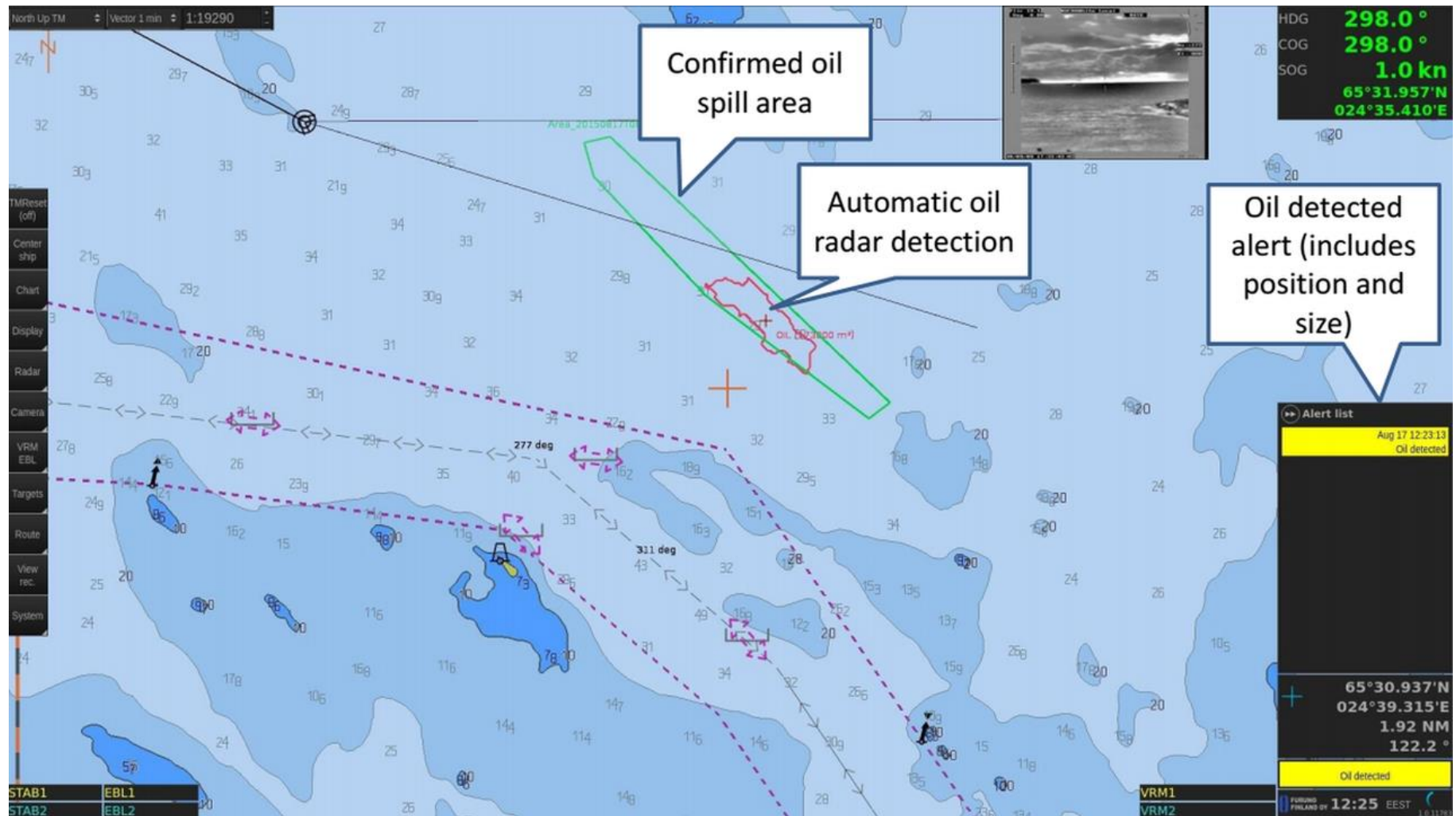
(b) Oil spill area polygon created in the system

Scenario 1: ESABALT benefits in oil spill recovery operations



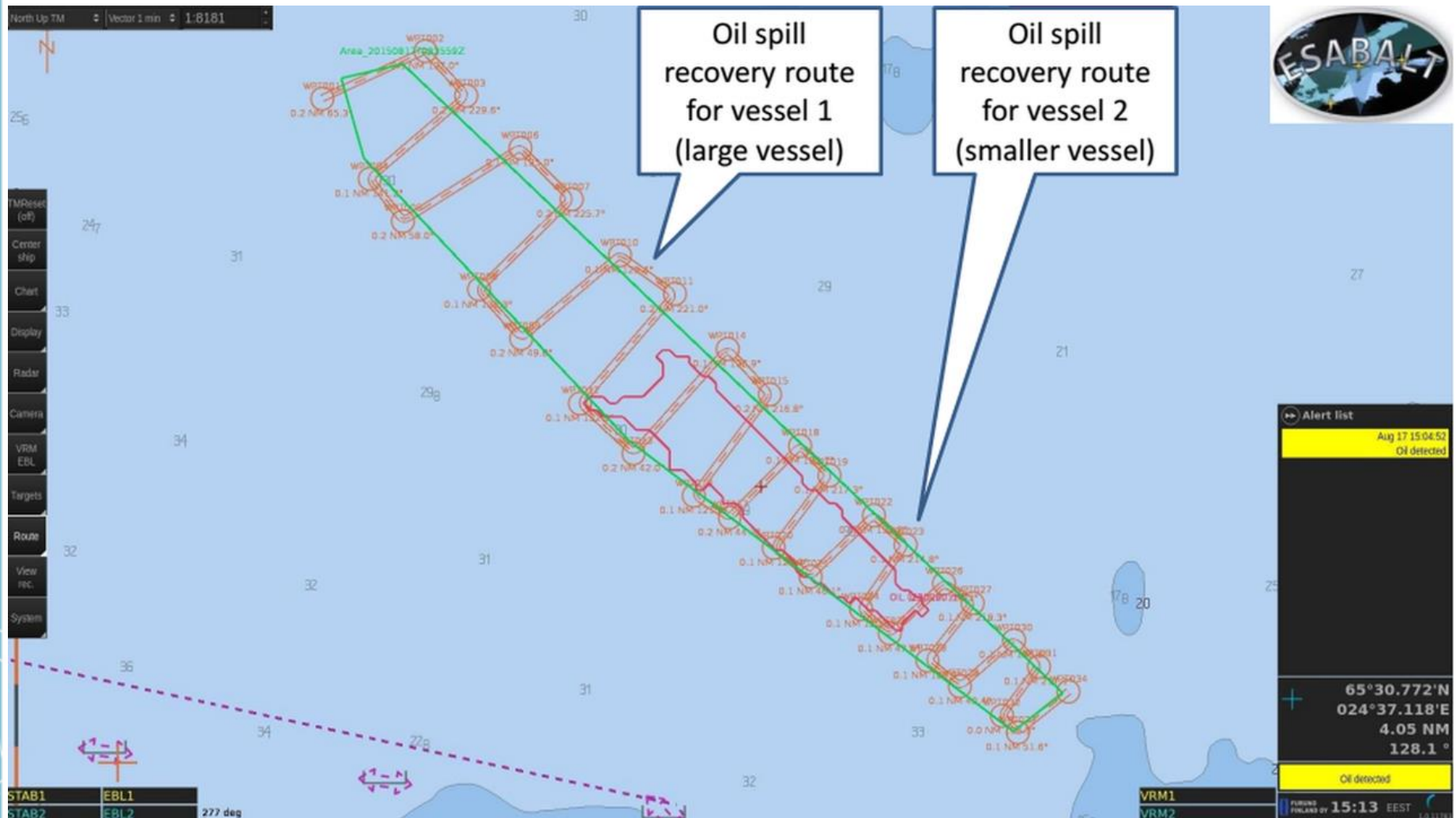
(c) Oil radar picture

Scenario 1: ESABALT benefits in oil spill recovery operations



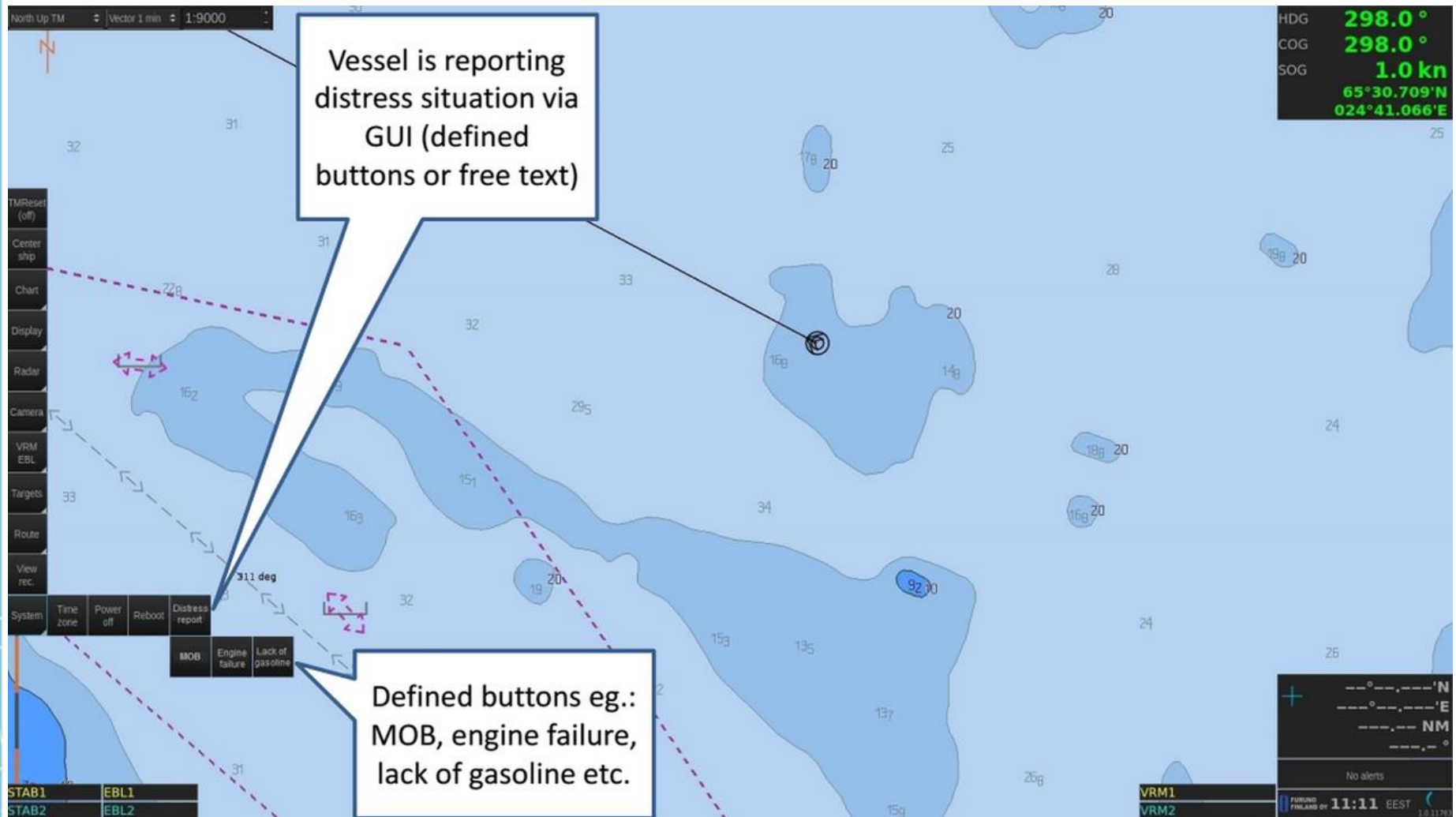
(d) Oil spill confirmed area superimposed on original detected polygon

Scenario 1: ESABALT benefits in oil spill recovery operations



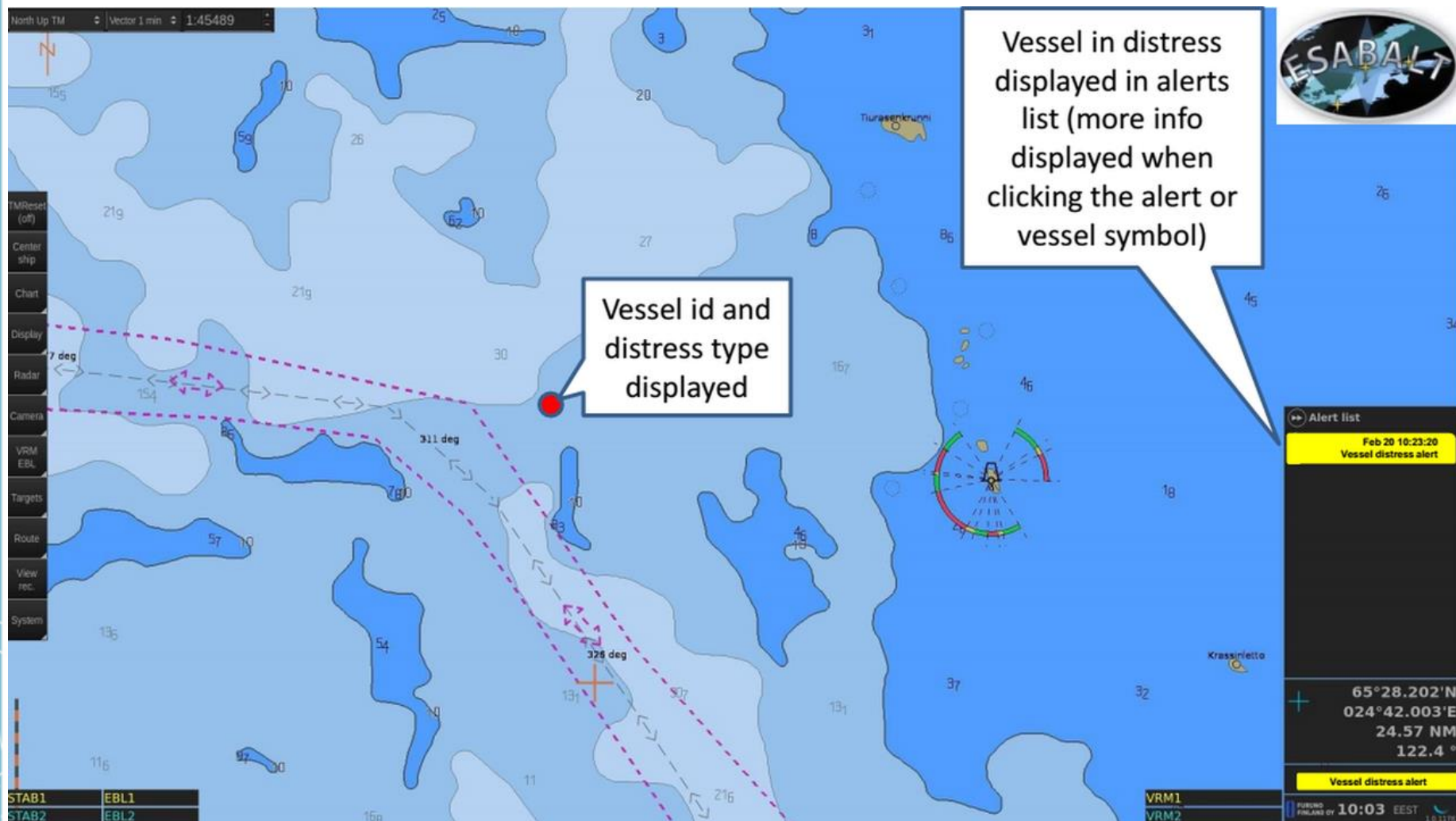
(e) Planned routes for recovery vessels

Scenario 2: ESABALT System for Assisting Multiple Vessels in Distress



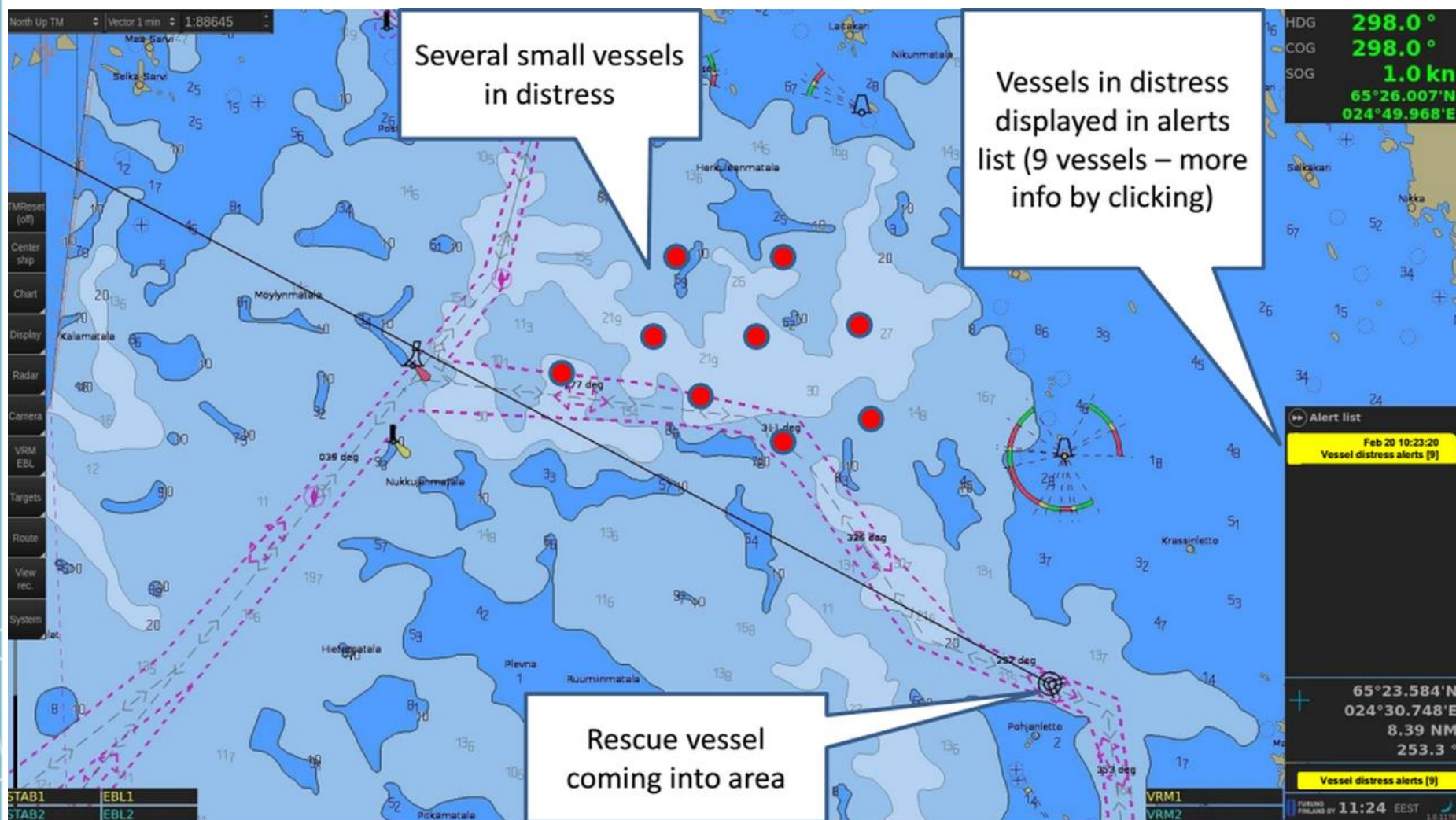
(a) Vessel's report of the distress situation using ESABALT GUI

Scenario 2: ESABALT System for Assisting Multiple Vessels in Distress



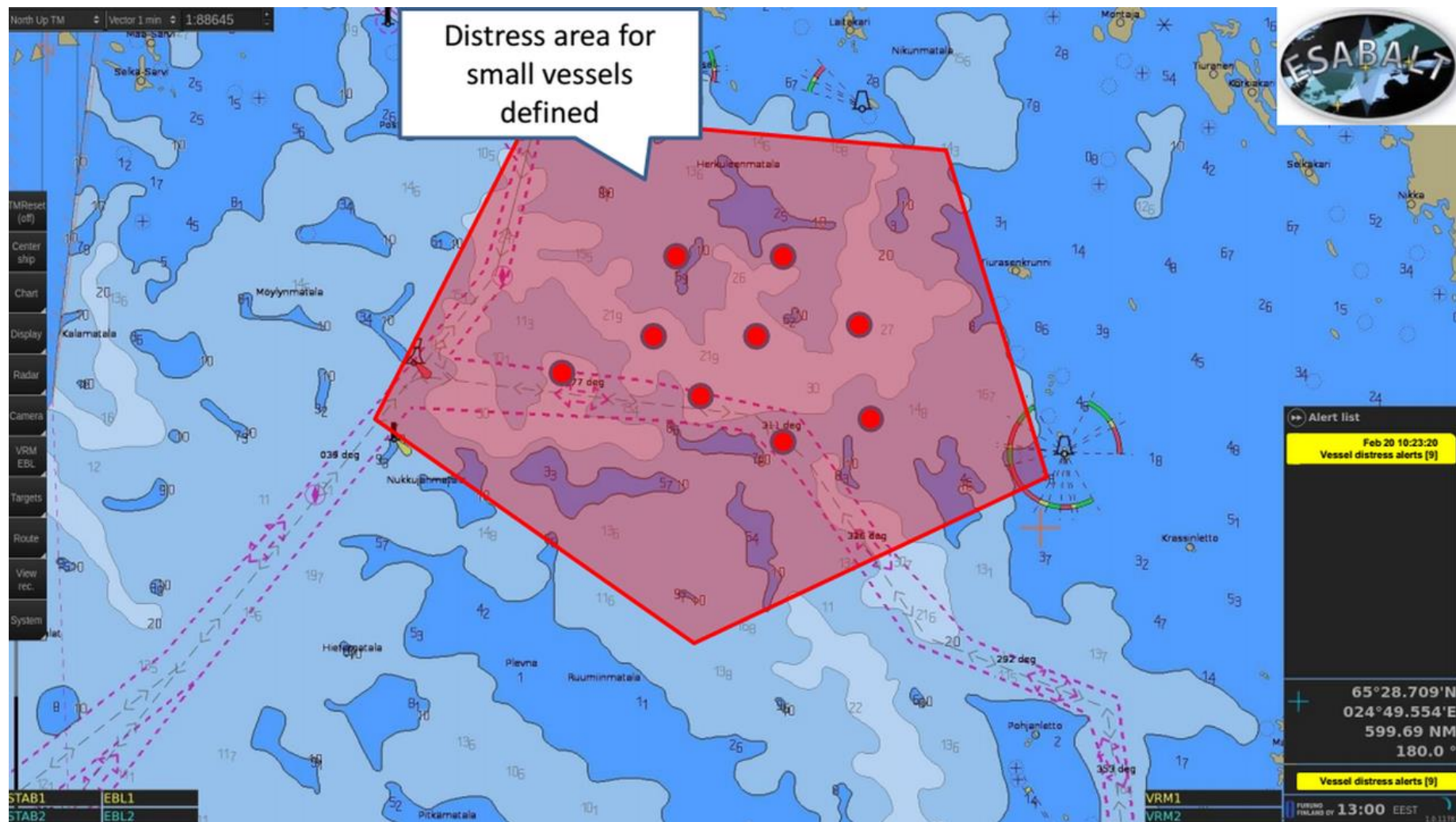
(b) Distress data forwarded to vessels in the vicinity

Scenario 2: ESABALT System for Assisting Multiple Vessels in Distress



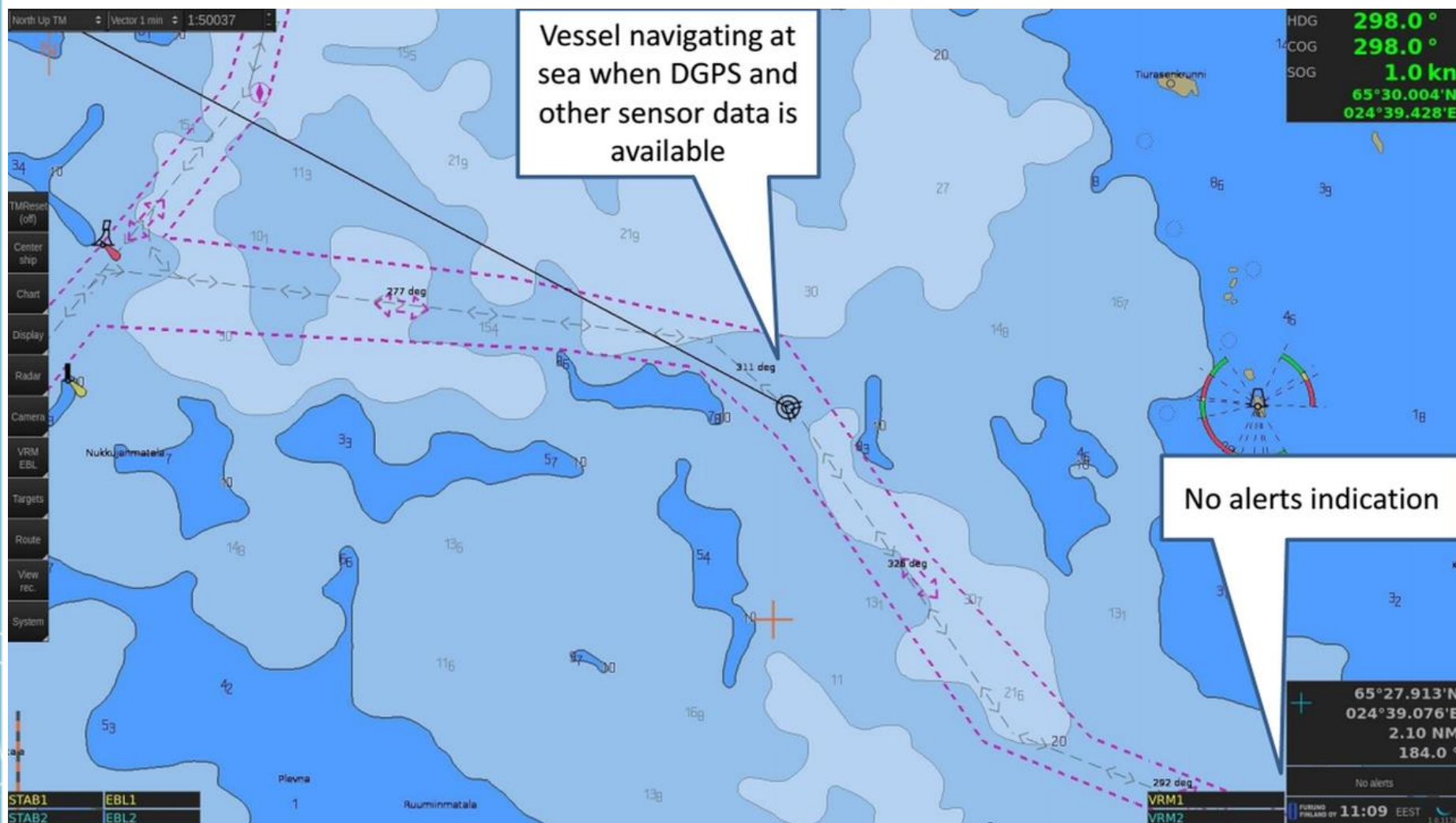
(c) Multiple distress messages aggregated in the ESABALT system

Scenario 2: ESABALT System for Assisting Multiple Vessels in Distress



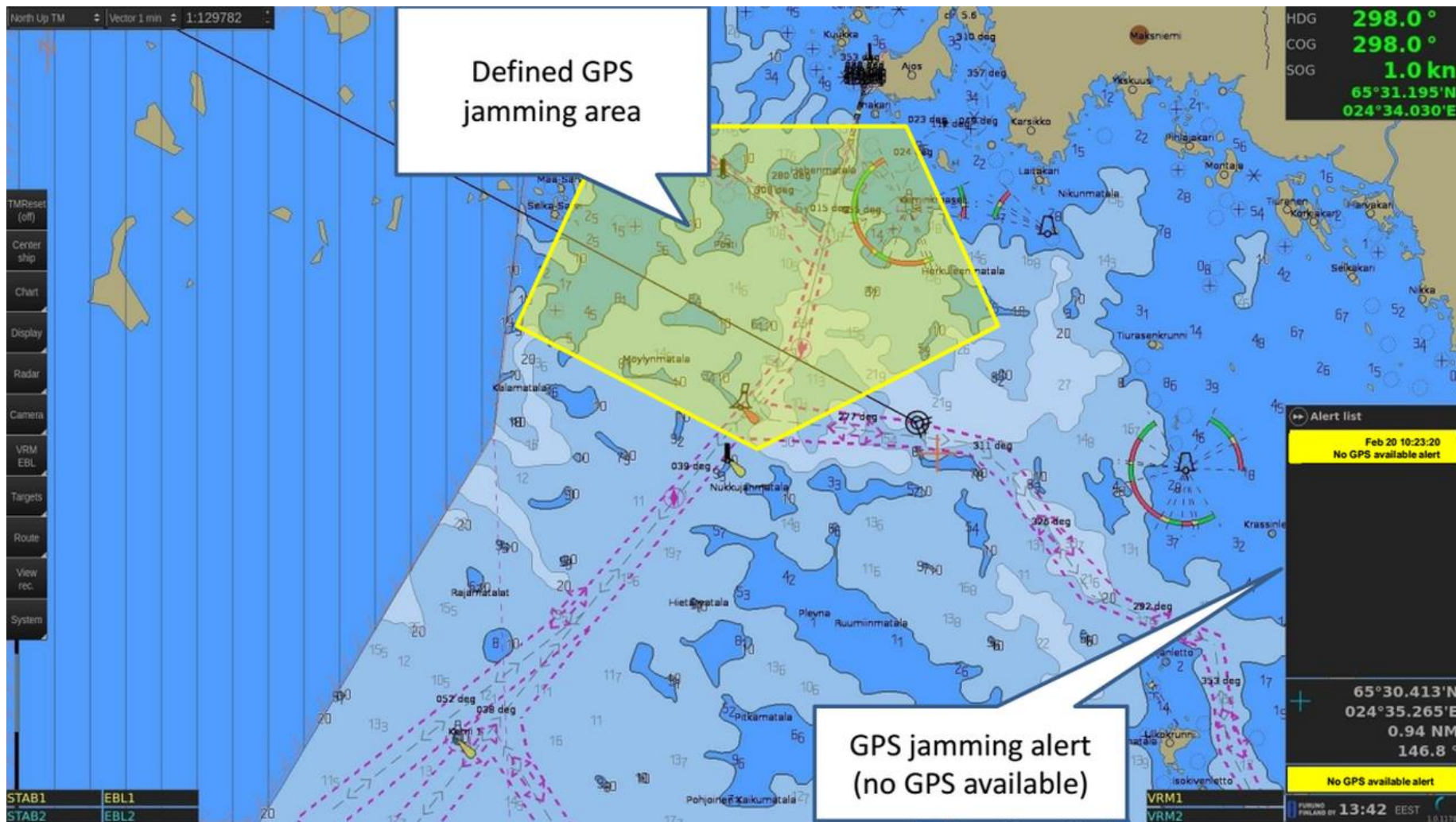
(d) ESABALT generated general distress area

Scenario 3: ESABALT System for Assisting in the Aftermath of SATNAV Signal Jamming



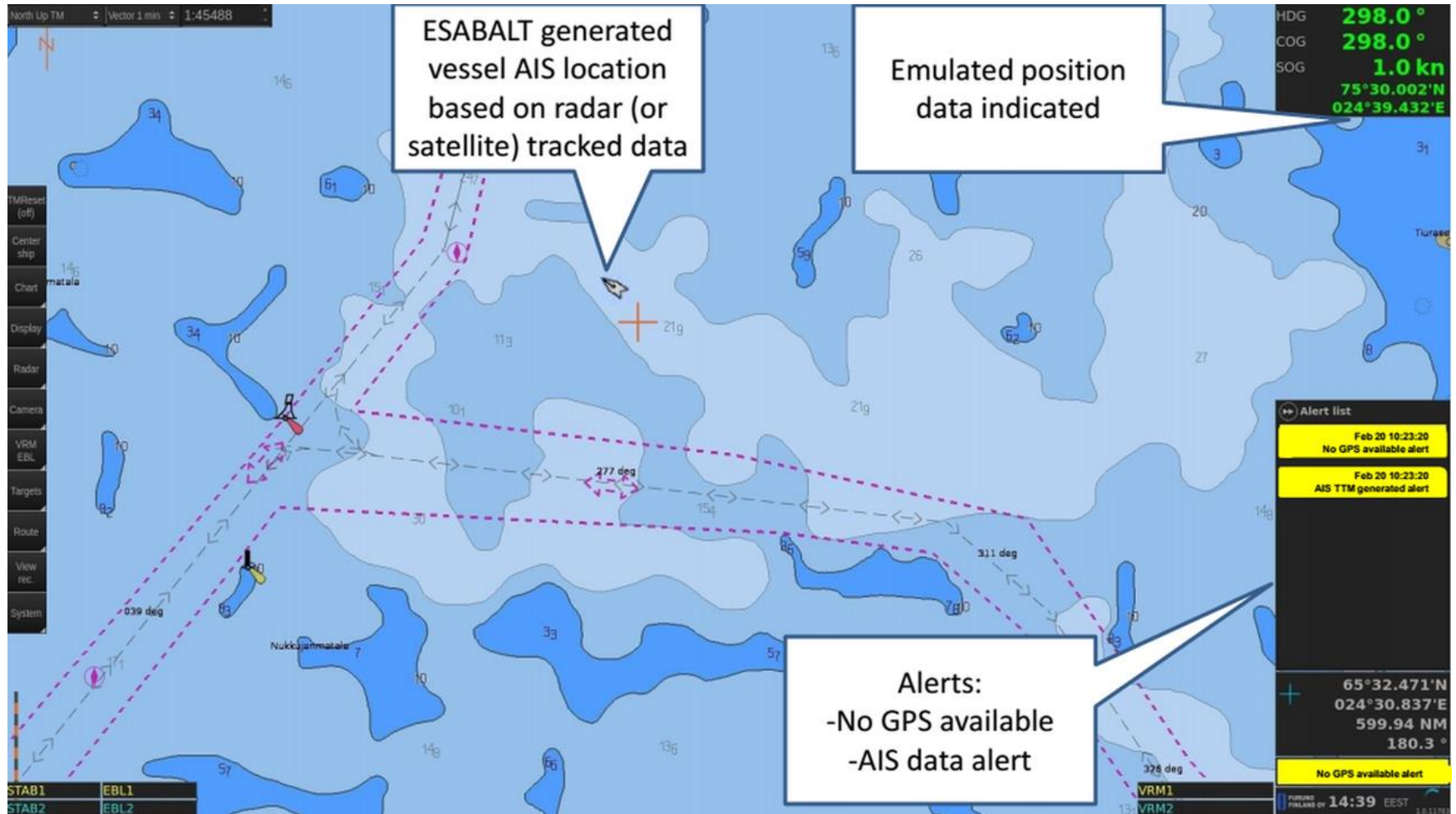
(a) ESABALT user interface in normal operating conditions

Scenario 3: ESABALT System for Assisting in the Aftermath of SATNAV Signal Jamming



(b) SATNAV unavailability alert reported to all vessels by the ESABALT system

Scenario 3: ESABALT System for Assisting in the Aftermath of SATNAV Signal Jamming

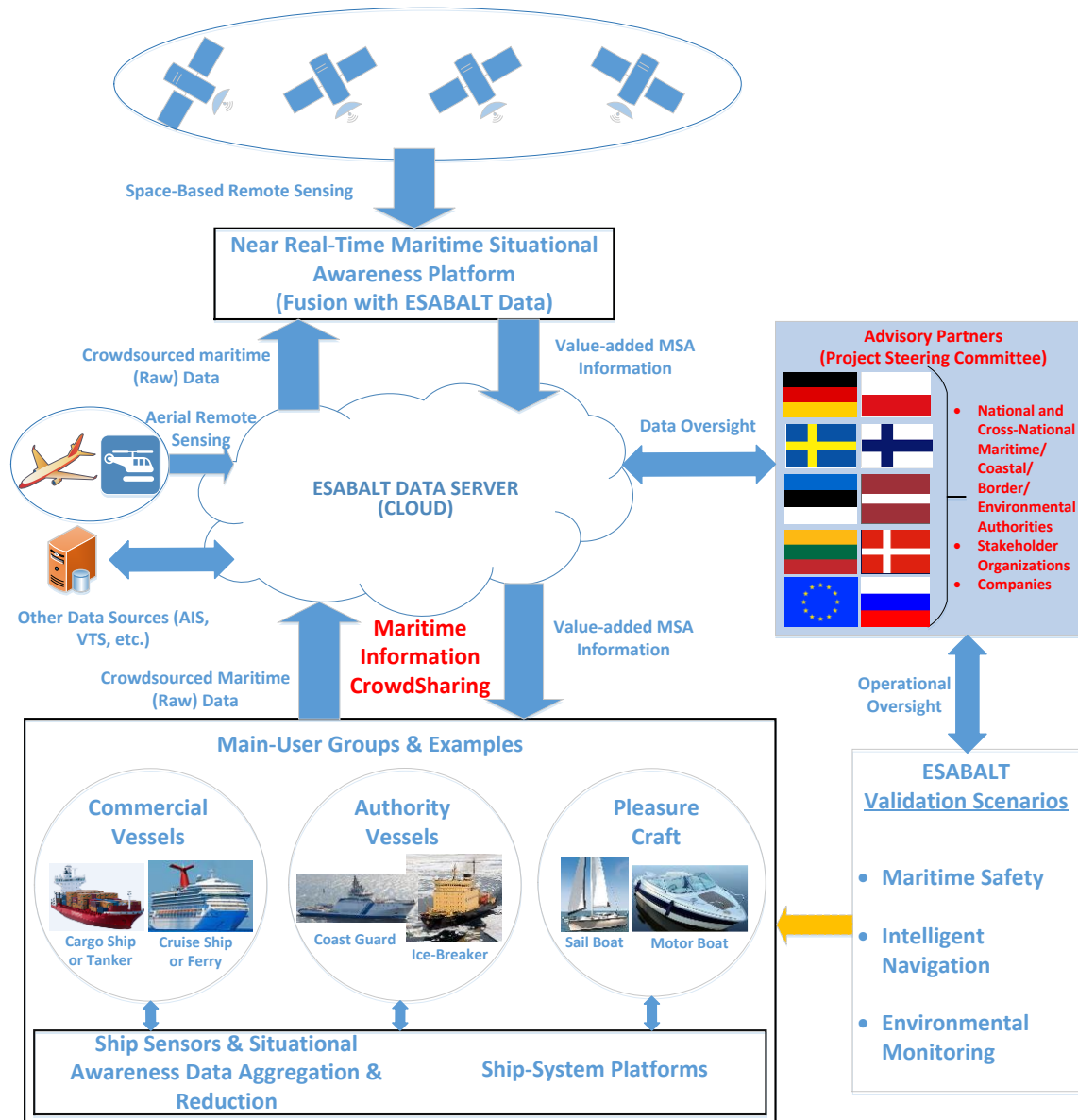


(c) Vessel's position information via AIS transmissions sent by ESABALT system

System Self-analysis

- ❖ BONUS ESABALT has reached TRL 4 – Technology demonstrated in laboratory environment.
- ❖ System analysis based on quality of service factors: reliability, availability, usability, credibility, and security.
- ❖ Economic and non-economic feasibility analysis based on economic, political, social and technological domains.
- ❖ The study proves that ESABALT system is designed to be technologically feasible to implement and economically sustainable to operate within the boundaries of the defined quality of service parameters.

Future Outlook



Conclusions

- ❖ The primary aim of ESABALT is to create a common (international) platform for crowdsourced information exchange to enable cooperation for enhanced maritime safety and security in the Baltic Sea region.
- ❖ Diverse classes of ships and sensors can contribute to and benefit from the data pool.
- ❖ The benefits of ESABALT was demonstrated under three case scenarios simulated using Furuno Finland maritime equipment and software.
- ❖ Feasibility study under economic, political, social, and technological domain prove that the ESABALT system will be sustainable under operational conditions.
- ❖ Future integration with space/aerial remote sensing to increase the temporal and spatial scope of situational awareness in the Baltic Sea.

ESABALT

www.ESABALT.org

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THANK YOU!