

# **BONUS for Earth Observation in the Baltic Sea Region**

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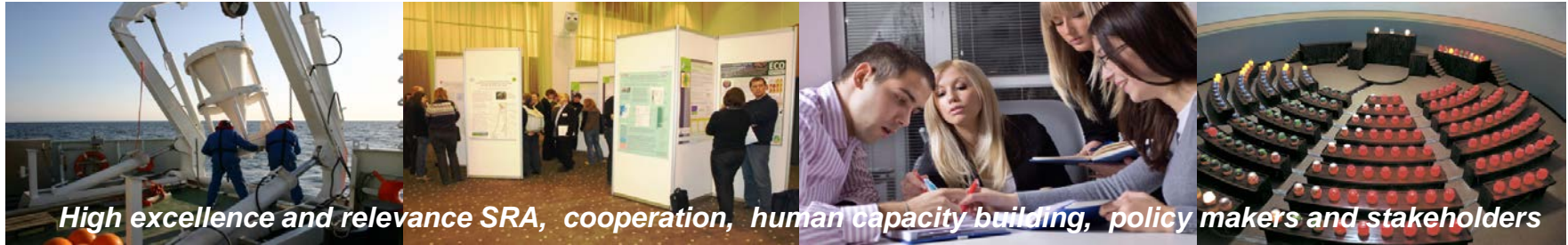
***– BONUS FERRISCOPE***

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***Baltic from Space Workshop, 29-30 March 2017, Helsinki***

# What is BONUS?



*Funded by the eight EU member states and the EU; EUR 100 million for 2011-17*

## VISION

Economically and ecologically prosperous Baltic Sea region where resources and goods are used sustainably and where the long-term management of the region is based on sound knowledge derived from multidisciplinary research

## MISSION

Integrating the Baltic Sea System research into a durable, cooperative, interdisciplinary and focused transnational programme in support of the region's sustainable development

# Structure of the research agenda

## Five strategic objectives:

Understanding the Baltic Sea ecosystem structure and functioning

Meeting the multifaceted challenges in linking the Baltic Sea with its coast and catchment area

Enhancing sustainable use of coastal and marine goods and services of the Baltic Sea

Improving the capabilities of the society to respond to the current and future challenges directed to the Baltic Sea region

Developing improved and innovative observation and data management systems, tools and methodologies for marine information needs in the Baltic Sea region

## 19 themes:

- Biogeochemical processes
- Biodiversity
- Food webs
- Hazardous substances

- Catchment land cover
- Coastal systems
- ICZM
- Eco-innovation

- Maritime risks
- Pollution by shipping
- Fish stock assessments
- Fisheries management
- Sustainable aquaculture

- Governance and policy
- Lifestyles and well-being
- Maritime spatial planning

- Integrated monitoring programmes
- Innovative measurement techniques
- ICT services

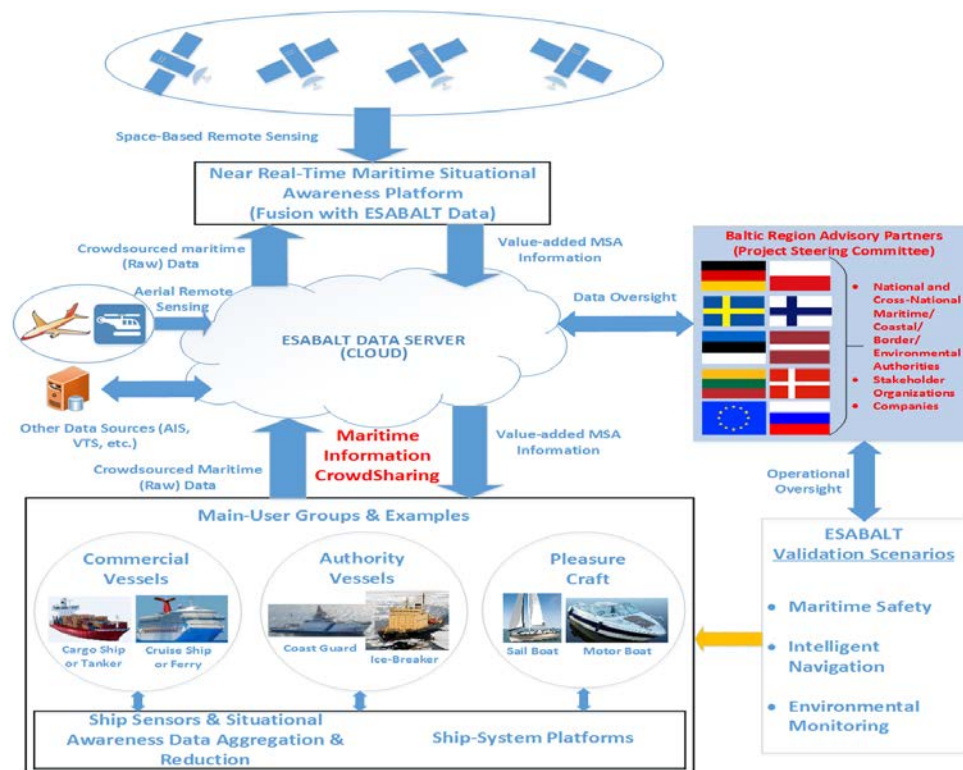




BONUS STRATEGIC OBJECTIVE	THEMES CALLED Themes and expected outcomes are presented in the BONUS strategic research agenda 2011-2017 <a href="http://www.bonusportal.org/sra">www.bonusportal.org/sra</a>
2: Meeting the multifaceted challenges in linking the Baltic Sea with its coast and catchment	2.4 Eco-technological approaches to achieve good ecological status in the Baltic Sea
5: Developing improved and innovative observation data management systems, tools and methodologies for marine information needs in the Baltic Sea region	5.2 Developing and testing innovative in situ remote sensing and laboratory techniques
	5.3 User-driven new information and communication services for marine environment, safety and security in the Baltic Sea area



- ❖ Feasibility study for **Autonomous Crowd-Sharing** of Maritime Information
- ❖ Conceptualizes **seamless integration of satellite-based remote sensing data with ship-based situational awareness data.**
- ❖ **Scientific Innovation** – Design for Value-Added Services, Seamless Integration with Existing Ship Systems
- ❖ Applicable to **all Classes of Ships**
- ❖ Maritime Information **Infrastructure**
- ❖ **Business** Growth in Baltic Sea Region
- ❖ Enhances **EU-Baltic** integration
- ❖ Applicable for **Arctic** and **Winter-time Navigation**



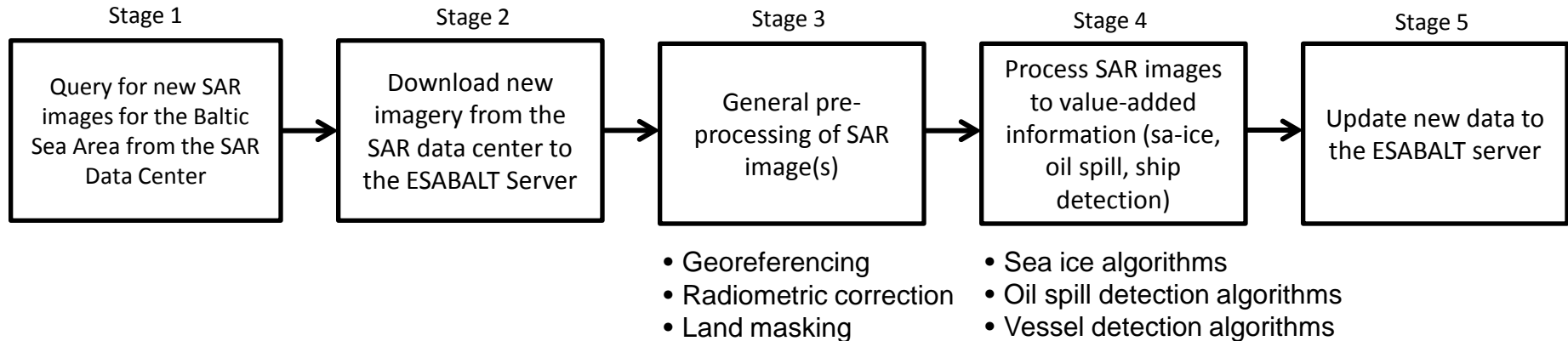
## BONUS ESABALT & Space-based Earth Observation

- ❖ **Route optimization:** Re-routing due to severe icing or oil spill event.
  - *Sea-ice monitoring:* type of sea ice, thickness, coverage, drift, etc.
  - *Oil spill monitoring:* coverage, drift estimate, etc.
- ❖ **Display nearby vessels:** Ships without AIS (Automatic Identification System) need to be located.
  - Vessel location, heading, size, speed, etc.
- ❖ **Option I:** Implement own automatic data acquisition and processing chain for Sentinel-1 data.
- ❖ **Option II:** Use data products from already operational maritime services utilizing Earth observation data.

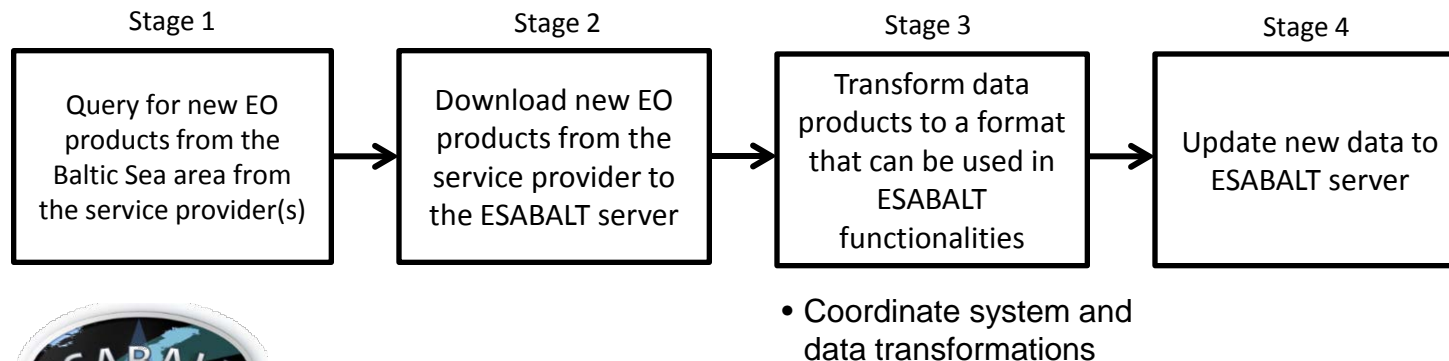


## EO data integration to BONUS ESABALT system

**Option I:** Implement own automatic data acquisition and processing chain for Sentinel-1 data



**Option II:** Use data products from already operational maritime services utilizing Earth observation data





# The FerryScope project

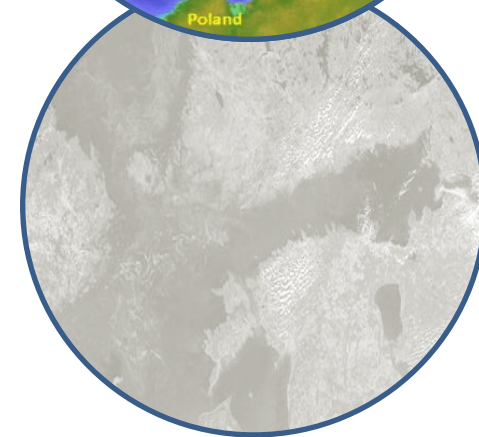
- Development of water quality assessment of the Baltic Sea by combining the information from
  - **satellite data**
  - **ship-borne measurements** and
  - **modelling**
- FerryScope period: 2014 - 2016
- Involved Partners:
  - Brockmann Consult GMBH (GER),
  - Estonian Marine Institute
  - Finnish Environment Institute
  - Plymouth Marine Laboratory (UK).
  - Project coordinator: Martin Böttcher, BC



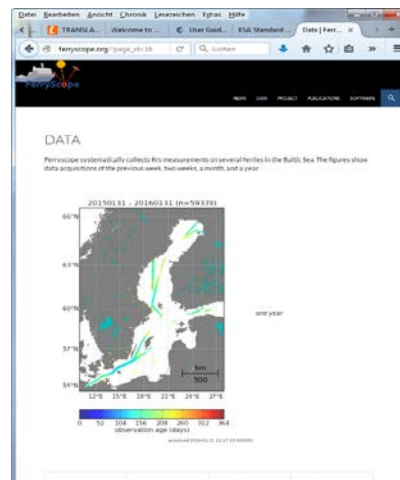


# Rflex System: Installation, running, postprocessing

- Reflectance measurements on-board ship decks
- Installed on ship-of-opportunity ferries, parallel to existing Alg@line sensors
  - Alg@line measures e.g. temperature, salinity, chl-a
- Rflex-data is useful for developing algorithms for EO data
- Automated dataflow from ships, further processed and disseminated via a web feature service.



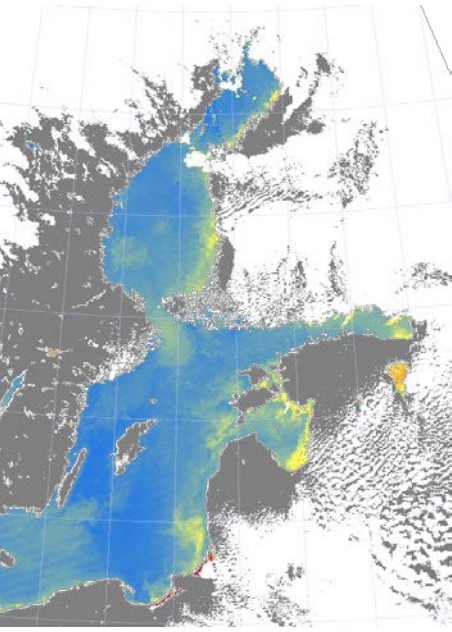
<http://ferryscope.ymparisto.fi/Rflex/index.xhtml>



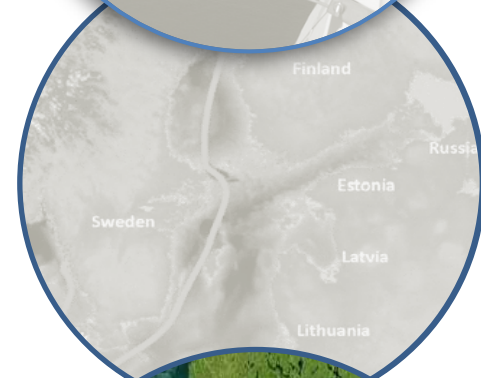
# Water quality algorithm development



- Towards improved EO algorithms for Baltic Sea
- During the lifetime of FerryScope,
  - MODIS atmospheric correction for Baltic Sea waters
  - The system is prepared for OLCI
- Generation of specific Baltic Sea Waters bio-optical Look-up Tables



- Processing of water constituents with EO data using SIOCS-bio-optical model



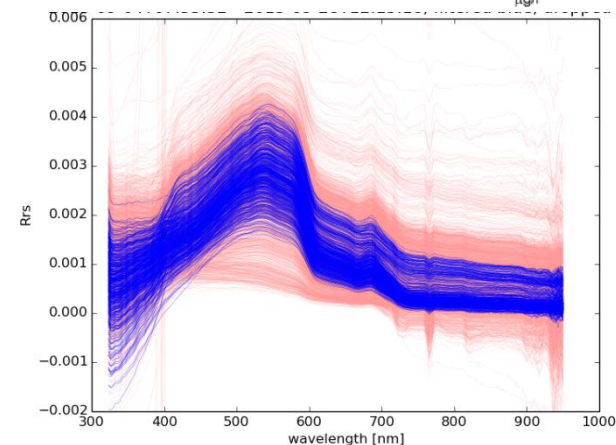
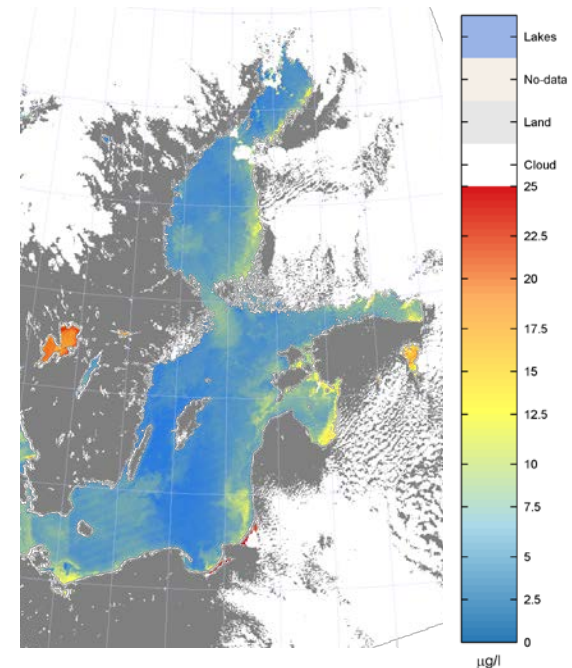
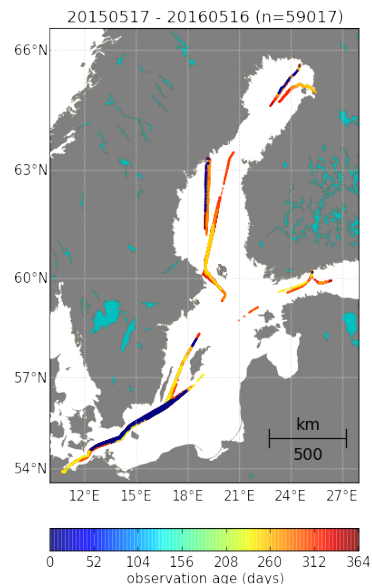
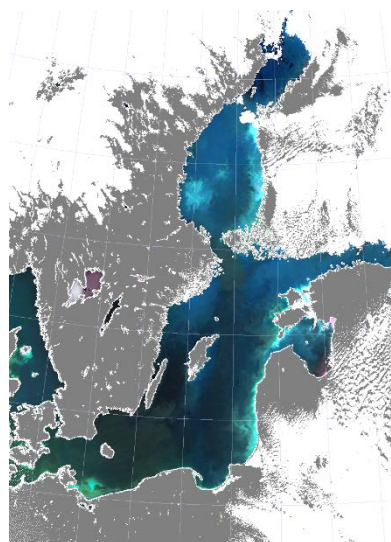
# Ferryscope products

## 1. For the audience interested in algae situation in the Baltic Sea:

- Estimates of chlorophyll-a from EO and ship measurements  
-> determine the amount of algae

## 2. For the scientific community:

- Timeseries of filtered reflectances
- Matchups between satellite and ship-borne observations







## BONUS call 2015: Blue Baltic

**5: Developing improved and innovative observation and data management systems, tools and methodologies for marine information needs in the Baltic Sea region**

**Theme 5.2: Developing and testing innovative in situ, remote sensing and laboratory techniques**

Focus on remote sensing, particularly, on full usage of capabilities of the new instruments and developing dedicated and locally calibrated algorithms that could enable usage of remote sensing in the Baltic Sea monitoring.

Projects will be selected for funding only on a condition that at least 25% of the requested BONUS funding goes to enterprises



# BONUS

SCIENCE FOR A BETTER FUTURE OF THE BALTIC SEA REGION

## **Towards sustainable blue growth**

Outline of the joint Baltic Sea and the North Sea research and innovation programme 2018–2023



# THANK YOU!

[www.bonusportal.org](http://www.bonusportal.org)

[www.bonusportal.org/projects](http://www.bonusportal.org/projects)