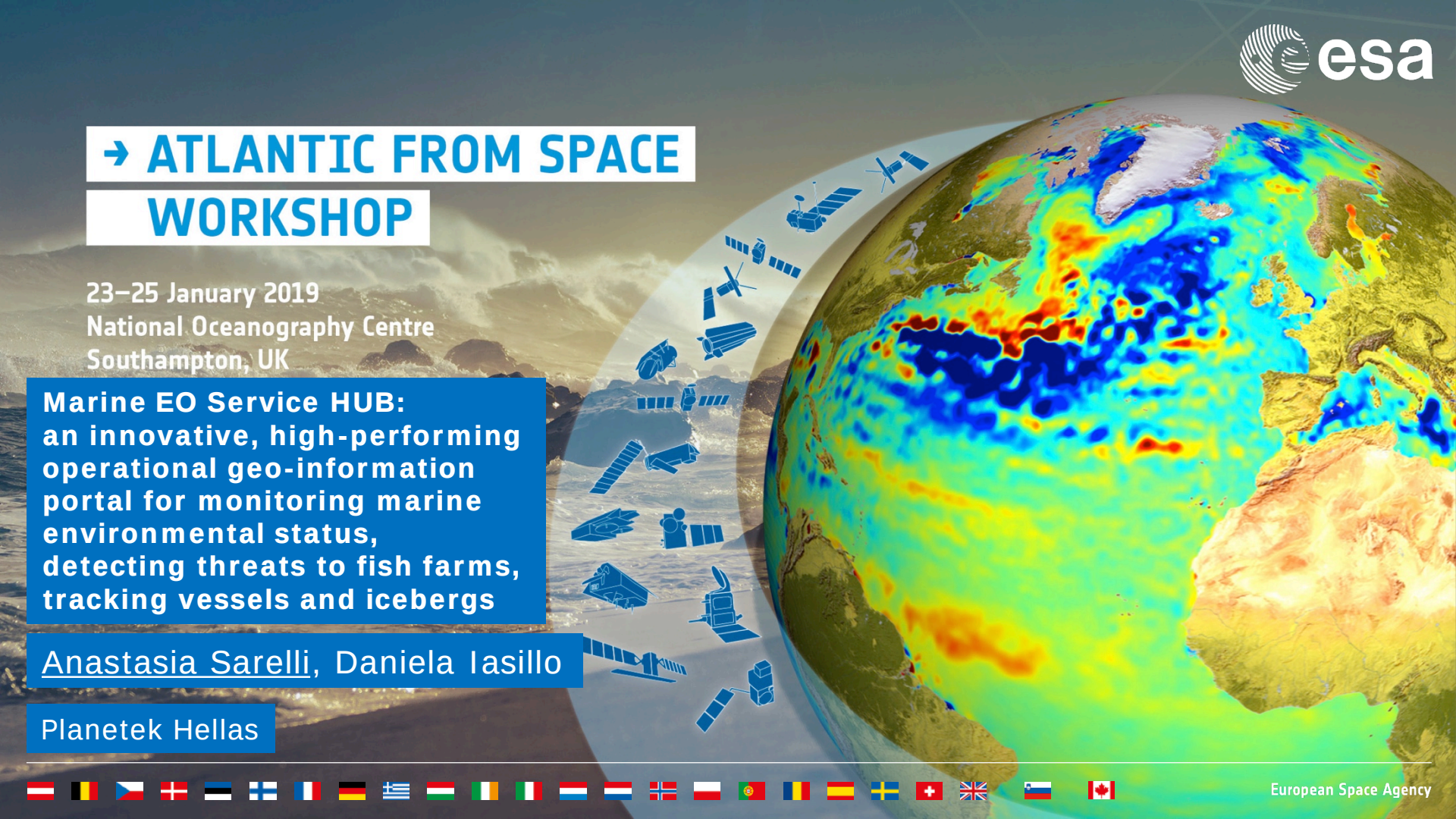


→ ATLANTIC FROM SPACE WORKSHOP

23–25 January 2019
National Oceanography Centre
Southampton, UK

Marine EO Service HUB: an innovative, high-performing operational geo-information portal for monitoring marine environmental status, detecting threats to fish farms, tracking vessels and icebergs

Anastasia Sarelli, Daniela Iasillo

Planetek Hellas

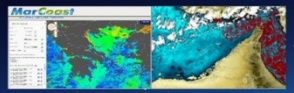
Who we are..

planetek hellas

Earth Observation & Space Systems

www.planetek.gr

- E.O. applications for environment & security



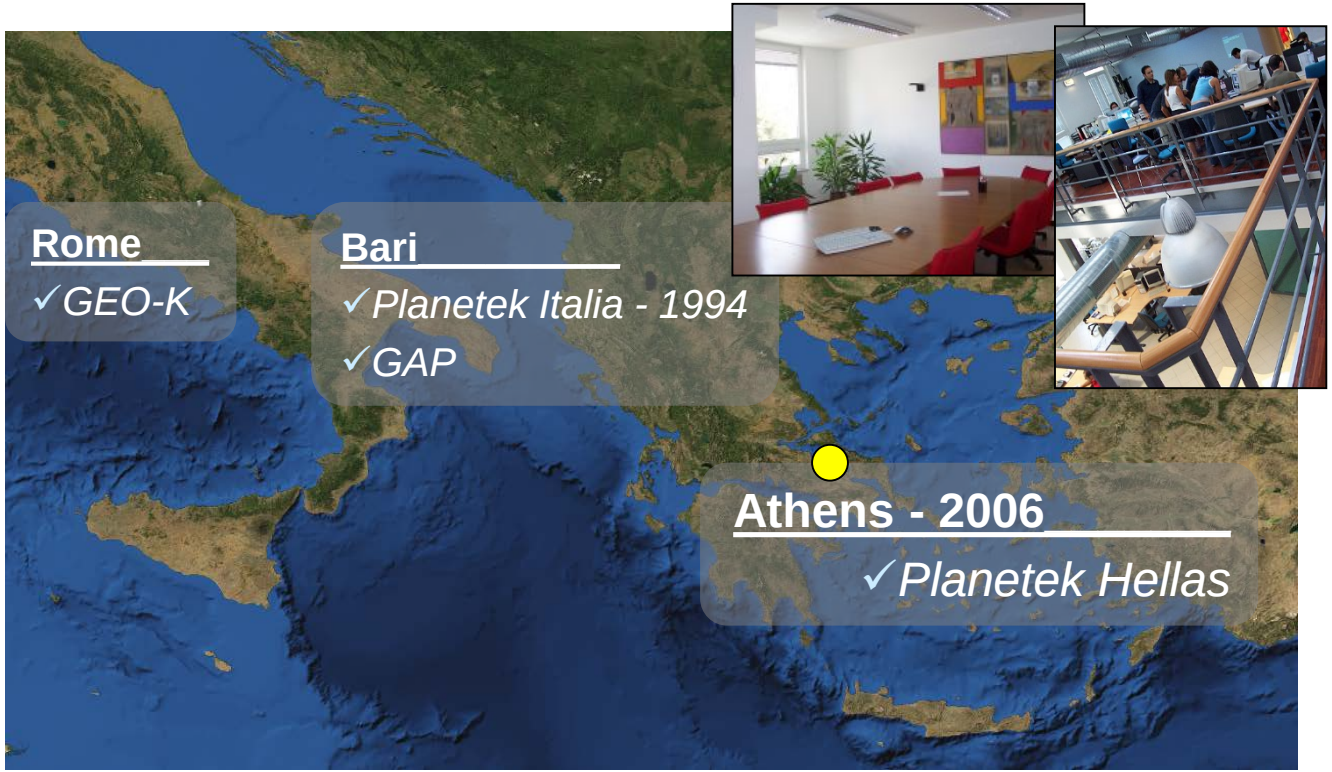
- On Board Payload Data Processing

- Space Astronomy Data Exploitation

- Spatial Data Infrastructures & Interoperability

- Satellite Ground Segment & Data Fusion Centre

Planetek Group



Planetek Hellas and Planetek Italia

Key numbers

Planetek Group

SME

Year IT **1994**

Year GR **2006**

People Italy **45**

People Greece **15**

Italy **5M€**

Greece **0,88M€**

European Space Agency Projects (total 10 > 2M€)

NTSS

Naval Traffic St

MarCoast 2

Remote Sensing a Marine & Coastal Environmental Information Services

Seas for Security

Remote Sensing analysis of ESA's satellite data over the Greek seas regarding water quality (Sea surface temperature, Water transparency, chlorophyll concentration) and publishing the results using Web technologies

2010-2013

MarCoast

a GMES Services Network

SIMS

Seagrass Integrated Monitoring System

Possidonia Oceanica mapping through evolution techniques integrating Satellite, Airborne and In Situ data. WebGIS application for the distribution and promotion of the result.

(Planetek Hellas – ENEA)

Daily probability of HAB occurrence map.

Input data: MERIS scene dated 01/11/2008

% HAB probability

2009-2011

TSM from 2 Pléiades images (07/02/2013) applying the calibrated algorithm.

ESA – Satellite detection of Illegal Crops for the Dutch and Greek Police

C-V

Coast

using

8 κανάλια δορυφορικών αισθητήρων

03/06/

28/09/2

WEOS Waste Earth Observation System

Service I Rapid response mapping of illegal waste treatment sites

Service 2 Long term monitoring of illegal waste treatment sites

GAMMA REMOTE SENSING

ITACA

Innovation Technology Applications for Coastal Archaeology

Satellite Identification and Monitoring of Ancient Submersed Settlements and

BIO_SOS

BIOdiversity Multi-Source Monitoring System: From Space TO Species

(Call: FP7-SPACE-2010-1).

BIO_SOS will provide high definition land cover maps for change detection and biodiveristy monitoring within NATURA 2000 sites and along their borders.

Dec. 2011-2013

BIO_SOS

Μελέτη περίπτωσης Le Cesine

Πάνω: φωτογραφία τοπίου.

Κάτω: εικόνα Quick bird

eENVplus

eEnvironmental services for advanced applications within INSPIRE

FP7 Call: CIP-ICT-PSP-2012-6

3 Cross-border Pilots:

- Czech Republic/Slovakia for everyday life issues connected to Environmental aspects
- Hungary/Slovakia for Nature Conservation
- Italy/Slovenia for Environmental Risk (Geohazard)

1 Scenario in two Pil

Belgium and Italy for A

SEO_DWARF - Semantic EO Data Web Alert and Retrieval Framework

Bind proce under a single

Define and implement remote sensing methods

Extract metadata

- 4 years duration
- Budget: 1,6 M Euros
- Budget for Planetek: € 368 K
- 38+ people will be exchanged among partners

European Space Agency

MARINE-EO: An Innovation Procurement

Work Programme 2016 – 2017, 5 iii. Leadership in Enabling and Industrial Technologies – Space, Topic: EO-2-2016: Downstream services for public authorities

Marine-EO

Bridging Innovative Downstream Earth Observation and Copernicus enabled Services for Integrated maritime environment, surveillance and security

the first Earth Observation Pre-Commercial Procurement project

MARINE-EO: Winning Consortium

Among the winning Consortiums for Phase 1 and Phase 2:

Planetek Hellas E.P.E (Prime Contractor)

Planetek Italia s.r.l.

Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici

Kongsberg Satellite Services AS

Creotech Instruments S.A.

StormGeo AS (SubContractor)

MARINE-EO
SATOCEAN Service Objectives (1/2)

- Develop, test and validate a platform for the provision of **three (3) Earth Observation Services**, related to the marine environment, addressing the following:
    1. Marine Environmental Status in **Hot Spots** (SATOCEAN-USC-1)
    2. **Fish Farms**: Detection of Fish Farm Threats (SATOCEAN-USC-2)
    3. Detection of **Vessels and Icebergs** in the Arctic zone (SATOCEAN-USC-3)

MARINE-EO
SATOCEAN Service Objectives (2/2)

- Propose a set of services that will be operational at the end of all three PCP stages and will **bridge the gap between Public Authorities and EO Service Providers**

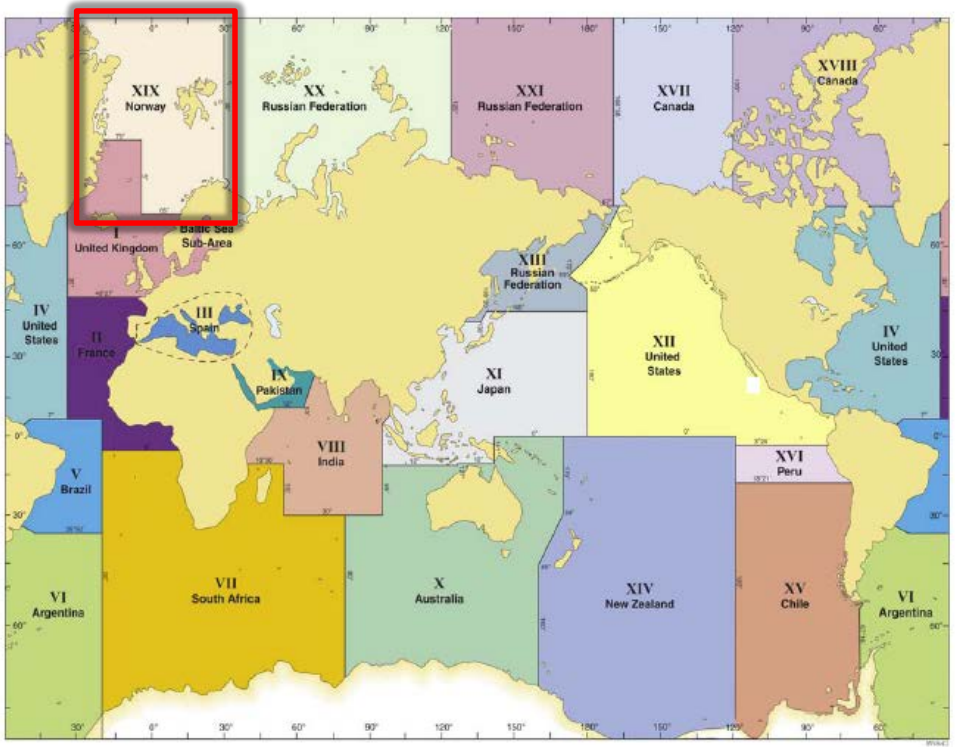
- Strengthen transnational collaboration in maritime awareness sector by facilitating **knowledge transfer** and **optimization of resources** for the public authorities participating in the buyers group

Areas of Interest (1/2)

SATOCEAN-USC-1
SATOCEAN-USC-2

- **Mediterranean Sea** (Greece, Spain)
- **North Atlantic Ocean** (Portugal – Mainland and Azores)
- **Norwegian Sea** (Norway)

Areas of Interest (2/2)



SATOCEAN-USC-3

- **NAVAREA XIX** geographic area (under responsibility of Norway)

Marine Environmental Status in Hot Spots (SATOCEAN-USC-1)

SATOCEAN-USC-1 focuses on monitoring the marine environmental status (**water quality**) of specific water regions which are:

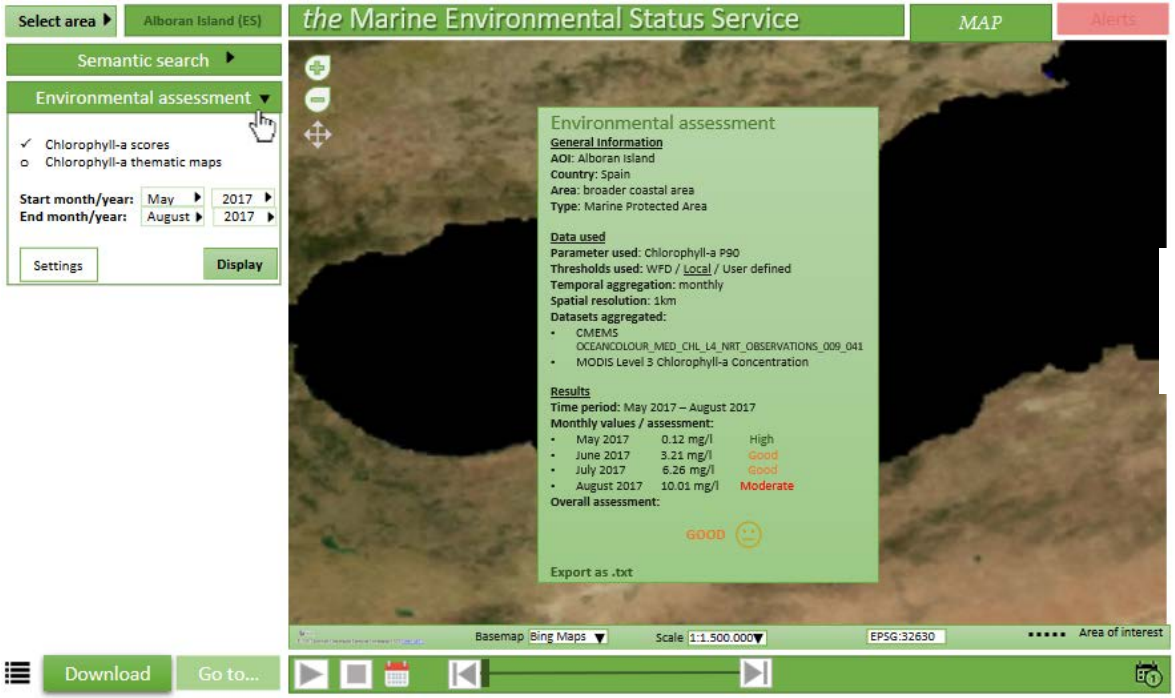
- Hot spot
- Protected areas (PAs)

Scope:

Easy to access and/or extract information about the current and/or historic environmental status of a specific region of interest (from multiple valid data sources)

Marine Environmental Status in Hot Spots
Main features (1/4)

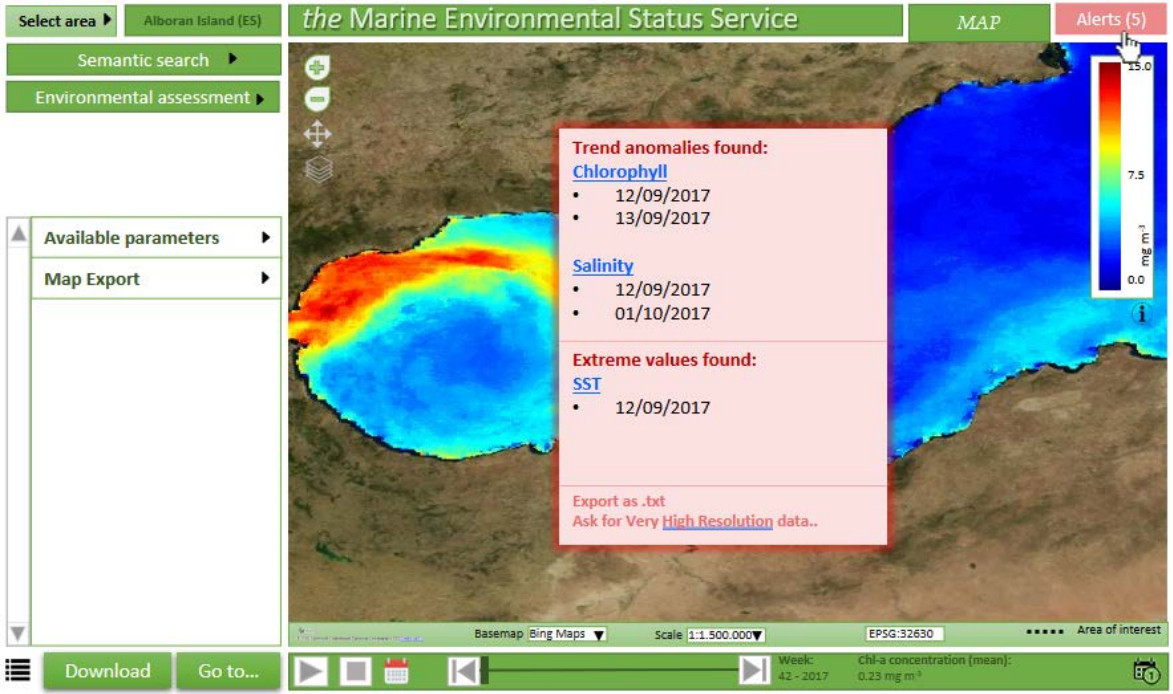
Environmental assessment generation as map/report



Generation of scores or thematic maps for a defined time frame

Marine Environmental Status in Hot Spots
Main features (2/4)

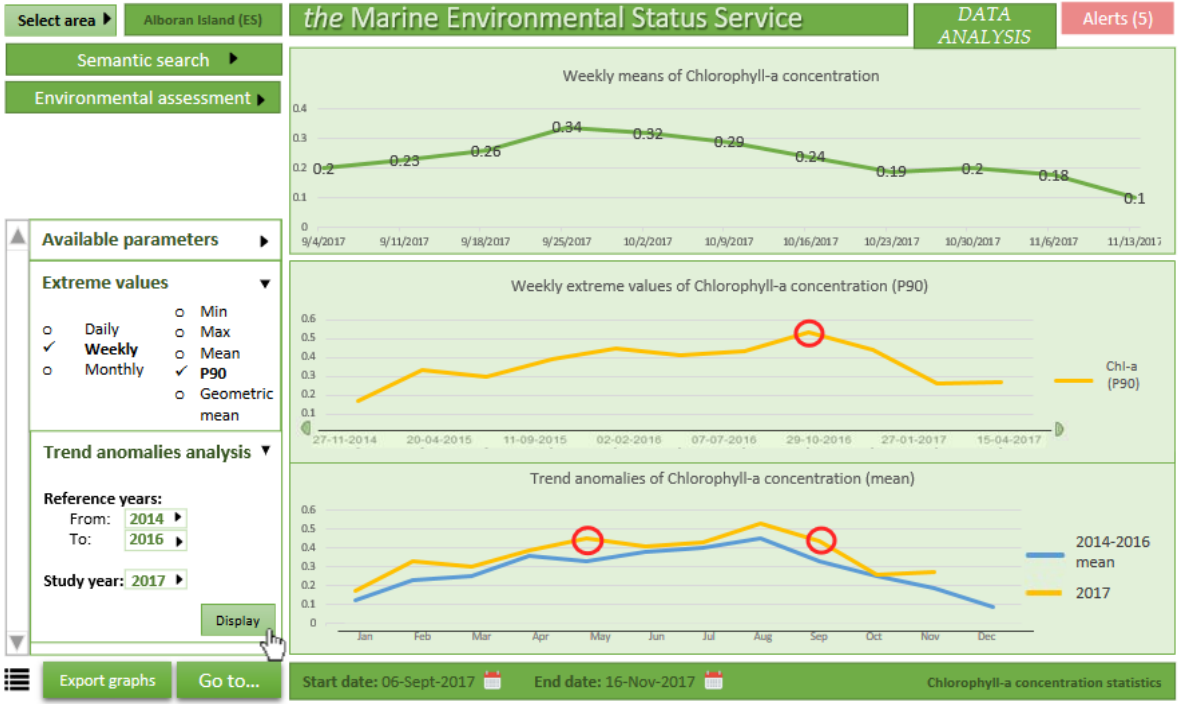
Alert notifications and report detected in the selected time frame



Window of alerting values for the selected time frame

Marine Environmental Status in Hot Spots
Main features (3/4)

Data analysis of the selected parameters (time series, extreme values, trend anomalies)



Graph generation of the "Extreme values" and "Trend anomalies"

Marine Environmental Status in Hot Spots
Main features (4/4)

Catalogue of in-situ, EO and climatological raw datasets used for the products' generation

Select area | Alboran Island (ES) | *the* Marine Environmental Status Service | DATASETS | Alerts (5)

Available datasets	Data Source	Spat. Res. (km)	Temp. Res.	Acqui
In situ				
❑ Chlorophyll-a	EMODnet	-	-	25/10/
❑ Chlorophyll-a	INS TAC (CMEMS)	-	-	30/10/
❑ Salinity	INS TAC (CMEMS)	-	-	30/10/
❑ Salinity	EMODnet	-	-	25/10/
❑ Dissolved Oxygen	EMODnet	-	-	25/10/
EO data				
❑ Sea Surface Temperature	CMEMS SST_MED_SST_L4_NRT_OBSERVATIONS_010_004	1	1 day	06/09/
❑ Sea Surface Temperature	Sentinel 3 – SLSTR Level 2 Sea Surface Temperature	1	<0.8 days	06/09/
❑ Chlorophyll-a	CMEMS OCEANCOLOUR_MED_CHL_L4_NRT_OBSERVATIONS_009_041	1	1 day	06/09/
❑ Chlorophyll-a	Sentinel 3 – OLCI L2 chl_oc4me	0.3	1 day	06/09/
❑ Chlorophyll-a	MODIS Level 3 MODIS Chlorophyll-a Concentration	1	1-2 days	06/09/
❑ Salinity	CMEMS GLOBAL_ANALYSIS_FORECAST_PHY_001_024	9	1 day	06/09/
❑ Suspended Matter	Sentinel 3 – OLCI Level 2 TSM_NN	0.3	<1.4 days	07/09/
❑ Transparency	Sentinel 3 – OLCI Level 2 KD490_M07	0.3	<1.4 days	07/09/
❑ Transparency	CMEMS OCEANCOLOUR_GLO_OPTICS_L3_NRT_OBSERVATIONS_009_030	4	1 day	06/09/
❑ Wave velocity	CMEMS GLOBAL_ANALYSIS_FORECAST_PHY_001_024	9	1 day	06/09/
❑ Wind speed/direction	CMEMS GLOBAL_ANALYSIS_FORECAST_PHY_001_024	9	1 day	06/09/
❑ Sea surface height	CMEMS SEALEVEL_GLO_WAV_L3_NRT_OBSERVATIONS_008_052	7	1 day	06/09/
Climatological data				
❑ Sea winds		28	1 day	06/09/

Map section
Data analysis section
In-situ, EO and Climatological datasets

Download | Go to... | Start date: 06-Sept-2017 | End date: 6-Nov-2017

- Display of all the raw datasets used for the SATOCEAN-USC-1 products
- Multiple selection of dataset download availability

Fish Farms: Detection of Fish Farm Threats (SATOCEAN-USC-2)

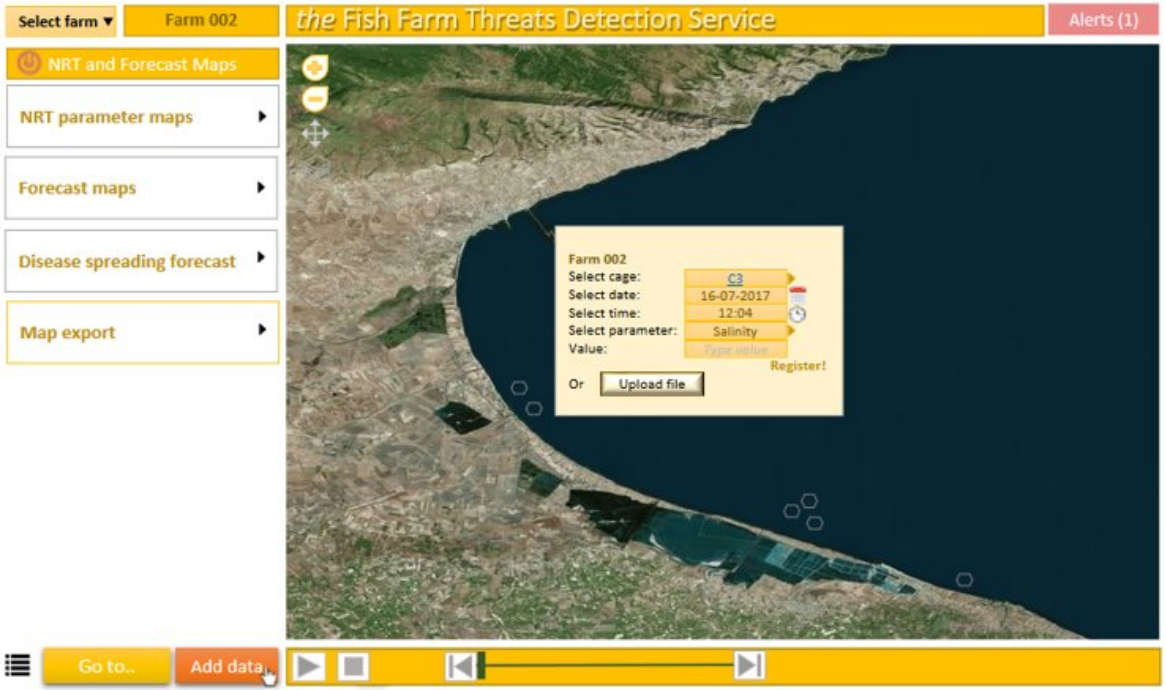
SATOCEAN-USC-2 focuses on monitoring the **detection of fish farm threats,** regarding both the coastal and the offshore surrounding area

Scope:

Easy access and/or information extraction about the threats of fish farms

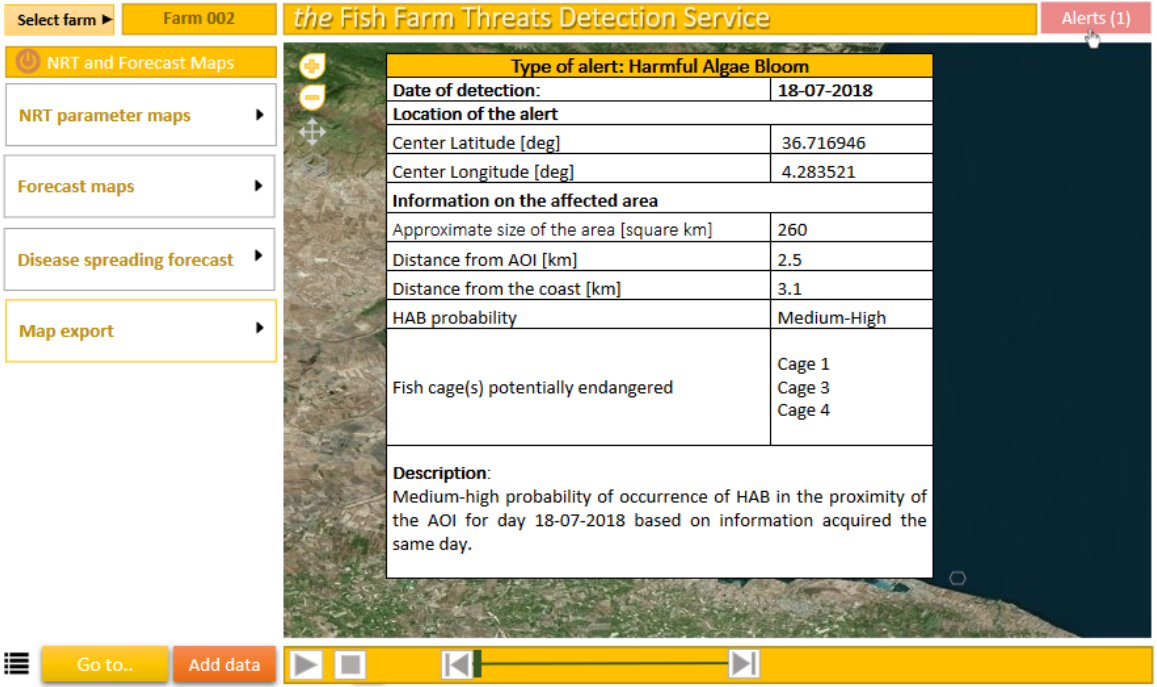
Fish Farms: Detection of Fish Farm Threats
Main features (1/6)

Add in-situ data by the user



Fish Farms: Detection of Fish Farm Threats
Main features (2/6)

Alert notification and report

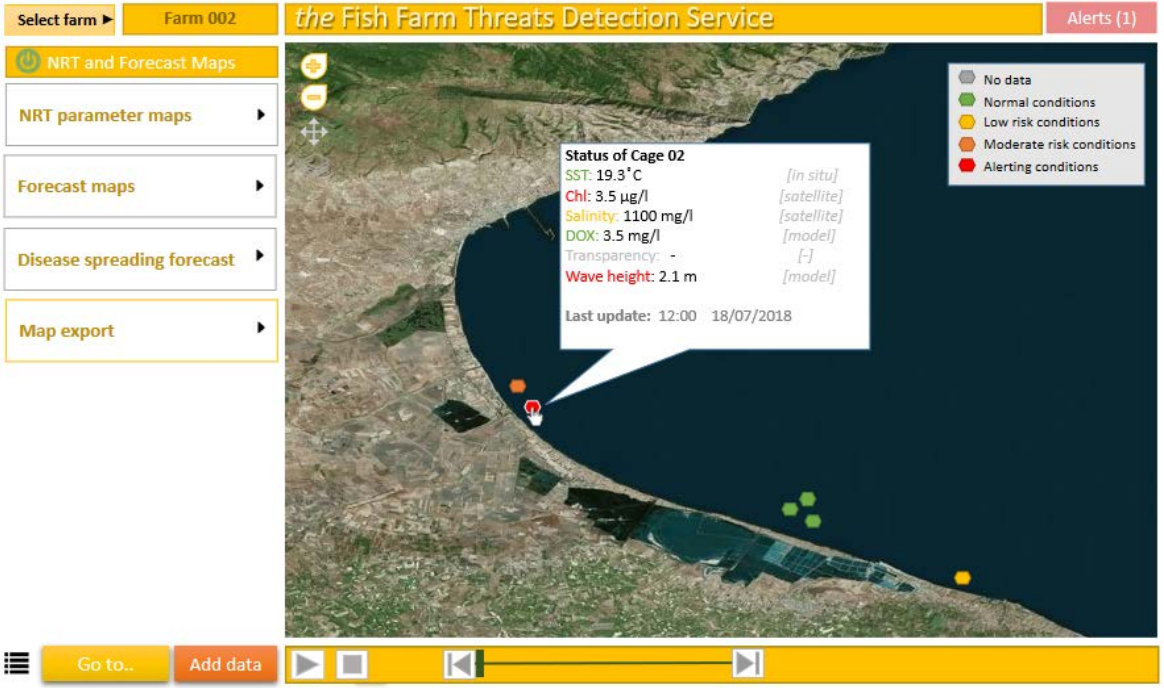


Type of alert: Harmful Algae Bloom	
Date of detection:	**18-07-2018**
Location of the alert	
Center Latitude [deg]	36.716946
Center Longitude [deg]	4.283521
Information on the affected area	
Approximate size of the area [square km]	260
Distance from AOI [km]	2.5
Distance from the coast [km]	3.1
HAB probability	Medium-High
Fish cage(s) potentially endangered	Cage 1 Cage 3 Cage 4

Description:
Medium-high probability of occurrence of HAB in the proximity of the AOI for day 18-07-2018 based on information acquired the same day.

Fish Farms: Detection of Fish Farm Threats
Main features (3/6)

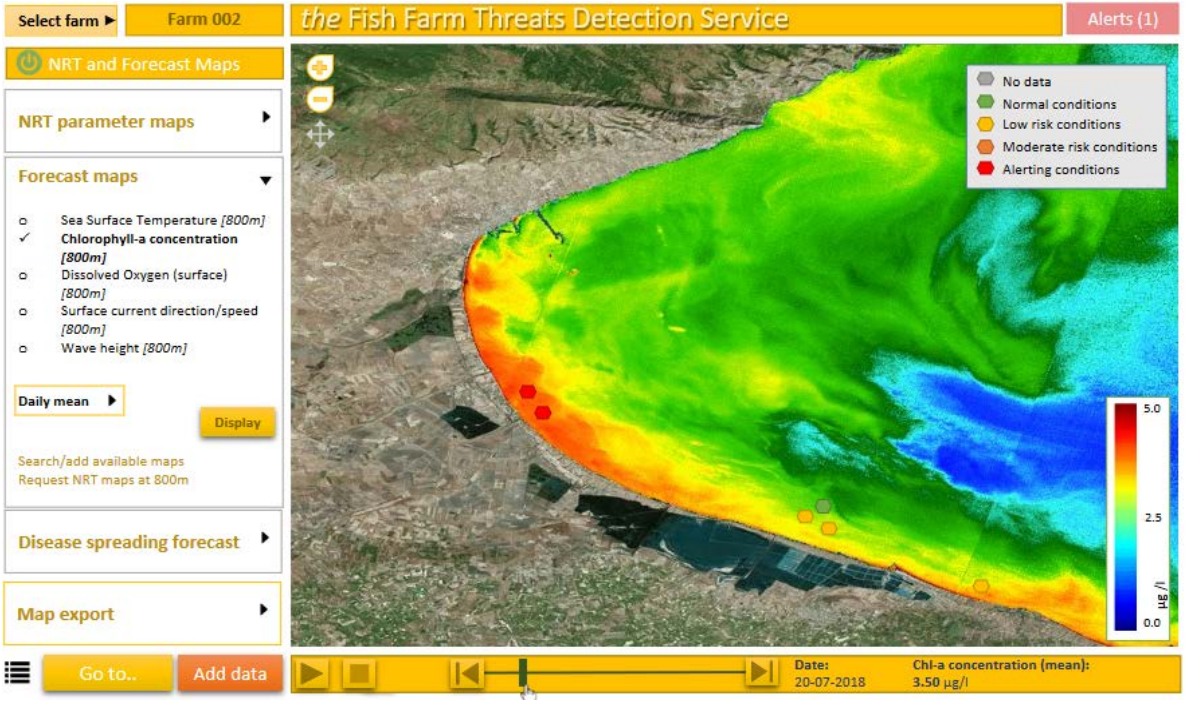
Status for every cage of the selected fish farm



- Latest overall status per cage
- Latest status of each available water quality parameter for each cage

Fish Farms: Detection of Fish Farm Threats
Main features (4/6)

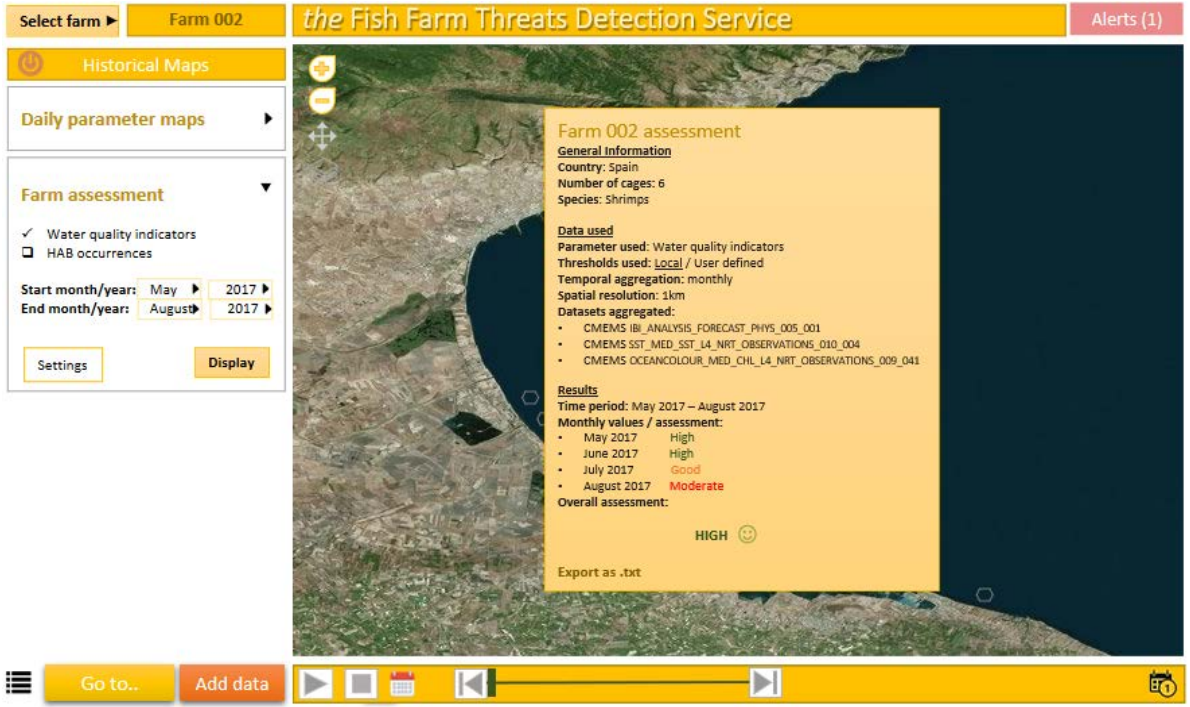
NRT and Forecast Maps visualization and export



- Panel for the NRT visualization of selected parameter
- Panel for the 5-day forecast of selected parameter
- Disease spreading forecast

Fish Farms: Detection of Fish Farm Threats
Main features (5/6)

Historical Maps visualization and export



- Selection of parameter and time frame for visualization
- Farm assessment report according to the water quality indicators (as in SATOCEAN-USC-1) or the HAB occurrences for a specific time frame

Fish Farms: Detection of Fish Farm Threats
Main features (6/6)

Data analysis of the selected parameters (time series, forecast trends, HAB occurrences)

- Selection of multiple parameters
- Weekly/monthly graph for selected time frame
- 5-day forecast graph
- Monthly HAB occurrence graph for selected time frame
- Analysis available for specific cages

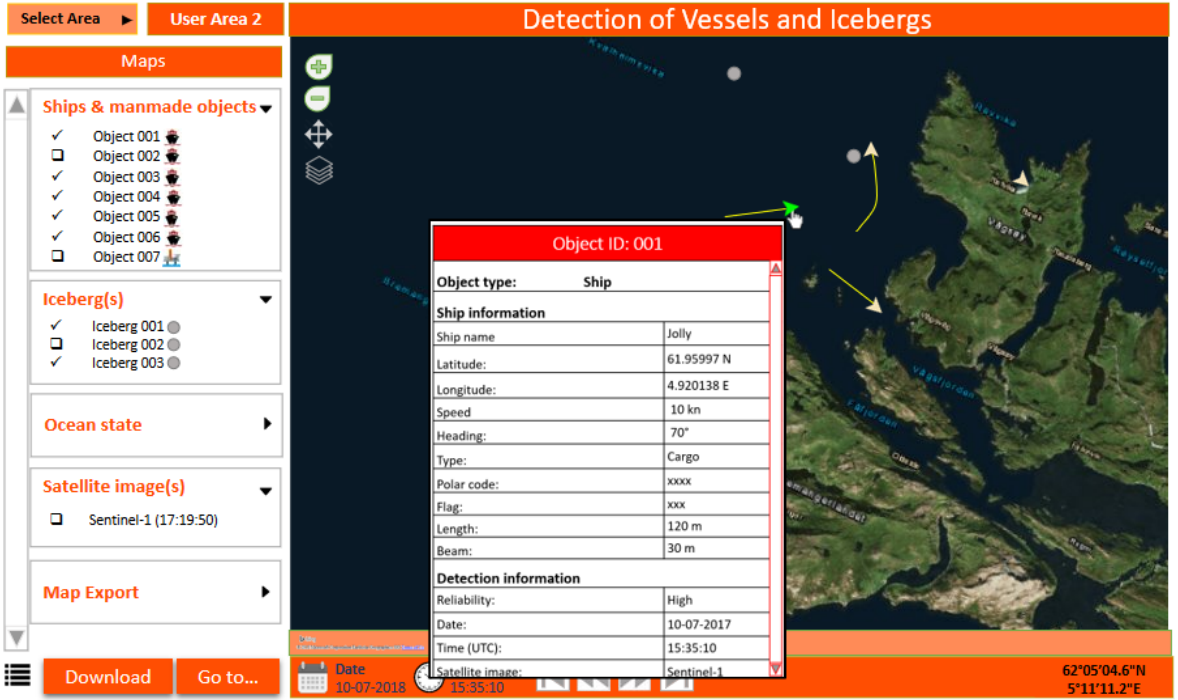
Detection of Vessels and Icebergs in the Arctic zone (SATOCEAN-USC-3)

SATOCEAN-USC-3 focuses on the **detection** of **vessels** and **icebergs** in **Arctic Area:**

- **Core functionality** to be provided using the operational **KSAT Vessel Detection Service Chain**

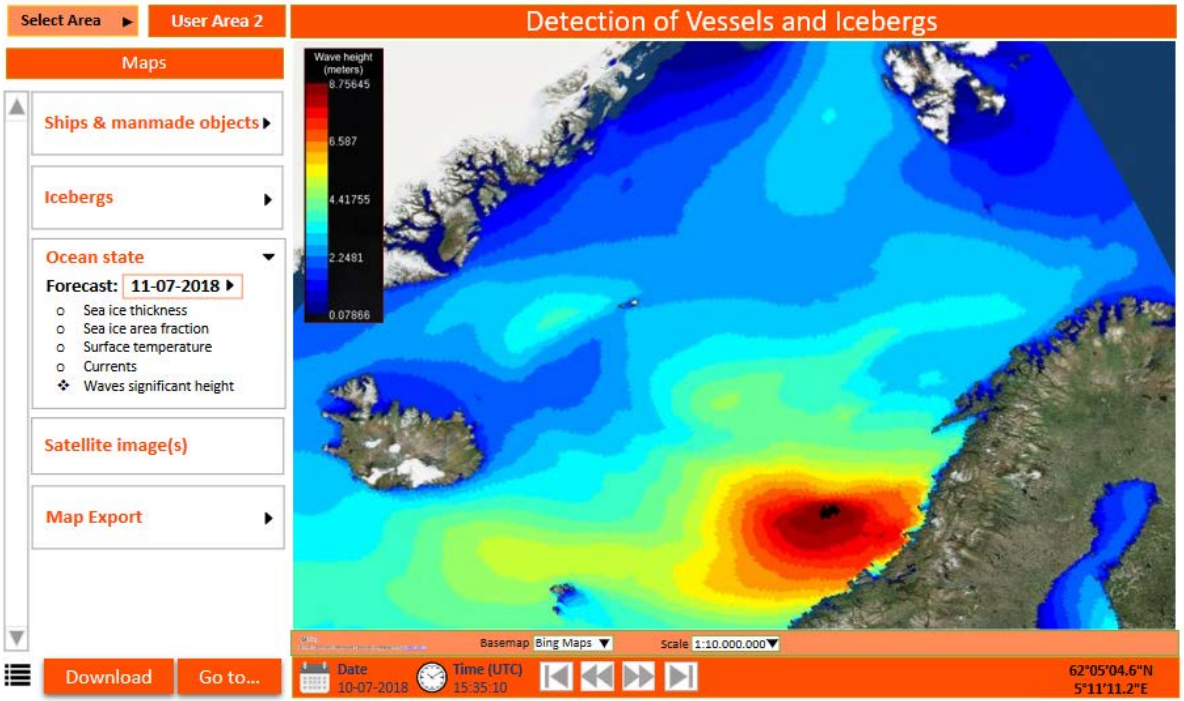
Detection of Vessels and Icebergs in the Arctic zone
Main features (1/4)

Detection of Vessels and Icebergs



- Panels where all detected features (ships/manmade objects and icebergs) are showed
- Satellite images used for the detection of the displayed objects

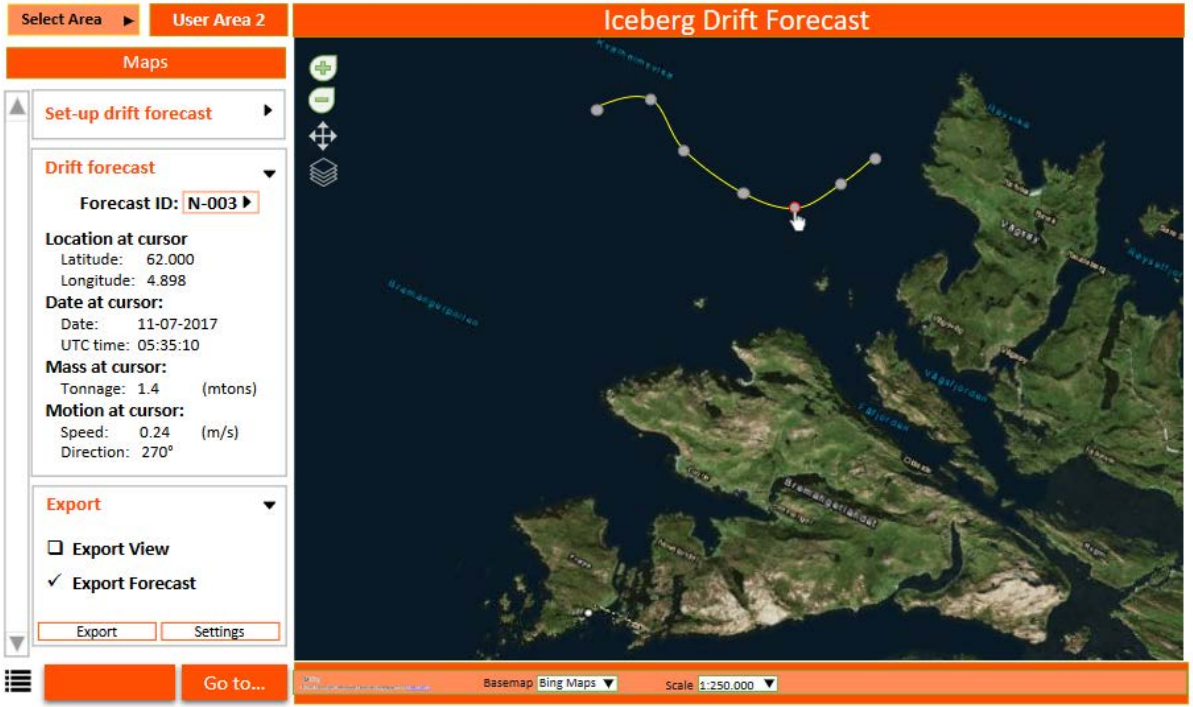
Ocean State visualization



Forecast of 3D ocean physical state

Detection of Vessels and Icebergs in the Arctic zone
Main features (3/4)

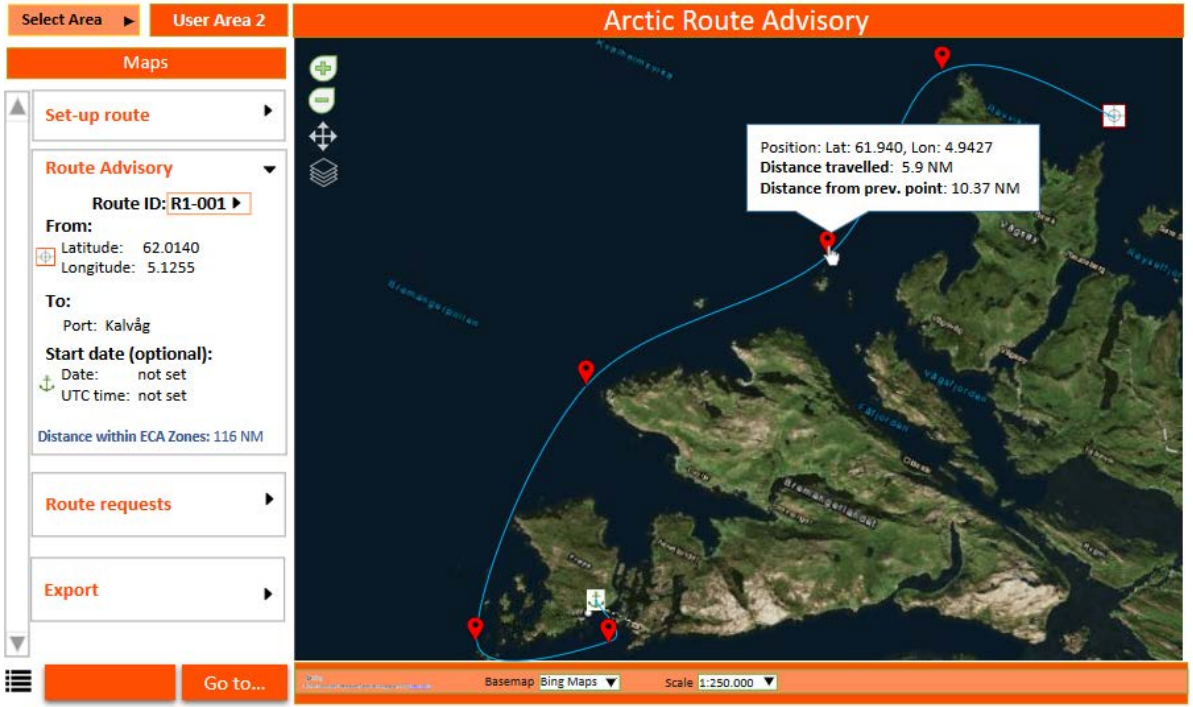
Iceberg Drift Forecast



- Parameters set-up of the forecast
- Display of the generated iceberg drift forecast
- Export of the view/forecast

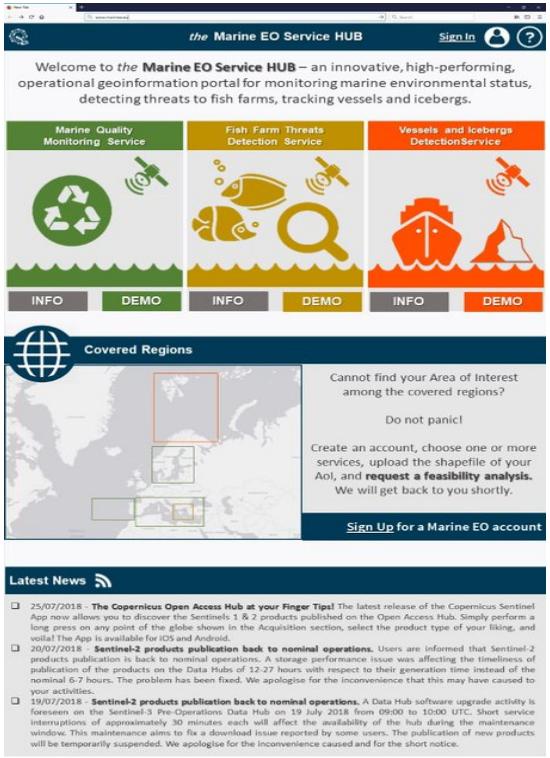
Detection of Vessels and Icebergs in the Arctic zone
Main features (4/4)

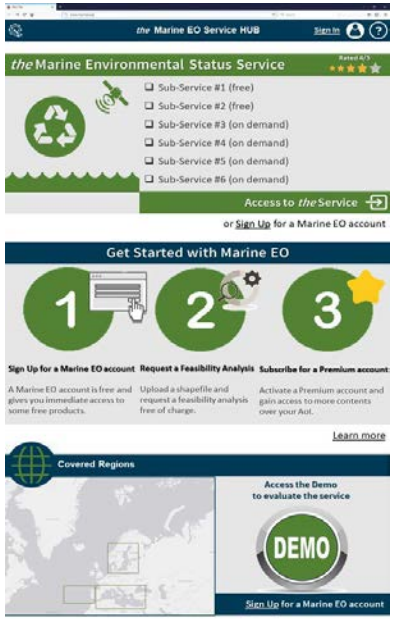
Arctic Route Advisory

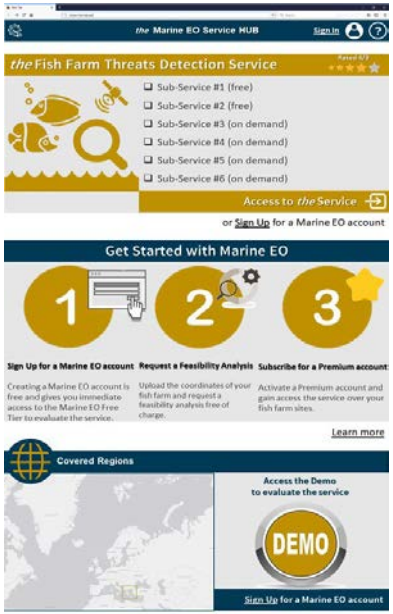


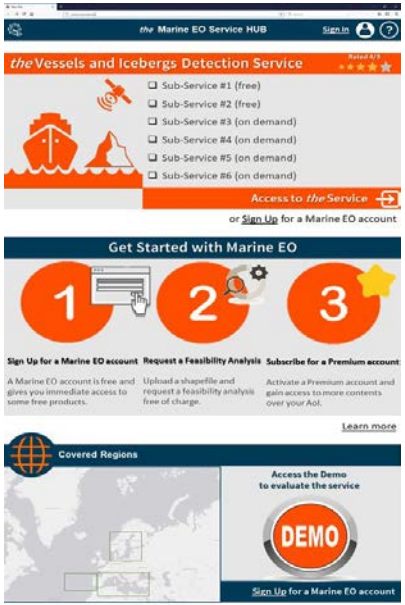
- Set-up of the route (start/end points or ports, estimated time of departure/arrival, vessel specifications)
- Display of the generated route

Marine-EO Service HUB









Recommendations on future investments in the Atlantic region

- ✓ Need of a reliable correlation and aggregation of the vast amount of available data (satellite, in-situ)
- ✓ Dedicated platform for Atlantic region on:
  - Water quality (overall Atlantic and MPA's)
    - Rapid monitoring
    - Social awareness
  - Aquaculture
    - Boost economic activity
    - Monitor (illegal) fishing
  - Arctic area
    - to be handled separately

✓ Linkage with the Sustainable Development Goal Indicators (SDGs)

Thank you!

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Project Manager

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Planetek Hellas

Key numbers

Planetek Group

SME

Foundation **2006**

planetek italia People **45**

planetek hellas People **19**

planetek hellas Mid turnover the last 3 years **750K €**