

→ 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

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Planetek Hellas



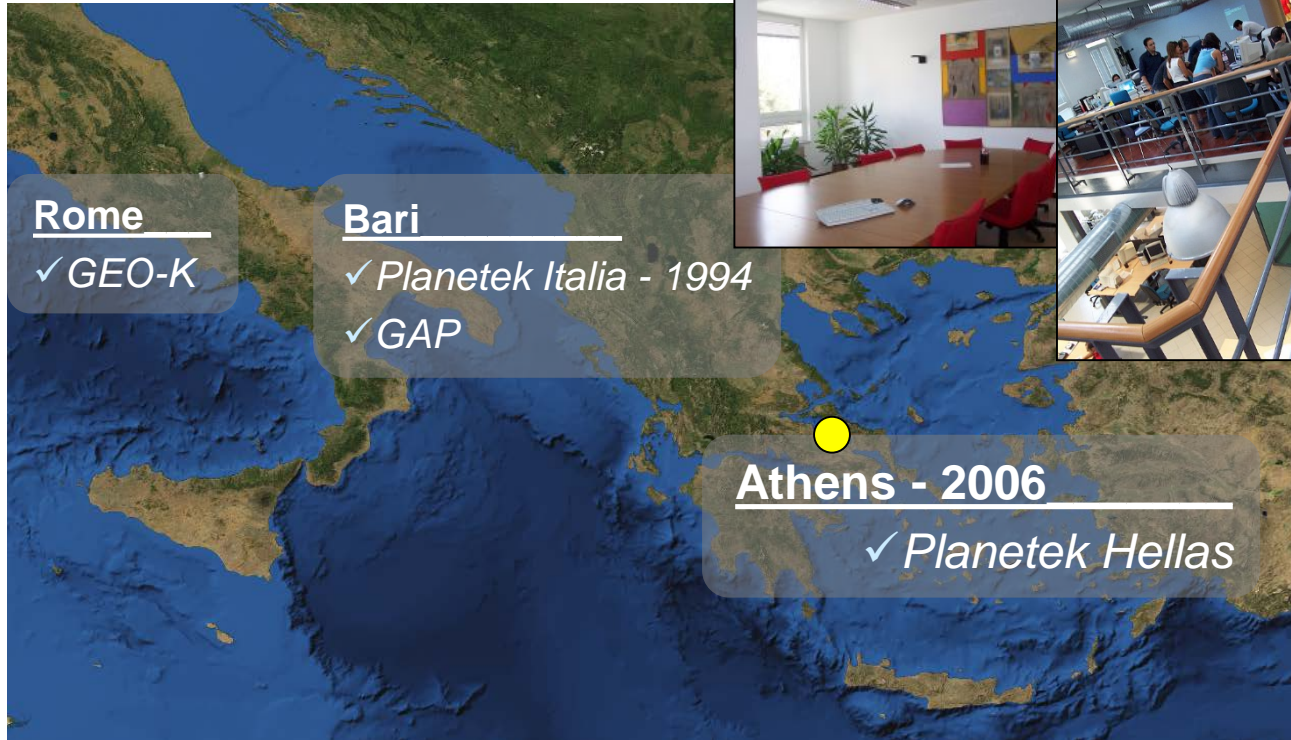
- E.O. applications for environment & security**

- On Board Payload Data Processing**

- Space Astronomy Data Exploitation**

- Spatial Data Infrastructures & Interoperability**

- Satellite Ground Segment & Data Fusion Centre**

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 System
MarCoast 2
 Remote Sensing & 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)

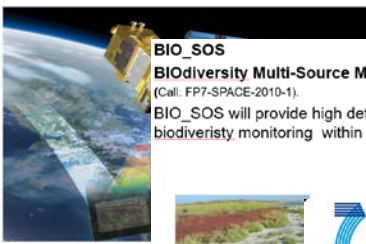
SIMS
Seagrass Integrated Monitoring System
 Posidonia Oceanica mapping through evolution techniques integrating Satellite, Airborne and In Situ data. WebGIS application for the distribution and promotion of the result. (Planetek Hellas – ENEA)

2009-2011 TSM from 2 Pleiades images (07/02/2013) applying the calibrated algorithm.

Daily probability of HAB occurrence map. Input data: MERIS scene dated 01/11/2008

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 biodiversity monitoring within NATURA 2000 sites and along their borders.

Dec. 2011-2013

eENVUplus
 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 Pilots

- Belgium and Italy for

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

C-V
 Coast using
 8 κανάλια δορυφορικών αισθητήρων

63/06/12
 28/09/12

WEOS Waste Earth Observation System

Service 1 Rapid response mapping of illegal waste treatment sites
Service 2 Long term monitoring of illegal waste treatment sites



SEO_DWARF - Semantic EO Data Web Alert and Retrieval Framework

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





HORIZON 2020

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



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

the first Earth Observation Pre-Commercial Procurement project

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)

- 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)



Author | Atlantic from Space Workshop | 23-25/01/2019 | Slide 8

- 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

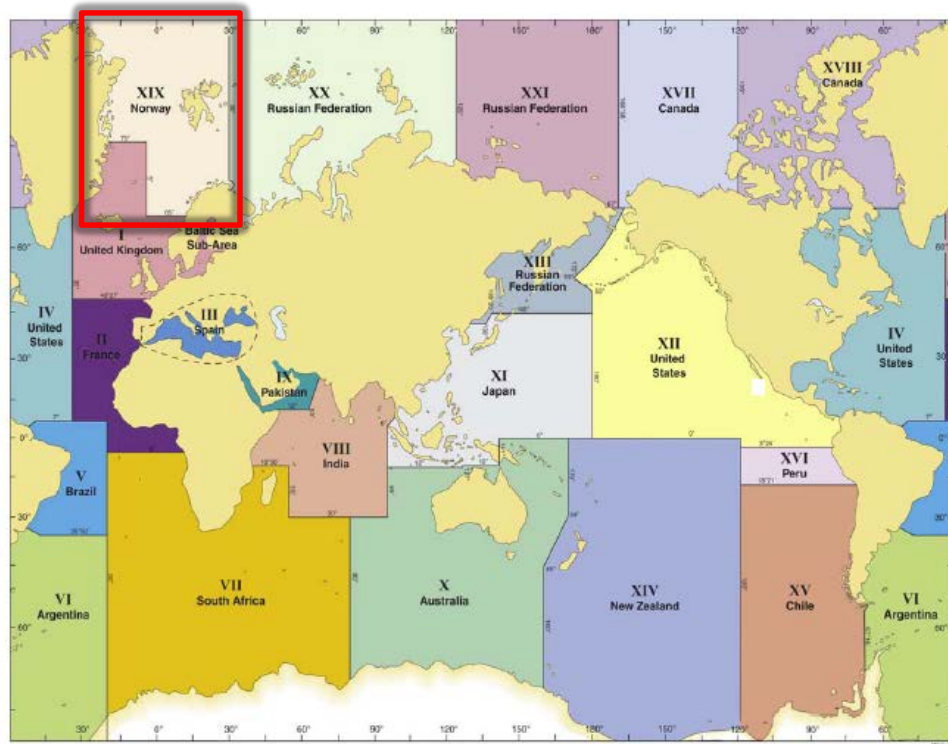
Areas of Interest (1/2)



SATOCEAN-USC-1 SATOCEAN-USC-2

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





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



Select area ▶ Alboran Island (ES) | **the Marine Environmental Status Service** | **MAP** | **Alerts**

Semantic search ▶

Environmental assessment ▼

- Chlorophyll-a scores
- Chlorophyll-a thematic maps

Start month/year: May ▶ 2017 ▶
End month/year: August ▶ 2017 ▶

Settings | **Display**

Environmental assessment

General information
AOI: Alboran Island
Country: Spain
Area: broader coastal area
Type: Marine Protected Area

Data used
Parameter used: Chlorophyll-a P90
Thresholds used: WFD / Local / User defined
Temporal aggregation: monthly
Spatial resolution: 1km
Datasets aggregated:

- CMEMS
OCEANCOLOUR_MED_CHL_L4_NRT_OBSERVATIONS_009_041
- MODIS Level 3 Chlorophyll-a Concentration

Results
Time period: May 2017 – August 2017
Monthly values / assessment:

- May 2017 0.12 mg/l High
- June 2017 3.21 mg/l Good
- July 2017 6.26 mg/l Good
- August 2017 10.01 mg/l Moderate

Overall assessment: **GOOD** 😊

Export as .txt

Basemap Bing Maps | Scale 1:1,500,000 | EPSG:32630 | Area of interest

Download | Go to... | Navigation controls

Generation of scores or thematic maps for a defined time frame

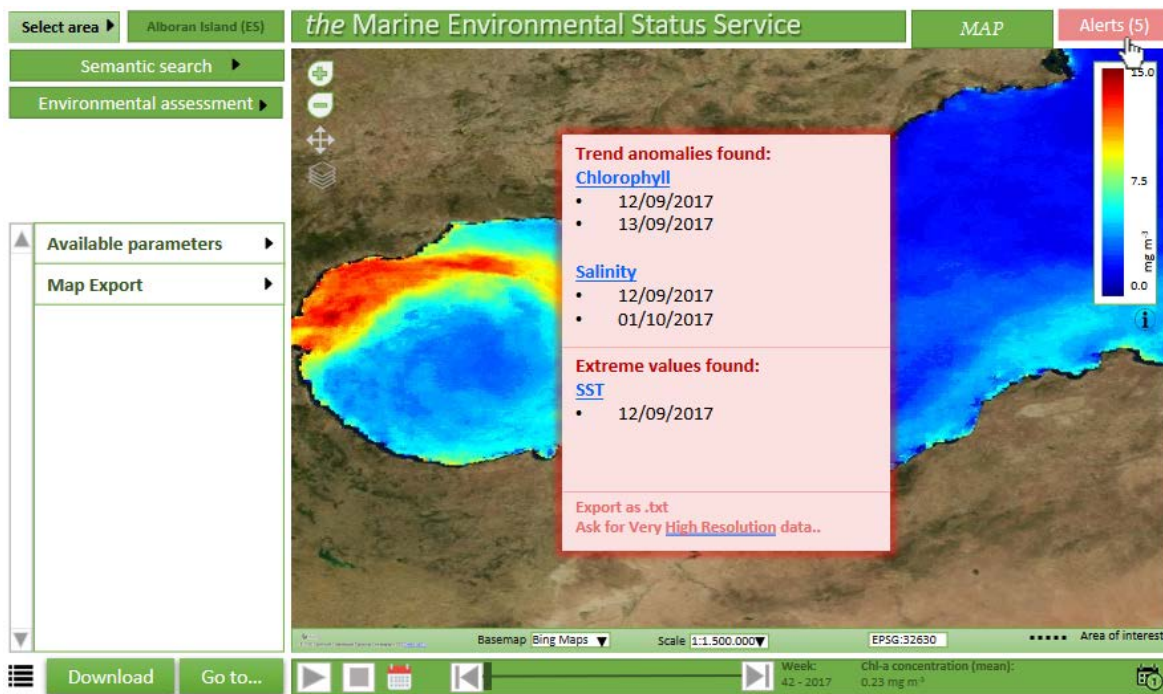


Marine Environmental Status in Hot Spots

Main features (2/4)



Alert notifications and report detected in the selected time frame



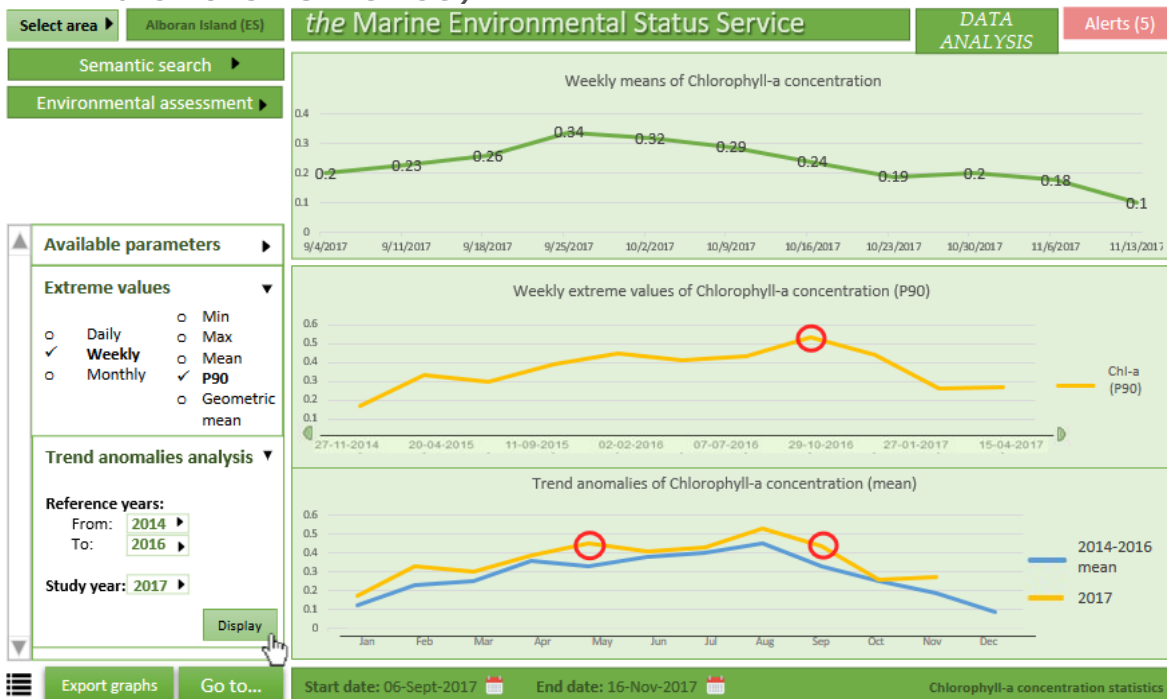
Window of alerting values for the selected time frame

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				
<input type="checkbox"/> Chlorophyll-a	EMODnet	-	-	25/10/
<input type="checkbox"/> Chlorophyll-a	INS TAC (CMEMS)	-	-	30/10/
<input type="checkbox"/> Salinity	INS TAC (CMEMS)	-	-	30/10/
<input type="checkbox"/> Salinity	EMODnet	-	-	25/10/
<input type="checkbox"/> Dissolved Oxygen	EMODnet	-	-	25/10/
EO data				
<input type="checkbox"/> Sea Surface Temperature	CMEMS SST_MED_SST_L4_NRT_OBSERVATIONS_010_004	1	1 day	06/09/
<input type="checkbox"/> Sea Surface Temperature	Sentinel 3 – SLSTR Level 2 Sea Surface Temperature	1	<0.8 days	06/09/
<input type="checkbox"/> Chlorophyll-a	CMEMS OCEANCOLOUR_MED_CHL_L4_NRT_OBSERVATIONS_009_041	1	1 day	06/09/
<input type="checkbox"/> Chlorophyll-a	Sentinel 3 – OLCI L2 chl_oc4me	0.3	1 day	06/09/
<input type="checkbox"/> Chlorophyll-a	MODIS Level 3 MODIS Chlorophyll-a Concentration	1	1-2 days	06/09/
<input type="checkbox"/> Salinity	CMEMS GLOBAL_ANALYSIS_FORECAST_PHY_001_024	9	1 day	06/09/
<input type="checkbox"/> Suspended Matter	Sentinel 3 – OLCI Level 2 TSM_NN	0.3	<1.4 days	07/09/
<input type="checkbox"/> Transparency	Sentinel 3 – OLCI Level 2 KD490_M07	0.3	<1.4 days	07/09/
<input type="checkbox"/> Transparency	CMEMS OCEANCOLOUR_GLO_OPTICS_L3_NRT_OBSERVATIONS_009_030	4	1 day	06/09/
<input type="checkbox"/> Wave velocity	CMEMS GLOBAL_ANALYSIS_FORECAST_PHY_001_024	9	1 day	06/09/
<input type="checkbox"/> Wind speed/direction	CMEMS GLOBAL_ANALYSIS_FORECAST_PHY_001_024	9	1 day	06/09/
<input type="checkbox"/> Sea surface height	CMEMS SEALEVEL_GLO_WAV_L3_NRT_OBSERVATIONS_008_052	7	1 day	06/09/
Climatological data				
<input type="checkbox"/> 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: 06-Nov-2017

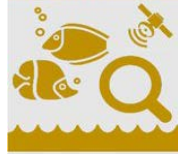
- Display of all the raw datasets used for the SATOCEAN-USC-1 products
- Multiple selection of dataset download availability



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



Select farm ▼ Farm 002 the Fish Farm Threats Detection Service Alerts (1)

NRT and Forecast Maps

NRT parameter maps ▶

Forecast maps ▶

Disease spreading forecast ▶

Map export ▶

Farm 002

Select cage: [dropdown]

Select date: 16-07-2017

Select time: 12:04

Select parameter: Salinity

Value: [input field] Type value

Register!

Or Upload file

Go to... Add data...



Alert notification and report



Select farm ▶ Farm 002 **the Fish Farm Threats Detection Service** Alerts (1)

NRT and Forecast Maps

- NRT parameter maps ▶
- Forecast maps ▶
- Disease spreading forecast ▶
- Map export ▶

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.

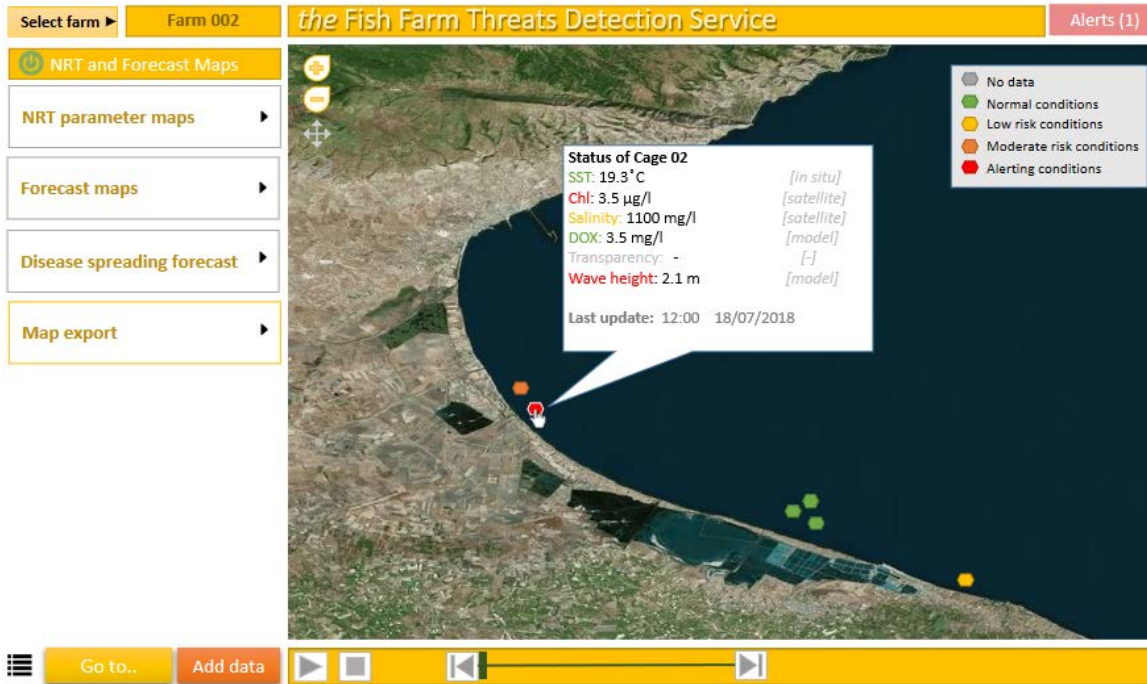
Go to... Add data

Fish Farms: Detection of Fish Farm Threats

Main features (3/6)



Status for every cage of the selected fish farm



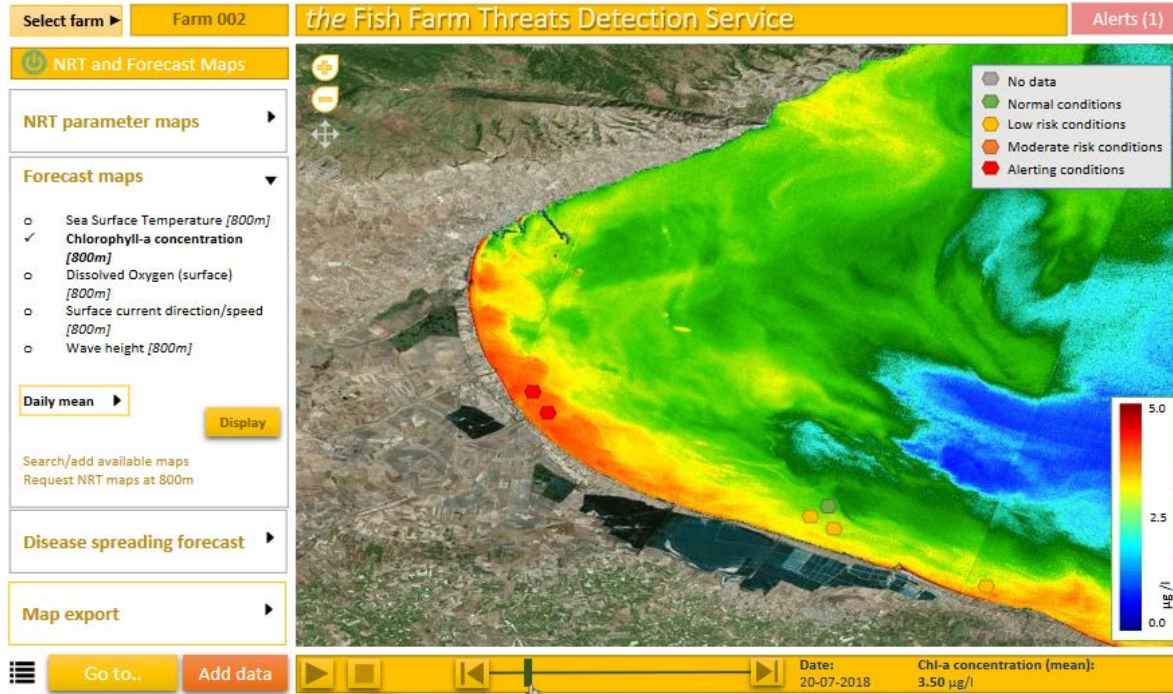
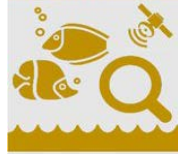
- Latest overall status per cage
- Latest status of each available water quality parameter for each cage

Fish Farms: Detection of Fish Farm Threats

Main features (4/6)

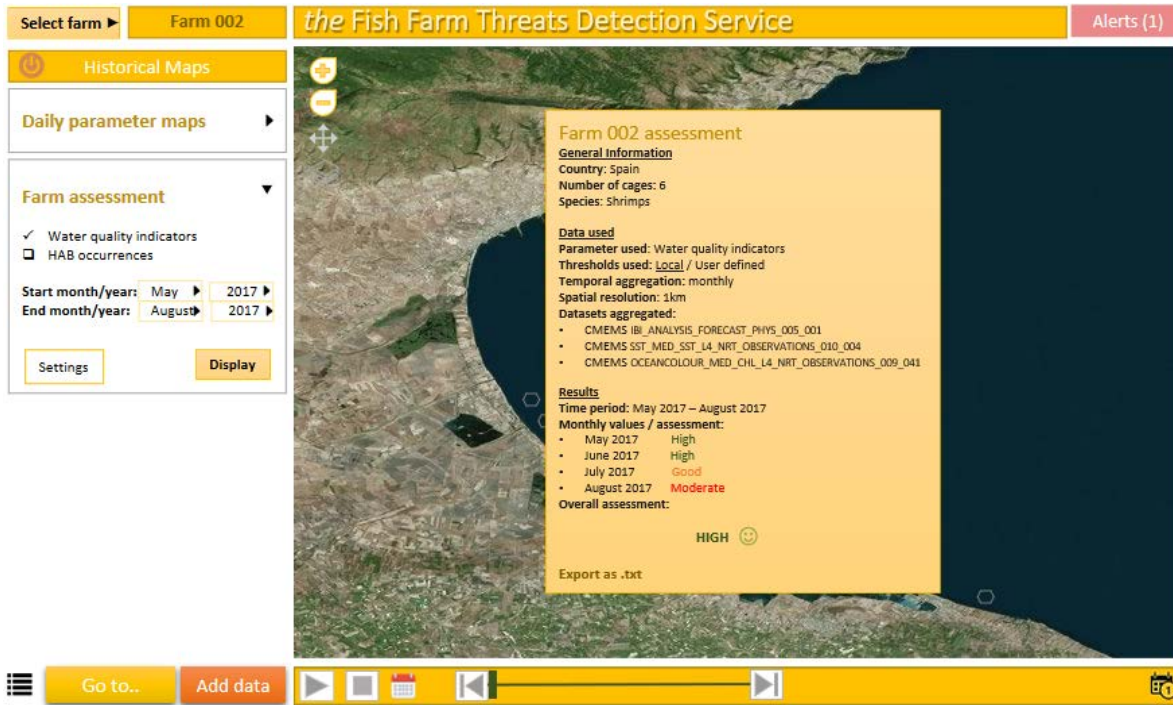


NRT and Forecast Maps visualization and export



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

Historical Maps visualization and export



the Fish Farm Threats Detection Service Alerts (1)

Select farm ▶ Farm 002

Historical Maps

Daily parameter maps ▶

Farm assessment ▼

Water quality indicators
 HAB occurrences

Start month/year: May ▶ 2017 ▶
End month/year: August ▶ 2017 ▶

Settings Display

Farm 002 assessment

General Information
Country: Spain
Number of cages: 6
Species: Shrimps

Data used
Parameter used: Water quality indicators
Thresholds used: Local / User defined
Temporal aggregation: monthly
Spatial resolution: 1km
Datasets aggregated:
• CMEMIS_IBI_ANALYSIS_FORECAST_PHYS_005_001
• CMEMIS_SST_MED_SST_L4_NRT_OBSERVATIONS_010_004
• CMEMIS_OCEANCOLOUR_MED_CHL_L4_NRT_OBSERVATIONS_009_041

Results
Time period: May 2017 – August 2017
Monthly values / assessment:
• May 2017 High
• June 2017 High
• July 2017 Good
• August 2017 Moderate
Overall assessment: HIGH 😊

Export as .txt

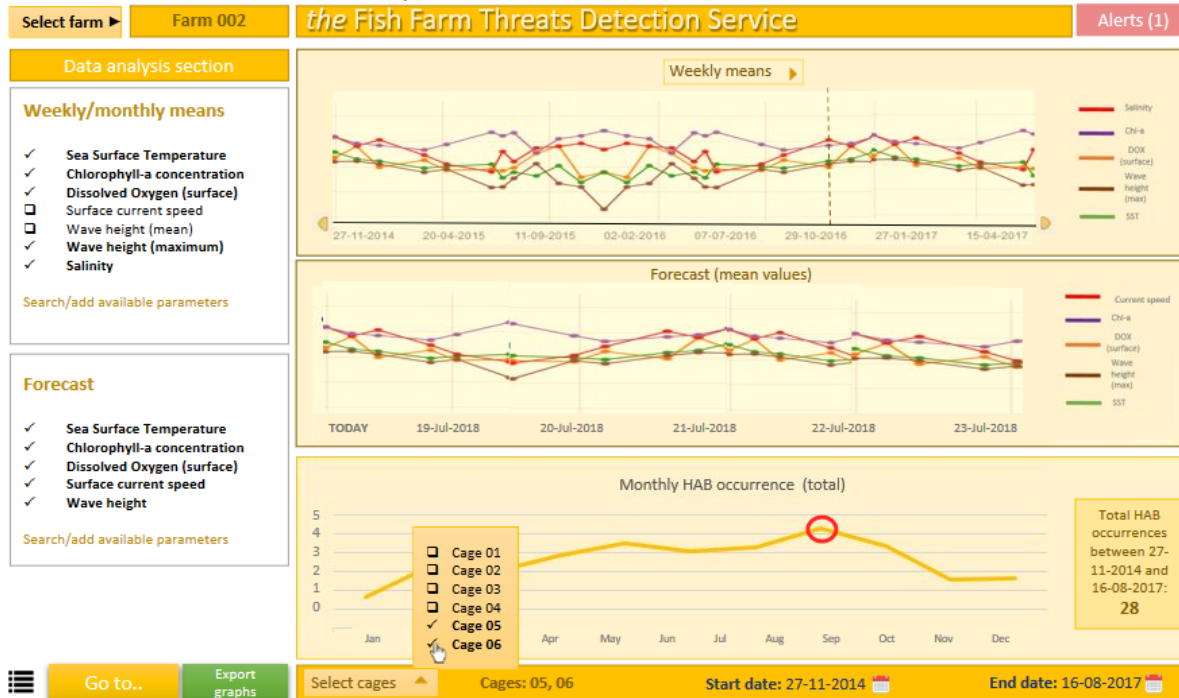
- Selection of parameter and time frame for visualization
- Farm assessment report according to the water quality indicators (as in SATOCEAN-USC-1) or the HAB occurrences for a specific time frame

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



Object ID: 001	
Object type:	Ship
Ship information	
Ship name	Jolly
Latitude:	61.95997 N
Longitude:	4.920138 E
Speed	10 kn
Heading:	70°
Type:	Cargo
Polar code:	xxxx
Flag:	xxx
Length:	120 m
Beam:	30 m
Detection information	
Reliability:	High
Date:	10-07-2017
Time (UTC):	15:35:10
Satellite image:	Sentinel-1

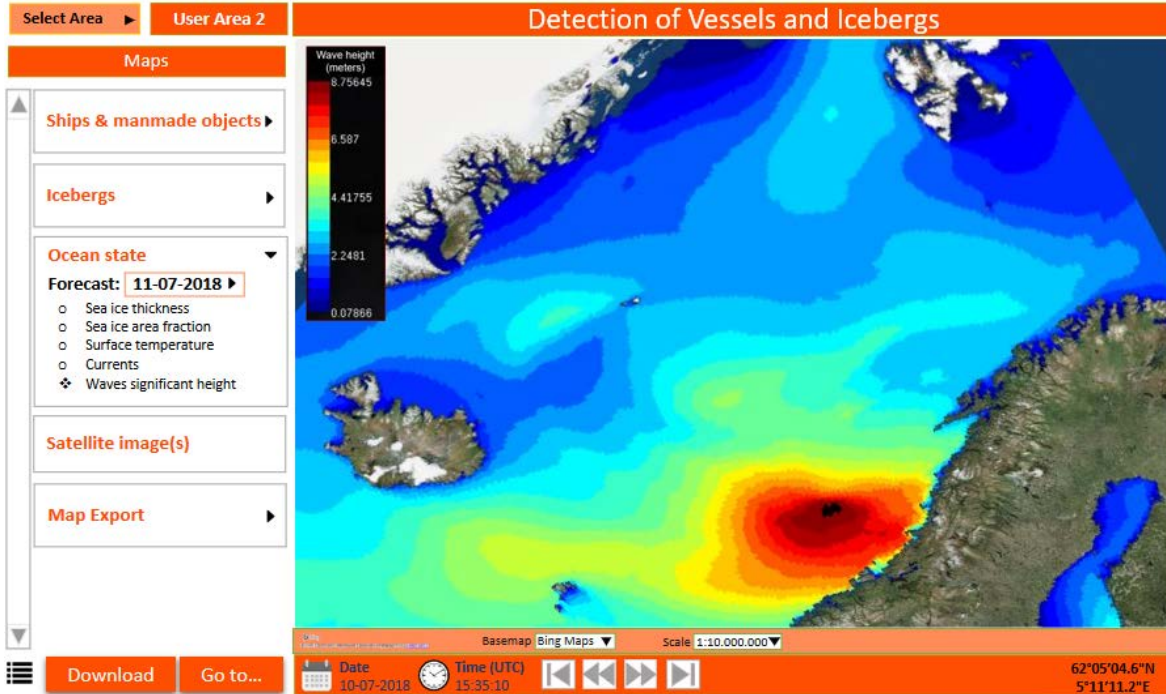
- Panels where all detected features (ships/manmade objects and icebergs) are shown
- Satellite images used for the detection of the displayed objects

Detection of Vessels and Icebergs in the Arctic zone

Main features (2/4)



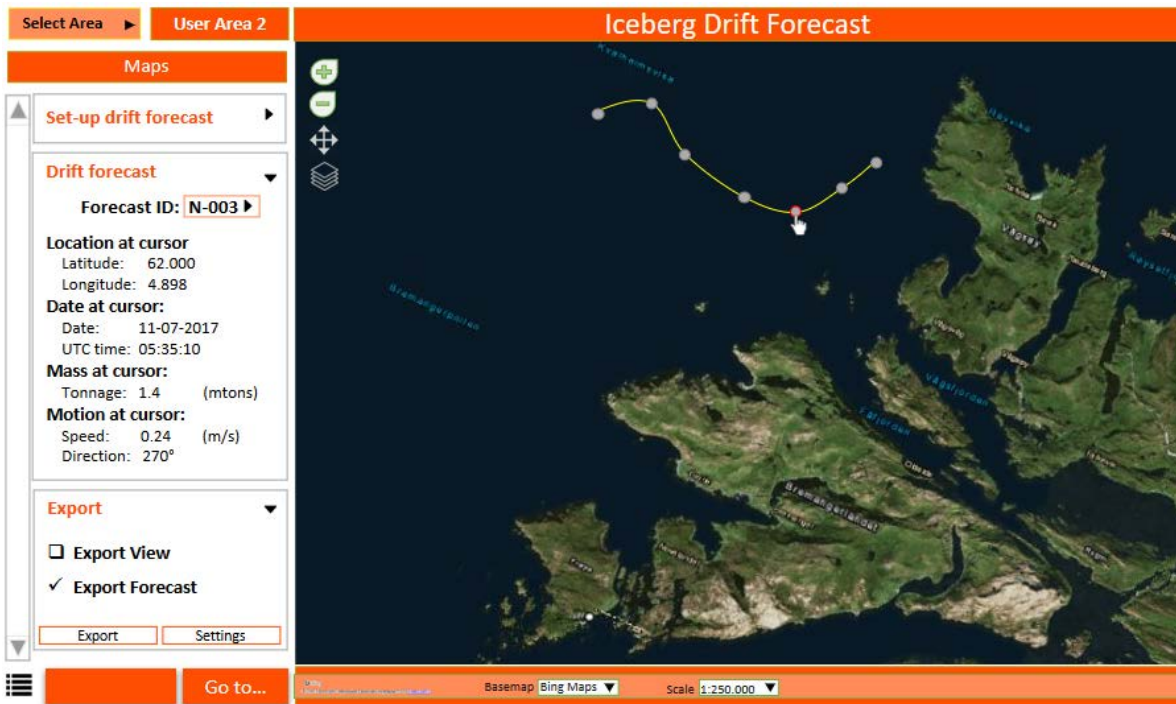
Ocean State visualization



Forecast of 3D ocean physical state



Iceberg Drift Forecast



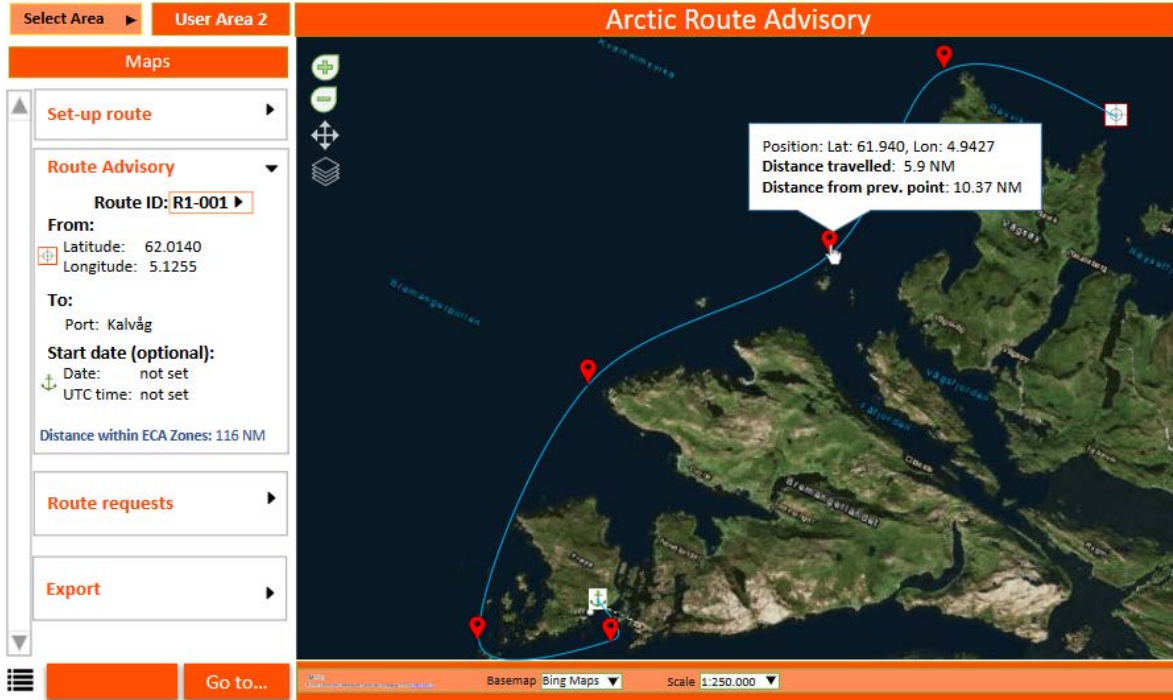
- Parameters set-up of the forecast
- Display of the generated iceberg drift forecast
- Export of the view/forecast

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



the Marine EO Service HUB

Welcome to the **Marine EO Service HUB** – an innovative, high-performing, operational geoinformation portal for monitoring marine environmental status, detecting threats to fish farms, tracking vessels and icebergs.

<p>Marine Quality Monitoring Service</p> <p>INFO DEMO</p>	<p>Fish Farm Threats Detection Service</p> <p>INFO DEMO</p>	<p>Vessels and Icebergs Detection Service</p> <p>INFO DEMO</p>
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Covered Regions

Cannot find your Area of Interest among the covered regions?
Do not panic!
Create an account, choose one or more services, upload the shapefile of your Aoi, and **request a feasibility analysis**. We will get back to you shortly.

[Sign Up for a Marine EO account](#)

Latest News

- 25/07/2018 - **The Copernicus Open Access Hub at your Finger Tips!** The latest release of the Copernicus Sentinel App now allows you to discover the Sentinels 1 & 2 products published on the Open Access Hub. Simply perform a long press on any point of the globe shown in the Acquisition section, select the product type of your liking, and voilà! The App is available for iOS and Android.
- 20/07/2018 - **Sentinel-2 products publication back to nominal operations.** Users are informed that Sentinel-2 products publication is back to nominal operations. A storage performance issue was affecting the timeliness of publication of the products on the Data Hubs of 12-27 hours with respect to their generation time instead of the nominal 6-7 hours. The problem has been fixed. We apologise for the inconvenience that this may have caused to your activities.
- 19/07/2018 - **Sentinel-2 products publication back to nominal operations.** A Data Hub software upgrade activity is foreseen on the Sentinel-3 Pre-Operations Data Hub on 19 July 2018 from 09:00 to 10:00 UTC. Short service interruptions of approximately 30 minutes each will affect the availability of the Hub during the maintenance window. This maintenance aims to fix a download issue reported by some users. The publication of new products will be temporarily suspended. We apologise for the inconvenience caused and for the short notice.

the Marine Environmental Status Service

- Sub-Service #1 (free)
- Sub-Service #2 (free)
- Sub-Service #3 (on demand)
- Sub-Service #4 (on demand)
- Sub-Service #5 (on demand)
- Sub-Service #6 (on demand)

[Access to the Service](#)
or [Sign Up for a Marine EO account](#)

Get Started with Marine EO

- 1
- 2
- 3

Sign Up for a Marine EO account **Request a Feasibility Analysis** **Subscribe for a Premium account**

A Marine EO account is free and gives you immediate access to some free products. Upload a shapefile and request a feasibility analysis free of charge. Activate a Premium account and gain access to more contents over your Aoi.

[Learn more](#)

Covered Regions

Access the Demo to evaluate the service

DEMO

[Sign Up for a Marine EO account](#)

the Fish Farm Threats Detection Service

- Sub-Service #1 (free)
- Sub-Service #2 (free)
- Sub-Service #3 (on demand)
- Sub-Service #4 (on demand)
- Sub-Service #5 (on demand)
- Sub-Service #6 (on demand)

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Get Started with Marine EO

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- 2
- 3

Sign Up for a Marine EO account **Request a Feasibility Analysis** **Subscribe for a Premium account**

Creating a Marine EO account is free and gives you immediate access to the Marine EO Free Tier to evaluate the service. Upload the coordinates of your fish farm and request a feasibility analysis free of charge. Activate a Premium account and gain access to your fish farm sites.

[Learn more](#)

Covered Regions

Access the Demo to evaluate the service

DEMO

[Sign Up for a Marine EO account](#)

the Vessels and Icebergs Detection Service

- Sub-Service #1 (free)
- Sub-Service #2 (free)
- Sub-Service #3 (on demand)
- Sub-Service #4 (on demand)
- Sub-Service #5 (on demand)
- Sub-Service #6 (on demand)

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[Learn more](#)

Covered Regions

Access the Demo to evaluate the service

DEMO

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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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 **[@planetekhellas](https://twitter.com/planetekhellas)**

 **www.linkedin.com/company/planetek-hellas**





Key numbers

Planetek Group

Foundation **2006**



SME

planetek **People 45**
italia



planetek **People 19**
hellas

planetek
hellas

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

