

Using CMEMS in operational industrial Geo-Information platforms: the SEonSE case

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Copernicus Marine Service and market opportunity for the Italian Blue Growth sector

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Content

- e-GEOS Company Overview
- e-GEOS experience and investment in Copernicus Maritime Services
- SEonSE: an operational platform solution for Maritime Services and CMEMS
- CMEMS downstream services supporting the Blue Growth and Maritime Spatial Planning

e-GEOS

LEONARDO THALES

67%

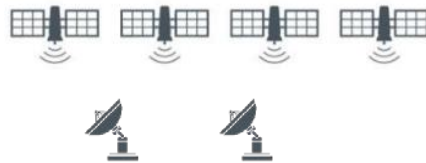
33%

TELESPAZIO
a LEONARDO and THALES company

- Contracts
- People
- Assets



exclusive world wide rights



80% **e-geos** 20%

AN ASI / TELESPAZIO COMPANY



INTERNATIONAL
MARKETS
80%



DOMESTIC
MARKETS
20%

10+
SATELLITE MISSIONS
DATA ACQUIRED.

9+

70millions
AGRICULTURAL PARCELS

2500+

750+
MARITIME REPORTS/ YEAR

188+

100m €+
REVENUES

500+
PEOPLE

e-GEOS Premises



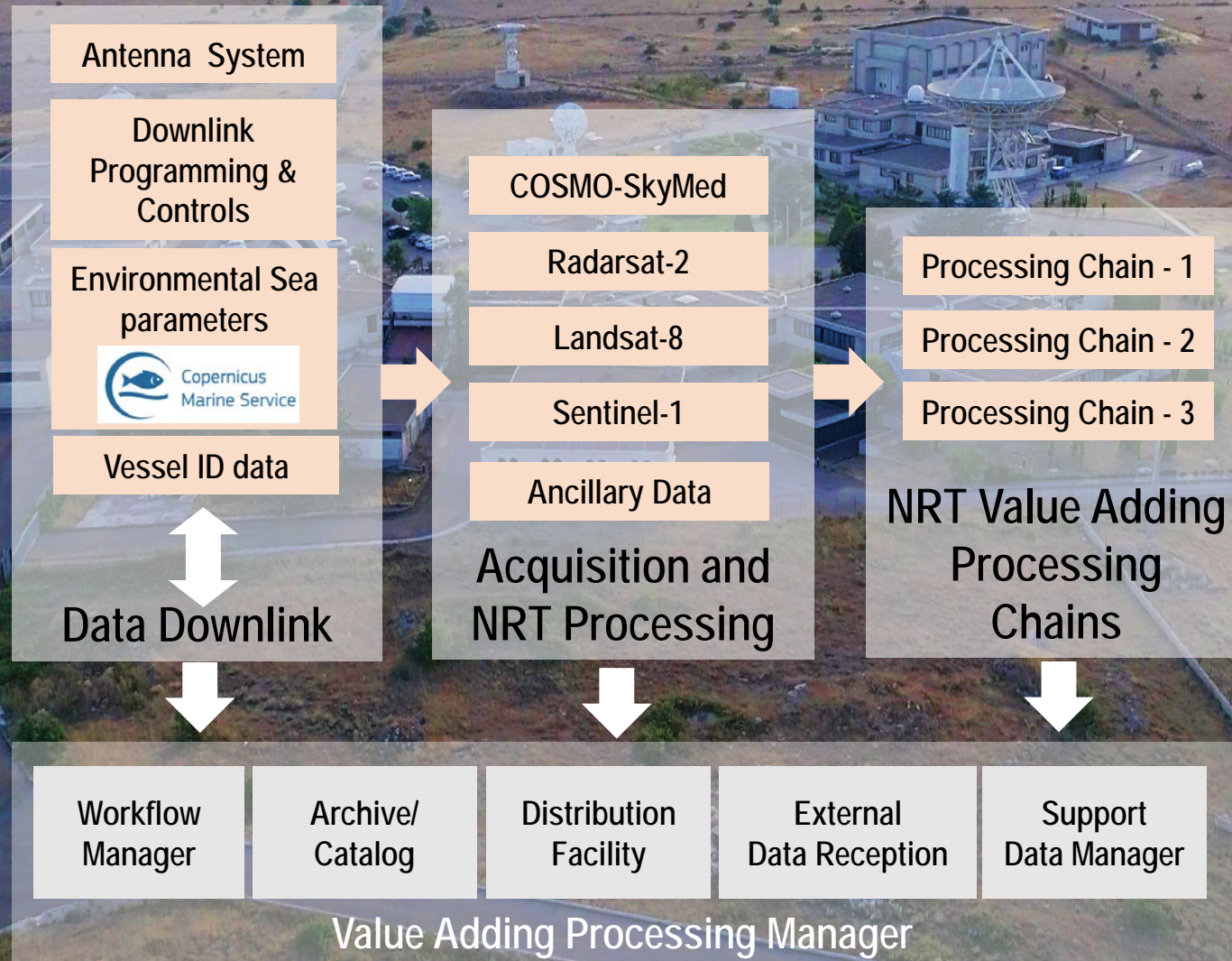
Copernicus Space Component Core Ground Segment facility

e-GEOS site in Matera is a Core Ground Segment facility to acquire and process **Sentinel-1&2** up to L1 standard products.

To fulfill the **Near Real Time** delivery requirements for data and products within the operational services to **Institutional End Users**, e-GEOS made an investment enabling its facility in Matera to acquire and process in NRT **Sentinel-1** data up to L1 standard products for (to date):

- **EMSA CleanSeaNet Services** (Oil Spill and Vessel Detection)
- **Off-shore platforms oil spill monitoring services** within Italian territorial waters (Italian Ministry of Environment)
- **FRONTEX** (Vessel Detection – incl. wake detection and sea status)

Today: e-GEOS Maritime Services workflow



Maritime Services

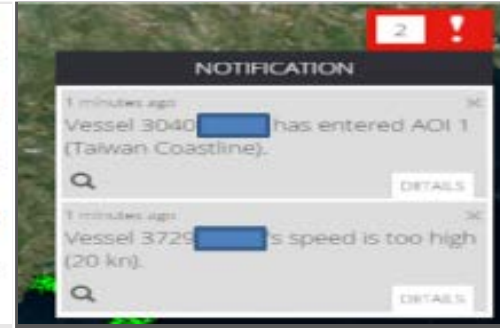
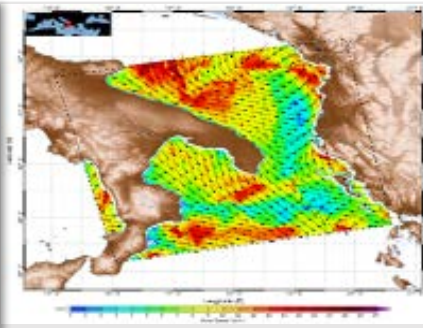
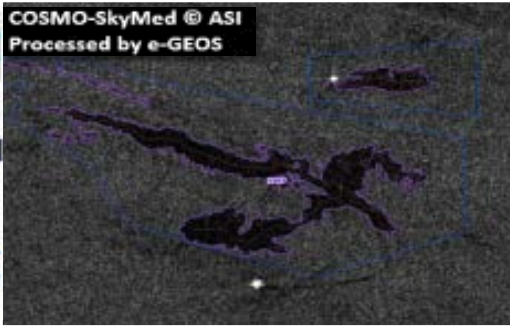
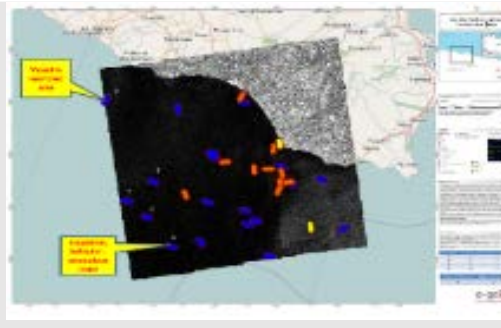
Vessel detection

Activity Report

Oil Spill Detection


Maritime Sea Status parameters

Geospatial Analysis and Alert Notifications



SERVICE STRENGTHS

 Ground Receiving Terminal Network

 Wide and Global coverage


 Multisensor solution

 Validated by Institutional User

 Secure data access

 Experienced Operators on maritime Satellite image analysis

 Operation 24/7

 Fully Automatic and/or supervised processing

e-GEOS for CleanSeaNet

7500+



Product delivered

Assets

3 antennas



3 NRT processing chains



10 YEARS
Service

Satellites

Envisat

Radarsat 1

Radarsat 2

COSMO-SkyMed

Sentinel 1A

Sentinel 1B



60+



People

Project Manager

Operational manager

NRT Team

Emergency Team

Algorithm developers

NRT chain engineer

CURRENTLY
IN ORBIT

e-GEOS for CleanSeaNet

- Oil Spill report <30 minutes from sensing
- Local wind & wave information from SAR imagery
- Quality control procedures applied to services operational production
- AIS data integration
- Operational service with Envisat and Radarsat 1

- Oil spill warning <15 minutes from sensing
- Radarsat 2 integration in Matera Ground Station
- e-GEOS develops its own Global Wind & Wave SW
- Add on of Services for Frontex
- COSMO-SkyMed

- Integration of Radarsat 2 high resolution modes
- Integration of Sentinel-1 receiving station in Matera Space Centre



 **1st**
contract



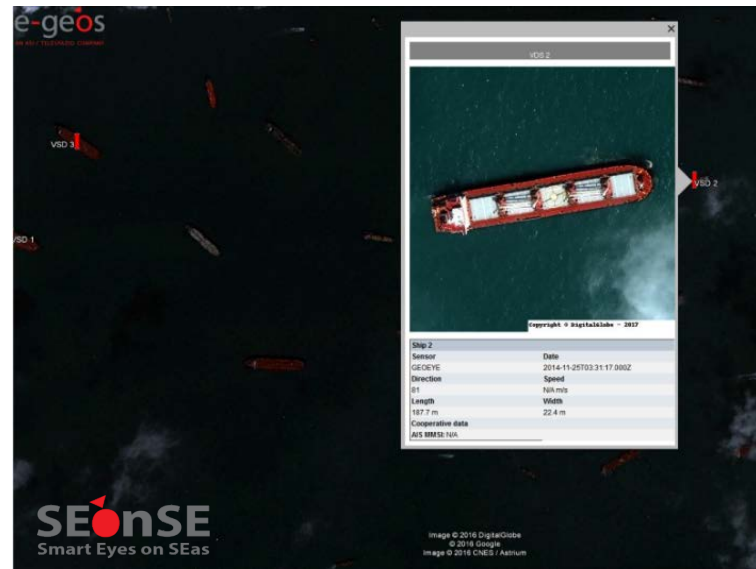
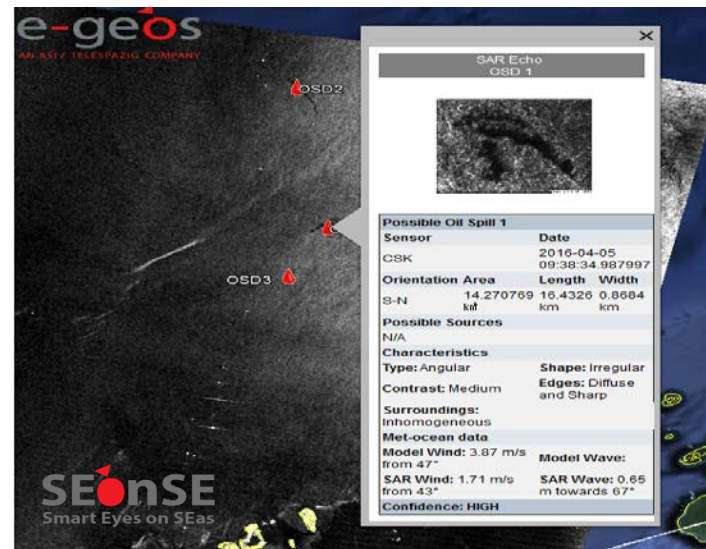
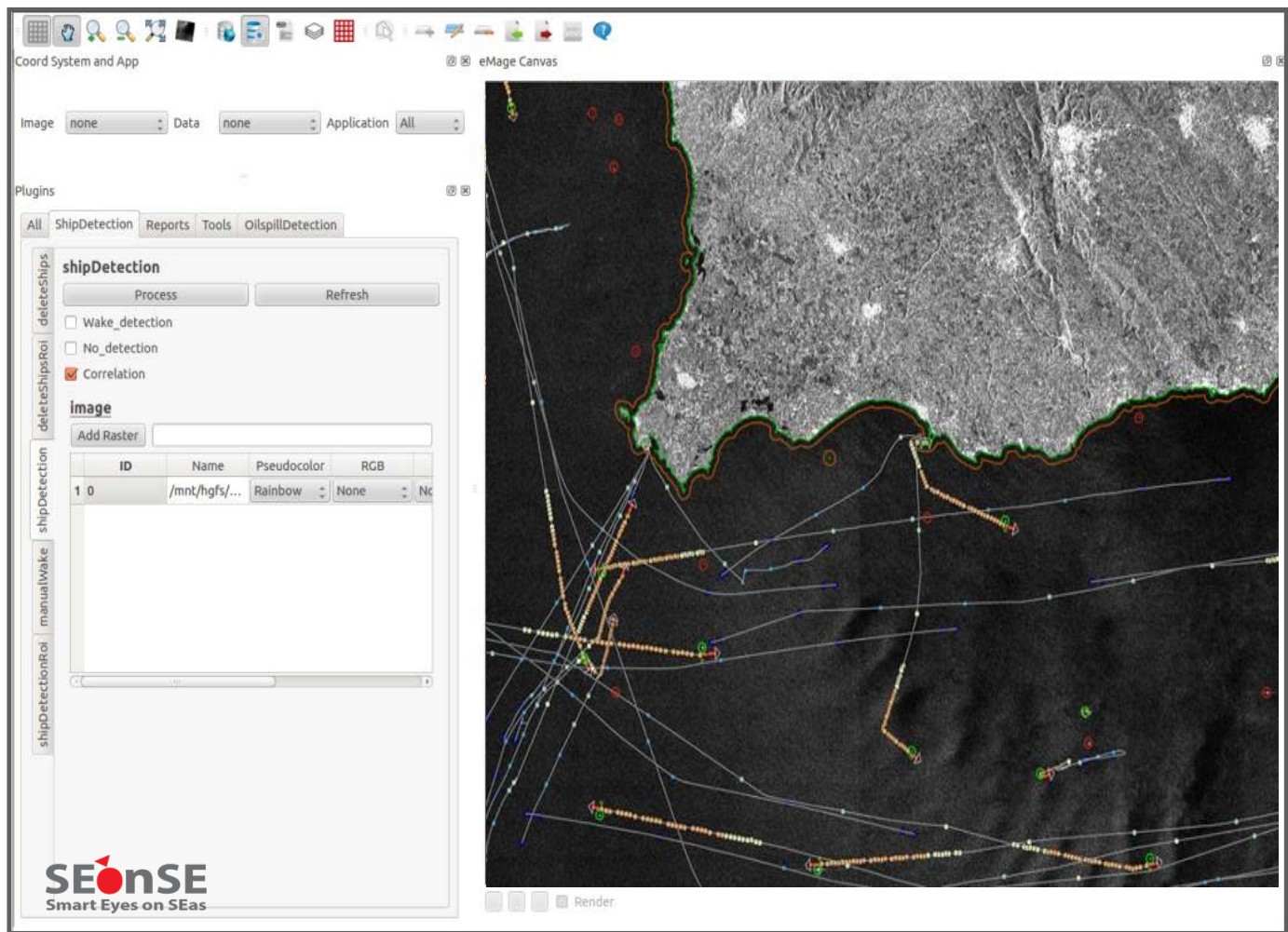
 **2nd**
contract



 **3rd**
contract

main technological evolutions

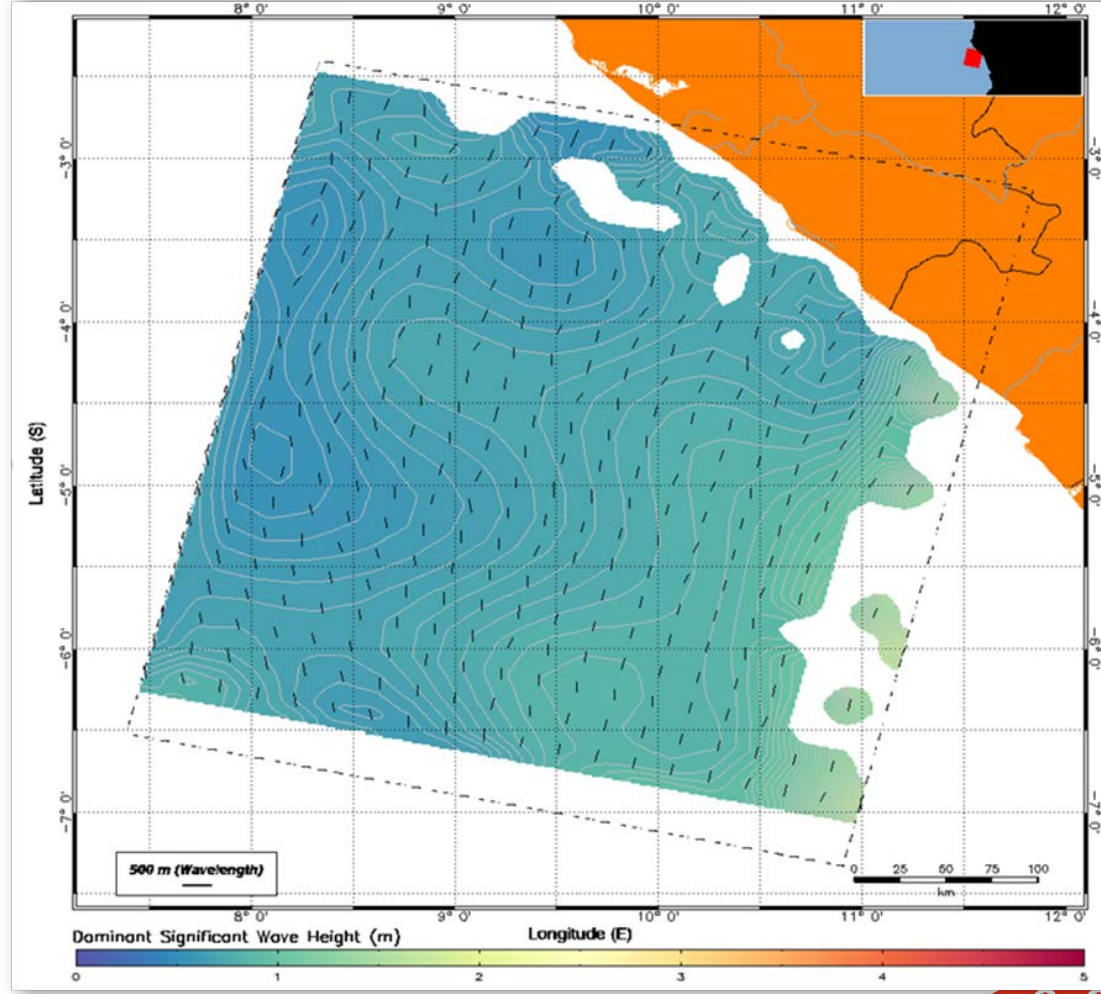
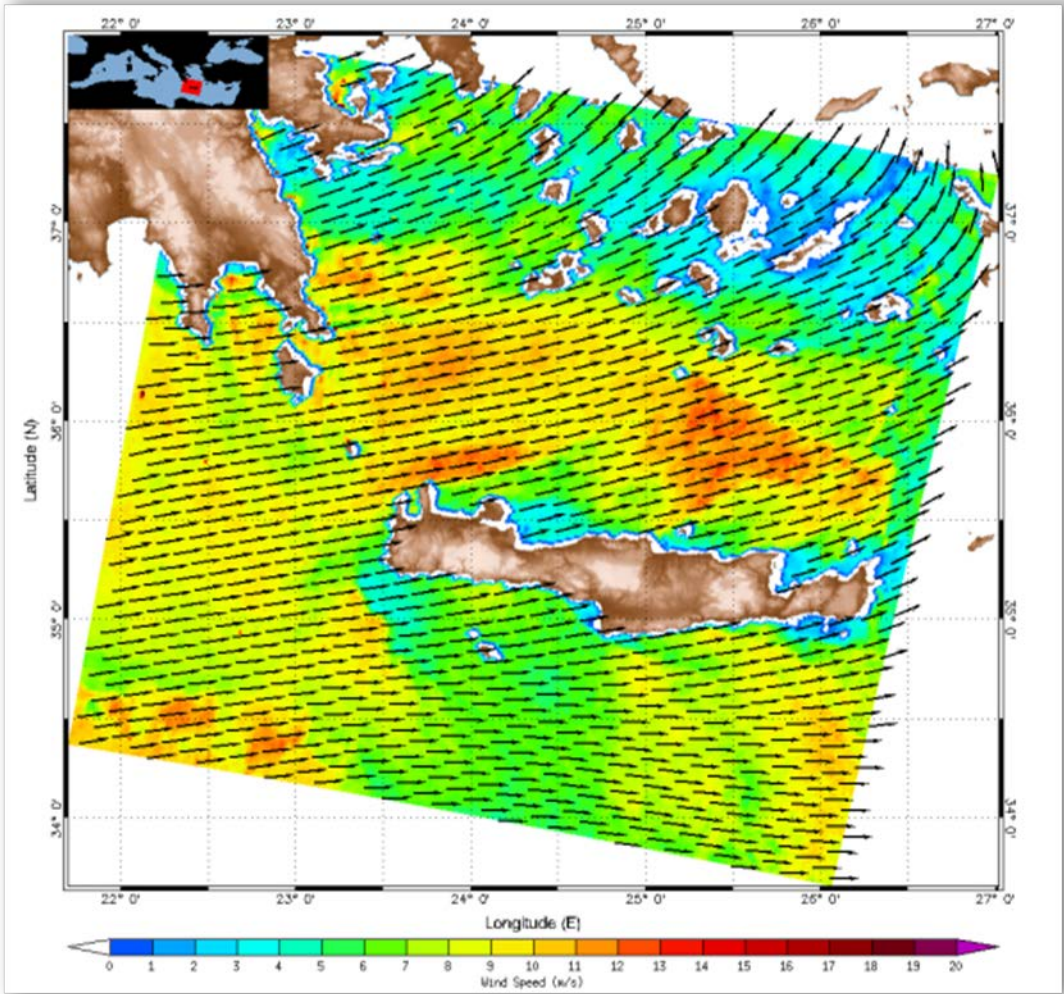
SEonSE Engine



- Multi-sensor data ingestion
- Data Fusion
- Maritime features extraction and correlation

SEonSE Engine: Wind and Wave products

Wind and wave fields extraction from SAR images with e-GEOS proprietary GWW tool



SEonSE Engine and CMEMS integration



- **Wave height** and **wind speed** data are ingested to initialize the SEonSE SAR processing module dedicated to the extraction of **SAR wind and wave layers**. These also allow the management of some other modules, such as:
 - **vessels' wake detection**, highly dependant on the sea status
 - **artifacts and false alarms reduction**
- **Surface wind** and **Currents** data are ingested to extend the **drifting simulation** capabilities, applicable both to the oil spills and vessels features
- On demand, e-GEOS performs analyses relevant to the **fisheries activities monitoring**, in favourable conditions mainly including **SST** and **CHL** data; CHL data are also included in **offshore seepage analyses**

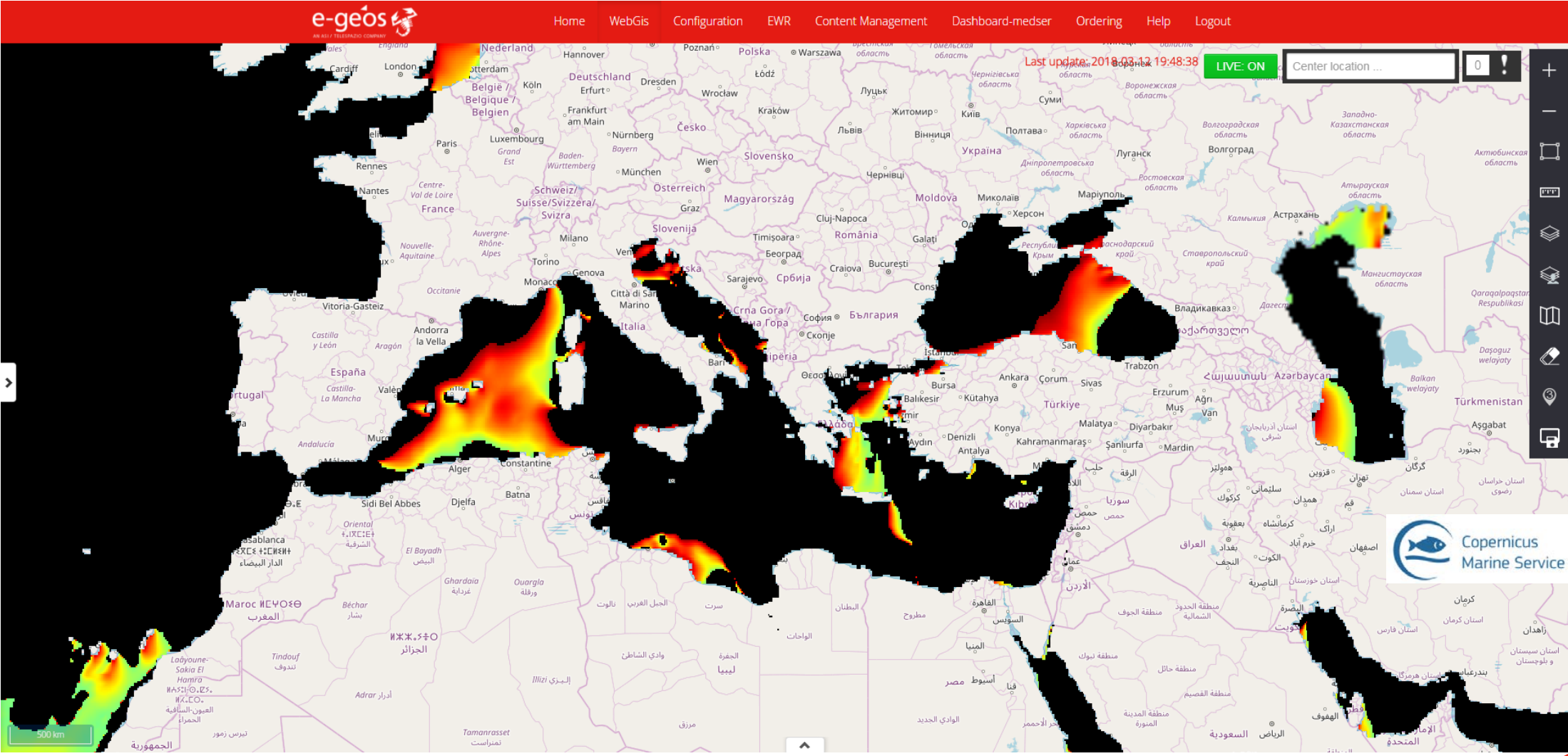
The screenshot shows the SEonSE Portal interface. At the top, there is a navigation menu with links: Welcome, WebGIS, Configuration, Content Management, Dashboard, Ordering, and Logout. The main area features a satellite map with a dark overlay representing vessel tracks. A pop-up window titled 'VO PACHECO' is open, showing a photo of the vessel and a table of metadata.

Info	Documents	Trails
MMSL: 710000900	Call sign ID: P50746	
IMO Number: 100880000	Vessel type: Fishing	
Date/Time: 2018/02/22 03:15:26	Beam: 10	
Long [°]: -51.5025366667	Length: 23	
Lat [°]: -32.7723110067	Draught: 0	
Heading: N/A	Destination: N/A	
SOG (kts): 5.1	Tow: N/A	
COG: 204.2	ETA: 2015-10-31 04:00:00	
Flag State: Brazil	Provider: brt	
Message ID: 18		

FLEXIBLE AND MODULAR:

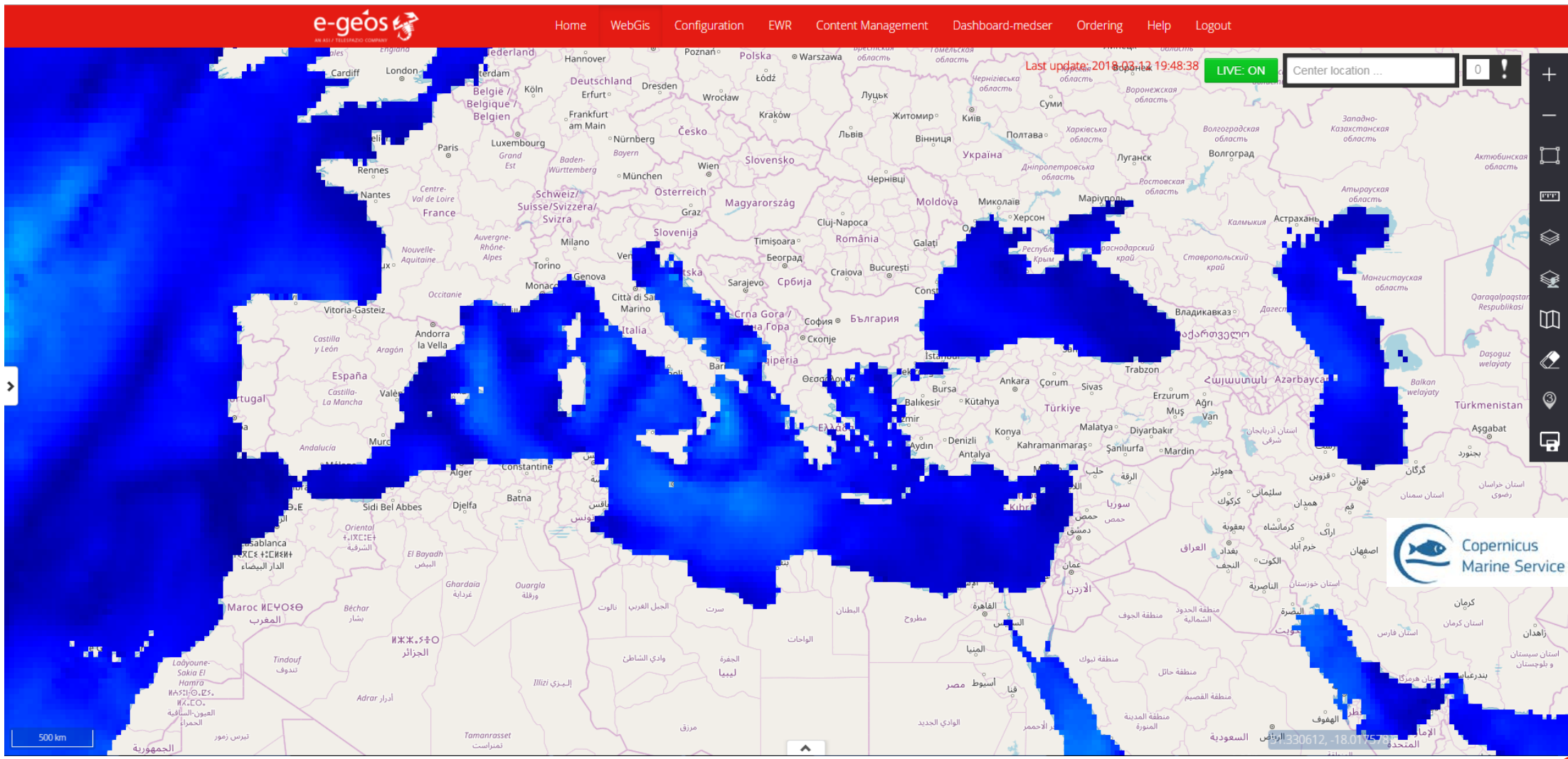
- EO Multi-mission/sensor
- Ancillary data int.
- Multi-layer selection
- Data filtering
- Forecasting
- User editing
- User alerting
- Statistics
- Reporting
- Online support

SEonSE Portal and CMEMS layers – Surface Wave



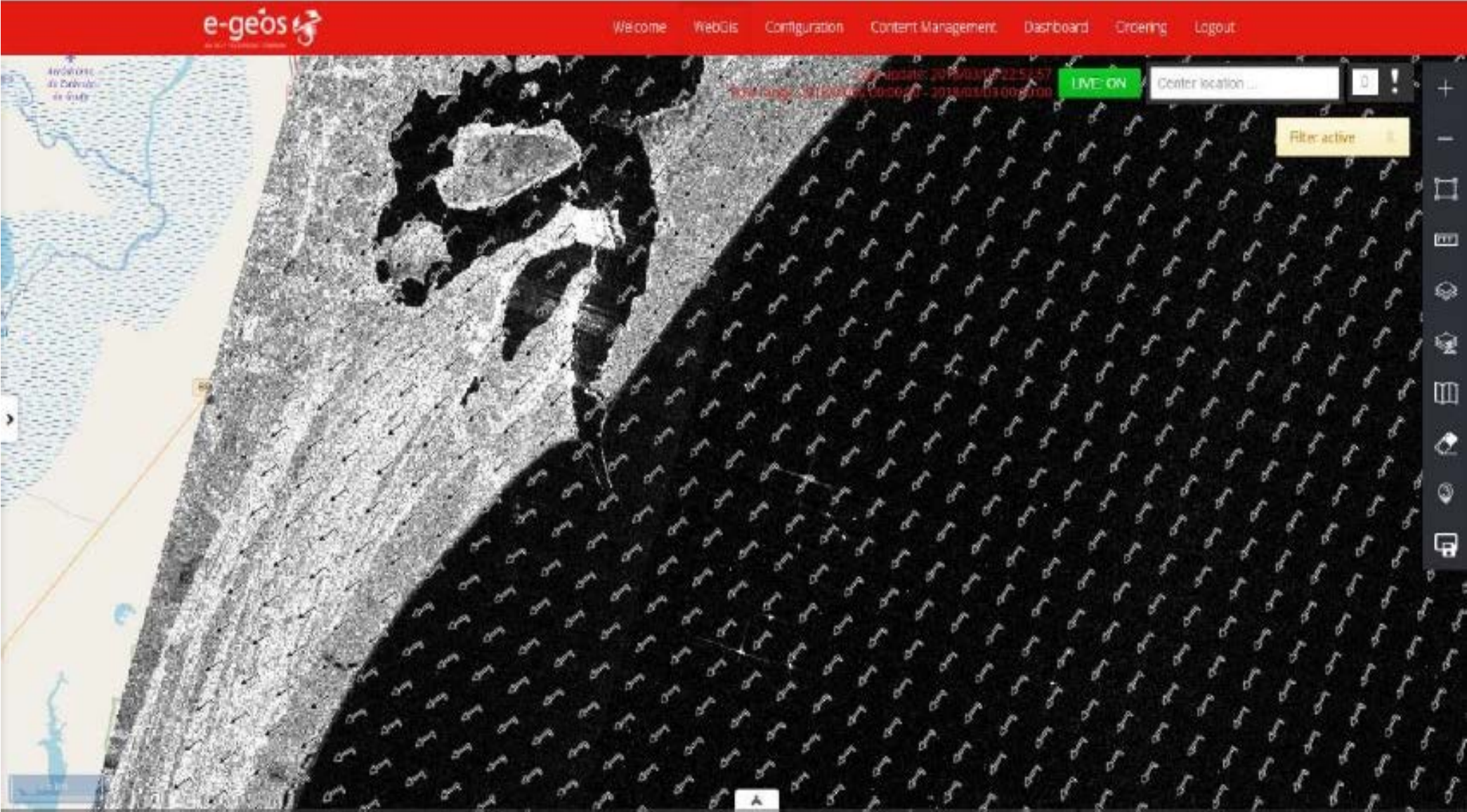
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SEonSE Portal and CMEMS layers – Wind Speed

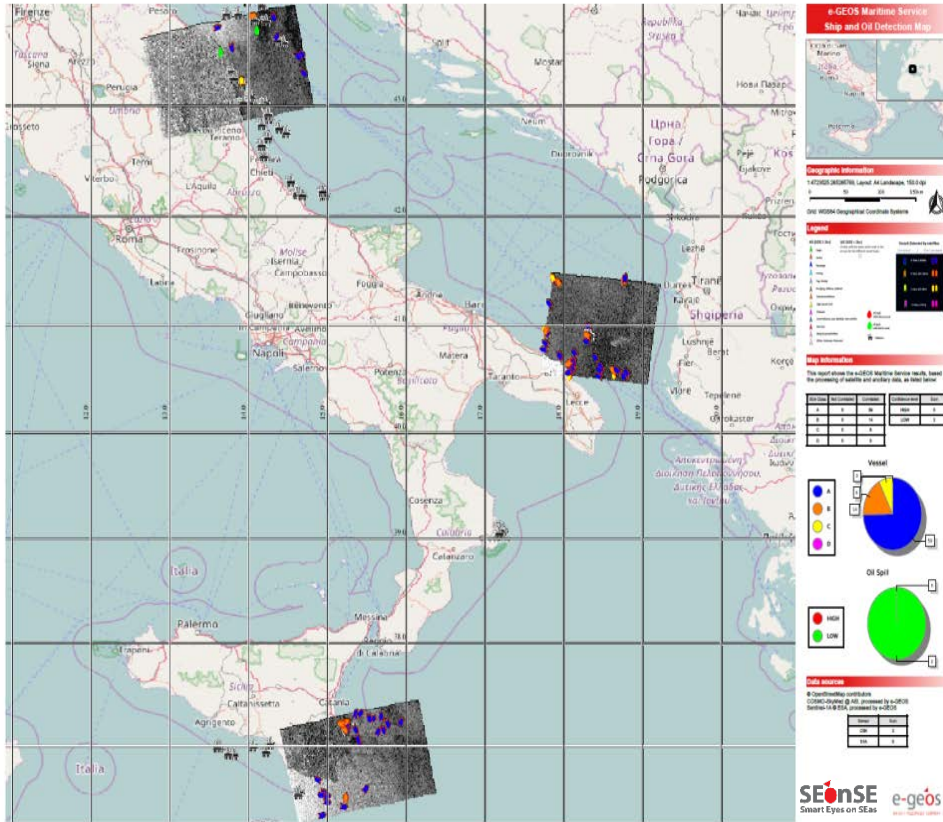


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SEonSE Portal – SAR derived Wind layer



SEonSE Portal – PDF reporting



Satellite detected vessel data

vssid	datetime	heading (°)	speed (kts)	length (m)	width (m)	class	mmsi
6	2016-05-15T04:33:51Z	81	-1,94	388,10	36,10	A	N/A
11	2016-05-15T04:33:52Z	96	-1,94	146,70	19,00	A	N/A
23	2016-05-15T04:33:54Z	7	-1,94	99,50	14,80	B	N/A
34	2016-05-15T04:33:54Z	272	-1,94	100,60	14,90	A	N/A
16	2016-05-15T04:33:55Z	96	-1,94	146,80	19,00	A	N/A
5	2016-05-15T04:33:56Z	77	-1,94	121,00	16,80	A	N/A

Satellite detected oil spill data

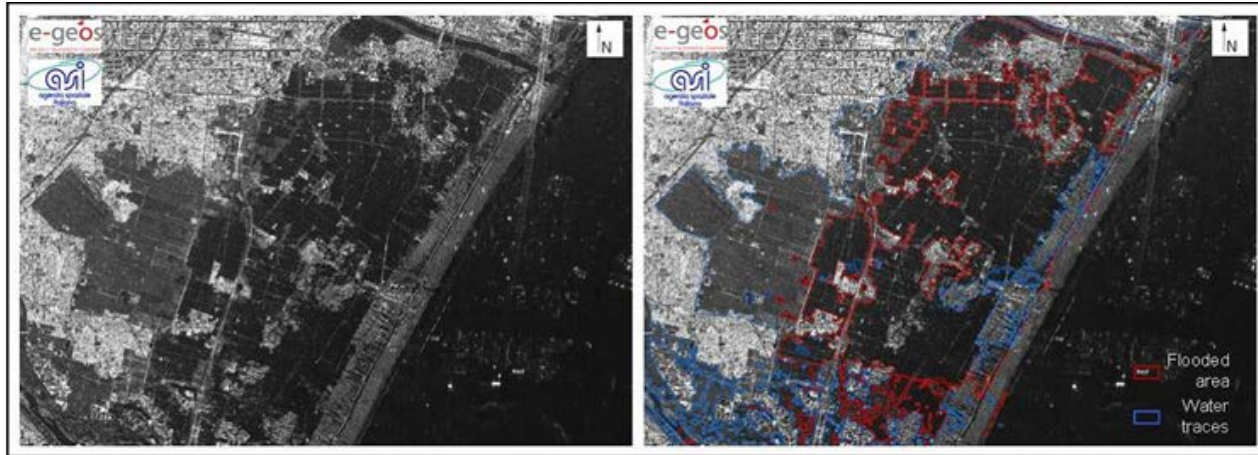
osdid	datetime	confllevel	length (km)	width (km)	orientation	possiblesource
1	2016-05-15T04:35:44.018Z	LOW	7,09	0,21	S-N	-1
2	2016-05-15T04:35:44.018Z	LOW	0,89	0,07	S-N	-1

Data sources

datetime	sensor	mode
2016-05-15T04:33:51Z	CSKS4	WR
2016-05-15T04:35:36Z	CSKS4	WR
2016-05-15T16:22:13Z	CSKS4	WR

- Reporting service provided through REST API
- Pre-configured and user-defined multiple layouts

Rischi Naturali indotti dalle Attività umana – ASI COSTE Project



Coastal flooded areas extraction, sample. – Japan NorthEast coast (2011) COSMO-SkyMed©ASI, processed by e-GEOS.



CONTRACT N. 2017-I-8.0 ASI and RTI (e-GEOS, Planetek)
Scientific Responsible: CNR (IREA, ISAC, ISMAR, IMAA)
Progetto Premiale "Rischi Naturali indotti dalle Attività umana - COSTE"

- “Collabortive Virtual Laboratory”: *costeLAB*
- To monitor and manage coastal risks based on an EO multi-mission and multi-sensor approach
 - ✓ Collaborative Ground Segment derived products exploitation
 - ✓ Big Data rapid access
 - ✓ Scalable cloud systems
 - ✓ Dedicated application platform
 - ✓ Minimize technological and interfaces limits
 - ✓ Stimulate a virtual community to share knowledge and resources (federation and collaboration of scientists)
 - ✓ Facilitate the access to Copernicus data and services
- *costeLAB* will ingest CMEMS derived data (sea status physico-chemical parameters)

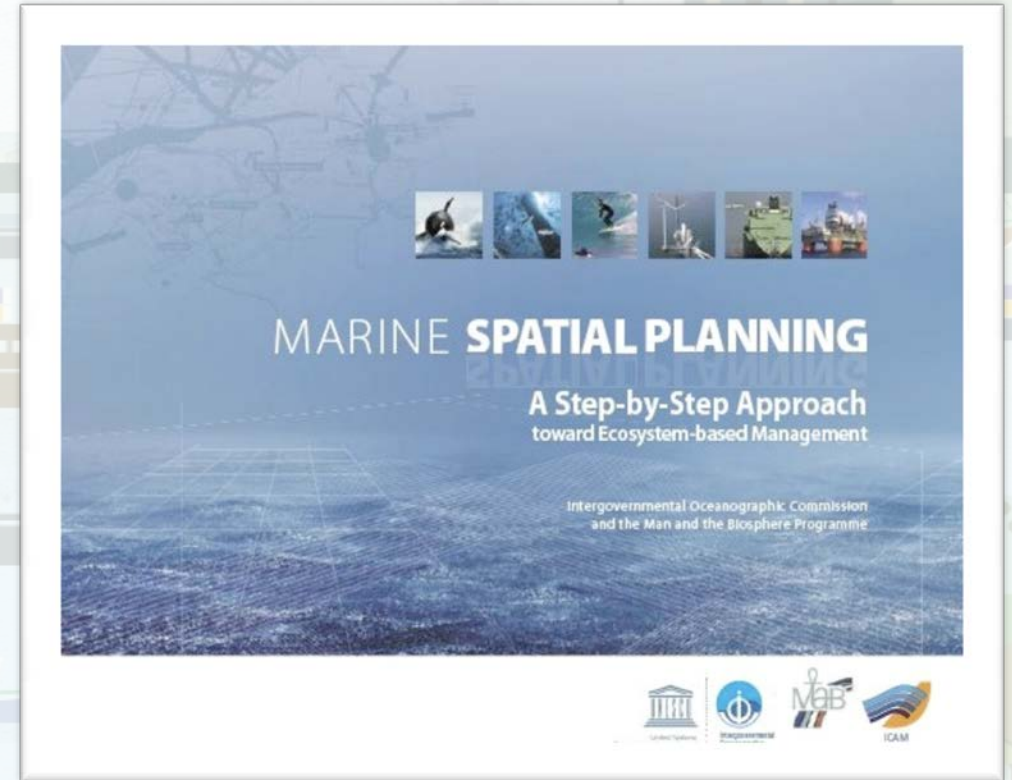


CMEMS downstream services supporting the Blue Growth, Maritime Spatial Planning and ICAM

July 2014

- **DIR 2014/89/UE**: to adopt a common framework for the **European Maritime Spatial Planning (MSP)**, including:
 - **Integrated Coastal Areas Management (ICAM)**
 - Tourism
 - Fisheries / Aquaculture
 - Oil / gas / minerals extraction
 - Wind farms / Energy
 - Ports / Vessels Traffic monitoring
 - Protected areas management

Ecosystem based approach



2021: Deadline for the establishment of maritime spatial plans

The BLUEMED Initiative



BLUEMED is the research and innovation Initiative for promoting the blue economy in the Mediterranean Basin through cooperation.

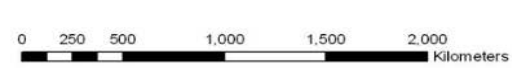
It is the strategy of reference for the Mediterranean Countries to work together for a healthy, safe and productive Mediterranean Sea.

Through the implementation of its **Strategic Research and Innovation Agenda (SRIA)**, BLUEMED Initiative will contribute to the creation of new 'blue' jobs, social well being and a sustainable growth in the marine and maritime sectors

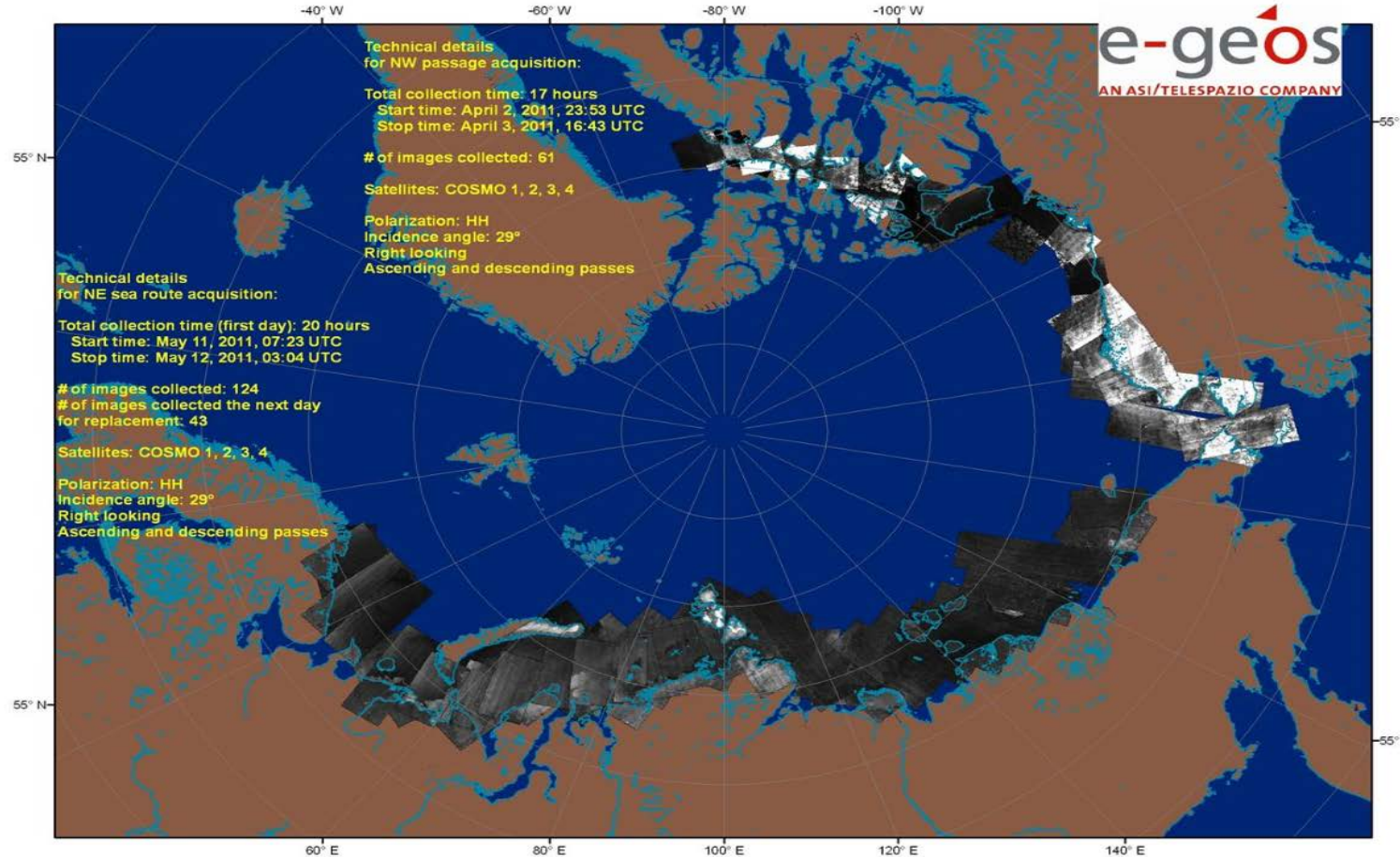
e-GEOS VP - Head of Product Management and Innovation (Federica Mastracci) is the **National Pivot for the Technology Platform**

e-GEOS is cooperating at a European level with all entities involved in the **SRIA definition**, and providing technological related contents to the **national positioning White Paper**.

Ice Monitoring and EO potential in the Arctic, the Northern shipping routes sample




COSMO-SkyMed northern routes test collection
(dedicated to John Franklin and Michail Vasil'evič Lomonosov)

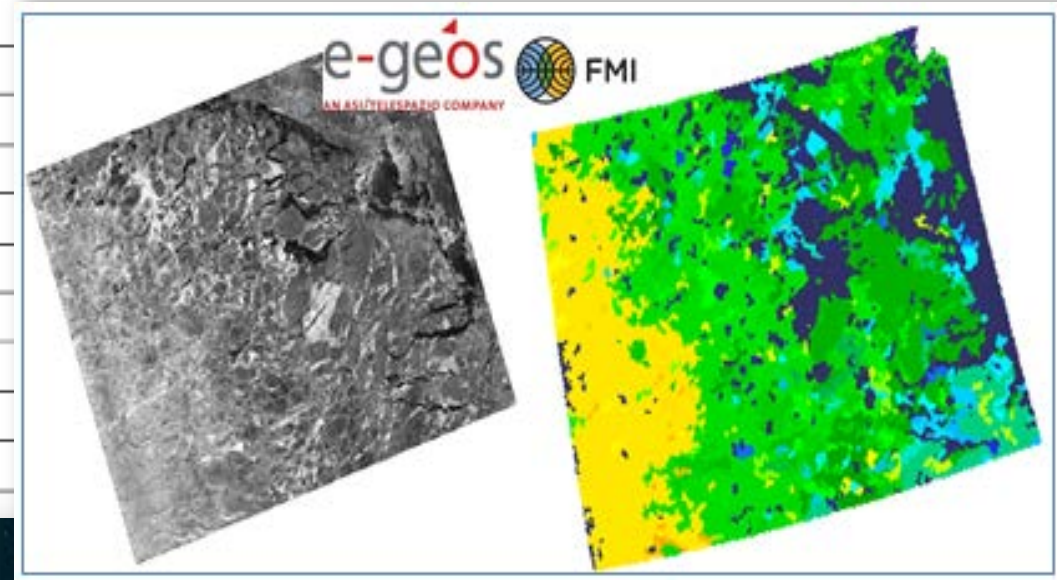


COSMO-SkyMed with its 4 satellites guarantees un-matched revisit and coverage capabilities, especially close to the Poles.

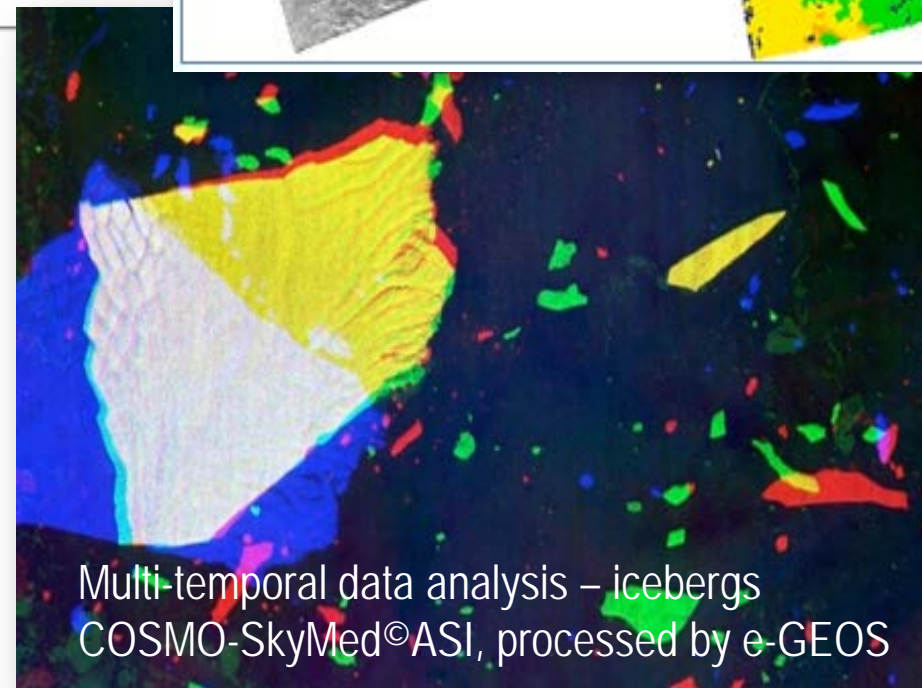
CSK allows complete coverage of the Northern Routes **every day**.

Ice Monitoring, EO and CMEMS

Sea Ice 	SIC	Sea ice concentration
	SIE	Sea ice edge
	SIT	Sea ice thickness
	SIUV	Sea ice velocity
		Sea ice drift
	SNOW	Snow
	ICBG	Iceberg
	SIAGE	Sea ice age
	SIALB	Sea ice albedo
	WIND	Wind



- MARINE EO PCP – Call for tenders recently closed
- Icebergs and Vessels Detection
- Climate Change





Grazie! ... Any Questions?

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e-geos

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