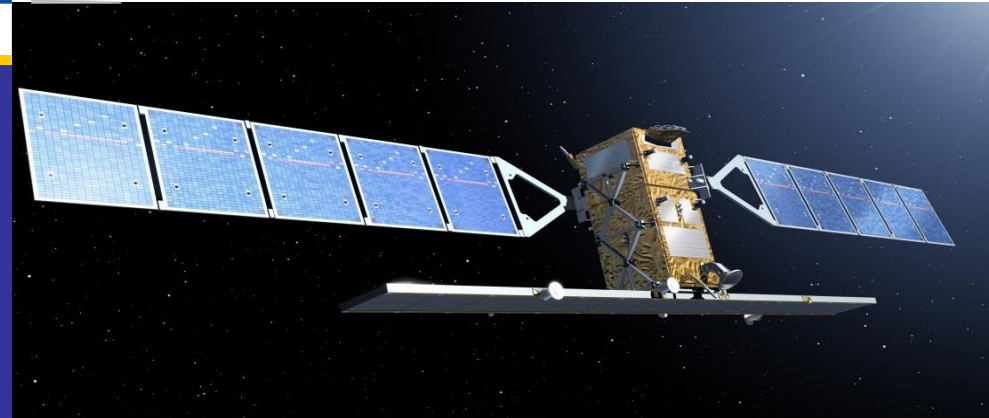


Copernicus Services: State of Play and Future Perspective

Dr. Silvo Žlebir
DG GROW, Copernicus Services



Copernicus
Europe's eyes on Earth

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 www.copernicus.eu

Space

Outline

Copernicus Services: Current situation and perspective

Copernicus Services: Data access

Copernicus Services: User Uptake Activities

Copernicus Services: Contracting opportunities

6 Services

Land Monitoring
Marine Monitoring
Atmosphere Monitoring
Emergency Management
Climate Change
Security



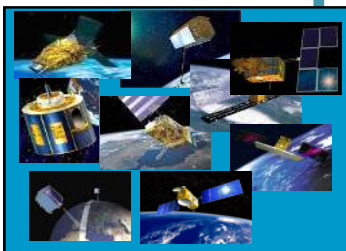
Analyses and re-analyses
Modeling
Forecasting
Service activations

...

...added-value products



Contributing
satellite
missions



in-situ
measurements



EU and global
sources:

- WMO /EUMETNET
- EuroGeographics
- EuroGOOS
- EuroArgo
- ICOS
- EARLINET
- ...

Services: Implementation Overview

Entrusted to EEA

- **Land Monitoring Service (LMS), local and pan-EU**
- **Overall In-situ Coordination**

Entrusted to Mercator Océan

- **Marine Environment Monitoring Service (MEMS)**

Entrusted to ECMWF

- **Atmosphere Monitoring Service (CAMS)**
- **Climate Change Service (C3S)**

Managed by JRC

- **Land Monitoring Service (LMS), global**
- **Emergency Management Service (EMS)**

Under negotiation

- **Security Service (CSS)**

Copernicus Land Monitoring Service



2015

Copernicus activities (incl. GIO activities until 30/06/2015)

Copernicus land monitoring service: **Pan-European** Continental Component

- ★ HR + VHR image mosaics + bio-geophysical parameters
- ★ Production of 5 thematic high resolution layers (imperviousness, forests, grasslands, wet lands, small water bodies)
- ★ Production of HRL Green Linear features
- ★ Providing land cover and land cover change information at Pan-European scale
- ★ Set up of a daily European snow & ice cover service

Copernicus land monitoring service: **Local** Component

- ★ Riparian Zones mapping
- ★ Natura 2000 sites: evolution of LC/LU + Threats
- ★ Urban Atlas
- ★ Coastal zone monitoring

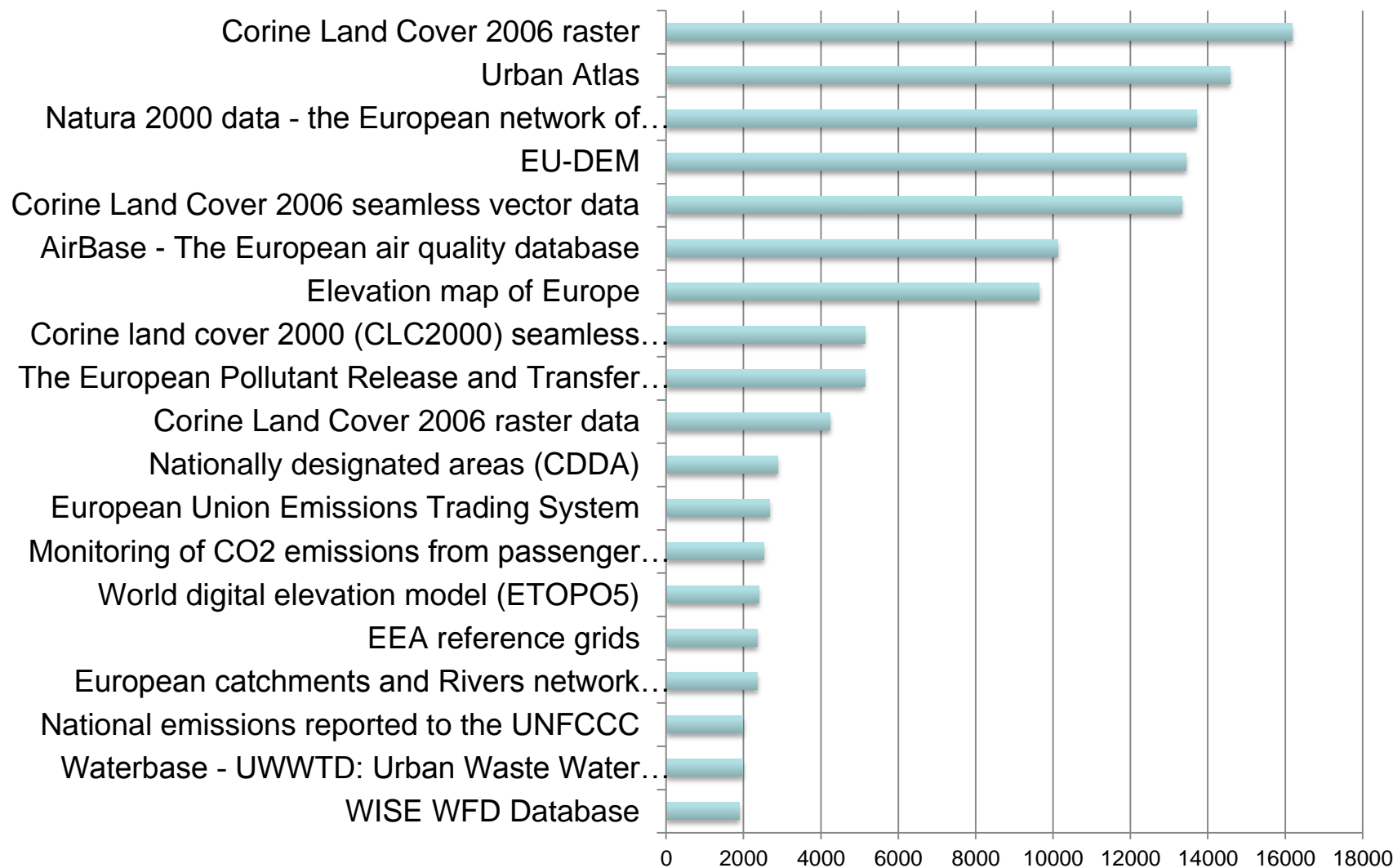


9 groups of products (vegetation-energy-water) providing a picture of the world every ten days

<i>Variable</i>	<i>Temporal Coverage</i>	<i>Temporal resolution</i>	<i>Spatial coverage</i>	<i>Spatial resolution</i>	<i>Sensor</i>
LAI/FAPAR/FCover	1999 – present	10 days	Global	1km	SPOT/PROBA V
NDVI/VCI/VPI	1999 – present	10 days	Global	1km	SPOT/PROBA V
Dry Matter Productivity	2009 – present	10 days	Global	1km	SPOT/PROBA V
Burnt Area	1998 – present	1 day	Global	1km	SPOT/PROBA V
TOC Reflectance	2013 – present	10 days	Global	1km	SPOT/PROBA V
Surface Albedo	1999 – present	10 days	Global	1km	SPOT/PROBA V
Land Surface Temperature	2009 – present	1 hour	Global	0.05 °	Σ Geo
Soil Water Index	2007 – present	1 day	Global	0.1 °	Metop / ASCAT
Water bodies	1999 – present	10 days	Global*	1km	SPOT/PROBA V

Current service evolution : move from 1 km resolution to 300 m (EU)

Unique Pageviews of downloadlink 2014



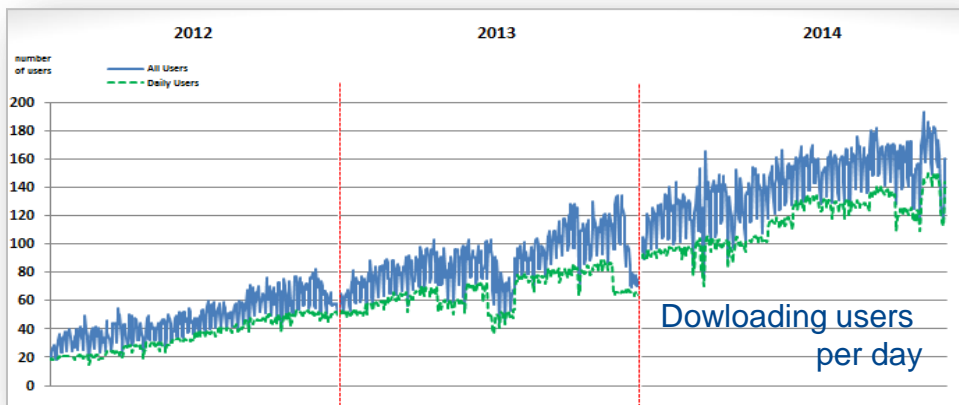
Domain	Additional Products
Pan European	HRLs : S1 SAR / S2 layers' improvement
	HRLs :Pan-European Green linear elements
Local Component	Snow information layer
	Coastal zone information
	Urban Atlas extension to EEA39
	Urban 3D
Global Component	Ten daily biophysical variables (300 m & 1 km) - World level
	Additional ten-daily biophysical variables (phenology, snow, inland water level ...) – World level
	Hot Spot mapping and monitoring at High Resolution

Copernicus Marine Environment Monitoring Service

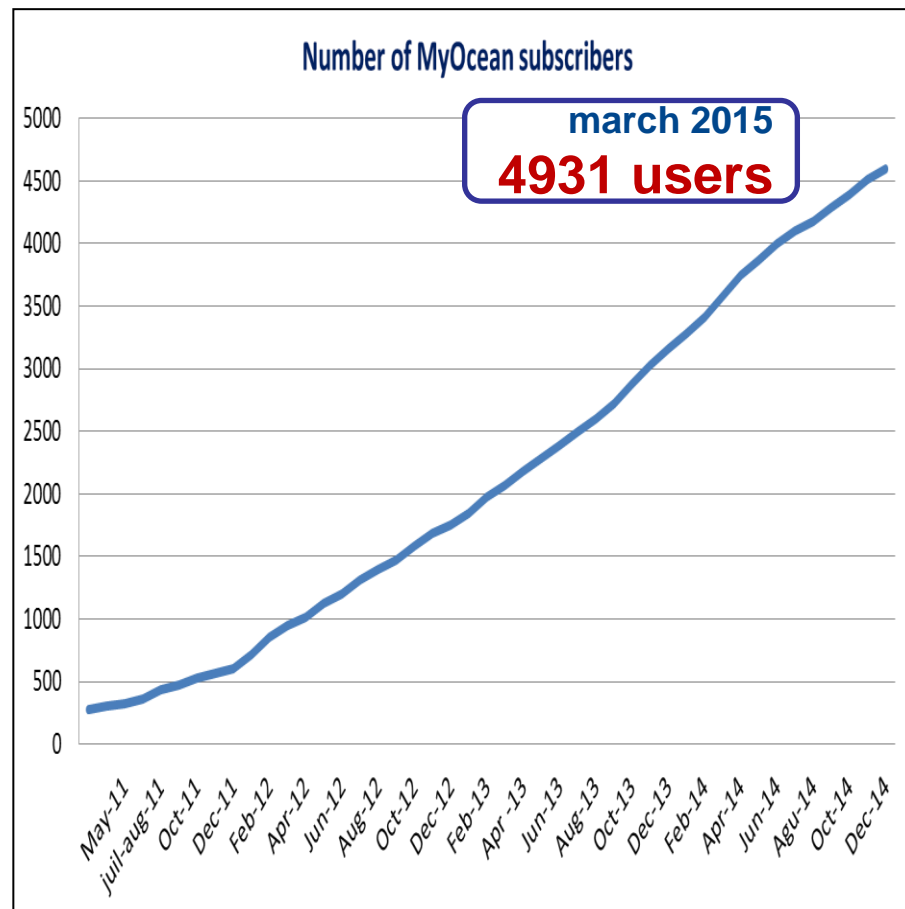
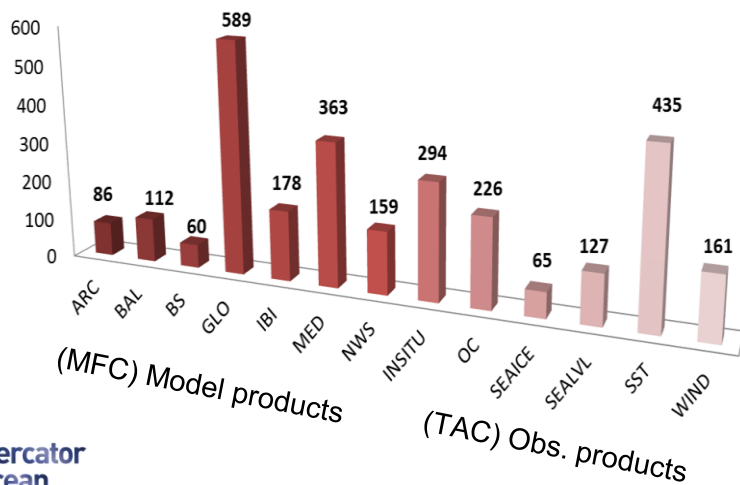
11 product groups with ~120 data products:

Domain	Product groups
Analysis and Forecast	Global Ocean
	Arctic Ocean
	Baltic Sea
	Atlantic-European North West Shelf Ocean
	Atlantic-Iberian Biscay Irish Ocean
	Mediterranean Sea
	Black Sea
Observation	Sea Level
	Ocean Colour
	Sea Surface Temperature, Sea Ice, Wind
	In-situ (Temperature, Salinity, Biogeochemistry)

Key Performance Indicators illustrated with MyOceanFollowOn operations



MyOcean - 2014
Number of users per product family (MFC & TAC)



❑ Short term:

- ✓ Operational service delivery with guaranteed level of service
- ✓ User consultation, **increased uptake** of products
- ✓ Ocean State **Assessment Report and Indicators** from re-analysis
- ✓ **Integration** of Sentinel-1 and Sentinel-3

❑ Mid term (3 years):

- ✓ Better **quality** (e.g. resolution, assimilation, forcing) and validation
- ✓ Improved biogeochemistry parameters (e.g. in support to **MSFD**)
- ✓ Development of **Wave Service** capability

❑ Long term (6 years) and beyond MFF

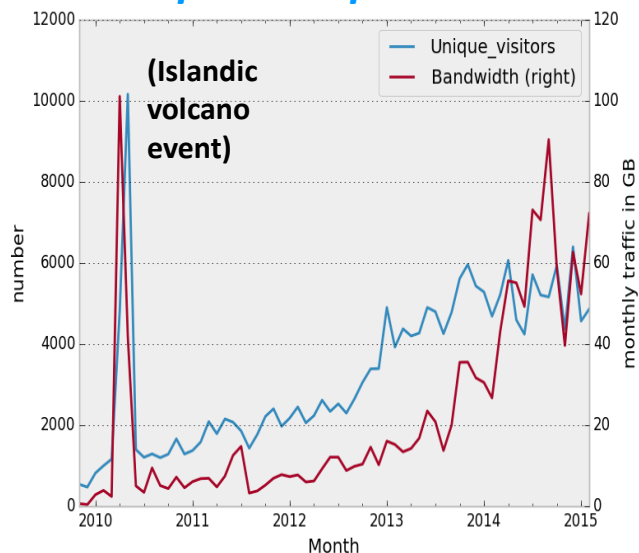
- ✓ Potential evolutions to be confirmed during first phase:
 - Improved Re-analyses / Indicators / Assessments,
 - Improved Resolution and Biogeochemistry in support to Coastal zone monitoring

Copernicus Atmosphere Monitoring Service

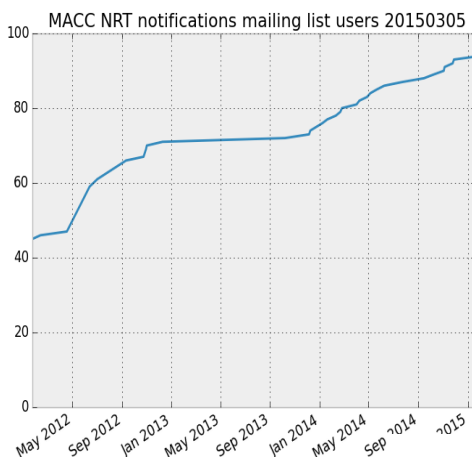
10 product groups with ~240 data products:

Domain	Product groups	
Regional products	European Air Quality O ₃ , NO, NO ₂ , CO, SO ₂ , PM ₁₀ , PM _{2.5}	NRT analysis and forecast
		Reanalysis
Global products	Atmospheric composition Greenhouse gases, reactive gases, aerosol, stratospheric O ₃	NRT analysis and forecast (troposphere and stratosphere)
		Reanalysis (troposphere and stratosphere)
Supplementary products		Policy support
		Solar radiation
		Greenhouse gas fluxes
		Climate forcing
Emissions products		Anthropogenic emissions
		Fire emissions

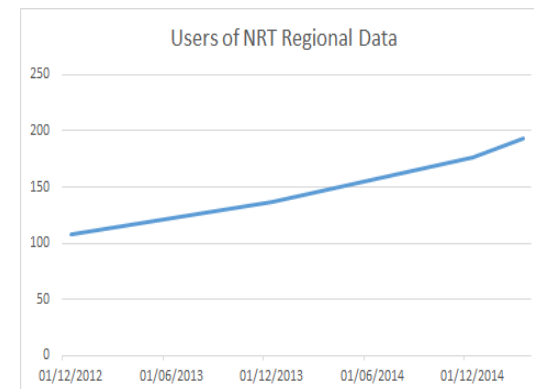
atmosphere.copernicus.eu web



Daily time-critical users of Global Services

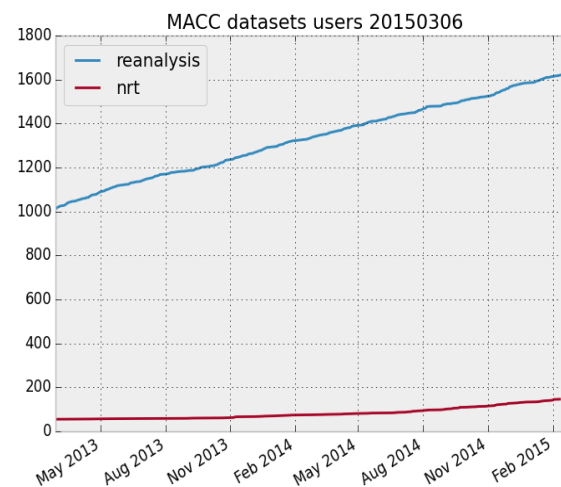


Daily time-critical users of Regional Services



Service	Number of Users/ Requests for data
Global NRT Analyses & Forecasts	~225 users
Regional NRT Analyses & Forecasts	155 users
Global Reanalysis	1600 users
GHG flux inversions	40 users
Solar Radiation	~1000 requests/year
Global ftp	~ 40 users
Emissions, fire	1773 users (716 institutes)

Users of the global re-analysis



❑ Short term – phase I

- ✓ Operational service delivery with guaranteed level of service
- ✓ Facilitating access: advanced web services, OGC compliant formats
- ✓ **Use cases to increase uptake of products and support effective communications (success stories)**
- ✓ Consolidation of access to in-situ **observations** from international networks and research infrastructures
- ✓ Product data sheet and improved documentation

❑ Continuous priorities

- ✓ **improved quality (resolution, methodology...) and validation**
- ✓ **Enhanced and additional assimilation of space based measurements (Sentinel-3 [AOD, FRP], S-5precursor, S-4, S-5, Metop, NPP, JPSS...)**

❑ Long term – phase II and beyond MFF

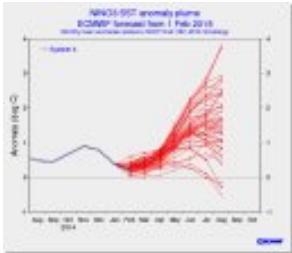
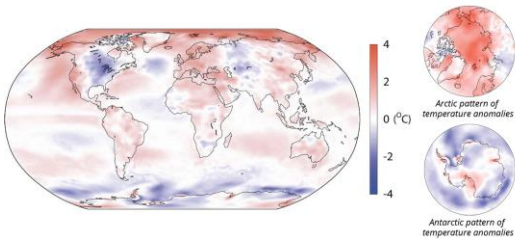
- ✓ **evolution to be defined during phase I and through user consultation.**
***Potential* aspects: support in case of volcanic eruptions, operational pollen forecasts...**

Copernicus Climate Change Service



Geophysical domain	Climate variable
Atmosphere surface	Surface Air Temperature
	Surface Precipitation
	Water Vapour (Surface Humidity)
Atmosphere Upper-Air	Surface Radiation Budget
	Earth Radiation Budget
	Cloud Properties
Atmosphere composition	Carbon Dioxide & Methane
	Ozone & Aerosol
Atmosphere Upper-Air and surface	Wind speed and direction
Oceanic Surface	Ocean Colour
	Sea Ice
	Sea level
	Sea Surface Temperature
Oceanic Sub-surface	Global Ocean Heat Content
Terrestrial	Snow Cover
	Glaciers and Ice Caps
	Albedo
	Fraction of Absorbed Photosynthetically Active Radiation (FAPAR)
	Fire Disturbance
	Ice Sheets

Sector	Sectoral index
Agriculture and forestry	Vegetation health/FAPAR
	Crop Moisture Stress Index
	European Drought Index
Coastal areas	Global and EU means and anomalies
	Ocean colour/currents/sea level
Health	Heat Stress Index
	Climate extremes
Infrastructure	Air Freeze Index
	Residential Energy Demand Temperature Index
Tourism	Climate means and trends
	Extreme events
	Regional snowfall index
Water management	snow index
	EU drought index
	Lake level
Marine & fisheries	Sea Surface Temperature means and trends
Energy	Residential Energy Demand Temperature Index
	Climate means and trends



Copernicus Emergency Management Service

Mapping Component

Early Warning Component

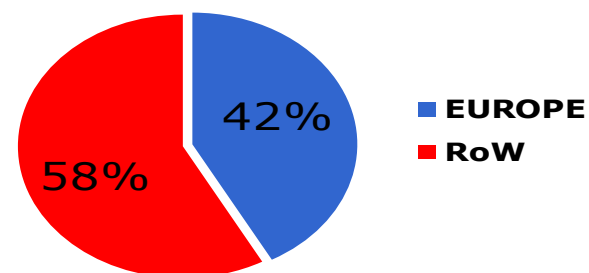
Domain	Products	
Mapping (upon specific requests from authorised users - "activations")	Rapid Mapping	Reference Maps
		Delineation Maps
		Grading Maps
	Risk and Recovery Mapping	Reference Maps
		Pre-disaster situation maps
		Post-disaster situation maps
Early Warning System	EFAS	- Daily overview reports, - flood alerts, and - Flood watches for forecasted floods up to 10 days in advance (real-time info: not public, for national authorities and ERCC only). - European overview of ongoing floods (public)

EMS - Mapping

□ How many activations?

135 in total since April 2012:

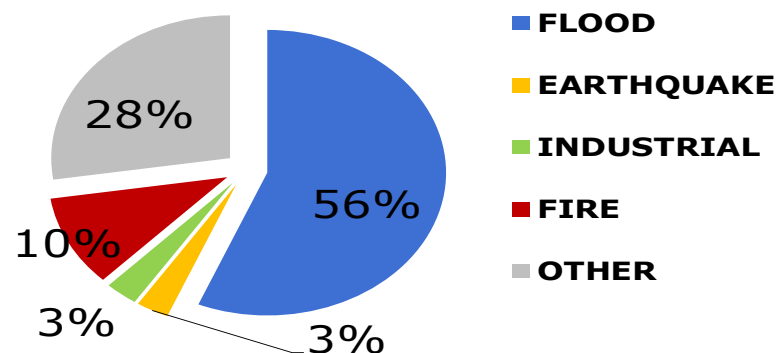
→ 69 in Europe, 66 outside



□ Which kind of disaster?

**14 Fires, 76 Floods, 4 Earthquakes,
4 Industrial accidents, 37 Other**

- In Europe: mostly floods
- Outside Europe: many humanitarian



□ Who is activating?

Activations are received by:

- MS Civil Protection,
- European Services or
- UN agencies via DG ECHO

- **integration of EFFIS in the EMS portfolio**

- **increased nb of activations**

(through promotion of EMS e.g. to EU dels)

- **integration of early warning
into Rapid Mapping activations**

e.g. EFAS and EFFIS alerts for floods and forest fires

- **reduction of service delivery time**

*Early warning, satellite pre-tasking (already positive experience **during activation for Balkan floods**)*

- **enlarged geographic cover of EFAS**

- **evaluation of EMS service 3 years-on.**

Copernicus Security Service





Copernicus - Security Implementation Plan

Border
Surveillance

Support to
EU External
Actions

Maritime
Surveillance

(DA) Spring 2015

(-) Late 2015

DA April 2015



Inter-Agency cooperation

Industrial Base

Domain	Product groups
LAND SERVICES	Coastal Monitoring
	Pre-frontier Monitoring
	Reference Imagery/ Mapping
MARITIME SERVICE	Maritime Surveillance of an Area of Interest
	Vessel Detection Service
	Vessel Tracking and Reporting Service
	Vessel Anomaly Detection Service
ENVIRONMENTAL SERVICES	Environmental Assessment – for Risk Analysis

Security/Maritime surveillance TODAY



User community	Product groups	Products
Fisheries Control	Monitoring of fishing grounds	Monitoring of fishing grounds; High seas industrial fishing; Large vessels and reefers
		Monitoring of fishing grounds; high seas industrial fishing; Medium-sized vessels, reefers, and cages
		Monitoring of fishing grounds; Coastal fishing; Small vessels (active and static gear), tugs and cages, auxiliary vessels
		Monitoring of fish cages; Small areas; detailed analysis
	Monitoring of fishing ports to survey and control the departing or landing of fishing vessels	Monitoring of fishing ports; Large areas; large objects
		Monitoring of fishing ports; Small areas; detailed analysis
Maritime Security and Safety		Search and rescue
Customs		Ship safety
		Monitoring of criminal trafficking of goods
Marine environment Services		CleanSeaNet: Support to pollution Response
		CleanSeaNet: Detection of illegal oil discharges
Various potential user	Defence	Shoreline Geospatial Information Services
		Extended Maritime Surveillance
		Support to Anti-piracy Activities
		Blue Belt (monitoring movement of goods)

Outline

Copernicus Services: Current situation and perspective

Copernicus Services: Data access

Copernicus Services: User Uptake Activities

Copernicus Services: Contracting opportunities

Copernicus data access – FREE AND OPEN DATA POLICY!

- Currently:

- **Different Services' data portals and information-product portals, registration mostly required**
 - <http://land.copernicus.eu>
 - <http://emergency.copernicus.eu>
 - <http://atmopsphere.copernicus.eu>
 - <http://marine.copernicus.eu>

- Near future integrated system:

- **One big data Copernicus portal (copernicus.eu) and common registration facility**

- Additional possibility:

- **Making use of GEO/GEOSS Portal and GEOSS Common Data Infrastructure**

Outline

Copernicus Services: Current situation and perspective

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Copernicus User Uptake: 2013-2014 Project Background

***Objective: to give support to the take-up of
4 Copernicus services by users***




Contract started in Dec 2012 and runs until August 2014

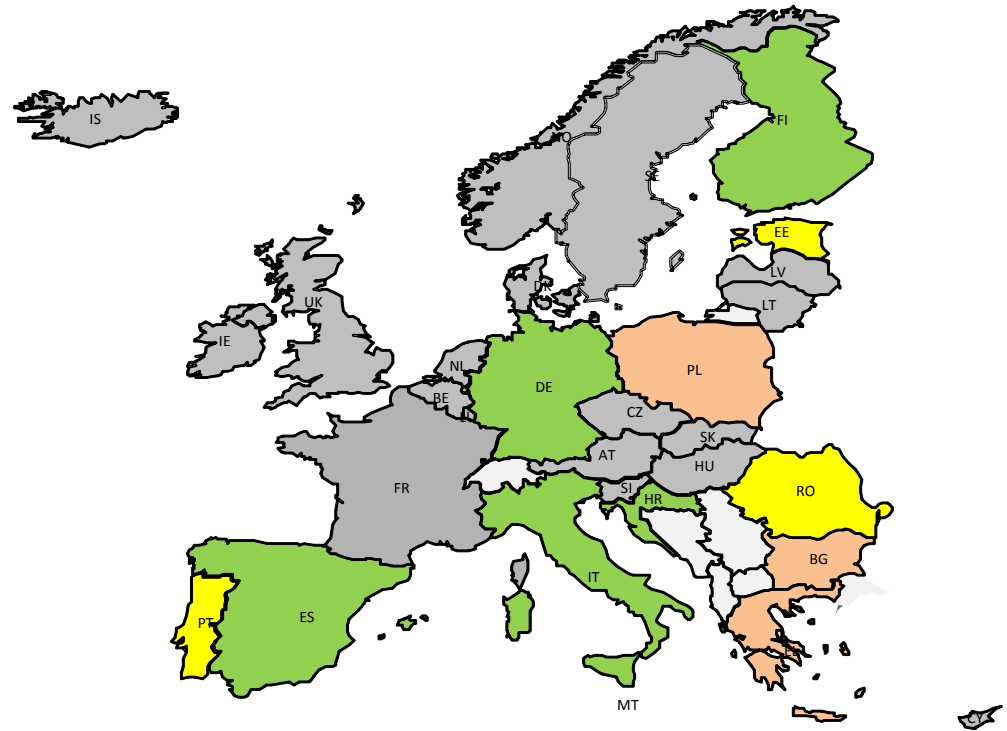
Project consortium:

Led by CGI UK Ltd (formerly Logica UK Ltd), partners from industry and user organisations, with expertise in Copernicus



Copernicus User Uptake 2013-2014 Project - Activities and Geography

-  Test Case Users
-  Emergency Showcases/Events
-  Awareness and Training Events



- ❑ **Support the integration of Copernicus services into users' specific workflows**
- ❑ **Development of value-added products or tools**

Land

1. Global Land products (Spain)
2. Soil sealing/ land take indicators (Italy)

Marine

1. Support for MSFD (Baltics, Adriatic, Black Sea)
2. Support for Coastal Ecosystems Management (Italy)
3. Web visualisation Tools

Atmosphere

1. PM10 event analysis (Germany)
2. Long range pollutant transport (Helsinki)
3. Tools for dissemination of pollen information

Materials downloadable from:

www.copernicus.eu/main/user-uptake/

- Webinars
- Training materials
- Test Case reports and presentations
- Mid Term and Final Report

New Framework Contract (FWCs 2015-2018):

• SUPPORT TO THE UPTAKE OF THE COPERNICUS SERVICES BY USERS

Lot 1: Support to the user uptake promotion, communication and dissemination activities

- *Copernicus user communication strategy roadmap*
- *Copernicus user uptake information sessions*
- *Redevelopment and hosting Copernicus user uptake website*

Lot 2: Support to the use of Copernicus data and information

- *Workshops–Integration of Copernicus data and integration(user uptake)*
- *Organization of app and data/information provision app competitions and/or development camps at local, regional and/or national level*
- *Education and training activities to support the user uptake by expert users and decision making users/managers*

New Framework Contract (FWCs 2015-2018):

- **SUPPORT TO THE UPTAKE OF THE COPERNICUS SERVICES BY USERS**

Addressed to:

- ***Intermediate users and end-users***

Intermediate users built upon the Copernicus data and information to deliver value-added information/service to the end-users

- ***Technical experts and non-technical experts (managers, decision makers)***

Outline

Copernicus Services: Current situation and perspective

Copernicus Services: Data Access

Copernicus Services: User Uptake Activities

Copernicus Services: Contracting opportunities

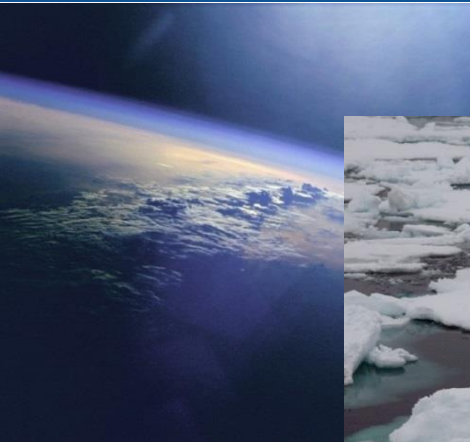
• Environmental Monitoring

- Protecting people and property
- Effective environmental policy implementation
- Combating climate change

• Economic growth, creating new jobs

- Security for European citizens

• ...





Copernicus services rely on industrial procurement

- **Direct Management**

See Copernicus Web site:

<http://www.copernicus.eu/main/tenders-grants>

and

See TED – Supplement to the Official Journal of the EU:



<http://ted.europa.eu/TED/main/HomePage.do>

- **Indirect Management**

See Copernicus Entrusted Entities Web pages :

European Environment Agency (EEA): Land Monitoring, In situ coordination

ECMWF: Atmosphere Monitoring Service, Climate Change Service

Mercator Ocean: Marine Environment Monitoring Service

and

See TED – Supplement to the Official Journal of the EU :



<http://ted.europa.eu/TED/main/HomePage.do>



**Thank you
for your attention**