



European
Commission

Copernicus Emergency Management Service

Francoise VILLETTE
DG GROW,
I2 Copernicus Unit



Copernicus
Europe's eyes on Earth

Follow us on:

 Copernicus EU

 CopernicusEU

 www.copernicus.eu

Space



- ★ Copernicus Space programme – what is it ?
- ★ The 6 services from Copernicus
- ★ The Emergency service



- ★ **Earth Observation programme** providing relevant information to EU policies in the fields of **environment, disaster management and security** (former GMES)
- ★ Copernicus is a **flagship of the European Space Policy**
 - ★ *Copernicus Space Programme of the European Space Agency (ESA)*
 - ★ *Copernicus Regulation + MFF*


Objectives




"The Union Earth observation and monitoring programme"

Monitor the environment


Foster downstream applications in a number of fields




Protect people and assets




Increase general knowledge on the state of the Planet




Improve environmental policy effectiveness



Facilitate adaptation to climate change

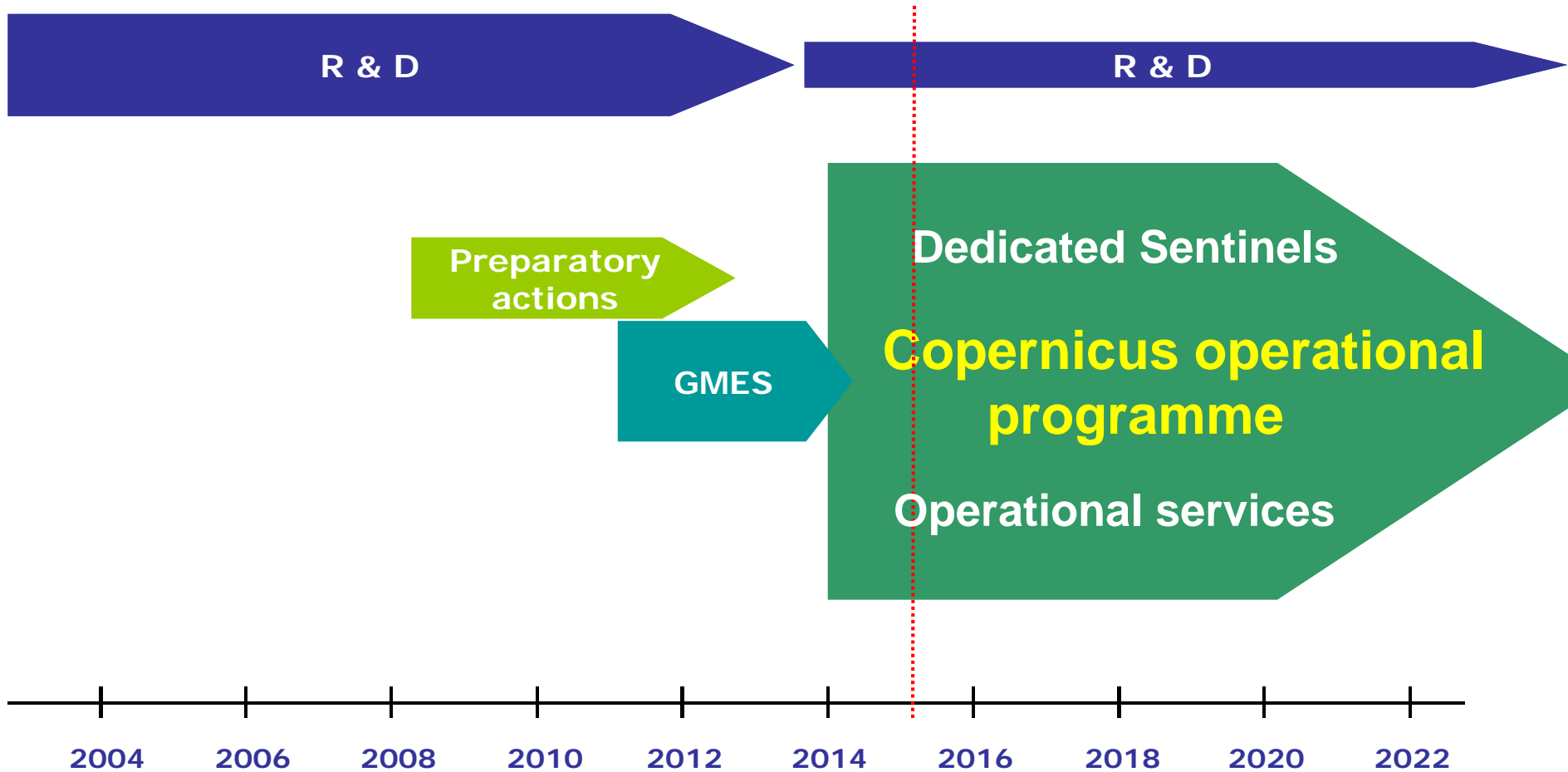


Help managing emergency and security related situations





Activities now transfer from research to operations



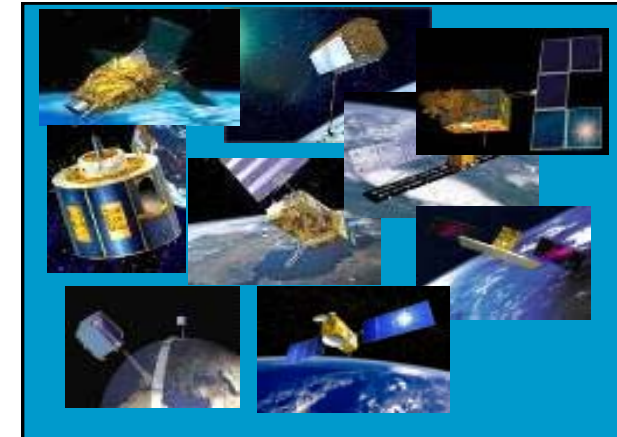


Seven Milestones reached:

- **Programme Regulation adopted**
- **Budget of € 4.3 Bn for 2014-2020**
- **Full, free and open access to data**
- **Successful launch of Sentinels 1A+2A+3A**
- **First images used**
- **Funds delegated to ESA/EUMETSAT and service providers**
- **Four services are operational delivering 24h/7d**

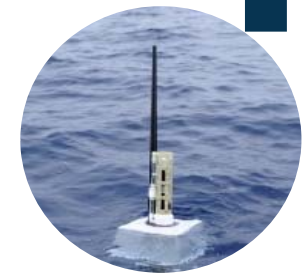
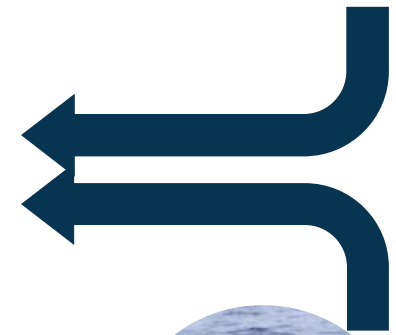


6 services use Earth Observation data to deliver ...



Contributing missions

Sentinels



...added-value products

in-situ



Each Sentinel is technically different to meet the needs of the 6 services



Sentinel 1 – radar imaging
All weather, day/night applications



Sentinel 2 – Optical imaging
Land applications: urban, forest, agriculture,..



Sentinel 3+6 – Ocean and global land monitoring, high precision ocean altimetry



Sentinel 4+5 – Atmosphere composition monitoring, from a geostationary (-4) and a polar orbit (-5)

Space Segment



- **First Sentinel launched April 2014, operational since Oct 2014. Sentinel 2 launched June 2015, S3 launched mid-February 2016**
- **By end 2020: 8 Sentinel satellites in orbit, over **24 Sentinels by 2040**, providing most of the data needed by Copernicus services**
- **Where Sentinels not yet operational, Programme buys Earth Observation data from other satellite data providers**

DD/MM/YYYY, Name of the event, Place

Space

First Name SURNAME, GROW, UNIT



Sentinel-1A

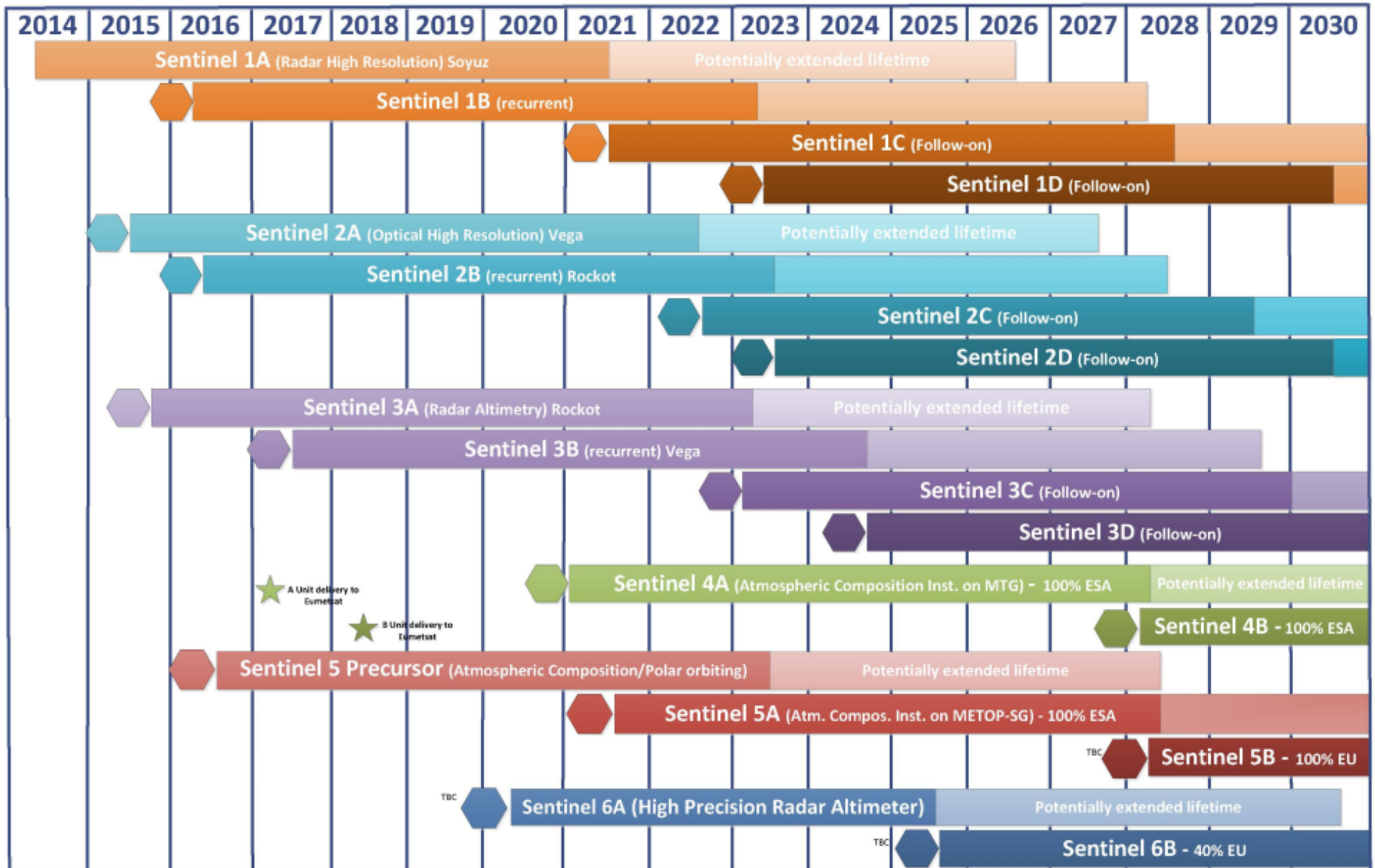


launched



**Launch from Europe's Spaceport
in Kourou, French Guiana, on 3 April 2014**

Copernicus Constellations Deployment Schedule



Legend: Flight Acceptance Review

Sentinel Data Access



**Full, free
and open
Access for
everybody**



Copernicus Space Component
Data Access Portal

sentinels.copernicus.eu

Copernicus
Services
Access

Scientific / Other
Access Hub

Collaborative
Access Hub

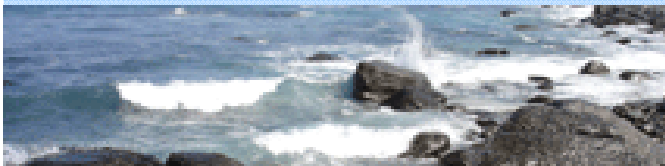
International
Agreements
Access Hub



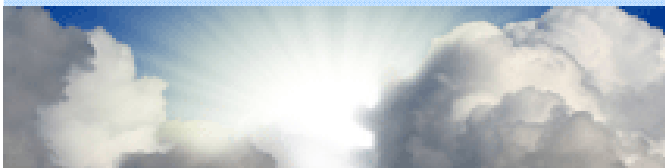
Monitoring of earth systems



Land



Marine



Atmosphere



Security



Emergency



Climate Change



- ★ Copernicus Space programme – what is it ?
- ★ The 6 services from Copernicus
- ★ The Emergency service

The Emergency



Service



Helping victims when disaster strikes

Space

Copernicus |
Europe's eyes on Earth



Emergency Management Service (EMS)

- ★ Operational since April 2012
- ★ 24/7 addressing natural and man-made disasters globally
- ★ Provides disaster management information based on space data combined with other information
- ★ Focal point for users is the Emergency Response Coordination Centre (ERCC)
- ★ Coordination by DG ECHO, DG GROW, DG JRC
- ★ Two components: Mapping and Early Warning System (EWS)
- ★ For some events EMS Mapping is supported by EWS
- ★ Standard delivery: raster and vector maps
 DMM, ID, Name of the event, Place

COPERNICUS
Emergency Management Service

Copernicus EMS - Copernicus Emergency Management Service

Home | What is Copernicus | EMS - Mapping | EMS - Early Warning System | News

EMS - MAPPING

- Service Overview
- Who can use the service
- How to use the service
- Products: Rapid Mapping
- Products: Risk and Recovery
- Quality control / Feedback
- New phase in brief

RAPID MAPPING

- List of Activations
- Map of Activations
- GeoRSS Feed **29** readers

RISK AND RECOVERY

- List of Activations
- Map of Activations
- GeoRSS Feed **17** readers

OTHER

- Map of Activations of Other Organizations
- Map Coverage Planner
- Meetings, workshops
- Citations
- Calls for Tender

Copernicus Emergency Management Service - Mapping
A service in support of European emergency response

Map above displays only latest Copernicus EMS - Mapping Activations. To see a Map of All Activations, go to section Map of Activations in Rapid Mapping or in Risk and Recovery Mapping sub-menus respectively.

Latest Copernicus EMS - Mapping Activations

Act. Code	Title	Event Date	Type	Country	Feed
EMSR120	Flood in Spain	2015-02-27	Flood	Spain	
EMSR118	Flood in Spain	2015-02-02	Flood	Spain	
EMSR117	Flood in Greece	2015-02-01	Flood	Greece	
EMSR116	Flood in Malawi	2015-01-17	Flood	Malawi	
EMSR113	Industrial Accident in Vrbětice	2014-12-03	Industrial acc...	Czech Republic	

Summary of the Copernicus EMS - Mapping Activations

Type of Disaster	Number of Activations	Number of Reference Maps	Number of Delineation Maps	Number of Grading Maps
Earthquake	2	17	17	16
Flood	52	312	415	33
Forest fire, wild fire	12	30	32	13
Industrial accident	5	12	3	1
Other	39	164	67	82
Wind storm	9	53	28	33
[Total: 01.04.2012 - 09.03.2015]	119	588	562	178

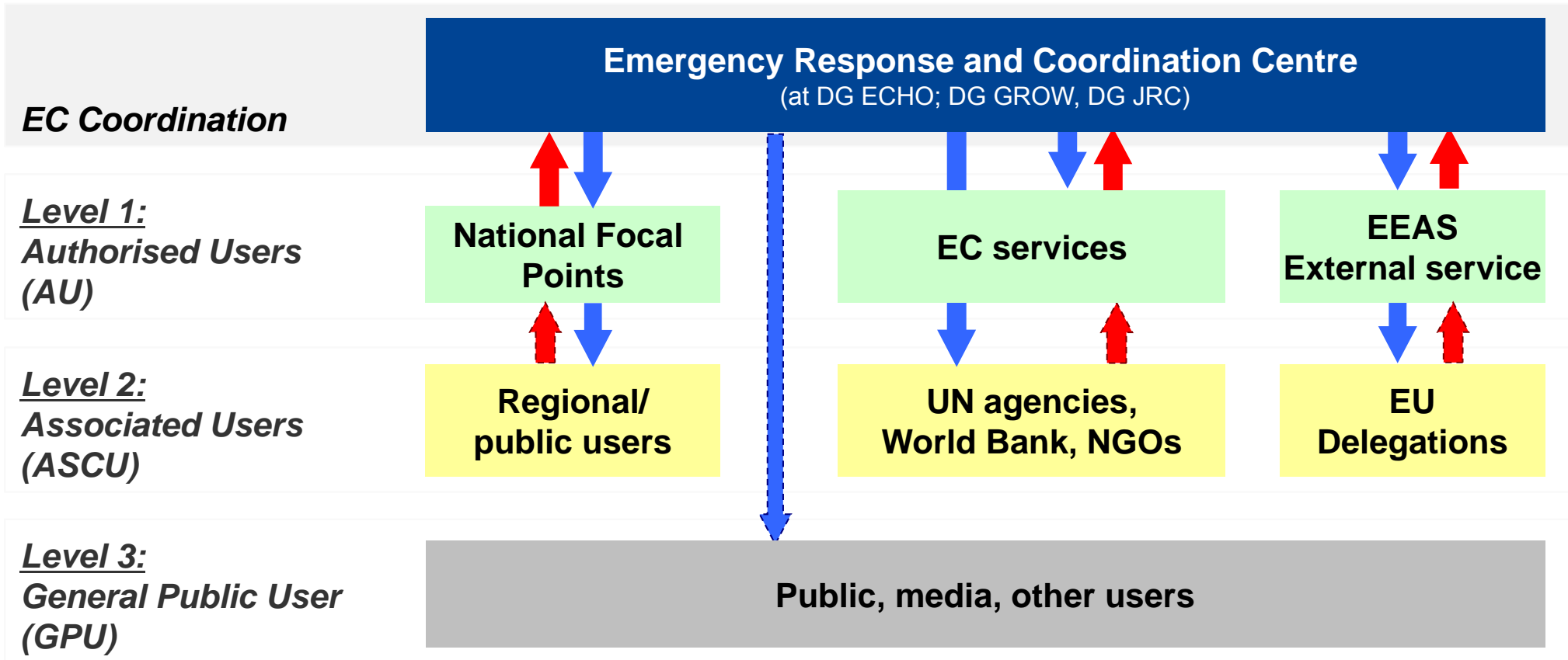
In the above table, only non-obsolete components are considered.

Copernicus Emergency Management Service (EMS) provides information for emergency response in relation to different types of disasters, including meteorological hazards, geophysical hazards, deliberate and accidental man-made disasters and other humanitarian disasters, as well as prevention, preparedness, response and recovery activities.

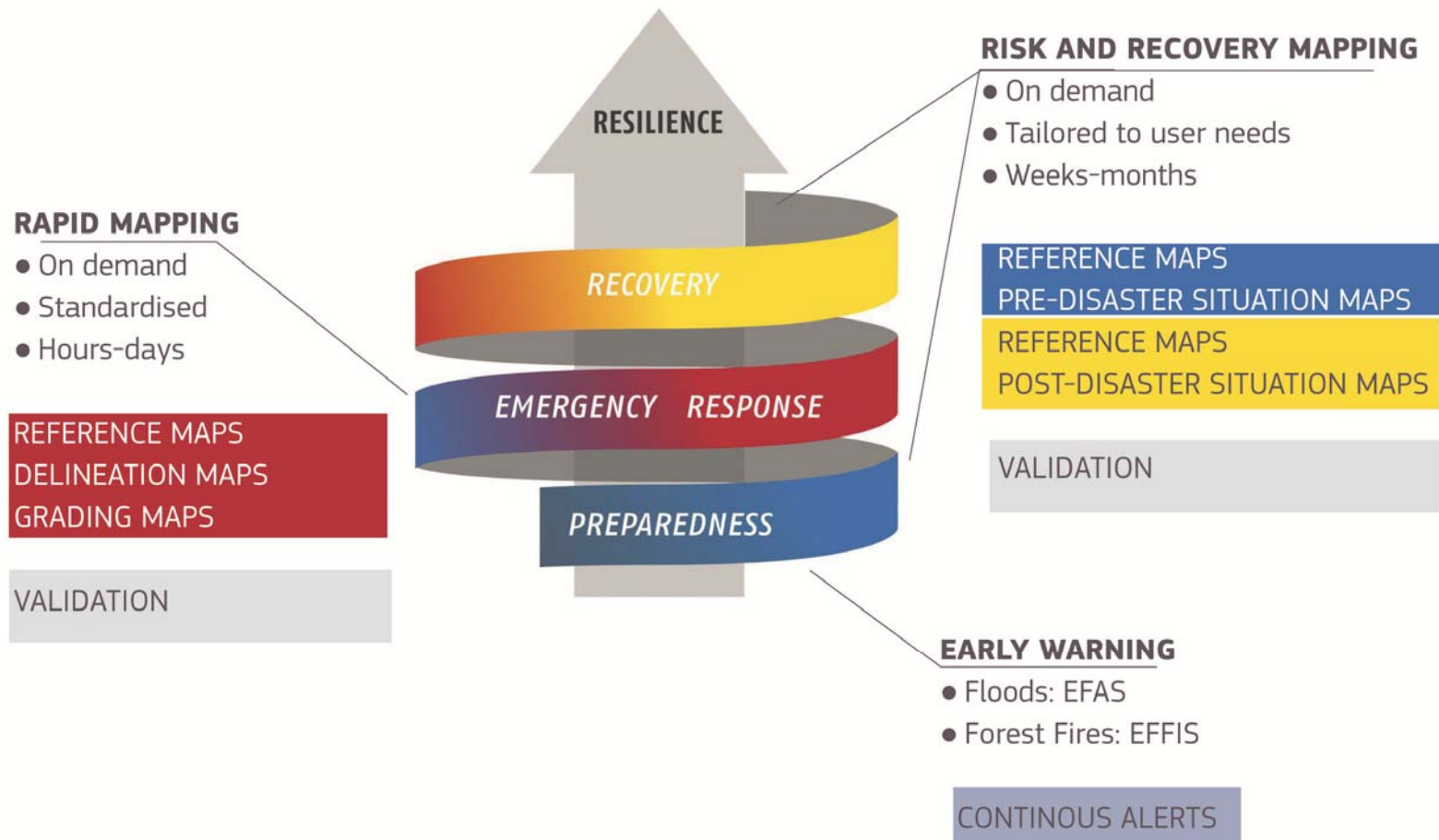
Copernicus EMS consists of the Mapping Service and of the Early Warning System (floods). The Emergency Management Service - Mapping, which has been an operational activity since April 1st, 2012, is a fully operational service as defined in Article 5 to the Copernicus Regulation.



Copernicus EMS Mapping - Users



↑ trigger ↓ inform



Emergency Management Service (EMS) has two components:

- ▶ **Early Warning**
 - **EFAS (floods)**
 - **EFFIS (forest fires)**

- ▶ **Mapping**
 - **Rapid Mapping**
 - **Risk & Recovery**

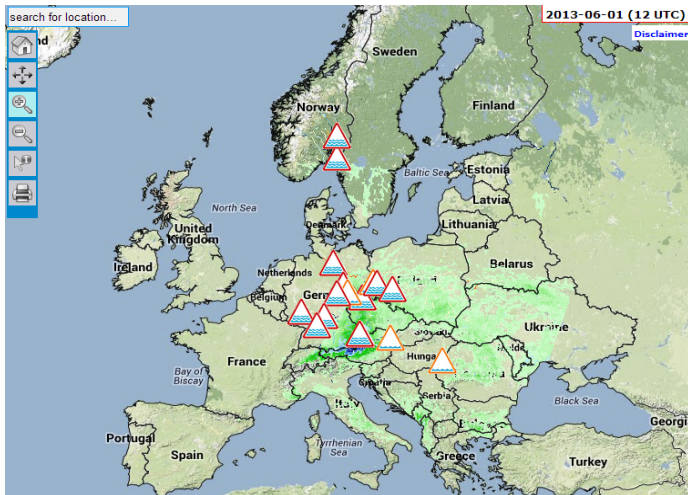
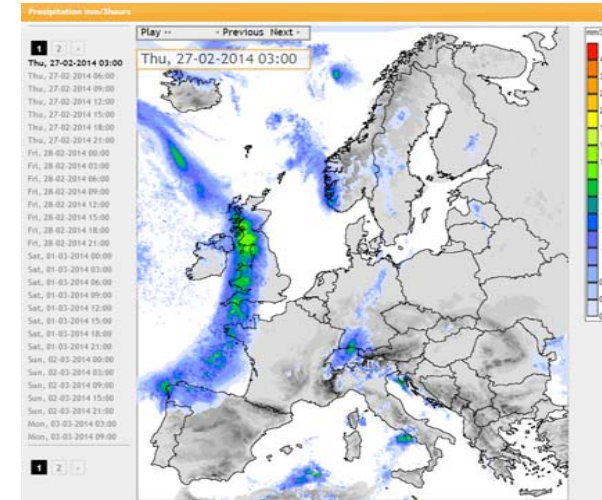


European Flood Awareness System (EFAS), the early warning system for floods

★ EFAS fully operational: under development at JRC since 2002 and fully operational since September 2012 under the Copernicus Emergency Management Service.

★ Objectives of EFAS:

- ✓ Provide complementary flood forecasting information to national services
- ✓ Provide European scale overview to the ERCC/ECHO
- ✓ Pre-alerting Copernicus EMS Mapping



- EFAS partners: national/regional hydrometeorological authorities; currently more than 35 partners (EU & non-EU)



European Forest Fire Information System

• *The scope of EFFIS is to:*

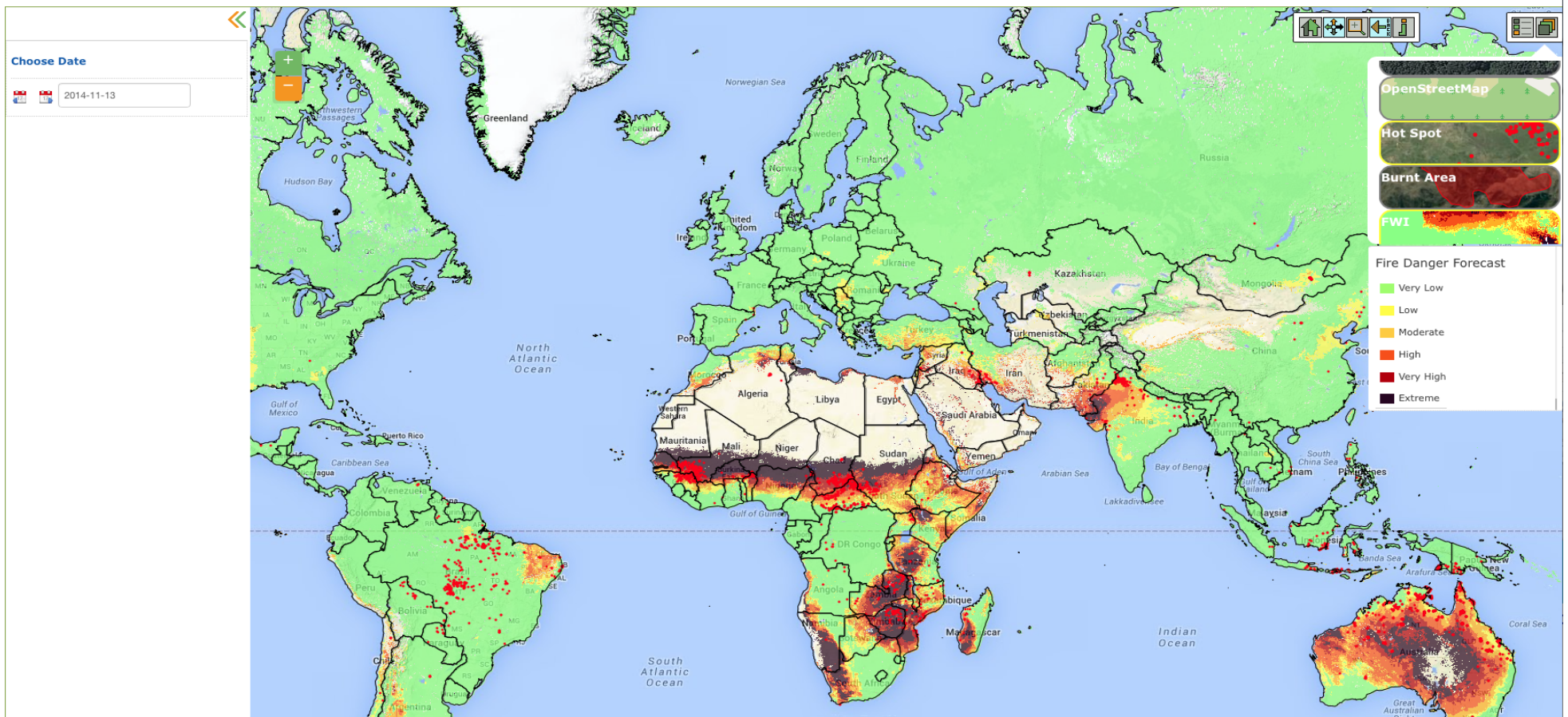
- Provide EU level assessments during both pre-fire and post-fire phases
- Complement national fire information systems
- Support forest fire fighting operations

• *Users*

- EC Services, European Parliament, national/regional forest fires and civil protection services of EU and non-EU countries, and EU citizens
- FAO, United Nations Economic Commission for Europe, FAO *Silva Mediterranea*

Global Wildfire Information System

FISE | Topics | Disturbances | Abiotic | **Fires**



Emergency Management Service (EMS) has two components:

- ▶ **Early Warning**
 - **EFAS (floods)**
 - **EFFIS (forest fires)**

- ▶ **Mapping**
 - **Rapid Mapping**
 - **Risk & Recovery**



Emergency Management service



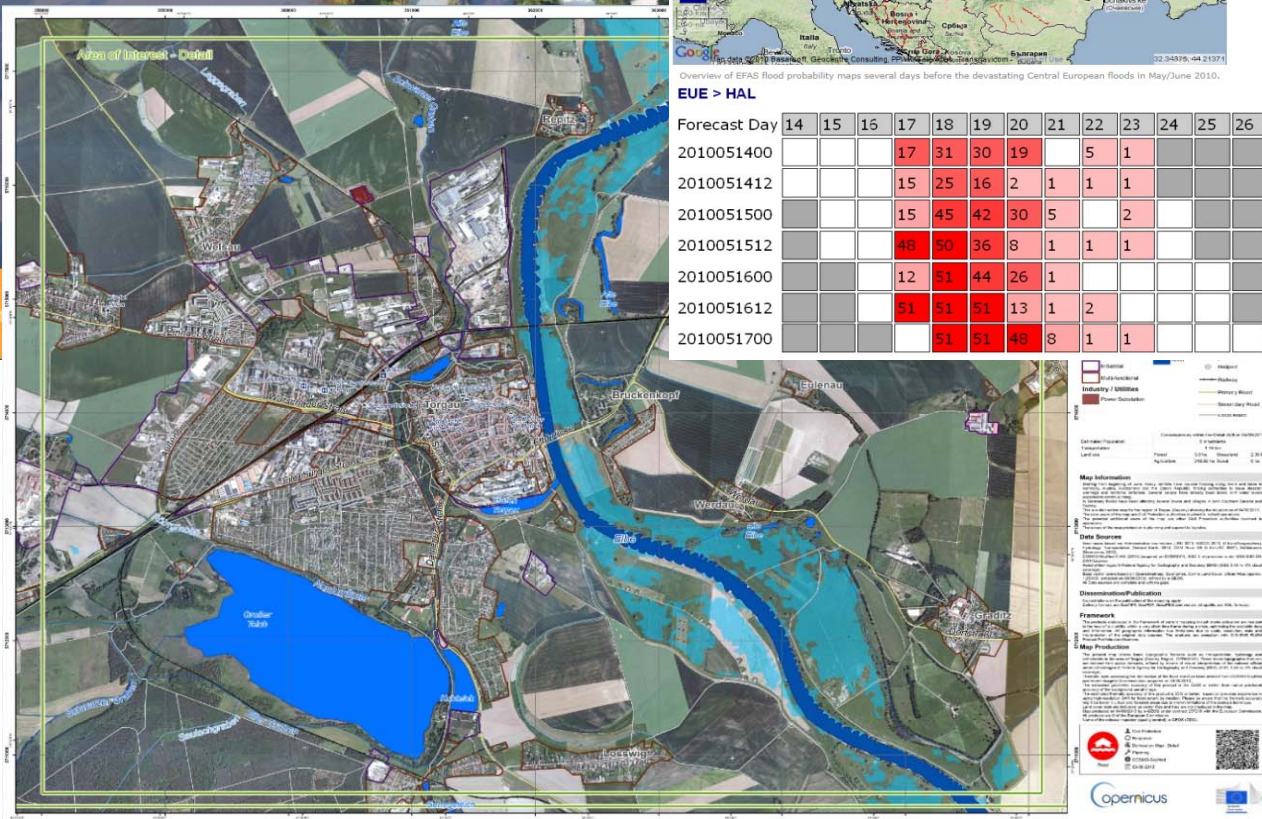
Flood and forest fire risk forecasts



Overview of EFAS Flood probability maps several days before the devastating Central European floods in May/June 2010.

EU E > HAL

Forecast Day	14	15	16	17	18	19	20	21	22	23	24	25	26
2010051400				17	31	30	19		5	1			
2010051412				15	25	16	2	1	1	1			
2010051500				15	45	42	30	5		2			
2010051512				48	50	36	8	1	1	1			
2010051600				12	51	44	26	1					
2010051612				51	51	51	13	1	2				
2010051700					51	51	49	8	1	1			



Enterprise and Industry

Providing support to emergency response services

Situation maps, reference information

DD/MM/YYYY, Name of the event, Place



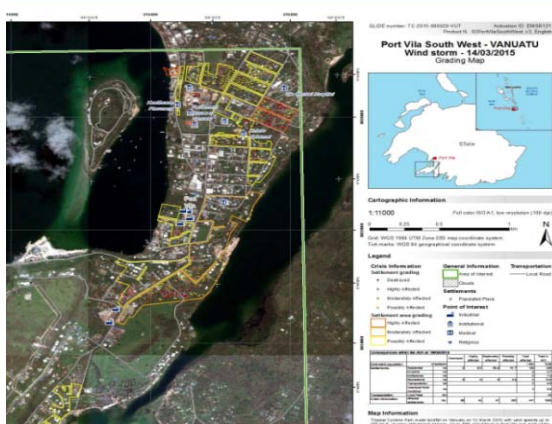
Copernicus EMS Rapid Mapping

- ★ 24/7 service
- ★ Standardised products (map types)
- ★ Two production modes (service levels SL)

MAP TYPE	CONTENT	DELIVERY TIME*	
		SL1	SL5
Reference	Detailed status of the territory & assets prior to the crisis e.g. Topographic features & specific information	9h	5 days
Delineation	Assessment of the event's extent e.g. delineation of burnt area, delineation of flooded area, earthquake impact area; estimations on the exposed or affected population and assets	12h	5 days
Grading	Assessment of the damage grade & its spatial distribution e.g. for any disaster event, location of destroyed/damaged buildings and assets, and damage grading (possibly-moderately-highly affected-destroyed)	12h	5 days

* after satellite image delivery

EMS Mapping



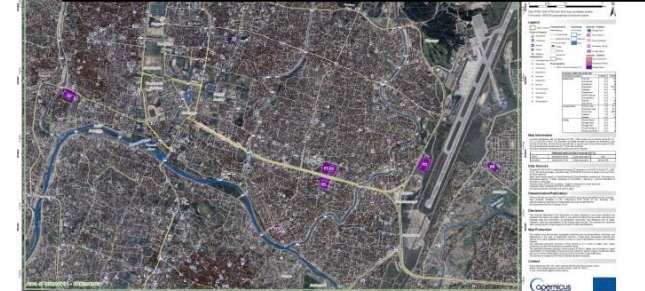
Tropical Cyclone, Vanuatu



Ebola epidemic, Guinea

EMSR125: Earthquake in Nepal

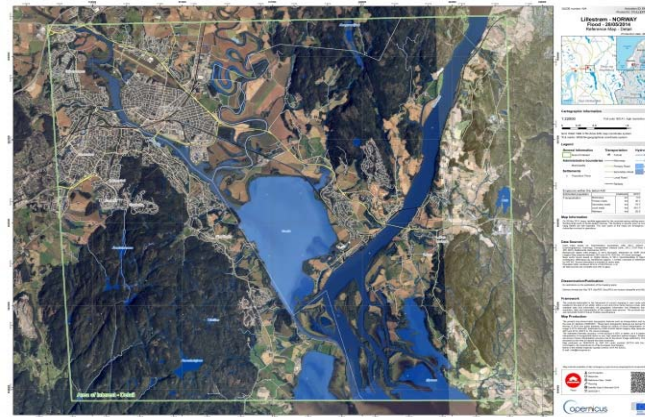
Event Time (UTC): 2015-04-25 11:45
 Event Time (LOC): 2015-04-25 16:45
 Event Type: Earthquake
 Activation Time (UTC): 2015-04-25 12:20
 Reference maps: 4
 Delineation maps: 0
 Grading maps: 4
 Activation Status: Open
 Affected Countries:
 - Federal Democratic Republic of Nepal
Area Descriptor: Katmandu, Bidur, Pokhara, Bharatpur
Authorized User:
 EC Services/DG ECHO
Activation Reason:
 An earthquake in Nepal with a magnitude of 7.9M, 10km depth occurred with at least one consequent aftershock of 7.1M, 10km depth. The epicenter is located between the capital Kathmandu and the city of Pokhara, and was also felt in northern parts of India. Extensive damage to buildings and injuries have been reported.
Requested Product: Reference and Grading Maps



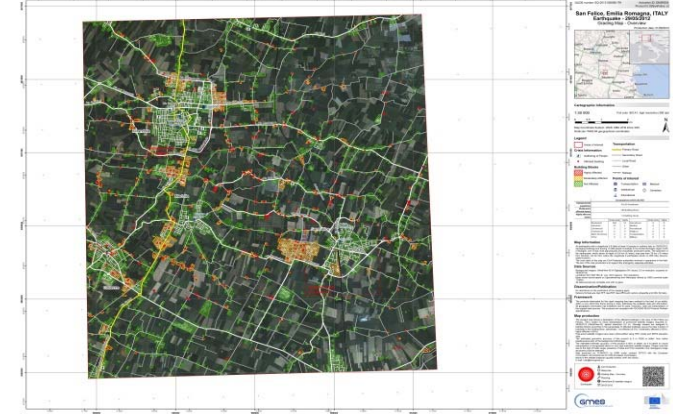
Earthquake, Nepal



Refugee Camp, Al Mafraq Jordan



Floods, Ostlandet Norway



Earthquake, San Felice sul Panaro, Italy



Copernicus Emergency Management Service

What contribution can Risk & Recovery mapping make?

Provides on-demand geospatial information supporting emergency management activities not related to the immediate response. It addresses prevention, preparedness, disaster risk reduction and supports the recovery phase.

Product delivery phase: 35 days (15 + 20)

MAP TYPE	CONTENT	DELIV. TIME
REFERENCE	Detailed status of the territory and assets. <ul style="list-style-type: none"> E.g. Topographic features and specific information, e.g. land use zoning plans, mitigation measures 	20d(#)
PRE - DISASTER	Relevant info to help planning for contingencies on vulnerable areas <ul style="list-style-type: none"> E.g. Hazard exposure to hazardous events; Vulnerability / resilience of settlements and buildings; Risk status for population and assets; Evacuation plans; Forecasts; Alerts 	20d(#)
POST - DISASTER	Relevant thematic information, beyond the immediate response phase <ul style="list-style-type: none"> E.g. Hazard exposure to hazardous events; Vulnerability / resilience of settlements and buildings; Risk status for population and assets; Post disaster needs assessment; Recovery plans; Reconstruction / rehabilitation monitoring; IDP monitoring (IDP camps, IDP movements). 	20d(#)

(#) working days after signature of a specific contract, which may require normally 15 days after the service request



What is possible with Rapid Mapping?

- ★ On-demand, fast provision (hours-days) of geo-spatial information in support to emergency management activities
- ★ Provide an overview of the reference situation on the ground
 - ★ Location of assets (settlements, transportation, land use, land cover, etc.)
 - ★ Terrain, hydrology
- ★ Delineate the disaster's extent (e.g. flooded or burnt area, lava flow extent)
- ★ Locate damages to buildings, transportation infrastructure, etc. (to be used for quantitative estimates)

New & Future Developments

- Use of airplanes and drones for image acquisition
- Use of social media for early alerts (in addition to open data)
- Building of a common platform among international mapping agencies in case of large disasters
- International framework agreements bilaterally with countries or with international organisations e.g. African Union



The Copernicus Emergency Service

- ★ www.copernicus.eu/
- ★ www.emergency.copernicus.eu

A satellite view of Earth from space, showing a large portion of the blue ocean and white clouds. The curvature of the planet is visible on the right side.

Thank you for your attention

Francoise.Villette@ec.europa.eu

emergency.copernicus.eu

FB: CopernicusEU

Twitter: @Copernicus EU

