Copernicus Emergency Management Service

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Space

Outline

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

Copernicus in a nutshell

- **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

European Commission

"The Union Earth observation and monitoring programme"

Protect people and assets

Increase general knowledge on the state of the Planet

Monitor the environment

Improve environmental policy effectiveness

Facilitate adaptation to climate change

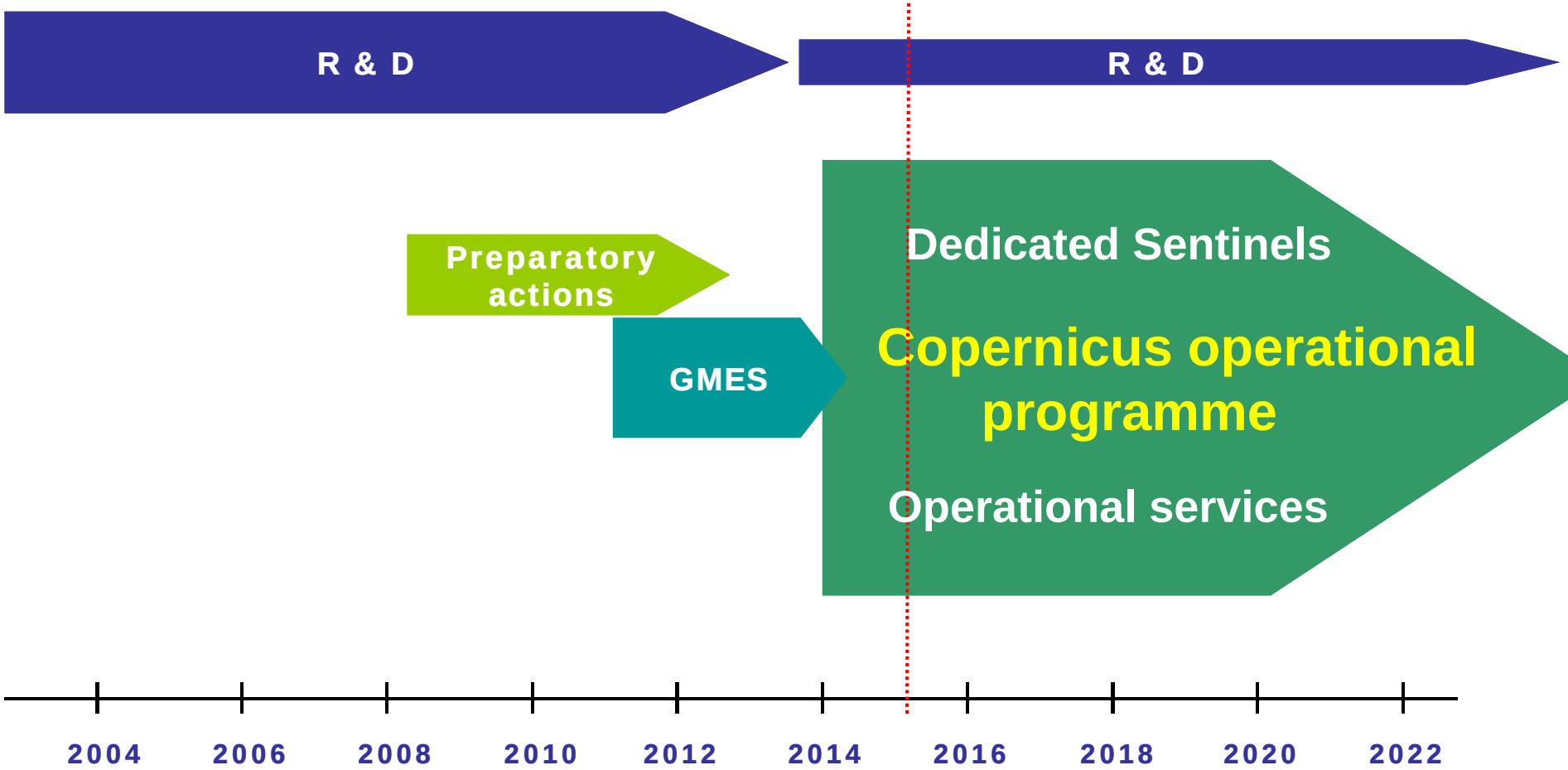
Foster downstream applications in a number of fields

Help managing emergency and security related situations

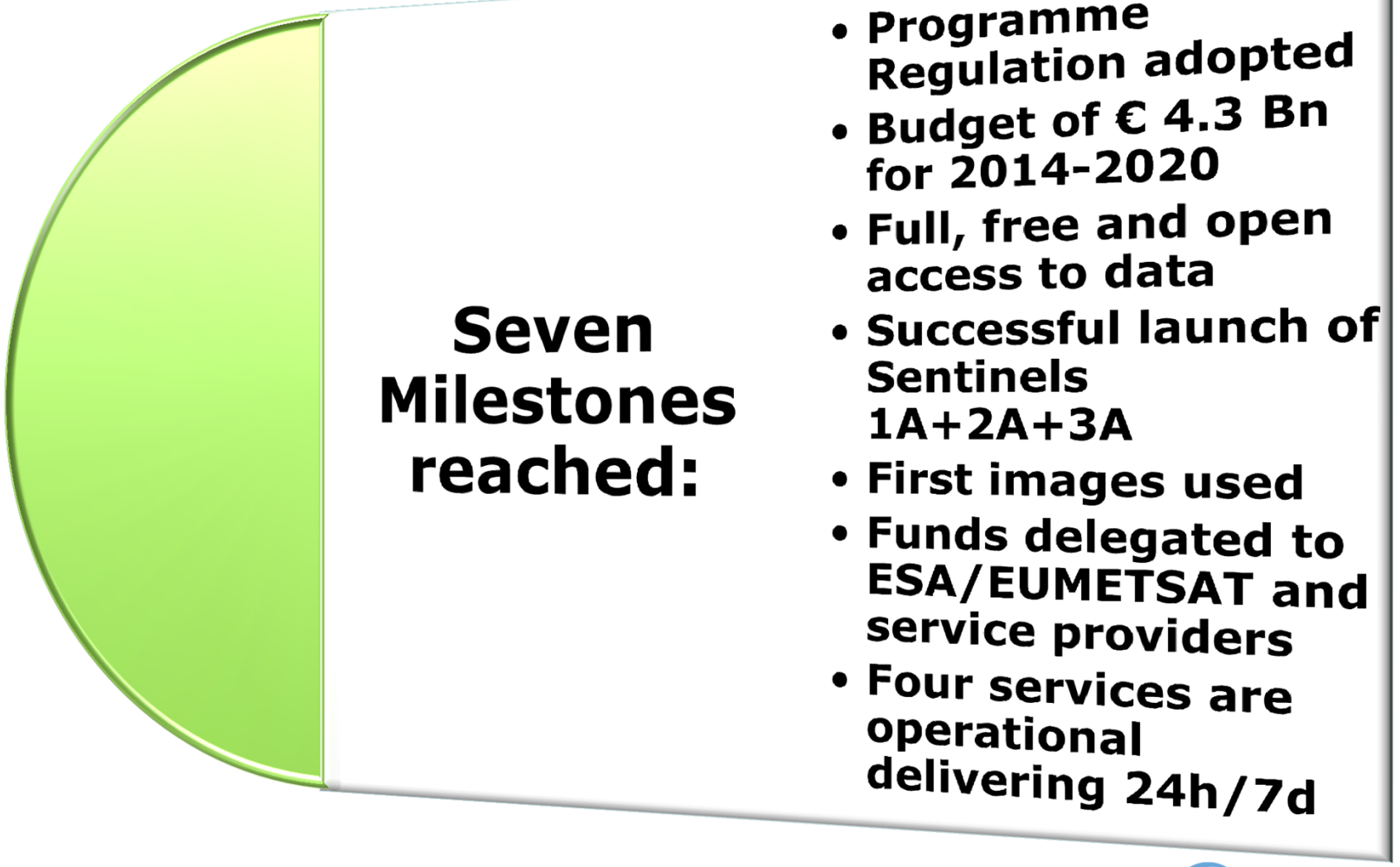
Copernicus Timeline

European Commission

Activities now transfer from research to operations

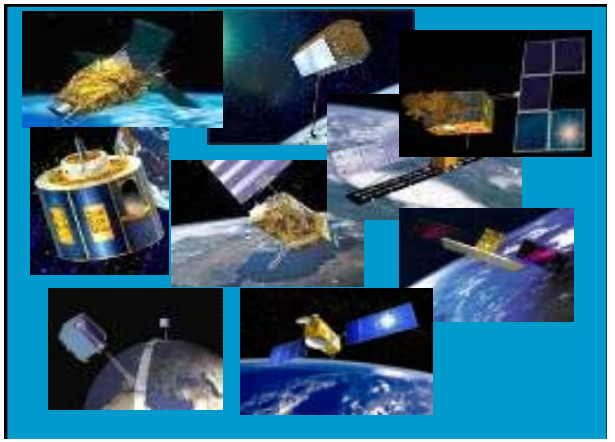


Copernicus current status



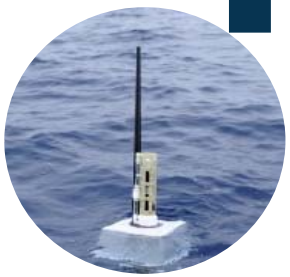
Copernicus architecture

6 services use Earth Observation data to deliver …



Sentinels

Contributing missions



…added-value products

in-situ

European Commission

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

Sentinel-1A launched

European Commission

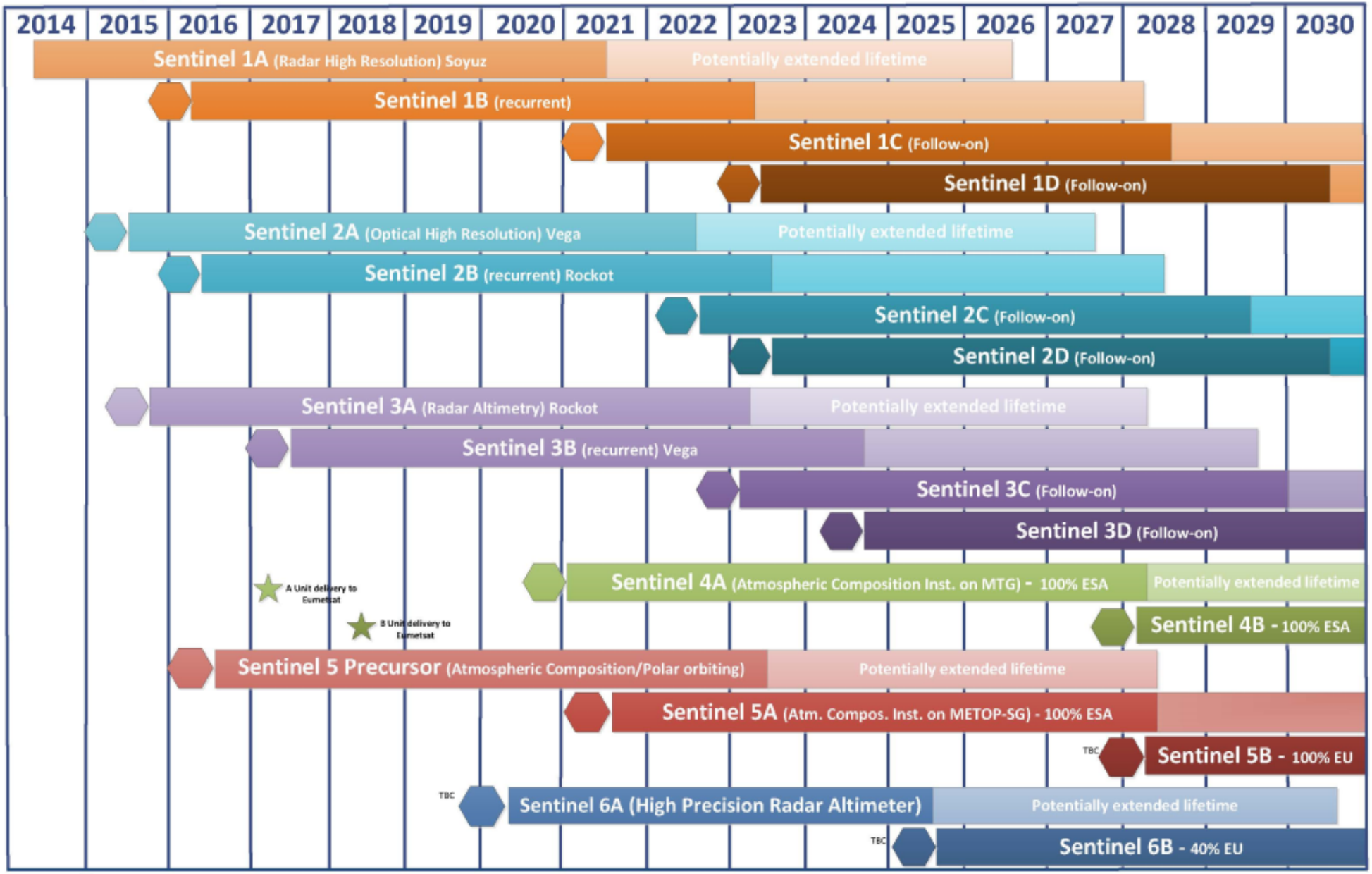
Launch from Europe's Spaceport in Kourou, French Guiana, on 3 April 2014

Space

Copernicus Europe's eyes on Earth

Status 05/06/2015

Copernicus Constellations Deployment Schedule



Sentinel Data Access

European Commission

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

Credit: ESA

Space

Copernicus | Europe's eyes on Earth

The 6 Copernicus Services

European Commission

Monitoring of earth systems

Land

Marine

Atmosphere

Security

Emergency

Climate Change

Space

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The Emergency Service

European Commission

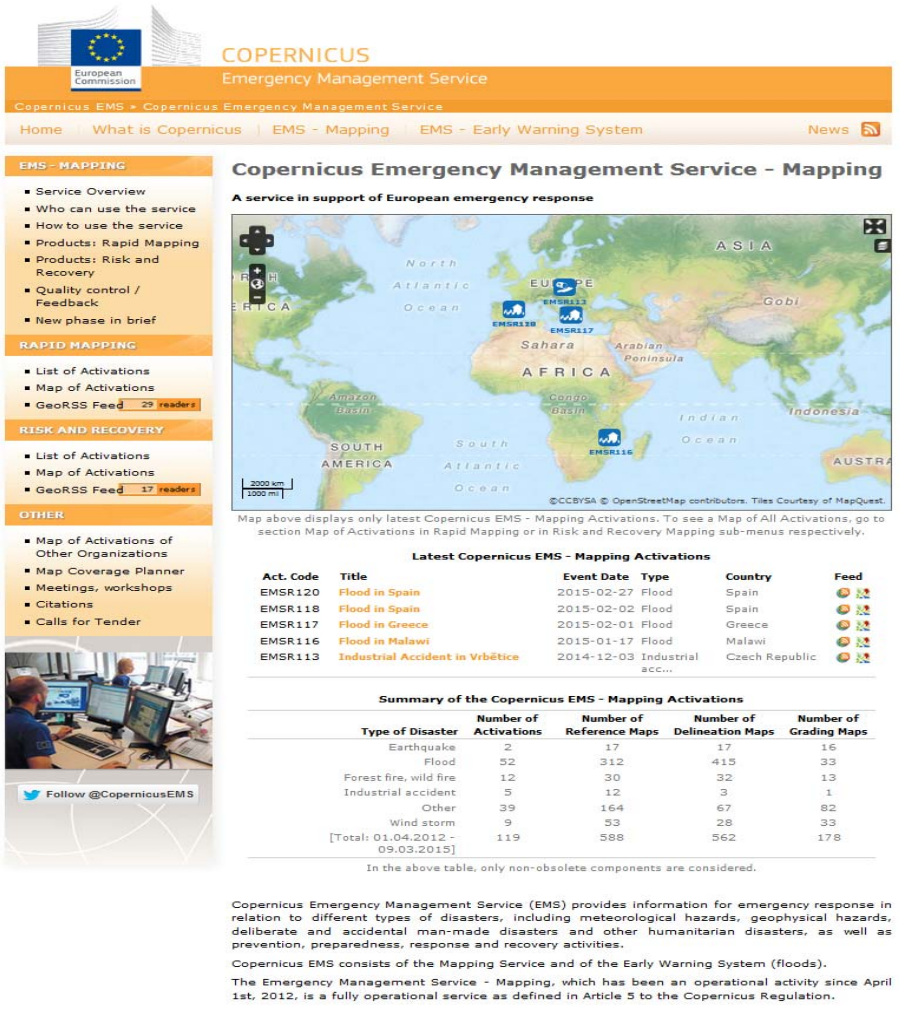
Helping victims when disaster strikes

Space

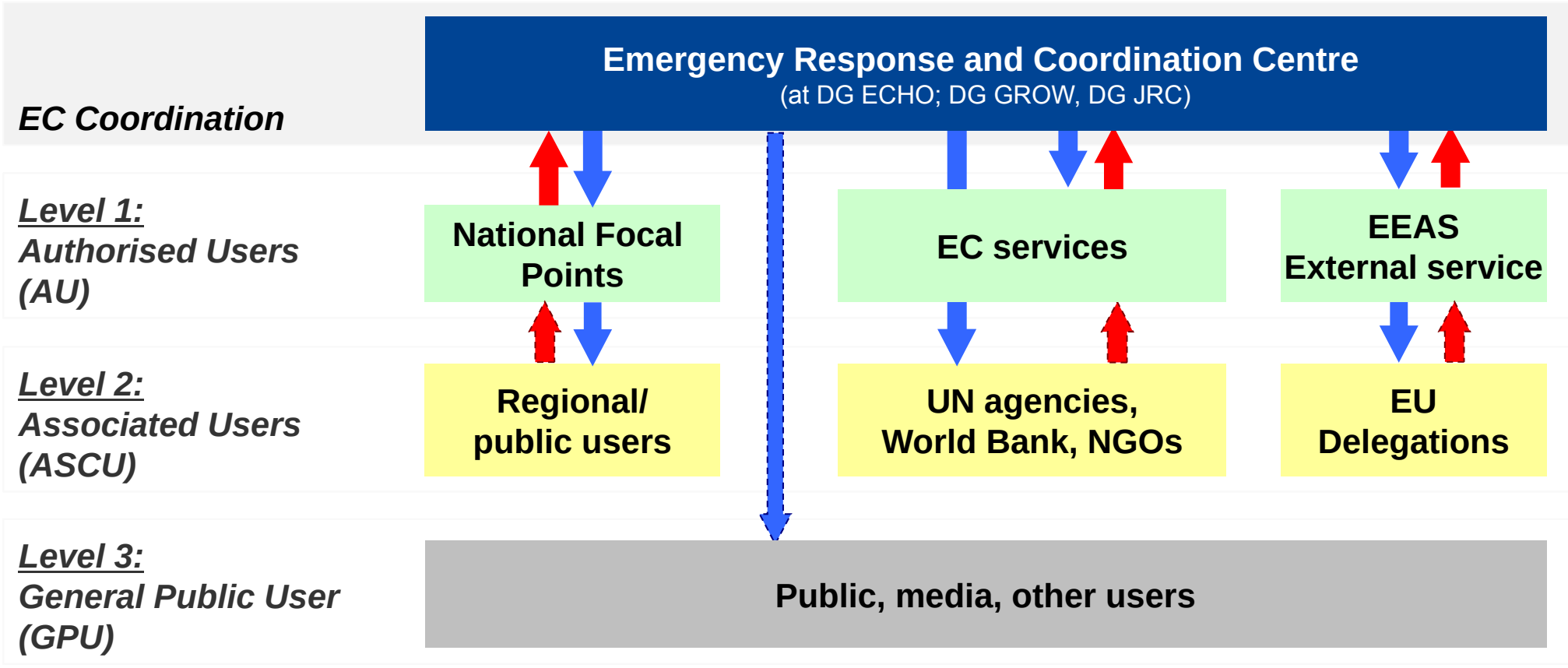
Copernicus Europe's eyes on Earth

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 at DG ECHO (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

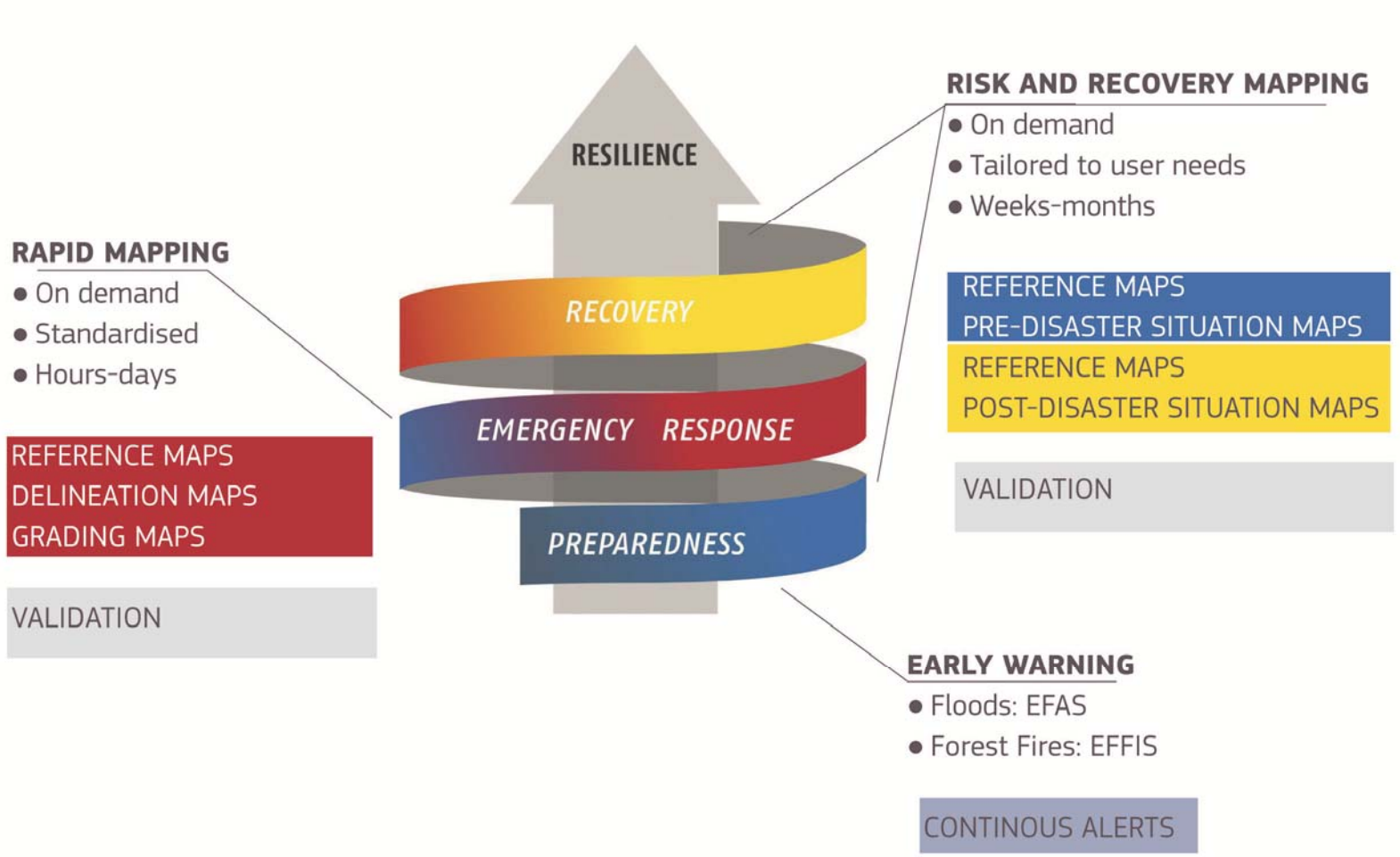


Copernicus EMS Mapping - Users



The Emergency Service

European Commission



Emergency Management Service (EMS) has two components:

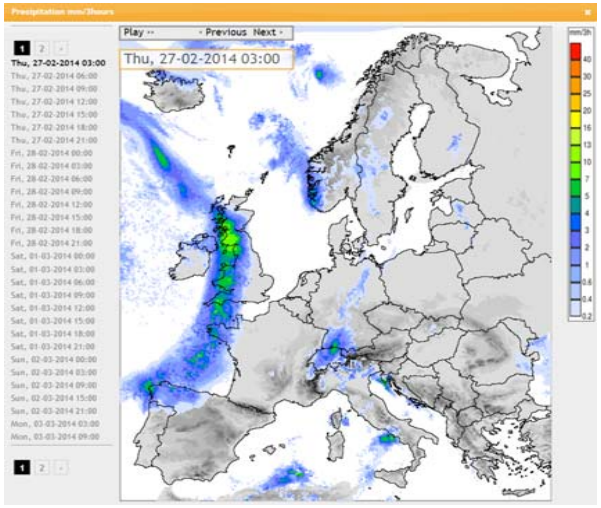
- ***Early Warning***
  - ***EFAS (floods)***
  - ***EFFIS (forest fires)***
- ***Mapping***
  - ***Rapid Mapping***
  - ***Risk & Recovery***

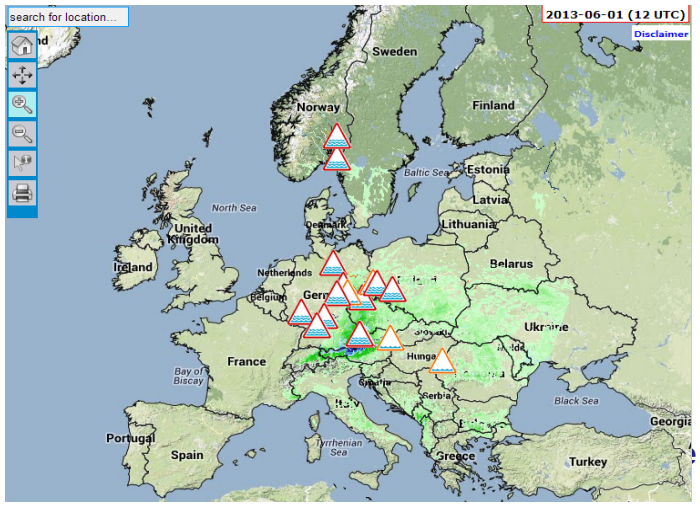
European Flood Awareness System (EFAS), the early warning system for floods

★ 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

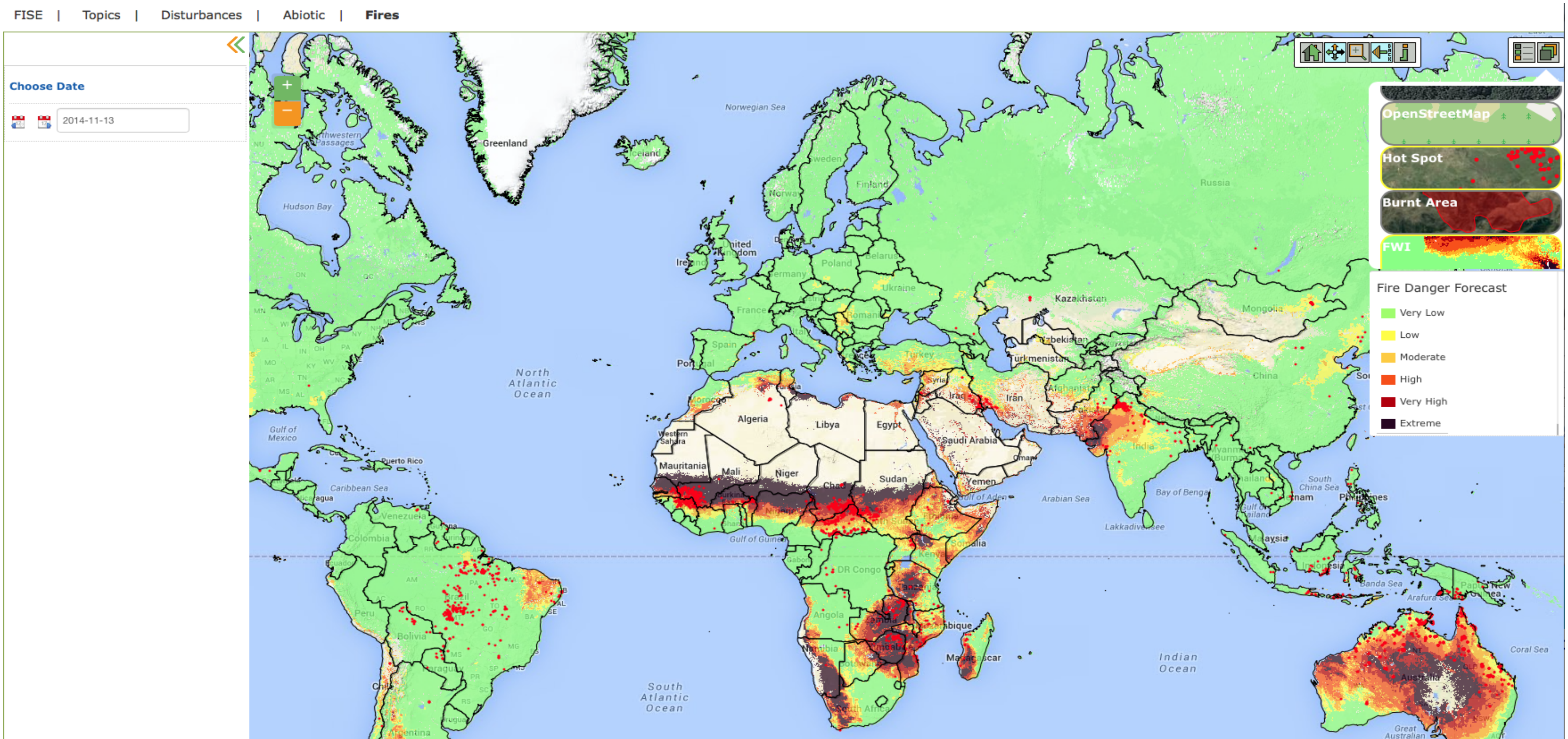
- ***The scope of EFFIS is to:***
  - **Provide EU level assessments during both pre-fire and post-fire phases**
  - **Complement national fire information systems**
  - **Support forest fire fighting operations**
- ***Users***
  - **EC Services, European Parliament, national/regional forest fires and civil protection services of EU and non-EU countries, and EU citizens**
  - **FAO, United Nations Economic Commission for Europe, FAO *Silva Mediterranea***

EFFIS → to global scale

GWIS

European Commission

Global Wildfire Information System



Space

Europe's eyes on Earth

Emergency Management Service (EMS) has two components:

- ***Early Warning***
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- ***Mapping***
  - ***Rapid Mapping***
  - ***Risk & Recovery***

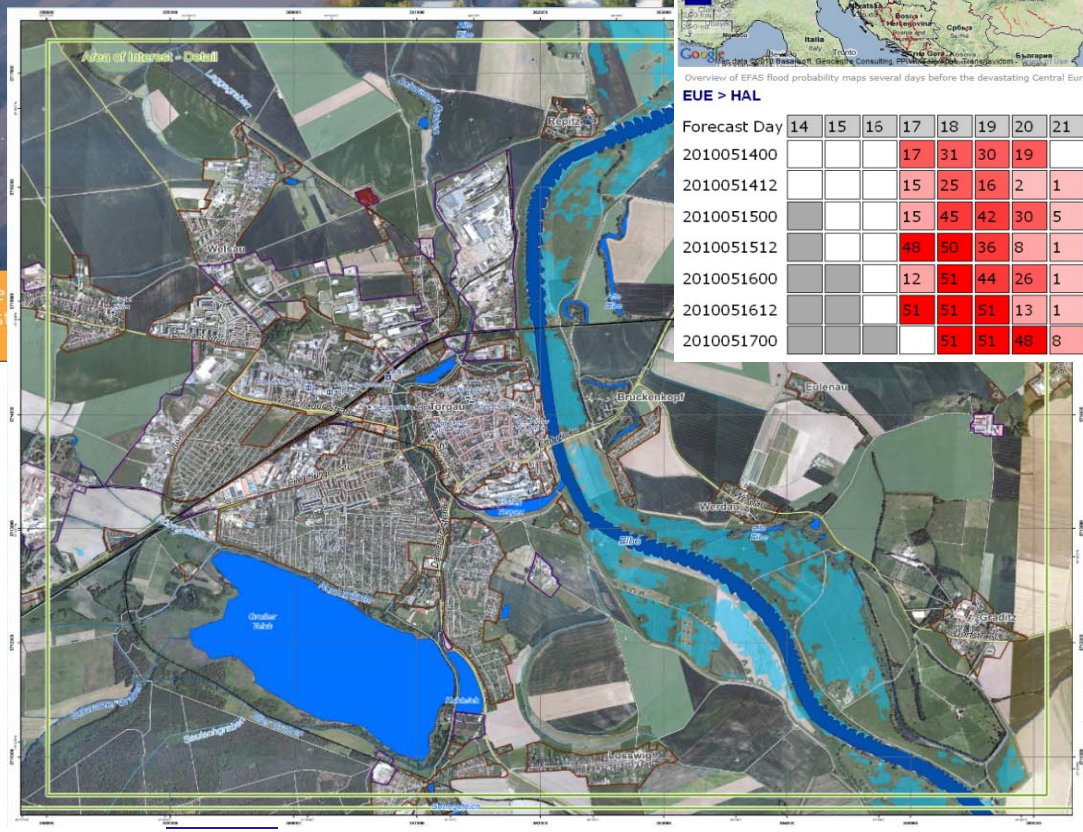
Emergency Management service

European Commission

Flood and forest fire risk forecasts

EUE > 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	48	8	1	1			



Providing support to emergency response services

Situation maps, reference information

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

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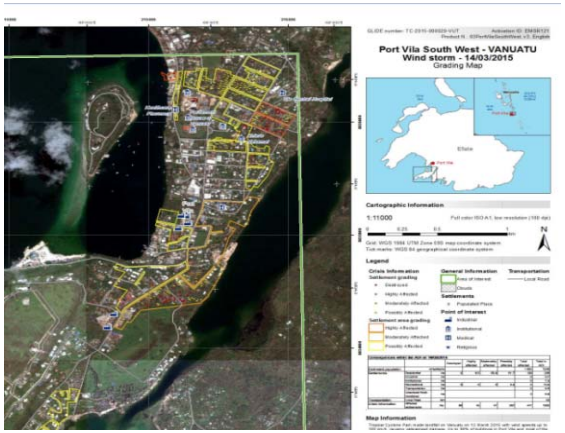
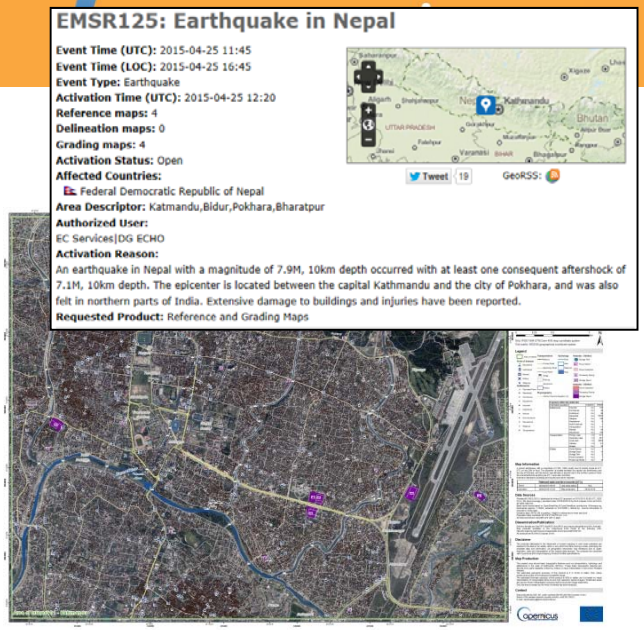


Tropical Cyclone, Vanuatu

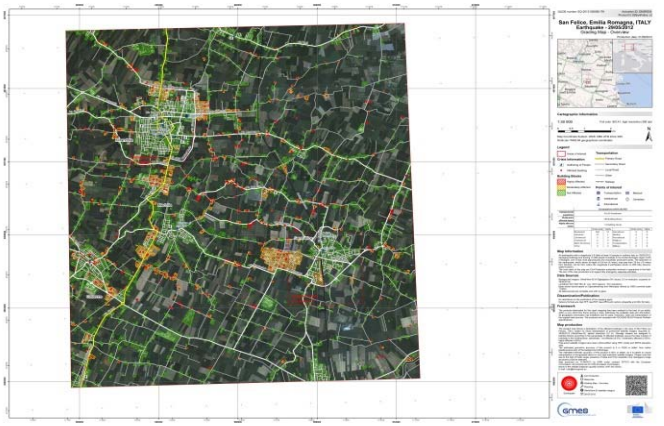
Ebola epidemic, Guinea



Earthquake, Nepal

Refugee Camp, Al Mafraq Jordan

Floods, Ostlandet Norway



Earthquake, San Felice sul Panaro, Italy

European Commission

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.** • 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** • 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** • 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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The European Earth Observation Programme