Emergency Management Service

service overview
Copernicus at a Glance

Copernicus is the European Union’s Earth Observation programme: a user-driven space programme under civil control. Copernicus monitors the Earth using its own dedicated constellation of satellites – the Sentinels – complemented by other satellites provided by Member States and other third parties, as well as utilising a range of non-space (‘in situ’) data sources. The Copernicus programme supports the protection of the environment, the efforts of Civil Protection and civil security, and contributes to European participation in global initiatives. Copernicus offers six different service lines: Emergency Management, Atmosphere Monitoring, Marine Environment Monitoring, Land Monitoring, Climate Change, and services for Security applications.

More information on Copernicus can be found at the following location: http://copernicus.eu.

The Copernicus Emergency Management Service

The Copernicus Emergency Management Service (EMS) has been in operation since April 2012. The service provides maps and analyses based on satellite imagery (before, during or after a crisis) as well as early warning services for flood and fire risks. Through these services, it supports crisis managers, Civil Protection authorities and humanitarian aid actors dealing with natural disasters, man-made emergency situations, and humanitarian crises, as well as those involved in recovery, disaster risk reduction and preparedness activities. As an EU service, the EMS’s first priority is responding to EU needs and interests, whether within the EU or abroad.

The EMS is provided under the overall political coordination and budgetary management of the European Commission’s Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) - as are all Copernicus services – and operated through the 24/7/365 Emergency Response Coordination Centre (ERCC) at the Directorate-General for Humanitarian Aid and Civil Protection (DG ECHO). The Joint Research Centre (DG JRC) is in charge of technical support and management of the service providers’ contracts for map production and the operation of the Early Warning service. The services are free of charge. The Mapping component must be activated by an Authorised User.

“The Copernicus Emergency Management Service supports actors dealing with natural disasters, man-made emergency situations, and humanitarian crises as well as those involved in preparedness and recovery activities. The service improves people’s safety and helps to prevent loss of lives and/or property before, during, and after disasters by providing information on, for example, the type and magnitude of risks, the extent of a flooded area, the spread of a forest fire, the damage caused by an earthquake or the progress of recovery and reconstruction efforts.”

The Emergency Response Coordination Centre (ERCC) is the operational hub of the Copernicus Emergency Management Service.
The Copernicus Emergency Management Service

The Copernicus Emergency Management Service (EMS) has two main components, **Early Warning** and **Mapping** as well as a dedicated component for the **validation** of the mapping products.

The Copernicus EMS **Mapping** component addresses a wide range of emergency situations resulting from natural or man-made disasters, covering in particular floods, earthquakes, tsunamis, landslides, severe storms, fires, industrial accidents, volcanic eruptions, and humanitarian crises. The service is provided in two modules. **Rapid Mapping** provides high-speed service delivery in the midst of or immediately after catastrophic events or humanitarian crises, and is available 24/7/365. **Risk & Recovery Mapping** is designed for pre- or post-crisis situations in support of recovery, disaster risk reduction, prevention, and preparedness activities.

The **Early Warning** component of the EMS delivers alerts and risk assessments of floods and forest fires.

A dedicated **Validation** component is used for the independent verification of a sample of service outputs produced by the Rapid Mapping or Risk & Recovery Mapping modules, with the aim of continuously improving the quality of the service.
Rapid Mapping

The Copernicus EMS Rapid Mapping component provides geospatial information (maps and brief analyses) within hours or days, immediately following a catastrophic event. Three standard categories of maps form the basis of the product portfolio, each of which perform specific functions relevant to crisis management activities:

1) **Reference maps** are based on satellite imagery acquired prior to the disaster event, and are often used for comparative purpose as a baseline for generating post-emergency products. The imagery for such products is usually drawn from an archive.

2) **Delineation maps** outline the extent of the area affected by the event.

3) **Grading maps** provide an assessment of the impact caused by the disaster.

On top of the selection of one of the standard map types, users may request the inclusion of additional information layers (e.g. road network, hydrology, critical infrastructure). Delineation and Grading Maps can also be requested as “monitoring” products, in which case updated maps are supplied at given periodic intervals.

The Rapid Mapping component of the Copernicus Emergency Management Service has been used to support emergency management and humanitarian aid activities during its 122 activations in the first three years since it began operations in April 2012. The service has been activated, amongst many others, in the following countries and regions:

- Italy, after the earthquake in Emilia Romagna in 2012 (Reference of the activation: EMSR004)
- The Philippines, after the devastating impact of Typhoon Haiyan in 2013 (Reference of the activation: EMSR058)
- West Africa, in the context of the 2014 Ebola crisis (Reference of the activation: EMSR110)
- Serbia and Bosnia and Herzegovina, following flooding and consequent landslides in 2014 (Reference of the activations: EMSR086, EMSR087)
- Greece, following the outbreak of wildfire in the region of Thessalia (Reference of the activation: EMSR098)
- Iceland, after the volcanic eruption in 2014 (Reference of the activation: EMSR099)

Reference of the activation: EMSR101- Sisak, Croatia, Delineation Map, 2014
Activation: [http://emergency.copernicus.eu/mapping/list-of-components/EMSR101](http://emergency.copernicus.eu/mapping/list-of-components/EMSR101)
Map: [http://emergency.copernicus.eu/mapping/ems-product-component/EMSR101_02SISAK_DELINEATION_DETAIL01/1](http://emergency.copernicus.eu/mapping/ems-product-component/EMSR101_02SISAK_DELINEATION_DETAIL01/1)
Risk & Recovery Mapping

The Risk & Recovery Mapping component delivers products within weeks or months, depending on the complexity of the activation request. Three categories of products are available, as follows:

1) **Reference maps**, which provide comprehensive knowledge of the territory and exposed assets and population.
2) **Pre-disaster situation maps**, which provide relevant and up-to-date thematic information that can help Civil Protection and humanitarian aid agencies plan for contingencies on areas vulnerable to hazards, aiming to minimise loss of life and damage, e.g. preparing timely response operations, organising the temporary re-allocation of people and property from exposed locations, and facilitating timely and effective rescue;
3) **Post-disaster situation maps**, which provide relevant and up-to-date thematic information for use beyond the immediate response phase, such as assessing recovery needs, mapping the long-term impact of the disaster event, and monitoring progress in reconstruction efforts.

The following are examples of information which can be included in Risk & Recovery Mapping products:

- The exposure of a given location to a particular hazard
- The vulnerability and/or resilience of buildings, people and assets
- The risk status of buildings, population and assets
- A post-disaster needs assessment (i.e. a detailed damage and loss assessment and estimation of recovery needs)
- Recovery plans
- Reconstruction/rehabilitation monitoring (e.g. rubble clearance, monitoring the progress of new construction activity, monitoring the rehabilitation of agricultural land)

Reference of the activation: EMSN006 - Post-event situation map of Hradec Kralove and Pardubice, Czech Republic. This map was used in the framework of the national exercise RESTART 2013, simulating a power failure associated with a severe windstorm.

Activation: [http://emergency.copernicus.eu/mapping/list-of-components/EMSN006](http://emergency.copernicus.eu/mapping/list-of-components/EMSN006)

Map: [http://emergency.copernicus.eu/mapping/ems-product-component/EMSN006_01HRADECKRALOVEPARDUBICE_01Delineation_05Detail/1](http://emergency.copernicus.eu/mapping/ems-product-component/EMSN006_01HRADECKRALOVEPARDUBICE_01Delineation_05Detail/1)

The Risk & Recovery Mapping component of the service has been activated in support of a wide variety of planning, prevention, disaster risk reduction and preparedness activities, including the following:

- Flood risk assessment and mitigation in Bolivia (Reference of the activation: EMSN014)
- Reconstruction and recovery monitoring in Haiti of projects related to the EEAS’ “Urban Rehabilitation Program” (Reference of the activation: EMSN015)
- Preparedness, disaster risk assessment and disaster risk reduction in several districts in Nepal (Reference of the activation: EMSN012)
- Analysis of environmental degradation around the Dadaab refugee camps, Kenya (Reference of the activation: EMSN011)
Early Warning Service

The Early Warning component of the EMS currently provides alerts related to floods, forest fire danger predictions as well as near-real time assessment of forest fire impacts.

The European Flood Awareness System (EFAS) provides flood probability forecasts for all European rivers. National authorities in Member States receive twice-daily pan-European flood forecast information up to 10 days in advance. A pan-European overview of ongoing floods is posted on the EFAS website and updated daily. An extension of the coverage of EFAS from European to global scale is currently being tested and is accessible in pre-operational mode. The launch of a robust global operational system is envisaged for 2017.

The European Forest Fire Information System (EFFIS) is a web-based geographic information system that provides fire danger forecasts up to 10 days in advance and near real-time and historical information on forest fires and their regimes in the European, Middle East and North Africa regions. Fire monitoring in EFFIS encompasses the full fire cycle, and the service provides information both on pre-fire conditions and post-fire damages. The extension of EFFIS towards a Global Wildfire Information System (GWIS) is underway. A prototype of GWIS already exists, providing, as within EFFIS, fire danger forecast information and active fire locations. The inclusion of burnt area maps and fire damage assessment in GWIS is anticipated as from 2016.
Added Value of the Copernicus EMS

The Copernicus Emergency Management Service offers a range of benefits to users in the fields of crisis management, humanitarian aid, and disaster risk reduction, preparedness, and prevention:

> The Mapping component of the Copernicus EMS covers almost any geographical area on the globe, and addresses most natural and man-made disaster types. The Early Warning component currently covers Europe, and the extension to worldwide coverage is underway.
> Rapid Mapping services are available on a 24 hours/day, 365 days/year basis. Rapid Mapping services aim at a target delivery of mapping products within 9-12 hours, whilst an early information product (First Available Map – FAM) is delivered within 3 hours (for certain map types). In exceptional cases (major disasters), the service provider may be requested to aim for a target delivery time of 6 hours for the full package.
> Risk and Recovery Mapping products can support a wide range of activities in the context of recovery, disaster risk reduction, preparedness and prevention, including analysing exposure to a variety of hazard types (floods, landslides, volcanic eruptions, etc.), carrying out probabilistic risk assessment, assessing the vulnerability and resilience of buildings or populations and developing evacuation plans.
> Early Warning services are accessible 24/7/365 via web interfaces. Flood alerts are provided twice-daily by EFAS. EFFIS provides near-real-time information on active fires.

Using satellite imagery to acquire information about a situation on the ground offers numerous advantages:

> Information about difficult-to-access locations can be obtained (e.g. remote, conflict-stricken and border areas)
> Radar satellites (such as Copernicus’ Sentinel-1) can acquire imagery at night and irrespective of weather conditions (e.g. even when cloudy)
> Large areas can quickly be assessed for damages to transport and building infrastructure; this can be particularly valuable in dense urban areas with large populations
> It is possible to monitor an area over a period of time to observe changing phenomena such as the expansion of urban areas or settlements, the movements of displaced populations, and the progress of construction activities.

Considerations to be taken into account when satellite imagery is used include the following:

> Optical satellites can only acquire images during the day, and image quality can be severely degraded by the presence of clouds, haze or smoke.
> The accuracy and quality of the mapping results can vary depending on the nature of the phenomena observed.

How to Access the Service

EMS Mapping services can be directly activated only by Authorised Users. Each Member State, as well as countries participating in the Union Civil Protection Mechanism, has a nominated Authorised User. Entities of the EU Member States who are not Authorised Users and who wish to activate the EMS Mapping service must identify their National Contact Point; the Emergency Response Coordination Centre maintains a list of such Authorised Users.

The Authorised User must request the activation of the service by filling in a Service Request Form (SRF). There are specific forms for Rapid Mapping and for Risk and Recovery Mapping activations. The SRF is sent to the ERCC. EU Delegations should contact the EEAS SitRoom, which will process the request and forward it to the ERCC. Users from international organisations and requestors outside the EU and not participating in the UCPM, should contact ERCC, which may be able to activate the EMS on their behalf.

If the request is accepted, the service provider of the Rapid Mapping module (for Rapid Mapping) or the DG JRC (for Risk and Recovery Mapping) enters into a dialogue with the Authorised User (or the EU Delegation) to compile, and clarify when necessary, the relevant technical details.

The complete Copernicus EMS User Guide can be downloaded from http://emergency.copernicus.eu/
More information on how to activate the EMS Mapping services is supplied in the dedicated “Quick Start Guide”. The service request forms are available at the following address: http://emergency.copernicus.eu/mapping/ems/how-use-service
EMS Early Warning services can be accessed directly on the web portals for the respective services:
European Flood Awareness System: https://www.efas.eu/
The European Forest Fire Information System: http://forest.jrc.ec.europa.eu/effis/