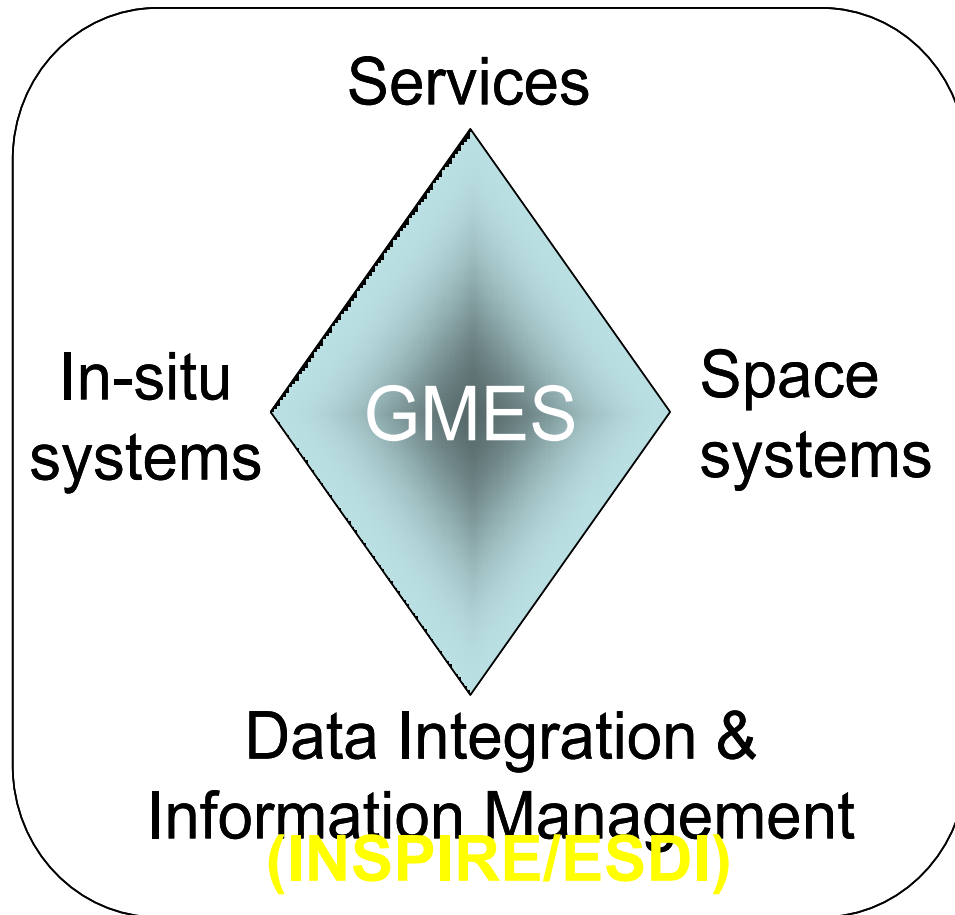


Global Monitoring for Environment and Security





INSPIRE

Infrastructure for Spatial Information in Europe

GMES (Global Monitoring for Environment and Security) **is a European initiative for the implementation of information services dealing with environment and security.**

GMES is based on observation data received from Earth Observation satellites and ground based information. These data will be coordinated, analysed and prepared for end-users.

Through GMES the state of our environment and its short, medium and long-term evolution will be monitored to support policy decisions or investments.

GMES is a set of services for European citizens helping to improve their quality of life regarding environment and security.

GMES is built up gradually: it starts with a pilot phase which targets the availability of a first set of operational GMES services by 2008 followed by the development of an extended range of services which meet user requirements.

2. How did it start?

Years of research in the fields of science and technology associated with observation and understanding of the processes and phenomena of the terrestrial environment led in 1998 to the idea to launch GMES.

By a combination of measurements at terrestrial level and from space, it rapidly became clear that new operational services could be offered in fields such as **oceanography, precise mapping of land use, rapid mapping at times of emergency for the civil protection field or air quality monitoring.**

The progressive implementation of GMES is made possible by the activities and investments of European Union and ESA Member States. These and other public and private contributions are jointly supported by the European Commission (EC) and the European Space Agency (ESA).

3. To whom is it addressed?

GMES is the European solution to respond to the needs of citizens in Europe to access reliable information on the status of their environment.

GMES will mainly support decision-making by both institutional and private actors. Decisions could concern either new regulations to preserve our environment or urgent measures in case of a natural or man-made catastrophes (i.e. floods, forest fires, water pollution).

But to take decisions, it is necessary to **anticipate, intervene and control**. (předcházet, zasahovat, řídit)

GMES will integrate these functions by assembling the information acquired in a reliable, valid and compatible manner and make them available for user friendly exploitation. The services will be used by environmental agencies, local, regional and national authorities, civil protection organisations, etc.

The new observation techniques and analysis of data will permit these actors to better anticipate potential threats, to intervene timely and to increase the efficiency of the intervention.

By observing the main Earth sub-systems (land, air, seas) a number of information services can be developed and used for the definition and monitoring of EU policies in the field of environment and security.

Moreover, by building on these services and adding value to them (possibly using other data and observations), more targeted and customised (tailored) services can be developed addressing for instance health issues, productivity increases and other aspects.

Some examples of services are:

Oil spill/discharge detection & monitoring;

Land cover/land use for policy making and services to farmers;

Support to civil protection – rapid mapping;

Environment and health services – ozone monitoring and UV exposure.

WHAT SERVICES WILL BE PROVIDED?

The services provided by GMES can be classified in three major categories:

Mapping, including topography or road maps but also land-use and harvest, forestry monitoring, mineral and water resources that do contribute to short and long-term management of territories and natural resources. This service generally requires exhaustive coverage of the Earth surface, archiving and periodic updating of data.

Support for emergency management in case of natural hazards and particularly civil protection institutions responsible for the security of people and property. This service concentrates on the provision of the latest possible data before intervening.

Forecasting is applied for marine zones, air quality or crop yields. This service systematically provides data on extended areas permitting the prediction of short, medium or long-term events, including their modelling and evolution.

The widespread and regular availability of technical data within GMES will allow a more efficient use of the infrastructures and human resources. It will help the creation of new models for security and risk management, as well as better management of land and resources.

GMES is the European participation in the **worldwide** monitoring and management of our planet Earth and the European contribution to the Group on Earth Observation (GEO). The global community acts together for a synergy of all techniques of observation, detection and analysis.

At the World Summit on Earth Observation in Washington in July 2003, the Group on Earth Observations (GEO) was established, with the goal of addressing the information requirement for the environment on a global scale. This work was completed in Brussels in February 2005 by the adoption of a 10 year implementation plan of an integrated Global Earth Observation System of Systems (GEOSS).

The GEOSS is an ambitious programme of information for ecological security and durable development intended for mankind. It principally foresees the monitoring and understanding of nature, the extent of disasters due to human activities, the impact of global warming, desertification, erosion and deforestation.

GMES will be the main European contribution to GEOSS.

The Forum GMES 2008 held in Lille on 16-17 September 2008 marked the launch of the first GMES services in pre-operational mode:

[Marine Environmental Services](#)

[Atmospheric Environmental Services](#)

[Land Environmental Services](#)

[Support to Emergencies and Humanitarian Aid](#)

[Support to security -related activities](#)

The development of these services is supported by [implementation groups](#) put in place in the context of the [Action Plan 2004 - 2008](#).

Marine Environmental Services

MyOcean is a project granted by the European Commission within the 7th Framework Programme, with the objective to define and to set up a concerted and integrated pan-European capacity for Ocean Monitoring and Forecasting.

The areas of benefit are:

Maritime Security

Oil Spill combat

Marine Resources management

Climate Change

Seasonal Forecast

Coastal Activities

Ice Survey

Water Quality and Pollution.

MyOcean is the last step toward the GMES Marine Core Service after many Europe founded programmes such as [POLARVIEW](#), [ECOOP](#), [MARCOAST](#), [MERSEA](#), ...

Atmospheric Environmental Services

The prototype atmospheric services of GMES are currently provided by two cooperating consortia that operate the [PROMOTE](#) GMES Service Element project funded by the European Space Agency, and the [GEMS](#) project funded by the European Commission as part of the 6th Framework Programme for Research, Technical Development and Demonstration.

The focus of [PROMOTE](#) is the delivery of services to support informed decisions on issues related to stratospheric ozone depletion, surface UV exposure, air quality and climate change. Services are based both on products derived directly from satellite data and on products from established data assimilation and modelling systems. Services can be accessed from [PROMOTE](#) website.

The focus of [GEMS](#) is to develop new integrated systems for monitoring the global distributions of atmospheric constituents important for climate, and for monitoring and forecasting constituents affecting air quality and surface solar radiation, with a focus on Europe. Trial versions of these systems are currently being operated, and the products can be accessed from [GEMS](#) website.

From mid-2009, the core services of the atmospheric component of GMES will be delivered by a new consortium comprising most of the partners of the [GEMS](#) project and core production partners from [PROMOTE](#),

following the conclusion of a grant from the European Commission under the 7th Framework Programme. These services will continue and rationalize the provision of the main sets of data products provided currently by [PROMOTE](#) and [GEMS](#). It is also expected that the Framework Programme will support development of a set of downstream services that provide user-oriented information based on the core-service data products.

Land Environmental Services

Land Environmental Services operationally provide sound, reliable and affordable land related geo-information products on the regional, European and global scale. Their aim is to effectively support public authorities of the European Commission and the EU Member States in the implementation of the new European Environmental Directives as well as international treaties towards adaptation to Climate Change.

By the combined analysis of data received from Earth Observation satellites and ground based measuring networks these services provide wide-area and cross-boarder harmonized geo-information products for a multitude of thematic areas,

like land use / land cover change, soil sealing, water quality and availability, spatial planning, forest management, carbon storage and global food security. Selected examples of products from various European regions can be viewed and tested on the [Land Information Services](#) portal.

Fast Track Service / CORINE Land Cover 2006

Based on previous consolidation results, the European Environment Agency (EEA) has added the first Pan-European High-Resolution Land Cover Data to its data service: a Sealing Layer and a Forest Layer covering entire Europe. In addition, the CORINE Land Cover database, existing since the 1990s, was updated for the third time for the year 2006.

The ambition is to add further high-resolution layers during the coming years during the implementation of the Land Information Core Services

Urban Atlas

Quality of Life in Europe's cities is being recorded by the Urban Audit initiative of DG Regional Cohesion and DG Environment. The Urban Atlas Core Service Element is to add a spatial dimension, e.g. to show the accessibility to green urban areas or to enable the localization of abstract statistical parameters (e.g. population density).

Forest Monitoring

Forest Monitoring Services provide innovative, timely, cost-effective and quality-assured forest information to support reporting on national and international policies such as the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, the UN Convention on Biological Diversity (UNCBD), the Ministerial Conference on the Protection of Forests in Europe (MCPFE) and processes related to Streamlining European Biodiversity Indicators by 2010 (SEBI 2010). Making use of Earth Observation methodologies allows retrieving spatially explicit information on the state and development of forests from continental to regional scale in a cost-efficient way and at proven high quality.

Water Quality

Water Quality Services address the Water Framework Directive (WFD) obligating the EU Member States to manage, monitor and report the status of the water resources on river basin scale. The services focus on identification and management of nutrient and pesticide inputs into the water cycle resulting from diffuse and point sources.

Spatial Development

The Spatial Development Service provides spatially referenced and consistent geo-information for monitoring of urban structure, urban growth and soil sealing in support of reporting obligations. Products describe the pressure, state and impact of urban land take for integrated spatial planning.

Environmental Resource Management in Africa

The Service for Environmental Resource Management in Africa ensures permanent access to high quality pre-processed data for all African countries by using advanced satellite telecommunication infrastructures. Products of the service comprise advanced environmental parameters (in particular related to vegetation conditions), processed according to standard procedures, as well as maps such as land cover maps, forest maps, etc.

Support to Emergencies and Humanitarian Aid Services

Support to Emergencies and Humanitarian Aid services target three main application domains:

Civil Protection: National Civil Protection Services of Europe, DG ENV (European CP Unit), and more globally all risk management actors in Europe at different territorial scales

Humanitarian Aid: DG RELEX, DG ECHO, NGOs

Security crises: European Council, Member States

It addresses all types of disasters: natural disasters (floods, fires, landslides, storms, earthquakes, etc.), technological accidents, humanitarian crises (for instance after a severe drought period), civilian-military crises.

Pre-operational services for Crisis management support have been developed by the GMES Service Element for Humanitarian Relief - [RESPOND](#) and the GMES Service Element for Civil Protection – [RISK-EOS](#)

Data Portal

The Connecte@sy portal offers access to products delivered by the [PREVIEW](#) and [RISK-EOS](#) projects. The goal of this common portal is to provide a unified access to the products in order to facilitate the information exchange and sharing between the service providers and the risk user community.

In complementary with the existing delivery means held by the service provider for specific users, the Connecte@sy portal proposes the following functionalities at a global level:

The consultation of the available products,

The on-line visualisation and combination of data,

The possibility to retrieve and visualise data in Google Earth.

Windstorm Services

Alerts of strong winds over Europe for 1-2 and 3-5 days ahead using a traffic light warning system, and with the facility to access more forecast detail.

Fire Services

Fire Meteo Indices: The European Forest Fire Information System (EFFIS) supports the services in charge of the protection of forests against fires in the EU countries and provides the European Commission services and the European Parliament with updated and reliable information on wildland fires in Europe.

Automatic Burn Scar Mapping: Daily provision of burnt area maps based on an Automatic and Autonomous system. The Automatic Burn Scar Mapping service provides during the summer fire season daily products regarding burn scars mapping at medium-resolution for burnt areas larger than 48ha.

Burn Scar Mapping: The Burn Scar Mapping service package is dedicated to provide, seasonally, after the summer and winter fire seasons, information products regarding burnt scar mapping at high-resolution (60 m accuracy).

Regional Fire Monitoring: Detection and Monitoring of active fires near real-time by MSG/SEVIRI data (updated every 15 minutes)

Floods services

Medium-range plain flood forecasting: The benefit of the European Flood Alert System (EFAS) is two-fold. First, EFAS should provide the European Commission with useful information for the preparation and management of aid during a flood crisis.

Second, National Water Authorities should benefit from additional medium-range flood information that might contribute to increased preparedness in an upcoming flood event. EFAS is aimed at complementing national flood forecasting systems, not to replace them. The European Flood Alert System (EFAS) activity is at present in a development and testing phase at the European Commission Joint Research Centre.

Flood Information System (floodserver):

The use of flood management and information systems shows the benefits of readily available information and the need for effective and efficient cooperation between the users.

The floodserver supplies detailed information on the extent, impact and damage potential of past flood events. It is designed to provide extensive flood risk information for whole Europe quickly, reliable and easily accessible for everyone using detailed maps and information about past and potential future flood events.

At present flood relevant information about the rivers Rhine, Elbe and Lower Weser is already available. For the river Severn a TerraSAR-X based flood extent map has recently been implemented into the floodserver.

Northern Flood: Probability forecasts for exceeding the High Flood, i.e. flood with a return period 2-10 years.

Flood Risk Analysis: Delivery of information products to support flood scenarii elaboration and flood prevention plans

Flash Flood Early Warning: Hourly mapping of excessive runoff and overflow risks on basin prone to flash floods