



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 12.11.2008
COM(2008) 748 final

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**Global Monitoring for Environment and Security (GMES):
we care for a safer planet**

{SEC(2008) 2808}
{SEC(2008) 2809}

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1. INTRODUCTION

In the middle of the 20th century, we saw our planet from space for the first time. From space, the Earth is a small and fragile ball dominated not by human activity but by patterns of clouds, oceans greenery and soils¹.

Space systems help us to understand the fragility of our planet. They provide tools to address challenges mankind faces in the 21st century such as security threats, environmental degradation and climate change. Earth observation is a powerful advanced technology which through space and ground based capacities can monitor the Earth's environment and security threats and provide timely and reliable information. Europe has, therefore, decided to develop its own operational independent capacity through the Global Monitoring for Environment and Security (GMES) initiative. This decision reflected the growing responsibility of the EU in European and world affairs. Establishing such a system marks a strategic choice of the EU, with lasting impacts for the further political, economic, social, and scientific development of the EU.

Substantial work has been undertaken so far to move GMES from concept to reality. Recognising the importance of Earth observation, the Council endorsed the approach² and welcomed the Austrian and German EU Presidency initiatives³ on the future architecture and governance of GMES based on the combined efforts of the European Space Agency (ESA) and the European Union (EU).

GMES has now entered into its pre-operational phase. In 2011 it will be technically feasible to move into the operational phase.

Thus the Council has recently⁴ reaffirmed the need to implement GMES rapidly. It has requested the Commission to elaborate an action plan leading to the setting-up of an EU programme, aiming at securing the availability of GMES services and of critical observation data. In that context, it invited⁵ the Commission to propose, by 2008, arrangements for financing, operational infrastructure and effective management of GMES.

Following an intense consultation with main stakeholders this Communication responds to this invitation. Its main objective is to establish a basis for further discussions and consolidation of the political consensus among the various partners involved in order to proceed with implementing actions at a later stage.

¹ Report of the World Commission on Environment and Development: Our Common Future (A/42/427).

² 3rd Space Council orientations.

³ Graz Dialogue and Munich Roadmap.

⁴ Council Resolution on "Taking forward the European Space Policy" of 26.9.2008.

⁵ OJ C 136, 20.6.2007, p. 1.

2. A USER DRIVEN EARTH OBSERVATION PROGRAMME: STATE-OF-PLAY AND FUTURE SHAPE

GMES will deliver services of public interest. Examples include maps for emergency operations, monitoring of climate change parameters or chemical composition of the atmosphere. Substantial R&D effort has already been invested on Earth observation by the EU, ESA and their respective Member States to develop GMES infrastructure and pre-operational services. The operational phase needs to be assured.

GMES consists of the following three components:

Space

The GMES Space Component consists of space observation infrastructure addressing service data needs with missions observing land, atmospheric and oceanographic parameters. In practice it will rely on:

- Existing or planned European space infrastructure mainly satellites of ESA, EUMETSAT and Member States⁶; and
- Space infrastructure co-financed by the EU and ESA.

Within the Space Component, different functions need to be covered for all space infrastructure types (demonstration missions, initial and recurrent elements of operational missions). Currently, following a gap analysis conducted by ESA, ESA and the EC are jointly developing space observation infrastructure in the frame of the ESA GMES Space Component Programme. This programme aims at developing and implementing a number of satellite missions known as “the Sentinels”.

In situ

The GMES In-Situ Component will rely on a large number of facilities, instruments and services owned and operated at national, regional and intergovernmental levels inside and outside the EU. In situ infrastructure provides data to monitor the Earth's oceans, continental surfaces and its atmosphere. Examples of such data include the chemistry of the atmosphere and air quality, ice cover and soils and geophysical data among others.

Services

GMES services are the basis for Europe's autonomy in information provision world-wide. The scope and delivery schemes of GMES services should be designed to ensure an operational implementation based on user requirements and applicable legislation, but might have to be prioritised according to institutional and policy needs. The timely and cost-efficient delivery of information depends to a large extent on the successful implementation of the Infrastructure for Spatial Information in the European Community (INSPIRE) Directive⁷, which provides for the development and exchange of data for the implementation of EU

⁶ Including meteorological and national high-resolution and very-high resolution multispectral and radar imaging missions.

⁷ Directive 2007/2/EC

policies notably in the environmental sector. GMES services will make available products at European and global level.

In 2008 the preoperational services have been launched, paving the way for the future operation of GMES. The types of GMES services at this stage are:

- Marine and Atmosphere Services

This group includes services for the systematic monitoring and forecasting of the state of the Earth's subsystems state at regional and global levels, using models and methodologies that require large computing and processing capacities. These services produce information for monitoring and understanding climate change and may contribute towards improvements in the transport sector and the deeper marine knowledge needed for implementation of the EU's new Integrated Maritime Policy⁸.

- Land, Emergency and Security Services

This group includes geo-information services for land monitoring, emergency response and security applications at national, regional, European and global levels.

The development of GMES in its initial phase has given priority to the establishment of services in the area of Earth observation for environmental and emergency services. The development of the security services needs now to be accelerated. There is an opportunity to add value to an emerging European maritime surveillance network as a part of the EU Integrated Maritime Policy. This will require close co-operation with and between Member States and the European Defence Agency.

Likewise, the Commission will propose an approach for the contribution of GMES to climate change monitoring, using elements of its atmosphere, land and marine services.

Moreover, GMES has the potential to contribute to the proposed Shared Environmental Information System (SEIS)⁹ aims at modernising and simplifying the collection, exchange and use of the data and information required for environmental policy. In this context, GMES has the potential to improve the provision of services both to public policy makers and to citizens.

To date, GMES services are incomplete. They are not yet fully and permanently globally available. Their sustainability is not yet fully guaranteed. Therefore further investment is necessary including in the space infrastructure to fill the gaps of GMES services and to guarantee their long-term sustainability and reliability. Moreover a number of very different actors of varied institutional nature will have to be brought permanently together, also to ensure a proper representation of the EU and ESA Member States and further countries involved notably through their participation in intergovernmental organisations. For a cost efficient development of GMES it is essential to build the system in a modular or phased implementation approach based on available space and ground-based resources.

⁸ An Integrated Maritime Policy for the European Union ("The Blue Book"), Brussels, 10.10.2007, COM(2007) 575 final

⁹ COM(2008) 46 final of 1.2.2008

3. GMES: A PUBLIC INVESTMENT FOR GROWTH

While GMES will mainly serve public authorities, it is also creating opportunities for increased private sector usage of information sources and will also trigger partnerships between the research and the business community. Public investment will incite industry to explore innovative ways of integrating observing, communications and information technologies and should facilitate market uptake by value-adding service providers, many of which are small and medium enterprises (SME). This, in turn, will entail that as activities become mature and financed by the private sector, public investment will be either gradually reduced or re-directed to less mature sectors depending on the policy priorities. Thus, the development of market opportunities could eventually determine the proportion of public investment although this is not likely to happen in the short to medium term. At any event, GMES is expected to remain primarily a public-driven programme.

To achieve this, GMES services should be fully and openly accessible, as long as EU and Member States security interests do not suggest otherwise. This will help to promote the widest possible use and sharing of Earth observation data and information in line with the proposed SEIS and in accordance with existing legislation such as the INSPIRE Directive taking into account the Global Earth Observation System of Systems (GEOSS) principles. Finally, GMES will explore synergies with satellite navigation systems, notably Galileo and EGNOS, and communication systems to ensure integrated information towards the user.

4. INTERNATIONAL COOPERATION

Although European autonomy for GMES services is essential, international cooperation in Earth observation remains imperative to fulfil the European need for information at global level and to develop a cost efficient system. GMES cannot be successfully implemented without exchanging equivalent observation data through cooperation schemes, thereby sharing the cost of observation infrastructure with non-EU partners. Further, only a coordinated approach bringing together the main actors in the world will lead to effective action to counter global environmental threats. In particular, the joint development of shared Earth observation tools has led the major actors in the world to recognise the importance and impact of the on-going climate change process. The Commission therefore proposes to establish an international cooperation strategy for GMES. In line with the Lisbon GMES process, in the case of Africa this will be drawn in partnership with the African Union Commission as part of the joint EU-Africa strategy.

International cooperation should build on existing cooperation schemes developed by European national and intergovernmental actors with international counterparts, e.g. the World Meteorological Organisation, and be developed for new areas through the Group on Earth Observations (GEO) which is coordinating efforts to build a Global Earth Observation System of Systems (GEOSS). In the GEO process it is important to ensure access to observation data not controlled by Europe, and to define the European contribution to this international endeavour. GMES is also expected to be the main European contribution to the global 10-year GEOSS implementation plan.

5. FINANCING GMES

GMES is conceived as a system of systems delivering services of public interest and its financing is expected to be mainly public. The common European interest in such a project is

clear but the current EU budget does not have the capacity to develop it to its aimed potential. Taking into account the financial and staffing constraints of the Commission and the principle of cost efficiency, at this stage in its development, the only possible funding approach is to develop it in a modular way. This means that every possible expansion in the scope of GMES services that will be considered and every new evolution of GMES will be assessed with transparency against the principles of cost efficiency and user needs, the EU policy interests and the ability to provide the appropriate funding and organisational structures.

There needs to be a smooth transition between three stages, which also feedback into each other: demonstration stage with R&D funding, pre-operational stage with mixed R&D and operational funding, operational stage with operational funding from EU, intergovernmental and national operational budgets, bearing in mind that R&D funding will continue to be required during the operational stage to assure the evolution of GMES.

GMES will be co-financed at European, intergovernmental and national levels. Consequently, cost-sharing principles need to be defined together with a cost assessment based on the scope of services. The overall financing needs of GMES will be subject to a detailed financial and budgetary analysis led by the EU.

Space

The Community Programme should contribute to the sustainability of the space infrastructure, notably to the in-orbit availability, operations and replenishment of space infrastructure currently being co-financed by ESA and the EC in order to fill infrastructure gaps. It should also provide a funding scheme for accessing data from non-ESA developed infrastructure.

The Commission will assess the costs for the Space Component on the basis of the Space Component Long-term Plan coordinated by ESA starting with current service requirements.

In situ

The in-situ infrastructure is developed and maintained by Member States and should remain their responsibility. However, following the approach taken for space infrastructure and subject to decisions on the size and scope of future EU budgets, the Community Programme should contribute, where appropriate, to support the development of in-situ infrastructure, notably by encouraging both pan-European and globally co-ordinated data collection and exchange. The Community Programme should also contribute to co-ordination activities that are necessary to ensure the availability of in situ data for the GMES services. Where appropriate, it should also put in place accompanying measures linked to, for instance, the support of cross-border activities and global networks.

Services

It is foreseen that co-funding of operational services should be ensured by the GMES programme. The challenge is to consolidate the outcome of the massive investment already made within the EU research framework programme and at national and intergovernmental levels. The various user communities are expecting the EU to ensure the sustainability of GMES services and to implement accompanying measures in support of innovation and market uptake in the downstream sector.

The costs for the service component will be assessed on the basis of the scope identified by the expert groups of user communities, previous studies and on the basis of the already available pre-operational services¹⁰.

On the basis of precise costs estimates, the Commission will make a legislative proposal for defining the EU contribution for the operational phase of GMES for 2011-2013. Subject to a budgetary and financial evaluation and the availability of the necessary funds and organisational structures, the EU contribution beyond 2014 should sustain the operations of GMES.

6. SUSTAINING AN EARTH OBSERVATION CAPACITY: GOVERNANCE

A large number of players will contribute to the implementation of GMES including intergovernmental agencies, such as ESA, national and regional¹¹ organisations, environmental agencies, civil protection services, space agencies, industry, and user communities.

Succeeding with GMES will necessitate the establishment of partnerships among the different players involved under the leadership of the EU. These partnerships should ensure the integration of existing and new elements, thereby ensuring that decision-making is based on a clear division of roles and responsibilities, and accountability for public expenditure, while fully respecting subsidiarity and ensuring transparency. It should also provide a framework in which Member States entering into partnerships with the Community can ensure the long-term availability of their assets.

In these partnerships the European Commission should have the overall political co-ordination of the GMES programme including institutional, EU budget and programme management and implementation, contribution to market development and international co-operation activities. On the basis of the experience in the implementation of GMES, alternative organisational arrangements will be examined.

6.1. Technical Implementation

The technical implementation of the programme should be mainly entrusted to European entities which interact with public and private actors.

Space

The European Space Agency should co-ordinate the implementation of the space component.

Starting from an analysis of space-based observation needs in response to service requirements, ESA should ensure for and on behalf of the EC, the long term availability of the GMES Space Component. For all space infrastructure types, this will mainly consist of the preparation and consolidation of the Space Component decision-making process, including:

- the preparation of a Space Component Implementation Plan;

¹⁰ As presented at the 2008 GMES Forum organised by the French Presidency on 16, 17/10/2008, in Lille.

¹¹ In the Cohesion Policy, for the period 2007-2013, the Commission has opened up opportunities to Member States and regions to support the implementation of GMES.

- the supervision and monitoring of the implementation of this plan; and
- the coordination of R&D activities for the modernisation of observation infrastructure in support of the evolution of service requirements as approved by GMES governance bodies.

For routine global observation of atmosphere and oceans, ESA should ensure coordination with the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), which liaises with the meteorological service providers to compile their space observation needs.

For new space component infrastructure, that might be necessary to fill gaps for the provision of GMES services, again ESA should be assigned the role of procurement and, where applicable, development agent, for and on behalf of the EU. ESA should provide mission specifications derived from service requirements and assess their compliance.

In the short-term, the following arrangements¹² should be made for the operations of the Sentinel missions co-financed by ESA and the EU:

- ESA will operate space infrastructure in support of land and emergency services¹³, until an operator has been selected;
- EUMETSAT will operate space infrastructure in support of marine and atmosphere services¹⁴. Taking stock of the successful cooperation model between the two organisations in support to meteorology, ESA will coordinate with EUMETSAT for the development of the ground segment.

In situ

Similarly to the Space Component, the main focus of the implementation of the in situ component is to guarantee also in the long term easy access to data necessary to GMES services; and the sustainability of in situ observation networks. Such data and in situ observation networks are currently mainly under control of national, regional and local authorities and different European networks.

The EEA is expected to play an important role, in coordination with the Commission, in relation to the supervision of some services and coordination with user communities under the SEIS umbrella. Some specific coordination activities could be delegated to other existing relevant coordination bodies¹⁵.

Services

¹² In accordance with technical discussions between ESA and EUMETSAT.

¹³ This includes Sentinels 1 and 2, carrying radar and multispectral imaging sensors, and the land part of Sentinel 3.

¹⁴ This includes the Sentinel 4 and 5 instruments flying onboard EUMETSAT missions and the marine part of Sentinel 3.

¹⁵ For instance, EUMETNET (the European network of meteorological services) for meteorological in-situ observation systems and services; EUROGOOS (the European Association for the Global Observing System); EUROGEOGRAPHICS (the European association of National Mapping and Cadastral Agencies) and Eurogeosurveys (the European Association of Geological Surveys) for cartography, geology, mapping and reference data; and EMODNET (the European Marine Observation and Data Network) for marine data or other bodies under the umbrella of the EU Integrated Maritime Policy.

To ensure the provision of operational marine and atmosphere services the Commission suggests establishing a network of technical centres at EU level. In this context, the European Centre for Medium-range Weather Forecasting (ECMWF) could be assigned the coordination of the Atmosphere network. For the Marine Service, the Commission will first issue calls for proposals to consolidate the network and its coordinator until long term arrangements are defined.

Land, emergency and security services should be provided under the control of national and regional authorities. Consequently a shared methodology will be needed so that services can be integrated and aggregated at European level following the successful agriculture model. The Commission is ready to contribute to the development of a common methodology for service delivery and aggregation of geo-information products. In the context of the consolidation of crisis management activities, the Emergency Service will be made available to various emergency response actors at EU and Member States levels, including through the civil protection response instrument, humanitarian aid interventions and crisis management operations.

Moreover, the Commission will provide technical support to the design and implementation of services at EU and national levels through its Joint Research Centre (JRC) and Eurostat services.

In order to remain user-driven, GMES needs to establish a strong link with users through structures that are close to the user communities. Several agencies and bodies established by the EU will not only be future users of GMES services, but could also contribute to the aggregation of service requirements and service provision. For instance, the European Environment Agency (EEA), the European Maritime Safety Agency (EMSA), the European Union Satellite Centre (EUSC), the European Defence Agency (EDA) and the European Agency for the Management of Operational Cooperation at the External Borders (FRONTEX). Other agencies might also be involved depending on the needs and the evolution of GMES services.

In some cases, the mandate and resources of specialised agencies might have to be examined to allow a contribution to the GMES services taking into consideration the current discussions on the way forward for European agencies¹⁶.

6.2 Coordination of the Partnership

The Commission will be responsible for the overall co-ordination of GMES, assisted by a Partners Board and a Programme Committee for the implementation of the EU programme. In addition it is suggested to foresee establishing a Security Board and a User Forum, which should advise the Commission.

A process for establishing user needs has been used for the selection of fast track and pilot services and for the development of space observation infrastructure by ESA. This process should be now formalised with the establishment of the GMES programme. The process will include:

- definition of user requirements;

¹⁶ COM(2008) 135 final of 11.3.2008.

- consolidation of the scope and content of services and related observation requirements; and
- definition of related observation infrastructure architecture according to available means.

All partners should be involved in a structured way in this decision-making process.

Managing the Partnership

The Partners Board described above, will be composed of representatives of Member States which contribute to GMES with infrastructure. Other relevant organisations should be invited as observers. The GMES Partners Board will be instrumental in the implementation and future evolution of the programme. Discussions will be prepared at component level (Service, In-situ and Space Components) and representation in the Board should be organised accordingly.

Implementing the EU Programme

The Community programme will form the basis of the Community contribution to the GMES partnership and will complement the actions of other partners. It should be open to international agreements with non-EU countries¹⁷ with the possibility of financial contributions.

The Commission, assisted by a Programme Committee, will manage the implementation of the GMES Programme. Discussions will be prepared at component level (Service, In-situ and Space Components) and representation in the Committee will be organised accordingly. The technical implementation will be done as explained in section 6.1.

Data security

Effective handling of data security within GMES must take due account of Member States' data security requirements and would help operational services fulfil basic data security criteria especially for security users, by identifying and mitigating risks such as proliferation of data, disclosure of interest or doubts about the reliability of GMES services.

The corresponding work to provide guidance and input for data security which meets Member States security requirements should be taken through the Security Board, drawing on all relevant expertise.

¹⁷ For example, ESA or EUMETSAT Member States not members of the EU.

Meeting user requirements

In addition, to the other elements presented in this Communication, a User Forum should be established to safeguard the user-driven objective of GMES. The Forum will have different configurations, depending on the services, and will address technical and scientific issues as necessary. The user representatives will be selected on a transparent, objective and non-discriminatory basis, taking into consideration the necessity to avoid conflicts of interest. In its management, GMES will also seek synergies with Galileo for what concerns user support.

7. CONCLUSIONS

In 2009, the Commission will make a legislative proposal for an EU Earth observation programme named GMES. Together with its proposal for the GMES Programme, the Commission will examine the operational funding necessary for GMES during 2011–2013, taking account of the constraints of the existing EU budget. Decisions on funding and organisational arrangements after 2013 will have to be determined as part of the next multiannual financial framework of the EU.

On the basis of defined cost-sharing principles and a cost assessment based on the scope of services the overall financing needs of GMES will be subject to future analysis led by the EU.

The Commission will co-ordinate the management and implementation of the GMES programme, assisted by a Programme Committee, a Partners Board, a Security Board and a User Forum. Interim governance will be proposed while this governance structure is being created.

The Commission will propose a full and open data and information policy for GMES.

EU instruments in support of competitiveness and innovation should be deployed to stimulate the growth of the GMES downstream sector. In particular, due to their importance for job and growth creation, GMES services should be considered in the lead market initiative.

The Commission will propose an international cooperation strategy for GMES. In this context the Commission will collaborate with its GEO partners under the agreed terms for GEOSS¹⁸ on how to ensure or maintain access to observation data, and to define the European contribution to this international endeavour.

¹⁸ Including the 10-year GEOSS implementation plan and the Cape Town Declaration.