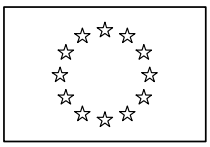

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COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

Global Monitoring for Environment and Security (GMES): From Concept to Reality

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COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

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INTRODUCTION

The objective of GMES is to provide, on a sustained basis, reliable and timely services related to environmental and security issues in support of public policy makers' needs. GMES is an EU-led initiative, in which ESA will implement the space component and the Commission will manage actions for identifying and developing services relying both on in-situ and remote sensing data.

This Communication sets out a strategy for delivering GMES, beginning with the pilot phase of the three first operational GMES services by 2008. It explains the process for defining the scope of these services, in conjunction with the users, and sets out the Commission's goal to ensure continuity of service. It discusses the establishment of appropriate management structures linked to each phase of the programme.

SUMMARY

At a time when command and appropriate use of information has important geo-strategic implications, Europe needs to have available a capacity which allows it independently to evaluate its policy responses in a reliable and timely manner. A comprehensive Earth observing system, using space-borne and in situ techniques (land, air and sea) through well-defined operational services, is key to ensuring the implementation and monitoring of environmental and security policies in the context of sustainable development.

Currently demand for Earth observation services in Europe is still fragmented albeit growing. Two factors can change this. First, decision makers at all levels have to be convinced that services are reliable as to their quality and continuity. Second, they need to see from experience that those services will contribute sufficiently to their organisation's objectives to justify meeting the cost of their long-term operation, maintenance and renewal.

On the supply side, Europe has developed world class assets and expertise. However, observing systems are run independently and coverage is incomplete for both the in-situ and satellite observing systems. Many satellites and in-situ observing networks are experimental and cannot guarantee the required quality and continuity of measurement to provide the basis of operational services now or in the future. While our international partners are investing heavily in the development of capacities for global monitoring, Europe is still working with different national capacities and different national standards.

Recognising the strategic importance of Earth observation and its growing potential, Europe will develop its own operational capability through the GMES programme. GMES aims at coordinating existing systems, producing services of guaranteed validity and, crucially, ensuring their future continuity.

GMES will be developed in steps through the introduction of pilot phase services, starting with three fast track services (land, marine, emergency) by the end of 2008. A total of eleven initial services have already been identified, which could be successively deployed to support a wide range of needs.

In the short-term, GMES will draw on existing in-situ and space-based observing capacities developed by EU and ESA Member States. In the longer-term, investments will be made in the deployment of new capacities to provide continuity of data sources and infrastructure in support of the development of GMES services.

Optimum complementarity should also be achieved in the management of GMES-related activities. The Commission envisages introducing an organisational structure for GMES Services to accelerate the aggregation of demand and improve its internal management arrangements. Investment in the space component by the EU and by ESA will be managed together by ESA, under the respective financial rules. Longer-term structures for managing GMES will be discussed with EU and ESA Member States.

Efficient data management and information sharing are a prerequisite for the producing GMES services. A continuous dialogue between stakeholders will be maintained to develop the needed spatial data infrastructures and the implementation of the INSPIRE (Infrastructure for Spatial Information in Europe) proposal for a directive will be supported. As such, GMES will contribute to facilitating access, use and harmonisation of geospatial information at pan-European level. GMES will be an essential tool to increase interoperability of national systems, hence fostering the development of adequate European standards.

GMES will constitute a growing element in the EU's bilateral relations with international partners. It will be developed taking into account the activities of the Group on Earth Observations (GEO). With its federating role, GMES will be the main European contribution to the global 10-year implementation plan for a Global Earth Observation System of Systems (GEOSS).

1. THE STRATEGIC DIMENSION

The command of information on environment and security has geostrategic implications. The political mandate has been expressed at the June 2001 Gothenburg summit and in the later Council Resolution towards[1] "achieving by 2008 an **operational** and **autonomous** European capability".

In its February 2004 Communication[2] the Commission has outlined the strategic role of GMES in the development of the EU's role as a global actor and identified elements for its implementation. The European Parliament has expressed support for the introduction of GMES[3]. The second Space Council has confirmed that GMES will be the second EU flagship of space policy after Galileo.

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1 Council Resolution 2001/C 350/02 (13.11.2001)

2 Global Monitoring for Environment and Security (GMES): Establishing a GMES capacity by 2008 – Action Plan 2004-2008 (COM (2004) 65 Final)

3 B5-0045/2004 European Parliament resolution on the action plan for implementing the European space policy

The need for reliable and timely information has been underlined by increased demand. Natural and manmade catastrophes in Europe, America, Asia and Africa, coupled with increased security needs, have further reinforced the case for improved monitoring systems. Global to local levels of requirements have now been identified.

GMES will make an important contribution to serve the EU's civil security needs[4]. In addition, it will provide opportunities for additional capabilities for the European Security and Defence Policy (ESDP). All possible civil and military synergies should be pursued to ensure a better use of resources, in full complementarity with the EU Satellite Centre (EUSC), which is already operational in this area.

GMES will provide important support for environmental monitoring and assessment and contribute to the implementation of the Shared Environmental Information System being developed by the Commission and Member States. It will improve the quality of environmental information, while making it more accessible, and streamline and rationalise environmental reporting.

GMES thus covers local, regional and global issues and is becoming instrumental in the further development of a European leadership role in the practical application of earth observation for climate and environment monitoring and civil security.

GMES will provide the EU with a tool for participating in the international efforts consistent with the July 2005 G8 recommendation to strengthen the global climate observing system. It will contribute to the EU Strategy for Africa[5], through the development of an African observatory and the implementation of the African Monitoring of the Environment for Sustainable Development (AMESD) initiative. GMES has been highlighted in the EU's dialogues with the USA, Russia, China and India[6]. The US recently published its Strategic Plan for an Integrated Earth Observation System. Russia and Japan are about to do the same.

GMES will become the main European contribution to the global 10-year implementation plan for the GEOSS. GMES will generate data and services related to both environment and security. The EU's participation in the GEOSS will facilitate data exchange with international partners, in the area of environment monitoring, and will encourage the increased use of Earth observation, as well as the development of a system of worldwide observation systems.

As an initiative of the EU, GMES will be at the centre of a series of partnerships. These need to be defined at the EU level, including the role of agencies, Member States, value added services industry (including SMEs), user communities etc.

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4 Report from the Panel of Experts on Space and Security (March 2005)

5 'EU Strategy for Africa' COM(2005)489 Final (12.10.2005)

6 The EU US summit ('The European Union and the United States Initiative to Enhance Transatlantic Economic Integration and Growth' EU-US Joint Declaration.) concluded "to promote cooperation using civilian space based technologies for sustainable development, science, exploration and deepening the knowledge society". The EU Russia summit in May 2005 adopted a set of road maps for four Common Spaces. In the road map for the Common Economic Space, the EU and Russia agree "to provide appropriate environment for fruitful cooperation on GMES programme." On the occasion of the China EU summit in September 2005 both parties agreed "to strengthening the EU-China Cooperation in Space, namely in joint activities in Earth Observation and Earth Science […]".

GMES will stimulate economic growth by facilitating the creation of innovative added value services. It has been selected as one of the quick start projects in the Commission's Initiative for Growth[7]. GMES should stimulate the industrial sector to expand its service offer and to develop the innovative observing, communications and information technologies that will be required within a dynamic and evolutionary GMES capacity, creating opportunities for increased private sector usage of information sources. The European industrial base will be an important asset to maintain a European autonomous capacity and political independence in decision making.

2. GMES AT THE SERVICE OF THE EU

GMES will substantially increase the ability of geospatial information to support a variety of EU policies, in particular:

– Europe's environmental commitments, within EU territory and globally, by contributing to the formulation, implementation and verification of the Community environmental policies[8], national regulations and international conventions;

– other EU policy areas such as agriculture, regional development, fisheries, transport, external relations, development aid and humanitarian assistance;

– Common Foreign and Security Policy, including the European Security and Defence Policy;

– other policies relevant to European citizens' security at Community and national levels[9], notably justice, home affairs and customs, including surveillance and management of external borders[10].

European Commission Services spend some tens of million Euros annually on the use of geospatial data across a wide range of policies; the EU Satellite Centre similarly acquires Earth Observation data to extract information in support to the CFSP including the ESDP[11]. Based on current and foreseen policy development, these expenditures are bound to increase significantly in the near future.

Some concrete examples include:

– in agriculture: the area acreage checks and agri-environmental measures;

– in fisheries: the Vessel Monitoring and Vessel Detection systems;

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7 "A European initiative for growth: Investing in networks and knowledge for growth and jobs: Final report to the European Council" COM(2003) 690 final/2 (21.11.2003)

8 The 6th Environmental Action Plan (2004 to 2010) addressing climate change, nature and biodiversity, environment and health, natural resources and waste

9 "A secure Europe in a better world–European Security Strategy" Javier Solana 12/12/2003

10 Including the work of the European Agency for the Management of Operational Cooperation at the External Borders of the Member States

11 See the Council Joint Action of 20 July 2001 on the establishment of a European Union Satellite Centre, Article 2, Point 1: (2001/555/CFSP) The Centre shall support the decision-making of the Union in the context of the CFSP, in particular of the ESDP, by providing material resulting from the analysis of satellite imagery and collateral data, including aerial imagery as appropriate, in accordance with Articles 3 and 4.

– in external relations: imagery acquisition in the frame of specific Community Instruments (eg Rapid Reaction mechanism);

– in environment: land-use and land-use changes, natural hazards (eg forest fires, floods, tsunami response) and global climate change monitoring;

– in development policy: water, vegetation and food security monitoring activities;

– in research: environmental research.

3. IMPLEMENTATION

3.1. Users at the forefront

The goal of the current development phase is to build a strong user base for GMES information services. This implies that needs are identified and updated and that the services provided will be reliable and effective.

Users of GMES information services are involved in the development, implementation and monitoring of environmental and security policies from global to local scales. The European Commission is one key user. Its own needs are being identified and demand is progressively being aggregated.

Users need to be assured that the services will be available on a long-term basis. This requires action to guarantee the availability of the space-based, in-situ and data management infrastructures.

Assessment mechanisms have to be set up to validate quality, relevance and performance of services. The introduction of each service will be subject to a number of key milestones. The corresponding roadmaps will include the individual start up costs and the operating costs.

3.2. Gradual introduction of pilot operational services

By its nature GMES is complex: it will require, as appropriate, the integration of data from space-based and in-situ (airborne, water-based and ground-based) earth observation capacities into user-driven operational application services.

It is essential to move forward from the current project-based approach. The capacity has to be built up gradually, based on clearly identified priorities and by using existing elements wherever possible.

The gradual introduction of services will be based on:

- their maturity;
- uptake by the user communities (relevance for policy making and policy implementation); and
- long-term sustainability of demand and supply.

Pilot services and the required infrastructures will be funded by aligning Community, national and regional resources. The speed at which services are introduced will depend largely on the efficient leveraging and pooling of these funding resources.

The challenges are to achieve increased interoperability of acquisition systems; to harmonise and to foster the standardisation of data structures and interfaces; to overcome policy barriers to data sharing; to design quality assurance mechanisms; to achieve fusion of data from different sources at different levels; and to provide innovative, user-friendly services that are cost effective and sustainable. These developments should become part of a coherent, single overall programme, without losing the benefits of decentralised management and investments.

Near term opportunities need to be selected and their scope has to be defined. To meet the goal of operational services by 2008, these must receive fast track treatment.

3.3. Candidate services for Fast Track introduction

In the first step, the Commission judges that three fast track services are likely to satisfy these criteria and proceed into a pilot operational phase. It has established a process for confirming these and defining their exact scope and modalities. This process includes thematic workshops (to be held in October-November 2005) aimed at strengthening the participation and commitment of the relevant user communities. The three services already proposed to the EU and ESA Member States in the GMES Advisory Council are: Emergency Response, Land Monitoring, and Marine Services. They are described in Annex A.

The overall goal remains to develop an extended range of GMES services which meet user requirements and for which the economic and societal benefits justify the investment. Support to the deployment of further of these services will therefore be prepared in the course of 2005-6. Using the same validation process as for the Fast Tracks (see Annex B), further pilots will be introduced progressively with a view to providing a broader range of services, as indicated in Annex C. These will include, for example, services such as atmospheric monitoring, external border surveillance and crisis prevention, to which some Member States have emphasised the importance that they attach.

The objective is to gradually develop and validate a number of pilot operational services, based on selected R&D projects extending and strengthening the current actions. Accordingly, the Commission is ensuring that, under FP6, the ongoing GMES projects support the implementation of potential operational services. Remaining FP6 resources, yet to be committed, will be focused, as far as possible, on the fast track services, including the integration of the components parts – in-situ, space and data management – and the build-up of the GMES space component. The pilot phase of the fast track services should be ready for early delivery in 2008.

Crucial to the success of the GMES service component is the development of a European Spatial Data Infrastructure as envisaged by the INSPIRE proposal for a directive. Pilot services shall therefore in effect act also as INSPIRE pilots and be integrated in the INSPIRE Implementation Programme. Data policies will need to be developed, which should facilitate acquisition and exploitation by both service providers and users.

3.4. Funding strategy

Over the past 5 years about 230 Mio Euro have been spent at a European level on GMES related demonstration services: the EU is mobilising via FP 6 about 100 Mio Euro (from 2003 to 2006); ESA is investing over the 5 years 130 Mio Euro for the space, ground and service segments.

Whilst in the long-term, services should be funded by the users, the critical infrastructure and enabling technologies will need upfront investment for pilot services to be introduced.

The Commission is preparing the specific programme of FP 7. RTD activities through the framework programme of community research, in particular in the domain of environment, depend heavily on the availability of Earth observation data. As the second flagship of the EU space policy, it is envisaged that GMES will be allocated a substantial majority of the funding available for Space under the Seventh Framework Programme for Research, Technological Development and Demonstration Activities[12] (FP7). From this allocation, it is envisaged funding a significant proportion of the budget for the space component for which ESA has estimated an investment of €2.3bn for 2006-2013[13]. Member States of the EU and of ESA are already planning to complement this investment with an ESA programme and, in some cases, programmes to develop national satellite systems.

The research projects funded through the "Environment" thematic priority of FP 7 will further assist to identify future GMES operational services. They will generate data and models which will contribute to the implementation of the nine societal benefit areas of GEOSS. The "Information society technologies" thematic priority will contribute to the data and information management element of GMES, to the implementation of INSPIRE and, hence to GEOSS.

An overall funding strategy for the in-situ and data management components is more complex to develop due the diversity and scattered responsibilities over many different agencies in the Member States. This will require better alignment of the financial resources and the leverage of new ones where gaps in infrastructure need to be filled.

The use of non-R&D Community instruments will be explored in relation to both in-situ and space components.

For the time being, bringing GMES to operational status involves a series of public-public partnerships on the supply side, supported by the intervention of research budgets. These will continue to play a major role but, in the future, where services become integral to development or implementation of public policies, they should be supported by the relevant institutional users. In some areas, GMES may also attract private sector customers, with appropriate cost-recovery mechanisms. This may make public-private partnerships possible, in due course.

This can only be achieved if Europe capitalizes on its strength through better coordination and pooling of all available resources.

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12 COM(2005) 119 final 6.4.2005

13 Programme proposal by the ESA Director General to the ESA Member States

3.5. Building on existing capabilities

GMES will use to the maximum extent possible existing capacities, national or European. It is necessary to map these, including actual and planned infrastructures that could contribute to fulfil the requirements, and to ensure their interoperability. Remaining gaps need to be identified and, along with the replacement needs of existing capacities, be discussed between the EU and its agencies, ESA, EUMETSAT, and the Member States of these organisations. The maximum use within Europe of existing and planned operational satellites, in-situ networks and spatial data infrastructures needs to be ensured. A better coordination and provision of resources is needed, including multiple use facilities.

In order to ensure autonomous capabilities, as advocated by the Gothenburg summit, Europe should progressively rely on its own capabilities. The mid to long-term strategy to do so needs to be defined, taking into account increasing inter-dependence with international partners.

Nevertheless, it is recognised that certain measures regarding the development of the space component of GMES have to be taken as a matter of urgency, to maintain data continuity in the next 10-15 years. The majority of GMES-like services currently rely on observations from a number of satellites which have already exceeded, or will reach within a few years, their nominal end-of-life.

As a way of meeting the most urgent satellite observation requirements, the ESA Director General has proposed to ESA Member States to secure an initial budget to cover the first phases of development of the future space infrastructure of GMES (including the related ground segment). The Commission welcomes this proposal which takes into account its plans for the initial services and, in particular, the three fast tracks. During 2006-2007, it will assess its contribution to the GMES space component in the light of:

- finalisation of user requirements;
- the definition of the initial services, in particular the fast tracks; and
- the approval of the FP7 programme proposal and budget.

Gap and efficiency assessments of the in-situ and spatial data infrastructures are being undertaken. During 2006-2007 the outcome of these findings will serve better to define future Community contributions.

3.6. Impact assessment

This Communication details strategy and near-term changes in the management of the GMES initiative. In line with the overall Commission policy, before substantial funds are committed to pilot operational services, GMES will require justification based on a solid impact assessment. In view of the related commitments expected to be made by the Member States of EU and ESA, this should be more specific to GMES than the impact assessment relating to FP7. The overall socio-economic case for GMES has been indicated in the first phase of a study by independent consultants. Member States have provided a team of experts to assess the methodology of the study as it progresses.

The study identifies a range of strategic benefits from implementing GMES. By their nature, many of the significant benefits are largely *non-quantifiable*. However, the report also identifies substantial *quantifiable* benefits over the period 2005-2030. A preliminary impact assessment has been prepared by the Commission Services. It will be finalised and published after the final socio-economic study report is available in the coming months.

The second phase of the study should be completed in November 2005. It will seek to further substantiate the total overall benefits through detailed validation and further stakeholder consultation. It will also identify which geographical areas and economic sectors are expected to secure these benefits and seek to differentiate between shorter-term and longer-term benefits. The impact assessment will be finalised at that point and published.

3.7. Governance

The appropriate division of work and the establishment of organisational steps are critical to the successful implementation of GMES.

3.7.1. Roles and responsibilities

It is essential to achieve optimal complementarity between the EU institutions, ESA and their Member States, based on clearly defined roles and responsibilities.

The EU will:

- define the priorities and requirements;
- aggregate the political will and user demand; and
- ensure the availability and continuity of services.

ESA will:

- support and define the technical specifications of the space component;
- implement the space component, coordinating centres of excellence across Europe; and
- advise the EU on future space component requirements.

Member States may:

- strengthen internal co-ordination of related data collection and management activities and federate national demand;
- contribute to the implementation of the necessary spatial data infrastructures and in-situ components;
- support the implementation of the space component.

ESA consequently will manage the development of those space infrastructures which are identified for support under FP7, in accordance with the rules of that programme, integrating these activities with its own in this area. The Commission will manage the development of GMES services supported through FP7, either directly or through externalisation. This will

allow the optimal integration of data from in-situ monitoring. After the completion of the current ESA GMES Service Element projects, the further development and consolidation of such services will be the responsibility of the EC, as an integral part of its overall programme within FP7.

The operation of satellite and in-situ systems will need to be assessed on a case-by-case basis, taking into account ownership of the assets. It should maximise cost-effective use of existing expertise in inter-governmental organisations, Member States and industry.

As regards negotiating the supply of earth observation data required for operational GMES services, both during their pilot phase and when fully operational, it will be necessary to identify the most effective way for doing this, based on a coherent Europe-wide approach.

3.7.2. Structures

The management structure for GMES has to evolve according to the gradual development of new operational services and the evolution of the user requirements. It should be pragmatic, flexible and modular. The management structure needs, therefore, to be sufficiently open to be able to evolve towards each next step.

The successful implementation of GMES will require the active involvement of industry, with particular attention to SMEs and service providers. Participation of industry to such a project of common European interest remains an open option. It will be accompanied by a feasibility study/impact assessment.

In setting up its organisational frame, GMES will fully take into account the experience gained through the Galileo process.

a) Short-term

Existing demand at EU level will be progressively aggregated. The Commission will set up a GMES organisational structure, operating within the Commission, to strengthen the management of GMES. The Commission will also strengthen the relations between the advisory bodies with an interest in GMES and related areas.

The tasks of the new structure for GMES Services would include:

- identification of strategy for GMES, becoming the focal point for the coordination of the Commission's GMES-related activities and the consolidation of user needs;
- development of GMES pilot services, starting with the fast track services; and
- support to the management of on-going and future research and technology development activities.

The structure would have the potential to form the core of an embryonic GMES management body and could progressively work also on behalf of other EU institutions and agencies.

b) Medium-term from 2007 onwards

The start of FP 7 will see the establishment of pilot phase operational services. There will be further consolidation of user requirements, validation of GMES services, development of associated infrastructures, finalisation of negotiations ensuring long-term access to data and improved interoperability.

In this phase, if the Commission's organisational structure continued, it would be likely to expand, with additional staff seconded from national, regional or local authorities from EU and ESA Member States, in line with the progress of the operational services. This could signal a need to progress to a new structure which could involve moving closer to the structure suitable for the long-term. The Commission has already indicated[14] that a Joint Technology Initiative (JTI) for GMES may be one option to be assessed against others as a means of bringing together resources and mobilising a critical mass. Such an approach would be capable of bringing relevant user organisations into the programme. It would demonstrate that progressively the end user is willing to buy into the process.

Nevertheless, the most appropriate management structure will need to be fully evaluated. The Commission proposes to do this in association with the Member States through the introduction of a dedicated subgroup of the GMES Advisory Council. This will be able to draw on a consultants' study undertaken under FP6 [15] to identify the impact of potential organisational models.

c) Long-term – fully operational phase

In this phase a number of services will have completed successfully the pilot phase. Each should guarantee specified quality and availability of products. Continuing availability of services is likely to be the result of procurement arrangements stimulated by users, probably through a central body.

4. PROMOTING GMES/BRANDING

It will be essential to raise the public profile of GMES with users and the public generally. Recognition of Galileo in the media is strong and raising GMES to comparable levels will take a sustained effort.

An appropriate brand and clear brand values need to be established. Stakeholder involvement must be substantially increased, through a sustained public awareness programme. This should include securing public recognition, for example through a competition among schools to name the programme.

The Commission envisages organising in 2007 a GMES Summit. This Summit could bring together key public and private stakeholders with a view to highlight progress, exchange experiences and chart the way towards an integrated worldwide earth observation system.

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14 European Space Policy - Preliminary Elements COM(2005) 208 final, 23.05.2005

15 'GOSIS Report (D3) on potential GMES organisational models' Specific Support Action under FP6