



**COUNCIL OF
THE EUROPEAN UNION**

Brussels, 9 February 2004

6094/04

**RECH 20
ENV 81
COSDP 53
TRANS 57**

COVER NOTE

from : Secretary-General of the European Commission,
signed by Mrs Patricia BUGNOT, Director

date of receipt : 4 February 2004

to : Mr Javier SOLANA, Secretary-General/High Representative

Subject: Communication from the Commission to the European Parliament and the Council entitled: "Global Monitoring for Environment and Security (GMES): Establishing a GMES capacity by 2008 - (Action Plan (2004-2008))".

Delegations will find attached Commission document COM(2004) 65 final.

Encl.: COM(2004) 65 final



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 3.2.2004
COM (2004) 65 final

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT AND THE COUNCIL**

**Global Monitoring for Environment and Security (GMES): Establishing a GMES
capacity by 2008 - (Action Plan (2004-2008))**

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INTRODUCTION

The Global Monitoring for Environment and Security (GMES) initiative is to enable decision-makers in Europe to acquire the capacity for global as well as regional monitoring so as to effectively realise the EU's objectives in a wide variety of policy areas. At a time when command of information has geo-strategic implications, investments have been and continue to be made at various levels, without co-ordination, to develop monitoring technologies and data systems. GMES aims at co-ordinating existing as well as new technologies and systems to better meet a structured demand for information on the part of European, national, regional and local decision-makers and users. GMES addresses the (potentially common) needs of public authorities in various policy areas, as, for example, in the case of information on land cover, which will contribute to prediction and management of floods, forest fires and crop yields, as well as monitoring of carbon sinks and sources in the framework of the Kyoto protocol. The implementation plan presented in this Communication outlines the necessary steps towards priority services during the period 2004 to 2008.

Why GMES?

At a time when command of information has geo-strategic implications, GMES aims at providing the EU with the capacity to pursue its interests and to effectively address today's challenges and threats in a wide variety of policy areas. In the fields of environment and security, decision-making can be greatly facilitated by providing the relevant authorities with tools to combine and process large quantities of data and information from diverse and often unrelated sources.

The challenge for GMES is therefore to gather together existing data and provide innovative, cost-effective, sustainable and user-friendly services, that enable decision-makers to better anticipate or mitigate crisis situations and issues relating to the management of the environment and security. To achieve this, GMES needs to make full use of data collected from space-borne, airborne and in-situ observation systems that is then delivered to service providers through an efficient data integration and information management capacity.

Data gathering and analysis is already conducted at many levels, national and international, and investments made in Europe over the past decade have created a wealth of different environmental monitoring capabilities and application specific data supply chains. Despite advances made in sensor technology and networks, data evaluation techniques and information technology networks, the production of information in support of environmental and security policies remains often below its full potential to provide benefits for the users. These end users are stakeholders in public services, private industry, academia and the citizen. Europe now needs to capitalise on its strengths by better co-ordination, continuity of services and ways to improve support to the implementation of EU policies including where appropriate support to the Union's Common Foreign and Security Policy (CFSP). The role of the European Commission in this respect is to provide through GMES the framework for a more coherent use of existing systems and networks and a co-ordinated development of new ones in response to data needs of public authorities at various levels and in various policy areas.

GMES covers local and global issues and has become instrumental in the development of a European leadership role in global environmental monitoring and cooperation at global level. GMES is now regarded as the European contribution to the actions recommended at the World Sustainable Development Summit in Johannesburg (2002), and those linked to the Earth Observation Summit initiative recently launched at Ministerial level, with 37 countries and 22 international organisations involved.

From concept to capacity

The GMES concept was initiated in 1998 and endorsed by the EU and European Space Agency (ESA) Councils in 2001. In its Communication to the EU Gothenburg Summit (2001) the Commission called for “..establishing by 2008 a European capacity for Global Monitoring of Environment and Security” to gather, interpret and use data and information in support of sustainable development policies. In setting-up its organisational framework GMES will fully take into account the experience gained through the GALILEO process.

An exploratory initial period, undertaken jointly by the EC and ESA, took place between 2001 and 2003 (following the GMES EC Action Plan 2001-2003¹), the detailed outcomes of which are presented in the Initial Period (2001-2003) Final Report², together with the lessons learnt. The importance of GMES has also been recognised in the recent European Space Policy White Paper³ and in the 2003 Environment Policy review⁴.

The GMES initiative has now reached a stage of maturity where it can progress to its development and implementation phase, with service provision for different areas becoming operational in a staged approach. In particular, GMES has the potential to stimulate economic growth by creating innovative added-value services. In this context, it has been selected as one of the “Quick Start” projects in the Commission’s Initiative for Growth.

The aim of this Communication is threefold: (i) to outline the key lessons learnt as a result of the initial phase and identify further challenges; (ii) to determine how to establish a GMES capacity by 2008, including a governance structure and funding strategy; (iii) to present an Action Plan for the next period (2004-2008).

1. KEY LESSONS LEARNT AND MAIN CHALLENGES

During the GMES initial period the main findings have been derived from the following principal sources:

- the GMES-related projects undertaken in the EC Research Framework programmes and ESA’s GMES Services Element programme;
- interactions with the potential GMES user community, through “GMES Fora” events, which gathered several thousand participants;
- dialogue with Member States and international organisations represented on the GMES Steering Committee;
- consultation with European experts in the context of the Commission’s Infrastructure for Spatial Information in Europe (INSPIRE⁵ initiative);
- experience accumulated in the context of activities conducted in support to a broad range of community policies by the JRC.

The main points are summarised below. Full details can be found in the Final report for the GMES Initial Period (2001-2003).

¹ COM (2001) 609 final

² Final Report for the GMES Initial Period 2001-2003 (final). Cf. web site <http://www.gmes.info>

³ European Space Policy - White Paper COM (2003) 673

⁴ 2003 Environment Policy review – Consolidating the environmental pillar of sustainable development COM(2003) 745 final

⁵ Cf. Memorandum of Understanding of 11 April 2002 between Commissioners Wallström, Busquin, Solbes on the development of the INSPIRE initiative. This is a legal initiative that will address technical standards and protocols, organisational and coordination issues, data policy issues including data access and the creation and maintenance of spatial information.

1.1. GMES at the service of EU policies and user needs

Reviewing the various user needs, it was established² that GMES has to support the following EU objectives and policy domains:

- Europe's environmental commitments, within EU territory and globally, by contributing to the formulation, implementation and verification of the Community environmental policies⁶, national regulations and international conventions;
- other EU policy areas such as agriculture, regional development, fisheries, transport, external relations with respect to the integration of the environmental dimension in the respective domains and their specific requirements;
- Common Foreign and Security Policy (CFSP), including the European Security and Defence Policy (ESDP);
- other policies relevant to European citizens' security at Community and national levels⁷, notably the potential exists for application to policies related to Justice and Home Affairs activities of the European Union, such as border surveillance.

Other European Union initiatives should be duly taken into account. Examples include the new EU legislation that has been enacted such as Directive 2003/98 on the re-use of public sector information⁸ adopted in December 2003 and the Copyright Directive⁹ that is currently being transposed, both of which aim to facilitate an internal market for digital content products and services.

GMES is an initiative for the benefit of its users, both public authorities and also the private sector, e.g. insurance and transport firms. Users are acting at all levels, and range for example from global organisations to regional and local authorities.

1.2. Main challenges to address in the coming period

Information services in support of these policies require significant improvement, despite progress in some domains. A better coordination and provision of resources is needed to fill existing gaps. During the initial period investigations, deficiencies were found of a political, technical, organisational and financial nature. In particular the following main challenges were drawn from the lessons learnt:

- the demands for information are scattered and should become more explicit through better dialogue between users and providers. An assessment focussing on the needs across different policies must be undertaken, to prevent redundant data collection and inefficient investments;
- the overall continuity, comparability and integration of space and in-situ data, modelling activities and interoperability of the systems need to be strengthened;
- user-friendly and cost-effective access to standardised data and harmonised data policies must be fostered, addressing the variable qualities (difficult and tardy access, poor definition, fragmentation, regional inconsistencies and

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

⁷ "A secure Europe in a better world–European Security Strategy" Javier Solana 12/12/2003

⁸ Directive 2003/98/EC of 17 November 2003, published in the OJ of 31 December 2003 (L345/90)

⁹ Directive 2001/29/EC, adopted on 22 June 2001

- incompleteness, partly due to differences in pricing policies including intellectual property rights, technical or legal restrictions);
- the provision of regular and reliable end-to-end services and the effective structuring of the user community must be ensured;
 - the dialogue amongst stakeholders involved in the information chain must be developed and the emergence of a true “GMES partnership” must be facilitated, including political ownership and governance;
 - security aspects must be consolidated, considering that this domain is not as mature as the environmental one (a preliminary analysis¹⁰ has been performed by the GMES Working Group on Security);
 - the commitment of funding for GMES to reach its operational stage must be ensured, enabling the transition from research funding that support existing experimental systems or precursor services to operational funding for upgraded services, observing systems and the establishment of data management systems.

1.3. Examples of expected economic and social benefits

Geohazards such as earthquakes, volcanic eruptions, landslides and subsidence inflict an enormous cost to the society in terms of loss of life and property. For the period 1992-2001, the annual averaged number of people killed due to natural disasters is estimated to be around 53000 in the World including almost 2700 for Europe¹¹. The damage is estimated to be around €50 billion at the global level (annual averaged figure) and the socio-economic impact is tremendous considering the number of people affected by these disasters. A preliminary study¹² shows that substantial savings could be made thanks to a better understanding of the events and improved forecasting, which would help to mitigate risks.

GMES can assist through improved prediction, monitoring and assessment capabilities, in the preparation of strategies to cope with natural hazards and human-made disasters, thus contributing to the reduction of the resulting economic losses.

Air pollution is a major environmental health problem affecting developed and developing countries. For example, an impact assessment made for Austria, France and Switzerland¹³ showed that those countries bear almost €50 billion of air pollution related health costs, of which some €27 billion are road-traffic related. The number of deaths due to pollution-related disease is estimated at about 5% of total deaths¹². GMES services should provide more accurate monitoring and analyses in support of EU regulations and programmes to deal with such issues (e.g. Clean Air for Europe programme).

The sustainable management of resources and environment needed to deal with consequences of climate change will require more informed policies. It is estimated¹² that the provision of improved monitoring services could result in economic benefits in the order of €3 to 4 billion per year.

¹⁰ “The security dimension of GMES”, position paper of the GMES Working Group on security, see <http://www.gmes.info>

¹¹ World Disaster Report (IFRC&RCS, 2002)

¹² 5th Framework programme, contract EVK2-CT-2002-80016 GSeS, Socio-economic Impacts Report. ESYS-2002386-RPT-04

¹³ UN-ECE 1996. Health costs due to road traffic-related air pollution. An impact assessment project of Austria, France and Switzerland (www.unece.org)

GMES will contribute to the efforts undertaken in INSPIRE. A cost benefit analysis for INSPIRE¹⁴ which looks at the measures to be taken to improve the access to data and information in the EU within the scope of GMES, gives a total of potential benefits of €1.2 to €1.8 billion per year. Experience elsewhere in the world has shown that a thriving market for added value services can develop when the access to quality data and information improves, hence stimulating innovation and the creation of new jobs. It is reasonable to assume that GMES would contribute to a more vibrant economic activity in this area. This assumption is also supported by the private sector's positive reaction to the INSPIRE initiative.¹⁵

Access to information is of strategic importance for the prosperous development of nations and regions, and GMES will similarly contribute to Europe's ability to address new challenges and threats. Further assessment of the need for an autonomous and independent information management capability with respect to the state of the environment and security, including the accountability and transparency of EU policies¹⁶ on the basis of a more detailed economic and cost/benefit analysis of GMES will be initiated in 2004.

¹⁴ Contribution to the extended impact assessment of INSPIRE <http://www.ec-gis.org/inspire/>

¹⁵ Results of the INSPIRE Internet consultation and public hearing

¹⁶ EU policy on good governance; Aarhus convention

2. ESTABLISHING A GMES CAPACITY BY 2008

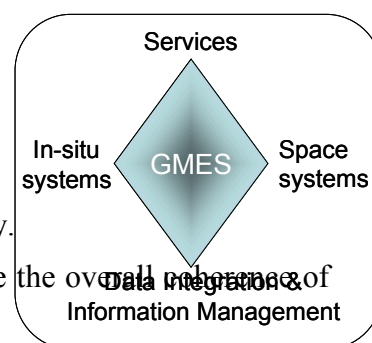
From the experience gained during the initial period, there is significant support to justify the further development of the GMES, the objective being to achieve a “core capacity”, i.e. the initial set of services and the supporting components needed to deliver these services on an operational basis by 2008. The capacity is to be built-up gradually, based on clearly identified priorities and by using existing elements wherever possible.

The GMES implementation period coincides with the development of the GALILEO satellite-based infrastructure for navigation and positioning, which will be available from 2008 onwards. Compatibility between the two systems will be ensured in order to offer complementary services to users.

2.1. Building the GMES core capacity: technical aspects

The GMES capacity is based on four inter-related components as represented by the “GMES diamond” (see graph):

- services;
- observations from space;
- in-situ (including airborne) observations;
- data integration and information management capacity.



These components must be addressed collectively to ensure the overall coherence of GMES.

From the users' perspective, the priority component is the provision of **services** to fulfil the policy and users' needs. The range of services available by 2008 will be developed progressively.

The provision of services relies on the **space** and **in-situ components** that capture the required data. In addition, access to socio-economic and other statistical data will be important in order to provide the maximum added value to the services foreseen. The **data integration and information management** will enable user access and the sharing of information. These components will be developed in conjunction with the set of services that are required. Such a 'build-as-you-need' approach requires GMES to retain a modular open system approach that can easily accommodate new elements.

The GMES core capacity, that is the combination of these components, will evolve over time to become a truly coherent European shared information capacity at the service of user communities.

The development and deployment of the GMES core capacity will be performed in two phases:

- Implementation phase (2004-2006) focusing on: (i) a structured dialogue between users and providers; (ii) the development of cost-beneficial services capable of reaching an operational status; (iii) space component design activities, leading to their procurement; (iv) in-situ component assessment and subsequent upgrading; (v) enabling data integration and information management activities, with the objective of improving coherence and access; (vi) the development of long-term funding strategy and business plan.

- *Operational phase (2007 onwards)* aiming to: (i) deliver regular operational services (upgrades and new services); (ii) implement the space component; (iii) expand the in-situ component; (iv) operate a sustained data integration and information management capacity.

The successful implementation of GMES will require the active involvement of industry, with particular attention to SMEs and service providers. GMES should stimulate the industrial sector to expand its service offer and to develop the innovative technologies that will be required within a dynamic and evolutionary GMES capacity.

The consolidation of the European industrial base will be an important asset to maintain a certain European autonomous capacity in this field and political independence in decision-making, in line with objectives in the White Paper on European Space Policy as far as the European Space industry is concerned.

2.1.1. *Prioritising and specifying services*

The priorities to be established for GMES until 2006 are based on the existing funds available from the EC 6th Framework programme¹⁷ and ESA's GMES Services Element activities and the following criteria:

- relevance in terms of contributing to EU political priorities as defined by the Member States and the Institutions;
- tangible economic and social benefits;
- pan-European interest;
- maturity in scientific and technical terms;
- availability of required monitoring tools/data;
- existence of an established or emerging user community.

The following selected priorities will contribute to the core capacity services, and cover topics at global, European, regional and local levels.

- Acquisition of independent knowledge on the state and evolution of the global environment with particular reference to:
 - providing information on a global scale on the sustainable use of renewable resources (such as vegetation and forests), wetlands, food supply, and land cover, carbon sinks and stocks;
 - monitoring global atmospheric processes and chemistry;
 - monitoring the conditions of the global oceans.
- Supporting the EC 6th Environmental Action Plan in particular:

With respect to environmental policies monitoring:

 - climate change;
 - air quality;

¹⁷ In order to prepare for the implementation of GMES Services, the 6th Framework programme "Aeronautics and space" and "Information Society Technologies" thematic priorities have targeted the integration and the operational validation of available research results.

- needs associated with the Water Framework Directive and the Integrated Coastal Zones Management Recommendation;
- the habitats and species conservation status of the Natura 2000 programme.

With respect to environmental thematic strategies monitoring:

- the state of soil, performance of soil functions and the use of land;
- the marine and urban environment, and the information needed for the Environment and Health strategy¹⁸.
- Providing support to civil protection for prevention, monitoring, risk management and assessment of:
 - natural hazards at the EU-25+ level, with a particular focus on floods, forest fires, climate related pressures (drought, adverse weather conditions) and geophysical hazards;
 - technological hazards at the EU-25+ level with particular attention to the risks associated with industrial activities and maritime transport, including oil spills and ice monitoring.
- Providing support to EC Common Agricultural, Fisheries and Regional development policies:
 - for the monitoring of crop conditions, the evolution of the agri-environment, the use of the territory, and the monitoring of fishing activities.
- Providing support to development and humanitarian aid:
 - by providing relevant information in relation to the organisation and distribution of aid for priority geographical areas, as identified by the European Commission Humanitarian Office (ECHO) and other stakeholders in this domain.
- Providing support to the EU Common Foreign and Security Policy (CFSP):
 - help setting up a framework through which the Member States and the relevant EU bodies can improve acquisition, access and exchange of data and information needed in the context of conflict prevention and crisis management. Specific attention will be given to: monitoring of international treaties for preventing the proliferation of nuclear, chemical and biological weapons (WMD); monitoring population settlements, movements, density, etc.; assessment of sensitive areas for early warning; and rapid mapping during crisis management.

2.1.2. *Space observing systems: integrating the available systems and defining the future generation*

Europe has successfully developed and launched advanced Earth observation systems, providing a comprehensive set of operational space missions with permanent and continuous observing capabilities of the Earth's system. This has resulted in global leadership in meteorology, land, ocean and atmosphere observations.

¹⁸ COM(2003) 338 final

Due to the time requirements for designing and launching satellite systems, the future space components of GMES need sufficient prior definition, including the incorporation of specific service requirements such as the capability of collecting and distributing very large volumes of data at very high speeds. The current meteorological component will continue in service until 2015/2020, but the other Earth Observation European satellites currently in orbit have a nominal lifetime terminating in 2007/2008.

In parallel, the concept of European security is evolving and further consideration needs to be given to the investments foreseen and how this can complement and support GMES capacity, in particular Earth observation satellites for civil and military applications (cf. the French Pleiades, the Italian Cosmos-Skyimed and the German SAR-Lupe systems).

2.1.3. *In situ (including airborne) observing systems: closing the gaps*

Because of its dispersed nature, it is more difficult to capture the full complexity of the in-situ component¹⁹ than the space segment.

Most in-situ monitoring systems or surveys are currently operated by a wide variety of public sector bodies through within national research institutions. There are also some activities within the context of the EU Research Framework programmes.

The implementation of pan-European in-situ networks and surveys tend to be a consequence of EU environmental legislation, voluntary collaboration agreements between public sector entities and agreements established in the context of various global international and regional conventions.

Within the EU, survey data and maps on land cover and land use, including air photographs, *cadastres* and geographic data, are collected at local, regional and national levels. However, despite recent progress, pan-European datasets needed to build GMES services addressing cross border issues, such as floods, remain underdeveloped.

With regard to reporting obligations under the UN Framework Convention on Climate Change and its Kyoto Protocol, the second “Adequacy Report” has listed many shortcomings in current global in-situ observing networks on which climate change adaptation policy development continues to depend.

Beyond Europe, basic cartographic information is lacking to support the efficiency of operations linked to humanitarian aid, food security, crisis management and conflict prevention. Population and socio-economic survey data collected within the EU from local to pan-European level are essential but as yet incomplete. There is also a need to improve the data collection on populations, available infrastructure and resources in sensitive areas within and beyond Europe.

To adequately deploy GMES services by 2008, substantial improvements will be required in in-situ observing systems both at EU and global levels. During the period 2004-2008, the GMES in-situ component implementation will focus on those in-situ systems and survey data that directly support the priority services identified.

¹⁹ In-Situ component relates to data collected by: (i) all networks of sensors deployed on land, sea, water and in the atmosphere aimed at measuring and providing a complete description of the Earth system; (ii) all surveys aimed at collecting socio-economic data, land cover and land-use data, geology, soil conditions, bio-diversity information and other geographical data such as for example elevation, administrative boundaries, transport and utility networks etc

GMES will complement existing field-based monitoring networks by closing gaps, ensuring the sustainability of services and securing access to data and information. In the longer term, the objective will be to progressively improve coordination in the deployment and operations of different thematic in-situ networks and surveys to optimise national investments and avoid redundant data collection.

2.1.4. *Data integration and information management: setting-up a shared information capacity*

GMES services add value by combining and linking data from different sources, over extended periods of time, and packaging this information in an accessible and relevant manner. To achieve this, GMES requires a multidisciplinary data management approach that is able to access national data holdings, to merge these with new data and to prepare timely integrated information products.

The areas of GMES that are data and computationally intensive require high-performance networks and GRID²⁰-based computing for the essential data mining, sharing and analysing and visualisation of the results.

GMES systems need a structured framework for data integration and information management. The supporting architecture will progressively evolve from a set of unconnected networks to a fully integrated network, incorporating stand-alone data and information, the selection and aggregation of information from heterogeneous sources and the translation of data and information between various sources in real time.

In this aspect, the GEANT²¹ network could provide the necessary infrastructure to access the main public data sources. In addition, the integration of the European Environmental Agency and the EUMETNET networks within GMES would enhance the sharing of environmental information across Europe.

This Communication emphasises the need to maintain coherence between various data sources and information initiatives at Community level. For the selected services, GMES will contribute to the development of the **European Spatial Data Infrastructure** in compliance with INSPIRE.

2.2. **Defining data policies and their underlying economic model**

The diversity of data that the GMES services require and produce will benefit from the development of a **data policy** that takes INSPIRE duly into account. This may vary according to the domains and types of services provided, but will need to find a balance between "non-discriminatory access", economic viability and the necessary incentives for private service providers to invest in the development of such capacity. Since the objectives of the Aarhus Convention (June 1998) request open access to the environmental information for the benefit of citizens, a significant part of GMES information should be freely available.

Further in-depth analysis will be required to maximise the use of GMES data and information by users through assessment of global data policy situations and in order

²⁰ GRID: is a type of parallel and distributed system that enables the sharing, selection, and aggregation of geographically distributed "autonomous" resources

²¹ GEANT is a project of the EC's Framework programme "Information Society Technologies thematic priority that will provide pan-European interconnection between national research and education networks of EU-25+ at Gigabit speeds

to decide between the different possible models. Special attention will be devoted to possible data protection issues.

Another issue for consideration is that some GMES services may include information relating to secure/multiple-use purposes, where certain added value activities would generate sensitive information requiring controlled access.

2.3. Pursuing research, promoting education and training

Science and research provide the knowledge on which sound policies are established. Research activities that will be of benefit to the GMES capacity and users will cover issues such as:

- the enhancement of monitoring technologies (including novel in-situ sensors) and standards;
- the improvement of models and capacity for analysis, forecasting, planning and decision support;
- the improvement of interoperability, linkage between observing systems and other data sources;
- information technologies for improved accessibility to long-term data archives, implementation of metadata standards, actions to facilitate information retrieval and dissemination.

To maximise the use of the GMES capacity and the sustainability of its services, education and training of users are seen as key activities, in particular:

- the preparation of training courses for the users related to the use of GMES services and the information products;
- knowledge development and exchange including basic research on environmental processes and methodologies.

The development of a strong European GMES capacity requires the mobilisation of expertise and competence that is found in industry, research establishments, the academic sector and governmental organisations. The level of resources currently available for R&D and technology, both at European and national levels, must be maintained for all areas relevant to GMES. Growing insight into the GMES capacity requirements should influence the priorities of work and the allocation of these resources.

2.4. Dealing with the dual nature of GMES

The observation and information associated with relief efforts for floods, forest fires, earthquakes, industrial disasters or terrorist actions can often also be provided through the use of equipment that was initially designed exclusively for military purposes. For example, humanitarian aid and crisis management tasks may require rapid production and delivery of information using high-resolution satellite imagery, whether used by civilian or defence agencies.

Space applications, complementing other means, could help to provide civil and military authorities with the necessary elements to conduct a European Security and Defence Policy and more particularly crisis management operations. The Western European Union (WEU) Assembly recommendation has recognised the need for “developing a European Earth Space observation capability to meet Europe’s

Security requirements”.²² The recommendation welcomes the GMES initiative and supports the view that all possible civil/military synergies should be pursued to ensure a better use of resources.

True dual-use is about civil and military users sharing capabilities and data production. Technically, this implies additional costs for the ground segment, where civil and military systems will continue to remain distinct. However, GMES services will lead to enhanced information production techniques and interpretation tools that could benefit civilian and military users, thereby supporting an implicit dual use or multi-use scenario.

In its European Space Policy White paper the Commission supports an overall assessment of existing capacities and multi-user needs through an EU dedicated working group²³. GMES will take full advantage of this action during 2004 and use the results in the implementation phase.

Emerging organisational structures to support the Union’s collective requirements for imagery and mapping for security²⁴ will also be of benefit while developing GMES and the cooperation with the EU Council will be intensified in this respect.

2.5. Promoting GMES in a global context

GMES services and observing systems will be instrumental in the development of a European leadership role in global environmental monitoring.

The GMES services with their global dimension are a means for international cooperation particularly in the agriculture, water resources, oceans, atmosphere and civil security domains. The space and in-situ observing systems, through the data captured, constitute significant contributions to international initiatives. An effective cooperation already exists in the field of meteorology within the World Meteorological Organisation and in particular between Europe and the USA.

Cooperation at global level has received further attention since the first Earth Observation Summit in mid 2003, where GMES was considered as the European contribution to environmental issues. The European Commission coordinates the European position and has a leading role in the ad hoc Group on Earth Observation (GEO) as co-chair with the USA, Japan and Developing countries (represented by South Africa). At the Summit 33 different countries and 21 international organisations recognised the need to prepare a 10-year implementation plan for coordinated Earth observation systems building on existing initiatives. In the context of the Earth Observation summit, the European Commission intends to promote the involvement of the developing countries in this initiative with the ambition to provide to policy makers in those countries with better information on which to base their decisions.

Efforts such as the Integrated Global Observing Strategy Partnership, the Committee on Earth Observation Satellites, the Kyoto Protocol of the UN Framework Convention on Climate Change and other Multilateral Environment Agreements

²² document C/1789 from its 48th session, June 2002

²³ The working group will be composed of relevant representatives drawn from EU, Member States, ESA and space organisations regrouping civil and military space users. It is expected to report by end of 2004

²⁴ as identified in a joint document: Strategic IMINT Collection ECAP Panel Final Report – Annex C “Common Operational Requirements for a European Global Satellite Observation System (for Security and Defence Purposes)” signed by Belgium, France, Germany, Greece, Italy and Spain

(such as the Convention to Combat Desertification and the Convention on Biological Diversity) offer large cooperation platforms which will be used to promote GMES at international level.

The extension of GMES to the African continent will be conducted in response to the Johannesburg 2002 Action Plan²⁵. In addition, activities will be pursued through projects such as the African Monitoring of Environment for Sustainable Development project²⁶. It will contain an important technology transfer component with the European objective being to foster capacity building in Developing Countries.

The Russian Federation is a major partner in the context of shared concerns for environmental²⁷ and climatic changes, resource management and other areas such as security of energy supply and transport. GMES will also be a continuing point of focus regarding the EU-Russia partnership on space.

Besides the long lasting cooperation with the USA, nations with significant space and in-situ assets and information producing capabilities such as Japan, India, China, Brazil, Israel and Ukraine are potential candidates for further cooperation.

2.6. Governance: fostering the partnership

The governance, respecting the open and distributed nature of the GMES capacity, must be particularly flexible, acknowledging the role and responsibility of the wide range of stakeholders, and promoting consensus-building. During the transition from research-led pre-operational GMES activities to fully operational services over the period 2004-2008, the following principles should apply:

- a systematic and practical application of subsidiarity;
- the gradual implementation of GMES, in an evolutionary and open way;
- an involvement of all levels of industrial service providers;
- the contribution of research to the improvement of services.

Advisory body (GMES Advisory Council) and GMES partnership

To develop a sense of “political ownership”, the GMES process will be supported by an advisory body - “**GMES Advisory Council**” - bringing together the EU Member States, the Commission, ESA, the EEA²⁸ and other relevant EU agencies such as the EMSA²⁹ and the EUSC³⁰, users, industry, service providers, research organisations and academia.

The role of this Advisory Council will be to:

- facilitate consensus-building in the GMES community around the development of a long-term perspective;

²⁵ Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August - 4 September 2002, (United Nations publication, No. E.03.II.A.1)

²⁶ AMESD is the follow-up of the PUMA project, an initiative of five African Regional Economic Groupings together with the EC and EUMETSAT to enable African countries to access, process and use data from the Meteosat Second Generation satellites. AMESD will focus on environmental monitoring in the sustainable development context

²⁷ e.g. SIBERIA project on forestry from the 5th Framework programme

²⁸ European Environment Agency

²⁹ European Maritime Safety Agency

³⁰ European Union Satellite Centre

- provide advice to the GMES management, stressing the user driven orientation of GMES;
- foster the coordination and complementarity of European and national activities;
- exchange experience on best practices.

GMES support and service to the objectives and policies referred to in paragraph 2, will be part of a coherent approach defined by the Member States and the competent EU Institutions.

In parallel to the Advisory Council the Commission will encourage the creation of a **“GMES partnership”** that would promote a common approach to the development and deployment of the GMES capacity. Partners will be invited to join the partnership through a **“GMES Memorandum of Understanding”**.

Management operations

The operational management of GMES will be implemented using the mechanisms foreseen in the Framework Agreement³¹ established in 2003 between the European Community and the European Space Agency. In short term, the Commission, in partnership with ESA, will set up a GMES interim structure in the form of a **“GMES Programme Office”**, populated in part by seconded experts from Member States and relevant international organisations (e.g. EUMETSAT). The main tasks of this GMES Programme Office will be:

- to ensure the coordinated management of the on-going GMES-related EC and ESA funded projects and to prepare for further calls for proposals and tenders;
- to specify more precisely the GMES capacity services and supporting components to be made available by 2008;
- to undertake detailed studies on the economic viability of GMES, for example cost-benefits and data policies and to explore its financial structuring, in particular with the EIB;
- to promote awareness on GMES and support education and training;
- to prepare a proposal for a possible GMES Joint Undertaking (JU)³², an equivalent structure or any other adequate mechanism, subject to the political view.

Findings will be presented in a report to the European Parliament and Council in early 2005.

In the medium-term, once formally adopted, it is expected that the GMES JU (or equivalent structure or mechanism) will take over from the GMES Programme Office. Beside the EC and ESA, it would be open to Member states as well as to international organisations and other interested investing partners. Its main tasks would be to consolidate the work undertaken by the GMES Programme Office, to ensure the completion of the GMES core capacity and the gradual take-up of the operational services and of component activities by their final holders.

³¹ Cf. Art. 5 and 9

³² Cfr. Article 171 EC Treaty

2.7. Setting up a funding strategy

Community resources will play a crucial role for GMES. Their objective is to bring added-value at the European level, thereby complementing the Member States' own efforts.

For the period 2004-2006, resources are available in the context of the EU Financial Perspectives (2000-2006). The preparation of the different component of the GMES core capacity during 2004-2006 will be funded by a number of thematic priorities of the 6th Framework Programme³³ and the GMES Services Element³⁴ funds of ESA. For 2007 and beyond resources are conditional on the future EU Financial Perspectives – only an indicative funding strategy is mapped out at this stage. The inclusion of GMES in the “Quick Start” list of projects may also provide opportunities for EIB support.

GMES services

The 6th Framework Programme and the GMES Services Element funds of ESA will help to develop data delivery and comprehensive end-to-end services in the 2004-2006 timeframe. The subsequent GMES operational services as from 2007 will each require an average of €20-30 million per year. To cover progressively the selected priority services and the necessary actions to link those services to the Space an in-situ components through and efficient data integration and information management, it is forecast that €80 million would be required in 2007, with an increase to €150 million in the following years.

A funding mechanism will have to be developed (in principle by the GMES Programme Office and its subsequent follow-up, involving the EC, ESA, Member states and private sources), to ensure the users of the GMES services (public or private) make a contribution to the operating costs through an appropriate business model.

Space component

ESA will undertake the preparatory activities required for future space observing systems during 2004-2006, based on a programme to be proposed to its Member States. The provision of space observing systems over the period 2007 and beyond is estimated at €100 million per year based on ESA contribution, with additional public expenditure (cf. White Paper on European Space policy) amounting to €340 million in 2013.

In-situ component

Preparatory activities for future in-situ observing systems that are in line with the GMES core capacity services will have to be identified during 2004-2006. The investment possibilities of the Member States will be explored for improvements of in-situ observing systems in the period after 2007.

Data integration and information management component

Initial activities for this component are currently supported by the 6th Framework programme, building on research activities for data models, the development of open standards for data documentation, high speed networking and data policy. Combined

³³ “Aeronautics and Space” “Research Networking” and “IST”: €150M

³⁴ ESA GMES Services element: €83M

research efforts supporting INSPIRE will contribute to the creation of a European spatial data infrastructure from 2007 onwards.

The infrastructure to be set up will focus on the necessary elements required for the priority services to function. The establishment of such a system will require additional funds which partly could be covered by 6th Framework Programme pilot projects aiming at setting up early services with actors requiring high-capacity communications and a reallocation of funds presently spent on monitoring at local, regional and national levels. Resources for setting up the infrastructure needed for linking space monitoring with ground based monitoring would be expected to come from funds allocated to GMES by the gradual redirection of national resources.

The progressive development of a European spatial data infrastructure is estimated at approximately €200 million per year³⁵ but must be considered in the light of the already existing or planned investments of the Member States to improve the exploitation of environmental and geographic information.

Overall funding strategy

It is foreseen that some GMES service activities will be partly, if not fully economically self-sustaining. However the intervention of public authorities will be required for certain aspects:

- as a promoter of the space, in-situ and information management components, as part of an infrastructure which is of general European interest;
- as users of services for fulfilling the needs of public policies.

The Commission may propose an enlarged definition of the Trans-European network (TEN) instrument for the future Financial Perspectives, which could support such investments and activities that are beyond the scope of the research instruments available.

Financial mechanisms will be analysed during 2004, in particular with the European Investment Bank, in order to explore the possibilities to attract private investment and to propose a comprehensive funding strategy beyond 2006.

3. SUMMARY OF MAIN ACTIONS DURING 2004-2008

N°	Immediate management actions in 2004	Actors	Instrument
1	Establish the management structures: -a) Programme Office and Advisory Council -b) an organisational framework for dialogue and partnership	a) EC and ESA, Member States b) in close consultation with broader range of partners	a) EC/ESA Framework Agreement b) Memorandum of Understanding
2	a) Establish a policy for GMES international partnerships	EC, with Member States and European organisations (e.g. ESA, EUMETSAT)	a) Memorandum of Understanding

³⁵

Contribution to the extended impact assessment of INSPIRE <http://www.ec-gis.org/inspire/>

b) Coordinate the European position within GEO		b) GEO co-chairmanship
c) Coordinate actions regarding developing countries in the context of the GEO and emerging GMES services		c) GEO co-chairmanship

N°	Implementation actions	Actors(coordinated by GMES Programme Office ³⁶)	Implementing instrument	Timing
3	Prepare the in-situ component: a) implementation plan b) investigating feasibility of novel technologies c) upgrade in-situ component	EC, EEA, Member States	a) 6th FP b) 6 th FP c) stakeholder programmes	a) 2004 b) 2005 - 2006 c) 2005-2008
4	Establish an action plan to meet the users' needs for security and explore dual use	EC and Council, ESA, Member States	Advisory Council and Space Policy Working Group	2004-mid-2005
5	Establish a data policy framework	EC, ESA, EEA, Member States through Advisory Council	INSPIRE Memorandum of Understanding	2004-mid-2005
6	Define the follow-up management structure (e.g. Joint Undertaking)	EC	EC Treaty, Art. 171	2004 - 2005
7	Preparation for the provision of regular and reliable services	EC, ESA	- 6 th FP - ESA Services element	2004 - 2008
8	Improve data integration and information management and validate with stakeholders	EC, ESA, EEA, Member States and service providers (e.g. EUMETSAT).	- 6 th FP, 7 th FP - INSPIRE - Stakeholder programmes	2004-2008
9	Develop the space component	ESA in consultation with EUMETSAT and national space agencies	- ESA Agenda 2007	2004 - 2008

³⁶

and later JU, an equivalent structure or any other adequate mechanism

			EUMETSAT and national programmes	
N°	Funding Actions	Responsibility	Legal Instrument	Timing
10	Ensure sustainability of GMES services through appropriate funding mechanisms	EC, ESA, Member States, private sector	EU Financial Perspectives and national budgets	2004 – 2006 – 2007 onwards

4. CONCLUSIONS

5 years ago, the “Baveno Manifesto” launched the original GMES concept. After a period of investigations and experiments worth around € 50 million of mainly public (but also some private) investment, GMES has now reached the stage where key decisions and actions need to be taken for its actual deployment and the practical implementation of operational services between now and 2008.

GMES has the potential to enable decision-makers in Europe to acquire the necessary capacity regarding the global monitoring of environment and security which is needed to effectively address today’s threats and challenges in a wide variety of policy areas. It will also represent at global level an influential contribution to the Global Earth Observation initiative recently launched by the USA. This Communication sets out that GMES has the ability to provide effective support to several objectives and policies that have been agreed at the level of the EU, as well as to other European, national (including regional and local) decision makers and users.

The Commission has recognised the importance of GMES in its White Paper on the European Space Policy and the 2003 Environment Policy review³⁷. It also has underlined its potential for creating new opportunities for high tech industries and service companies for providing new information based services for private and public users. The inclusion of GMES in the “Quick Start” project list within the Initiative for Growth endorsed by the Brussels European Council (13 December 2003) confirms that time has come to move forward.

The European Parliament and the Council are invited to consider the Action Plan presented in this Communication. This plan will be implemented in close cooperation with the Member States, ESA and its Member states, other international organisations and with the private sector. The Commission will report early in 2005 on the progress made and intends to make the relevant formal proposals for the management scheme and funding resources needed for an operational GMES core capacity by 2008.

³⁷2003 Environment Policy review – Consolidating the environmental pillar of sustainable development COM (2003) 745 final

FICHE FINANCIERE

Policy areas: 08 Research

Activity: Implementation of 6th Framework Programme operational expenditure

TITLE OF ACTION: COMMUNICATION "GLOBAL MONITORING FOR ENVIRONMENT AND SECURITY"

1. BUDGET LINE(S) + HEADING(S)

RTD FP6/priority 4/B6 6140 (ABB : 08 0401)

B2003-B66013 (ABB : 08 0105)

INFSOFP6/priority 2/B6 6120 (ABB : 09 0401, 09 0105)

ENV FP/3/B4304, B4304A (ABB : 07010401, 07010100)

2. OVERALL FIGURES

2.1. Total allocation for action (Part B): € 120.392 million until 2009

2.2. Period of application: 2004 - 2009

2.3. Overall multi-annual estimate of expenditure:

(a) Schedule of commitment appropriations/payment appropriations (financial intervention) (*see point 6.1.1*)

€ million (to three decimal places)

	Year 2004	2005	2006	2007	2008	2009 and subs. Years	Total
Commitments*	60	40	5				105
Payments	6	26	34	28	9	2	105

* Based on contributions DG RTD FP6 Priority 1.4 (65 M€) and DG INFSO FP6 Priority 2 (40 M€). The commitment profile is reducing over the FP6 period, as majority of projects are initiated as early as possible in the programme, and as outlined in the Framework programme road map for calls. Not shown in the table are the 35 M€ already committed in 2003 in DG RTD FP6 Priority 1.4, nor their payment appropriations. All payment profile in projects are taken to be typically linear.

(b) Technical and administrative assistance and support expenditure (*see point 6.1.2*)

Commitments	0.250	0.750	0.625	0	0	0	1.625
Payments	0.250	0.750	0.625	0	0	0	1.625

Subtotal a+b

Commitments	60.250	40.750	5.625	0	0	0	106.625
Payments	6.250	26.750	34.625	28	9	2	106.625

The estimative credits foreseen in this planning shall be covered within the allocations of appropriations for the budget lines mentioned under section 1 above and granted to the managing DGs (DGs RTD, INFSO and ENV) in the framework of the annual budget procedure.

- (c) Overall financial impact of human resources and other administrative expenditure (see points 7.2 and 7.3)

Commitments/ payments	1.884	2.316	2.392	2.392	2.392	2.392	13.767
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TOTAL a+b+c							
Commitments	62.134	43.066	8.017	2.392	2.392	2.392	120.392
Payments	8.134	29.066	37.017	30.392	11.392	4.392	120.392

The estimative credits foreseen in this planning shall be covered within the allocations of appropriations for the budget lines mentioned under section 1 above and granted to the managing DGs (DGs RTD, INFSO and ENV) in the framework of the annual budget procedure.

2.4. Compatibility with financial programming and financial perspective

[X] Proposal is compatible with existing financial programming.

[...] Proposal will entail reprogramming of the relevant heading in the Financial Perspective.

[...] Proposal may require application of the provisions of the Inter-institutional Agreement.

2.5. Financial impact on revenue:

[X] Proposal has no financial implications (involves technical aspects regarding implementation of a measure)

OR

[...] Proposal has financial impact – the effect on revenue is as follows:

(NB All details and observations relating to the method of calculating the effect on revenue should be shown in a separate annex.)

(€ million to one decimal place)

Budget line	Revenue	Prior to action [Year n-1]	Situation following action					
			[Year n]	[n+1]	[n+2]	[n+3]	[n+4]	[n+5]
	a) Revenue in absolute terms							

	b) Change in revenue	Δ							
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(Please specify each budget line involved, adding the appropriate number of rows to the table if there is an effect on more than one budget line.)

3. BUDGET CHARACTERISTICS

Budget	Type of expenditure		New	EFTA contribution	Contributions from applicant countries	Heading in financial perspective
08 04 01	Non-comp	CD	no	yes	yes	3
08 01 05	Non-comp	ND	no	yes	yes	3
09 04 01	Non-comp	CD	no	yes	yes	3
09 01 05	Non-comp	ND	no	yes	yes	3
07010401	Non-comp	ND	no	no	no	3
07 04 02	Non-comp	CD	no	no	no	3
07 05 01	Non-comp	CD	no	no	no	3

4. LEGAL BASIS

Treaty establishing the European Community (in particular Article 71, 95, 170, 171 or 174 as appropriate). Decision No 1513/2002/EC of the European Parliament and the Council concerning the sixth framework programme of the EC for research, technological development and demonstration activities, contributing to the creation of the European research area and to innovation (2002-2006) (OJ L 232, 29.08.2002, p. 1).

EC/ESA Framework Agreement Council Decision (Document 12858/03) on the Agreement between the European Community and the European Space Agency.

5. DESCRIPTION AND GROUNDS

5.1. Need for Community intervention

5.1.1. Objectives pursued

To reach a GMES core capacity for environment and security.

5.1.2. Measures taken in connection with ex ante evaluation

These measures are based on the final report for the GMES initial period (2001-2003), which proposes a way forward for the period 2004-2008 as requested by the Council of the European Union of 13 November 2001 and the Council of ESA of 19 June 2001.

In accordance with the GMES EC Action Plan (COM(2001)609), the actions have been generated by a joint EC/ESA team and further reviewed and commented by the EU and ESA Member States through the GMES Steering Committee (GSC).

5.1.3. Measures taken following ex-post evaluation

The proposed action plan foresees the establishment of a GMES Advisory Council, to address programmatic issues not covered by the measures set up for the ex-post evaluation of the Research Framework programme.

The review of running projects by external expert reviewers are carried out according to current Framework programme 6 procedures.

5.2. Action envisaged and budget intervention arrangements

Following adoption, the Communication will be transmitted to the Council and to the European Parliament for discussions. It may be that policy initiatives on particular aspects of GMES will be required in the future.

There may be a need to revise these spending estimates in the light of the results of the ongoing discussions between the Commission, the European Space Agency and national GMES Initiatives on measures for preparing effective GMES Services. Findings on the best way forward for management of GMES implementation in period 2007 and following will be presented to Council and Parliament in 2005.

5.3. Methods of implementation

The implementation is based on the Research Framework programme 6 individual work programmes for Priority 1.4 "Aeronautics and Space" and on Priority 1.2 "Information Society Technologies ". It utilises the FP6 instruments of Integrated Projects, Networks of Excellence, STREPs, CAs and SSAs. The financial estimates presented are based on the adopted road map of the Work Programmes, as published Dec 2003 (OJ C303 of 13.12.2003) for Priority 1.4 and on future Work Programmes for 2004 and 2005 for Priority 1.2.

6. FINANCIAL IMPACT

6.1. Total financial impact on Part B - (over the entire programming period)

(The method of calculating the total amounts set out in the table below must be explained by the breakdown in Table 6.2.)

6.1.1. Financial intervention

Commitments (in € million to three decimal places)

Breakdown	2004	2005	2006	2007	2008	Total
FP6 projects						
RTD 080401	40	20	5			65
INFSO 090401	20	20				40
TOTAL	60	40	5	0	0	105

6.1.2. *Technical and administrative assistance, support expenditure and IT expenditure (commitment appropriations)*

	2004	2005	2006	2007	2008	Total
1) Technical and administrative assistance						
a) Technical assistance offices						
b) Other technical and administrative assistance: - intra muros: - extra muros:						
Subtotal 1						
2) Support expenditure						
a) Studies ENV 07 01 0401		0.500	0.500			1.000
b) Meetings of experts (evaluations) RTD 08 0401	0.250	0.250	0.125	0	0	0.625
c) Information and publications						
Subtotal 2	0.250	0.750	0.625	0	0	1.625
TOTAL	0.250	0.750	0.625	0	0	1.625

6.2. Calculation of costs by measure envisaged in Part B (over the entire programming period)

Commitments (in € million to three decimal places)

Breakdown	Type of outputs (projects, files)	Number of outputs (total for years 1to 5)	Average unit cost	Total cost (total for years 1to 5)
	1	2	3	4=(2X3)
TOTAL COST				

7. IMPACT ON STAFF AND ADMINISTRATIVE EXPENDITURE

The needs for human and administrative resources shall be covered within the allocation granted to the managing DG Research in the framework of the annual budget procedure.

7.1. Impact on human resources

Types of post		Staff to be assigned to management of the action using existing and/or additional resources		Total	Description of tasks deriving from the action
		Number of permanent posts	Number of temporary posts		
Officials or temporary staff	A	9.6		9.6	Desk officers and management RTD contracts, DG ENV desk officers, payments, informatics Secretarial support
	B	1		1	
	C	5		5	
Other human resources (ENDs)			6.3	6.3	
Total		15.6	6.3	21.9	

Posts covered by the research budget are classified as permanent posts. Calculated on the basis of 1 A grade for 0.1 B and 0.5 C grades. This breaks down as 6.1 posts for DG RTD per year 1.5 post for DG ENV and 2 posts for DG INFSO. Value takes average over 2004-2009. The resources foreseen are covered by existing provisions in DG RTD, DG ENV and DG INFSO.

7.2. Overall financial impact of human resources

Type of human resources	Amount (€)	Method of calculation *
Total Officials	1.684 Mio €	15.6 x 108,000 €
RTD 08 0105	1.307 Mio €	12.1 x 108,000 €
INFSO 09 0105	0.216 Mio €	2 x 108,000 €
ENV 07010101	0.162 Mio €	1.5 x 108,000 €
Other human resources (ENDs)	0.240 Mio €	6.33*365*104 €
RTD 08 0105		
Total	1.924 Mio €	

The amounts are total expenditure for twelve months.

7.3. Other administrative expenditure deriving from the action

Budget line	Amount Mio €	Method of calculation
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(number and heading)		
Overall allocation (Title A7)		
A0701 – Missions	0.130	Mio€
A07030 – Meetings		
		100 x 1300 € (based on two-day missions including 300€ indemnity + 850€ travelling + 150€ accommodation), foreseeing 10 missions/annum for 10 A-grade officials on average
A07031 – Compulsory committees	0.240	Mio€
A07032 – Non-compulsory committees ¹		
A07040 – Conferences		
A0705 – Studies and consultations		
Other expenditure (specify)		
		Average over five years with €60,000 per meeting (80 delegates)
Information systems (A-5001/A-4300)		
Other expenditure - Part A (specify)		
Total	0.370 Mio€	See above

The amounts are total expenditure for twelve months.

¹ The proposed actions foresee the establishment of a GMES Advisory Council, representing the EC/ESA Member States, industry and academia stakeholders in GMES (total 80 delegates, 4 mtgs per year)

I.	Annual total (7.2 + 7.3)	2.294 M€
II.	Duration of action	6 yrs
III.	Total cost of action (I x II)	13.767 M€

8. FOLLOW-UP AND EVALUATION

8.1. Follow-up arrangements

The proposed activities include further specification of a future GMES management structure, and the analysis if the impact of future GMES services, as regards their cost-benefits and best financial practices. Findings on the best way forward for management of GMES implementation in period 2007 and following will be presented to Council and Parliament in 2005.

8.2. Arrangements and schedule for the planned evaluation

Project proposal evaluations are carried out according to current Framework programme 6 procedures prior to selection for funding. The review of running projects by external expert reviewers is also foreseen. Precise modalities for the implementation will have to be arranged, in line with FP6 practices.

9. ANTI-FRAUD MEASURES

The proposed activities only consist of expenditure on personnel, expert meetings, FP6 instrument contracts and missions.

Contracts will be subject to the Commission's usual control mechanisms already in place under Framework programme 6 anti-fraud measures : the control of payments for any service, contract or study requested is carried out by the Commissions's services prior to payment, taking into account any contractual obligation, economic principles and good financial or management practice. Anti-fraud provisions such as supervision and reporting requirements are included in all contracts made between the Commission and recipients of any payments.