GMES
Global Monitoring for Environment and Security

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EDITORIAL

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The end of the second semester of 2003, under EU Italian Presidency has been rich in events of importance to GMES, which lead to the recent adoption by the Commission of the Communication on "Global Monitoring for Environment and Security (GMES): Establishing a GMES capacity by 2008 (Action Plan 2004-2008)".

The Minister of Environment Altero Matteoli hosted the 4th GMES Forum on behalf of the Italian Presidency at Baveno (Lago Magiore, in the Piemonte Region) between the 26th to 28th of November 2003. This event was followed by the second Global Earth Observation meeting (GEO)[1].

Stefano Caldoro, UnderSecretary of State for Research noted that the Forum followed the recent adoption of the White Paper on Space policy – which foresees support to GMES "for a cleaner and more secure Europe," as does the new framework agreement between the EU and the ESA, which was signed by the EU Commissioner Philippe Busquin, the Director General of the ESA, Jean-Jacques Dordain and the Italian Minister of Research, Letizia Moratti. Another key development is the EU's "Initiative for Growth," which has just been endorsed by the European Council in October to encourage Europe's economic recovery by focusing on major structural projects, such as GMES.

It is important to take the lessons learned from the GMES Initial Period forward to the GMES' Implementation Period 2004-2007. During the Forum presentations were made on the results of the work undertaken by the EC Thematic Projects and Cross-cutting Assessments studies, the ESA GSE projects, as well as the related activities of DG Environment - INSPIRE framework and of the Joint Research Centre (JRC).

Italy has been very engaged in the GMES process since the signature of the "Baveno Manifesto" in May 1998. The Italian Ministries of Environment and of Research have been key players in the Italian participation, in cooperation with other administrations and stakeholders such as APAT, the national Environmental Agency, universities, research centres and many enterprises, including SMEs. Italy also hosts two of the main European research centres: the JRC at Ispra (Lombardia) and the ESA ESRIN at Frascati (Lazio). This creates opportunities for cooperation with Research centres and Industry already operating in the field of Earth Observations.

Minister Matteoli clearly stated that Italy is very sensitive to finding solutions for environmental problems and to ensure the safety, in the broadest sense, of its citizens. This is the reason why Italy is very committed and aware of the importance both of the establishment of the GMES capacity for Europe, and of its strategic role as a European contribution in the International context of the GEO activities.

Italy's own capabilities are very high in all GMES fields, from in-situ to space observations and monitoring covering both tailored research and services and applications to fulfil final users needs. For these reasons, Italy has positioned itself as one of the main GMES players in all fields of future activity.

The fact that GMES will become a world player is fundamental for Europe. The socio-economic benefits are expected to be very high in comparison to the costs for all types of environmental problems. The need for establishing an Independent European Capacity able to assure monitoring, prevention and management of the environmental and security issues appears obvious and drives the initiative's target completion date of 2008.

Concerning Italy's expectations, we see the successes of the Initial Period, which have provided a huge contribution to the start of the Implementation Period. We hope that the outcomes will deliver a strong message to the next EU Environment and Competitiveness Council in order to reinforce the GMES position as a key player in the EU Sustainable Development policy strategy. In this context we appreciate the commitment made by Catherine Day, Director General of Environment at the European Commission, with a view to concentrating the activity on the delivery of products for the next stage while continuing to support the targeted research.

[1] *See article on p.11 for further details.*

In the next phase of the initiative, which mainly addresses the establishment of services able to fulfil the institutional environmental needs, Italy is placing the GMES mainly under the remit of the Environment Ministry, with the research side being shared with the Research Ministry for basic activities.

Further work cannot continue correctly without the fundamental dialogue which was built up during the Initial Period. At the end of the 4th Forum José Achache, ESA Director of Earth Observation Programmes, Herbert von Bose, EC Head of the Unit "Aeronautics and Space" – DG Research, and Timo Mäkelä, EC Director "Sustainable Development and Integration" – DG Environment, all endorsed the view that the dedicated Forums which were planned in the Action Plan framework, have evolved in the right direction. The main physical Communication platform focused on the users/transformers/suppliers' discussions in order to set up a common approach. Now, during the Implementation Period the priorities' guidelines can be defined to target the relevant results within the dialogue framework. As agreed by all attendees at the last Steering Committee meeting in Brussels, future work needs stronger involvement from a number of different players: Institutional Authorities directly concerned with the environment, national and regional environmental agencies, industries, university and research centres.

In conclusion, we can say that with the success of the 4th GMES Forum, the GEO meeting and the COP9 Climate Change Convention held in Milano, Italy leaves the Presidency of the Union with a wide range of significant achievements in the wide field of Environment.

The work set up during this period is now in the hand of the Irish Presidency for the First Semester of 2004. We wish them good luck and hope for a fruitful cooperation.

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THE SECURITY DIMENSION OF GMES

Security

Issues of security are taking an increasingly important role in a number of areas of policy at European and national level. They are relevant to the provision of humanitarian and development aid and crisis management around the globe, as well as civil protection and potentially to law enforcement in Europe. The Global Monitoring for Environment and Security initiative (**GMES**) will provide Europe with an autonomous monitoring capability in support of European security policies.

The concept of security has changed since the end of the Cold War and Europe faces new threats that are more diverse and less predictable. The borderline between civil and military responsibilities is becoming fuzzy and the term "security" finds itself used in a variety of contexts. Thus the **GMES** Steering Committee decided in October 2002 to create a working group to define the scope of security within **GMES** and highlight the corresponding needs. The group reviewed the main policies linked to conflict prevention and crisis management: Civil Protection, Humanitarian Aid and the European Union (EU) Common Foreign and Security Policy (CFSP).

Civil Protection

The EU Civil Protection Unit and civil protection authorities within Member States of EU and ESA are involved in risk mapping, early warning and crisis management. The origin of the disaster can be natural, accidental or deliberate (e.g. terrorist/malicious action): the same mechanisms will be used to deploy the necessary resources and help the population.

Most of the actions are undertaken in Europe, however civil protection teams may assist countries outside Europe in the framework of co-operation agreements and in the context of CFSP in the field of civil crisis management.

In case of major crises, the civil protection authorities of the affected country (or the EU Civil Protection Unit) can invoke the International Charter on Space and Major Disasters[1]. Through the Charter the requesting party obtains easy and free of charge access to satellite data, with top priority in satellite tasking. Weaknesses of this system are due to limited satellite resources, exclusion of conflict-driven crisis and lack of services for data interpretation other than on an ad-hoc basis. In the longer run, this system which is currently implemented on a voluntary basis by the data providers, could be developed further to be fully user-driven and supplemented by the required services of data interpretation and assistance for users.

[1] *Charter on co-operation to achieve the co-ordinated use of space facilities in the event of natural or technological disasters http://www.disasterscharter.org*

Humanitarian Aid

The impact of disasters - whether abnormal natural events such as a floods or hurricanes, human-induced events such as armed conflicts or simply poor harvests - is much greater in the developing world than in the developed one. The EU through ECHO, its Humanitarian Aid Office, and Member States of EU and ESA are involved in programmes to provide aid to developing countries, much of it channelled through Europe's non-governmental organisations.

To improve the effectiveness of aid requires increasing the quality and quantity of information available on regions outside Europe, both for those who need to decide rapidly whether to deploy resources and for those operating on the ground in remote areas with limited communications and poor infrastructure. In this context, satellite based imagery plays an increasing role, especially to provide a rapid update when existing maps are obsolete. Of course satellite imagery has to be complemented by other topographic, socio-economic and statistical data in order to meet specific information demands.

Common Foreign and Security Policy

The EU has established a Common and Foreign Security policy, through which the EU expresses its position on the international stage and acts in a consistent manner where there is common interest from Member States. The Council of the EU plays a vital role in the implementation of this policy, in which the European Commission is fully involved.

As part of the CFSP, the Union is developing a common security policy that embraces all issued relating to its security, including the gradual definition of a common defence policy - this is the European Security and Defence Policy (ESDP).

The EU is acquiring the necessary resources to undertake crisis management operations including humanitarian and rescue tasks, peacekeeping tasks and tasks of combat forces in crisis management including peacemaking. The Union may also decide to undertake missions in the field of policing, the rule of law, civilian administration and civil protection.

By providing accurate and timely information, earth observation assets can support decision making from the routine situation monitoring, through the build-up to a potential crisis, to support for a crisis management operation. Space-based observation assets are mostly free from the restrictions of geography and sovereignty, and are therefore particularly useful in this context.

Conclusions

In the context of security, several policies could benefit from **GMES**: prevention and responses to crises related to natural and technological risks in Europe; humanitarian aid and international co-operation; conflict prevention including monitoring of compliance with treaties; surveillance of borders; and EU CFSP/ESDP. The following organisations could therefore be considered as potential users:

- Civil protection and search-and-rescue organisations in Europe for management of natural and technological risks;
- European institutions, government departments of EU and ESA Member States, international organisations and NGOs engaged in co-operation, humanitarian and development aid, as well as civilian crisis management outside Europe;
- The EU Council and, under its mandate, entities involved in the planning and conduct of civil and military crisis management operations.

Once **GMES** services are in place, we can expect that they will benefit additional users. In particular, GMES could be useful in the domain of justice and home affairs. The **GMES** requirements for these tasks at European level are currently under development.

Analysis of inputs from the Council and Commission services involved in the group, suggests a number of common needs in support of security: improved access to earth observation data and to background data (on population, infrastructure, resources); improved production of information and response to users' needs; improved interoperability of systems for crisis management; development of methodology and tools for forecasting and decision-making.

In response to these needs, the working group proposed several actions including: access for the European Union to earth observation data from the upcoming military and civil national satellites; development of an imagery and mapping centre in support of Commission and Council needs; creation of a database for background data; development of services supporting actions of civil protection teams and NGOs; and evolution of the International Charter on Space and Major Disasters.

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THE JOINT RESEARCH CENTRE'S CONTRIBUTION TO GMES

JRC has been a catalyst in the GMES process since it began, paying particular attention to the long-term strategic importance of such an initiative. The JRC supports the development of GMES in four key areas. First, through our work with policy Directorates General the JRC constantly assesses and develops the institutional demand for data and information services, identifies shortcomings in present monitoring infrastructures and checks the feasibility and effectiveness of proposed new solutions. Present JRC activities that are linked to the GMES initiative include those in support to

- **Europe's commitments to monitoring the global environment** through land cover assessments, deforestation, bio-diversity, sustainable forest management, fire, ocean productivity and the atmosphere;
- **Environmental policies with a European geographic focus** through monitoring water and air quality, land-use change and forestry, urbanisation, soil condition, nature protection sites and the implementation of the EU's Kyoto reporting obligations;
- **European civil protection** through flooding alert systems, fire risk maps, risk assessment from landslides, databases arising from the Seveso Directive and marine oil-spill monitoring;
- **Common Agricultural and Fisheries Policies** through monitoring area-control measures, forecasting crop production - both inside and outside Europe - and detecting and identifying fishing vessels;
- **European Union external aid and security policies** through provision of mapping and decision support services for aid, reconstruction and demining and development of tools for verification of non-proliferation treaties.

Secondly the JRC is undertaking many of those applications in full coordination with the **Infrastructure for Spatial Information in Europe (INSPIRE)** initiative; we maintain a leading role in the establishment of a European Spatial Data Infrastructure through close association with DG Environment.

Our third area of input involves in-house development of remote sensing science and a close working relationship with European (and other) space agencies. Our work to advance the science underpinning **monitoring from space** benefits JRC policy support and scientists in the wider community.

Finally our heritage of participation in **global research and observation programmes**, our activities in the European Research Area and our framework programme 6 partners give us unique insights into the possibilities for international co-operation at global level and the possible scenarios for an organisational framework for GMES.

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GMES FORUM [1]

Marking the end of the Initial Period of the GMES Action Plan, the 4th Forum was held at Baveno in the Piemonte region of Italy between the 26th and 28th November 2003. It was attended by over 300 participants, coming from the European Union and from third countries and followed by the second meeting of the Global Earth Observation (GEO) ad hoc Group on the 28th and 29th November 2003.

The Draft Final Report (version 3.5) of the 2002-2003 Initial period, formed the basis of the presentations and of the discussions. This was complemented by papers and presentations from GMES Cross-cutting assessments, EC Thematic Projects and ESA GSE. The basis for discussion included GMES related initiatives at various levels, such as GEO on the Global level. Many suggestions were made for improvements to the draft report, which the Chairman of the 3rd Plenary Session undertook to present to the GMES Steering Committee (see Events documents at http://www.gmes.info/library/index.php).

1 See http://www.gmes.info/forums/index.html for more details.

BIOPRESS

BIOPRESS – Linking pan-European land cover change to pressures on biodiversity – is a EC-FP5 project funded in the framework of the GMES 'Global Monitoring for Environment and Security' initiative (http://www.gmes.info/projects/index.html). It is the only GMES project under the priority theme "Land cover change in Europe". The BIOPRESS consortium consists of seven international partners and aims at providing the EU-user community with quantitative information on how changes in land cover and land use has affected the environment and biodiversity in Europe. The project is currently producing consistent and coherent sets of historical (1950 – 1990 – 2000) land cover change information in and around circa one-hundred Natura 2000 sites located from the boreal to the Mediterranean, and from the Atlantic to the continental regions of Europe. These land cover change statistics will subsequently be converted into quantitative measures of pressures on biodiversity.

A wide variety of national and international legal mechanisms (e.g. Habitats Directive and EU Common Agricultural Policy) have been established to protect the environment, ensure sustainable use of natural resources and maintain an acceptable level of biodiversity. BIOPRESS is delivering information that is currently not available from other information sources and thus assisting the EU community in determining the effectiveness of measures taken under such policies. For example, the project may be able to contribute to the development of specific IRENA agro-environmental indicators http://agrienv.jrc.it/ (e.g. topological change) by delivering more detailed information on permanent and non-permanent land cover change.

The change statistics are produced by means of two parallel activities, the backdating of CORINE land cover 1990 of circa one-hundred 900 km² windows with aerial photography of the 1950'ies and, the interpretation of aerial photography from 1950, 1990 and 2000 for circa fifty 30km² transects. The windows are interpreted to identify the CORINE level 3 land cover and use classes to a minimum mapping unit of 25 ha. The transects, at the other hand, are interpreted to a minimum mapping unit of 1ha and are also interpreted for linear and point features such as hedges, small streams and cluster of houses. Currently, adequate (> 75%) aerial photo coverage of the 1950'ies has been found for 47 windows and 48 transects and the substantial task of geo-coding, mosaicking and interpretation is in full flow.

A key role of the GMES thematic projects is to report on problems encountered at scientific, technical, legal, and institutional level during the production of their information product. To date, several issues have been identified, one of which is the current status of spatial data archives. For example, there is a vast quantity of aerial photography available for Europe, however acquisition at European scale is hindered substantially as these data are stored in many public, private and military archives across Europe and in US air force archives. The general picture for Europe is one

Natura 2000 is a European network of protected sites. Each Member State is responsible for identifying and designating Special Areas of Conservation sites which are important for the protection of the species and habitats covered by the Habitats Directive. These sites and the Special Protection Areas created under the Birds Directive will form part of the Natura 2000 network of sites.

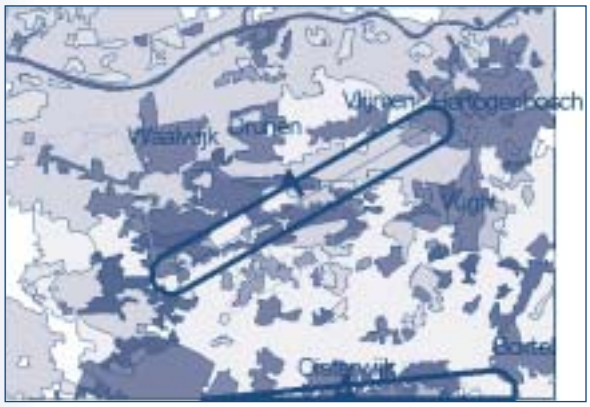
90 km² windows in The Netherlands

Sander Mucher, 24-6-2003, Alterra

of stand-alone regional and national archives, with outdated and incomplete cataloguing systems, often in need of financial support. The establishment of a European archive network with links to other non-EU archives could help improve the current situation.

The figures show, as an example, the location of the seven 90km² windows in The Netherlands for which aerial photo coverage was found. These windows include in total of eight 30km² transects. Photo interpretation of one of the transects revealed how the area surrounding one of the 100 Natura 2000 sites under investigation has been subjected to a substantial amount of urbanisation, and afforestation in the past 50 years (1953 – 1986 – 1998). This particular site contains a mixture of open grasslands, sandy heaths and alluvial forests. The change matrix suggests a natural or artificial encroachment of forests in the surrounding grass- and heath lands which, if not managed adequately, will lead to a continued change in the landscape and its associated biodiversity.

Transect in 90km² window and its change matrix



LC1998

LC1853	11	12	13	14	22	31	32	33	41	51	62	Total
11	51			8								58
12		3										3
13			0									0
14				5								5
22	1				1							2
31	2	2	1	9		739	23		3		17	795
32	1	3			0	115	59	2			3	182
33						16	39	210				266
41		3				80	8		4			95
51		4								23		27
62	255	46	4	53	23	52	1		0		1435	1868
Total	309	60	4	75	24	1002	131	212	7	23	1455	3302

urbanisation	383	deforestation	28	other changes	8
intensification	43	afforestation	312		

11	Urban fabric	32	Shrub, Herbaceous
12	Industrial, transport	33	Open spaces
13	Mine, dump, constr.	41	Inland wetlands
14	Artificial vegetated	51	Inland waters
22	Permanent crop	62	Ambiguous
31	Forests		

In the next 12 months the BIOPRESS team will continue to produce land cover change information from the photo interpretation of windows and transects. As the information is accumulating the team will start interpreting the information and converting it into quantitative measures on four key pressures: intensification, abandonment, urbanisation and afforestation. Final outputs will include an assessment of these pressures on the biodiversity of Annex-I grasslands, forests, raised bogs and mires, and freshwater habitats found across Europe.

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Illustration of method applied for the photo-to-photo interpretation of three time points


Aerial Photo 1953; LC 1998, 1986, 1953


Aerial Photo 1986; LC 1998, 1986


Aerial Photo 1998; LC 1998

BICEPS: BUILDING AN INFORMATION CAPACITY FOR ENVIRONMENTAL PROTECTION AND SECURITY

BICEPS was funded under the FP5 Dedicated Action on GMES in conjunction with two other projects (DPAG and GSeS) to draw together the results and experiences of the GMES Thematic Projects and to synthesise inputs into the Report on the initial phase of the programme. BICEPS focuses on scientific and technical design issues, whereas DPAG and GSeS address, respectively, questions of data policy and socio-economic and institutional facets.

The work of the BICEPS team was conducted in two phases. The first task was to assess the closeness of the match between the need for information and the capacity of present observing systems to satisfy that need. The main driver for GMES and the starting point for the BICEPS study was the information necessary to support EU policy in the domains of environmental protection and security. However many stakeholders are engaged in the development and implementation of EU policies. GMES must therefore be responsive to the needs of a wide range of users beyond the policy domain and should be capable of serving applications in various thematic areas and at many different scales.

The work took the form of desk studies, which drew on inputs from policy documents, scientific reviews and, importantly, expert comment from GMES Working Groups, Thematic Project teams, Forum participants and leading practitioners across the community. Interim results of this analysis are published as Reports, accessible from the web site of the Cross-Cutting Assessments (www.gmes-cca.co.uk). The principal outputs consist of profiles, in a standard format. These describe, from the perspective of users in 6 policy themes (see Box 1), relevant characteristics of a European shared information capacity needed to deliver key GMES functions (Figure 1). These topics broadly correspond to the original GMES Priority Themes, but have been enhanced by the inclusion of a number of services and additional issues proposed by the GMES Steering Committee.

BOX 1: POLICY THEMES CONSIDERED IN THE BICEPS STUDY

Policy theme	Issue
Climate change	Climate change and protection of the ozone layer
Marine environments	Marine ecosystems Oilspills Eutrophication and harmful algal blooms
Terrestrial environments	Nature and biodiversity Soil management Wildfires
Freshwaters	Water management Flooding
Urban environments and living space	Urban development Wastes Air quality Noise
Environmental security	Geophysical hazards Technological hazards Food security Humanitarian aid

Each of the profiles follows a common structure (see Box 2).

BOX 2: STRUCTURE OF BICEPS THEMATIC PROFILES

- Policy context
- Information needs
- Data sources
- Data processing and analysis
- Limiting factors
- Implications for GMES

The second stage in the BICEPS study was to extract, from the findings of the above studies, prioritised recommendations for actions that would lead to the establishment the proposed capacity to share environmental information between stakeholders in GMES. The prioritisation criteria applied in this task are listed in Box 3. Note that the order in which these are presented has no significance and that their application was, in part, qualitative and subjective.

BOX 3: PRIORITISATION CRITERIA FOR BICEPS RECOMMENDATIONS

- Need
- Potential added value
- Strategic considerations (e.g. achievement of EU autonomy in key areas)
- Feasibility
- Cost
- Opportunities for shared action (within and outside the EU)

The initial recommendations, endorsed by the relevant Working Groups of the GMES Steering Committee, are published in draft form at www.gmes-cca.co.uk/Outputs/Outputs.htm. They address five broad areas of information system design (see Box 4). The final version of this report will be published in early 2004: together with similar documents from the other cross-cutting assessments, it forms a key input to the synthesis report on the initial phase of GMES and to the discussions on the Commission Communication on GMES.

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BOX 4: SUMMARY OF BICEPS RECOMMENDATIONS

Monitoring networks

Build on current capacity. e.g.
- Consolidate and complement EU networks
- *Enhance EU contribution to international networks*
- *Expand capability of existing systems*
- *Improve integration between systems*

Identify and introduce best practice across GMES and adopt accreditation procedures based on this
Improve continuity and sustainability

Modelling & analysis

Improve availability of operational quality-controlled products and services based on atmospheric and ocean predictive models
Commit to support for high quality products required to inform climate change policy based, in particular, on data assimilation by coupled climate-ocean-land models.

Interoperability & data linkage

Improve the availability of basic information globally
Improve integration of EO, *in situ* monitoring, socio-economic survey and management information
Improve links between existing systems

Archiving, metadata & data access

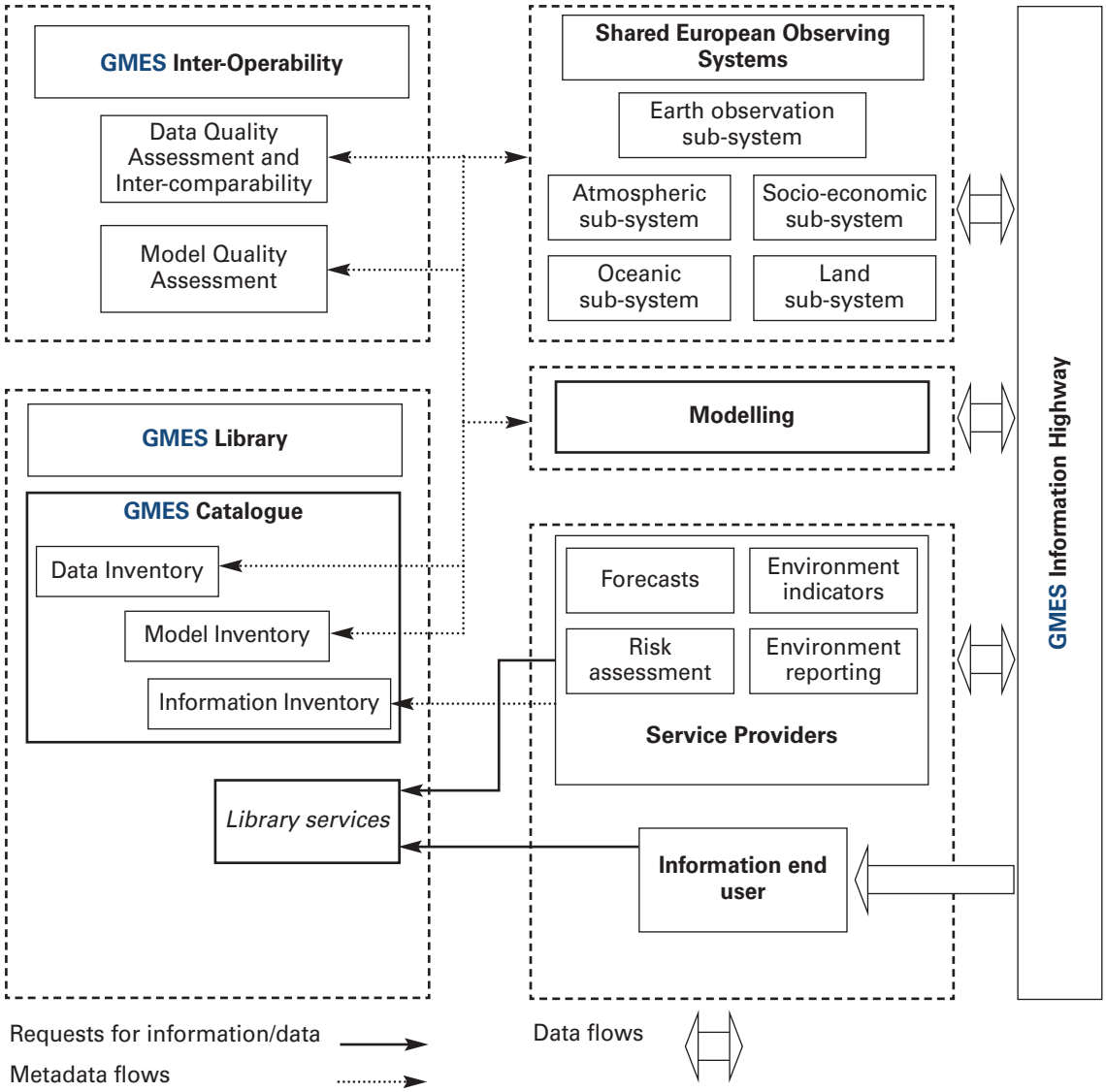
Identify key long-term EU datasets and ensure their continued accessibility
Implement within a European Shared Information System (ESIS) appropriate archiving services
Initiate any necessary programmes of data rescue
Implement appropriate metadata standards & services
Maximise use of internet for information delivery

Knowledge development & exchange

Prioritise support for RTD in areas not already covered by international programmes
Improve coordination between DG-RTD and ESF
Promote research to improve understanding of:
- *Complex cause / effect relationships (especially in relation to DPSIR models)*
- *Social impacts and responses (especially in urban contexts)*

Exploit Centres of Excellence as authorities on best practice and to provide specialist training

FIG 1



ESA GMES SERVICES ELEMENT (GSE)

The GMES Services Element is part of the ESA contribution to GMES. The aim of GSE is to deliver policy-relevant, operational information services, primarily (but not exclusively) derived from EO. The prime objectives of GSE are therefore:

- In the short term, to ensure the maximum use is made of Earth observation services in support of European policies on environment and security.
- In the longer term, to establish the case for future EO operational systems that can deliver policy-relevant information for the benefit of Europe's citizens.

In this way, GSE shall demonstrate early on that EO can, in future, deliver such information via services that can become sustainable, ie available, reliable and affordable

Ten contracts under the consolidation phase were kicked off in early 2003. The aim is to build and deliver operational services so as to:

- Make better use of existing EO resources, with a view to continuity
- Convince authoritative user communities of the strategic value of EO as a critical information source for formulation and implementation of environmental and security policies
- Provide inputs for a long-term organisational/institutional set-up that addresses the long term operations of GMES services, by the end of the initial period
- Establish a structured process to obtain feedback from the policy sector on the needs for future satellite resources
- Use EO to improve access for European citizens to objective information on environment global, regional and local scales

At present, more than one hundred users are participating in contracts within the programme element. This includes international organisations, pan-European organisations, national, regional and local government agencies and departments. The common factor driving this level of commitment is the difficulty these entities have at present (or expect to have in the near future) in collecting, processing and analysing the necessary geo-information to formulate, implement, monitor, enforce and review environmental and security policy. Additional organisations both within Europe and elsewhere are also negotiating how they too can participate.

A brief summary is given below for each contract presently underway. For further information on each activity you are invited to contact the project manager named for each consortium.

Urban Services

Each year, within Europe and world-wide, expansion of urban areas causes natural landscape loss. Monitoring and control of changes in the urban environment are therefore fundamental to sustainable urban planning and environmental urban management. In addition, many European environmental policies depend critically on local implementation and control as well as national and European level management. At present, however, there is no systematic availability of common, consistent information required to ensure effective urban environmental management over Europe.

The GUS project delivers services for users such as Municipalities, Regions as well as the European bodies to support the tasks such as environmental management, land use monitoring and urban development control. These are served through a service portfolio that includes soil sealing maps, urban thermography, hot spot identification for urban land cover change and basic land use mapping, among others. The areas covered by these services will eventually extend beyond the European Continent, with a particular emphasis on developing countries with a greater level of need for updated geo-information.

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Forest Monitoring

The UNFCC (United Nations Framework Convention on Climate Change) and the Kyoto Protocol have far reaching legal and financial implications in forest management. Apart from climate change related drivers, forest management must contribute to habitat protection and more effective protection of biodiversity as well as expanding its pro-active role in sustainable development. The Forest Monitoring consortium delivers on demand a range of standardised information products which respond to the management and decision support requirements expressed by key local, regional, national and pan-national organisations presently operating within the forestry sector. The service portfolio offers a variety of outputs including digital an analogue information, statistics, modelled data and integrated reports highlighting forest area, other land user and changes, areas of afforestation, reforestation and deforestation, forest structure, above ground biomass, carbon stock and forest environmental indicators.

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SAGE (Service for Advanced Geoinformation on Environmental Pressure & State)

The implementation of the Water Framewok directive and the Soil Thematic Strategy are major challenges to the majority of national, regional and local government organisations responsible for collection, analysis, management and control of the required information. The

SAGE consortium is developing two service portfolios in response to this evolving requirement for standardised reporting information: AquaSAGE products focussing on water quality, water shortage and water condition indicators (pressure and state) and SoilSAGE products to support generation of pressure and state indicators on soil conditions. These information products are aggregated at catchment level and not by administrative units and therefore fulfil additional demands of the WFD. As a result, in water management it will be possible to generate more reliable statements on water pollution and water quality as well as reducing the impact of exceptionally dry periods while for soil management, soil status can be assessed in full compliance with reporting requirements.

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Risk EOS (EO based services for Natural Risks Management)

The aim of this project is to provide European end-user bodies (civil protection and environmental services at European and national levels) with a consistent set of operational services for risk management. These will cover all phases of the risk management process: prevention, early warning, crisis and post-crisis. Multiple risk categories are covered with a specific focus on floods and forest fires. The services portfolio will support land planning policies, risks prevention plans, population information awareness and operational crisis management amongst others.

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ROSES (Real-time Ocean Services for Environment & Security)

The ROSES service portfolio provides a comprehensive detection, impact forecasting and decision support service portfolio for oil spills and algal blooms. This is achieved by coupling state of the art ocean modelling and forecasting with present and future capabilities in satellite based marine surveillance. The intention is to ensure, by 2008, complete coverage of European waters with daily surveillance coverage and improved modeling to forecast slick and bloom evolution. This responds to European commitments under regional environmental conventions such as Ospar, Helcom and the Mediterranean Action Plan as well as supporting more ambitious European objectives such as the complete elimination of operational oil discharges into the marine environment by 2020. The main users will be national environmental agencies, coast guards and maritime and coastal management organisations. In addition, port authorities will play an important role in relation to their ship inspection responsibilities.

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http://roses.cls.fr

Icemon

Historic data and state of the art models indicate that Arctic ice cover is changing with significant reductions in summer sea ice levels expected during this century. This will have profound implications for transport, environmental protection and management, energy production and protection of national territorial waters. As oil and gas production, shipping traffic and marine transportation increase, the risk of accidents and subsequent contamination of highly sensitive habitats and ecosystems is greatly increased. Furthermore, as the surrounding environment changes, many of these ecosystems will require a more proactive level of management to ensure their preservation and stability.

Icemon is working to expand the present range of ice information products to ensure a more detailed understanding of the status of the Arctic environment, the analysis of climate change trends and the provision of more precisely customised information services to the maritime transport and shipping sectors. This builds on frameworks established within the operational meteorological and sea ice communities and brings in players such as classification societies who expect an increasing role in the area in the near future. The initial focus of the activity is the European Arctic, including Russian waters and the Baltic Sea.

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Northern View

Northern regions are distinctly different from other geographic areas and share a common set of characteristics including large remote areas of limited accessibility, low population densities sensitive ecosystems of global importance, rich non-renewable and renewable resources and increasing industrial activity. Efforts are now being made to develop northern policies in a cooperative manner across regions and nations with the aim of resolving specific northern environmental and development challenges. To support balanced and sustainable development, effective monitoring is vital. In response, the initial service portfolio components developed and provided under Northern View will give relevant information on sea ice, oil discharge, icebergs, glaciers and snow cover and land cover mapping. The objective is to provide a complete coverage of all high latitude areas starting with the initial service coverage of oil spill surveillance for Canadian waters to Environment Canada, environmental information and ice conditions services for Northern Canada and snow and glacier information for northern Norway.

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GMFS (Global Monitoring for Food Security)

Food security depends on complex interactions between climate, soil conditions, local agricultural practices, politics and macro-economic factors. International bodies such as FAO, WHO and the World Bank monitor different components of these factors but in general, present

techniques for environmental status monitoring and associated geo-information collection and analysis methodologies do not deliver the required level of fine scale detail or wide area coverage. International organisations, national governments and NGOs, amongst others, need dependable access to reliable intelligence on actual and potential crop production; for example the start and duration of growing seasons, irrigation and fertilisation. The GMFS service portfolio includes current crop acreage, yield and production level monitoring, future crop yield and production level forecasting and the compilation of agricultural indicators such as vegetation state and land cover. These information products are fed into existing early warning systems that monitor agriculture for food security, initially for sub-Saharan Africa and then expanding to cover parts of central and south east Asia, South America and the Middle East.

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Coastwatch

The Coastwatch initiative establishes an operational service, providing effective information for coastal and marine environment management.

The initial service portfolio, which aims to test the Coastwatch concept, is under development and will support policy measures defined at the European level including the Water Framework Directive (WFD) and the European Strategy for Integrated Coastal Zone Management (ICZM). For ICZM needs, it will contribute to monitoring coastal environment status and land use changes, thereby supporting the implementation of Integrated Coastal Zone Management Recommendation. For WFD needs, the mapping service will deliver both "near real time" and historical information on water conditions such as water colour, sea surface temperature and wave exposure. For 2004, the portfolio will be extended in an open and coordinated fashion to incorporate new service providers and new information services in order to satisfy additional users.

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Terra Firma

The Terra Firma project is establishing a pan-European ground motion hazard information service which includes subsidence in all its forms (including landslides and the effects of seismicity) with an inital focus on urban subsidence where 186 European towns have been identified. European radar satellites collect data which is used to construct motion maps. Data availability stretches back over the last 12 years. This data will be enhanced by the team who will add in pre-existing and possibly even in-situ data. The result will provide "causal" and "modelled" information services. Civil engineers will be significant end-users of the resultant product.

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GROUP ON EARTH OBSERVATION (GEO)

At the G8 Summit at Evian in June 2003, under the heading of "Science and Technology for Sustainable Development", heads of state adopted a US-originated initiative to develop close co-operation on global observation strategies over the next ten years. The Earth Observation Summit was the first ministerial-level meeting aiming to achieve progress in this area. Well over thirty nations and the European Commission attended the event, which was supported and hosted by prominent members of the US administration, including the Secretary of State, Colin Powell, accompanied by the Secretary of Commerce, Donald Evans, and the Secretary of Energy, Spencer Abraham.

The main outcome of the summit was the adoption of a declaration that recalls the results of the World Summit for Sustainable Development and the G8 Summit and affirms "the need for timely, quality, long-term global information as a basis for sound decision-making". It proposes the preparation of a ten-year plan for the co-ordination of our respective Earth observation strategies and establishes a high level Group on Earth Observation (GEO) to ensure its preparation.

The framework for the plan was presented on 25 April 2004 at the second Earth Observation Summit in Tokyo, with the full plan to be presented at the third Earth Observation Summit to take place in Europe during the first quarter of 2005. GMES will form a basis of the European contribution to the co-ordinated Earth observation systems that are called for.

Ten European nations and the European Commission were represented. Thanks to intensive prior consultations and consensus-building with EU and ESA Member States, the agency itself and other European partners, the European contributions were well co-ordinated and well-received.

As a result, all issues of concern to our Member States and European partners were satisfactorily addressed by the GEO, which is co-chaired by the Commission's Research Director General, Achilleas Mitsos, along with his US, Japanese and South African counterparts.

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GMES EUROPEAN AND GLOBAL INVENTORY

By 2008 the GMES will establish a coherent, efficient and sustainable shared information system. To reach this objective, amongst other tasks, it is necessary to examine the various initiatives of direct relevance to GMES that already exist. Accordingly, an (albeit non-exhaustive) inventory[1] based on immediately accessible information at European and Global levels has been compiled by the members of the GMES Support Team[2].

At the European level, the list contains reference to data centres and programmes from governmental and non governmental bodies which have objectives and tasks relating to observation/monitoring, networks/systems, as well as the production and delivery of information targeted at environmental and security policy issues. A few examples, among many others that can be found in the inventory, include: The European-Mediterranean Seismological Centre (EMSC) devoted to the promotion of seismological research and which also runs an Early Warning System for potentially damaging earthquakes in the Euro-Med region, the European Environmental Agency (EEA) with activities ranging from monitoring of environmental phenomena, data collection and analysis, to indicator production, assessment and reporting, and also Europe's Meteorological Satellite Organisation (Eumetsat) whose primary objective is to establish, maintain and exploit European systems of operational meteorological satellites.

The Global dimension of GMES covers a wide range of institutions and programmes dealing with many different scientific and operational areas of environment and security monitoring. The global activities of GMES stem from the commitments of the European Union under International Conventions and also from the specific role that a number of Community policies play outside of the European territory. This global dimension is also relevant given the potential contribution of GMES towards strengthening the strategic position of Europe at Global level. Some very long-standing institutions are included in this inventory, for example, both the International Council for the Exploration of the Sea (ICES) and the US Geological Survey (USGS) were founded in the 19th Century, but the majority of the institutions are 20th Century creations. Some of the very new ones are predominantly space related such as the International Charter on Space and Major Disasters (ICSMD), and the Water Resources Management in Africa (TIGER). Some others are mostly in-situ related, where the Global Climate Observing System (GCOS) or the Global Ocean Observing System (GOOS) being good examples. Finally, organisations such as the Integrated Global Observing Strategy (IGOS) and the World Meteorological Organisation (WMO) are all included in the list as dealing with integration of observing systems.

The inventory will be maintained and updated, as more organisations and programmes relevant to GMES are identified.

1 See http://www.gmes.info/forums/index.html, at 3rd Forum, "GMES Relevant Organisations Inventory" and " European activities of relevance to GMES"
2 See www.gmes.info/organisation/

NEWS IN BRIEF

GMES Communication

The GMES Communication[1] entitled "Global Monitoring for Environment and Security (GMES): Establishing a GMES capacity by 2008 (Action Plan 2004-2008)" was adopted by the European Commission on the 3rd of February 2004. It focuses on a new Action Plan aiming at establishing a working GMES capacity by 2008. It includes a structure for its management, funding aspects and a step-by-step approach on how to move forward. Outlining the key lessons learned as a result of the Initial phase and identifying further challenges, the Communication described the tasks required to accomplish this in the next 5 years of the Implementation phase (2004-2008).

Space policy

The European Commission adopted on 11th of November 2003, the White paper "Space: a new European frontier for an expanding Union"[2]. The Action Plan is aiming to bring essential support to the Union's policies and objectives: faster economic growth, job creation and industrial competitiveness, enlargement and cohesion, sustainable development and security and defence. Solutions presented by Space applications are related to domains such as the environment, transportation, telecommunications and security, for example. One of the ambitious initiatives is GMES.

The GMES initiative includes space-based earth observation tools along with in-situ and airborne systems, to monitor the planet at a global level. In adopting its November 2003 White paper on Space Policy the European Commission set up an Action Plan which will make a wide ranging contribution to the development of the GMES capacity.

EU/ESA agreement

The EC has also signed an agreement with the ESA to reinforce its cooperation framework with the Agency for the Space sector. This partnership adds value to the previous work already undertaken between the two organisations, as, for example, in the 2001 GMES Action Plan, and forms the basis for the first joint EC and ESA implementation steps to be undertaken in the GMES context. For more information:
http://europa.eu.int/comm/space

Growth Initiative

The European Commission, adopted on 11th of November 2003, a Communication[3] entitled "a European Initiative for Growth – Investing Networks and Knowledge for Growth and Jobs" . The initiative, conducted in close cooperation with the European Investment Bank (EIB), consists of a comprehensive action plan spelling out what needs to be done to quick-start investment in networks and knowledge across the European Union. The targets for reinforcing the wider structural reform agenda were launched in Lisbon in March 2000. The EC's proposal includes a Quick-Start programme of 56 projects which are ready to start immediately. They include projects, for example, on transport TENs, gas and electricity, broadband networks, GMES projects and cutting-edge technologies. All these projects meet four criteria: maturity, having a cross-border dimension, an impact on growth and innovation, and a positive environmental effect. The work should be underway within the next 3 years at the latest.

For more information: http://europa.eu.int/comm/commissioners/prodi/pdf/growth_initiative_en.pdf

FP6 call "Space and Aeronautics" - 2nd call publication

In the 2nd call (closed on 31st March), € 40 Millions are dedicated to GMES to cover the Integrated Project application field topics water resources, risk management, atmosphere, as well as a data harmonisation Support Action (SSA) to underpin the INSPIRE initiative. Additionally to these specific topics, research projects in support of all GMES can also be submitted as STREPs. For more information: http://www.cordis.lu/fp6/aerospace.htm

1 COM (2004) 65 final
2 COM (2003) 673
3 COM (2003) 690

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