Galileo – GMES Workshop
Less Known Elements of the Space Flagship Programmes:
Public Perception and International Aspects

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90.00h to 13.15h

European Parliament
Brussels

“Earth Observation in the Global Context:
GEOSS (Global Earth Observation System of Systems)”

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Content of presentation

- **Group on Earth Observation (GEO)**
- **Global Earth Observation System of Systems (GEOSS)**
- **Contribution of Global Earth Observation resources to the implementation of EU Policies**
- **Looking into future EO activities and conclusions**
The Group on Earth Observations (GEO) is coordinating efforts to build a Global Earth Observation System of Systems, or GEOSS.

GEO is constructing GEOSS on the basis of a 10-Year Implementation Plan for the period 2005 to 2015.

“The vision for GEOSS is to realize a future wherein decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations and information”.

GEO is a voluntary partnership of governments and international organizations.

As of beginning November 2010 GEO’s Members include 85 Governments and the European Commission and 61 Participating Organizations.
• The Directorate of DG Research in charge of Environment takes the lead within the Commission regarding the participation of the EC in the Group on Earth Observations (GEO).

• The EC is one of the 4 Co-Chair of GEO, together with China, the US and South Africa.

• The EC maintains and supports a GEO European Caucus which facilitates the building of European consensus within GEO (working closely with EU MS and organisations such as ESA, EUMETSAT, ECMWF, etc..)

• The EC funds research projects necessary for the development of GEOSS through the environment theme of the FP7 Cooperation Program

• The EC also provides more operational GEOSS elements through GMES (space infrastructure and operational services)
Represents a COLOSSAL investment by GEO Members & PO in EO systems

Delivers major societal benefits to USERS, such as policy makers & citizens

Provides improved interoperability

Delivers trusted data & information

Is “Open”, in accordance with DSP

Enables GEOSS resources to be readily discovered and accessed

Represents a COLOSSAL investment by GEO Members & PO in EO systems
Agreed at the Beijing Ministerial Summit 5 November 2010 to:

1. Maximize the number of documented datasets made available on the basis of full and open access;

2. Create the GEOSS Data Collection of Open Resources for Everyone (GEOSS Data CORE), a distributed pool of documented datasets with full, open and unrestricted access at no more than the cost of reproduction and distribution; and

3. Develop flexible national and international policy frameworks to ensure that a more open data environment is implemented, thus putting into practice actions for the implementation of the GEOSS Data Sharing Principles;
The access to global sets of Earth observation data and resources is a necessity in many domains: climate prediction (e.g. Carbon Cycle, management of ocean resources, health protection etc...):

- Access to new data
- Data cohesion (calibration and interoperability)
- Agreed global data set in strategic areas

GEO is a unique platform to promote international collaboration in many areas (space, research, development etc....):

- Collaboration with Research partners outside Europe: China, Africa, US
- Optimise and share space infrastructure
- Support Capacity Building in developing countries

Global EO data sets are essential for the implementation of a number of European Union policies including environment, development, innovation, research and finally, space policy.
2007 call
Coverage of several GEO Societal Benefits Areas by involving the European S&T Community (Carbon Cycle, Biodiversity, Ocean Interior, Soil, Water)

2008 call
Research supporting the Initial GEOSS Information System in relation with Europe’s development of INSPIRE

2009 call
Emerging observing systems (Environment and Health, Sustainable exploitation of mineral resources) / Further structuring the European approach in GEO

2010 call
New tasks introduced in the 2009-2011 GEO Work Plan (Global Mercury Observing System, promoting GEO in S&T Community) links between GEO and new technologies (data visualisation, GNSS, reanalysis)

2011 call
Strong emphasis on Capacity Building (EO for agri and forestry in Africa, Monitoring of Med African coastal zone), Data sharing (GOOS, atmospheric hazards, water management) Global Observation systems (Carbon)

Capacity building: Annual emphasis (EU policy & core GEO activity)
Many global Eco-region classifications exist, but
- they are mostly based on personal judgment
- they often have a low spatial resolution
- they distinguish relatively few classes globally

Köppen climate zones

After the recent conference of the UNCBD in Nagoya it was decided that GEO should contribute to Coordinate the global biodiversity observation effort (GEO BON)

WWF ecoregions
Key challenges for Africa:

- Make accurate & reliable public data visible and accessible
- Support the sustainable use of underground resources
- Promote an efficient availability of the existing information and knowledge
- Implement a capacity building curriculum in SDI management for qualified human resources

An important share of the global geology-related resources and reserves is located in Africa:

- Metallic minerals
- Building materials
- Groundwater
- Geothermal energy
Enhance the capacity to plan and build multidisciplinary scenarios
Integrate socio-economic development indicators
Improve governance for managing non-renewable natural resources
Market investment opportunities to support the economy
Strengthen professional skills and capacities
EO2HEAVEN: Earth Observation and Environmental modelling for the mitigation of Health risks
“Health and development policies”

EO2HEAVEN will develop a better understanding of the complex relationships between environmental factors, population exposure, and health impacts.
Environmental effects on allergies and cardiovascular diseases in Dresden and the Free State of Saxony, Germany

Environmental challenges to health in South Durban, South Africa, due to air pollution

Investigating the impact of climatic variables on the cholera outbreaks in Sub-Saharan Africa
GMOS will validate atmospheric mercury modelling systems, identify source-emitter relationship and support key European and international programmes including:

- GEO Task He-09-02d “Global Observation System for Mercury”
- EU Thematic Strategy on air pollution, Marine conventions GMES, etc.
Toward an Integrated Global Carbon Observation System “Climate policy”

Integrative role of IGCO (task CL-09-03a)

- Satellite observations
- Ocean color
- Atmospheric sounding
- Land imagery

- In situ networks
- Ecosystems fluxes
- Ocean observations
- Atmospheric networks

- Integration Assimilation
- Carbon cycle data assimilation systems
- Distribution

IGCO
FP7 Capacity Program: support to Research Infrastructures
FP7 SPACE THEME GMES supports:

1) Added-value services to policy-makers and to other users on an operational sustained basis.

Land Monitoring (GEOLAND2): Initially European land cover & urban spots

Marine Monitoring (MyOcean): Sea state & ecosystem characteristics over Global ocean & European regional seas

Atmospheric Monitoring (MACC): Atmospheric composition for air quality (European) and climate forcing (global), ozone monitoring (global) and solar energies

2) Space Infrastructure components: Sentinel missions (ESA), Eumetsat, National & 3rd parties

GMES project resources and data are now registered in GEOSS and Sentinels will follow GEOSS data sharing principle
11 Essential Climate Variables

- Cloud Properties
- Carbon Dioxide, Methane & other GHGs
- Ozone
- Aerosol properties
- Sea Surface Temperature
- Sea Level
- Sea Ice
- Ocean Colour
- Glaciers and ice caps
- Land cover
- Fire disturbance
• Potential to use novel technologies to deliver novel Earth Observation (EO) tools and applications in support of (GEOSS).

• This approach will be central for the implementation of projects in the years 2012-13, building on cutting-edge technologies in the information, telecommunication, and space sectors:

1. Achieving the development of the unique interoperable GEOSS Information System and implementing the GEOSS Data Sharing Action Plan through, for instance, the use of Grid and Cloud Computing technologies;

2. Developing the global integrated network of in-situ environmental observations, taking particular advantage of mobile telephony;

3. Providing global environmental assessments based on the new generation of European Earth Observation satellites (SMOS, CRYOSAT, GOCE).
Direct involvement in GEO tasks: specified at the level of call

- EC facilitates participation in GEO: GEO European Project Workshops:
  - GEPW-1 Brussels, Sept. 08’ – Input to design of GEO 2009-2011 WP
  - GEPW-2 Stresa, IT May 09’ – EU contribution to GO 09-011 WP
  - GEPW-3 Istanbul, Oct 09’ – EU contribution to Global datasets & planning European input to demonstrate GEOSS progress at the ministerial Summit in 2010
  - GEPW-4 in Athens, April 2010 - Registration and sharing of European datasets in the GEOSS & European coordination for the GEO VII 2010 Ministerial Summit (Exhibition, Showcases, Declaration)
  - GEPW-5 in London, tentative dates 7-8-9 February 2011 (TBC) – European input to the GEO 2012-15 WP
  - Implementation of GEO data sharing Action Plan
GEOSS: Global Earth Observation System of Systems is rooted in Science:

1) Observation Systems specialized or covering several societal benefit areas are often prototypes or scientific observatories
2) A GEOSS common infrastructure (GCI) enabling GEOSS resources to be readily discovered and accessed (requiring up-to-date information science)
3) Sophisticated modelling capacity to deliver products for users

Take advantage of the Innovation Union Strategy:
Include a research agenda focused on challenges: energy security, transport, climate change and resource efficiency, health and ageing, environmentally friendly production methods and land management, and to enhance joint programming with Member States and regions

Continue to connect the rich European EO component to GEOSS:
Significant resource dedicated to EO in Europe (GMES, GALILEO, INSPIRE, Development policies, Research activities)