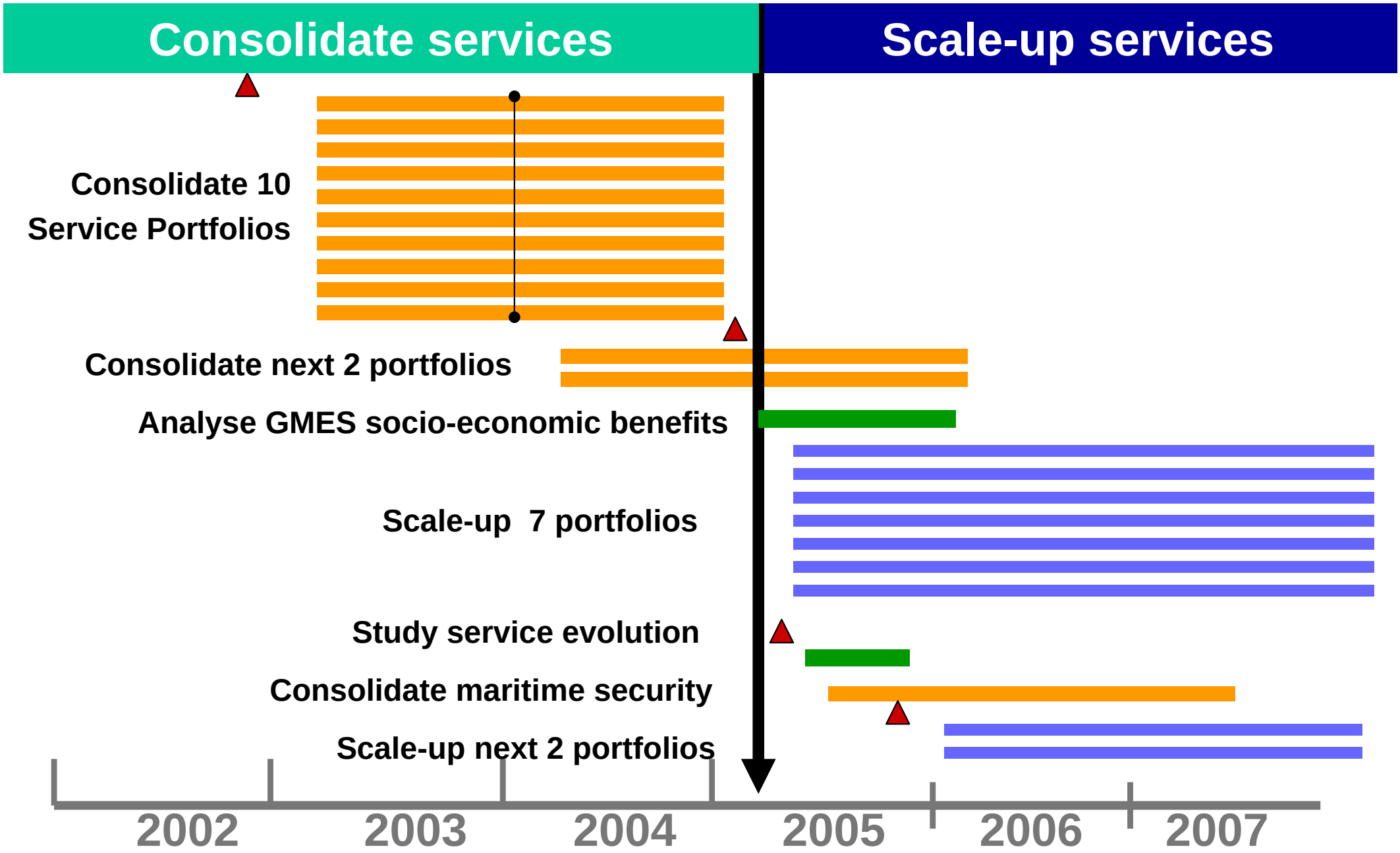
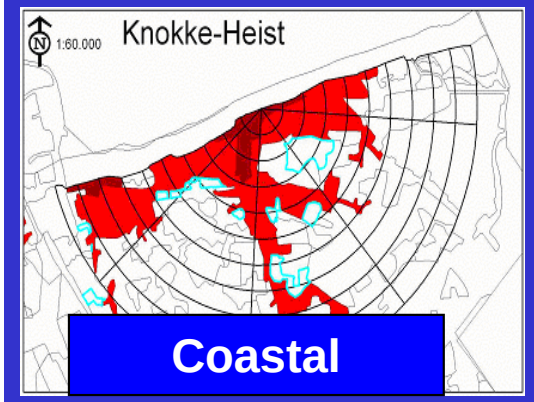
GMES Services Element

- **ESA Programme dedicated to GMES**
  - Approved: ESA Ministerial Council Nov 2001
  - Earthwatch element
- **Deliver Operational Services**
  - Support for environmental & security policies
- **Budget**
  - 83 Meuro (+increased subscriptions => 97Meuro)
  - 5 years

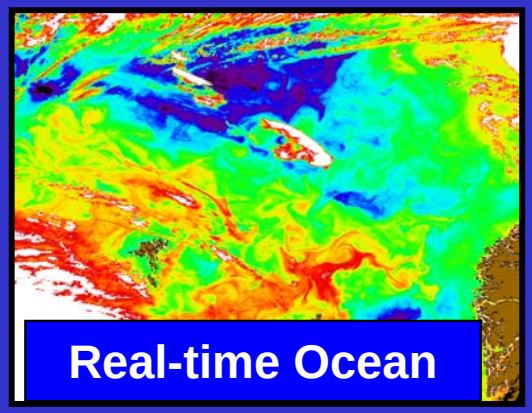
What has GSE done : What is planned?



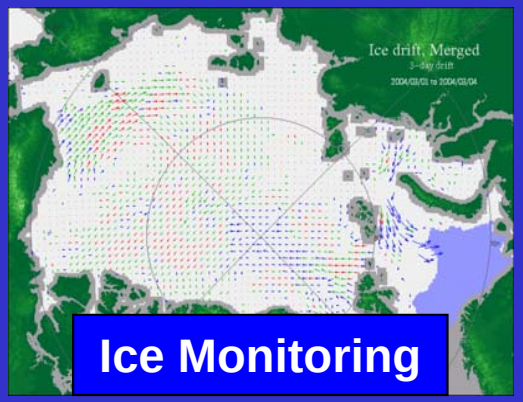
12 GMES Service Porftolios



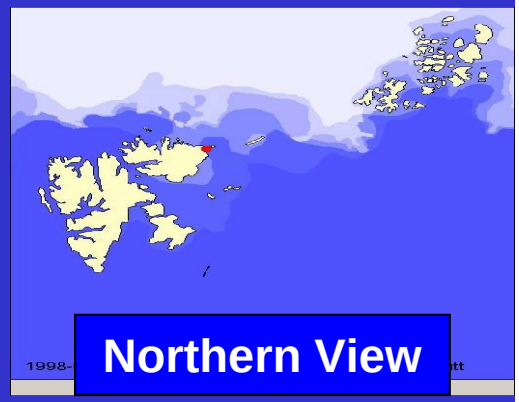
Coastal



Real-time Ocean

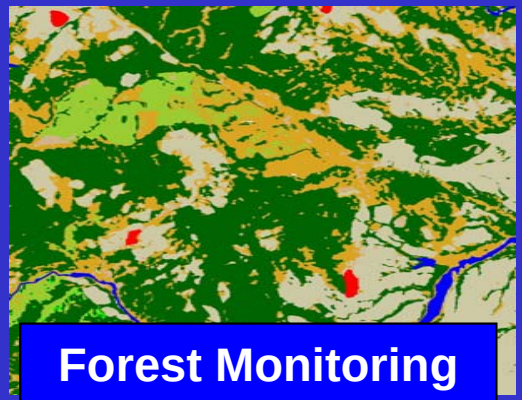


Ice Monitoring

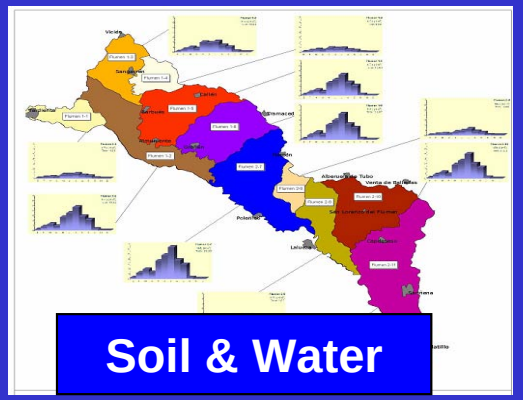


Northern View

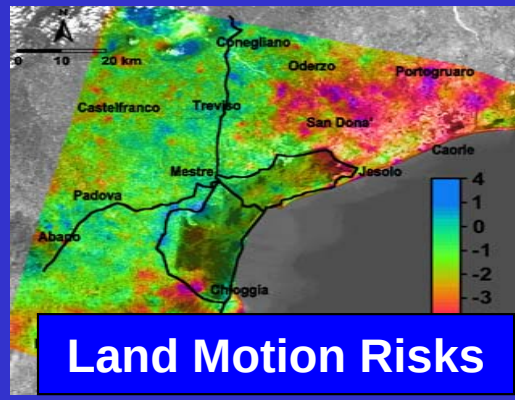
Risk fire & flood



Forest Monitoring



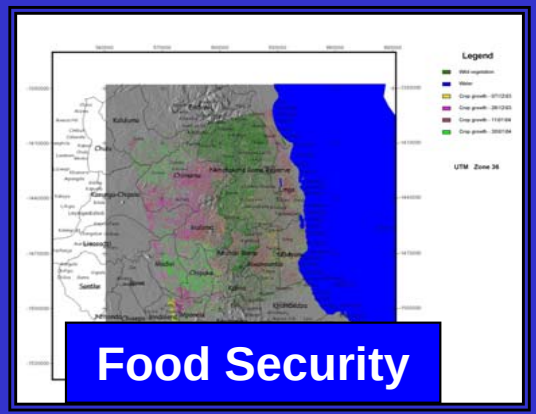
Soil & Water



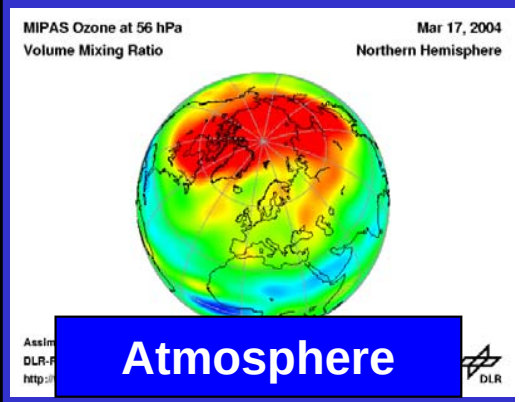
Land Motion Risks

Urban Services

Humanitarian Aid

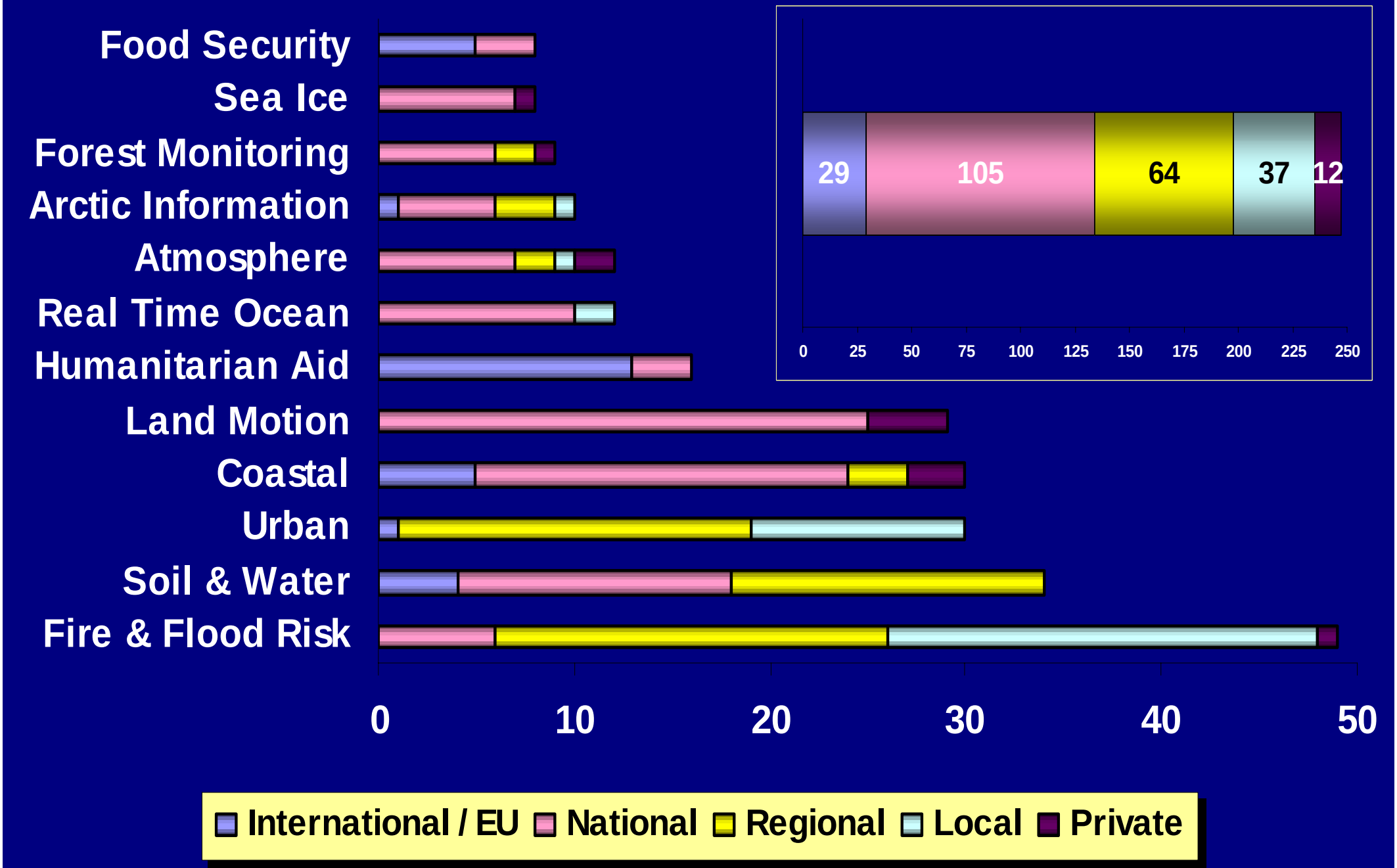


Food Security

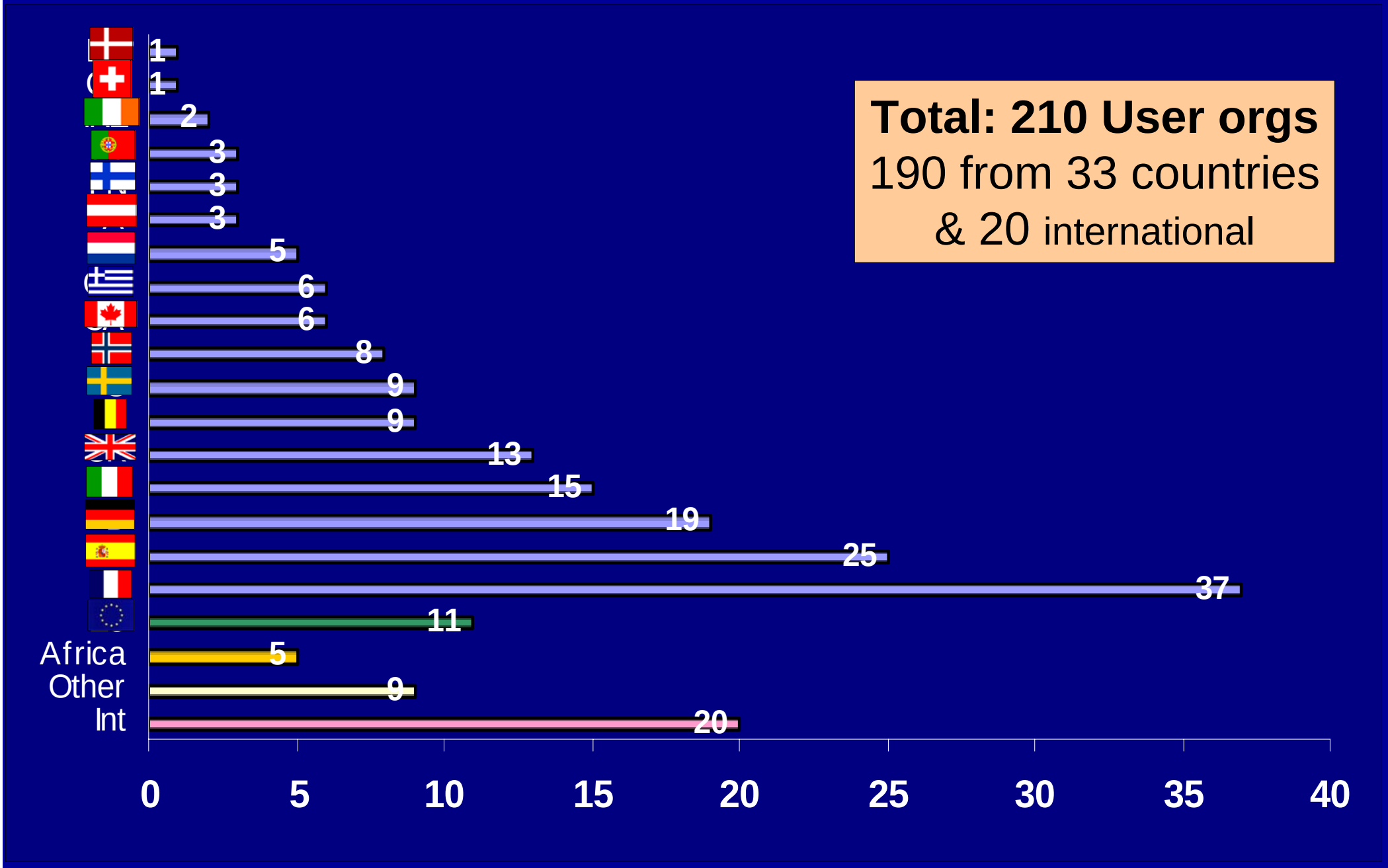


Atmosphere

Who are the User Organizations ?



Where are the User Organizations ?



Total: 210 User orgs
190 from 33 countries
& 20 international

Why do Public Users need GMES ?

	Forest Monitoring	SAGE	Urban Services	CoastWatch	ROSES	ICEMON	Northern View	Risk EOS	TerraFirma	GMFS	RESPOND	PROMOTE
EU: Aarhus Convention	●	●	●	●	●	●	●	●	●			●
EU: Civil Protection Action Progs. / Coop. Mechanisms								●	●			
EU: Policies on Food Aid / Security & Rural Povery										●	●	
EU: Integrated Coastal Zone Management (R)			●	●								
EU: Soils & Forest Strategies	●	●	●					●				
EU: Water Framework Dir. (D)	●	●	●	●	●		●	●				
EU: CLRTAP												●
EU: ECHO											●	
EU: Northern Dimension Action Plan						●	●					
6th EAP - tackle climate change	●					●	●	●				●
6th EAP - protect nature & wildlife	●	●	●	●	●		●	●				
6th EAP - address environment & health	●	●	●	●	●		●					●
6th EAP - preserve natural resources & manage waste	●	●	●	●								
Int: Arctic Environmental Protection Strategy						●	●					
Int: Convention on Biological Diversity	●	●	●	●			●	●				
Int: RAMSAR Convention on Wetlands of Int. Import.		●		●								
Int: UN Convention on Combating Desertifcation		●								●		
Int: UNCED Agenda 21												●
Int: Kyoto Protocol Articles 2, 3, 6, 12	●											●
Int: UN Mandates (OCHA, UNDP, UNHCR, UNICEF, WFP)											●	
Int: Mandates of various NGO's											●	
Int: SOLAS						●	●					
Int: MARPOL				●	●		●					

Main Policy Areas Addressed in Stage 1

What are the GMES User Needs
How are they structured ?

European-Level

- Driven by EU Policies
- EC DGs and Community Institutions

National-Level

- Driven by National policies & international commitments
- National ministries & Institutions

Regional-Level

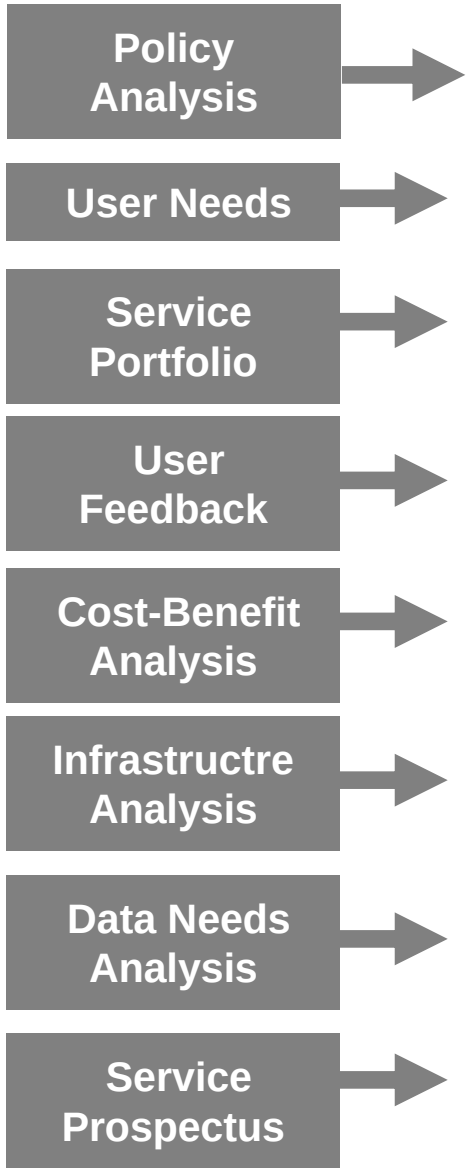
- Driven by national policy & regional issues
- Civil Protection Units, Regional Government Agencies

Local-Level

- Driven by local issues, national law and institutional statute
- Municipalities, Port Authorities

What has GSE produced so far ?

- Documented answers
  - What information is needed?
  - What services can be provided?
  - What are the benefits for Europe's Citizens?
  - Do the benefits justify the costs
- Geographic scope
  - Global; continental; regional; national; local
- Timescale
  - Present + 10 years



GSE Service Element : 2005- 2008
Scaling up consolidated Services

Starting Sept 2005

- Polar Information Services
- Marine & Coastal Information Services
- Flood & Fire Risk Services
- Geo-hazard (Land motion) Information Services
- Food Security Information Services
- Forest Monitoring Services
- Land Information Services

Starting Early 2006

- Atmospheric Monitoring Services
- Humanitarian Aid Information Services

Polar Information Services

Service Portfolio

- Iceberg Surveillance
- Sea-ice floe edge conditons
- River Ice Maps
- Glaciers Monitoring
- Hi-res ice charts
- Sea-ice thjckness charts
- Medium-res ice charts (Greenland)
- Met-ice-ocean regional forecasting
- Oil spill monitoring in Canada

Providers

- Consortium led by C-Core (Canada)
- 10 Service providers, from 7 countries

Users

- 22 national user organizations from 6 countries
- International ice patrol, EEA

Forest Monitoring Services

Service Portfolio

- Pan European forest Monitoring
- Support to National Report for UNFCC & KP on LULUCF
- Forest Information updates
- Support to Environmental Monitoring
- Forest disturbance detection & post-monitoring
- Support to management & report for CDM Projects
- (typically at map scale 1:50,000)

Providers

- Consortium led by GAF AG
- 13 Service providers, 3 research partners, 9 countries

Users

- 17 user organizations including 12 national bodies
- UNFCCC NPOCs, EEA, & regional forest authorities
- 1 commercial forestry company

Flood & Fire Risk Information Services

Service Portfolio

- Burn Scar Mapping
- Assets Mapping
- Flood Risk Analysis
- Flash Flood Early Warning
- Rapid Mapping

Providers

- Consortium led by EADS Astruim
- 10 Service providers from 5 countries

Users

- 18 user organizations including
- 6 national bodies, 7 regional, 5 local
- Civil protection authorities

Marine & Coastal Information Services

Service Portfolio

- Oil-spill detection & notification (60mins)
- Oil spill drift forecasting (hourly, up to 72 hours ahead)
- Coastal water quality monitoring & alert (bi-weekly)
- HAB monitoring & forecasting
- Seasonal water quality assessment European waters (2-10 km grid)
- Metocean data provision (ocean colr, wind wave,current ,salinity)

Providers

- Consortium led by Alcatel France
- 20 Service providers from 8 countries
- Includes Met-Os & industrial providers

Users

- 11 national level european organizations
- Regiona environemnt agencies (I,E,D) & Port authorities
- EEA, DG-ENV, EMSA

Geo-hazard (Land Motion) Risk Information Services

Service Portfolio

- Urban Subsidence:
  - Basic INSAR Measurement
  - Initial Interpretation
  - Modeled interpretation
- Landslides
  - Inventory
  - Monitoring

Providers

- Consortium led by NPA (UK)
- 11 Service providers from 5 countries

Users

- UP to 50 user organizations, focus on EU 25+
- Geological surveys & institutes, Civil engineering
- Civil protection authorities

Food Security Information Services

Service Portfolio

- **Rush Delivery of Vegetation State indicators**
- Tailored Synthesis to support crop & food assessment missions (WFP, FAO)
- Detailed annual national-scale crop monitoring

Providers

- **Consortium led by Vito (B)**
- **8 Service providers from 5 countries**

Users

- **African national ministries (Malawi, Senegal Kenya,)**
- **African regional instituions (SADC, AGHRYMET)**
- **International agencies: FAO-GIEWS, WFP-VAM, EC/JRC MARS,**

Land Information Services

Service Portfolio

- **European Urban Atlas (components)**
- Impervious areas and sealing levels
- In land water quality contamination
- Irrigation /Agricultural water consumption

Providers

- **Consortium led by Info-terra (D), being finalised**
- **~10 Service providers from 5+ countries**

Users

- **50+ European user organizations**
- **National & Regional Environmental Agencies**
- **Municipal Aujthorities**
- **EEA, DG-ENV, DG-Regio**

Atmospheric Monitoring

Providers

KNMI
DLR
DWD
RIU
U Bremen
CERC
Prev'Air
ACRI-ST
FMI

Services

Deliver a Service on Stratospheric Ozone

- *past, present, forecast*

Deliver a Service on UV Radiation:

- *past, present, forecast*

Demonstrate a Service on Air Quality: -

- *past, present, forecast*

Define future service on greenhouse gas

- *emissions, concentrations*

Policies

- Vienna convention
- Montreal Protocol
- UN Convention on Long-Range Transboundary Air Pollution
- UNFCCC
- EU: Clean Air for Europe (CAFÉ)

Users

JRC-IES
NILU
EPA
UBA-A
UBA-D
BVDD
LUA
WMO
ECMWF
DEFRA
London
RIVM
SYKE
ADEME
L'Oreal
Meteo Fr
EMPA
ARPA
APAT
VITO/VMM

Humanitarian Aid Services

RESPOND

Providers:

- **Infoterra**
- **Sertit**
- **Keyobs**
- **Metria**
- **DLR**
- **JRC**
- **UNOSAT**
- **Reuters**
- **Aid 4 Aid**
- **Kayser-Threde**
- **SciSys**
- **SSTL**
- **ESYS**

Services

- **Digital maps & thematic products & services**
- **Instantly available** for rapid orientation & decision making: Global coverage
- **For known "Risk Zones",** proactively updated, available rapidly.
- **For emerging & on-going crisis zones**, created from new data, on a rush basis, as a reactive response.
- **Alert services** to Humanitarian community and coupling of alerts and mapping resources.

Users:

- **ECHO**
- **UN OCHA**
- **UN HCR**
- **UNOPS**
- **UNDPKO**
- **THW**
- **Red Cross (Germany)**
- **AlertNet**

Policies

United Nations: mandates of OCHA, UNDP, UNHCR, UNICEF, WFP

European: ECHO [(CE) 1257/96] - to provide emergency assistance & relief to victims of natural disasters or armed conflict outside EU

National: Member states ministries **Local:** Mission of National and International NGOs

Strategy Group

- **ECHO**
- **IFRC**
- **German Ministry**

GSE

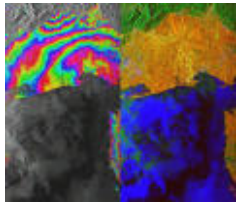
Open Partnership Agreement for Each Network

Service Level Agreement (between Service Provider and User)

Co-location Meeting at ESRIN on Dec. 06-08

- *Coordination among GSEs (common Webportal, Data Exchange/Needs etc.)*
- *Coordination with EU Fast Track Initiatives (EU Core Services, GSE downstream Services)*
- *GSEs as pilot projects for INSPIRE*

What is Needed for the GMES Space Component ?

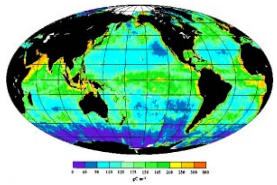


Sentinel 1 – SAR imaging

All weather, day/night applications, interferometry

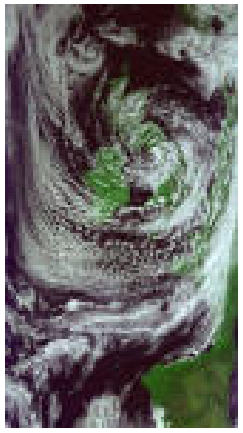
Sentinel 2 – Superspectral imaging

Continuity of Landsat, SPOT & Vegetation-type data



Sentinel 3 – Ocean monitoring

Wide-swath ocean color and surface temperature sensors, altimeter



Sentinel 4 – Geostationary atmospheric

Atmospheric composition monitoring, trans-boundary pollution

Sentinel 5 – Low-orbit atmospheric

Atmospheric composition monitoring

GMES-1: The gap-filler

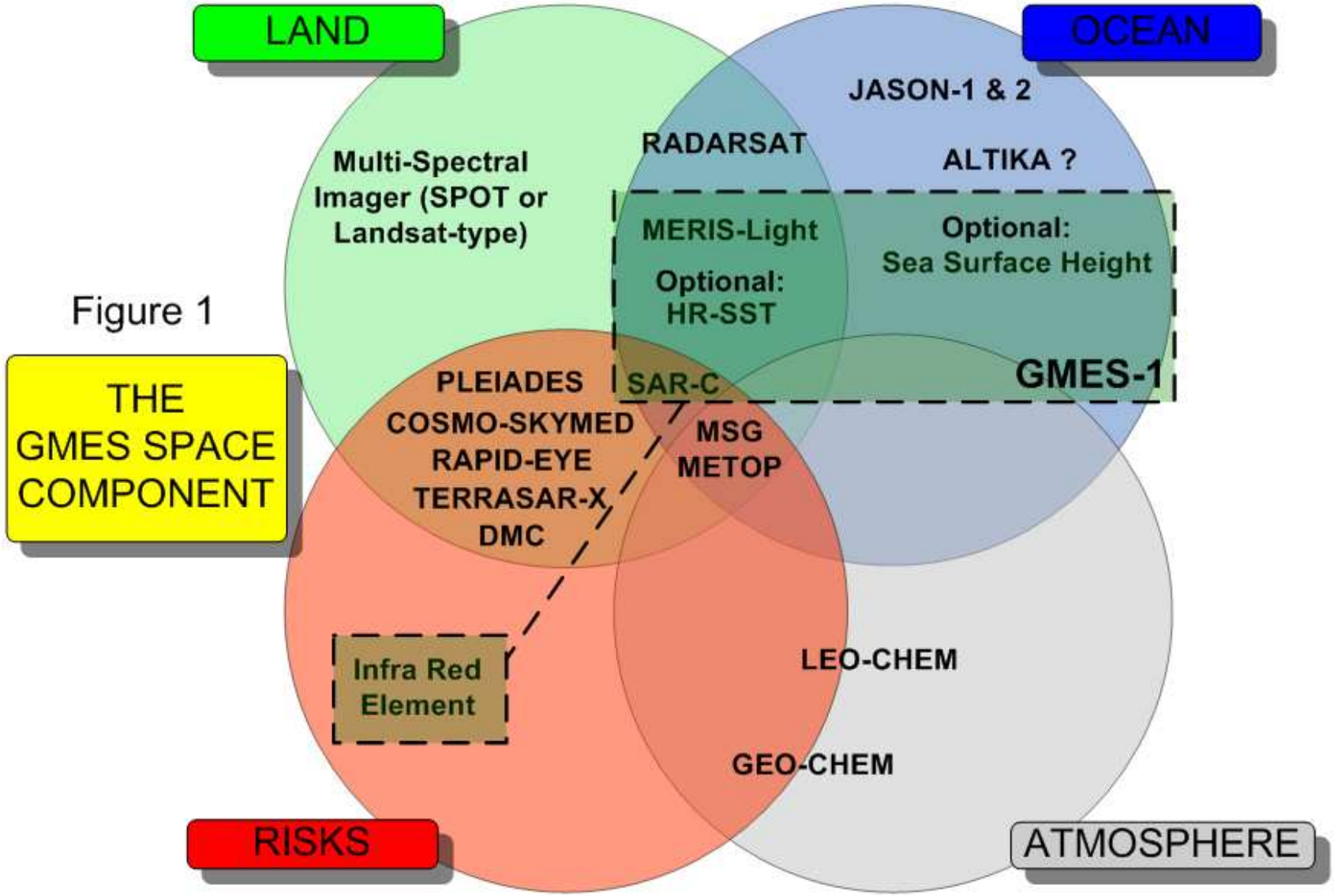


Figure 1

THE GMES SPACE COMPONENT

GMES Financing & Cooperation Model (Space Component)

- **Co-funding by EC and ESA at ratio 2:1**
  - ESA funds development of new Sentinel satellite families up to phase B
  - Phases C/D are shared co-funded
  - Phase E (operation / exploitation) funded by EC
  - Recurrent satellites & operation of space component fully funded by EC

- **ESA is also ready to continue development of key services**

ESA Preparatory Activities for GMES Space Component

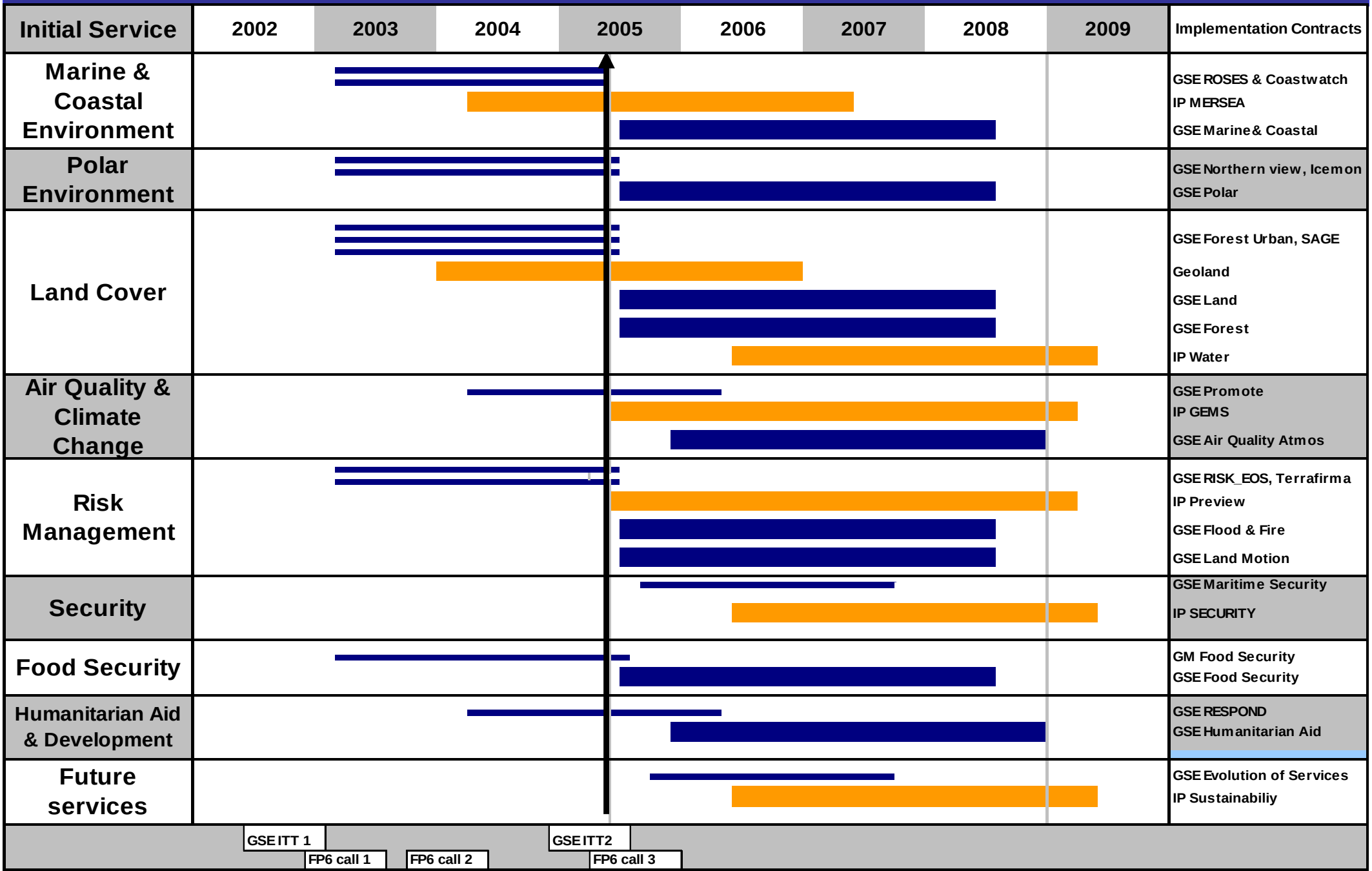
1. **Socio-economic analysis**
2. **Architecture studies**
3. **Ground Segment**
   - *Oxygen Concept (O_2 – "open and operational")*
4. **Space Component**
   - *Sentinels*
   - *Coordination with national missions and Eumetsat*

+ Development of Initial Services: *GSE Programme*

ESA Ministerial Council : Dec 2005

- **Two new ESA Earth Observation Programmes proposed**
  - **Earth Observation Envelope Programme 3: *~1350 MEuro***
    - 2006-2011
    - Earth Explorer Missions
    - Science and Applications Development
    - Instrument Pre-development
    - Continuity of Missions (Ground Segment & Operations,
      e.g ENVISAT, ERS)
  - **GMES Space Component Phase-1: ESA has received more than asked for *~250 MEuro for 2006-7***
    - 2006-2011
    - GMES-1 implemented up to in-orbit validation
    - Sentinels 1, 2, 3 up to phase B
    - Sentinels 4, 5 up to phase A
    - Decision on GMES Phase-2 (2008-2013 with EC in 2007).

Coordinated EC-ESA Implementation of GMES Services 2002 - 2008



GMES Schedule

2001	GMES on Ministerial agenda; ESA GMES Service Element approved by Min. Council
2003	European White Paper on Space
2004	GMES Interim Report
2004/5	ESA, EC, MS Coordination -> GPO, GAC -> *GMES Initial Services* -> *GMES Pilot Services*
2005	Implementation proposal to ESA Ministerial Council, EU Space Council
2006	EC BUDGET Decision
2007	Decision on GMES Space component Phase 2
2008+	“European GMES capacity” developed, operational services start…
2012+	GMES full capacity

GEO