GMES Services Overview

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Talk Outline

- Introduction to GMES
- Overview of the GMES Services Component
- GMES projects related to InSAR
Aims to establish an independent European capacity for Earth Observation to

- serve European policies by supporting their implementation
- help meet international commitments
- stimulate market development (downstream sector)

In order to meet the aims, GMES implementation covers

- Space Component
- *In situ* Component
- Service Component
GMES Components – interconnected and equally important

**Space Component**
Sentinels, Contributing Missions and related Ground Segment

**In-situ Component**
Land, air and water monitoring sensors

**Services Component**
Information services for land, marine, atmosphere, emergency, security and climate change
**GMES dedicated missions: Sentinels**

<table>
<thead>
<tr>
<th>Sentinel</th>
<th>Description</th>
<th>Launch Year(s)</th>
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<td>Sentinel 1 – SAR imaging</td>
<td>All weather, day/night applications, interferometry</td>
<td>2013 / 2015</td>
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<td>Sentinel 2 – Multi-spectral imaging</td>
<td>Land applications: urban, forest, agriculture, .. Continuity of Landsat, SPOT</td>
<td>2013 / 2015</td>
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<tr>
<td>Sentinel 3 – Ocean and global land monitoring</td>
<td>Wide-swath ocean color, vegetation, sea/land surface temperature, altimetry</td>
<td>2013 / 2014</td>
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<td>Sentinel 4 – Geostationary atmospheric</td>
<td>Atmospheric composition monitoring, trans-boundary pollution</td>
<td>2020</td>
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<td>Sentinel 5 – Low-orbit atmospheric</td>
<td>Atmospheric composition monitoring (S5 Precursor launch in 2015)</td>
<td>2020+</td>
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Potential Contributing Missions to GMES – Some examples

Optical MR and LR missions
- PROBA-V
- SPOT (VGT)

Optical VHR and HR missions
- DMC
- Pléiades
- SeoSat
- RapidEye
- SPOT (HRS)

SAR missions
- COSMO-Skymed
- TerraSAR-X
- Tandem-X
- Radarsat

Altimetry missions
- Cryosat
- Jason

Atmospheric missions
- MSG

Developed for other purposes but making important data available for GMES
- SPOT (HRS)

Available today or planned at European, national and international level
- MSG

And many more...
GMES Service Component Overview

- GMES Services broken into 6 themes
  - Land, Marine, Atmosphere (Earth systems)
  - Emergency Response, Civil Security, Climate (cross-cutting)

- GMES Services intended to be funded under the GMES Programme

- EC leads development & implementation of the Service Component
  - Development began with FP6 and ESA GSE projects and continues in FP7
    - Land and Emergency Response begin partial operations in 2011 under GMES Initial Operations (GIO) Regulation
    - Other themes will continue development funding under FP7 until 2014, except Climate which is still under definition

- Development of a self-sustaining downstream services sector expected
  - based on tailoring Sentinel data and/or GMES Service information for niche markets
InSAR-based Services related to GMES

- InSAR applications relevant to the GMES themes of
  - Land, Marine and Climate Services by addressing monitoring of snow, ice, and glaciers
  - Emergency Response theme by addressing geohazards

- Downstream service development currently supported by
  - FP7 project grants
    - DORIS
    - Subcoast
    - PanGeo
    - EVOSS
  - ESA GMES Service Element
    - Terrafirma
Terrafirma: a pan-European terrain motion hazard information service

- **Project aims**
  - Help users to identify and mitigate terrain motion risk through use of qualified InSAR service products with expert interpretation and ground data
  - 2 products: Advanced Terrain Motion Mapping and Modelling
  - 3 application themes: hydrogeology, tectonic, and flood

- **Project information**
  - Lead by Altamira Information
  - Point of contact: Geraint Cooksley
  - 3rd Stage of the ESA GMES Services Element and ends 2012
  - Website: [http://www.terrafirma.eu.com/](http://www.terrafirma.eu.com/)
Project aims
- Detect, map, monitor and forecast ground deformations caused by landslides and land subsidence
- Exploit SAR archives and evaluate new SAR missions to provide long time-series of ground deformations
- Advance on techniques to combine satellite and ground-based DInSAR with GPS measurements and geophysical probing for long-term monitoring of ground deformations

Presentation on Day 3 of this Workshop!

Project information
- Lead by National Research Council (CNR), Italy
  - Point of contact: Fausto Guzzetti
- 36 month project began 10/2010
- Website: [http://www.doris-project.eu/](http://www.doris-project.eu/)
SubCoast: Assessing & monitoring subsidence hazards in European coastal lowlands

- **Project aims**
  - deliver data and information on extent and impact of subsidence in selected coastal lowland areas around Europe, based on:
    - multi-scene co-referenced PSI-processing
    - GNSS-assimilated PSI-processing
    - assimilation of PSI-data in geomechanical models
    - coupling of tide gauge data and Core service data with PSI
  - Derive indicators of environmental and economic impact of subsidence by making use of state-of-the-art scenario and impact models

- **Project information**
  - Lead by TNO
  - Point of contact: Chris Bremmer
  - 36 month project began April 2010
  - Website: [http://www.subcoast.eu/](http://www.subcoast.eu/)
PanGeo: Enabling access to geological information in support of GMES

- **Project aims**
  - Enable free and open access to geohazard information by providing a free, online information service for 52 of the largest European towns, based on:
    - Measurements of terrain motion derived from satellite persistent scatterer InSAR processing algorithms developed in Terrafirma
    - Geological and geohazard information already held by national Geological Surveys
    - Polygonal landcover and landuse data from GMES Land Service’s Urban Atlas
  - Web portal to allow integration of the ground stability layer with the Urban Atlas to highlight landcover polygons influenced, for which hyperlinks to interpretative reports are available

- **Project information**
  - Lead by Fugro NPA Ltd
    - Point of contact: Ren Capes
  - 36 month project began on 2/2011
  - All 27 EU national geological surveys are involved in the project
  - Website: [http://www.pangeoproject.eu/](http://www.pangeoproject.eu/)
EVOSS: European Volcano Observatory Space Services

- **Project aims**
  - Provide information on atmospheric, thermal and ground deformation cues during sustained volcanic unrest and eruption periods
  - Ground deformation services to address need for precision measurements and monitoring of fast and huge topography changes through
    - integrated exploitation of new SAR platforms
    - application of PSInSAR algorithms

- **Project information**
  - Lead by IPGP (Institut de Physique du Globe de Paris)
    - Point of contact: Fabrizio Ferrucci, Steve Tait
  - 36 month project began 3/2010
  - Website: [http://www.evoss.eu/](http://www.evoss.eu/)
Thank you for your attention!