Federation of partners: The example of Iceland geohazard Supersite within Helix Nebula

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Maryline Lengert, ESA

A European cloud computing partnership: big science teams up with big business

HELIX NEBULA THE SCIENCE CLOUD

Strategic Plan

- ▶ Establish multi-tenant, multi-provider cloud infrastructure

- ▶ Identify and adopt policies for trust, security and privacy

- ▶ Create governance structure

- ▶ Define funding schemes

CERN — To support the computing capacity needs for the ATLAS experiment

EMBL — Setting up a new service to simplify analysis of large genomes, for a deeper insight into evolution and biodiversity

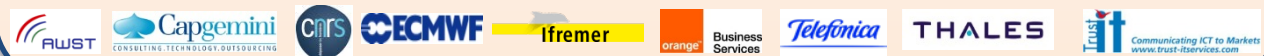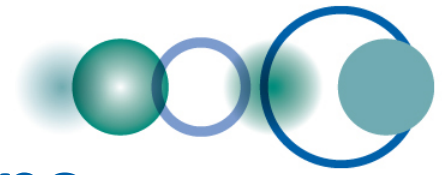**esa** — To create an Earth Observation platform, focusing on earthquake and volcano research

PIC port d'informació científica — To improve the speed and quality of research for finding surrogate biomarkers based on brain images

Suppliers

Atos · CGI · CloudSigma · CSA cloud security alliance · DANTE www.dante.net · EGI · indra · interoute from the ground to the cloud · MEMSET HOSTING

SAP · sixsq · SWITCH · T··Systems · terradue 20 · the SERVER LABS the IT architects · ultimum technologies · Yandex

Adopters

AWST · Capgemini CONSULTING.TECHNOLOGY.OUTSOURCING · cnrs · ECMWF · Ifremer · orange Business Services · Telefónica · THALES · trust it Communicating ICT to Markets www.trust-itservices.com
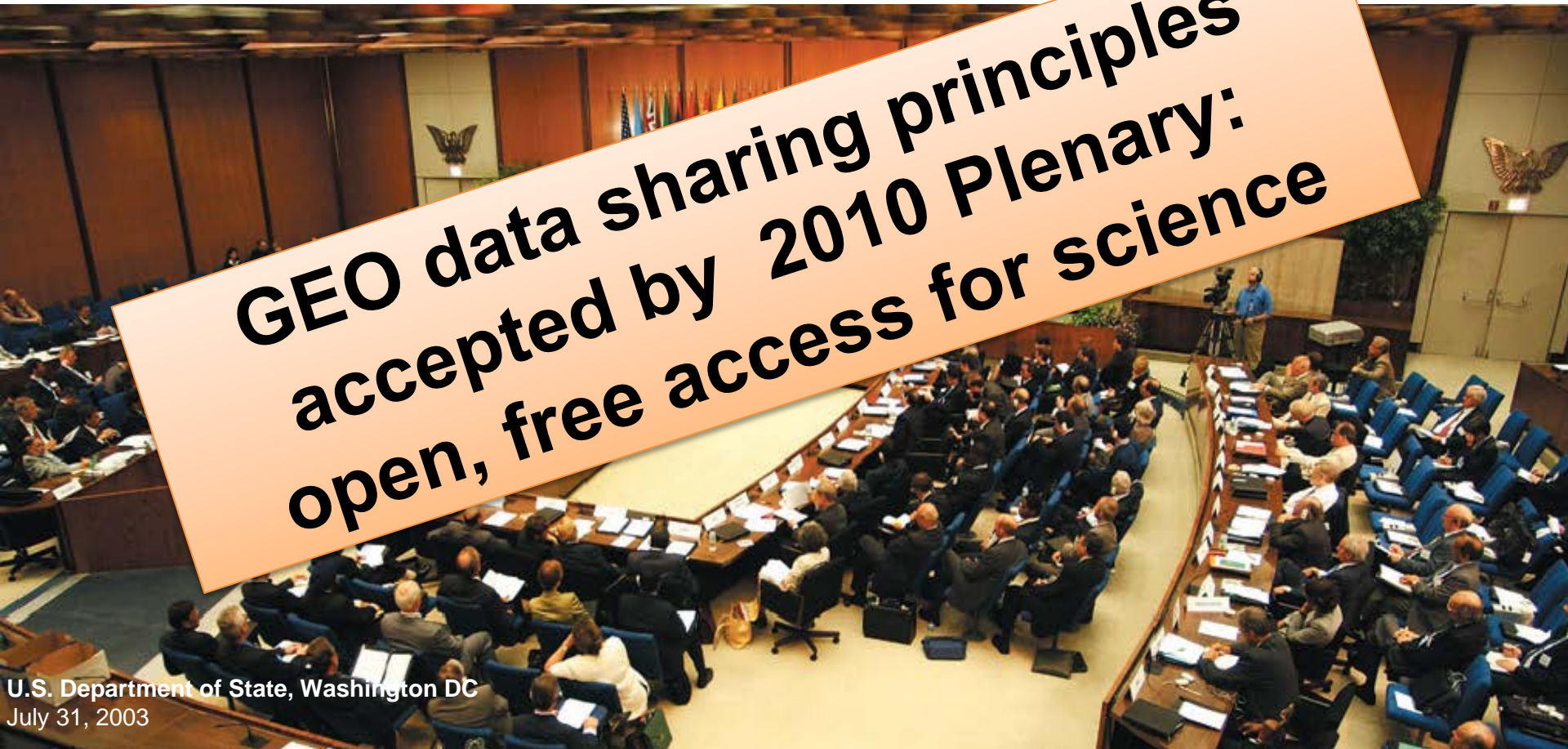
Group on Earth Observations

Intergovernmental Organization with **86 members** and
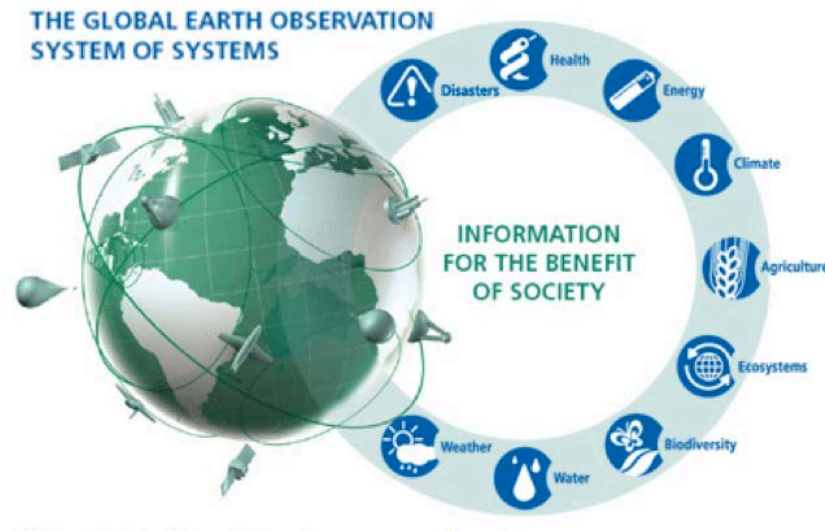
61 participating organizations

Construct by 2015: **G**lobal **E**arth **O**bservation **S**ystem of Syste~~ms~~ (~~GE~~OSS)

GEO data sharing principles accepted by 2010 Plenary: open, free access for science

U.S. Department of State, Washington DC
July 31, 2003

GEOSS - System of Systems

What is GEOSS?: The Global Earth Observation System of Systems

THE GLOBAL EARTH OBSERVATION SYSTEM OF SYSTEMS

Disasters · Health · Energy · Climate · Agriculture · Ecosystems · Biodiversity · Water · Weather

INFORMATION FOR THE BENEFIT OF SOCIETY

The Global Earth Observation System of Systems is simultaneously addressing nine areas of critical importance to people and society. It aims to empower the international community to protect itself against natural and human-induced disasters, understand the environmental sources of health hazards, manage energy resources, respond to climate change and its impacts, safeguard water resources, improve weather forecasts, manage ecosystems, promote sustainable agriculture and conserve biodiversity.

What are the GEO-hazard Supersites?

GEO task in Workplan 2009-2011
DI-09-01: Systematic Monitoring for Geohazards Risk Assessment
c) Supersites and Natural Laboratories

- This GEO initiative aims at a better understanding of the geophysical processes causing geohazards (earthquakes and volcanoes).

- **Global partnership of scientists, satellite and in-situ data providers** (**multi-sensor InSAR**, seismic, GPS, **complete data sets!**)

- Data can support national authorities and policy makers in risk assessment and mitigation strategies.

Data sets

- **Seismic, GPS**
- **SAR**
- **(gas, gravity change)**

volcanoes: time delay for ground-based data as desired by observatory

Japan Natural Laboratory
→complete ESA data set
(>10,000 scenes)
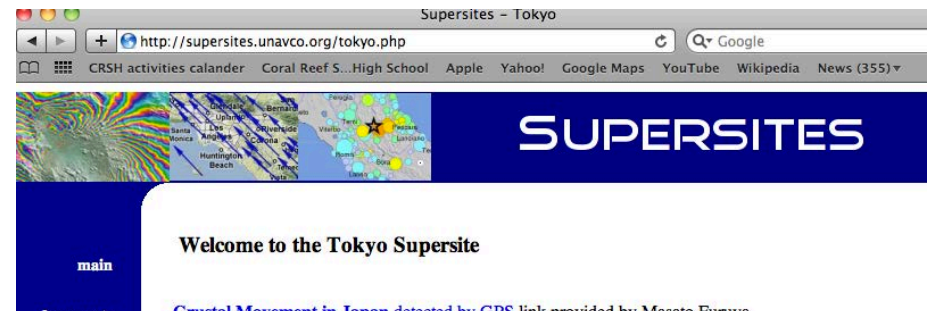
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Long-term goal

"Design Global Volcano Observing System (GVOS) as part of GEOSS".

Components:

- E-infrastructure (Cloud Computing): Virtual connection between

- volcano observatories, space agencies and scientific community
- data analysis on Cloud → latest data products, algorithms available to volcano observatories (e.g. InSAR time-series)

- Space data (CEOS)

- Ground data: regional plans needed for
- *Europe, Africa* *(lead: EPOS, INGV)*
- *Americas* *(lead: Earthscope, USGS?) (dedicated workshop 10/2011 in Chile)*
- *Asia, Australia* *(no lead identified)*

Already designed:
Global Forest Observing System (GFOS)
Global Ocean Observing System (GOOS)
Global Climate Observing System (GCOS)
…

Federation needed

FUTUREVOLC Data Policy

- All FUTUREVOLC partners agree that **successful integration of space-based and in-situ data** is a timely and important step towards their common goal of improving geohazard monitoring and research.

- Users will gain access to the supersite data sharing facilities through a **one time registration** (similar to GEBCO, the General Bathymetric chart of the Oceans). Data will be stored at the supersite with the sole purpose of sharing it among registered users

The objectives of the FUTUREVOLC data policy are:

- To **converge** and **harmonize** observation methods and tools, to promote the use of standards and references, inter-calibration and data assimilation.

- To **enhance interoperability** between participating organizations, including production of technical specifications for collecting, processing, storing, and disseminating shared data, metadata and data products.

- To **facilitate data management, information management, and common services**, to promote the data sharing principles of the GEO Plenary, recognizing relevant international organizations,, national policies and legislation.

Iceland Geo-hazard Supersite

- ESA SSEP is currently federating with Iceland Futurevol. All ERS data covering Iceland will be stored in Iceland using ESA SSO

- Technically federation is being established thanks to GEANT connection
  - tests have achieved performances of some 200 Mb/s up to 1 Gb/s
  - ESA SSO is currently being installed

FIM on Iceland Geo-hazard Supersite

- The partners:
  - HN Suppliers (currently CloudSigma): login on HNX
  - GEANT, SWITCH (Swiss NREN), NORDUNet
  - UK National flagship Catapults/CEMS and Janet
  - Other NRENs will be involved with HN Suppliers
- ESA SSO is used (Shibboleth) for ESA space data access, GEANT provides carrier functionalities
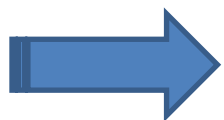
To get a global federation, we need to be compatible and trusted by many others.
Each partner will likely have its own SSO.

Next steps

- ESA SSEP will be extended to US (NSF & NASA partners), Japan, Australia and Africa

- A functioning FIM is essential for Helix Nebula being an InfoaaS marketplace

- A participant to HN can/will have several sources of resources coming from different parties

- Need for a FIM that allows easy "shopping" across domain using multiple resources

Thanks !