The GEO Science and Technology Roadmap

Introduction

This roadmap identifies and motivates the path that the Science and Technology Committee (STC) of the Group on Earth Observation (GEO) has decided to pursue to achieve its objectives.

It primarily addresses the Committees of GEO, its Task Teams, working groups and Communities of Practise. It also addresses the Science and Technology (S&T) communities within the scope of the Societal Benefit Areas of the Global Earth Observation System of Systems (GEOSS) and the S&T communities needed to build, deploy, access and sustain the GEOSS.

The STC invites GEO Members and Participating Organizations to take note of its approach. Many activities will benefit from – or even depend on – active participation of the GEO Committees and other communities. For the community at large this document may be useful as a concise explanation of the direction the STC is taking to fulfil its mandate.

Where we want to go

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, based upon sound scientific and technical advice. Through GEOSS, GEO aims at enabling societal benefits of Earth observations, including advances in scientific understanding in the nine Societal Benefit Areas (SBA). For the domain of science and technology GEO aims to Ensure full interaction and engagement of relevant science and technology communities such that GEOSS advances through integration of innovations in Earth observation science and technology, enabling the research community to fully benefit from GEOSS accomplishments.

What we need in order to get there

To realize this vision GEO must integrate advances in science and technology through appropriate consultation with the research and observation communities. It must support research efforts that are necessary for the development of tools required. It must promote research and development in key areas of Earth sciences to facilitate improvements to Earth observation systems. And it must encourage and facilitate the transition of systems and techniques from research to operations.

Individual scientists and their institutions, both public and private, from relevant fields must be convinced to invest their time and efforts to advise on the content of the GEO Work Plan and work on its implementation. The S&T communities must be involved at all stages of the system design, data analysis, validation and documentation to meet scientific and technological standards in GEOSS components, data, and services. Engaging these S&T communities is the goal of the STC.

Where we are

The STC has been set up to ensure that GEO has access to scientific and technological advice. Its objectives support the 2015 strategic target of ensuring "full interaction and engagement of relevant science and technology communities into GEOSS implementation so that state of the art technology and latest Earth observation science knowledge is continuously applied in its development and operation; strongly support scientific research and technological development"[1]. These high-level objectives of the STC are:

1. Enable GEO to make decisions on best available and sound scientific and technological advice, through the solicitation of input from a broad, trans-disciplinary scientific and technological community

2. Ensure scientific and technological integrity and soundness of GEO Work Plans.

From its inception, GEO has benefited from ideas and advice of scientists and engineers. These S&T communities have arguably been the most active in developing the common vision for GEOSS and in contributing to its initial development.

Not all GEO Member countries have arranged for effective ways to integrate their national Earth observation and related scientific activities with GEO. Furthermore, many contributions from scientists are to a large extent made at best-effort within the scope of their funded research projects. Without dedicated resources, including funding, available for activities directed specifically towards GEO or GEOSS, it is difficult for scientists to respond to GEOSS needs. Additional incentives and fresh approaches are therefore needed to strengthen and expand their engagement at the level required for GEOSS.

[1] Strategic Targets: GEOSS Implementation by 2015 [To be adjusted according to final Target wording following the Reconciliation Meeting March 30th-April 1st]

The way forward

This roadmap presents a set of activities grouped under two headings, which can be mapped to the objectives.

1. Actively engaging and incorporating science and technology participants in the development of GEOSS

a) **Revolving scientific review of each Work Plan**, starting with the current work plan for 2009-2011 on grounds of scientific and technological soundness and completeness against the outstanding questions and challenges in each of the SBAs

b) **Implement review indicators in the GEO Work Plan reporting** to ensure that activities in individual GEO Tasks and Sub-Tasks meet the applicable scientific and technological standards

c) **Assess the requirement for continuity and long-term monitoring** by Earth observation systems of essential data from GEOSS components

d) **Ensuring state-of-the-art technology in the GEOSS Common Infrastructure (GCI) and Observation Infrastructures.**

e) **Responding to S&T needs and priorities** in Earth observation for GEOSS.

2. Creating incentives and promoting GEO in the S&T communities

a) **Getting GEO/GEOSS better acknowledged** in the scientific community.

b) **Establishing a "GEO label"** to recognise the scientific relevance, quality, acceptance and societal needs for activities in support of GEOSS.

c) **Building awareness of GEO and GEOSS** in the different S&T communities, within the scope of the GEOSS development.

d) **Showing GEOSS at work** with a set of compelling examples showing how GEOSS serves the S&T communities in their work.

e) **Enhancing registration of scientific data sets** as an important indicator for potential contributors from the science communities in assessing the relevance of GEOSS for their work.

f) **Identify key commercial partners**, which could contribute to GEOSS and also benefit from improved observational means, products and services and might therefore support certain S&T development.

g) **Catalyze research and developing funding** to help engaging the S&T communities in the implementation of the GEOSS.