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CBS EXPERT MEETING ON GEOSS MATTERS

ITEM 3

GENEVA, SWITZERLAND, 7-9 NOVEMBER 2005

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GEO Work Plan for 2006, Version 1

(Submitted by the Secretariat)

Summary and Purpose of Document

The document presents the task that GEOSS plans to address in 2006. Note that the numbering of the tasks is not always the same as in Version 0.

ACTION PROPOSED

Review all the tasks listed in this document and identify those of relevance for CBS.

Prepare the CBS input to the WMO reaction to this work plan. This input has to be delivered by 9 November to the WMO GEO focal point.



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**GEO 2006 WORK PLAN
VERSION 1
COVER MEMORANDUM**

21 October 2005

Dear GEO colleagues,

Attached please find the 2006 Work Plan, Version 1, for official review. This version contains significant revisions based on comments on Version 0 received from technical experts and the GEO Executive Committee. These comments focused principally on the need for more detail on how tasks for 2006 would be implemented. We have attempted to address that concern in this draft, as well as to provide a number of other important clarifications. On the whole, the first round of comments were extremely helpful for strengthening the document, and I wish to thank all of you who made the contribution to that effort.

The attached draft is for official comment by GEO Members and Participating Organizations. This round of review represents the principal review step before the document is revised for final acceptance at GEO-II on 14-15 December.

Regarding the task sheets found in Annex A (*to be distributed on 24 October*), reviewers should bear in mind that these are primarily intended to begin coordination among the parties involved in each task, as well as for internal management purposes. They are working documents, and as such will require further discussion with relevant actors and substantial revision before implementation begins. Should your government or organization have official comment on any aspect of these sheets, we ask that your comments be as specific as possible.

Given the anticipated time required to incorporate the final round of comments on the text itself, I would like to propose the following revised review schedule to GEO-II:

- **21 October (Friday)** - Version 1 is released for official review, with **comments due 11 November** (3-week comment period)
- **25 November (Friday)** - Version 2 is released for final review and approval at GEO-II on 14-15 December (2 weeks for final review).

We look forward to receiving your comments and to finalizing this work plan in the coming months, so that we may together begin the exciting work of GEOSS implementation.

Yours sincerely,
José Achache
Director



GEO
GROUP ON EARTH OBSERVATIONS

WORK PLAN FOR 2006

VERSION-1 FOR OFFICIAL REVIEW

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Introduction

The mission of GEO, is to build the Global Earth Observation System of Systems (GEOSS) in order to:

“... realize a future wherein decisions and actions for the benefit of human kind are informed via coordinated, comprehensive, and sustained Earth observations . . . The purpose of GEOSS is . . . to improve monitoring of the state of the Earth, increase understanding of Earth processes, and enhance prediction of the behaviour of the Earth system.” (*GEOSS 10-Year Implementation Plan*)

This vision, articulated in the GEOSS 10-Year Implementation Plan, represents the consolidation of a broad scientific and political consensus: the assessment of the state of the Earth requires continuous and coordinated observation of our planet at all scales. The perspective of considering the Earth as an integrated system facing major common challenges represents a significant breakthrough, an intentional departure from earlier approaches looking at individual components of the Earth’s system. This new approach has gathered the political support of the world’s leaders, and has led to the creation of the Group on Earth Observations.

The GEO mandate has been reinforced by the G-8 Gleneagles Plan of Action in July 2005, which welcomed the adoption of the GEOSS 10-Year Plan, and made commitment to “move forward in the national implementation of GEOSS in our member states.”

The September 2005 World Summit in New York further recognized efforts such as GEOSS, in that “science and technology . . . are vital for the achievement of the development goals . . . to address the special needs of developing countries in the areas of health, agriculture, conservation, sustainable use of natural resources and environmental management, energy, forestry, and the impact of climate change.”

GEOSS will be designed to enhance delivery of benefits to society in nine areas:

- **Disasters**
Reducing loss of life and property from natural and human-induced disasters
- **Health**
Understanding environmental factors affecting human health and well-being
- **Energy**
Improving management of energy resources
- **Climate**
Understanding, assessing, predicting, mitigating, and adapting to climate variability and change
- **Water**
Improving water-resource management through better understanding of the water cycle
- **Weather**
Improving weather information, forecasting, and warning
- **Ecosystems**
Improving the management and protection of terrestrial, coastal, and marine ecosystems
- **Agriculture**
Supporting sustainable agriculture and combating desertification
- **Biodiversity**
Understanding, monitoring, and conserving biodiversity

The GEOSS 10-Year Implementation Plan calls for a series of annual work plans to implement the GEOSS. This document, the GEO 2006 Work Plan, sets forth a series of activities and tasks for the first year of GEOSS implementation.

Part I: Objectives of GEO

GEO provides the forum to mobilize all actions that will contribute to the realization of the GEOSS. These actions can be articulated around three overarching objectives:

- To build a sustainable, comprehensive and coordinated observation system of systems;
- To provide open and easy access to data anytime and anywhere; and
- To increase the use of Earth observations

GEO will provide the impetus for this mobilization as follows:

1. To build a sustainable, comprehensive and coordinated observation system of systems

GEOSS, as a “system of systems”, will provide the overall framework for the progressive harmonisation and integration of all Earth observation efforts from GEO Members and Participating Organizations, including *in situ*, airborne and space-based observations. While GEOSS will not substitute for the mandates and governance arrangements of organizations responsible for existing individual observing systems, its coordination efforts will ensure that all systems work in full synergy and that gaps are filled. Its advocacy efforts will result in new or continued observations where necessary. In this way, GEOSS will improve the overall supply and quality of Earth observations.

2. To provide open and easy access to data anytime and anywhere

The societal benefits of Earth observations cannot be achieved without data sharing. GEOSS will ensure that the quality data required by users reaches them in a timely fashion and in an appropriate format. There will be full and open exchange of data, metadata, and products shared within GEOSS, recognizing relevant international instruments and national policies and legislation. To accomplish this technically, GEOSS will link databases and communication networks efficiently through interoperability arrangements based on open, international standards.

3. To increase the use of Earth observations

The end goal of creating the system of systems, and improving access to the data it provides, is to increase the use of such data and to generate information and services for the benefit of society. Building GEOSS will require the development of scientific research and will stimulate the development of operational products, services and tools. It will, in particular, facilitate the transition from research to operations of observing systems and techniques and enable partnerships between research and operational communities. Promotion and outreach activities for emerging communities will contribute to further increase the use of Earth observations. Most critically, achieving the vision of GEOSS will require GEO to facilitate substantial capacity-building efforts in human resources, institutions and observational infrastructures, particularly in developing countries.

Achieving these objectives will require mobilizing the scientific, technological, and human expertise of all nations. Achieving these objectives will deliver a truly successful GEOSS, resulting in the availability of timely, high-quality information as a sound basis for decision-makers at all levels.

Part II: Activities Overview

In 2006, GEO will begin implementation of the GEOSS 10-Year Implementation Plan as endorsed by the Third Earth Observation Summit. GEO programme activities will cover all five transverse elements and nine societal benefit areas identified in the 10-Year Plan. These fourteen programme areas are guided by principles presented in the 10-Year Plan and summarized below. The detailed work plan of supporting tasks for each programme area is presented in Part III.

The programme tasks identified in Part III will be carried out collectively and cooperatively by GEO, including the Secretariat, individual GEO Members and Participating Organizations, and GEO Committees. While some tasks will be implemented by the Secretariat, others will require the engagement of GEO Members and GEO Participating Organizations. To clarify task responsibilities and to allocate appropriate levels of resource, a task classification scheme is provided in Part III and reflected in the budget description in Part IV.

To reinforce the GEO process, the Secretariat will also engage in a series of institution building activities to strengthen the GEO organization and consolidate its role in the Earth observation community.

2.1. Programme Activities

2.1.1. Design an interoperable GEOSS architecture

GEOSS components must work together at the global system level to add value to existing systems and to accommodate new systems. Accomplishing this requires the design of a flexible GEOSS architecture. This architecture will depend chiefly on data and information providers accepting and implementing a set of interoperability arrangements, including technical specifications for collecting, processing, storing, and disseminating shared data, metadata and products. To ensure GEOSS is highly scalable, the same architectural principles that make GEOSS a "system of systems" can be applied independently to any element within GEOSS.

2.1.2. Improve data sharing and management

Data, the basic output of Earth observation systems, is the essential input for generating products and decision-support tools to inform policymakers. Access to these data is the centrepiece of GEOSS. GEO will pursue activities that progressively ease both technical and legal barriers to data sharing. Technically, systems participating in GEOSS will be required to make data timely and easily available in useful formats. Typically, this involves a multi-step process of data storage, transformation, and exchange, which includes (a) processing and archiving, (b) transfer and dissemination, and (c) assimilation and modelling. Moreover, these data must be presented and made available through the development of user-friendly information tools and products. The rapid development of advanced information technology and communication networks is at the core of this process.

Exchange of data within GEOSS will be based on the following data sharing principles:

- There will be full and open exchange of data, metadata, and products shared within GEOSS, while recognizing relevant international instruments and national policies and legislation.
- All shared data, metadata, and products will be made available with minimum time delay and at minimum cost.
- All shared data, metadata, and products for use in education and research will be encouraged to be made available free of charge or at no more than the cost of reproduction.

2.1.3 Engage user communities

The ultimate objective of GEO is to enhance the use of Earth observations by a broad range of user communities – from both developed and developing countries. These user communities include policymakers, scientists, industry, international, intergovernmental, and non-governmental organizations. To ensure the link between GEOSS implementation and socio-economic policy maker needs, GEO will define and establish relationships with major international economic development and cooperation programmes and organizations. Engagement of these communities to identify their needs for new or improved services is essential to enhancing the adequacy of provided data and products for a wide diversity of applications. In particular, it is essential to engage the research community by promoting the involvement of universities and laboratories in GEOSS activities. Mechanisms will be put in place to facilitate the formation of strong consortia in order to benefit from funding of major national and international research programmes of relevance to GEO. Scientific research is also essential to ensure the transition from research to operational systems and generate new applications in existing and emerging fields.

2.1.4 Create a GEO Fellowship Programme

GEO should take advantage of emerging scientific and technical talent, and at the same time, rely on the young generation to expand involvement of the scientific, operational, and professional communities into GEO activities. To this end GEO will develop a fellowship programme to select high-quality graduate and post-graduate students and young professionals to assist the Secretariat in the implementation of Work Plan activities, for a typical fellowship appointment of 6 months in Geneva.

2.1.5 Build capacity where needed

Capacity building is an integral part of the GEO implementation strategy. Capacity-building activities will build on existing local, national, regional and global initiatives. It will address all issues related to data collection, archiving, distribution, analyses and interpretation. GEO will particularly concentrate its efforts on the development of observation and modelling infrastructures. In addition, attention will be given to expanding training and education in developing countries and economies in transition for specific applications in key emerging areas of societal benefit.

2.1.6 Develop outreach and communication

The goal of the GEO outreach effort will be to position GEOSS internationally and within member and potential member countries as a critical asset capable of delivering socio-economic benefits to people and economies around the globe. The general objective is to reach the target audiences identified in the GEOSS 10-Year Implementation Plan. Outreach to scientific, technical, and user communities will ensure that the full benefits of GEOSS are realized. Communication with the general public and policymakers will maintain the strong political support necessary for the effective build up of GEOSS.

2.1.7 Implement activities specific to each societal benefit area

The 10-Year Implementation Plan sets out nine societal benefit areas. Some of these societal benefit areas are themselves complex clusters of issues, with many and varied stakeholders. In each area there are specific observational needs for many variables, with requirements for their accuracy, spatial and temporal resolution and speed of delivery to the user. There was also a recognition very early in the GEO process that there is considerable commonality of observation needs among societal benefit areas, and that clear benefits could be derived from a coordinated global observation system. Nevertheless, it should be recognized that the societal benefit areas are at widely varying levels of maturity with respect to establishing user needs, defining the observation requirements, and implementing coordinated systems. In each of the societal benefit areas, GEO will work with the appropriate GEO

Participating Organizations, and when necessary, organizations not currently participating in GEO, to ensure successful execution of the tasks identified.

2.2 Organizational Activities

2.2.1 Define relationships with existing coordinating mechanisms, programmes and associations

Today, a diverse array of organizations and bodies are engaged in overlapping Earth observation coordination efforts for a variety of specific observational domains, for specific Earth observation platforms, or for particular user requirements. GEO will engage in dialogue with these bodies (e.g. Committee on Earth Observation Satellites (CEOS); Integrated Global Observing Strategy Partnership (IGOS-P); the Global Climate Observing System (GCOS)), as well as relevant UN specialized agencies and the sponsors of major observing strategies, to better define how these bodies can contribute to building and operating GEOSS and to determine how best to streamline and harmonize their efforts in the context of GEO.

2.2.2 Harmonize Earth observation planning

To ensure the successful implementation of GEOSS, GEO will develop a coordination mechanism to reinforce synergies among national and/or regional Earth observation planning efforts, and enhance alignment of these efforts with the GEOSS 10-Year Implementation Plan, to improve data continuity and fill gaps as necessary. To facilitate this, an ongoing dialogue will be developed with relevant national and regional agencies responsible for *in situ*, airborne, and space-based Earth observation, relying on existing fora where appropriate.

2.2.3 Mobilize resources

Given the large number of tasks to be coordinated by GEO Secretariat, it is essential to mobilize the adequate level of resources. To do so GEO will: (a) encourage GEO Members and Participating Organizations to contribute to the GEO Trust Fund, (b) establish high-level relationships with key international funding agencies, including the World Bank, and regional development banks (Europe, Asia, Africa, Americas), (c) increase consultation with major G-8 funding entities to finance GEOSS priority activities, and (d) explore the creation of donor mechanisms for funding activities in targeted areas.

2.2.4 Expand participation in GEO

GEO will seek to increase the number of GEO Members and will endeavor to establish high-level relationships with key international user organizations currently not participating in GEO but relevant to GEO societal benefit areas. For the latter, the goal is to identify relevant organizations and programmes and to encourage them to join GEO as Participating Organizations. GEO will also aim to attain observer status in high-level governing bodies (or equivalent) of these organizations in order to define key areas of cooperative activity.

2.2.5 Explore the relationship with industry

Industry can play a major role in the implementation of GEOSS, particularly in the domain of information technology and value-added products. Industry engagement in GEO activities will ensure that GEOSS is sustainable on a broad base of private sector as well as public sector support, and will also help to ensure that GEOSS stays current with mainstream and emerging information services and technologies.

Part III: Programme Tasks for 2006

Each area of programme activity outlined in Part II requires a series of supporting tasks. Section 3.1 provides supporting tasks in transverse issues common to all nine societal benefit areas, followed by specific advancements proposed for each societal benefit area in Section 3.2.

For all GEO Members and Participating Organizations to be able to allocate human and financial resources in the preparation of their 2006 budgets, this work plan provides an indication of where responsibility for task implementation will lie, and whether specific resources will be required to implement the task. One of the following classifications is given to each task for this purpose:

- [SEC] - Task will be implemented by the GEO Secretariat within its 2006 operations budget;
- [ORG] - Task will require one or more GEO Participating Organizations or GEO Member agencies to implement the task with its own resources, coordinated with GEO committees and Secretariat as necessary, with no additional funds required beyond those allotted in the Secretariat operations budget;
- [RES] - Task will require one or more GEO Members or Participating Organizations to provide the necessary resources, beyond the Secretariat operations budget. Funding and implementation of these tasks may be administered by an individual Member, Organization, or the Secretariat, if so directed.

Currently the GEO 2006 Work Plan comprises 50 SEC tasks, 22 ORG tasks, and 20 RES tasks, for a total of 92 tasks (including the GEONetCast initiative, see below). Estimated costs associated with these tasks are shown in the budget in Part IV.

The tasks in Section 3.1 and 3.2 are designed to address specific targets identified in the GEOSS 10-Year Implementation Plan Reference Document (GEO 1000R). Although the 107 two-year targets are emphasized, many of these two-year targets were designed as first steps in support of the subsequent six-year and ten-year targets also described in the Reference Document. Therefore, while some tasks will be initiated and completed within the first two-years, others may span the full 10 years of GEOSS implementation.

3.1 Transverse Activities

The identification of activities for each transverse area is driven by significant synergies among user requirements. Addressing these common requirements is central to the efficient implementation of GEOSS, and they directly support the programme activities outlined in Part II.

3.1.1 Special Initiative: GEONetcast

GEO will design and launch “GEONetcast”, a major initiative to develop a worldwide, operational, end-to-end Earth observation data collection and dissemination system, using existing commercial telecommunications infrastructure. GEONetcast will build on the success of such projects as Puma and Eumetcast, as well as other similar national and regional projects, and take advantage of emerging concepts such as the WMO’s Integrated Global Data Dissemination System (IGDDS). GEONetcast will collect and disseminate space-based and *in-situ* derived data, metadata, and products for all GEO societal benefit areas. As a first step towards the development of GEONetcast, GEO will assess current data transfer & dissemination systems in all societal benefit areas. [RES]

3.1.2 Architecture

Transverse architecture activities for 2006 will be coordinated with the GEO Architecture and Data Committee, and will focus on the following:

- Based upon user requirements and building on existing systems and initiatives
 - defining the components of the GEOSS architecture
 - converging or harmonizing observation methods
 - promoting the use of standards and references, intercalibration, and data assimilation
- Defining and updating interoperability arrangements to which GEO Members and Participating Organizations agree to adhere, including technical specifications for collecting, processing, storing, and disseminating shared data, metadata and products
- Facilitating architecture and data standards, using existing standards wherever possible, and identifying gaps in existing standards
- Strengthening and creating a framework for *in-situ* observations
- Expanding capacity for, and identifying challenges to, continuity of observation of key variables commonly required across user communities
- Advocating protection of radio frequencies

Architecture Tasks for 2006

Architecture Design

AR-06-01: Advocate formal commitments by GEO Members and Participating Organizations of contributed systems and other components, including agreement to adhere to GEOSS interoperability specifications as defined to date. [SEC]

AR-06-02: Agree how the GEOSS architecture links the components of GEOSS, allowing for growth potential (see Diagram). [SEC, ORG]

(Addresses Target 087)

Interoperability

AR-06-03: Establish and maintain a process for reaching interoperability arrangements, informed by ongoing dialogue with major international programmes and consortia. That process is to be sensitive to technology and accessibility disparities among GEO Members and Participating Organizations, and must include mechanisms for upgrading arrangements. [SEC]

AR-06-04: Produce practical strategic and tactical guidance on how to converge disparate systems to a higher degree of collaboration and interoperability using GEOSS principles. [ORG]

AR-06-05: Initiate development of a publicly accessible, network-distributed Clearinghouse, subject to GEOSS interoperability specifications, and including an inventory of existing data, metadata, and pre-defined common products (GEO Clearinghouse). [SEC]

AR-06-06: Facilitate interoperability among Digital Elevation Model (DEM) data sets with the goal of producing a global, coordinated and integrated DEM. [ORG]

(Addresses Targets 084, 085, 088, 089 & 236)

In-situ Networks

AR-06-07: Produce an inventory, by societal benefit area, of existing *in-situ* observation networks (including airborne). [SEC]

AR-06-08: Initiate the creation of a global *in-situ* coordination mechanism within GEO and advocate synergy and sharing of infrastructure among observing systems, starting with the Water societal benefit area. [SEC]

AR-06-09: Advocate additional resources for the maintenance and expansion of *in-situ* observing systems in cooperation with major national and international organizations and programmes, starting with the Water societal benefit area. [SEC]

(Addresses Targets 040, 041, 048, 091, 214 & 215)

Continuity of Observations

AR-06-10: Establish a GEO gap analysis process for all nine societal benefit areas to examine priorities [SEC]

Based on a preliminary examination, the following critical areas were identified for in-situ observations: global carbon cycle, hydrology, seismology, atmospheric chemistry and meteorology (in developing countries).

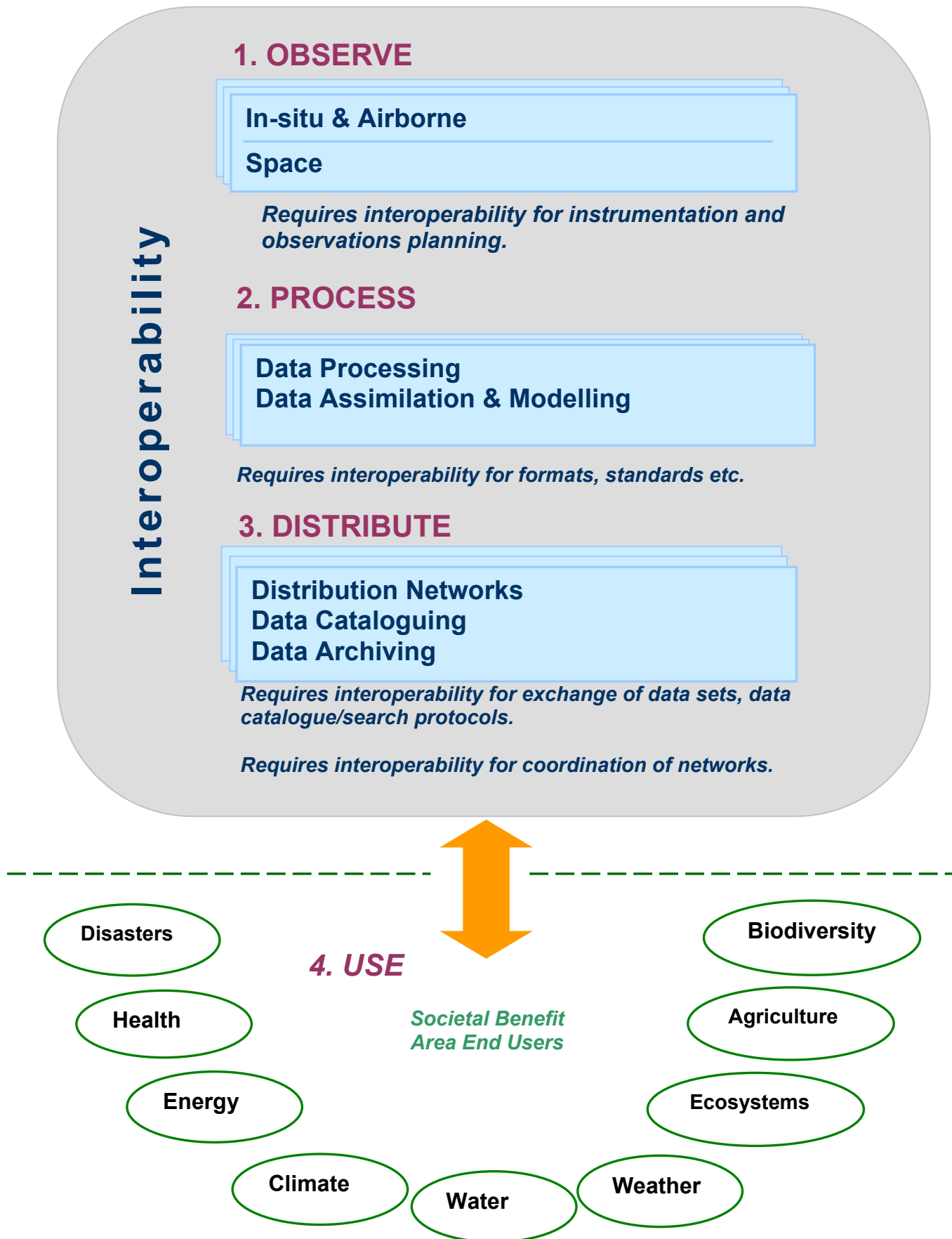
Similarly, the following areas were identified for space-based observations: SAR interferometry, ocean colour measurement, moderate-to high-resolution land use/land cover measurement & precipitation measurement, soil moisture measurement and global carbon observation.

AR-06-11: Advocate the need to establish continuity for near real-time, 30-m (or better) resolution, multi-spectral remote-sensing coverage everywhere on the Earth's surface to all participants, including support for the launch of a Landsat-equivalent follow-on mission. [RES]

AR-06-12: Prepare a series of appropriate advocacy activities, including representations to the International Telecommunication Union. For example, evaluation of challenges presented by the industrial development of automobile anti-collision radar and the implications for the use of radio frequencies essential for tropospheric sounding. [ORG]

(Addresses Targets 003, 004, 006, 007, 035, 036, 044, 061, 064, 067, 073, 093, 098, 135, 136, 191, 192 & 207)

GEOSS Architecture



3.1.3 Data Management

Transverse data-related activities for 2006 will be coordinated with the GEO Architecture and Data Committee, and will focus on the following:

- Initiating steps for promoting the agreed GEO data sharing principles
- Improving systems for Earth observation data transfer and dissemination
- Advocating recovery and archiving of critical historical *in-situ* and space-based observations
- Supporting the development and use of emerging assimilation and modelling techniques for new applications
- Identifying and improving the access to common data across GEOSS societal benefit areas
- Developing common data access tools, portals and best practices for users across societal benefit areas

Data Management Tasks for 2006

Data Sharing & Archiving

DA-06-01: Establish a Task Force on data sharing to identify steps required to further the practical application of the agreed GEOSS data sharing principles. [SEC]

DA-06-02: Conduct an inventory of archived data for each societal benefit area (especially ecosystems), identify data gaps, identify data at risk, and evaluate costs of data rescue. In complement, conduct a workshop to define a data archiving strategy taking into account data types, processing levels and supporting media. [RES]

(Addresses Targets 016, 042, 052, 065, 080, 094, 095, 097, 105, 119, 121, 136, 177, 180, 184, 201, 238, 239 & 240)

Assimilation & Modelling

DA-06-03: Support and advocate funding for demonstration projects promoting the wider use, in other disciplines, of the ensemble prediction methodology developed for weather forecasting and encourage the development of decision support tools in the areas of disaster mitigation, human health improvement, energy management, and crop forecasting. [SEC]

(Addresses Targets 007, 026 & 49)

Basic Geographic Data

DA-06-04: Facilitate, with relevant countries and international organizations, the development and availability of data, metadata, and products commonly required across diverse societal benefit areas, including base maps and common socio-economic data. [ORG]

DA-06-05: Develop a framework document for basic geographic data (including format, precision, accuracy, etc.), paying attention to initiatives such as Global Mapping by ISCGM and the Framework Data defined in the U.S. NSDI. [ORG]

DA-06-06: Advocate use of existing Spatial Data Infrastructure components as institutional and technical precedents including standard protocols and interoperable system interfaces, among other components. [ORG]

(Addresses Targets 009, 019, 061, 069, 076, 086, 090, 097, 114, 169 & 228)

Data Portals and Tools

DA-06-07: Define a model web portal system for access to all Earth observation data designed to increase use, quality, and accessibility of existing information, tools, and networks. Particular attention will be given to the coordination of networks in specific societal benefit areas to enable reuse thereby to achieve synergy and leverage. [SEC]

DA-06-08: Improve technical capability to (i) create common geo-referenced maps, (ii) merge socio-economic data using geographic information systems (GIS), and (iii) combine geo-referenced maps with application tools to yield basic information systems. [ORG]

DA-06-09: Establish GEOSS Best Practices Registry by a request for proposals from GEO organizations willing to maintain/update GEOSS Best Practices Registry. The registry should also include existing cost-benefit sharing mechanisms and examples (data sharing, cooperative data acquisition, joint development, joint flight, collaborative sciences, etc). [SEC]

(Addresses Targets 083, 092, 105, 114, 184, 187, 236 & 238)

3.1.4 User Engagement

Transverse user-related activities for 2006 will be coordinated with the GEO Committee on User Interface, and will focus on one main objective: Federating potential users and stakeholders into communities of practice (a mechanism defined by the GEO Committee on User Interface) within the various societal benefit areas, to assist them in the identification and communication of their requirements.

User Engagement Tasks for 2006

(note that the primary user interface tasks will take place within each societal benefit area)

US-06-01: Initiate pilot communities of practice to identify and further refine users' needs, in particular on cross-cutting areas, building upon the initial experience of community of practice and on information provided by national, regional and project-level surveys. [ORG]

US-06-02: Promote interactions, in the form of fora, between data providers, scientists, industry, international governmental and non-governmental organizations, decision- and policy- makers to identify requirements for new or improved data, products and services. [ORG]

(Addresses Targets 013, 022, 032, 037, 068, 093, 096, 153 & 211)

3.1.5 Capacity Building

Transverse capacity-building activities for 2006 will be coordinated with the GEO Committee on Capacity Building and Outreach and will focus on:

- Assessing existing and planned capacity-building activities in Earth observations globally, to provide frame for future GEOSS capacity building initiatives
- Initiating and supporting relevant training initiatives
- Initiating specific activities for a number of societal benefit areas, including Disasters, Health, Water, Weather, Ecosystems and Agriculture

Capacity Building Tasks for 2006

General Activities

CB-06-01: Perform a survey of capacity-building initiatives in GEO member countries and Participating Organizations to identify existing and planned capacity-building activities and gaps. [SEC]

CB-06-02: Identify infrastructure needs critical to the implementation of GEOSS in developing countries. [SEC]

CB-06-03: Support the expansion of education and training initiatives for Earth observation utilization in developing countries in cooperation with specialized UN and other organizations. [SEC]

CB-06-04: Design multi-media training modules to communicate the levels of risk to the public to enable them to make informed decisions associated with societal benefit areas including food and water security, health, disasters, weather and climate. [RES]

(Addresses Targets 010, 099, 100, 101, 102, 103, 104, 105, 106, 117, 185, 186, 187, 188 & 240)

Activities by Societal Benefit Area

CB-06-05: Disasters Initiate a knowledge-transfer programme to developing countries, to ensure minimum capacity to utilise Earth observations for disaster management. [ORG]

(Addresses Targets 005, 102, 104 & 240)

CB-06-06: Health Perform an assessment (per country, with emphasis on developing countries) of existing capacities for the integration of Earth observation and Health data (in terms of data collection, processing and integration). Identify gaps, and explore funding projects to close gaps. [SEC]

(Addresses Targets 015, 020, 128 & 195)

CB-06-07: Water Promote best practices in Earth observation application for integrated water resource management in developing countries by supporting the Integrated Global Water Cycle Observations (IGWCO) series of workshops in South America, Asia, and Africa. [SEC]

(Addresses Targets 050, 051, 052, 157, 214, 222 & 240)

CB-06-08: Weather Co-organize a series of regional workshops with major numerical weather-prediction (NWP)-training centres to assist developing countries in their utilization of currently available forecasts; building in particular upon WMO programmes for the least developed countries. [ORG]

(Addresses Targets 054, 055, 101, 159, 223 & 240)

CB-06-09: Ecosystems Build upon existing initiatives (e.g. ANTARES in South America for oceans and GOFC-GOLD regional networks for terrestrial domains) to develop a global network of organization-networks for ecosystems, and coordinate workshops to strengthen observing capacity in developing countries. [RES]

(Addresses Targets 062, 063, 162, 164, 225 & 226)

CB-06-10: Agriculture Design training modules to demonstrate the usage of Earth observation data and products for the agricultural sector in Africa, Asia, Latin America, and the Indian subcontinent. [RES]

(Addresses Targets 070, 071, 076, 166 & 240)

3.1.6 Outreach

Outreach activities for 2006 will focus on:

- Enhancing technical engagement with emerging user communities for Earth observations
- Raising awareness of the availability and potential uses of Earth observations in each societal benefit area
- Raising general awareness of GEOSS and the value of Earth observations through the design and launch of an 18-month communication campaign to reach prioritized target audiences
- Maintaining ongoing media contact and interest in GEOSS

Outreach Tasks for 2006

Engagement with Specialized Scientific and Technical Audiences

OR-06-01: Develop a comprehensive list of major international conferences and workshops relevant to GEOSS (UNFCCC COP, sustainable development fora, etc.) in each societal benefit area and ensure GEOSS participation and visibility in selected events. [SEC]

OR-06-02: Engage in a series of presentations and briefings to technical audiences in each societal benefit area, with an emphasis on emerging fields of health, energy, water resources management, and ecosystems. [SEC]

OR-06-03: Promote awareness of successful communities of practice activities, advancing awareness of potential applications for Earth observations. [SEC]

(Addresses Targets 011, 025, 107, 189 & 241)

Outreach to Non-Specialists

OR-06-04: Implement an outreach campaign plan of targeted communication activities developed by the Secretariat. [SEC]

OR-06-05: Complete preparation of general communication tools for the outreach campaign, including a GEOSS logo/visual identity; an engaging website; an umbrella message and sector-specific messages; multi-media & press tools; and standard PowerPoint briefings. [SEC]

OR-06-06: In coordination with the outreach campaign, engage in a series of regular media roundtables and briefings and occasional well-timed press conferences and special events. [SEC]

OR-06-07: Establish a network of press & media representatives for all GEO members and participating organisations to advance outreach objectives. [SEC]

(Addresses Targets 107, 189 & 241)

3.2 Specific Activities and Tasks by Societal Benefit Area

3.2.1 Disasters

Disaster-induced losses can be significantly reduced through an enhanced coordination of observations related to hazards, timely processing of the data and dissemination of the resulting information to relevant authorities. GEOSS implementation will provide a major contribution to the monitoring, prediction, early warning and mitigation of hazards occurring at local, regional and global levels.

Building on the 2005 World Summit resolution “to work expeditiously towards the establishment of a worldwide early warning system for all natural hazards with regional nodes, building on existing national and regional capacity such as the newly established Indian Ocean Tsunami Warning and Mitigation System”, GEO activities for 2006 will focus on:

- Priorities identified by the GEO Working Group on Tsunami Activities
- Developing a multi-hazard approach to early warning and crisis management
- Expanding the use of Earth observations for disaster prevention and mitigation

Disasters Tasks for 2006

Data Management

DI-06-01: Encourage *in-situ* and space agencies to (i) systematically record data over regions subject to tsunami risk and (ii) archive data in a form easily accessible to all countries. [SEC]

DI-06-02: Facilitate improvement of capabilities for global seismographic networks such as GSN, FDSN, DAPHNE, and data sharing among GEO members. [RES]

DI-06-03: Support, and advocate funding for, research projects that contribute to the improved integration of InSAR technology for disaster warning and prediction. [SEC]

DI-06-04: Promote the format standardization of water-level data (e.g. DART data), in a format easily used by developing countries. [ORG]

DI-06-05: Advocate open access to all data relevant to tsunami early warning, vulnerability assessment and post-reconstruction, with particular emphasis on real-time access for developing countries. [SEC]

(Addresses Targets 001, 003, 004, 006, 007, 008, 010, 102, 104, 111, 117, 120, 190, 191, 192, 194 & 240)

Products and Maps

DI-06-06: Create a project plan for the production of high-resolution near-shore bathymetric maps and the development of digital elevation models in coastal zones. [RES]

DI-06-07: Create a project plan for the preparation of a “global tsunami hazard map” to provide information for coastal zone monitoring and infrastructure planning & investment. [RES]

DI-06-08: Conduct an inventory of existing geologic and all-hazard zonation maps and identify gaps and needs for digitization. [ORG]

(Addresses Targets 003, 008, 102, 104, 117, 120, 190, 194 & 240)

Multi-hazard Approach

DI-06-09: Provide high-level incentives for the cooperation of national and international agencies towards a multi-hazard "coastal vulnerability" approach, linking coastal flooding, storm surges, tropical cyclones and tsunami. [SEC]

DI-06-10: Conduct an assessment of meteorological geostationary-satellite capabilities for the management of non-weather related disasters. [RES]

DI-06-11: Initiate and maintain a dialogue between GEO and the Board of the International Charter on Space and Major Disasters to identify mechanisms for strengthening the scope and Mandate of the Charter. [SEC]

DI-06-12: Explore possibilities for the development of an international charter on telecommunication systems and disasters, building upon the experience of the International Charter on Space and Major Disasters. [SEC]

(Addresses Targets 001, 003, 005, 008, 010, 102, 104, 117, 120, 190, 194 & 240)

3.2.2 Health

The application of Earth observations to improve human health is an emerging field in which GEO can facilitate significant progress by forging new connections between the Earth observation and health sectors at all levels.

Activities for 2006 will focus on:

- Identifying and further refining human health user requirements for Earth observations
- Improving the Earth observation sector's understanding of these requirements
- Demonstrating the utility of Earth observations for human health needs
- Raising awareness of the availability and potential uses of Earth observations for human health

Health Tasks for 2006

HE-06-01: Establish a *GEO Human Health, Environment and Earth Observation Task Force*, composed of representatives of the health, environment, and Earth observation communities at national and regional levels, to support the Secretariat in defining priorities and implementing all health-related tasks. [SEC]

HE-06-02: Organize a workshop in Geneva in mid 2006 with the support of WHO, that will cover human health issues, including observations, modelling aspects, building upon past events (EC workshop on Human health and Global Change, NIEHS/EPA workshop on Human health and Air quality, EPIDEMIO workshop, Wengen meeting on seasonal climate forecasts for health, etc). [SEC]

HE-06-03: Facilitate the formation of international consortia and coordinate, besides advocating funding for, the implementation of demonstration pilot-projects integrating Earth observations, health and epidemiological as well as socio-economic data. As a priority, a project initiated by THORPEX will focus on the use of advanced weather and climate ensemble forecasting methods to develop and improve the predictability of major health hazards and impacts in West Africa. [RES]

HE-06-04: Organize bi-lateral meetings with major health organizations and associations at national and regional levels and representatives of GEO, to raise awareness of potential uses of Earth observation for health. [SEC]

(Addresses Targets 011, 013, 015, 016, 020, 022, 031, 037, 128, 134, 153, 195, 210 & 211)

3.2.3. Energy

Much like the health sector, the application of Earth observation information to improve energy development, management and delivery is an emerging field that could yield significant benefits for economies worldwide and transition economies in particular. The G-8 Gleneagles Plan of Action specifically references the need for cleaner and more efficient energy resource management, and increased awareness of the environmental impacts of energy production and use. The need for improved weather forecasting has already been articulated by the energy sector. In contrast the application of additional types of Earth observation information remains largely unexplored. Development of new applications in this area must take into account strong industrial competitiveness in the energy sector, which tends to limit the exchange of information between stakeholders.

Activities for 2006 will focus on:

- Assessing the importance of Earth observation-derived information for sustainable energy management
- Producing a strategic 5-10 Year Plan for the exploitation of the new generation of operational observing systems, building upon consultations with international policy and economic organizations, energy providers, and the Earth observation community
- Facilitating access to existing information and products for energy stakeholders
- Identifying and further refining Energy users' requirements for Earth-observation-derived information and customized tools
- Encouraging the development of decision support systems and tools for energy management

Energy Tasks for 2006

EN-06-01: Establish a *GEO Energy and Earth Observations Task Force*, composed of representatives of both the energy and Earth observation communities at national and regional levels, to support the Secretariat in developing and implementing energy-related priorities and tasks. [SEC]

EN-06-02: Organize a major workshop in 2006 to identify and define the main elements/components of a strategic 5-10 Year Plan for the optimum exploitation of the enhanced capabilities offered by the forthcoming new generation of observing systems and forecasting modelling techniques (e.g. ensemble-based techniques developed by ECMWF and others). [SEC]

EN-06-03: Facilitate the formation of an international consortium to initiate and monitor the implementation of a demonstration project utilizing advanced ensemble forecasting techniques to improve energy management techniques – particularly those linked to hydro-power. [RES]

EN-06-04: Conduct a survey and assessment of energy management needs in terms of Earth observations (*in-situ* and space) in cooperation with national energy agencies and associations, focusing on gaps and requirements for new observations. [SEC]

EN-06-05: Initiate and maintain a dialogue between decision-support tool providers and energy production & distribution managers to identify requirements for the development of improved and/or new tools. [SEC]

EN-06-06: Participate in major energy fora and roundtables organized by international organizations, energy associations, and business councils. [SEC]

(Addresses Targets 025, 026, 049, 132a, 132b, 133 & 202)

3.2.4 *Climate*

In the climate domain, important goals for GEO include ensuring the sustained provision of both key climate data and climate products derived from these data in all domains, promoting the completion of partially implemented observing systems, and facilitating access to quality-assured climate data. GEO supports the GCOS Implementation Plan, as referred to in the Gleneagles G-8 Summit statement, through emphasizing the need to develop successful mechanisms for sharing critical climate observations and strengthening existing climate institutions.

Activities for 2006 will focus on:

- Providing coherent, consistent, continuous long-term records for key climate datasets and products derived from these datasets
- Expanding earth observations of critical climate variables such as those identified in the GCOS Implementation Plan
- Enhancing and improving coordination of terrestrial climate observations and improving coherence in global ocean observation coordination

Climate Tasks for 2006

CL-06-01: Ensure the initiation of international mechanisms to coordinate and maintain sustained climate data reprocessing and reanalysis efforts. [RES]

CL-06-02: Establish actions securing the provision of key climate data from Earth observing satellite systems. [ORG]

CL-06-03: Clarify and consolidate the role of existing intergovernmental mechanisms for terrestrial climate observations. Develop a framework for the preparation of guidance materials, standards, and reporting guidelines for terrestrial observing systems for climate and associated data, metadata, and products to expand the comprehensiveness of current networks, facilitate exchange of data, and provide strategic direction to the terrestrial climate sector. [ORG]

CL-06-04: Identify lead national entities or focal points for national ocean observation efforts that can articulate national goals for their ocean observing sector and coordinate national activities with other designated national entities in order to create a truly global system of ocean observations. [ORG]

(Addresses Targets 027, 028, 032, 033, 034, 035, 036, 135, 136, 137, 140, 143, 207 & 212)

3.2.5 Water

Improving water resource management through a better understanding of the water cycle is a priority objective for GEOSS. This implies the integration of observations, data assimilation, prediction models and decision support tools into a coherent and comprehensive management system.

Activities for 2006 will focus on:

- Improving existing *in-situ* observation networks for hydrology at all levels
- Improving and expanding space-based observations for measurement of hydrological variables
- Developing ensemble-based hydrological prediction techniques

Water Tasks for 2006

WA-06-01: Organize one major workshop on water observations, combining space and *in-situ* observing systems and focussing on (i) water quality, (ii) surface and ground water, (iii) precipitation, (iv) soil moisture, (v) hydrological ensemble-based prediction and (vi) new observing techniques and products. [SEC]

WA-06-02: Help coordinate and advocate funding for one (or more) demonstration-project that points to the added value of hydrological ensemble-based forecasts in local water resource-management. [RES]

WA-06-03: Organize a side-event at World Water Forum IV (March 2006, Mexico), highlighting the benefits of global and coordinated Earth observations for water resource-management. [SEC]

WA-06-04: Produce a global dataset mapping catchments to the first and second order stream level for use in applying land cover data to management of catchments and monitoring the hydrological cycle. [RES]

(Addresses Targets 040, 041, 042, 043, 044, 045, 046, 047, 049, 050, 051, 069, 151, 152, 154, 155, 157, 184, 214, 215, 216, 217, 218, 219, 220, 222, 238 & 240)

3.2.6 *Weather*

The GEO priorities in the realm of weather are consistent with, and supportive of, those of the World Meteorological Organization (WMO). Objectives for 2006 were designed to support WMO efforts in addressing issues of data continuity, data gaps and predictive model improvements. These include:

- Advocating the stability (and improvement as necessary) of surface-based and space-based observing systems
- Encouraging the development of advanced forecasting systems and data dissemination methods
- Improving access to numerical weather prediction (NWP) data and products for developing and least developed countries

Weather Tasks for 2006

Observing Systems

WE-06-01: Advocate a complete and stable surface-based (*in-situ* and airborne) Global Observing System (GOS). High priority should be given to a stable and fully functional GCOS Upper Air Network (GUAN) and the further development of the Aircraft Meteorological Data Relay (AMDAR) programme including homogenous coverage of AMDAR data over 24 hours and improved vertical resolution of vertical profiles. [ORG]

WE-06-02: Advocate a stable and improved space-based Global Observing System (GOS) including operational geostationary and polar components. In particular support WMO efforts related to increased spatial and temporal resolution for geostationary imagers and sounders; (ii) a broader availability of polar Doppler wind profiles for initial operational testing. [ORG]

WE-06-03: Facilitate the timely implementation of the Global Precipitation Measurement mission. [SEC]

(Addresses Targets 053 & 158)

Forecasting Systems and Dissemination Methods

WE-06-04: Facilitate the development and maintenance of a prototype global operational multi-model ensemble prediction system (e.g. through THORPEX) incorporating easily accessible databases. [RES]

WE-06-05: Support the development of Advanced Dissemination Methods (ADMs) within an operational Integrated Global Data Dissemination Service (IGDDS), as a contribution of the WMO Space Programme to GEONetcast. [SEC]

(Addresses Targets 053, 057, 158, 160, 223 & 240)

Data Access

WE-06-06: Initiate and maintain a regular dialogue with international weather data centres to promote wide distribution and international exchange of NWP data and products, including free access for developing countries. [ORG]

(Addresses Targets 054, 105, 159, 185, 186, 187, 188, 223 & 240)

3.2.7 Ecosystems

The goal of systematic, global ecosystems observations is to describe and to assess the condition of ecosystems services, including pressures and impacts on those services, with particular regard to natural resource management. A key outcome of GEOSS is to support natural resource industries and managers in understanding resource production potential and limits within the context of ecosystems, to inform policy making and promote sustainability.

For this, it is essential to improve the basic knowledge of temporal and spatial variations in ecosystems. The vision for GEOSS is to allow repeated mapping of ecosystems extent and the quantification of ecosystems condition. This requires the development of standardized and integrated methodologies, observations and products, on a global basis.

Activities for 2006 will focus on:

- Initiating planning for a global carbon observing system
- Developing a global operational scheme for ecosystems classification
- Pursuing harmonization of ecosystems observing methods
- Improving tools for space-based and *in-situ* ecosystems observations

Ecosystems Tasks for 2006

EC-06-01: Support the Integrated Global Carbon Observation (IGCO) development of a global carbon-observing system, in particular improved global networks of *in-situ* CO₂ observations. [RES]

EC-06-02: Formally establish an Ecosystems Classification Task Force, covering terrestrial, freshwater, and ocean ecosystems, with a mandate to create a globally agreed, robust, and viable classification scheme for ecosystems. [SEC]

EC-06-03: Initiate the harmonization of observing-methods and create synergies between ecosystems observing activities and those of other existing groups and mechanisms for terrestrial, and marine systems. [SEC]

EC-06-04: Explore techniques for up-scaling *in-situ* ecosystem observations. [SEC]

EC-06-05: Complete the survey of the research community involved in *in-situ* observations and modelling for new platform and sensor needs, or for suggestions for better use of existing systems. [ORG]

(Addresses Targets 058, 059, 060, 064, 067, 161, 163, 165, 225 & 226)

3.2.8 *Agriculture*

The primary GEO objective within this area is to increase food security through the utilization of Earth observations. This requires exploration of the full range of available Earth observations that can provide value to the agricultural sector, the sustained provision of basic data and data products, and the development of the capacity and infrastructure necessary to utilize Earth observation information, especially within the developing world. In 2006 GEO will seek to engage all elements of the agriculture sector to begin to define long-range strategies for meeting its goals.

Activities for 2006 will focus on:

- Further exploring the utility of current Earth observations within the agricultural sector, especially in developing nations
- Advocating for the development of new applications for Earth observation data and the promulgation of these applications
- Securing commitments to sustain the acquisition of key land cover datasets and data products for the agricultural sector

Agriculture Tasks for 2006

AG-06-01: Establish a *GEO Agriculture and Earth Observations Task Force* to create a 5 to 10 year strategic plan, to define a series of specific objectives for 2007, and to create a plan of action for GEOSS. The Task Force is to include, but will not be limited to, representation from the Food and Agriculture Organization, the European Environmental Agency, the food production industry and GEO member nations. [SEC]

Task AG-06-02: Utilizing global and regional high-resolution land-use/land-cover datasets (e.g. GLOBCOVER) and earlier 1-km resolution land cover data sets (e.g. Global Land Cover 2000), begin production of a high-resolution global land-cover change dataset and report. Create mechanisms for regular analysis and reporting on land cover change building on current efforts and promulgate the use of these products, especially in developing countries. [RES]

AG-06-03: Advocate funding for demonstration projects to produce global irrigated area/crop production datasets and promulgate sustained monitoring efforts utilizing the validated methodologies. [RES]

AG-06-04: Investigate how and where precision farming techniques and applications could be adapted and appropriately transferred. [ORG]

AG-06-05: Coordinate and advocate funding for the implementation of a demonstration project integrating Earth observations, agricultural data and socio-economic data. This will be initiated by THORPEX and focus on the use of advanced weather and climate ensemble forecasting methods to develop and improve the predictability of food-supply hazards in Africa. [RES]

(Addresses Targets 069, 073, 074, 075, 076, 166, 173, 228 & 231)

3.2.9 Biodiversity

Biodiversity monitoring efforts worldwide engage the interest and concern of population segments as diverse as the ecotourism industry, the pharmaceutical industry, environmental organizations, the agricultural sector, and, of course, the scientific community. The community of networks monitoring various aspects of biodiversity is highly diverse and topically focused. The challenge for building GEOSS in this realm is to assist these monitoring communities to develop comprehensive classification and observing strategies that will allow both observational standards and interoperability to emerge from the current monitoring activities, thus allowing global integration of data generated by these efforts. The framework for monitoring biodiversity trends recently adopted within the UN Convention on Biological Diversity (CBD) will form the basis for further developments in this area.

Activities for 2006 will focus on:

- Developing coherent biodiversity observation strategies within the context of an agreed upon ecosystem classification system
- Facilitating the establishment of monitoring systems that enable frequently-repeated, globally-coordinated assessment of trends and distributions of species of special conservation merit
- Facilitating consensus on data collection protocols and the coordination of the development of interoperability among monitoring programs

Biodiversity Tasks for 2006

BI-06-01: Ensure participation of the biodiversity community on the Ecosystem Task Force (see Task EC-06-01) in order to ensure that the classification system developed as part of this task is compatible with biodiversity observational requirements. [SEC]

BI-06-02: Building on the framework adopted for monitoring biodiversity trends in the UN Convention on Biological Diversity, conduct a series of workshops and meetings to (i) define the needs and requirements of the biodiversity information users sector, (ii) delineate available methodologies and (iii) identify the adequacy of current and past observational strategies. [SEC]

BI-06-03: Initiate the development of a strategic plan for capturing historical biodiversity data from natural history collections and the research community. [ORG]

BI-06-04: Initiate the development of a strategic plan for periodic global assessment of status and trends for species of merit. Include the remote sensing community in this discussion to determine the applicability of remote sensing to this topic. [SEC]

BI-06-05: Facilitate the interoperability of the multi-institutional biodiversity observation network through GBIF and ensure that it links to data sets of ecological and other related observation systems. [RES]

(Addresses Targets 077, 078, 079, 080, 081, 082, 178, 179, 184, 233, 234, 235 & 238)

Part IV: Budget for 2006

Taken together, the collective Earth observation assets of GEO Members and the GEOSS-related programs of the GEO Participating Organizations represent large investments, on the order of tens of billions of US dollars. The budget of the GEO Secretariat will amount to a small fraction of those investments. The key role of the Secretariat will be to leverage the coordinated deployment of these large Member investments and the harmonization of programs within GEO Participating Organizations. In this way, the GEO will collectively deliver the tangible benefits of GEOSS to society.

Item	2006 Projected Costs CHF	2006 Projected Costs USD
FIXED COSTS		
Staff Salaries/Cost <i>(Includes 12 core staff: Director, 8 programme staff, 3 administrative staff)</i>	2,349,500	1,850,000
Travel Expenses <i>(Includes staff travel and third party assistance)</i>	431,800	340,000
Production Services <i>(includes website, graphic design, printing, audiovisual, etc.)</i>	342,900	270,000
Official Meeting Support <i>(Includes 2 Executive Committee and 1 Plenary meeting)</i>	81,280	64,000
Telecommunications <i>(includes phone charges, web server, list serves, telecons)</i>	113,030	89,000
Equipment and Premises <i>(includes furniture, computers, partition modification, etc.)</i>	97,790	77,000
Representation <i>(Director's hospitality budget)</i>	19,050	15,000
Incidental Expenses <i>(includes petty cash, office supplies)</i>	34,290	27,000
TOTAL FIXED COSTS	3,469,640	2,732,000
PROGRAMME COSTS		
Fellowships <i>(4 fellows for 6 months each)</i>	101,600	80,000
Contractors <i>(includes 19 FTE - full-time equivalencies)</i>	1,737,360	1,368,000
Meetings and Workshops <i>(includes meeting space, pre-conference planning, expert travel, equipment rentals)</i>	1,714,500	1,350,000
TOTAL PROGRAMME COSTS	3,553,460	2,798,000
SECRETARIAT OPERATIONS SUBTOTAL	7,023,100	5,530,000
<i>WMO Service Level Agreement Charges (Max 7% of expenditures)</i>	491,617	387,100
<u>SECRETARIAT OPERATIONS TOTAL</u>	7,514,717	5,917,100
<u>SUPPLEMENTAL PROGRAMME COSTS</u> <i>([RES] Activities - See following pages)</i>	6,794,500	5,350,000
TOTAL GEO BUDGET FOR 2006	14,309,217	11,267,100

Conversion rate: 1 USD = 1.27 CHF

The total personnel anticipated for the full implementation of programme activities falling under Secretariat operations is 35 persons, including 12 staff, 19 contractors, and 4 fellows, with some contractors possibly performing work off-site. The Secretariat projects that some staff positions and potentially all contractor positions may be filled through secondments, thus significantly defraying personnel costs. The full cost has been included here to provide a more accurate picture of the support necessary to implement the programme.

The supplemental programme budget, detailed with operational programme costs on the following pages, represents costs anticipated for those resource- intensive tasks marked [RES] in the text, for which one or more GEO Members or Participating Organizations must provide the necessary resources, beyond the Secretariat operations budget.

TASK No.	TASK	PROGRAMME			SUPPLEMENTAL PROGRAMME
		Contract Staff	Contractor Level of Effort (In Months)	Estimated Costs [SEC]	Estimated Costs [RES]
SPECIAL PROJECT					
	GEONetcast	1	12	72,000	200,000
ARCHITECTURE					
AR-06-1	Pursue commitments for GEOSS components				
AR-06-2	Identify and agree architecture requirements				
AR-06-3	Interoperability arrangements process				
AR-06-4	Interoperability guidance document				
AR-06-5	Initiate network-distributed clearinghouse	1	6		
AR-06-6	Facilitate DEM interoperability				
AR-06-7	Inventory existing in-situ data networks	1	12		
AR-06-8	Initiate creation of in-situ coordination mechanism				
AR-06-9	Advocate resources for expanding in situ obs				
AR-06-10	Establish continuity gap analysis process	1	12		
AR-06-11	Landsat follow-on				200,000
AR-06-12	Radio frequency protection advocacy				
	Architecture contractors costs	3	30	180,000	
	Architecture meetings and workshops			50,000	
	ARCHITECTURE SUB- OPS SUBTOTAL			230,000	
DATA MANAGEMENT					
DA-06-01	Data sharing task force				
DA-06-02	Inventory, analysis, workshop on data archiving				500,000
DA-06-03	Advocate ensemble prediction for new areas				
DA-06-04	Identify geographic data layers common to SBAs				
DA-06-05	Develop basic geographic data framework doc				
DA-06-06	Advocate use of SDI				
DA-06-07	Define model web portal system				
DA-06-08	Improve/merge geo-referenced mapping and GIS	1	6	36,000	
DA-06-09	Establish best-practices registry				
	Data management contractor costs	1	6	36,000	
	Data management meetings and workshops			50,000	
	DATA MANAGEMENT - OPS SUBTOTAL			86,000	

TASK No.	TASK	<u>PROGRAMME</u>			<u>SUPPLEMENTAL</u>
		Contract Staff	Contractor Level of Effort (In Months)	Estimated Costs [SEC]	<u>PROGRAMME</u> Estimated Costs [RES]
USER ENGAGEMENT					
US-06-1	Initiate communities of practice				
US-06-2	Promote user requirements fora				
	User engagement contractor costs			0	
	User engagement meetings and workshops			50,000	
	USER ENGAGEMENT - OPS SUBTOTAL			50,000	
CAPACITY BUILDING					
CB-06-1	Survey of CB initiatives	1	12	72,000	
CB-06-2	Identify infrastructure needs in dev countries	1	12	72,000	
CB-06-3	Support edu.&training in dev countries				
CB-06-4	Multi-media training modules				400,000
CB-06-5	EO and disaster mitigation-dev countries	1	12	72,000	
CB-06-6	EO & health data networks-dev countries	1	6	36,000	
CB-06-7	EO & IWRM best practices-dev countries	1	6	36,000	
CB-06-8	Weather forecast utilization-dev.countries				
CB-06-9	Expand ANTARES network				300,000
CB-06-10	Training modules EO & ag-dev countries				100,000
	Capacity building contractor costs	5	48	288,000	
	Capacity building meetings and workshops			50,000	
	CAPACITY BUILDING - OPS SUBTOTAL			338,000	
OUTREACH					
OR-06-1	Develop events list by SBA				
OR-06-2	Engage in technical presentations				
OR-06-3	Promote successful communities of practice				
OR-06-4	Implement 18-month outreach campaign	1	12	72,000	
OR-06-5	Create campaign tools (web, print, multi-media)				
OR-06-6	Engage media				
OR-06-7	Establish press and media network				
	Outreach contractor costs	1	12	72,000	
	Outreach briefings , roundtables, other meetings			50,000	
	OUTREACH - OPS SUBTOTAL			122,000	

TASK No.	TASK	<u>PROGRAMME</u>			<u>SUPPLEMENTAL</u>
		Contract Staff	Contractor Level of Effort (In Months)	Estimated Costs [SEC]	PROGRAMME Estimated Costs [RES]
DISASTERS					
DI-06-1	Encourage obs & archive for tsunami risk areas				
DI-06-2	Facilitate seismographic network improvement				500,000
DI-06-3	Advocate integration of InSAR for hazards				
DI-06-4	Promote water-level data format standardization				
DI-06-5	Advocate data access for tsunami warning				
DI-06-6	Coastal bathymetric & DEM maps				200,000
DI-06-7	Global tsunami hazard map				200,000
DI-06-8	Inventory geologic & all-hazard zonation maps	1	6	36,000	
DI-06-9	Establish coastal vulnerability approach	1	12	72,000	
DI-06-10	Assess geostationary capability for hazards	2	24	144,000	
DI-06-11	Maintain dialogue with Charter Board				
DI-06-12	Explore charter on telecom for disasters	1	12	72,000	
	Disaster contractor costs	5	54	324,000	
	Disaster meetings and workshops			50,000	
	DISASTERS - OPS SUBTOTAL			374,000	
HEALTH					
HE-06-1	Establish Health, Env, & EO Task Force	1	12	72,000	
HE-06-2	Workshop on EO & Health				
HE-06-3	Ensemble prediction and Health				400,000
HE-06-4	Bi-lateral meetings to raise awareness				
	Health contractor costs	1	12	72,000	
	Health meetings and workshops			150,000	
	HEALTH - OPS SUBTOTAL			222,000	
ENERGY					
EN-06-1	Energy and EO Task Force	1	12	72,000	
EN-06-2	EO & Energy Strategic Plan & Workshop				
EN-06-3	Ensemble-prediction and Energy				300,000
EN-06-4	Assessment of EO requirements for energy mgmt				
EN-06-5	Decision support tool development				
EN-06-6	Participate in major energy fora				
	Energy contractor costs	1	12	72,000	
	Energy meetings and workshops			150,000	
	ENERGY - OPS SUBTOTAL			222,000	

TASK No.	TASK	<u>PROGRAMME</u>			<u>SUPPLEMENTAL</u>
		Contract Staff	Contractor Level of Effort (In Months)	Estimated Costs [SEC]	Estimated Costs [RES]
CLIMATE					
CL-06-1	Create int'l mech for clim. data reproc&reanal.				
CL-06-2	Space-based climate data provision				
CL-06-3	Terrestrial observations coord and strengthening				
CL-06-4	Ocean observations coordination				
	Climate contractor costs	0	0	0	
	Climate meetings and workshops			150,000	
	CLIMATE - OPS SUBTOTAL			150,000	
WATER					
WA-06-1	EO and Water	1	12	72,000	
WA-06-2	Funding EO and Water demo projects				200,000
WA-06-3	World Water Forum IV session				
WA-06-4	Global dataset mapping catchments				150,000
	Water contractor costs	1	12	72,000	
	Water meetings and workshops			150,000	
	WATER - OPS SUBTOTAL			222,000	
WEATHER					
WE-06-1	Surfaced-based GOS				
WE-06-2	Space-based GOS				
WE-06-3	Timely GPM mission				
WE-06-4	Prototype multi-ensemble prediction				400,000
WE-06-5	Support Advanced Dissemination Methods				
WE-06-6	Exchange and access to NWP data				
	Weather contractor costs	0	0	0	
	Weather meetings and workshops			75,000	
	WEATHER - OPS SUBTOTAL			75,000	
ECOSYSTEMS					
EC-06-1	Global Carbon Observing System				250,000
EC-06-2	Ecosystem Task Force	1	12	72,000	
EC-06-3	Harmonization of ecosystem obs. methods.				
EC-06-4	Up-scaling tools for in-situ eco obs				
EC-06-5	In-situ platform needs for ecosystems	1	6	36,000	
	Ecosystems contractor costs	2	18	108,000	
	Ecosystems meetings and workshops			150,000	
	ECOSYSTEMS - OPS SUBTOTAL			258,000	

TASK No.	TASK	PROGRAMME			SUPPLEMENTAL PROGRAMME
		Contract Staff	Contractor Level of Effort (In Months)	Estimated Costs [SEC]	Estimated Costs [RES]
AGRICULTURE					
AG-06-01	Agriculture and Earth Observations Task Force	1	12	72,000	
AG-06-02	Land cover change dataset and report				300,000
AG-06-03	EO & global irrigated area / crop prod				300,000
AG-06-04	Precision farming transfer to dev. countries				
AG-06-05	THORPEX demonstration project				250,000
	Agriculture contractor costs	1	12	72,000	
	Agriculture meetings and workshops			75,000	
	AGRICULTURE - OPS SUBTOTAL			147,000	
BIODIVERSITY					
BI-06-1	Biodiversity participation in Ecosystem TF				
BI-06-2	UNCBD support				
BI-06-3	Historical biodiversity data capture				
BI-06-4	Species of merit assessment				
BI-06-5	Permanent biodiversity observation sites network				200,000
	Biodiversity contractor costs	0	0	0	
	Biodiversity meetings and workshops			150,000	
	BIODIVERSITY - OPS SUBTOTAL			150,000	
PROGRAMME COST SUMMARY					
	FELLOWSHIPS	4	6	80,000	
	CONTRACTOR COSTS	22	228	1,368,000	
	<i>(19 FTE- full time equivalencies at 6,000 USD per month)</i>				
	MEETINGS AND WORKSHOPS			1,350,000	
	TOTAL PROGRAMME COSTS			2,798,000	
	TOTAL SUPPLEMENTAL PROGRAMME				5,350,000
SUMMARY					
	FIXED COSTS			2,732,000	
	PROGRAMME COSTS			2,798,000	
	SUBTOTAL OPERATIONS			5,530,500	
	<i>(WMO Service Charge)</i>			387,100	
	TOTAL SECRETARIAT OPERATIONS			5,917,100	
	TOTAL SUPPLEMENTAL PROGRAMME				5,350,000

Appendix A

Work Plan Team Formation

At the Sixth Meeting of the *ad hoc* GEO (GEO-6), the plenary agreed to the creation of a Work Plan Development Team (hereafter Work Plan Team or WPT) which would be tasked to produce the 2006 GEO Work Plan as well as a report on preliminary activities to be conducted in 2005. Immediately following GEO-6, the GEO Secretariat issued a call for secondments of personnel to serve as members of the GEO Work Plan Team. Thanks to the generosity of their countries and participating organisations, five individuals were provided and co-located with the Secretariat, three in March, two in May, and one in July. In addition to the Secretariat Executive Officer, a special assistant was recruited to assist the team.

At GEO-I, the Work Plan Team provided an initial report (GEO 0107) on planned activities for 2005. A revised report, containing 26 tasks for implementation, was released on 1 July 2005 (GEO 0107R). A full report on these activities is included in the 2005 Annual Report (GEO 0207) to be presented at GEO-II on 14-15 December.

In order to develop specific tasks and priorities for 2005 and 2006, the WPT agreed to proceed on the basis of the 2, 6 and 10-year targets contained in the Implementation Plan Reference Document (GEO 1000R), with appropriate cross references to the relevant section of the Implementation Plan itself (GEO 1000). While all targets were considered, the WPT focused its work on developing activities in support of the 107 two-year targets, which are to be achieved by 2007. Please note that for easy reference, the WPT has assigned a serial number to all targets (see companion document GEO 1000R-T).

To translate these 107 broad targets into concrete actions, the WPT determined it was necessary to develop preliminary tasks to be initiated in 2005, major tasks for 2006, and target fulfillment tasks for completion by 2007. To facilitate the identification of these tasks, the WPT created a "Work Packet" for each target. These packets consist of three parts requesting task proposals for 2005, 2006, and 2007. They also provide a summary of the specified target and a citation from the Reference Document.

Input Analysis

Drawing upon the list of topic coordinators and other experts who supported the development of the Implementation Plan, the Work Plan Team developed an informal list of 75 experts who could be contacted to assist in completing the packets, with the understanding that these experts could enlist the assistance of others in their community. These experts were asked to submit a preliminary list of proposed tasks for 2005 by 15 April, and to identify well-qualified individuals or groups to provide further input. From May to August, the WPT expanded the process well beyond the initial 75 experts by coordinating with GEO Participating Organizations and other expert groups to finalize the list of 2005 activities, gather additional suggested tasks for 2006, and identify possible actors for 2006 task implementation. As of 5 August, the WPT had received proposals for nearly 800 activities in 2006.

The WPT created a log of all proposed tasks and activities, and the log was then divided among the team members for analysis. Throughout the month of August, the WPT worked together and in consultation with contributing experts to define the list of tasks presented in Part III.

Appendix B: List of Acronyms

AGU	American Geophysical Union
ANTARES	Observation Network in South America
CEOS	Committee on Earth Observation Satellites
DAPHNE	Deployment of Asia-Pacific Hazard-mitigation Network for Earthquakes and volcanoes (Japan)
DART	Deep-ocean Assessment and Reporting of Tsunamis
DEM	Digital Elevation Model
EC	European Commission
ECMWF	European Centre for Medium-Range Weather Forecasts
EO	Earth Observations
EPA	Environmental Protection Agency
EPIDEMIO	Earth Observations in Epidemiology Programme funded by ESA
ESA	European Space Agency
FDSN	Federation of Digital Broad-Band Seismograph Networks
GBIF	Global Biodiversity Information Facility
GCOS	Global Climate Observing System
GEO	Group on Earth Observations
GEO-n	n-th meeting of the <i>ad hoc</i> GEO
GEONetcast	GEO 2006 Special Initiative; see p. 8
GEOSS	Global Earth Observation System of Systems
GLOBCOVER	Global land-cover project initiated by ESA and using MERIS data
GOFC-GOLD	Global Observation for Forest and Land Cover Dynamics
GSN	Global Seismographic Network
GTN-H	Global Terrestrial Network for Hydrology
IGCO	Integrated Global Carbon Observation
IGOS	Integrated Global Observing Strategy
IGWCO	Integrated Global Water Cycle Observations
InSAR	Interferometric Synthetic Aperture Radar
IOC	Intergovernmental Oceanographic Commission of UNESCO
ISCGM	International Steering Committee for Global Mapping
NIEHS	National Institute of Environmental Health Sciences
NSDI	National Spatial Data Infrastructure
NSF	National Science Foundation
NWP	Numerical Weather Prediction
SAR	Synthetic Aperture Radar
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC COP	United Nations Framework Convention on Climate Change Conference of the Parties
WHO	World Health Organization
WMO	World Meteorological Organization
WPT	Work Plan Team