



GROUP ON
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GEO Post-2015 Working Group Interim Report

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GEO Post-2015 Working Group Interim Report

Observing, Sharing, Informing through GEOSS: Renewing the GEO Vision beyond 2015 Issues and Options

Note: The following text is presented to the GEO-IX Plenary not for negotiation, but for review and guidance on the options presented. Based on the discussion and decisions made at Plenary, an amended text will be prepared for negotiation in 2013. Section 1 of this paper outlines the vision for GEO and GEOSS beyond 2015, supported by three rationales for their continuation. Section 2 discusses issues and proposes options regarding the strategic directions, the Societal Benefit Areas, and the governance of GEO post-2015. Annex I briefly presents five core functions for GEO that have implications for implementing GEOSS post-2015, Annex II provides a brief synopsis of the activities of the Post-2015 WG, and Annex III contains the complete Post-2015 WG membership list.

PREAMBLE

Earth observations are an increasingly important factor in helping societies address challenges to ensuring food, water and energy security, making societies more resilient to natural hazards and adaptive to climate change, and insuring environmental sustainability. Despite significant progress in recent years, substantial gaps remain in national, regional and global efforts to meet these challenges. The Group on Earth Observations (GEO) has demonstrated it can play a key role in addressing these gaps in an effective and long-term manner through coordination and networking among its major Earth observation stakeholders. By collaborating with these and other major international environmental mechanisms on a best-efforts basis, GEO is implementing the Global Earth Observation System of Systems (GEOSS)¹. To develop and utilize such an integrated global observation system is a task beyond the ability of any single nation, international organization or academic discipline. Within the partnership framework of GEO, continued international cooperation to link individual observing systems together and to share observations brings this system of systems ever closer to reality.

1 THE VISION FOR GEO AND GEOSS POST-2015

1.1 Current vision

The international collaborative framework of GEO was initiated in July 2003 in response to calls for action by the 2002 World Summit on Sustainable Development and by the Group of Eight (G8) countries. These bodies recognized that international collaboration is essential for enabling effective exploitation of the growing potential of Earth observations to support decision-making around the globe in an increasingly complex and environmentally stressed world. GEO was formally created in 2005 as a voluntary partnership of governments and international organizations following three Earth Observation Summits (2003, 2004, 2005), and its mandate reaffirmed at GEO Ministerial Summits in Cape Town (2007) and Beijing (2010).

The current vision for implementing GEOSS is *“to realize a future wherein decisions and actions for the benefit of humankind are informed via coordinated, comprehensive, and sustained Earth observations and information.”*²

At the present time, GEOSS implementation represents the voluntary, collective effort of 88 Member governments, the European Commission and 64 Participating Organizations to deliver useful Earth observation information to society. As governments seek to achieve economies and efficiencies in collecting and managing Earth observations, the need to more fully harness the potential of pooling resources to address urgent challenges is evident. GEO provides a flexible, collaborative framework for optimizing available resources and realizing this potential.

As GEO comes towards the end of its 10 year mandate, the GEO community must decide whether or not GEO should continue, and if so what form GEO should take. The Post-2015 Working Group (WG) has been tasked with exploring different options and to develop future scenarios for Plenary. The aim of this interim report is to inform the Plenary of the WG activities to date³, and to seek guidance from Plenary as to which options to develop further.

¹ GEOSS is a coordinating and integrating network of Earth observing and information systems, contributed on a voluntary basis by Members and Participating Organizations of the intergovernmental Group on Earth Observations (GEO).

² GEOSS 10-Year Implementation Plan (2005).

³ See Annex II for an update of the Post-2015 WG activities.

1.2 Why GEO should continue beyond 2015

The first question for Plenary to consider is whether to recommend to Ministers that GEO's mandate should be extended for a further 10 years (i.e. through 2025). The following rationales for extending GEO are presented.

1.2.1 Rationale 1: Addressing urgent global challenges

Humanity currently faces enormous and complex challenges that will only continue to grow over the next few decades. The Earth's limited natural resources need to be carefully managed together with the environment. Food and water in sufficient quantities must be supplied to a growing population while preserving the world's biodiversity and ecosystems. The interrelated issues of climate change and extreme events, sustainable energy and disaster mitigation will demand more effective solutions.

To meet these diverse but interrelated challenges, decision-makers need access to timely, integrated and actionable data and information about the Earth system, and how it is changing. Evidence-based decision-making for economic, environmental and social issues depends on this kind of information.

1.2.2 Rationale 2: Support for Sustainable Development

Governments and international organizations have repeatedly stated the need for GEOSS in order to meet global commitments to Millennium and Sustainable Development Goals, both for current and future generations. Most recently, the 2012 United Nations Conference on Sustainable Development ("Rio+20") Outcome Document recognized a specific role to be played by GEOSS in sustainable development:

*"We recognize the importance of space-technology-based data, in situ monitoring and reliable geospatial information for sustainable development policy making, programming and project operations. In this context, we note the relevance of global mapping and recognize the efforts in developing global environmental observing systems, including by the Eye on Earth Network and through the Global Earth Observation System of Systems."*⁴

Facilitating the transition to a greener economy as advocated at Rio+20 will require comprehensive, multidisciplinary global Earth observations. GEOSS enables access to global information on natural resources and raw material that can be provided only through Earth observation techniques. At the same time, GEOSS is expected to play a crucial role in providing data to the policy, research and professional communities responsible for assessments and decisions related to environmental sustainability; data that interlinks environmental phenomena and predictions with other areas, such as socio-economic sectors.

1.2.3 Rationale 3: Building on Accomplishments of GEO

Significant progress has been made since 2005 when GEO began to implement GEOSS. GEOSS implementation involves thousands of individuals who monitor the Earth system, and share and exchange Earth system data, enabling countries to access information otherwise unattainable, yet fundamental for the production of essential environmental services⁵. Activities of the GEO Work Plan, geared towards achievement of the GEOSS Strategic Targets⁶, are advancing and by the year 2015, it is anticipated that hundreds of thousands of datasets addressing the SBAs will be easily accessible through GEOSS by means of its data dissemination mechanisms such as **the GEO Portal and**

⁴ Rio+20 Outcome Document, The Future We Want, Paragraph 274.

⁵ Note: In the context of this paper, the term "service" is defined as the delivery of products based on Earth Observation data and information addressing user needs through the coordinated use of the infrastructure and assets of the Members and Participation Organizations.

⁶ GEOSS Strategic Targets (2009).

GEONETCast⁷. At the same time, the endorsement of the GEOSS Data Sharing Principles has significantly improved data accessibility while several global initiatives such as the Global Forest Observation Initiative (GFOI), the GEO Biodiversity Observation Network (GEO BON), the GEO Global Agricultural Monitoring (GEOGLAM) initiative, the Global Mercury Observation System (GMOS), the Operational Global Carbon Observing System (GEOCARBON) and the emerging "Blue Planet" initiative on ocean observations have been incubated through GEO.

Earth observation data and information are owned by many entities around the world; no country is able to acquire the comprehensive data and tools it needs to inform policy pertaining to domains such as the environment, food security, energy, industry or health, just to name a few. A major step forward for sharing of basic environmental and scientific information between countries has been accomplished through GEO thanks to significant investments made by GEO members to support the implementation of GEOSS. As the Rio+20 Outcome Document exemplifies, the significance and uniqueness of GEOSS has been increasingly recognized by the global community, and expectations placed on GEO and GEOSS are growing. Therefore, the flow of data from the various countries and international organizations involved in GEOSS implementation should not stop, but rather continue to work smoothly beyond the original end date of the GEOSS 10-Year Implementation Plan.

In view of the pressing demand of decision-makers for access to comprehensive Earth observation datasets necessary to manage our environment sustainably, at regional and global levels, it is important not to lose any time in implementing GEOSS. GEO represents a unique initiative with a proven track record, considerable momentum and a flexible governance structure that can be naturally and easily extended beyond 2015 to oversee GEOSS implementation into the future.

Recommendation 1: The Post 2015 Working Group strongly believes that the need for GEO remains and that, while recognizing there is room for improvement, GEO is making significant progress towards meeting its Strategic Targets. Considering the urgency of the global challenges faced by humanity and the benefits of a response involving an international, collective approach to supplying the Earth observations, the Post-2015 WG recommends that GEO, and the implementation of GEOSS, be continued.

2 ISSUES AND OPTIONS FOR GEO AND GEOSS POST-2015

Assuming GEO should continue, the WG has considered issues and options with respect to the strategic direction of GEO, the Societal Benefit Areas, and governance. Based on feedback from the Plenary, the WG will further develop the selected options for the 2013 Ministerial Summit.

2.1 Strategic Direction

For the post-2015 period, building on its current activities, the WG considers the continuation of the following five core functions for GEO to be essential⁸:

1. Strengthening observation networks (space-based, airborne and particularly *in-situ*);
2. Advancing interoperability and integration of Earth observations;
3. Enhancing data access and sharing;

⁷ GEONETCast is a near real time, global network of satellite-based data dissemination systems designed to distribute space-based, air-borne and *in-situ* data, metadata and products to diverse communities.

⁸ See Annex I for detailed descriptions of the five core functions.

4. Building capacity to collect and use Earth observations;
5. Encouraging research and development of integrated applications of Earth observations.

To support these functions, the WG offers the following four over-arching options for consideration by the Plenary with respect to the nature and scope of GEO beyond 2015 (the principle idea of each option is highlighted in bold, underlined text):

- A GEO will function as a **catalyst** for Earth observations, including network strengthening, strategic planning, serving as a coordination and facilitation mechanism for Earth observations, and will identify needs for applications and services. The financial model for GEO would remain unchanged;
- B In addition to option 2.1.A above, GEO will commit appropriate resources to implement and sustain a more **robust and expanded GEOSS information system**, facilitating enhanced access to Earth observations data and information. A strengthened financial model for GEO would need to be elaborated prior to 2015 to support this option;
- C In addition to option 2.1.B above, GEO will **incubate specific applications and services** based on Earth observations, and arrange for these to be adopted, supported, and managed by specific governments and organizations. GEO will maintain appropriate links with these initiatives, enabling ongoing collaboration. A moderately strengthened financial model for GEO would need to be elaborated prior to 2015 to support this option;
- D In addition to option 2.1.C above, GEO will develop and deliver, on a continuing basis, a sequence of **operational applications and services** in support of international priorities. An entirely new financial model for GEO would need to be elaborated prior to 2015 to support this option.

Currently, global initiatives conceived and incubated by the GEO Communities of Practice to address critical gaps in our monitoring and understanding of the changing planet are playing a major role in shaping the future of GEOSS.

Recommendation 2: Considering the demonstrated success of the incubation model (which brings together existing observation systems dedicated to a specific issue and sets up the conditions to ensure that global and regional observation datasets become available and easily), the Post-2015 WG recommends Plenary endorse strategic direction option 2.1.C for the period 2015-2025.

2.2 Societal Benefit Areas

GEOSS was conceived “to meet the need for timely, quality, long-term global information as a basis for sound decision making” (2005), initially in nine Societal Benefit Areas (SBAs), namely: Agriculture, Biodiversity, Climate, Disasters, Ecosystems, Energy, Health, Water, and Weather. As the community is considering the future of GEO, it is timely to also consider whether the current SBA model is still suitable, or if alternative models, including changing the number and/or scope of the SBAs, should also be explored.

The primary outcome of the 2012 Rio+20 conference was the renewed commitment of world leaders to a sustainable future that eliminates world poverty, ensures food and water security, and reduces disaster risk. Thus, the three interdependent and mutually reinforcing pillars of sustainable development as originally agreed by the United Nations in 2005⁹ - economic development, social development and environmental protection - were re-affirmed at Rio+20. Orienting the work of GEO

⁹ 2005 UN World Summit Outcome, Paragraph 48.

towards these pillars could help to ensure that GEO is delivering data and information in accordance with the priorities of its Members and Participating Organizations.

In this context, the Post-2015 WG proposes the following three options for GEO post-2015 regarding the Societal Benefit Areas structure:

- A Retain the overall current SBA structure (status quo);
- B Maintain the current basic SBA structure while allowing for modifications, and explore linkages to sustainable development framework themes:
 - Sustainable Economies (economic development);
 - Resilient Society (social development);
 - Vibrant Planet (environmental protection).
- C Restructure the work of GEO around sustainable development framework themes, building on the successes of the current SBA structure.

Recommendation 3: Given the historical background that gave rise to GEO and links with sustainable development issues since its inception (Section 1.1 above), the Post-2015 WG recommends Plenary endorse SBA structure option 2.2.B for the period 2015-2025.

2.3 Governance

The GEO governance model, wherein governments and international organizations voluntarily contribute both financial and in-kind resources to GEOSS and work together to advance common goals and projects, succeeded in ensuring the rapid start-up of GEOSS. This model, and the other aspects of current GEO institutional and secretariat support arrangements, as articulated in the GEO Rules of Procedure, may well remain appropriate for GEO in the post-2015 period.

However, there is value in retaining some flexibility in this aspect of the discussion. Given that “form follows function,” the governance model of post-2015 GEO selected by Plenary will need to reflect the full scope of the activities being undertaken as well as further develop the finer nuances that governance model implies. Issues that need further consideration include building better linkages with the Earth observation-related specialized agencies and initiatives of the United Nations, exploring how to work effectively and collaboratively with the private sector (including Non-Governmental Organizations and commercial entities), building strong national and regional GEO mechanisms, funding essential components of GEOSS in a sustained way, and refining the discussions around how best to articulate the value-adding role of GEOSS with respect to other contributors of, and coordinating mechanisms for, Earth observations.

In light of these concerns, the GEO Post-2015 WG proposes the following general governance options for consideration by Plenary:

- A The current GEO governance structure will be maintained (voluntary, non-judicial, and flexible);
- B The current GEO governance structure will be maintained (voluntary, non-judicial and flexible); additionally, linkages with other relevant Earth-observation organizations, including the private sector, should be improved and resources to sustain key components of GEOSS should be identified;
- C GEO will be constituted as a totally new, formal intergovernmental program or organization, with mandatory financial contributions and a more formalized governance structure.

Planning for GEO's Post-2015 future governance and management should also take account of the valuable reviews of GEOSS's initial implementation conducted by the Monitoring & Evaluation Working Group (M&E WG). The efforts of the M&E WG could be complemented in the period between 2013-2015 with additional expert consultations, examining issues related to GEO management structures (e.g. Work Plan, Tasks, Implementations Boards, etc.).

Once there is greater clarity of the future "function" of GEO, there will be a more informed basis for developing options on its future "form".

Recommendation 4: In the interest of preserving GEO as a flexible, agile and inclusive international partnership, the Post-2015 WG recommends Plenary endorse governance option 2.3.B for the period 2015-2025.

3 SUMMARY

The Post 2015 Working Group acknowledges that more effort is required to enable informed decisions at the Ministerial in 2013. To guide its work in 2013, the Working Group would welcome input on the strategic issues outlined in this paper.

Plenary is therefore invited to:

1. Give its opinion on recommendation 1.

***Recommendation 1:** The Post 2015 Working Group strongly believes that the need for GEO remains and that, while recognizing there is room for improvement, GEO is making significant progress towards meeting its Strategic Targets. Considering the urgency of the global challenges faced by humanity and the benefits of a response involving an international, collective approach to supplying the Earth observations, the Post-2015 WG recommends that GEO, and the implementation of GEOSS, be continued.*

2. Discuss the 4 strategic direction options for GEO post-2015 and, in particular, give its opinion on Recommendation 2.

***Recommendation 2:** Considering the demonstrated success of the incubation model (which brings together existing observation systems dedicated to a specific issue and sets up the conditions to ensure that global and regional observation datasets become available and easily), the Post-2015 WG recommends Plenary endorse strategic direction option 2.1.C for the period 2015-2025.*

3. Discuss the 3 SBA models proposed in this paper and give its opinion on Recommendation 3.

***Recommendation 3:** Given the historical background that gave rise to GEO and links with sustainable development issues since its inception (Section 1.1 above), the Post-2015 WG recommends Plenary endorse SBA structure option 2.2.B for the period 2015-2025.*

4. Discuss the 3 governance models proposed in this paper and give its opinion on recommendation 4.

***Recommendation 4:** In the interest of preserving GEO as a flexible, agile and inclusive international partnership, the Post-2015 WG recommends Plenary endorse governance option 2.3.B for the period 2015-2025.*

Annex I

With continued effort between now and 2015, the essential GEO framework for collaboration as defined in the 2005-2015 GEOSS 10-Year Implementation Plan will be in place. Having already established the basic framework for GEOSS, GEO's activities during the 2015-2025 period could focus on the following areas, or "core functions" (described briefly below), designed to catalyze broader global action on advancing the GEOSS vision.

CORE FUNCTIONS FOR GEOSS IMPLEMENTATION POST-2015

1 STRENGTHENING OBSERVATION NETWORKS (SPACE-BASED, AIRBORNE AND PARTICULARLY *IN-SITU*).

Under this activity the objective would be to:

- foster strengthened and sustained observation networks, and
- support the creation and integration of comprehensive global Earth observation programs and networks of space-based, airborne, and particularly *in-situ* observations.

It is important that GEOSS continue facilitating access to space-based and airborne observations in a sustainable manner, integrating them with *in-situ* observations. Space-based and airborne observations can cover wide swaths geographically providing strategic information for decision-making. Sustaining the world's highly dispersed *in-situ* observation systems, however, will remain a GEO-specific challenge. Many terrestrial and marine-based observation systems are clearly degrading, and key gaps exist in multiple *in-situ* networks and carbon flux tower networks. The decentralized funding and maintenance of *in-situ* networks, which are often managed by multiple organizations, poses a major challenge. Potential actions that could address these challenges include:

- Engage with the private sector and the research community to develop initiatives and activities to promote specific, low-cost, high-value techniques, standards, and methodologies for improving *in-situ* networks;
- Engage educational institutions of all levels to collect Earth observation data and maintain various observational networks according to standard protocols (not only as a means to provides valuable data, but also to engage students outside the classroom; e.g. the GLOBE program);
- Take action through GEOSS to integrate *in-situ* with space-based observations and to encourage complementary observing system design and calibration/validation systems to optimize the value delivered by integrated Earth observing systems;
- Strengthen the existing multilateral consensus around improving and maintaining critical observation networks and reference sites in a few defined geographic areas that are not the province of one government or organization (such as for polar, ocean, climate, water-cycle and water quality observations);

- Use specific demonstration initiatives within the societal benefits framework to show the value of low-cost improvements to, and integration of, targeted *in-situ* observing systems; and
- Develop frameworks for risk management to help identify where *in-situ* monitoring is most needed around the globe – both from a thematic and a geographic perspective.

2 ADVANCING INTEROPERABILITY AND INTEGRATION OF EARTH OBSERVATIONS

Since 2005, the “system of systems” architecture of GEOSS has evolved in part by advancing interoperability standards and developing an information system currently consisting of a portal, a clearinghouse, a components and services registry, and a standards registry, known as the GEOSS Common Infrastructure (GCI). Since 2011, GEOSS has evolved with the development of a brokering capability and an Earth observations common vocabulary (EOCV) that harmonizes the search and discovery of components registered in the GCI and facilitates the rapid exchange of millions of data records. In the post-2015 period, the GEO community may explore various options for the further evolution of the GEOSS information system.

3 ENHANCING DATA ACCESS AND SHARING

GEO’s founding principles and landmark achievements in promoting a global commitment to full and open data sharing can be further advanced by activities such as:

- Advocate for national GEOs and for explicit, visible, open-data initiatives within GEO member governments;
- Work with individual governments to release previously unavailable datasets through targeted demonstration initiatives;
- Collaborate with other geographic data sharing programs or platforms (whether governmental or non-governmental) by ensuring GEOSS can utilize the datasets coming from these complementary activities;
- Develop special communications and advocacy campaigns to articulate and demonstrate the economic and societal benefits of open data sharing; and
- Expand the number of datasets contained in the GEOSS Data Collection of Resources for Everyone (Data-CORE).

4 BUILDING CAPACITY

GEO has a critical capacity building role to play in relation to sustainable development as well as regional cooperation. GEO is expected to assist countries and regions needing to increase their capacity to collect, store, maintain, and utilize Earth observation data. This entails the transfer of Earth observation technologies and the development of national and regional capacity to absorb and use those technologies. These capacity building activities should be implemented both directly and in partnership with relevant development agencies, NGOs and private sector entities, including intergovernmental and national agencies associated with GEO Members. Key to GEO’s capacity building success will be networking efforts to broaden ways of acquiring and sharing Earth observation data, processing/applications technology, and scientific and technical expertise to support user uptake by the relevant authorities and other interested stakeholders.

In this context, a regional approach is useful to deepen the understanding of natural phenomena that are unique to the region; it enables neighboring countries to share common needs, ideas and

Annex II

The Working Group first met in Geneva on 21-22 March. It selected three Co-Chairs: Gilles Ollier of the European Commission, Mmboneni Muofhe of South Africa, and Peter Colohan of the United States.

Based on the two days of discussion, the Co-chairs, with support from the Secretariat, produced the first draft of a document outlining the Group's views on issues and options for consideration in the post-2015 discussion. This document, entitled "**Observing, Sharing, Informing through GEOSS: Renewing the GEO Vision beyond 2015**", (working title) was further refined by the entire WG through an iterative process from April to June.

The WG submitted version 0 of the document to the 25th Executive Committee for review and comment. Based on feedback from the Executive Committee, a full WG teleconference was held on 30 July to discuss production of version 1. Draft inputs were prepared during the month of August prior to a full WG meeting held at the Secretariat in Geneva on 6-7 September, where a document plan was developed, and the content and format of version 1 discussed.

Following several Co-chairs teleconferences with the Secretariat, version 1 was distributed to the full WG on 19 September for comments through 26 September.

The Co-chairs and Secretariat then held a teleconference on 28 September to discuss the preparation of the next major revision, based on the WG feedback. Version 2 was distributed just prior to a full WG teleconference held on 2 October.

Subsequent to the teleconference, modifications were discussed at another Co-chairs-Secretariat teleconference before version 3 was distributed to the full WG for a final round of comments by 5 October.

The final version (4) was made available to the full GEO community on 10 October as part of the document set for GEO-IX Plenary.

Annex III

GEO POST-2015 WORKING GROUP NOMINATED PARTICIPANTS

- Argentina – Conrado Varotto, Laura Frulla
- Australia – Agnes Lane, Sue Barrell
- Brazil – Minister Fábio Vaz Pitaluga, Gilberto Câmara, Julio Dalge, Hilcea Ferreira
- Canada – Luc Brûle, Michael Crowe, Brian O’Donnell
- China – Huadong Guo, Bingfang Wu, Guoqing Li, Fang Chen, Huanyin Yue
- Estonia – Tiit Kutser
- European Commission – Gilles Ollier
- France – Daniel Vidal-Madjar
- Germany – Paul Becker, Helmut Staudenrausch
- Italy – Ezio Bussoletti, Maria Dalla Costa, Stefano Bruzzi
- Japan – Takao Akutsu, Takashi Kiyoura, Toshio Koike, Rui Kotani, Osamu Ochiai, Tomoko Hirakawa Ushio, Shizu Yabe
- Norway – Per Erik Skrøvseth
- Russian Federation – Alexander Gusev
- South Africa – Mmboneni Muofhe, Imraan Saloojee
- United Kingdom – Ruth Kelman, Liz Tucker
- United States – Peter Colohan, David Reidmiller, Kathryn Sullivan, Trigg Talley
- CEOS – Brent Smith, Tim Stryker
- COSPAR – Jean-Louis Fellous
- EUMETSAT – Paul Counet, Robert Husband
- European Space Agency (ESA) – Simonetta Cheli
- International Steering Committee for Global Mapping (ISCGM) – Fraser Taylor
- International Union of Geological Sciences (IUGS) – Robert Missotten
- Open Geospatial Consortium (OGC) – Lan-Kun Chung, Jeanne Foust, George Percivall
- Partnership for Observation of the Global Ocean (POGO) – Trevor Platt
- World Meteorological Organization (WMO) – Wenjian Zhang