



GROUP ON
EARTH OBSERVATIONS

GEO-X

15-16 January 2014

Preliminary Guidance for GEO 2025

Document 5

For information.

Preliminary Guidance for GEO 2025

This document presents preliminary guidance for GEO 2025. It includes more detailed information as context for the Ministerial Summit document titled, "Ministerial Guidance on the Evolution of GEOSS" (MS4), a series of four information papers prepared by the Post-2015 Working Group on Governance, Information Architecture, Management and Resourcing, and the summary of a Private Sector Think Tank Session held in September 2013 to better frame issues related to broadening stakeholder engagement in GEO. This latter effort builds on guidance provided during GEO-IX. Each of these last five papers appear in an Appendix to this document.

THE FORMING DECADE

In 2005, the intergovernmental Group on Earth Observations (GEO) was established as a coalition of willing governments and participating organizations to build a Global Earth Observation System of Systems (GEOSS) to realize a vision for a “future wherein decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations and information”¹. GEO has set out to implement GEOSS based on a 10-year Implementation Plan, which set forth a conceptual framework that defined key activities to develop a state in which timely, quality and sustained observations and information are available for decision-making across a wide range of disciplines.

The original implementation plan envisioned GEOSS driven by user demand and guided by user requirements. GEOSS would be a step towards addressing development agendas, including the achievement of the Millennium Development Goals, and furthering the implementation of international environmental treaty obligations, prompting GEO to cooperate with UN bodies.

And through it all, advancing the adoption and implementation of GEO data sharing principles worldwide, as well as developing architecture for delivering integrated Earth observation data and information to users, would remain GEO’s key focus.

As it was conceived, GEOSS aspired to encompass all areas of the world and to cover *in situ*, airborne, and space-based observations, to focus primarily on issues of regional and global scale and interdisciplinary applications, and develop capacity to access and apply Earth observations in decision-making in developing countries.

Since 2005, GEO has proceeded to implement this vast mandate. The time and effort required to create a new international body capable of taking up a task of this magnitude, including establishing a light governance structure and soliciting the GEO community to make voluntary contributions including making their infrastructures available to, and accessible by, GEOSS, have taken longer than anticipated.

Despite challenges, GEO proceeded to develop several value-added initiatives, including for monitoring of biodiversity and carbon stocks from forests. Some of these initiatives have been developed with a ‘bottom-up’ approach, catalysing critical communities of practice to solve current challenges. Other initiatives, though also conceived within a community of practice, further received a

¹ Original GEOSS 10-Year Implementation Plan (2005)

‘top-down’ political mandate from outside of GEO, such as supporting food security through global agricultural crop yield monitoring.

While these initiatives have followed different trajectories, they all took advantage of the GEO platform for its voluntary nature and light governance structure that proved conducive to effective problem solving. Their common distinct feature is the integration of Earth observations across the entire value chain, from identifying specific needs of user communities to delivering appropriate information tools to these users. Today, these initiatives are proving their added value to communities beyond GEO’s inner circles.

The lessons learned from this journey suggest that there can be several pathways to achieving the original goal of building a fully functional GEOSS. Ministers can decide to continue with the current model of GEO governance, resourcing and mechanisms that will ensure continued but modest progress towards GEOSS, or to adopt a more robust approach that would significantly advance the development of GEOSS by increasing the commitment of the GEO community and tapping into the capacities and resources of broader stakeholder communities, including the private sector, while exploring options for an alternative management structure that would accommodate this broader and diverse participation in building GEOSS.

THE NEXT DECADE

Upon renewal of its mandate, GEO will set out to develop a pathway to achieving the Vision for GEO 2025. Although much success has been achieved in 2005-2013, many aspects of the originally envisioned GEOSS remain to be developed. Most importantly, GEOSS must keep focus on strengthening the interface with user communities, whose needs GEOSS intends to address. For this, GEO must do more and better to engage with users and document their needs as a blueprint for its future work.

The post-2015 strategic objectives and core functions defined by GEO will drive the development of a new 10-Year Implementation Plan that will lay out specific actions designed to sustain and strengthen GEO’s current achievements and make new advances that will augment the current capacity of GEOSS while strengthening GEO’s role as a key information partner serving the needs of a vast community of decision-makers.

Accelerated implementation of a robust GEOSS will provide more accurate, comprehensive and authoritative information to policy and decision-makers in critical areas of societal benefit, such as disaster risk management (through better prediction and monitoring); health (through expanded monitoring and prediction of disease outbreaks); food security (through better monitoring of real-time crop conditions and prediction of drought and floods); and energy (supporting siting and installation of renewable energy infrastructure).

To keep up with the demand for newer and better decision support tools, and to keep up with technological innovation, which delivers more information faster and farther, GEOSS must evolve more quickly into a critical information partner addressing the demand for timely, quality information and tailored decision support tools.

The following activities will lay down the pathway for the Vision for GEO 2025:

1. Advocate for the value of **Earth observations** and the need to continue **improving our capacity to observe the Earth**;
 - a. Advocate for Earth observations as a necessary prerequisite for decision support tools for sustainable management of natural resources;
 - b. Advocate for the need to improve observations of the Earth system at multiple scales through sustained national investments and leveraging international collaborations.

2. Urge the adoption and implementation of **data sharing** principles globally.
 - a. Work with countries and partner organizations, particularly in the UN system, to endorse full and open access to Earth observation data in relevant and appropriate documents of international processes;
 - b. Achieve implementation of GEO data sharing principles by the GEO members.
3. Advance **GEOSS architecture as an intelligent information system** to allow for integration and visualization of Earth observation data in more meaningful and significant ways. The evolution of the GEOSS information system will aim to:
 - a. Provide seamless open access to expanded holdings of high quality *in situ*, airborne, space-based and community/citizen observations through GEOSS DataCORE datasets;
 - b. Integrate social and economic data;
 - c. Maintain an information base on data and interoperability standards; and
 - d. House an on-line repository of the Earth observations knowledge base in the GEOSS information system.
4. Develop a comprehensive, interdisciplinary **Earth observations (EO) knowledge base**, by engaging with existing and new Communities of Practice and leveraging the expertise of partner organizations, to define clearly the observations needed for all disciplines, and facilitate that data providers worldwide acquire these observations and make them accessible and available to all users. The knowledge base will:
 - a. Document new information on essential observation requirements for key domains and integrate with existing observation requirements databases;
 - b. Allow for requirements gap analysis through an iterative documentation process; and
 - c. Document best practices, including harmonization and comparison of processing tools and methodologies.
5. Cultivate **global initiatives** for specific end-use applications to address the multitude of societal challenges. Driven by user demand, this work will include a phase of defining needed observations and thus considerably contribute to the development of the knowledge base.
 - a. Engage with major stakeholder communities, including the UN bodies, development banks and private sector to identify opportune project areas;
 - b. Develop new global initiatives on a projected average a 4-year cycle – from concept design to initial operational capability. At the end of that start-up period, the initiatives are intended to be transferred to permanent host organizations.

POSITIONING GEO FOR SUCCESS

In 2016, Ministers of GEO member governments will be asked to adopt the new 10-Year Implementation Plan and invite the GEO community to pledge to carry out Work Plan activities that will advance towards the Vision for GEO 2025.

Maintaining its distinct implementation approach, GEO will pursue the Vision for GEO 2025 with voluntary contributions, cash and in-kind, to the Work Plan and GEO Trust Fund. The ability of GEO to achieve its strategic objectives in the next decade and to develop and enhance the components described above is largely dependent on the level of resources which will be made available by Members, Participating Organizations (POs) and other stakeholders. In addition to the level of resourcing, the pace of implementation will be influenced by the level of stakeholder engagement,

including increased participation of the private and non-governmental sectors), and innovations in technology which will impact the ability of GEOSS to acquire, share and manipulate observations and data. These additional aspects are outlined in greater detail in the Information Papers in Part B of this document.

The expectations that will be set for GEO for the next decade must be commensurate with the scale of commitments by the GEO community in support of GEO – both to its Work Plan and to the GEO Trust Fund. The GEO Work Plan – a collection of nationally and organizationally funded activities that collectively advance the implementation of GEOSS – is the essence of GEO’s work. Therefore, Members and Participating Organizations must *sustain* and, where possible, *expand* their contributions to future GEO Work Plans and special initiatives. In addition, the GEO community must ensure continued contributions to the GEO Trust Fund and secondments of experts to GEO Secretariat to sustain the Secretariat’s operations and strengthen its efficiency and capacity to better coordinate and facilitate the implementation of the Work Plan, and consequently, of GEOSS. To help mobilize additional resources for GEOSS implementation, in all future scenarios, GEO will increase engagement with the private sector (including foundations and international development banks) to demonstrate the power and value of Earth observations and environmental information, and to encourage increased financial and in-kind contributions.

1 RESOURCES FOR GEOSS IMPLEMENTATION

1.1 Resources for GEO Work Plan

- To fully realize the potential of GEOSS, GEO members should *increase* their support for the GEO Work Plan, as the main vehicle for implementing GEOSS.

Recognizing that Earth observations constitute the foundation of GEOSS, GEO members should make serious commitments to continue improving Earth observation and monitoring.

Success in post-2015 must build on the achievements of the first decade; therefore, Members and Participating Organizations should make strong commitments to sustain those projects that have become critical elements of GEOSS, particularly the components of the GEOSS Common Infrastructure, information dissemination mechanisms and capacity building networks.

To successfully implement the Vision for GEO 2025, GEO Members and Participating Organizations will need to significantly strengthen their efforts to establish and maintain close ties with institutional networks within which to advocate for wider recognition of the value of Earth observations and adoption of open data sharing principles.

Broader engagement by national experts in GEO initiatives will be needed to expand the societal benefit from these initiatives to all regions where the challenges being addressed exist. Robust expert networks, especially at regional levels, are needed to understand observations gaps and gaps in institutional capacity to use information derived from these observations, most notably with respect to trans-boundary issues, such as water resource management, climate adaptation and infectious disease warning.

To drive the benefit from GEOSS further along the user chain, GEO should advance its efforts to engage the private sector, both in developing GEOSS capabilities and utilizing GEOSS resources to maximize their application to problem-solving, and in providing constructive feedback to GEO to continuously improve the outputs of its work. GEO Members should lead national efforts to engage with the private sector by creating collaborative space to prototype solutions on the basis of open-source technology, including through development of software, for visualization of information tailored to specific user needs. Successful pilots can be further adopted at regional and global scales.

With more focus on regional implementation of GEOSS, Members in each GEO Caucus should boost coordination of activities and regional capacity building, working to establish regional GOESS nodes. Collectively, these regional nodes, when implemented, will form a global GEOSS.

1.2 Resources for GEO Trust Fund

Scenario A

- An increase in contributions to the GEO Trust Fund will allow GEO to institutionalize a dedicated budget line for the operation and maintenance of the GEOSS Information System, including the provision of help desk support to allow users to contribute to, and access, information from GEOSS, and regular interface with users, resulting in a better tool and, ultimately, better information to support decision-making. With increased contributions to the Trust Fund, GEO can undertake a proactive and rigorous strategy to use dedicated staff to engage with expert communities to define and document observation needs for the development of the knowledge base. A significant increase in contributions to the GEO Trust Fund will enable the GEO Secretariat to provide sustained expert and logistical support for the design and development of future global initiatives on a projected 4-year cycle to meet the growing need for coordinated, cross-disciplinary, horizontal EO information and services in support of emerging societal needs, such as safe and sustainable transportation, green cities, global and regional health, etc.

Scenario B

- GEO may choose to moderately increase contributions, consequently restraining the target number of global initiatives and various expert functions in the GEO Secretariat. However, this scenario will significantly hinder GEO's ability to keep up with the pace of change and progress towards the Vision for GEO 2025.

Scenario C

- At a minimum, GEO must sustain the current level of contributions to the GEO Trust Fund. This scenario will continue the original approach, depending on best-effort voluntary contributions of the GEO Community resulting in slower progress.
- At this level, the Earth observations knowledge base described above will be developed on a best-effort basis by the GEO Secretariat and the larger GEO community, reaching out to stakeholders including the UN agencies. The operation and maintenance of the GEOSS Common Infrastructure (GCI) will continue, with limited enhancements, including technical support to assist users and providers of data to access and share critical Earth Observations in support of societal decision-making. The current global initiatives will be supported by the Secretariat, with much of the development being carried out by Members, POs and stakeholders, while the development of new initiatives will be limited according to the capacity of these actors to contribute and will be carried out on an ad hoc basis.

2 COMMUNICATIONS STRATEGY

GEO will continue to develop a pro-active, comprehensive, multi-faceted strategy to broaden stakeholder engagement, and to raise awareness in the global community of the benefits of globally coordinated, integrated and comprehensive Earth observation networks. GEO will also encourage new channels and mechanisms to enhance communication and coordination among members and stakeholders on a national and regional level. This strategy will widen the GEO brand and communicate the unique value of GEOSS products and information, as well as its unique capacity to enable connections and coordination among the various providers and users of Earth observations data

and information. Through an effective and sustained communications strategy, stakeholders will see how GEO can benefit them directly, potentially resulting in increased investments.

3 DEMONSTRATING VALUE FOR MONEY

In order to ensure that GEO demonstrates continuous improvement and effectively manages the funds and contributions from its Members and POs, GEO will continue to conduct regular monitoring and evaluation activities, including internal audits and reviews by third party evaluators, as described in the Information Paper on Management (see A). GEO will incorporate the findings and recommendations of past studies and will continue to monitor performance and document progress at all levels of the Work Plan.

CONCLUSION

GEO is facing an exciting future. Strategic choices and optimal levels of investment by Members and Participating Organizations will enable GEO to realize its founding vision of a future wherein decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations and information, based on an integrated and interoperable observations and information system. The increased level of resources and enhanced participation by members and organizations world-wide will allow decision makers to access an immense source of openly available data in order to tackle the challenges facing society, such as access to clean and sustainable sources of water, food and energy; sustainable environmental and economic development; and resilience to natural hazards and climate change. The increased engagement of the private sector and other organizations will ensure that GEOSS is user-driven and supports the missions of relevant agencies and players on the global and regional stage who play a role in resolving these societal challenges.

APPENDIX

INFORMATION PAPERS

INTRODUCTION

The following five papers present issues and considerations that should be taken into account as a result of acceptance of the Recommendations contained in the Vision for GEO 2025, as referenced in the 2014 GEO Ministerial Summit Declaration. The following statements contained in the Recommendations are germane:

On Governance and Management: GEO will explore options for modifications to governance, including possibilities for a strengthened role for Participating Organizations based on the experiences of other international organizations, and for a strengthened Secretariat.

On Resourcing: a specific and strengthened framework or mechanism for steady resource commitments to GEOSS, from both public and non-public sources, will be developed by 2016.

Additionally, the GEOSS architecture has been and will continue to evolve organically to take advantage of new technology.

The Executive Committee requested that the Post-2015 Working Group (PWG) produce analyses of key areas that will need to evolve once Ministers endorse the continuance of GEO through 2025. In response, the PWG produced information papers on the following four topics: Governance; Information Architecture; Management; and Resourcing. A fifth paper on private sector engagement summarizes a Think Tank Session held in September 2013. The issues raised in these five papers are not independent of one another; they are an integrated set of topics. Decisions on the issues related to each topic will depend very much on the decisions made for each of the others. The purpose of the papers is to articulate the issues, identify opportunities for their resolution, which then, taken collectively, can represent options for the future form of GEO. The resolution of these issues can then form part of the Implementation Plan and resultant Work Plan that are expected to be presented for endorsement at the next Ministerial Summit.

1 GOVERNANCE

Vision for GEO 2025: Recommendation 4.2 - Governance

In the interest of preserving GEO as a flexible, agile and inclusive intergovernmental partnership, GEO will retain its present general governance structure: a regionally-based Executive Committee comprised of Member nations reporting to a full Plenary. However, to maximize the efficiency, effectiveness and success of GEO through 2025, GEO will explore options for modifications to governance including, possibilities for a strengthened role for Participating Organizations, based on the experiences of other international organizations, and for a strengthened Secretariat.

The “governance” of GEO consists of its Rules of Procedure, as well as the structure of its Plenary and Executive Committee. GEO’s Rules of Procedure address the following elements of the organization: (1) Plenary [see below] ; (2) Executive Committee [see below]; (3) Secretariat [see Information Paper on *Management*]; (4) Implementation Boards & Working Groups [to be addressed in the development of the next 10-year Implementation Plan and subsequent Work Plans]; and (5) Trust Fund and Finances [see Information Paper on *Resourcing*]. Note, text in **bold** below is taken verbatim from the [Rules of Procedure](#).

Plenary

Generally speaking, there has been no debate around or requests to revise the structure or operations of Plenary. GEO Membership is open to all States of the United Nations and to the European Commission. Plenary is the primary decision-making body for GEO. Plenary decisions are to be made by consensus. Plenary is to meet annually to adopt an annual Work Plan and associated budget for the following years. All Members and Participating Organizations (POs) designate one Principal and up to two Alternates per delegation. Rules of Procedure may be amended (through consensus) by Plenary. Four GEO Members will co-chair meetings of the Plenary, with each Plenary’s Chair rotating among the four GEO Co-Chairs. The process for selection of the four Co-Chairs is addressed under the ‘Executive Committee’. These aforementioned facets of GEO’s Plenary have not received any request for modification and are, therefore, deemed not to be in need of further discussion. The following two issues, however, may be worth additional consideration:

GEO welcomes, as Participating Organizations, intergovernmental, international and regional organizations with a mandate in Earth observation or related activities, subject to approval by GEO Members. GEO may invite other relevant entities to participate in its activities as observers.

- Should other relevant entities (i.e., national or sub-national) be welcomed as POs? Is there an ongoing need to distinguish between “Participating Organizations” and “Observers”? Should there be a special category of POs to distinguish among the major intergovernmental POs, such as the UN agencies, and global professional bodies/associations, such as CEOS and IEEE?

Membership and Participation is contingent upon formal endorsement of the Implementation Plan.

- What mechanism will be employed to ensure all existing POs endorse the new Implementation Plan to be developed by the end of 2015/early 2016 (i.e., endorse in statement in Plenary; submit letter to Secretariat)?

Executive Committee (ExCom)

Acting by consensus of the Members present, the role of ExCom is to facilitate the decisions of the GEO Plenary and to oversee and to make recommendations on the implementation of those decisions. It will meet at least once annually, working mainly by email and teleconference. Four ExCom Members will serve collectively as Co-Chairs of the ExCom, with two Co-Chairs representing developed countries and two Co-Chairs representing developing countries. One Co-Chair will serve as lead to guide the discussion for each meeting. The lead Co-Chair will rotate among the Co-Chairs, as agreed by the Co-Chairs.

Individuals serving on the Executive Committee do not serve in their individual capacity but as Member representatives, as well as representatives of their regional caucuses. These facets of GEO's ExCom have not received any request for modification and are, therefore, deemed not to be in need of further discussion. The following issues, however, may be worth additional consideration:

The Executive Committee will consist of 13 GEO Members based on the following geographic distribution: Africa (2), Americas (3), Asia and Oceania (4), CIS (1) and Europe (3).

- There has been Plenary endorsement (GEO-IX in Brazil) of the regionally-based ExCom structure. However, discussion may be warranted with respect to whether the number of ExCom Members States ought to be expanded, though there are concerns that an expanded ExCom could weaken its efficiency and become more cumbersome. If an expanded ExCom is to be pursued, under what conditions/selection criteria should additional Members be added? Is there a way to incentivize financial or in-kind contributions to the Trust Fund or Secretariat – or leadership of Work Plan Tasks or Boards – through ExCom Membership?
- There appears to be agreement that ExCom membership be reserved solely for Member States. However, should there be an opportunity for POs to observe and provide input to ExCom meetings? Should such an opportunity be open to all POs or should PO 'caucuses' be developed (e.g., UN organizations; other international organizations; academia; non-governmental organizations/foundations; trade associations; commercial entities) – each of which may then nominate a single representative to attend ExCom meetings? How can the ExCom best solicit and consequently discuss what the POs might want from such engagement?

Executive Committee Members, including those Members serving as Co-Chairs, will be nominated through regional caucuses. Based on the conclusions of the regional caucuses and further consultations, as necessary, the Director of the Secretariat will present a slate of nominees, including those nominated to serve as Co-Chairs, to the Plenary for its approval.

- While there has been Plenary endorsement of the regionally-based structure of GEO's ExCom, are there other processes that should be explored for a Member to be nominated for Plenary approval? Should there be a suite of criteria that must be met for a Member to be nominated for ExCom?

Upon approval, Executive Committee members will serve a term of up to two years.

- Should an ExCom Member's term length be extended beyond two years? Should there be any limit to how many consecutive terms a Member can serve on ExCom – or should these decisions be left to individual Regional Caucuses to decide?

The ExCom process will be guided by the following principles: (1) preserving sufficient continuity in the Executive Committee's membership; (2) ensuring sufficient opportunity for participation of GEO Members in the Executive Committee by rotation; (3) preserving the balance of developed and developing countries at the level of the Co-Chairs. If a Member chooses not to complete its term of service, then the regional caucus may select another Member to represent it in the Executive Committee to complete the remaining term of service.

- Should additional principles be considered for ExCom Membership (e.g., active engagement in GEOSS tasks or committees)?
- Should Regional Caucuses continue to be charged with determining ExCom rotation/Membership?

Next Steps

As we develop the new 10-year Implementation Plan, the Director of the Secretariat will solicit brief descriptions of governance structures from various international organizations (e.g., the Intergovernmental Panel on Climate Change (IPCC), Universal Postal Union (UPU), and International Labor Organization (ILO)). Results shall be compiled and presented to both ExCom and Plenary for information. Additionally, the Secretariat shall survey Members, POs and Observers for specific ideas on how the governance of GEO can be improved. Specifically, this survey would seek improvements to GEO's Rules of Procedure, as well as the structure (i.e., number and selection /rotation processes) of its Plenary and ExCom. An initial list of the most relevant Earth observing user organizations in the UN system could be put together, starting, for example, with co-located programs at WMO (e.g., GFCS).

2 INFORMATION ARCHITECTURE

GEOSS must continue to evolve in order to achieve the following recommendations from the Vision for GEO 2025:

- Recommendation 1: *GEO and the implementation of the GEOSS will continue through 2025.*
- Recommendation 2: GEO Strategic Objectives
 - *Facilitating enhanced access to: 1) national, regional and global Earth observation data and information (including “big data”) by implementing a robust and user friendly GEOSS information system that links available systems, also taking advantage of repositories of “big data”; and 2) tools to transform the data and information into useable formats for resource management and decision making;*
- Recommendation 3: Societal Challenges
 - *GEO and GEOSS will build stronger relationships with complementary global Earth observation organizations;*
- Recommendation 4.1: GEO Core Functions
 - *Strengthening observation systems (space-based, airborne and, particularly, in situ) and networks among observation systems;*
 - *Building and sustaining an information system that provides access to the data and products of its Members and Participating Organizations;*
 - *Developing capacity to collect and use Earth observations, and promoting regional GEOSS implementations; and*
 - *Engaging with users and decision-makers to ensure a user-driven GEOSS.*

GEOSS technical developments post-2015 must continue to follow and reaffirm the following core principles of GEO:

- Open and full data sharing (ensuring no-cost or low-cost/cost of duplication of data sets); and
- Interoperable, accessible and open information architecture.

Post-2015 GEOSS should:

- Revise and update system architecture and data architecture for GEOSS (GEOSS Information System) that adopts a flexible approach that will allow GEOSS to exploit the evolution of IT (information technology) as it occurs; and
- Grow into a true ‘system of systems’, allowing diversity of approaches and partner technologies that utilize the open standards as the glue between the GEOSS portal and other Earth observation information systems from diverse communities. Unity in diversity of information systems will be ensured by use of adopted GEOSS standards by both core GEOSS portal and partner contributions.

In addition to continuing to promote interoperability and data discoverability, the GEOSS post-2015 Information System should be:

- User friendly;
- Secure;
- Scalable;

- Extensible (for example, social networking and coding should have a place in GEOSS architecture to grow not only institutional partners but accept contributions from citizen-scientists);
- Operational 24/7;
- Agile and deployable to regional nodes.

Furthermore, in addition to the all-important metadata record discovery and brokering of data, GEOSS (and/or partners in the GEOSS systems of systems) should provide:

- Thematic mapping facilities around Societal Benefit Areas;
- Standardized templates for information products/maps by Societal Benefit Areas to facilitate ease of use;
- Data models and informational models for *in situ* and observational data in common use in various societal challenges (such a hydrographic models);
- Easy to understand apps that describe information captured in metadata around data provenance, quality and ownership;
- Apps (provided by GEOSS portal and partners) for data collection that are societal challenge-specific, such as for field data collection;
- Apps to create GEO community technical support, training and development of new GEOSS functionality (potentially a GEO *git.hub* site tied to the GEOSS portal).

GEO will also need to create guidelines or policies for the contributors and users of GEOSS in the following areas:

- User privacy and tracking of both providers and users for either political or monetization purposes;
- Security of the GEOSS architecture;
- Governance and resourcing of GEOSS to ensure reliability;
- Creating a marketplace for added-value commercial data products that can be provided to the users of GEOSS as an adjunct to GEOSS. Free core GEO data assets would remain the central purpose of GEOSS.

For GEOSS to operate as a **world reference** in the domain of Earth observations then it must become as robust and reliable as other available professional tools that enable the uploading and downloading of EO data. This will require GEO participants to **commit resources** for this system so that it continues to be developed, run and evolved in a professional way. This will be the overarching challenge facing post-2015 GEOSS.

3 MANAGEMENT OF GEO

In order to function effectively, GEO requires good coordination between its managerial (Secretariat), technical (Implementation Boards and Task leads) and decision-making (i.e., Executive Committee and Plenary) parts of the organization. At the same time, GEO must continuously provide a self-assessment of the progress towards achieving its Work Plan goals and strategic targets through the Monitoring & Evaluation process. The management and implementation structures of GEO, therefore, include: 1) the oversight of its performance; 2) formal structures such as committees, working groups, task forces and Implementation Boards; and 3) informal structures such as the Task teams, leads and Communities of Practice. The GEO Rules of Procedure outline the current functions of both the GEO Executive Committee and GEO Secretariat². These structures may be adjusted as and when necessary by the GEO Plenary.

In the Post-2015 period, the management structure of GEO requires more seamless coordination among the Executive Committee, the Secretariat, the Members, Participating Organizations, the Private Sector and the technical teams (Implementation Boards, Task Forces and Working Groups). To accomplish this, the Post-2015 Working Group identified a number of ideas for further

² *The Executive Committee*

The role of the Executive Committee is to facilitate the decisions of the GEO Plenary and to oversee and to make recommendations on the implementation of those decisions. The Executive Committee will:

- a. Ensure the efficient conduct of GEO business between meetings of the plenary;
- b. Supervise the work of the Director of the Secretariat and ensure that it is consistent with the
- c. direction received from Plenary;
- d. Facilitate the process of the development of the Annual Work Plan and budget in preparation for its presentation to Plenary; and
- e. Report in writing at least annually to GEO Plenary.

The Secretariat

The role of the Secretariat will be to coordinate, facilitate, manage, support and ensure sufficient outreach of and for GEO activities. The Secretariat, led by the Director, will facilitate and support GEO activities by:

- a. Preparing and submitting, for Plenary approval, the Annual Work Plan - including activities and
- b. budgets;
- c. Supporting the implementation by Members and Participating Organizations of the Annual Work Plan and executing expenditure of the budget;
- d. Providing annual reports on the performance of GEOSS and on Secretariat operations;
- e. Organizing, preparing and supporting all activities of the GEO Plenary, Executive Committee and GEO Implementation Boards and working groups;
- f. Pursuing activities to identify and secure funds for Secretariat operations and GEO activities in accordance with the direction of GEO;
- g. Overseeing the implementation of the GEO communication strategy as outlined in the Annual Work Plan;
- h. Organizing the GEOSS communities of practice as required in coordination with GEO Implementation Boards as appropriate;
- i. Facilitating overall cooperation and liaising with GEO Members and Participating Organizations, and other programmes and bodies, as appropriate or as needed, to support the work of GEO, with particular emphasis on existing systems and Earth observation coordination mechanisms; and
- j. Identifying staffing and other resources necessary to support the Annual Work Plan.

consideration on the basis of critical management issues, namely coordination, resourcing, membership and achievement of strategic targets:

- To support the Secretariat, especially post-2015, Members, Participating Organizations and the Private Sector should avail resources including, in-kind and financial support of activities of GEO and experts to serve on Implementation Boards, Committees, Task Forces, Working Groups and to lead tasks. Some nations are not in a position to contribute direct financial resources to the Secretariat. However, the needs of the Secretariat – and GEO more broadly – extend beyond pure financial resources. As such, Members and Participating Organisations are encouraged to increase in-kind contributions provided to the Secretariat. An example would be the hosting of workshops and related events in support of specific GEO activities and local-based experts to support the work of GEO remotely. (See Resourcing paper);
- The Secretariat, in turn, must ensure that the needs of Members and POs in all GEO activities are serviced adequately. The establishment of an Executive Secretary role within the GEO Secretariat should be explored and, perhaps, one rapporteur, to coordinate and compile all GEO documentation with one voice, to maintain the schedule of comment and review on Plenary and Executive Committee documents, and to ensure that the views of Members and Participating Organisations are well documented and reflected. The Executive Secretary could be assisted by the Scientific Officers in producing documentation, but would relieve those officers of the duty of version control and document management, so they may focus on content;
- The functioning of GEO to date has generally suffered from a lack of coordinated action between the technical (i.e., Work Plan) and decision-making (i.e., Executive Committee and Plenary) sides of the organization. With the adoption of the 2012-15 Work Plan, a new management structure was put in place that has Implementation Boards overseeing and coordinating the work of the Tasks, which make up the Components of the Work Plan. While the current reporting system through the Implementation Boards is an improvement, it is still too weak for a sound decision-making process. The process for making decisions at implementation level needs to be clearly defined;
- However, GEO has a built-in structure to continuously provide a self-assessment of the progress of the Work Plan through the Monitoring & Evaluation Working Group (M&E WG). While the M&E WG makes recommendations for action based on their assessments, there is currently no mechanism to ensure these recommendations are translated into actions whose progress is then assessed and reported on. One option to resolve this could be for the Executive Committee to delegate the recommendations of the M&E WG to Task Coordinators who will translate the recommendations into distinct actions for the Component Leads to carry out, with the Implementation Boards ensuring progress towards completion; and
- The growth in GEO membership has started to taper. In order to increase GEO Membership, active participation and to improve contributions to the trust fund and GEO tasks, the Secretariat must strengthen its outreach programme and improve visibility.

Role of the Secretariat

The role of the Secretariat will be to coordinate, facilitate, manage, support and ensure sufficient outreach of and for GEO activities. While the Secretariat has historically performed its functions capably, it has suffered from a lack of staff and resources in recent years. Members and POs typically second highly-skilled experts in their field to perform specific duties. In order to utilize their skills efficiently, a system must be put in place to ensure they receive proper administrative support in performing their work. In an effort to bolster the Secretariat, novel, creative ideas in terms of staffing and resourcing ought to be explored. For example, providing the Secretariat with Geneva-based secondees is often cost-prohibitive for many Members and Participating Organizations. So, while a

core Secretariat staff should be based in Geneva, additional secondments – based in their home institution (whether Member nation or Participating Organization) – should be allowed and encouraged in an effort to broaden GEO’s global reach, while allowing the Secretariat to complete its work more efficiently and effectively.

Besides the coordination function, the Secretariat should also enable the practicalities of the implementation process (e.g., transferring the data/information/etc. of the GEO tasks into the organizations/programs responsible for the sustainable use of these and other GEO outcomes). The resources for the Secretariat are currently limited and probably not enough. As significant higher contributions are not very likely in the current circumstances, other ways, such as virtual staff, should be explored. Those virtual staff would remain at their home institutions, but with firm commitments to work for the GEO Secretariat at a certain percentage of their time.

The necessary resources for implementation need to come from existing programs of GEO Members and Participating Organisations, based on reliable commitments, where GEO has the role of a broker to enable such agreements among GEO Members. The process for this needs to be made clear. To facilitate this, a multilateral funding system (e.g., through joint funding calls, matching fund systems, or the like) should be developed.

GEO can bring together users and providers. The GEO Secretariat should take more responsibility for this. The process and conditions of this cooperation should be clearly described, transparent and reliable. A starting point would be to negotiate Memoranda of Understanding (MOUs) between user programs and GEO.

4 MOBILIZING RESOURCES FOR GEOSS IMPLEMENTATION

Vision for GEO 2025: Recommendation 4.5 - Resources for GEO and GEOSS post-2015

The resourcing mechanisms for the implementation of GEOSS post-2015 will continue to rely on voluntary contributions. Based on this voluntary contribution principle, a specific and strengthened framework or mechanism for steady resource commitments to GEOSS, from both public and non-public sources, will be developed by 2016. This framework will enable GEO to sustain the essential technical and administrative components of GEOSS in the period post-2015 (GEO Secretariat and GEOSS Information System). Additionally, this framework will include support mechanisms for improving the participation of developing countries in GEO, and for the development, as appropriate, of global initiatives. In order to document global support to GEO and its added value, a dedicated registration system will be established to record resource contributions to the GEO Work Plan.

GEOSS implementation relies on resources (in-kind and cash contributions) mainly for the following areas of activity:

1. Growing holdings of earth observation data, information, applications and tools, development, infrastructure for disseminating this information to users, and the underlying development activities;
2. Day-to-day management of the GEO “process”:
 - a. Secretariat operations;
 - b. Support to developing countries.
3. GEO outreach to broaden stakeholder engagement;
4. Capacity building worldwide.

Enhanced resourcing efforts are needed to:

- Increase the number of contributing members and POs :
 - GEO Caucuses may consider setting a goal for a “caucus-level” contribution, distributing the burden among the caucus members.
- Tag GEOSS in national allocations/programmes for EO-related projects that align with GEOSS objectives to ensure direct traceability and linkage to GEOSS, simultaneously promoting awareness about GEOSS/GEO;
- Create “Challenge grants” (donor agencies to match/increase national/regional contributions).
- Engage the commercial sector in the development and operations/maintenance of the GEOSS Architecture/Information System – open this area of GEOSS to participation from the commercial sector, inviting current, state-of-the-art solutions for seamless and timely access, thereby simultaneously driving healthy competition and innovation, and freeing up GEO Members/Participating Organizations’ resources for other activities;
- Build stronger ties and connections with ‘development’ (foreign aid) communities so their investments/funded projects are guided by information from GEO and the active participation of developing countries in GEO will be enhanced;
- Stimulate virtual secondments;
- Pursue the development of regional GEOSS nodes (i.e., regional implementation of GEOSS), thereby encouraging more responsibility and sense of ownership for successful regional implementation of GEOSS among the countries in the regions:

- Countries within regions should be encouraged to contribute experts to coordinate and manage regional activities. This will contribute directly to individual capacity building in the region;
- Countries should be encouraged to share capacities and resources, particularly *in situ* observations providing key resources and content to GEOSS.

5 GEO PRIVATE SECTOR THINK TANK SUMMARY

Context

This summary reflects high-level findings from the Think Tank conducted by Space Bridges Sarl in September 2013 for the Group on Earth Observations (GEO). As the initial phase of the GEO Private Sector Initiative, the Think Tank generated strategic perspectives to identify opportunities and risks related to developing market relationships with the Private Sector. The Program included research on trends and in-depth phone interviews with approximately fifty targeted individuals—Earth observation (EO) industry leaders and innovative thinkers from diverse market sectors and disciplines. Fourteen of these experts participated in a 1-day Workshop convened in Geneva on 28 October, hosted by the GEO Secretariat.

Conclusions

The prospects for GEO's Private Sector market development are many. Fundamental demand for EO/geospatial information is very strong across all sectors (private and public). Moreover, demand is expanding rapidly as technology innovations in sensors and satellites *et al* converge with cloud computing, mobility, and social sharing tools that connect people to EO data more efficiently. Together, these forces are producing new geospatial data streams (private and public) and new techniques to more easily exploit the data downstream in the value chain. In turn, these trends can have a positive influence on GEO's strategy, product, planning, process, resources, channels and partner choices to support broader Private Sector engagement.

The foremost concern for GEO is that, as one Workshop participant put it, "*at this point, we don't know what we don't know*" about which aspects are most critical to Private Sector engagement success. Several definitive factors have, however, emerged from the Think Tank exercise:

- As an entity, GEO is very difficult for 'outsiders' to grasp—particularly for Private Sector executives with little Public Sector experience, even when they have been repeatedly briefed. This difficulty is rooted in material differences in organizational and business cultural anchors that shape expectations, motivations, and communication styles;
- The Private Sector is not monolithic—a narrower focus, pinpointing sector-specific data interests and criteria is needed before serious engagement efforts are launched;
- GEOSS data scope and portal functionality are probably not currently sufficiently robust to satisfy Private Sector needs over the long-term—*power users* will want more precise harmonized data sourced from both public and private providers;
- To successfully engage, GEO must be willing to create a 'business model' or articulate a value proposition in order to earn Private Sector trust that GEO will be able to sustain a consistent data supply regardless of the level of Member States' voluntary funding commitments.

A Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis for GEO's Private Sector engagement is shown in the chart below.

GEO Private Sector SWOT Essentials



Critical Issues

- GEO must clarify its ambitions—*expressed as Mission, Vision and Strategy*—as a foundation for communicating its purpose and value in clearer terms to Private Sector audiences worldwide.
- GEO is handicapped by a chasm between Public and Private Sector perspectives, 'language', expectations and pace.
- GEOSS 'public' data has significant potential value for many EO/geospatial analytics—however technology innovations are enabling competitive 'private' data alternatives.
- GEO must formalize its product strategy and organizational resources to develop, manage and sustain service quality/consistency that Private Sector markets require.

The Private Sector Roadmap

Resolving these issues will require GEO to declare its path forward and define clear and measurable outcomes. Although some of the critical issues listed are connected to legacy strategy and structure, most are related to the need for a *classic* formal technology product development approach.

Product Technology Roadmap: Obsessively focused on market needs and differentiations by customer type or segment to align the go-forward plan, product technology development roadmaps examine the broad market contexts in order to identify best solutions for needs, define value models, and assess capacity required to offer value, based on technical and service attributes.

GEO should begin developing a Roadmap as early as possible in 2014 in order to be ready in early 2015 to launch (a yet to be determined) GEO Private Sector market solution platform. Three core question areas should be resolved and answered in the process:

- **The Market Offering:** What is the GEO data product? What is the specific value proposition—and for whom? Is it real? How can it be measured?
- **The Delivery Mechanism:** What is the product platform? What will it take to succeed? Is it scalable? Is it worth it?
- **The Relationship Network:** Who can help GEO achieve success objectives—and precisely how and where in the process? In the long term, how can GEO ‘win’ in this market? And what does ‘winning’ mean?

Priority Action Items

GEO could begin with three strategic actions that will guide the product development Roadmap. These three actions will also support ongoing services improvement to meet the core (public sector) GEO Community needs. These ‘bridging’ actions will give GEO a straightforward and transparent assessment of risk, opportunity and requirements to successfully pursue Private Sector engagement.

1. Assemble the GEO ‘Thesaurus’ (Effective Communications)

To overcome the ‘language gap’, GEO must translate its value into terms that the Private Sector can easily understand—and must itself become fluent in how Private Sector decision makers assess value, risk and relationships;

2. Target a Specific Market Sector (Value Analysis)

Select a specific market sector (vertical or horizontal) and leverage GEO Community expert knowledge to identify a ‘use case’ for GEO data where the impact of GEO data is already recognized and the foundations (needs and value) are easier to find and quantify. Analyze the ‘use case’ to define requirements and evaluate the impact—reflecting all roles and inputs along the information value chain. Actively engage GEO Private Sector advisory bodies (organized by sector, function, or value chain position) for assistance and critical insight throughout the process;

3. Conduct a Product Strategy Development Pilot (Repeatable Process Model)

Examine and validate the selected market sector needs and evaluate the product positioning implications for GEO—particularly how value will be exchanged in the GEO/customer relationship and how to mitigate risk. Outline the product system alternatives (offering scope, delivery mechanisms, processes, resources, partners, development timeframe, budget and milestones) and align with viable approaches for sustainable value exchange (Value Model).