

*Proposed & Transitional*

**Terms of Reference  
Global Geodetic Observing System (GGOS)  
2006 – 2007**

*(Until New Terms of Reference to be officially adopted at  
IUGG/IAG Meeting July 2007 Perugia)*

*These Terms of Reference are modifications to the existing approved Terms of Reference prepared during the establishment phase of GGOS from 2003-2005. The primary changes are primarily structural in nature, focusing on the organization of the Steering Committee and Science Panel.*

**Preamble**

The proposal for the Global Geodetic Observing System (GGOS) was developed by the GGOS planning group from 2001 to 2003 according to by-laws of the International Association of Geodesy (IAG). The proposal was accepted by the IAG Executive Committee and the IAG Council at their meetings during the XXIII IUGG General Assembly in Sapporo in July 2003. GGOS was endorsed by the IUGG through Resolution No. 3 at the same General Assembly. During the IAG General Assembly held at Cairns in August 2005, the GGOS implementation plan was accepted as a draft, the Chair (Prof. Ch. Reigber) retired, and the IAG appointed a new Chair (Prof. M. Rothacher) and two supporting Vice-Chairs (Ms. R. Neilan and Prof. H-P Plag) to lead the next phase of GGOS development through 2009.

GGOS provides the basis on which future advances in geosciences can be built. By considering the Earth system as a whole (including the geosphere, hydrosphere, atmosphere and biosphere), monitoring Earth system components and their interaction by geodetic techniques and studying them from the geodetic point of view, the geodetic community provides the global geosciences community with a powerful tool consisting mainly of high quality services, standards and references, theoretical and observational innovations.

**Vision, Mission and Objectives of GGOS**

The **vision** of GGOS is to :

- Integrate different techniques, different models, and different approaches in order to achieve a better consistency, long-term reliability and understanding of geodetic, geodynamic and global change processes;
- Provide the scientific and infrastructure basis -as geodesy's significant contribution to

global change research in Earth sciences;

- View the Earth system as a whole by including the solid Earth as well as the fluid components, and the static and time-varying gravity field;
- Provide geodesy's contribution (products and discoveries) to Earth sciences and to the other scientific and application disciplines, and thus to assert the position of geodesy in geosciences;
- Integrate the work of IAG and to emphasize the complementarities of the broad spectrum of geodetic research and application fields.

The **mission** of GGOS is to:

- To become the *collective voice for IAG*;
- Promote the data and products of the Services;
- Ensure the stability and monitoring of the three fundamental fields of geodesy, namely *geometry and kinematics, Earth orientation and rotation, and the gravity field and its variability*;
- Work through the Services, Commission and their participating organizations to collect and archive geodetic observations, products and models, and to ensure their reliability, consistency and availability;
- Identify a consistent set of geodetic products and establish the requirements concerning the products' accuracy, time resolution, and consistency;
- Identify IAG service gaps and develop strategies to close them;
- Stimulate close cooperation between existing and new IAG Services;
- Promote and improve the visibility of the scientific research in geodesy;
- Achieve maximum benefit for the scientific community and society in general.

The key components of GGOS to accomplish this mission are the IAG Services and Commissions. The Services provide the infrastructure and products on which all contributions of GGOS will be based. The IAG Commissions provide expertise and support for the scientific development within GGOS. In summary, GGOS is geodesy's central interface to the scientific community and to society in general.

In order to fulfill its mission, the **objectives** of GGOS are to:

- Aim at maintaining the stability of and provide open access to the geometric and gravimetric reference frames as well as time series of data and products, by ensuring the

generation of uninterrupted state-of-the-art global observations related to the three fundamental aspects of geodesy;

- Focus *in the first phase* on all aspects relevant to ensure the *consistency of geometric and gravimetric products*, which includes space-borne and terrestrial aspects;
- Target an overall accuracy and consistency of GGOS products of the order of  $10^{-9}$  or better;
- Work to ensure the consistency between the different geodetic standards used in the Services and the geosciences community, in agreement with the international unions;
- Aim at improving the geodetic models at the level required by the observations.

IAG is a participating organization of the Group on Earth Observations (GEO) – GGOS acts on behalf of the IAG in GEO and actively contributes to the Global Earth Observation System of Systems (GEOSS).

GGOS is established as an official partner in the United Nation's Integrated Global Observing Strategy Partnership – IGOS-P (effective May 25, 2006).

### **Science Theme and Rationale**

The theme of GGOS is *Earth System Dynamics*, focusing on global deformation and mass exchange processes in the System Earth. The theme and rationale must be scientifically sound, broad and include all the activities that GGOS will aggregate today, and envisage in future. The GGOS Science Plan, defining the GGOS science rationale, is prepared by the Science Panel and approved by the GGOS Steering Committee; the plan will guide the Steering Committee tasks. The Science Plan shall provide a logical framework within a broader science and application context, including an analysis of the state-of-art in the science and technology fields, strength and deficiencies, and recommendations of what should be done.

Under the GGOS umbrella of *geometry*, *Earth rotation*, and *gravity field* this theme of *Earth System Dynamics* coordinates virtually all facets of geodesy. In addition, it may easily be translated and understood through tangible, individual sub-themes and a wide variety of service products. GGOS will bring together the following scientific questions and focus areas:

- Global patterns of tectonic deformation (with densification realized at regional scales) including inter-plate and intra-plate deformation,
- Global patterns of height changes (in one datum, on all time scales, of geodynamic as well as of anthropogenic origin) on land, of ice covers (including glaciers), and of sea level,
- Deformation (loading as well as expansion) due to the mass transfer between atmosphere,

- hydrosphere including ice and solid Earth,
- Separation of effects of mass changes from motion and from thermal expansion,
  - Separation of ocean effects from solid earth effects (e.g., sea-level estimation),
  - Quantification of angular momentum exchange and mass transfer,
  - Assessment of the angular momentum and mass balances in the Earth system model, and
  - Quantification of mass exchange between the components of the system Earth.

The above list is not meant to be final and can be further developed.

GGOS and its related research and Services' products will address the relevant science issues related to geodesy and geodynamics in the 21st century, but also issues relevant to society (global risk management, geo-hazards, natural resources, climate change, severe storm forecasting, sea-level estimations and ocean forecasting, space weather, and others). It is an ambitious program of a dimension that goes beyond IAG, requiring a strong cooperation within the geodetic, geodynamic and geophysical communities, and externally, to related endeavors and communities.

The GGOS Science Plan will serve as the basis for the implementation of GGOS through 2009 with a derived work plan. Furthermore, the Plan should become an attractive document for presentation to potential future partners, sponsors, and clients.

### **Organization and Structure of GGOS through 2007, and towards 2009**

The organizational structure of GGOS is comprised of the following key elements:

1. **GGOS Steering Committee** – is the central oversight entity.
2. **Executive Committee** – which serves at the direction of the Steering Committee and to accomplish day-to-day activities of GGOS tasks.
3. **Science Panel** – represents the geodetic and geophysical community.
4. **Services and Commissions**
5. **Working Groups** – which are independent of the tasks of the IAG Services, and are a mechanism to bring the various Services' and commission activities together, e.g., common product standards, conventions, consistency, etc.
6. **GGOS Secretariat** – to provide support to GGOS, the GGOS Chair(s) and Executive Committee.
7. **GGOS Committee Representatives** – to various organizations, especially the Group on Earth Observations (GEO) and related GEOSS committees and working groups.

**Steering Committee Structure of GGOS 2006 – 2007, and basis for 2009**

The Steering Committee is a consensus body with 2/3-majority vote for changes to the Terms of Reference and majority vote for meetings or decision where a simple majority is present. *Robert's Rules of Order* shall govern procedures, when not specified by these transitional terms of reference. The Steering Committee shall meet twice yearly.

**Steering Committee (all voting members):**

GGOS Chair (votes in case of a tie)	1
Vice-Chairs	2
Service Representatives*	10-13 (1 per Service)
IAG Commission Representatives*	4
GGOS Working Groups*	7 or more
Representatives related to GEOSS*	6 or more
Chair of GGOS Science Panel	1
Members at Large	3 or more
<u>IAG President</u>	<u>1 (ex-officio)</u>
	35 (or more)

\* Each primary representative can designate an alternate person who can assume the responsibilities, i.e., vote, when the primary delegate can not attend. Various electronic voting methods are acceptable, e.g., email, telecon, fax, etc., when necessary.

**Executive Committee:**

GGOS Chair	1
Co-Chairs	2
<u>Voting Members of the SC</u>	<u>3</u>
	6

The Chair appoints an independent Nominations Committee to solicit candidates for the Executive Committee (EC). The candidates must be current voting members of the SC. These candidates for the three (3) positions on the EC are nominated or self-nominated by the current voting members of the Steering Committee. The Nominations Committee presents the list of nominations to the SC for a vote. Other observers may be invited to attend EC meetings, usually teleconferences, as needed.

**Science Panel:**

Independent and multi-disciplinary Science Panel	7-12 members
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Members are based on recommendations from the GGOS community and candidates are approved by the Steering Committee. The Science Panel shall elect their own Chair to be approved by the Steering Committee. The Science Panel will develop the science plan and present it to the Steering Committee; an annual review of progress accomplished towards the plan will be addressed at one of the annual meetings of the Steering Committee.

***Services and Commissions:***

As noted above in these Terms of Reference, the key components of GGOS are the IAG Services and Commissions.

***GGOS Secretariat:***

Provides a coordination office to support GGOS and the Executive Committee and perform day-to-day activities in support of GGOS and specific assistance functions. *(To be filled through a call for participation.)*

***Working Groups and Committees:***

Working Groups are established by the Steering Committee as needed. The chair of a WG is appointed by the Steering Committee. The members of WGs are nominated by the WG Chair and confirmed by the SC

The following general principles are observed in order to establish GGOS working groups:

- GGOS will be based on the existing IAG Services and their products. GGOS is not taking over tasks of the existing, and well working IAG Services. GGOS will provide a framework for existing or future Services and strive to ensure their long-term stability;
- New entities will be established only if there is a compelling requirement;
- GGOS must be recognized by partners outside IAG: governments, inter-governmental organizations, non-governmental organizations (NGOs), (e.g, WCRP, IGBP, GEO/GEOSS, UN-OOSA, UNESCO, ICSU, IGOS-P, GOOS, GTOS, GCOS, CEOS, etc.), as geodesy's most important contribution to Earth sciences. For this purpose, contacts have to be established with these organizations;
- GGOS must promote interdisciplinary research in geodesy;
- GGOS will provide standards, conventions and strongly encourage compliance to quality assurance (validation, calibration, ensure the 1 part per billion [ppb] level) through increased interaction of the GGOS components, especially the Services.

**Approval of the Terms of Reference**

*These Terms of Reference were provisionally approved by IAG EC April 3, 2006, and by the GGOS SC, April 2006 Vienna – edits were suggested and have been incorporated for a follow-up distribution to the Steering Committee. The final version will be forwarded to IAG not later than the end of May 2006.*

**Appendix**

*For detail on GGOS transitory structural element see:*

*<http://geodesy.unr.edu/ggos/>*

**Organizational Diagram**

**Steering Committee and Science Panel Membership of the Global Geodetic Observing System, May 2006**