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of Geodesy



Global Geodetic
Observing System

GGOS Terms of Reference 2023



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Global Geodetic Observing System (GGOS) of the International Association of Geodesy (IAG)

Terms of Reference 2023

Preface

The proposal for the Global Geodetic Observing System (GGOS) was developed by the GGOS planning group between 2001 and 2003 according to the Bylaws 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.

Changes in the IAG Bylaws in 2007 resulted in GGOS being recognized as an integral component of IAG along with Services and Commissions. This transformed the status of GGOS from that of an IAG Project to an IAG component. Specific to GGOS are IAG Bylaw numbers 1(d) and 15.

The Terms of Reference of GGOS are regularly updated according to changes in the Statutes and Bylaws of its parent organization, the IAG, new strategic challenges for GGOS, achieved objectives, and organizational changes to meet new user needs or to be in line with global initiatives in geodesy matters. Previous versions of the GGOS Terms of Reference are available in the Geodesist's Handbooks of 2008 (<https://doi.org/10.1007/s00190-008-0259-0>, pages 826 – 829), 2012 (<https://doi.org/10.1007/s00190-012-0584-1>, pages 915 – 926), 2016 (<https://doi.org/10.1007/s00190-016-0948-z>, pages 1079 – 1094), and 2020 (<https://doi.org/10.1007/s00190-020-01434-z>, pages 197 – 220).

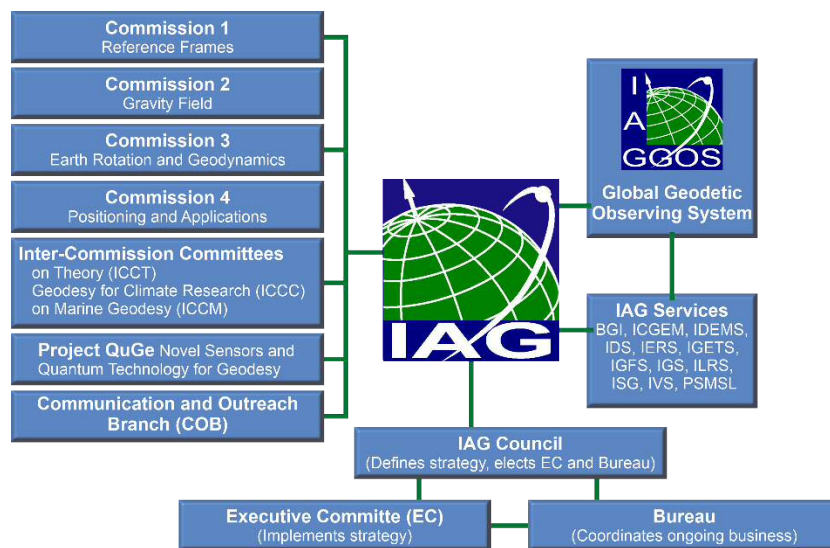
The Terms of Reference presented in this document introduce some minor changes to be consistent with the recent changes to the IAG Statutes and Bylaws and to update the structure of GGOS. Changes to the GGOS structure include, among others, the merging of the former GGOS Consortium and GGOS Coordinating Board into the new GGOS Governing Board and the increasing of the number of voting members. This helps to streamline decision making within GGOS and enhances the involvement of all IAG components in the governance of GGOS. The new structure of GGOS was endorsed by the IAG Executive Committee on April 26, 2023 and approved by the former GGOS Coordinating Board on May 30, 2023.

These Terms of Reference were approved by the former GGOS Coordinating Board on June 30, 2023 and by the IAG Executive Committee on September 5, 2023.

Part A: GGOS Background

GGOS, the Global Geodetic Observing System of the International Association of Geodesy

The parent organization of GGOS is the IAG. GGOS was established with the main objective of integrating and optimizing data analysis resources, procedures and dissemination of results performed by the different IAG components, namely the IAG Services, Commissions, Inter-Commission Committees (ICC) and dedicated Projects. Motivation for the establishment of GGOS as well as its main goals and challenges were documented by the IAG science community in 2009 in *The Global Geodetic Observing System: Meeting the requirements of a global society on a changing planet in 2020*¹.



Structure of the International Association of Geodesy

Essentially, GGOS works with the IAG Services to provide unique, mutually consistent, and easily accessible geodetic products (including the geodetic reference frames and the gravity field models) and the relevant geodetic constants for science and society. GGOS works in concert with Commissions, ICCs and dedicated projects concerning new developments, and it keeps all IAG components informed of the work in GGOS. This interaction is essential to understand the complexity of the Earth system, and advance geodetic knowledge as well as technology development. The societal benefit of integrated, consistent and high quality geodetic products is wide reaching, including improved navigation systems, better understanding of climate and environmental change, reliable Earth surface deformation modelling, precise monitoring of mass transport within the Earth's system, accurately determining changes in the rotation of the Earth, etc.

In order for GGOS to interact effectively with the other IAG components, all IAG components have representatives in the various organizational elements of GGOS (see Part C). Each IAG Service, Commission, ICC and Project has one representative on the GGOS Governing Board. The Commissions, ICCs and Projects have two representatives in the GGOS Science Panel. Each IAG Service

¹ Plag H.-P. and Pearlman M. (Eds.) *Global Geodetic Observing System: Meeting the Requirements of a Global Society on a Changing Planet in 2020*, Springer Berlin, Heidelberg, <https://doi.org/10.1007/978-3-642-02687-4>.

has up to two representatives in each GGOS Bureau (Bureau of Products and Standards and Bureau of Networks and Observations). IAG Services, Commissions, ICCs and Projects participate in the various Focus Areas, Committees and Working Groups established within GGOS according to their areas of interest and objectives.

GGOS Vision Advancing our understanding of the dynamic Earth system by quantifying our planet's changes in space and time.

GGOS Mission We live on a dynamic planet in permanent motion that requires long-term continuous quantification of its changes in a truly stable frame of reference, everywhere on or close to the Earth surface, at any time, and at high spatial resolution. This ambitious program requires a strong cooperation among the geodetic, geodynamic and geophysical communities, and to external stakeholders. GGOS endeavours to provide this integration at the highest level, in service to the scientific community and society as a whole.

GGOS in International and Interdisciplinary Contexts A key objective of GGOS is to increase the international and interdisciplinary visibility of the IAG and to engage with a diverse and growing range of stakeholders to raise awareness of the benefits of geodesy to science and society. In particular, GGOS contributes to two main initiatives: the scientific monitoring of global change, framed by the Group on Earth Observations (GEO), and to address global challenges related to the production and use of geospatial information, framed by the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM).

In the context of GEO, GGOS is the IAG's contribution to the Global Earth Observation System of Systems (GEOSS). GEOSS is a set of coordinated, independent Earth observation, information and processing systems that interact and provide access to diverse information for a wide range of users in both the public and private sectors. GGOS seeks the active participation of the geodesy community in current GEO flagships, programmes and initiatives.

In the context of UN-GGIM, GGOS contributes to sustaining the UN Global Geodetic Reference Frame (UN-GGRF) through science-policy networking in collaboration with the UN-GGIM's Subcommittee on Geodesy (SCoG) and the recently established UN Global Geodetic Centre of Excellence (UN-GGCE). The UN-SCoG provides an intergovernmental forum for cooperation and exchange of dialogue in support of the UN-GGCE, whose main task is to coordinate the development of a permanent, globally government-supported geodetic infrastructure as a cornerstone for the maintenance, sustainability and enhancement of the UN-GGRF. GGOS seeks a symbiosis between the scientific expertise of the IAG and the political framework of the UN-GGCE in order to optimize resources for an effective improvement of the global geodetic infrastructure.

GGOS also represents the IAG on the Committee on Earth Observation Satellites (CEOS). CEOS is a consortium of 61 agencies operating 172 satellites worldwide working together to ensure international coordination of civil, space-based, Earth observation programs for the benefit of all.

Part B: GGOS Strategic Direction

Overarching Strategic Priorities of GGOS

GGOS Goals, Objectives, and Outcomes are built around four strategic priorities that were first communicated in 2011 and then reiterated in the 2014 Strategic Plan, and continue to be relevant to the activities and future efforts of GGOS.

The strategic priorities of GGOS are:

- **Geodetic Information and Expertise**
Development and maintenance of organizational intangible assets, including geodetic information, expertise, and capacity building.
- **Global Geodetic Infrastructure**
Identification of gaps in the geodetic infrastructure and advocacy for modernization, extension and maintenance of the existing global geodetic infrastructure.
- **Standardization, Integration and Optimization**
Interaction with all IAG components to provide unique standards and mutually consistent, highly reliable, and easily accessible geodetic products.
- **Communication, Education, and Outreach**
Public relations, marketing, outreach, and engagement to ensure a long-term sustainable geodetic enterprise.

Long-Term Goals and Key Objectives of GGOS

GGOS aims to reinforce its role as a collaboration hub in the IAG, working as an observing system in support of sustainable geodesy by advocating and integrating diverse geodetic technologies and applications. In the focus of GGOS are:

- The observations needed to monitor, map, and understand changes in the Earth's shape, rotation, and mass distribution.
- The global geodetic frame of reference that is the fundamental backbone for measuring and consistently interpreting key global change processes and for many other scientific and societal applications.
- The benefit of science and society by providing the foundation upon which advances in Earth and planetary system science and applications are built.

Strategic Plan of GGOS

GGOS revises and updates its strategic goals and supportive objectives regularly to meet emerging needs in geodetic matters. Based on extensive community surveys, GGOS designs updated versions of its Strategic Plan, highlighting cross cutting community needs that each strategic goal shall endeavour to address. Guided by the strategic goals, the community needs are elements of a holistic effort to support the geodetic community and advance the recognition and use of geodesy for public benefit through innovation, advocacy, communication, and integration. The Strategic Plan is then complemented by an associated

Implementation Plan containing the actions designed to achieve GGOS goals and objectives. The core of the Implementation Plan is to identify, assign, execute, and monitor the progress of these actions, which can be multi-year efforts depending on their nature. Detailed version of the current GGOS Strategic Plan and the associated Implementation Plan are available at <https://ggos.org/>.

Part C: GGOS Structure

Overview of Key GGOS Elements

The organizational structure of GGOS consists of the following key elements:

GGOS Governing Board—is the central oversight and decision-making body of GGOS and the collective voice for all GGOS matters.

GGOS Executive Committee—serves under the direction of the GGOS Governing Board to accomplish day-to-day activities of GGOS.

GGOS Science Panel—provides advice and recommendations to the GGOS Governing Board and other GGOS elements on scientific aspects relevant to GGOS.

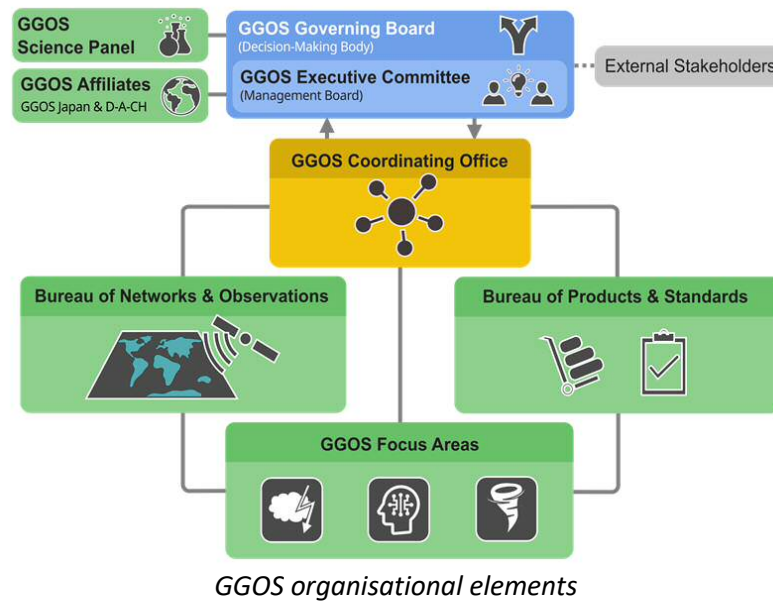
GGOS Coordinating Office—serves as the Secretariat of GGOS, coordinates the administrative work in support of the various GGOS structural elements, and is responsible for outreach and communications.

GGOS Bureau of Products and Standards—tracks, reviews, examines, evaluates all current standards, constants, resolutions and products adopted by IAG or its components and recommends their further use or proposes the necessary updates.

GGOS Bureau of Networks and Observations—develops a strategy to design, integrate and maintain the fundamental geodetic infrastructure including communication and data flow; monitors the status of the networks and advocates for implementation of core and other co-located network sites and improved network performance.

GGOS Affiliates—are national or regional organizations that coordinate geodetic activities in that country or region. GGOS Affiliates allow increased participation in GGOS, especially by organizations in under-represented areas of Africa, Asia-Pacific, and South and Central America.

GGOS Committees, Working Groups and Focus Areas—address overarching issues common to several or all IAG components, and are a mechanism to bring the various activities of the Services, Commissions, Inter-Commission Committees and Projects together, or to link GGOS to external organizations. Focus Areas are cross-disciplinary and address specific topics where GGOS contributors work together to address broader and critical issues.



**GGOS
Governing
Board**

Function

The Governing Board is responsible for governance, strategic policy and direction.

Membership

The membership of the GGOS Governing Board consists of delegates appointed by the other IAG components, the officers chairing the different GGOS components (see following sections), elected members-at-large and appointed members. Each primary delegate may nominate an alternate to temporarily assume responsibilities (i.e. voting) if the primary delegate is unable to attend a meeting. One person may not hold two voting positions on the GGOS Governing Board. The membership of the GGOS Governing Board follows the four-year term used in the IAG. Renewal of this membership takes place during or shortly after the IUGG General Assemblies (see IAG Bylaws for more details).

Appointment and Election of Governing Board Members

Representatives of IAG Services, Commissions, ICCs and Projects

Each IAG Service, Commission, ICC and Project is invited to nominate one delegate to the GGOS Governing Board. Delegates appointed to the Governing Board as representatives of the IAG Services, Commissions, ICCs or Projects must be active members of those components. After a four-year term, it is at the discretion of each IAG component to renew its representation with the same delegate or to nominate a different colleague. In the event that a representative is unable to participate in the duties of the GGOS Governing Board (due to illness, retirement, change of affiliation, etc.), the GGOS President shall request a new appointment (replacement) from the respective IAG component.

Members-at-Large

Members-at-large are invited to serve on the GGOS Governing Board to provide balanced representation of geographic regions or unique

**GGOS
Governing
Board**

capabilities. The GGOS President, with the assistance of the GGOS Coordinating Office, shall appoint an Election Committee to organize the election process. This process includes issuing a call-for-participation to identify possible candidates, ensuring the availability of the nominated candidates, and consolidating a final slate of members-at-large candidates. The Election Committee shall then present this final slate to the GGOS Governing Board for a vote. In the event that a member-at-large is unable to participate in the duties of the GGOS Governing Board (due to illness, retirement, change of affiliation, etc.), the GGOS President, with the assistance of the GGOS Coordinating Office, shall submit a list of at least two candidates for replacement to the GGOS Governing Board.

Appointed Members

After the election of the members-at-large, the GGOS Executive Committee can nominate up to two additional members to balance research areas or geographic regions not covered by the members-at-large. All candidates must then be approved by the Governing Board. In the event that an appointed member is unable to participate in the duties of the GGOS Governing Board (due to illness, retirement, change of affiliation, etc.), the GGOS Executive Committee can nominate another colleague to serve in his/her place.

GGOS Officers

The GGOS President, Vice President, Immediate Past President, Coordinating Office Director, External Relations Manager, GGOS Bureau Directors, and chairs of the Focus Areas, Committees and Working Groups established within each GGOS component are ex-officio members of the GGOS Governing Board during their terms of office. See below for details.

Representatives of the GGOS Affiliates

Each GGOS Affiliate is invited to nominate one delegate to the GGOS Governing Board. Delegates appointed to the Governing Board as representatives of the GGOS Affiliates must be active members of the respective Affiliates. After a four-year term, it is at the discretion of each GGOS Affiliate to renew its representation with the same delegate or to nominate a different colleague. In the event that a representative is unable to participate in the duties of the GGOS Governing Board (due to illness, retirement, change of affiliation, etc.), the GGOS President shall request a new appointment (replacement) from the respective GGOS Affiliate.

Voting

Decisions shall be made by consensus whenever possible. Decisions requiring a vote shall be made by a simple majority of the votes cast. The quorum for valid vote is fifty percent of the voting Governing Board members. Voting may be conducted in-person at meetings or by appropriate electronic means at the discretion of the GGOS Executive Committee.

Meetings

The Governing Board shall meet at least once a year, but twice a year is preferred. Observers may attend the Governing Board meetings at the

**GGOS
Governing
Board**

discretion of the GGOS President. Governing Board meetings shall be convened by the GGOS President with the support of the GGOS Coordinating Office.

Membership of the GGOS Governing Board (as of September 2023)

Voting Members

GGOS President (ex-officio, votes in case of a tie)	1
GGOS Vice President (ex-officio)	1
Immediate Past President of GGOS (ex-officio)	1
IAG President or designated Representative (ex-officio)	1
IAG Service Representatives	12
IAG Commissions Representatives	4
IAG Inter-Commission-Committee Representatives	3
IAG Project Representatives	1
GGOS Science Panel Chair (ex-officio)	1
GGOS Bureau Directors (ex-officio)	2
GGOS Affiliate Representatives	2
GGOS Coordinating Office Director (ex-officio)	1
GGOS Manager of External Relations (ex-officio)	1
GGOS Focus Area Leads (ex-officio)	3
GGOS Committee Chairs (ex-officio)	6
Members-at-Large (elected by the GGOS Governing Board)	3
Appointed Members (appointed by the GGOS Executive Committee)	2
<i>Total</i>	<i>45</i>
Non-voting members	
GGOS Working Group Chairs (ex-officio)	9
GGOS Web and Social Media Manager (ex-officio)	1
<i>Total</i>	<i>10</i>
Total GGOS Governing Board membership	55

**GGOS
President**

The GGOS President is elected by the IAG Executive Committee from a slate of nominations submitted and approved by the GGOS Governing Board. The President is appointed for a period of four years, renewable once. The GGOS President is the primary spokesperson and representative of GGOS to the IAG and external organizations. The GGOS President shall provide overall leadership for GGOS. The GGOS President shall preside at meetings of the GGOS Governing Board and GGOS Executive Committee and at the GGOS Days. Upon completion of his/her term as GGOS President, he/she shall serve Immediate Past President for the next term.

**GGOS
Vice President**

The Vice President of GGOS is nominated by the GGOS President and then approved by the GGOS Governing Board. The GGOS Vice President shall assist the GGOS President and act as the President in the absence of the President or when a motion involving the President is under consideration.

**GGOS
Executive
Committee**

Function

The GGOS Executive Committee is responsible for the administration of the affairs of GGOS in accordance with these Terms of Reference and the decisions of the GGOS Governing Board.

Membership

The GGOS Executive Committee consists of the following members:

Executive Committee Members

GGOS President (ex-officio)	1
GGOS Vice President (ex-officio)	1
GGOS Bureau Directors (ex-officio)	2
GGOS Coordinating Office Director (ex-officio)	1
GGOS Manager of External Relations (ex-officio)	1
GGOS Governing Board Representatives	2
<i>Total</i>	8

Permanent guests

Immediate Past President of GGOS (ex-officio)	1
IAG President or designated Representative (ex-officio)	1
GGOS Science Panel Chair (ex-officio)	1
<i>Total</i>	3

Appointment and Election of Executive Committee Members

The GGOS President, Vice President, Immediate Past President, Coordinating Office Director, External Relations Manager and the Directors of the GGOS Bureaus shall be members of the GGOS Executive Committees during their terms of office.

The Governing Board members should elect two representatives to the GGOS Executive Committee. These representatives must be voting members of the GGOS Governing Board and shall serve on the GGOS Executive Committee for a term of four years.

Meetings

The GGOS Executive Committee shall hold monthly video or teleconferences and shall meet in-person during the GGOS Governing Board meetings. GGOS Executive Committee meetings shall be convened by the GGOS President with the support of the GGOS Coordinating Office. The Immediate Past President of GGOS, the Chair of the GGOS Science Panel, and the President of the IAG or his/her designated representative shall be permanently invited guests at meetings of the GGOS Executive Committee. Other observers may be invited to attend these meetings (or teleconferences) as needed.

**GGOS
Science
Panel**

Function

The GGOS Science Panel is an independent and multidisciplinary advisory board that provides scientific support and guidance to the GGOS steering and coordination entities as requested. This support includes in particular, assistance in revising and updating the content of the GGOS 2020 book and

organizing relevant scientific sessions at conferences, workshops, and other events.

Membership

The members of the GGOS Science Panel are delegates from the IAG Commissions, ICCs and Projects and from the GGOS Focus Areas. Members-at-large may also be nominated when specific scientific topics not covered by the IAG are to be discussed. Membership of the GGOS Science Panel follows the usual four-year term. Renewal of this membership takes place during the IUGG General Assemblies.

Appointment and Election of the Science Panel Members

Each IAG Commission, ICC and Project is invited to nominate two delegates to the GGOS Science Panel. Each GGOS Focus Area is invited to nominate one delegate to the GGOS Science Panel. Delegates appointed to the GGOS Science Panel as representatives of the IAG Commissions, ICCs, Projects or GGOS Focus Areas must be internationally recognized scientists who are experts in the topics they represent. All nominated delegates must be approved by the GGOS Governing Board. The GGOS Governing Board may appoint additional at-large members to the GGOS Science Panel to cover scientific topics not covered by the IAG.

After a four-year term, it is at the discretion of each IAG component and GGOS Focus Area to renew its representation with the same delegate(s) or to nominate a different colleague(s). In the event that a representative is unable to participate in the duties of the GGOS Science Panel (due to illness, retirement, change of affiliation, etc.), the GGOS President, with the support of the GGOS Coordinating Office, shall request a new appointment (replacement) from the respective IAG component or Focus Area.

The immediate past Chair of the GGOS Science Panel is a Member of the GGOS Science Panel.

The GGOS Science Panel elects its own Chair, who is approved by the GGOS Governing Board. The GGOS Science Panel Chair is appointed for a period of four years, renewable once.

GGOS Committees, Working Groups and Focus Areas

The various GGOS structural elements may propose the establishment of Committees and Working Groups as needed, in accordance with the IAG Bylaws. The proposed Committees and Working Groups must be approved by the GGOS Governing Board. Working Groups shall be established for a period of four years, Committees for a longer indefinite period. The GGOS Governing Board appoints their chairs and prepare and approve their charters.

GGOS Focus Areas are cross-disciplinary and are intended to address gaps and needed future products. The GGOS Governing Board approves the GGOS Focus Areas and appoints their leaders. GGOS Focus Areas outline their charter and propose plans for the work they will undertake.

GGOS Coordinating Office

The GGOS Coordinating Office serves as the Secretariat of GGOS, coordinates the administrative work in support of the various GGOS structural elements, and is responsible for outreach and communications. The GGOS Coordinating

Office ensures information flow, maintains documentation of the GGOS activities, and manages specific assistance functions that enhance the administrative coordination across all areas of GGOS, including inter-services coordination and support for meeting and workshops. The GGOS Coordinating Office, in its long-term coordination role, ensures that the GGOS components contribute to GGOS in a consistent and continuous manner. The GGOS Coordination Office also maintains, manages, and coordinates the GGOS web and social media presence.

The position of Manager of External Relations resides within the GGOS Coordinating Office. The Manager of External Relations coordinates, in consultation with the GGOS President, GGOS engagement with external organizations such as the Group on Earth Observations (GEO), the Committee on Earth Observation Satellites (CEOS), the International Science Council (ISC) World Data System (WDS), the Federation of Surveyors (FIG), the UN Global Geospatial Information Management (UN-GGIM) Subcommittee on Geodesy (SCoG), and the UN Global Geodetic Centre of Excellence (UN-GGCE). The GGOS Governing Board elects the Manager of External Relations by vote.

GGOS Bureau of Products and Standards

The GGOS Bureau of Products and Standards monitors the strict observance of adopted resolutions, geodetic standards, standardized units, fundamental physical constants and conventions in all official products provided by the geodetic community. It reviews, examines and evaluates all current standards, constants, resolutions and conventions related to geodesy adopted by international organizations such as ISO (International Organization for Standardization), IAU (International Astronomical Union), IUGG, IAG and their components, and recommends their further use or proposes the necessary updates. It identifies possible gaps in standards and products, and initiates steps to fill them with, e.g., through resolutions of the IUGG and/or IAG Councils.

GGOS Bureau of Networks and Observations

The GGOS Bureau of Networks and Observations develops a strategy to sustainably design, integrate, and maintain the fundamental geodetic infrastructure to meet the long-term (10–20 years) requirements identified by the GGOS Science Panel. The Bureau advocates for the implementation of core and other co-located network sites to satisfy GGOS requirements, monitors the present state of the networks and projects future states, and supports and encourages infrastructure critical for the development of data products essential to GGOS. Primary emphasis must be placed on sustaining the infrastructure needed to maintain the evolving global reference frames, while ensuring broader support for the scientific applications of the data collected. The coordination and implementation of the GGOS co-located station network is a major focus of the Bureau.

GGOS Affiliates

A GGOS Affiliate is a national or regional organization that coordinates geodetic activities in that country or region. GGOS Affiliates provide a forum for multi-technique, space geodetic discussions, work to improve the quality of space geodetic observations, and encourage cooperation among the various agencies in that country or region that own, operate, and maintain the space geodetic

infrastructure there. To become a GGOS Affiliate, interested organizations submit an application to GGOS, which is approved by the GGOS Governing Board by vote.

Part D: Modification and Approval of Revisions

Changes to the GGOS Terms of Reference

Amendments to these Terms of Reference shall be approved by at least a simple majority of the votes cast by the GGOS Governing Board. The amended Terms of Reference shall then be submitted to the IAG Executive Committee for approval at its next meeting. Amendments shall take effect at the end of the IAG Executive Committee meeting.

The rules contained in the current edition of *Robert's Rules of Order Newly Revised*² shall govern GGOS in all cases to which they are applicable and in which they are not inconsistent with these Terms of Reference or any special rules that may be adopted by the GGOS Governing Board.

Approval of the Terms of Reference

These Terms of Reference were approved by the former GGOS Coordinating Board on June 30, 2023 and by the IAG Executive Committee on September 5, 2023.

² <https://robertsrules.com/>