

GGOS

Science Panel

2020-2022 Implementation Plan

1.0 IMPLEMENTATION OVERVIEW

1.1 Introduction

As defined in the GGOS Terms of Reference (approved in December 2018), “*The GGOS Science Panel is an independent and multi-disciplinary advisory board that provides scientific support and guidance to the GGOS steering and coordination entities as requested.*” The Science Panel serves as a primary point of communication and representation between GGOS and the geodetic and geoscience communities. It is composed of the leading experts in geodesy and general Earth sciences and provides valuable guidance to ensure that GGOS activities remain focused on the relevant scientific and societal needs of the day, as well as future needs.

Because of this key role within the organization, the Chair of the Science Panel is a voting member of the Coordinating Board and a permanent guest at meetings of the Executive Committee.

1.2 Goals and Objectives

The GGOS Science Panel *advises and provides recommendations relating to the scientific content of the GGOS 2020 book to the Coordinating Board; and represents the geodetic and geoscience community at GGOS meetings.* The Science Panel links GGOS with the science community and endeavors to support all GGOS entities to achieve all their goals and objectives and make their outcomes a reality. Nevertheless, as shown in Table 1.2-1, the Science Panel will handle directly a set of primary and secondary objectives (see Table 1.2-1 caption for the distinction).

Primary Goals and Objectives — The Primary Goal and Objectives of the Science Panel are Goal 1 (Geodetic Information and Expertise) with Objectives 1.1 (Understand societal and scientific needs and deficiencies) and 1.3 (Connect with the larger scientific community and integrate with other Earth observing systems).

The Science Panel will undertake to achieve the desired outcomes associated with this primary goal and objectives, namely (as stated in the Strategic Plan):

Objective 1-1 – Understand societal and scientific needs and deficiencies: GGOS will determine how to position itself as the primary source for geodetic information and expertise by first determining the greatest areas of need within the technical community and society.

Outcome 1-1A: A complete survey of all relevant areas benefitting from global

geodetic information and expertise, highlighting areas in need of support, and recommending relevant GGOS components or services that may potentially be able to fill these needs or deficiencies.

Outcome 1-1B: Knowledge of the greatest societal and scientific needs for geodetic products and services.

Objective 1-3 – Reaching out to the larger scientific community and integration with other Earth observing systems: As the primary source for integrated geodetic information and expertise of the IAG, GGOS will reach out to the larger scientific community and integrate with other Earth observing systems as part of the Global Earth Observations System of Systems.

Outcome 1-3A: Conduct and/or support meetings, workshops, and symposia in support of the multidisciplinary engagement and integration of individual experts as well as geodetic organizations and international services.

Outcome 1-3B: GGOS, the IAG Earth observation system, will continue to be integrated with other Earth observing systems such as: the Global Ocean Observing System (GOOS) and the Global Sea Level Observing System (GLOSS), Global Climate Observing System (GCOS), Global Terrestrial Observing System (GTOS).

Outcome 1-3C: GGOS will continue its participation in groups such as the Group on Earth Observations (GEO) and its Global Earth Observations System of Systems (GEOSS), and the Committee on Earth Observation Satellites (CEOS).

Secondary Goals and Objectives — The Secondary Goals and Objectives of the Science Panel are Goal 1 (Geodetic Information and Expertise) with Objective 1.2 (Position GGOS as the primary source for geodetic information and expertise), Goal 3 (Services, Standardization, and Support) with its Objective 3-1 (Coordination and development of IAG Services), and Goal 4 (Communication, education, and outreach) with its Objective 4-2 (Outreach to the technical community and general society).

The Science Panel will undertake to achieve the desired outcomes associated with these secondary goals and objectives, namely (as stated in the Strategic Plan):

Objective 1-2 – Position GGOS as the primary source for geodetic information and expertise: Informed by the outcomes of Objective 1-1, GGOS will determine the

steps necessary to position itself as the primary source of geodetic information.

Outcome 1-2A: GGOS will facilitate the integration of pertinent existing IAG products and services with potential additional IAG products and services, specifically addressing areas of need.

Outcome 1-2B: GGOS, as a clearinghouse for geodetic information and expertise, will serve as the voice of consensus within the geodetic community.

Outcome 1-2C: GGOS will engage and integrate experts in all services within the organization.

Objective 3-1 – Standardization: GGOS will operate using a set of established standards within the system of systems, in order to optimize communication within GGOS, among the services, and externally.

Outcome 3-1: GGOS organizational structure and operation will create standardized reports, processes, templates, support products, conventions, models, and reference frames.

Objective 4-2 – Outreach to the Technical Community and General Society: Develop outreach efforts to engage relevant groups in the participation of GGOS efforts, as well as providing educational resources to the general population.

Outcome 4-2A: GGOS will engage the expert population within GGOS membership; outreach to related and potentially complementary groups; support of geodetic satellite missions; advocate for new stations; and engage the general technical community through sessions at workshops and conferences.

Outcome 4-2B: Maintain a component of the GGOS website for education and general interest audiences; publish materials for distribution to students of various age as well as a general audience.

Table 1.2-1: Science Panel Goals and Objectives Mapping. The table identifies the primary (✓✓) and secondary (✓) Goals and Objectives that the Science Panel will be supporting to meet the outcomes stated in the GGOS strategic plan. Primary goals and objectives are those that are aligned with the charter of the GGOS Entity in question and are not likely to be realized without its involvement. Secondary goals and objectives are those that the given GGOS Entity can support as part of its charter.

	Goal 1 – Geodetic Information and Expertise			Goal 2 – Global Geodetic Infrastructure		Goal 3 - Services, Standardization, and Support		Goal 4 - Communication, Education, and Outreach	
	Objective 1-1 – Understand societal and scientific needs and deficiencies	Objective 1-2 – Position GGOS as the primary source for geodetic information and expertise	Objective 1-3 – Connect with the larger scientific community and integrate with other Earth observing	Objective 2-1 – Support and advocacy for infrastructure and associated elements	Objective 2-2 – Lead efforts for the integration of various ground observation networks within the GGOS network	Objective 3-1 – Standardization	Objective 3-2 – Coordination and Development of IAG Services	Objective 4-1 – Establish a Strong Internet/Online Presence	Objective 4-2 – Outreach to the Technical Community and General Society
Coordinating Board	✓✓	✓✓	✓	✓	✓	✓	✓	✓	✓
Consortium	✓	✓	✓✓	✓	✓	✓	✓✓		✓
Coordinating Office	✓	✓	✓	✓	✓✓	✓	✓	✓✓	✓✓
Bureau of N&O			✓	✓✓	✓✓	✓	✓		
Bureau of P&S	✓	✓	✓	✓		✓✓	✓✓		
Science Panel	✓✓	✓	✓✓				✓		✓

1.3 Science Panel Authority, Governance Structure, Management Structure, and Implementation Approach

1.3.1 Science Panel Authority

The Science Panel acts under the authority of the Coordinating Board. The Science Panel provides scientific advice to GGOS and supports all of the GGOS entities as requested.

1.3.2 Governance Structure

The fundamental governing structure of GGOS, including its Science Panel, is dictated by the GGOS Terms of Reference (GGOS 2015). The Terms of Reference establish the position of a Chair of the Science Panel. The Chair of the Science Panel is a voting member of the Coordinating Board and a permanent guest at meetings of the Executive Committee.

1.3.3 Management Structure

The Members of the Science Panel are nominated by the GGOS Focus Areas and by the Commissions and Inter-Commission Committees of the IAG and are approved by the Coordinating Board. The immediate past Chair is an ex officio member of the Science Panel and the Coordinating Board may appoint additional Members-at-large to the Science Panel in order to provide balance in representation of geographical regions or unique capabilities. The Science Panel elects one of its Members to serve as the Chair of the Science Panel subject to the approval of the Coordinating Board.

1.3.4 Implementation Approach

The GGOS Science Panel relies on partner institutions to provide the Members of the Science Panel. The GGOS Science Panel also relies on the other GGOS entities that it supports.

1.4 Stakeholder Definition

Table 1.4-1 summarizes the advocacy strategy for the identified internal and external stakeholders of GGOS including the Science Panel.

Table 1.4-1: GGOS Stakeholders and Advocacy Strategies

STAKEHOLDERS	ADVOCACY STRATEGIES
INTERNAL STAKEHOLDERS	
GGOS Coordinating Board	Frequent (Fortnightly and monthly) meetings to discuss progress and issues.
GGOS Bureaus	Frequent (monthly) meetings to discuss progress and issues.
GGOS Focus Areas	Frequent (monthly) meetings to discuss progress and issues.
GGOS Science Panel	Frequent (monthly) meetings to discuss progress and issues.
EXTERNAL STAKEHOLDERS	
CEOS	Web presence and social media coordination and promotion of each other's activities.
GEO/GEOSS	Web presence and social media coordination and promotion of each other's activities.
Space Agencies	Web presence and social media coordination and promotion of each other's activities.
United Nations	Web presence and social media coordination and promotion of each other's activities.

2.0 Science Panel BASELINES

The Science Panel supports all of the other GGOS entities upon request. The requirements, schedule, and technical and scientific content that form the foundation of the Science Panel are therefore derived from the tasking that it receives from the other GGOS entities.

The activities of GGOS are reviewed by the Science Panel to ensure that GGOS remains relevant to the needs of science and society. As a result of the ongoing reviews, the Science Panel may identify gaps in the activities of GGOS and may recommend actions

to fill the gaps including the development of new products and the establishment of new Focus Areas.

GGOS sessions are proposed and convened by the Science Panel at major scientific conferences in order to reach out to the geodetic and larger scientific communities to keep them informed about and engage them in GGOS' activities.

Topical science workshops are organized by the Science Panel in order to determine the requirements that different scientific disciplines have for geodetic data and products.

And the Science Panel co-organizes Unified Analysis Workshops with the IERS in order to advance the combination and integration of space and *in situ* geodetic techniques.

The Science Panel cooperates for the editing of GGOS special issues in scientific journals and for the planning of regular articles in GGOS newsletters.

2.1 Requirements Baseline

Since the Science Panel supports all of the other GGOS entities, its requirements are inherited from them. Depending upon the tasks given to the Science Panel, it could potentially inherit a number of the GGOS requirements. The totality of functional and operational requirements can be found in the Coordinating Board implementation plan.

2.2 Schedule Baseline

The schedule of the tasks given to the Science Panel by the other GGOS entities is task-dependent and is determined in consultation with the tasking entity.

The review of the activities of GGOS by the Science Panel is an ongoing activity and as such has no set schedule.

The schedule of the other activities of the Science Panel is shown below. These activities are divided into three main categories: Convening GGOS sessions at scientific conferences, organizing GGOS topical science workshops, and co-organizing Unified Analysis Workshops with the IERS.

GGOS Sessions at Scientific Conferences

American Geophysical Union Joint Assembly Annually (Spring)

American Geophysical Union Fall Meeting Annually (December)

European Geosciences Union General Assembly Annually (April)

Asia Oceania Geosciences Society Annual Meeting Annually (Summer)*¹

Japan Geoscience Union General Assembly Annually (May)^{*1}

International Association of Geodesy General Assembly Quadrennially (2019, ...)

International Association of Geodesy Scientific Assembly Quadrennially (2021, ...)

^{*1}Optional for years without IAG General/Scientific Assemblies

Unified Analysis Workshops

Unified Analysis Workshops Triennially (2021, ...)

2.3 Resources

Human resources are provided by the partner institutions that provide the Members of the Science Panel. Workforce requirements are highly variable since they depend upon the tasking levied upon the Science Panel by the GGOS entities that the Science Panel supports.

Material resources are provided by the partner institutions that provide the Members of the Science Panel.

Travel costs are similarly covered by the partner institutions that provide the Members of the Science Panel.

Other costs, such as meeting rooms and teleconferences, are covered by the hosting institutions.

3.0 CHANGE LOG

Table 3-1: Science Panel Implementation Plan Change Log

VERSION	RELEASE DATE	SYNOPSIS OF RELEASE
0.1	[150326]	First draft of 2015-2016 plan for review
1.0	[150623]	Final version of 2015-2016 plan
1.1	[161122]	First draft of 2017-2018 plan for review
2.0	[210212]	Final Version of 2020-2022 Implementation Plan

Table 3-1: Coordinating Office Implementation Plan Change Log

4.0 APPENDICES

Appendix A. Abbreviations

BNO Bureau of Networks and Operations

BPS Bureau of Products and Standards

CB Coordinating Board

CM Center of Mass

CO Coordinating Office

CEOS Committee on Earth Observation Satellites

CRF Celestial Reference Frame

DORIS Doppler Orbitography and Radiopositioning Integrated by Satellite

EOP Earth Orientation Parameter

FTE Full-time Equivalent

GCOS Global Climate Observing System

GEO Group on Earth Observations

GEOSS Global Earth Observations System of Systems

GGIM Global Geospatial Information Management

GIAC GGOS Interagency Committee

GIMS GGOS Integrated Master Schedule

GGOS Global Geodetic Observing System

GLOSS Global Sea Level Observing System

GNSS Global Navigation Satellite System

GOOS Global Ocean Observing System

GTOS Global Terrestrial Observing System

IAG International Association of Geodesy

ICRF International Celestial Reference Frame

IDS International DORIS Service

IERS International Earth Rotation and Reference Systems Service

IGS International GNSS Service

IGeS International Geoid Service

IGFS International Gravity Field Service

ILRS International Laser Ranging Service

ITRF International Terrestrial Reference Frame

IUGG International Union of Geodesy and Geophysics

IVS International VLBI Service for Geodesy and Astrometry

PSMSL Permanent Service for Mean Sea Level

RFO Reference Frame Origin

SLR Satellite Laser Ranging

TRF Terrestrial Reference Frame

UN United Nations

VLBI Very Long Baseline Interferometry

Appendix B References

[GGOS 2015] Terms of Reference of the Global Geodetic Observing System (GGOS), IAG Executive Committee, IUGG XXVI General Assembly, Prague, Czech Republic, June 2015.

[GGOS 2020]: Global Geodetic Observing System: Meeting the Requirements of a Global Society on a Changing Planet in 2020", H.-P. Plag and M. Pearlman (editors), Springer, 2009