GGOS
Implementation Plan
Phase 2024 – 2027

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Acronyms

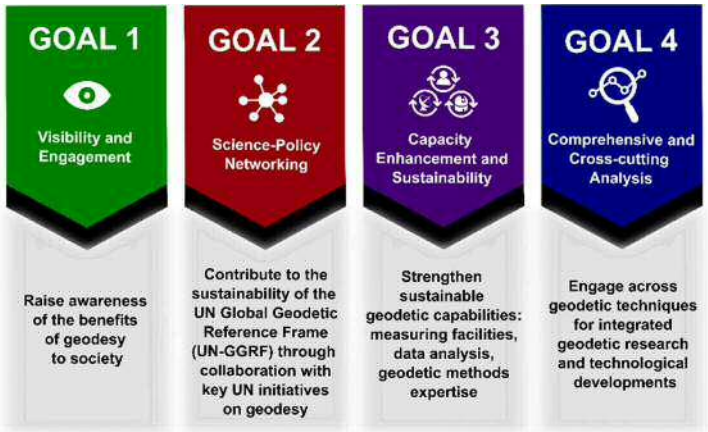
BNO	GGOS Bureau of Networks and Observations
BPS	GGOS Bureau of Products and Standards
C-DIS	BNO Committee on Data and Information Systems
C-DOI	GGOS Committee on DOIs for Geodetic Data Sets
C-EGV	BPS Committee on Essential Geodetic Variables
C-ESM	BPS Committee on Contribution to Earth System Modelling
CO	GGOS Coordinating Office
CODATA	Committee on Data for Science and Technology
C-SSM	BNO Committee on Satellite and Space Missions
EC	GGOS Executive Committee
ECV	Essential Climate Variables
ECS	Early Career Scientist
EGV	Essential Geodetic Variables
EOV	Essential Ocean Variables
FA	GGOS Focus Area
FA-AI4G	Focus Area Artificial Intelligence for Geodesy
FA-GSWR	Focus Area Geodetic Space Weather Research
GB	GGOS Governing Board
GCOS	Global Climate Observing System
GEO	Group on Earth Observations
GGOS	Global Geodetic Observing System
GGOS-A	GGOS Affiliates
GGOS-P	GGOS President
GOOS	Global Ocean Observing System
IAG	International Association of Geodesy
IAG-P	IAG President
IAU	International Astronomical Union
IERS	International Earth Rotation and Reference Systems Service
IGFS	International Gravity Field Service
IHRF	International Height Reference Frame
ISO	International Organization for Standardization
ITGRF	International Terrestrial Gravity Reference Frame
ITRF	International Terrestrial Reference Frame
IUGG	International Union of Geodesy and Geophysics
MER	Manager of External Relations
PLATO	Committee on Performance Simulations and Architectural Trade-Offs
SBAs	GEO Societal Benefit Areas
SDGs	UN Sustainable Development Goals
SP	GGOS Science Panel
UN-GGCE	UN Global Geodetic Centre of Excellence
UN-GGIM	UN Global Geospatial Information Management
UN-SCoG	UN Sub-Committee on Geodesy
WG-GRS	Working Group Consolidation of a best estimate GRS based on the adopted W_0 of the IHRF

Contents

Executive Summary

The implementation of the GGOS Strategic Plan 2024 - 2034 is planned in four-year phases 2024 - 2027, 2028 - 2031 and 2032 - 2035. The last phase extends beyond the period covered by the Strategic Plan so that the renewal/updating of the GGOS Strategic Goals can be addressed as a key action in the last phase of the current Implementation Plan. This will ensure consistency and continuity in the GGOS strategy. This document contains the implementation actions planned for 2024 - 2027.

The GGOS Strategic Plan[1] is based on four strategic goals, each of which is extended by four objectives in the areas of innovation, advocacy, communication, and integration.



Goals of the GGOS Strategic Plan 2024 – 2034.

In order to take forward all aspects of the Strategic Plan, an implementation action has been defined for each of the 16 objectives outlined in the Strategic Plan. Each implementation action is in turn made up of several activities (from one to six). These activities ultimately represent the work to be done and follow the SMART criteria: *Specific, Measurable, Achievable, Relevant, Time-bound*. Over-ambitious actions are avoided as they are doomed to failure.

A total of 64 implementation activities have been identified. Each activity is assigned to a GGOS component, which coordinates the interaction/support of other GGOS components (and external stakeholders as appropriate) and monitors progress and completion. Unlike other observing system communities, such as the Global Climate Observing System (GCOS) or the Global Ocean Observing System (GOOS), which rely on their own resources with financial support from international or governmental organisations, GGOS can only rely on voluntary contributions from those who wish to support its initiatives. Consequently, the successful completion of this Implementation Plan depends on the voluntary commitment of colleagues involved in GGOS, the other components of the International Association of Geodesy (IAG) and external stakeholders. Therefore, key premises of this Implementation Plan are to define specific roles, avoid duplication of activities, optimise resources, and recognise the contribution of the different actors. Cooperation and complementarity rather than competition is envisaged. In this way, after a brief introduction given in Section 1, Sections 2 and 3

[1] https://zenodo.org/doi/10.5281/zenodo.10571157

present the actors and resources available for implementation, and Section 4 summarises the main risks (and mitigation measures) to the realisation of this Implementation Plan.

The 63 implementation activities can be broadly categorised as follows:

- *Geodetic information and expertise*: Development and maintenance of organisational intangibles, including geodetic information, expertise, and capacity building.
- *Global Geodetic Infrastructure*: Identification of gaps in the geodetic infrastructure and advocacy for the modernisation, extension, and maintenance of the existing global geodetic infrastructure.
- *Standardisation, Integration and Optimisation*: 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.

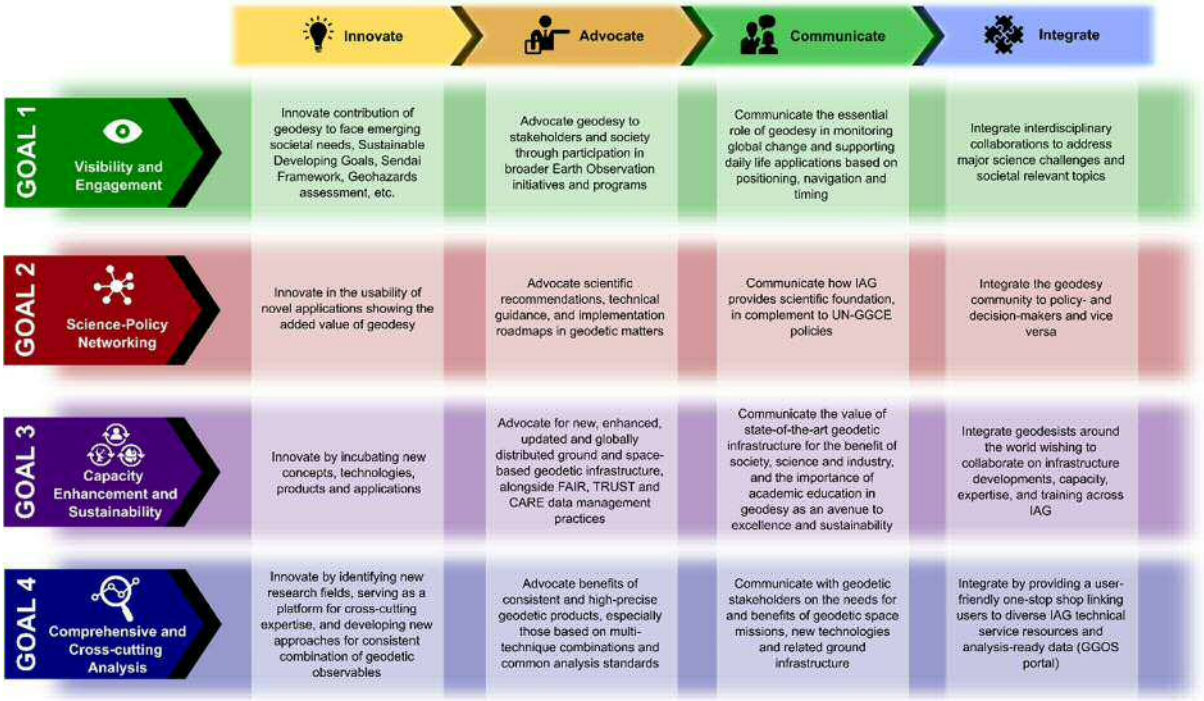
Section 5 describes each implementation action in detail, including milestones, outputs, responsible parties, timeframes, and performance indicators. A summary of these activities is provided in Annex 1. Each year at the GGOS Days there will be a comprehensive assessment of progress and, depending on the results, changes or refinements will be proposed for the following years. The corresponding Communication Plan is described in Section 6.

This Implementation Plan also includes collaboration with external stakeholders such as science organisations, academic researchers, national agencies, United Nations offices, non-governmental organisations, community members, etc. The key external stakeholders considered in this Implementation Plan are outlined in Annex 2.

The GGOS Implementation Plan, Phase 2024 - 2027, contained in this document, was unanimously approved by the members of the GGOS Governing Board on 18 September 2024.

1 Introduction

The GGOS Strategic Plan 2024 - 2034[2] defines four long-term goals and each of these goals contains four objectives. For each objective, we define an Implementation Action, which in turn comprises several activities.



GGOS Strategic Plan Matrix

The implementation of the GGOS Strategic Plan 2024 – 2034 is proposed in four-year phases with activities lasting for specific time periods as detailed in Section 5:

- Each activity is assigned to one GGOS component that coordinates the interaction/support of additional GGOS components (and external stakeholders if needed) and monitors progress and completion.
- Every year, a comprehensive progress assessment will take place at the GGOS Days and, according to the results, changes or refinements to current (unfinished) activities will be proposed for the following year.
- The current GGOS Strategic Plan is designed for ten years: 2024 - 2034. The corresponding Implementation Plan is designed in phases of four years: 2024 - 2027, 2028 - 2031 and 2032 - 2035. The last phase extends beyond the period covered by the Strategic Plan. This shall guarantee that the update or renewal of the GGOS Strategic Goals can be addressed as a key action of the current Implementation Plan. This will ensure consistency and continuity of the GGOS strategy.

In previous GGOS implementation plans, each GGOS component had its own implementation plan. Now, it is proposed to have only one implementation plan valid for all GGOS components, each with specific roles and responsibilities. This will streamline the work and keep GGOS actors on track: everyone will know what to do, when and how.

[2] https://zenodo.org/doi/10.5281/zenodo.10571157

The proposed implementation actions follow the SMART criteria: *Specific, Measurable, Achievable, Relevant, Time-bound*. Over-ambitious actions are avoided as they are doomed to failure.

In addition to starting to achieve the goals and objectives of the GGOS Strategic Plan 2024 – 2034, the implementation actions proposed in this document are also designed to meet the GGOS-related recommendations of the *International Association of Geodesy (IAG) Strategy 2019* document. All GGOS components are involved in the implementation team and the assigned responsibilities are in accordance with the *GGOS Terms of Reference 2023*[3].

2 Implementation agents and roles

IAG President (IAG-P): The IAG President provides overall leadership for the Association, is a permanent voting member of the GGOS Governing Board and represents the IAG in stakeholder organisations of particular interest to GGOS, namely the UN Sub-Committee on Geodesy (UN-SCoG), the UN Global Geodetic Centre of Excellence (UN-GGCE), and the Group on Earth Observations (GEO).

GGOS President (GGOS-P): The GGOS President provides overall leadership for GGOS, is the primary spokesperson and representative of GGOS to the IAG and external organisations, and chairs GGOS Governing Board meetings, GGOS Executive Committee meetings, the GGOS Days, and specific strategic retreats.

GGOS Governing Board (GB): The GGOS GB is the central oversight and decision-making body of GGOS. It consists of representatives from the IAG Services, Commissions, Inter-Commission Committees, and Projects, as well as the GGOS Officers (Chairs of the GGOS components). The GGOS GB is the collective voice for all GGOS matters. The GGOS GB sets the strategic direction of GGOS. As such, it strives to achieve all the goals and objectives of the GGOS Strategic Plan 2024 – 2034. See https://ggos.org/about/org/mng/governing-board/ for membership and resources (positions).

GGOS Executive Committee (EC): The GGOS EC serves under the direction of the GGOS GB to carry out the day-to-day activities of GGOS. It is responsible for the comprehensive and coordinated design, achievement, and progress monitoring of the GGOS Implementation Plan, as its members represent the main structural elements of GGOS: the GGOS GB, the GGOS Bureaus, the GGOS Coordinating Office, and the GGOS Science Panel. See https://ggos.org/about/org/mng/ec/ for membership and resources.

GGOS Science Panel (SP): The GGOS SP is composed of leading experts in Geodesy and other Earth Sciences and provides advice and recommendations to the GGOS GB and other GGOS elements on scientific aspects relevant to GGOS as requested. See https://ggos.org/about/org/science-panel/ for membership and resources.

GGOS Coordinating Office (CO): The GGOS CO 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 CO also ensures information flow, maintains documentation of the GGOS activities, manages specific assistance functions that enhance the administrative coordination across all areas of GGOS, and maintains, manages, and coordinates the GGOS web and social media presence. The GGOS CO hosts the *Manager of External Relations* (MER) and the *Committee on DOIs for Geodetic Data Sets* (C-DOI). See https://ggos.org/about/org/co/ for structure and resources.

[3] https://ggos.org/wp-content/uploads/2023/11/GGOS_ToR_2023.pdf

GGOS Bureau of Products and Standards (BPS): The GGOS BPS tracks, reviews, examines, and evaluates all current standards, constants, resolutions, and products adopted by IAG or its 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 IAG resolutions. The GGOS BPS hosts the *Committee on Contribution to Earth System Modelling* (C-ESM), the *Committee on Essential Geodetic Variables* (C-EGV), and the *Working Group Consolidation of a best estimate GRS based on the adopted W_0 of the IHRF* (WG-GRS). See https://ggos.org/about/org/bureau/bps/ for structure and resources.

GGOS Bureau of Networks and Observations (BNO): The GGOS BNO 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. The GGOS BNO hosts the *Committee on Performance Simulations and Architectural Trade-Offs* (PLATO), the *Committee on Data and Information Systems* (C-DIS), and the *Committee on Satellite and Space Missions* (C-SSM). The GGOS BNO also collaborates with the Working Groups on *Metrology of Space Geodetic Infrastructure* and *Genesis Mission* hosted by the International Earth Rotation and Reference Systems Service (IERS) and the IAG Sub-Commission 1.1 *Coordination of Space Techniques*, respectively. See https://ggos.org/about/org/bureau/bno/ for structure and resources.

GGOS Affiliates (GGOS-A): The GGOS affiliates are national or regional organisations that coordinate geodetic activities in that country or region. GGOS Affiliates allow increased participation in GGOS at the regional level. See https://ggos.org/about/org/affiliates/ for structure and resources.

GGOS Focus Areas (FA): The GGOS FA are cross-disciplinary and address specific topics where IAG and GGOS contributors work together to address broader and critical issues. Currents GGOS FA concentrates on *Geohazards Monitoring*, *Geodetic Space Weather Research* and *Artificial Intelligence for Geodesy*. The GGOS FAs host various study/working groups on specific topics. See https://ggos.org/about/org/fa/ for structure and resources.

In addition to these actors, this Implementation Plan includes collaboration with external stakeholders such as science organisations, academic researchers, national agencies, United Nations offices, non-governmental organisations, community members, etc. The key external stakeholders considered in this Implementation Plan are outlined in Annex 2.

3 Resource management

Each GGOS component takes over the responsibility to define the procedures, coordination, activities, and time schedule to achieve the actions assigned to them according to the Action Plan (see Section 5). Besides their memberships and structural elements, the various GGOS components may propose the establishment of new Focus Areas, Committees, and Working or Study Groups, only when needs cannot be met by any of the other existing GGOS or IAG components. The GGOS component responsible for each activity should set up procedures to measure the progress of the work with respect to this Implementation Plan and to undertake actions to resolve potential deficiencies. The reporting of progress against schedule as well as alignment of this progress is part of the Communication Plan (see Section 6).

All resources needed by the GGOS components for the realisation of this Implementation Plan are provided by their members through the supporting entities (universities, agencies, institutes, etc.) to

which they belong. We do not anticipate that any external funds will be available. Materials, travel costs and other expenditures such as those needed for meeting rooms, teleconferences, open access publications, etc. are covered by the hosting entities.

4 Risks and mitigation measures

Unlike other observing system communities, such as the Global Climate Observing System (GCOS) or the Global Ocean Observing System (GOOS), which rely on their own resources with financial support from international or governmental organisations, GGOS can only rely on voluntary contributions from those who wish to support its initiatives. Consequently, the successful completion of this Implementation Plan depends on the voluntary commitment of colleagues involved in GGOS, the other IAG components, and stakeholders. It is therefore of the utmost importance to coordinate actions with key stakeholders, in particular the IAG and the UN Global Geodetic Centre of Excellence (UN-GGCE), in order to define specific roles, avoid duplication of activities, optimise resources, and acknowledge the contribution of the different actors. Cooperation and complementarity rather than competition should be ensured. In this context, the following is a summary of the main risks (and mitigation measures) to the realisation of this Implementation Plan.

Risk	Mitigation measures
Resource constraints: Insufficient resources (human, technical, financial) to complete the implementation actions.	- Define prioritized, achievable, implementation actions. Avoidance of over-ambitious actions. - To ensure continuity, the operational (standing) GGOS components [EC, CO, BPS, BNO] take the lead of the actions. - The lead of each action defines the corresponding implementation schedule according to its capabilities. - The outputs of this Implementation Plan should give due recognition to the host organisations (agencies, universities, institutes, etc.) of the various colleagues contributing to the GGOS activities.
Resistance: Lack of support from other GGOS components	- Some implementation actions require the collaboration of GGOS components with time-limited membership, e.g., SP, GB, FAs, working/study groups, etc. These colleagues should be engaged at an early stage and regularly updated on progress and benefits of the Implementation Plan. - These colleagues should be involved in the definition and evaluation of implementation actions in a way that gives them a sense of belonging to GGOS and a sense of responsibility for contributing to the Implementation Plan. - If current members are unable to contribute to the realisation of the GGOS activities, they should make this known in an open and timely manner so that the GGOS components can find other representatives with more time and inclination to help.
Time delay or disruption: Implementation actions not completed within the planned timeframe or disrupted during implementation.	- To minimise the impact, the Implementation Plan is designed in four-year phases with actions lasting for specific timeframes (Section 5). - Definition of realistic timelines with buffer periods. - Redefinition or refinement of action items possible every year as contingency to continue with the Implementation Plan. - Identification and communication of possible action changes or disruptions well in advance.

Duplication of activities: Some objectives of the GGOS Strategic Plan 2024-2034 coincide with objectives recently outlined by the IAG Executive Committee or the UN-GGCE, e.g. involvement of early career scientists in IAG matters or outreach materials to raise awareness of geodesy.	- Participation of colleagues involved in GGOS in IAG Executive Committee and UN-GGCE meetings to be informed about their initiatives and to define cooperation agreements. - Rather than initiating GGOS actions on the same issues, GGOS contributes to IAG and UN-GGCE activities. - For outreach materials (flyers, videos, brochures, policy briefs, etc.), GGOS focuses on the scientific aspects of geodesy. The political/economic communication is left to the UN-GGCE. For example, if someone needs to initiate a project to calculate the geoid in his/her country, the outreach material produced by GGOS will provide the technical arguments for geoid determination. The outreach material produced by the UN-GGCE is expected to provide the political/economic arguments for the project.

Failure to reach target groups: A key component of this Implementation Plan is the production of outreach material. If this material is too technical, not all target audiences will be adequately informed.	- Classification of outreach material according to target audience:
	  - Journal articles for geodesists.
	  - White papers for the wider scientific community.
	  - Popular science reports for non-specialists.
	  - General outreach package: containing three different documents on the same topic:
	  · A brochure: with technical basics for the wider scientific community.
	  · A fact sheet: with technical details but also social benefits.
	  · A flyer: with information for the general non-specialist public, including high-school students.
	- The release of any outreach material should be accompanied by extensive announcement campaigns on the GGOS social media channels.

Low participation in GGOS meetings: Time and budget constraints do not allow GGOS meetings to be a priority for some colleagues, especially those from less developed countries.	- The experience and culture of successfully organising online and hybrid meetings during the pandemic, where the benefits in terms of participation were clear, should be kept alive rather than reverting to face-to-face-only formats. - GGOS should promote this in its own events and encourage other communities to do the same. - Promote the realisation of GGOS meetings in regions that need to be more involved in GGOS activities (e.g. Africa, South America, Asia, etc.). If it is a (pure) online meeting, choose a time that is more convenient for these regions.

5 Action plan

The following matrices describe in detail the milestones, outputs, activities, responsible and contributing GGOS components, proposed timelines, and the performance indicators for each implementation action in relation to the goals/objectives of the GGOS Strategic Plan 2024 - 2034. A summary table of these activities is provided in Annex 1.

Visibility and Engagement: Raise awareness of the benefits of geodesy to society

Action 1.1 Highlight the contribution of Geodesy to the well-being of society

Milestone

The contribution of geodesy to the well-being of society needs to be effectively communicated and recognised, leading to increased support for ongoing research, cooperation, and applications in the field.

Outputs

- Informative and visually engaging materials, including brochures, infographics, white papers, videos, etc. explaining the role of geodesy in everyday life.
- An awareness campaign through various media channels to inform the society about the importance of geodesy in achieving the United Nations Sustainable Development Goals.
- Highlighting specific case studies where geodesy has played a crucial role in measuring, monitoring, and forecasting geohazards, including protection against natural hazards and risks of extreme space weather events on critical infrastructure for daily life.
- Promotion of the relevance of GNSS technology for navigation, timing, and location-based services.
- Identification of emerging societal needs where geodesy can help.

Activities	Lead [Contributors]	Timeframe	Performance indicators
1.1.a Produce outreach packages describing geodesy's contribution to the UN Sustainable Development Goals (SDGs), the Sendai Framework, the GEO Societal Benefit Areas (SBAs) and other relevant initiatives.	GGOS-P [CO, BPS, BNO, SP, FAs, EC, GB]	2025/2026	· Two outreach packages a year.
1.1.b Demonstrate how the work of the IAG/GGOS is aligned with (or supports) the UN SDGs.	GGOS-P, IAG-P [CO, BPS, BNO, SP, FAs, EC, GB]	2025	· An article published in a popular science magazine.
1.1.c Showcase studies and reports demonstrating how geodesy contributes to monitoring and operating early warning systems for earthquakes, tsunamis, and other natural disasters.	FA-Geohazards	Continuous	· Presentations at international conferences and publications in scientific journals by experts of the FA-Geohazards.

1.1.d Showcase how geodesy contributes to risk identification of extreme space weather events on critical infrastructure for daily life.	FA-GSWR	Continuous	· Presentations at international conferences and publications in scientific journals by FA-GSWR.
1.1.e Establish a task force to identify emerging societal needs and assess how geodesy can contribute.	GGOS-P [CO, BPS, BNO, FAs, SP, EC, GB]	2026/2027	· Topic included in the update of the GGOS2020 book.

Visibility and Engagement: Raise awareness of the benefits of geodesy to society

Action 1.2 Participation in broader Earth observation initiatives

Milestone

The participation in broader Earth observation initiatives and programmes is necessary to highlight the contribution of geodesy to measuring, monitoring, modelling, and understanding Earth dynamics.

Outputs

- Description of the contribution of geodesy to Earth system monitoring in terms of Essential Variables to speak the same language as other initiatives such as the Global Climate Observing System (GCOS), the Global Ocean Observing System (GOOS) or the Global Earth Observation System of Systems (GEOSS).
- Mechanisms to establish active IAG/GGOS participation in GEO flagships and programmes.
- Increased visibility of geodesy in international Earth observation initiatives such as GEO, GEOSS, CEOS, GOOS, GCOS, GLOS, Future Earth, Research Data Alliance, etc.

Activities	Lead [Contributors]	Timeframe	Performance indicators
1.2.a Definition and classification of Essential Geodetic Variables (EGV).	BPS [BNO, CO, SP, FAs, EC, GB]	2024/2025	· A white paper describing the definition and classification of Essential Geodetic Variables after evaluation/interaction with GGOS SP, GGOS GB, IAG Executive Committee, UN-GGCE, and other stakeholders.

1.2.b Establish a task force to identify appropriate ways to interact with external stakeholders related to the use and application of geo-referenced data for Earth system monitoring, such as GEO, GEOSS, CEOS, GOOS, GCOS, GLOS, Future Earth, Research Data Alliance, etc.	CO [MER, IAG-P, GGOS-P, EC]	2024/2025	· A roadmap for effective IAG/GGOS participation in these conferences (what do IAG/GGOS need to do to ensure that they are heard?)
		Continuous	· Identification of key conferences in which IAG/GGOS should participate. · Identification/selection of outreach material topics that can be distributed at those conferences.

Visibility and Engagement: Raise awareness of the benefits of geodesy to society

Action 1.3 Communicate the role of geodesy in monitoring global change

Milestone

Garner recognition within the scientific community and society at large by contributing valuable insights and methodologies of geodesy and its applications in monitoring global change.

Outputs

- Educational materials (brochures, videos, infographics) explaining the principles of geodesy and its role in monitoring global change.
- Social media campaigns to emphasise geodesy's role in monitoring global change.
- Contribution to the global scientific discourse by showcasing the role of geodesy in addressing challenges such as sea-level rise, land subsidence, climate change, global water cycle, etc.
- Highlight specific case studies where geodesy has played a crucial role in measuring, monitoring, and modelling geohazards and climate-related changes.

Activities	Lead [Contributors]	Timeframe	Performance indicators
1.3.a Showcase research findings and reports on how geodesy contributes to monitoring sea-level rise, land subsidence, and other climate-related changes	GGOS-P [SP, GB, EC]	2026/2027	· Topic included in the update of the GGOS2020 book.

1.3.b Communicate the contribution of geodesy to the Essential Climate Variables (ECV) and the Essential Ocean Variables (EOV) as well as their interaction with the Essential Geodetic Variables (EGV).	BPS [SP, CO, BNO, GB, FAs, EC]	2026/2027	· An article about the contribution of geodesy to ECVs and EOVs as well as their interaction with the EGVs published in a popular science magazine or a broad geoscience journal (depends on Action 1.2.a).
1.3.c Participate and present research findings at international conferences and symposia focused on global change.	EC prepares a "standard" presentation (oral or poster) to be given by any colleague involved in GGOS	On demand	· On demand.

Visibility and Engagement: Raise awareness of the benefits of geodesy to society

Action 1.4 Interdisciplinary cooperation for Earth system monitoring

Milestone

Greater interaction with related disciplines involved in the study of the Earth system and its components (atmosphere, hydrosphere, cryosphere, oceans, and solid Earth) is necessary for comprehensive and accurate Earth system research.

Outputs

- Promotion of interdisciplinary events where scientists can exchange ideas, identify common challenges and explore opportunities for collaborative research.
- Increase public awareness and support for interdisciplinary research, emphasising its role in addressing global environmental challenges.
- Promote integrated Earth system models that incorporate data and insights from multiple disciplines, especially from geodesy.

Activities	Lead [Contributors]	Timeframe	Performance indicators
1.4.a Encourage interdisciplinary and international meetings to identify opportunities of cooperation with other scientific disciplines and to leverage shared observations and data to promote collaboration between different scientific communities.	GGOS-P [BPS, BNO, SP, FAs, CO, EC, GB]	Continuous	· GGOS sessions at international conferences and large IAG/IUGG meetings.
		Continuous	· A GGOS Topical Meeting dedicated to a specific topic. GGOS Topical Meetings should preferably be organised in conjunction with GGOS Days to increase participation and awareness of GGOS activities. GGOS Topical Meetings are not organised on a regular basis, but when there is a need to discuss a specific topic. · Input information for potential new GGOS Focus Areas.
1.4.b Promote cross-disciplinary projects through the IUGG Grants Programmes.	GGOS-P [CO, BPS, BNO, SP, FAs, EC, GB]	2024/2026	· One project every two years. It depends on IUGG approval of the project.
1.4.c Highlight the synergy between geodesy and astronomy and other Earth sciences through special sessions or presentations at major events of non-geodetic communities.	EC prepares a (oral or poster) presentation appropriate to the specific conference to be given by any colleague involved in GGOS	On demand	· On demand.

Science-Policy Networking: Contribute to the sustainability of the UN Global Geodetic Reference Frame (GGRF) through collaboration with key UN initiatives on geodesy

Action 2.1 Raise awareness of IAG Services for Earth observation and societal needs

Milestone

Bring to the forefront the IAG Services as key players in the scientific maintenance of the global geodetic reference frame in order to effectively raise awareness of their role in supporting Earth system observation and addressing societal needs.

Outputs

- Appealing and informative outreach materials about the IAG Services and their contributions to Earth observation and addressing societal needs.
- Strengthening the GGOS website as a central hub for geodetic information.
- Participation in global and regional outreach events to showcase geodetic contribution/support to science, society, and policy.
- Showcase research findings through publications, articles, and reports that demonstrate the practical applications and societal impact of geodesy, reinforcing the IAG Services' role.

Activities	Lead [Contributors]	Timeframe	Performance indicators
2.1.a Popularise the importance of geodesy (observations, products, community) and the IAG Services through the GGOS webpage, videos, and social media campaigns.	CO [BPS, BNO, SP, EC, GGOS-A]	Continuous	· One new GGOS video a year. · Continuous social media posts on GGOS and IAG related activities. · Four dedicated social media campaigns a year on geodetic products (every three months a different geodetic product will be promoted through social media posts, synchronised with Activity 2.1.c). · Statistics on the website or in social media.
2.1.b Provide keynote presentation(s) on · Geodetic observations, services, and products with applications for society. · How geodetic products and services can help science, society, and policy.	EC prepares "standard" (oral or poster) presentations to be given by any colleague involved in geodesy.	On demand	· On demand.

2.1.c Compile the observation and product descriptions in ggos.org into summary factsheets that can be made available online to everyone through GGOS and can also be translated into national languages by appropriate national agencies.	CO [GGOS-P, BPS, BNO, SP, EC, GGOS-A]	Continuous	· Four factsheets a year (synchronised with Activity 2.1.a)

Science-Policy Networking: Contribute to the sustainability of the UN Global Geodetic Reference Frame (GGRF) through collaboration with key UN initiatives on geodesy

Action 2.2 Scientific roadmaps to support policy makers in geodetic issues

Milestone

Scientific guidelines for geodetic issues can serve as a valuable tool for policy makers, guiding evidence-based decision-making and fostering collaboration between the scientific community and policy makers in addressing geodetic infrastructure challenges.

Outputs

- Descriptive materials and recommendations that emphasise the importance of geodesy in informing evidence-based policies for Earth observation, climate change monitoring, and sustainable development.
- Geodesy and the benefits of geodesy explained in easily understandable, non-technical language.
- Catalogue of key issues for the establishment, maintenance, and long-term use of geodetic infrastructure.

Activities	Lead [Contributors]	Timeframe	Performance indicators
2.2.a UN-GGCE plans to establish a series of seminars/capacity building activities on Geodesy. GGOS supports this activity on request.	EC prepares or coordinates presentations on requested topics.	On demand	· On demand.

2.2.b Prepare keynote presentation(s) on geodetic infrastructure and why we need to maintain/expand it.	EC prepares a "standard" (oral or poster) presentation to be given by any colleague involved in Geodesy.	On demand	· On demand.
2.2.c Describe challenges and practices required to host and maintain fundamental geodetic stations. Focus is not on economics, but on the technical and scientific aspects (e.g. engineering options and requirements, capacities needed, typical observing duties, data flow, etc).	BNO [BPS]	2024/2025	· A white paper describing main challenges and practices required to host and maintain fundamental geodetic stations.

Science-Policy Networking: Contribute to the sustainability of the UN Global Geodetic Reference Frame (GGRF) through collaboration with key UN initiatives on geodesy

Action 2.3 IAG's scientific foundation in complement to UN-GGCE policies

Milestone

It is necessary to ensure compatibility and collaboration with global efforts, fostering a unified approach to address transboundary geodetic challenges and supporting international policy coordination, in particular in line with the priorities identified by the UN-GGCE.

Outputs

- Effectiveness of geodetic contributions to policy by providing solutions to policy relevant challenges and facilitating continuous improvement and adaptation.
- Training and educational resources for policy makers to improve their understanding of geodetic issues and ensure effective use of geodetic information in policy making.
- Informed decision making in the provision of geodetic reference infrastructure for physical and geometric reference frames.

Activities	Lead [Contributors]	Timeframe	Performance indicators
2.3.a Support outreach and capacity building activities as well as public awareness campaigns initiated by the UN-GGCE (on demand).	GGOS-P, CO [EC, BNO, BPS, SP, GB, GGOS-A]	On demand.	· On demand.

2.3.b Based on the scientific experience of the BNO, prepare technical documentation describing the hierarchical framework of priorities for the deployment, use and maintenance of the geodetic infrastructure needed to achieve the goal of a 1 mm, +/- 0.1 mm/yr accurate reference frame as an input/resource for UN-GGCE activities.	BNO [PLATO]	2024/2025	· A white paper on the hierarchical framework of priorities for the deployment, use and maintenance of the geodetic infrastructure needed to achieve the goal of a 1 mm, +/- 0.1 mm/yr accurate reference frame.
2.3.c Establishment of a task force to define a strategy for access to terrestrial gravity data for global gravity models. This should provide the UN-GGCE with arguments to approach national agencies and convince them to make these data available for research purposes.	GGOS-P [EC, IGFS representatives in GGOS]	2025	· Factsheet on the importance of terrestrial gravity data for global gravity models.
2.4.d Prepare geodesy capacity development materials useful in providing evidence to support decision makers in moving towards a robust global geodesy supply chain.	GGOS-P, CO [EC, BNO, BPS, SP, GB, FAs, GGOS-A]	On demand	· On demand.

Science-Policy Networking: Contribute to the sustainability of the UN Global Geodetic Reference Frame (GGRF) through collaboration with key UN initiatives on geodesy

Action 2.4 Recognising geodesy as a strategic area in national and regional development plans

Milestone

Secure commitments from government officials to recognise geodesy as a strategic area and integrate it into development plans, emphasizing its potential contributions to various sectors.

Outputs

– Advocacy materials outlining the critical role of geodesy in national and regional policies related to infrastructure, land management, disaster resilience, and other strategic areas.

Activities	Lead [Contributors]	Timeframe	Performance indicators
2.4.a Popularise the 'inverted geospatial pyramid'*. *Bevis et al., 2022; https://www.fgdc.gov/ngac/meetings/september-2022/geodesy-presentation-ngac-sep-2022.pdf	GGOS-P [CO, BNO, BPS, SP, EC, GGOS-A, GB]	2025	· An outreach package on the inverted geospatial pyramid.
2.4.b Describe the Essential Geodetic Variables that serve as a measure to characterise/assess the availability and quality of geodetic infrastructure (as input/resource to UN-GGCE).	BPS [BNO, CO, EC, SP]	2025	· An outreach package highlighting the Essential Geodetic Variables (EGVs) that allow an assessment of the availability and quality of the geodetic infrastructure (EGVs of Level 0 and Level 1). It depends on Action 1.2.a.
2.4.c Presentations/contributions to regional conferences on development, land management and natural disaster mitigation showing the importance of geodesy.	EC prepares a "standard" (oral or poster) presentation to be given by any colleague involved in GGOS, in particular, in the GGOS-A.	On demand	· On demand.

Capacity Enhancement and Sustainability: Strengthen sustainable geodetic capabilities, including measuring facilities, data analysis, geodetic methods, and expertise

Action 3.1 Fostering new concepts, technologies, products, and applications

Milestone

Development, implementation, and adaptation of cutting-edge technologies to enhance geodetic data collection and analysis capabilities, and to gain recognition in the scientific community by contributing valuable knowledge of the various components of the Earth system using geodetic data and methods.

Outputs

- Sophisticated machine-learning based approaches to streamline data collection, analysis, and interpretation in the various fields of geodesy.
- Interdisciplinary research to demonstrate the contribution of geodesy to space weather research.

– Publication and wide dissemination of research results and case studies demonstrating the contribution of geodesy to Earth system monitoring.			
Activities	**Lead [Contributors]**	**Timeframe**	**Performance indicators**
3.1.a Development of machine learning approaches for enhanced collection, processing, analysis and interpretation of geodetic data.	FA-IA4G	Continuous	· Presentations at international conferences and publications in scientific journals by experts of the FA-AI4G.
3.1.b Development of geodetic methods for space weather research.	FA-GSWR	Continuous	· Presentations at international conferences and publications in scientific journals by experts of the FA-GSWR.
3.1.c Foster discussions between the different IAG components where colleagues can exchange ideas, identify common challenges, and explore opportunities for collaborative research or new geodetic products.	GGOS-P [CO, BNO, BPS, SP, EC, GB]	Continuous	· Discussions hosted at the GGOS Days or GGOS Topical Meetings. · Input information for potential new GGOS Focus Areas.
3.1.d Identify the lack of geodetic products that could be generated in the operational routine of the IAG Services and assess the feasibility and usability of these products.	BPS [BNO, SP, FAs, CO, EC, GB]	2025/2026/2027	· A list of potential new products from the IAG Services operational routine and the pros and cons of creating and using these products.
3.1.e Support/advocate the development of new technologies with significant potential to facilitate the expansion of the ground networks or their improvement, such as the automation in part or in full of stations or cost- and time- intensive tasks (e.g. local surveys), low-cost systems, and novel concepts of interest.	BNO [PLATO, IERS and IGFS representatives in GGOS]	Continuous	· Invited talks on promising projects or case studies across Services at IAG or GGOS meetings. · Theoretical support through simulations where relevant. · Summary of guidelines through presentations or a manual document.

Capacity Enhancement and Sustainability: Strengthen sustainable geodetic capabilities: measuring facilities, data analysis, geodetic methods, and expertise

Action 3.2 Gap filling (or update) in ground and space-based infrastructure, as well as consistent and well-documented data processing chain and product availability

Milestone

Identification of urgent ground and space-based infrastructure needs, particularly where infrastructure is deteriorating or non-existent.

Outputs

- Presentations at international conferences and research articles in scientific journals demonstrating the benefits of an updated and homogeneously distributed ground-based geodetic infrastructure and the use of novel observation methods in geodetic space techniques.
- Updated version of the requirements for the geodetic core sites.

Activities	Lead [Contributors]	Timeframe	Performance indicators
3.2.a Conduct simulations of ground network geometry, new observation concepts, and optimal satellite co-locations. Provide network simulations on request, to assess impact of existing stations. Communicate findings and recommendations to stakeholders.	BNO [PLATO]	Continuous	· Presentations at international conferences and publications in scientific journals by colleagues involved in PLATO.
3.2.b Update the 2015 document "GGOS Requirements for Core Sites" in line with the newest technical developments, including innovations in the International Terrestrial Reference Frame (ITRF) and the recent installed International Height Reference Frame (IHRF) and the International Terrestrial Gravity Reference Frame (ITGRF).	BNO [IERS and IGFS representatives in GGOS]	2025/2026	· Updated version of the document "GGOS Requirements for Core Sites".
3.2.c Identify gaps, discuss needs, and run simulations to study the impact of new (or removed) ground stations and future satellite missions for fulfilling the GGOS goals.	BNO [PLATO, C-SSM]	Continuous	· Presentations and publications in scientific journals by colleagues involved in PLATO and the BNO Committee on Satellite and Space Missions (C-SSM).

Capacity Enhancement and Sustainability: Strengthen sustainable geodetic capabilities: measuring facilities, data analysis, geodetic methods, and expertise

Action 3.3 Geodesy as a career

Milestone

Outreach strategies targeting schools, universities, and research institutions to educate the next generation of scientists and decision makers about the critical role of geodesy in Earth observation, everyday infrastructure, and sustainable development.

Outputs

- Educational materials (brochures, videos, infographics) explaining the principles of geodesy and its role in providing the reference frames for navigation, positioning, gravity field modelling and monitoring the Earth system and global change.
- Increased participation of early carrier scientists in GGOS meetings and initiatives.

Activities	Lead [Contributors]	Timeframe	Performance indicators
3.3.a Communicate the importance of geodesy to young people (pupils) in order to attract them to geodesy as future university students.	CO, GGOS-A, IAG ECS group.	2025/2026/2027	· Outreach material on geodesy in plain language (see Actions 1.1.a, 2.1.a, 2.1.c, 2.4.a).
3.3.b Advocate for the integration of geodetic concepts into educational curricula at the national and regional levels.	CO, GGOS-A, IAG ECS group.	On demand	· IAG or GGOS presentations at dedicated meetings (on demand).
3.3.c Approach educational institutions to promote geodesy as a key discipline and highlight its role in addressing global challenges.	CO, GGOS-A, IAG ECS group.	On demand	· IAG or GGOS presentations at dedicated meetings (on demand).
3.3.d Liaise with and become a partner of the International Geodetic Student Organisation. *https://en.wikipedia.org/wiki/International_Geodetic_Student_Organisation	CO, IAG ECS group.	2024	· Communication initiated by the IAG Executive Committee.

3.3.e Encourage and facilitate the participation of early career researchers in GGOS activities.	GGOS-P [CO, IAG-P, EC, FAs, GGOS-A]	Continuous	· Early career scientists in the different GGOS components. · Solicited presentations by early career scientists at GGOS meetings. · Facilitating travel grants for early career scientists.

Capacity Enhancement and Sustainability: Strengthen sustainable geodetic capabilities: measuring facilities, data analysis, geodetic methods, and expertise

Action 3.4 Promotion of IAG and global networking for capacity building and knowledge transfer

Milestone

Facilitate collaboration, information sharing, and capacity building by strengthening the IAG as a focal point for geodesists worldwide.

Outputs

- Outreach materials and activities to promote participation in the various components of the IAG, particularly among aspiring young scientists and geodesists from less developed countries.
- A catalogue of existing capacity building initiatives within the IAG and identification of new areas for knowledge transfer.
- Advocacy to reduce the significant disparity in geodetic issues between the global South and North.

Activities	Lead [Contributors]	Timeframe	Performance indicators
3.4.a Produce 1 - 2-page brochures that all geodesists can use on what geodesy, GGOS and IAG are, what we offer and how essential geodetic infrastructure is for daily life and monitoring the Earth system.	GGOS-P, IAG-P [BNO, BPS, CO, EC, SP]	Continuous	· Two brochures a year.
3.4.b Offer the possibility of organising courses on Global Geodesy for newcomers to the field (PhD level), with high standards and assessment, so that their coursework can be accredited to their home universities if they wish.	GGOS-P [IAG-P and other IAG/GGOS components]	On demand	· On demand.

3.4.c Promote the establishment of GGOS Africa.	De Witt*, [GGOS-P, BNO, BPS, CO, EC] *CB Member at large, South Africa	2024	· Diagnosis of the current situation and possibilities for the implementation of GGOS Africa.
		2025	· Establishment of the GGOS Affiliate GGOS Africa.
3.4.d Encourage the participation of geodesists from developing countries to present their work at international conferences.	GGOS-P [CO, EC]	Continuous	· Presentations given by geodesists from developing countries at GGOS meetings.
3.4.e Organise IAG meetings or participate in national geodesy related meetings in underdeveloped or developing countries to promote IAG and GGOS.	EC prepares a "standard" (oral or poster) presentation to be given by any colleague involved in GGOS, in particular GB members-at-large.	Continuous	· GGOS presentations at local/regional conferences on demand. · Facilitating remote participation in GGOS meetings.
3.4.f Compile a catalogue of capacity building activities and materials currently available in the different IAG components, identify gaps and suggest additional topics.	GGOS-P [CO, BNO, BPS, SP, FAs, EC, GB]	2025	· A catalogue of capacity building activities offered by the different IAG components and potential new topics. · A centralised, curated list of the most interesting materials, with useful descriptions, to be maintained on the GGOS website.
3.4.g Seek opportunities/possibilities for further communication/collaboration among GGOS Affiliates	GGOS-A	Continuous	· Joint meetings and initiatives between different GGOS Affiliates.

Comprehensive and cross-cutting analysis: Engage across geodetic techniques for integrated geodetic research and technological developments

Action 4.1 Identification of research areas not covered by the IAG

Milestone

Identify new research areas requiring interdisciplinary collaboration and filling gaps in integrated geodetic products.

Outputs

- List of geodetic topics or products not covered by the IAG components.
- Identification of new geodetic topics that can potentially be addressed by additional GGOS Focus Areas.

Activities	Lead [Contributors]	Timeframe	Performance indicators
4.1.a Identify geodetic topics or products not covered by the IAG.	GGOS-P [IAG-P, BPS, BNO, EC, SP, CO, GB]	2025/2026	· List of geodetic topics or products not covered by the IAG that could potentially be promoted through a GGOS Focus Area.

Comprehensive and cross-cutting analysis: Engage across geodetic techniques for integrated geodetic research and technological developments

Action 4.2 Consistent standards and high-precise combined geodetic products

Milestone

Achieve coordinated efforts between the IAG and external standards management organisations, leveraging resources and expertise for improved and consistent use of standards and conventions by all geodesy stakeholders.

Outputs

- Updated inventory of standards and conventions currently used across the IAG Services and proposed updates.
- Implementation of standardised protocols for sharing data among various scientific disciplines.
- Achieve seamless data interoperability, allowing researchers from different fields to access and integrate geodetic datasets for a more thorough understanding of Earth's dynamic systems.

Activities	Lead [Contributors]	Timeframe	Performance indicators
4.2.a Promote a consistent and well-documented data processing chain that describes how the original observational data are transformed into user-relevant information.	BPS [Representatives of IAG Services in BPS]	Continuous	· Liaise with IAG services, owners of geodetic space missions and other stakeholders producing data relevant to geodetic products to promote accurate documentation in the analysis of their data.
4.2.b Update of the BPS inventory of standards and products.	BPS	2025	· Identification of missing topics or recent adopted standards to be included in the updated version of the BPS inventory of standards and products.
		2026/2027	· Updated version of the inventory published in a scientific journal or as part of the updated GGOS2020 book

4.2.c Keep track of the standards, constants and conventions adopted by the IAG and collaborate with external stakeholders responsible for standards such as IERS, IAU, ISO, UN-SCoG, CODATA, etc. to ensure widespread use/homogenisation of common standards.	BPS	2024	· Interaction with IERS Conventions Centre: Finalizing Chapter 1 of the IERS Conventions "General definition and numerical standards".
		2025	· Invited BPS presentation at IAU Commission A3 "Fundamental Standards" Symposium.
		Continuous	· Continuous interaction with external stakeholders such as IAU, ISO, UN-SCoG, CODATA.
4.2.d Calculation of a new reference level ellipsoid based on current best estimates.	BPS [WG-GRS]	Continuous	· Presentations at international conferences and an article with the defining and derived parameters of a new reference level ellipsoid published in a scientific journal. · A descriptive manual for non-geodetic users on how to convert from currently used ellipsoids to the new one, including formulae that can be implemented by non-geodetic users (without a deep understanding of the whole subject) into their processing chains to support the rapid widespread use of the new reference ellipsoid.
4.2.e Updated geophysical models for the generation of consistent geodetic products	BPS [C-ESM]	Continuous	· Presentations at international conferences and publications in scientific journals by colleagues involved in the BPS *Committee on Contribution to Earth System Modelling* (C-ESM).
4.2.f Establishment of a task force to investigate data formats required by other geosciences for the use of geodetic products.	CO [C-DOI, C-DIS, BPS, EC]	2025/2026/2027	· Inventory of geodetic data/products used by other Earth science disciplines. · Forum (GGOS Topical Meeting?) to know the data formats in which they need the geodetic data/products.

Comprehensive and cross-cutting analysis: Engage across geodetic techniques for integrated geodetic research and technological developments

Action 4.3 Geodetic requirements for space missions, new technologies and ground-based infrastructure

Milestone

Be aware of advances and challenges in geodetic technologies, infrastructures, and methodologies to foster an effective and timely response from the various IAG components.

Outputs

- A roadmap to update the GGOS2020 book.
- Updated requirements for geodetic observations to obtain accurate geodetic products and improve the geodesy contribution to the measurement of Earth system changes.
- A catalogue of Essential Geodetic Variables (EGVs) as a common focus for the IAG community: definition of the requirements for what, where, when and how to observe.
- Feasibility study on the incorporation of additional satellite and ground-based data to improve geodetic reference frame products, in particular evaluating the benefits of the Genesis satellite mission and increased availability of site ties at geodetic observatories.

Activities	Lead [Contributors]	Timeframe	Performance indicators
4.3.a Preparing the update of the contents of the GGOS2020 book in line with the latest developments in geodesy and emerging scientific and societal needs.	GGOS-P [SP, BPS, BNO, CO, EC, GB]	2024/2025	· Survey of missing/new topics to be considered. · Decision on an appropriate medium for the update (a new book, a supplement, a special issue in a journal, an article, etc.). · List with contributing authors.
4.3.b Establish a first catalogue of Essential Geodetic Variables (EGVs) with detailed requirements for accuracy, stability, latency, and temporal and spatial resolution.	BPS	2025	· Definition of requirements for the EGVs (depends on Action 1.2.a).
		2025/2026	· Factsheets for EGVs (depends on Action 1.2.a).

4.3.c Keep track of proposed improved analysis methods for reference frame products published in the literature (by PLATO or colleagues outside the Committee), focusing on the inclusion of all existing data (in particular for satellites not yet considered in standard TRF products) and all available co-locations.	BNO [PLATO]	Continuous	· In collaboration with representatives from the IAG Services discuss if new proposals merit trial as pilot projects for future inclusion in the routine generation of products. · A white paper summarising the advantages of using additional satellites, data, or co-locations in the generation of reference frame products. · A review presentation given by the BNO at every GGOS/IERS Unified Analysis Workshop. · Regular reports at the GGOS Days.
4.3.d Investigate the benefits, opportunities, challenges, and potential operational products of the Genesis satellite mission dedicated to co-location in space.	BNO [PLATO, IAG WG on Genesis]	Continuous	· Dedicated presentations at IAG and GGOS meetings. · Articles published in scientific journals by the colleagues involved.
4.3.e Standardise local tie measurements, archiving and analysis procedures, maintain an up-to-date local tie archive, encourage additional groups to support these activities and extend the application of new survey techniques. If needed, produce, or extend documentation to guide observatories in this task (unclear whether the IERS TN 39 is sufficient). Exploit the upcoming Genesis mission as motivator for the ground networks to update their site ties.	BNO [IERS WG Metrology of Space Geodetic Infrastructure]	Continuous	· Updated catalogue of available site ties. · Concept of completeness of IERS TN 39 regarding guidance for site-tie measurements. · New/updated guidelines for site-tie measurements. · Presentation or position paper on the benefits of accurate site ties when tracking/analysing the Genesis satellite data to be discussed at GGOS-BNO or IERS meetings.

Comprehensive and cross-cutting analysis: Engage across geodetic techniques for integrated geodetic research and technological developments

Action 4.4 GGOS portal and web presence

Milestone

The GGOS portal and website serve as a central hub for information about geodesy, the IAG with its various components, and the data and products it provides.

Outputs

- Data-sharing mechanisms for openly accessible and citable geodetic data.
- A unified and accessible platform that facilitates interdisciplinary collaboration, providing a holistic view of geodetic products.
- An updated, comprehensive, and user-friendly website for geodesy, featuring relevant information, resources, and applications.
- Standards and protocols for data sharing, interoperability, and collaboration among geodetic organisations, facilitating the creation of a cohesive and comprehensive geodetic information system.

Activities	Lead [Contributors]	Timeframe	Performance indicators
4.4.a Unify IAG and GGOS websites and social media channels.	CO [jointly with IAG-P, IAG Vice-president, IAG Secretary General, and IAG Communication and Outreach Branch]	2024/2025	· A new IAG website in the GGOS website design · An integrated, harmonised website for IAG and GGOS accessible via the new domain *geodesy.science* · IAG and GGOS social media channels merged.
4.4.b Revise and update the GGOS webpage contents regularly.	CO [All GGOS components]	Continuous	· Regular content updates.
4.4.c Inclusion on the GGOS website of descriptions of geodetic products and observations not covered by the IAG Services.	BPS, BNO [CO, EC, SP]	2025/2026	· Four new or updated product/observation descriptions a year (prioritising geodetic observations and products needed for the EGVs)

4.4.d Definition and implementation of the basic functionalities of the GGOS Portal.	CO [BNO, BPS, C-DOI, C-DIS]	2025/2026	· An operational web platform for the GGOS portal. · Available geodetic product metadata integrated in the GGOS portal. · Promotional campaigns to encourage data providers to generate metadata for their products.
4.4.e Promote FAIR, TRUST and CARE practices and communicate their benefits.	CO [All GGOS components]	Continuous	· An outreach package describing the FAIR, TRUST and CARE practices and the benefits of their use in geodetic data and products.
4.4.f Promote the benefits for using digital object identifiers and related guidelines	CO [C-DOI, all GGOS components]	2025/2026/2027	· A section on the GGOS Website with information on DOIs (general information, benefit, examples, how-to, link to C-DOI). · Addition of relevant information about DOIs in the GGOS Portal. · Further development of the metadata recommendations for geodetic data to support all IAG Services (ongoing). · Overview on DOI activities for each IAG Service.

6 Communication plan

Communication type	Purpose	Medium	Frequency	Audience	Owner	Deliverables
GGOS Days meeting	General GGOS meeting, interaction GGOS/IAG, strategic issues, progress assessment	Face-to-face with the option of online participation	Annually	All GGOS components, invitees and interested parties	GGOS-P	Presentations and reports of GGOS components, minutes
GGOS GB meeting	Strategic issues, progress assessment	Face-to-face with the option of remote participation	Twice per year (GGOS Days in autumn, around EGU in spring)	Governing Board members and invitees	GGOS-P	Reports of GGOS components, minutes
GGOS EC meeting	Manage day-to-day business	Online	Monthly	Executive Committee members	GGOS-P	Progress reports, minutes, action items
GGOS SP meeting	Scientific advice to GGOS	Online	On request	Science Panel member and invitees	GGOS SP chair	Recommendations, action items, minutes
GGOS BPS staff member meeting	Manage day-to-day business	Online	Every three months	BPS staff members	BPS director	Strategic issues, minutes, action items
GGOS BPS and associated components	Strategic issues, progress assessment	Face-to-face with the option of remote participation	Varying	BPS members and associates, invitees, and interested parties	BPS director	Reports, minutes, action items
GGOS BNO meeting	Strategic issues, progress assessment	Face-to-face with the option of remote participation	Varying	BNO members, associates, and invitees	BNO director	Strategic issues, minutes, action items

Communication type	Purpose	Medium	Frequency	Audience	Owner	Deliverables
Focused meeting	Specific topics	In person or online	On request	GGOS colleagues involved	It may be convened by any GGOS component	Strategic issues, reports, minutes, action items
GGOS sessions at large scientific conferences	Scientific presentations, Outreach	In person, online (if offered by the organisers)	At least at AGU, EGU, IAG, IUGG	Geodesy and geophysical communities	GGOS SP chair	Presentations, articles in scientific journals
GGOS Topical Meetings	Foster discussion on specific science or technical topics	In person, online	On demand	GGOS and IAG colleagues, other Earth sciences (on demand)	GGOS-P	Presentations, opportunities of collaboration or innovation.
Unified Analysis Workshop	Interaction IAG Services and GGOS, standardisation, innovation	In person, online	Every 2 – 3 years	All IAG components (Commissions, Inter-Commission Committees, Services, GGOS) and invitees	GGOS-P, IERS Analysis Coordinator	Presentations, discussions, meeting report, recommendations
Annual report	Progress report	Written	Annually (shortly before the GGOS Days)	All GGOS components	CO director	Comprehensive GGOS progress report
GGOS reports in IAG's Travaux	Progress report	Written	Biennially	IAG	CO director	GGOS progress report
GGOS charter in IAG's Geodesist's Handbook	GGOS terms of reference, objectives, and structure.	Written	Every four years	IAG	CO director	Terms of reference of the GGOS components.

Annex 1. Summary of implementation activities (for more details see Section 5)

Implementation activities related to geodetic information and expertise (Development and maintenance of organisational intangibles, including geodetic information, expertise, and capacity building).

GGOS Requirements and Essential Geodetic Variables (EGVs)

Activities	Lead [Contributors]	Time frame	Performance indicators
1.2.a Definition and classification of EGVs.	BPS [BNO, CO, SP, FAs, EC, GB]	2024/2025	· A white paper on the topic.
1.3.b Communicate the contribution of geodesy to the ECVs and the EOV and their interaction with the EGVs.	BPS [SP, CO, BNO, GB, FAs, EC]	2026/2027	· An article on the topic published in a popular science magazine or a broad geoscience journal.
2.4.b Describe the EGVs that serve as a measure for the availability and quality of geodetic infrastructure.	BPS [BNO, CO, EC, SP]	2025	· An outreach package on the topic.
4.1.a Identify geodetic topics or products not covered by the IAG.	GGOS-P [IAG-P, BPS, BNO, EC, SP, CO, GB]	2025/2026	· A list of geodetic topics or products not covered by the IAG that could potentially be promoted through a GGOS Focus Area.
4.3.a Update the GGOS2020 book.	GGOS-P [SP, BPS, BNO, CO, EC, GB]	2024/2025	· Survey of missing/new topics to be considered. · Decision on an appropriate medium for the update (a new book, a supplement, a special issue in a journal, an article, etc.). · List with contributing authors.
4.3.b Establish a first catalogue of EGVs with requirements for accuracy, stability, latency, and temporal and spatial resolution.	BPS	2025	· Definition of requirements for the EGVs.
		2025/2026	· Factsheets for EGVs.

Focus Areas and Interdisciplinary Research

Activities	Lead [Contributors]	Time frame	Performance indicators
1.1.c Showcase studies and reports demonstrating how geodesy contributes to monitoring and	FA-Geohazards	Continuous	· Presentations at international conferences and publications in scientific journals.

operating early warning systems for earthquakes, tsunamis, and other natural disasters.			
1.1.d Showcase how geodesy contributes to risk identification of extreme space weather events on critical infrastructure for daily life.	FA-GSWR	Continuous	· Presentations at international conferences and publications in scientific journals.
1.4.a Encourage interdisciplinary and international meetings to identify opportunities of cooperation and to leverage shared data between different scientific communities.	GGOS-P [BPS, BNO, SP, FAs, CO, EC, GB]	Continuous	· GGOS sessions at international conferences and large IAG/IUGG meetings.
		Continuous	· GGOS Topical Meetings dedicated to specific topics. · Input information for potential new GGOS Focus Areas.
1.4.b Promote cross-disciplinary projects through the IUGG Grants Programmes.	GGOS-P [CO, BPS, BNO, SP, FAs, EC, GB]	2024/2026	· One project every two years. It depends on IUGG approval of the project.
1.4.c Highlight the synergy between geodesy and astronomy and other Earth sciences through special sessions or presentations at major events of non-geodetic communities.	EC prepares a (oral or poster) presentation appropriate to the specific conference to be given by any colleague involved in GGOS	On demand	· On demand.
3.1.a Development of machine learning approaches for enhanced collection, processing, analysis and interpretation of geodetic data.	FA-IA4G	Continuous	· Presentations at international conferences and publications in scientific journals.
3.1.b Development of geodetic methods for space weather research.	FA-GSWR	Continuous	· Presentations at international conferences and publications in scientific journals.
3.1.c Foster discussions between the different IAG components to explore opportunities for collaborative research or new geodetic products.	GGOS-P [CO, BNO, BPS, SP, EC, GB]	Continuous	· Discussions hosted at the GGOS Days or GGOS Topical Meetings. · Input information for potential new GGOS Focus Areas.

Science-Policy Networking

Activities	Lead [Contributors]	Time frame	Performance indicators
1.1.b Demonstrate how the work of the IAG/GGOS is aligned with (or supports) the UN SDGs.	GGOS-P, IAG-P [CO, BPS, BNO, SP, FAs, EC, GB]	2025	· An article published in a popular science magazine.
1.1.e Establish a task force to identify emerging societal needs and assess how geodesy can contribute.	GGOS-P [CO, BPS, BNO, FAs, SP, EC, GB]	2026/2027	· Topic included in the update of the GGOS2020 book.
1.2.b Establish a task force to identify appropriate ways to interact with external stakeholders such as GEO, GEOSS, CEOS, GOOS, GCOS, GLOS, Future Earth, Research Data Alliance, etc.	CO [MER, IAG-P, GGOS-P, EC]	2024/2025	· A roadmap for effective IAG/GGOS participation in these conferences (what do IAG/GGOS need to do to ensure that they are heard?)
		Continuous	· Identification of key conferences in which IAG/GGOS should participate. · Identification/selection of outreach material topics that can be distributed in those conferences.
1.3.a Showcase research findings on how geodesy contributes to monitoring sea-level rise, land subsidence, and other climate-related changes.	GGOS-P [SP, GB, EC]	2026/2027	· Topic included in the update of the GGOS2020 book.
2.2.a Support UN-GGCE seminars on Geodesy (on request).	EC prepares or coordinates presentations on requested topics.	On demand	· On demand.
2.3.a Support outreach and capacity building activities as well as public awareness campaigns initiated by the UN-GGCE (on demand).	GGOS-P, CO [EC, BNO, BPS, SP, GB, GGOS-A]	On demand	· On demand.
2.3.c Task force to define a strategy for access to terrestrial gravity data for global gravity models and interact with the UN-GGCE in this regard.	GGOS-P [EC, IGFS representatives in GGOS]	2025	· Factsheet on the importance of terrestrial gravity data for global gravity models.

2.4.d Prepare geodesy capacity development materials useful in providing evidence to support decision makers in moving towards a robust global geodesy supply chain.	GGOS-P, CO [EC, BNO, BPS, SP, GB, FAs, GGOS-A]	On demand	· On demand.

Implementation activities related to Global Geodetic Infrastructure (Identification of gaps in the geodetic infrastructure and advocacy for the modernisation, extension, and maintenance of the existing global geodetic infrastructure).

Activities	Lead [Contributors]	Time frame	Performance indicators
2.2.c Describe challenges and practices required to host and maintain fundamental geodetic stations (focus on the technical and scientific aspects, not on economics).	BNO [BPS]	2024/2025	· A white paper on the topic.
2.3.b Prepare technical documentation describing the hierarchical framework of priorities for the deployment, use and maintenance of the geodetic infrastructure needed to achieve the goal of a 1 mm, +/- 0.1 mm/yr accurate reference frame.	BNO [PLATO]	2024/2025	· A white paper on the topic.
3.1.e Support/advocate the development of new technologies to facilitate the expansion and improvement of the ground networks.	BNO [PLATO, IERS and IGFS representatives in GGOS]	Continuous	· Invited talks on promising projects or case studies across Services at IAG or GGOS meetings. · Theoretical support through simulations where relevant. · Summary of guidelines through presentations or a manual document.
3.2.a Conduct simulations of ground network geometry, new observation concepts, and optimal satellite co-locations. Provide network simulations on request, to assess impact of existing	BNO [PLATO]	Continuous	· Presentations at international conferences and publications in scientific journals.

stations. Communicate findings and recommendations to stakeholders.			
3.2.b Update the 2015 document "GGOS Requirements for Core Sites" in line with the newest technical developments in the ITRF, IHRF, and ITGRF.	BNO [IERS and IGFS representatives in GGOS]	2025/2026	· Updated version of this document.
3.2.c Identify gaps, discuss needs, and run simulations to study the impact of new (or removed) ground stations and future satellite missions for fulfilling the GGOS goals.	BNO [PLATO, C-SSM]	Continuous	· Presentations at international conferences and publications in scientific journals.
3.4.c Promote the establishment of GGOS Africa.	De Witt*, [GGOS-P, BNO, BPS, CO, EC] *GB member at large, South Africa	2024	· Diagnosis of the current situation and possibilities for the implementation of GGOS Africa.
		2025	· Establishment of GGOS Africa Activity.
4.3.c Keep track of proposed improved analysis methods for reference frame products published in the literature, focusing on the satellites not included yet in standard TRF products and all available co-locations.	BNO [PLATO]	Continuous	· Discussion of new proposals with representatives from the IAG Services. · A white paper on the topic. · Review presentation at every GGOS/IERS Unified Analysis Workshop. · Regular reports at the GGOS Days.
4.3.d Investigate the benefits, opportunities, challenges, and potential operational products of the Genesis satellite mission.	BNO [PLATO, IAG WG on Genesis]	Continuous	· Dedicated presentations at IAG and GGOS meetings. · Articles published in scientific journals.
4.3.e Standardise local tie measurements, archiving and analysis procedures, maintain an up-to-date local tie archive, encourage additional groups to support these activities and extend the application of new survey techniques.	BNO [IERS WG Metrology of Space Geodetic Infrastructure]	Continuous	· Updated catalogue of available site ties. · Concept of completeness of IERS TN 39 regarding guidance for site-tie measurements. · New/updated guidelines for site-tie measurements. · Presentation or position paper on the topic to be discussed at GGOS-BNO and IERS meetings.

Implementation activities related to Standardisation, Integration and Optimisation (Interacting with all IAG components to provide unique standards and mutually consistent, highly reliable and easily accessible geodetic products).

Activities	Lead [Contributors]	Time frame	Performance indicators
3.1.d Identify the lack of geodetic products that could be generated in the operational routine of the IAG Services and assess the feasibility and usability of these products.	BPS [BNO, SP, FAs, CO, EC, GB]	2025/2026/2027	· A list of potential new products from the IAG Services operational routine and the pros and cons of creating and using these products.
4.2.a Promote a consistent and well-documented data processing chain that describes how the original observational data are transformed into user-relevant information.	BPS [Representatives of IAG Services in BPS]	Continuous	· Liaise with IAG services, owners of geodetic space missions and other stakeholders producing data relevant to geodetic products to promote accurate documentation in the analysis of their data.
4.2.b Update of the BPS inventory of standards and products.	BPS	2025	· Identification of missing topics.
		2026/2027	· Updated version of the inventory published in a scientific journal or as part of the updated GGOS2020 book
4.2.c Keep track of the standards, constants and conventions adopted by the IAG and collaborate with external stakeholders to ensure widespread use/homogenisation of common standards.	BPS	2024	· Interaction with IERS Conventions Centre: Finalizing Chapter 1 of the IERS Conventions.
		2025	· Invited BPS presentation at IAU Commission A3 “Fundamental Standards” Symposium.
		Continuous	· Continuous interaction with external stakeholders such as IAU, ISO, UN-SCoG, CODATA.
4.2.d Calculation of a new reference level ellipsoid based on current best estimates.	BPS [WG-GRS]	Continuous	· Presentations at international conferences and an article on the topic published in a scientific journal. · A descriptive manual for non-geodetic users on how to convert from currently used ellipsoids to the new one.
4.2.e Updated geophysical models for the generation of	BPS [C-ESM]	Continuous	· Presentations at international conferences and publications in

consistent geodetic products			scientific journals.

Implementation activities related to Communication, Education and Outreach (Public relations, marketing, outreach, and engagement to ensure a long-term sustainable geodetic enterprise).

GGOS Portal and Internet Presence

Activities	Lead [Contributors]	Time frame	Performance indicators
4.4.a Unify IAG and GGOS websites and social media channels.	CO [jointly with IAG-P, IAG Vice-president, IAG Secretary General, and IAG Communication and Outreach Branch]	2024/2025	· A new IAG website in the GGOS website design · An integrated, harmonised website for IAG and GGOS accessible via the new domain *geodesy.science* · IAG and GGOS social media channels merged.
4.4.b Revise and update the GGOS webpage contents regularly.	CO [All GGOS components]	Continuous	· Regular content updates.
4.4.c Inclusion on the GGOS website of descriptions of geodetic products and observations not covered by the IAG Services.	BPS, BNO [CO, EC, SP]	2025/2026	· Four new or updated product/observation descriptions a year (prioritising geodetic observations and products needed for the EGVs)
4.4.d Definition and implementation of the basic functionalities of the GGOS Portal.	CO [BNO, BPS, C-DOI, C-DIS]	2025/2026	· An operational web platform for the GGOS portal. · Available geodetic product metadata integrated in the GGOS portal. · Promotional campaigns to encourage data providers to generate metadata for their products.
4.2.f Establishment of a task force to investigate data formats required by other geosciences for the use of geodetic products.	CO [C-DOI, C-DIS, BPS, EC]	2025/2026/2027	· Inventory of geodetic data/products used by other Earth science disciplines. · Forum (GGOS Topical Meeting?) to know the data formats in which they need the geodetic data/products.
4.4.e Promote FAIR, TRUST and CARE practices and communicate their benefits.	CO [All GGOS components]	Continuous	· An outreach package on the topic.

4.4.f Promote the benefits for using digital object identifiers and related guidelines	CO [C-DOI, all GGOS components]	2025/2026/2027	· A section on the GGOS Website with information on DOIs (general information, benefit, examples, how-to, link to C-DOI). · Addition of relevant information about DOIs in the GGOS Portal. · Further development of the metadata recommendations for geodetic data to support all IAG Services (ongoing). · Overview on DOI activities for each IAG Service.

Networking with scholars, young people, early carrier scientists, and colleagues from developing countries

Activities	Lead [Contributors]	Time frame	Performance indicators
3.3.a Communicate the importance of geodesy to young people (pupils) to attract them to geodesy as future university students.	CO, GGOS-A, IAG ECS group.	2025/2026/2027	· Outreach material on geodesy in plain language (see Actions 1.1.a, 2.1.a, 2.1.c, 2.4.a).
3.3.b Advocate for the integration of geodetic concepts into educational curricula at the national and regional levels.	CO, GGOS-A, IAG ECS group.	On demand	· IAG or GGOS presentations at dedicated meetings (on demand).
3.3.c Approach educational institutions to promote geodesy as a key discipline and highlight its role in addressing global challenges.	CO, GGOS-A, IAG ECS group.	On demand	· IAG or GGOS presentations at dedicated meetings (on demand).
3.3.d Liaise with and become a partner of the International Geodetic Student Organisation*. *https://en.wikipedia.org/wiki/International_Geodetic_Student_Organisation	CO, IAG ECS group.	2024	· Communication initiated by the IAG Executive Committee.
3.3.e Encourage and facilitate the participation of early career researchers in GGOS activities.	GGOS-P [CO, IAG-P, EC, FAs, GGOS-A]	Continuous	· Early career scientists in the different GGOS components. · Solicited presentations by early career scientists at GGOS meetings. · Facilitating travel grants for early career scientists.
3.4.b Offer the possibility of organising	GGOS-P [IAG-P and other	On demand	· On demand.

courses on Global Geodesy for newcomers to the field (PhD level), with high standards and assessment, so that their coursework can be accredited to their home universities if they wish.	IAG/GGOS components]		
3.4.d Encourage the participation of geodesists from developing countries to present their work at international conferences.	GGOS-P [CO, EC]	Continuous	· Presentations given by geodesists from developing countries at GGOS meetings.
3.4.e Organise IAG meetings or participate in national geodesy related meetings in underdeveloped or developing countries to promote IAG and GGOS.	EC prepares a "standard" (oral or poster) presentation to be given by any colleague involved in GGOS, in particular GB members-at-large.	Continuous	· GGOS presentations at local/regional conferences on demand. · Facilitating remote participation in GGOS meetings.
3.4.f Compile a catalogue of capacity building activities and materials currently available in the different IAG components, identify gaps and suggest additional topics.	GGOS-P [CO, BNO, BPS, SP, FAs, EC, GB]	2025	· A catalogue of capacity building activities offered by the different IAG components and potential new topics. · A centralised, curated list of the most interesting materials, with useful descriptions, to be maintained on the GGOS website.
3.4.g Seek opportunities/possibilities for further communication/collaboration among GGOS Affiliates	GGOS-A	Continuous	· Joint meetings and initiatives between different GGOS Affiliates.

Outreach and communication materials

Activities	Lead [Contributors]	Time frame	Performance indicators
1.1.a Produce outreach packages describing geodesy's contribution to the UN SDGs, the Sendai Framework, the GEO Societal Benefit	GGOS-P [CO, BPS, BNO, SP, FAs, EC, GB]	Continuous	· Two outreach packages a year.

Areas (SBAs) and other relevant initiatives.			
1.3.c Participate and present research findings at international conferences and symposia focused on global change.	EC prepares a "standard" (oral or poster) presentation to be given by any colleague involved in GGOS	On demand	· On demand.
2.1.a Popularise the importance of geodesy (observations, products, community) and the IAG Services through the GGOS webpage, videos, and social media campaigns.	CO [BPS, BNO, SP, EC, GGOS-A]	Continuous	· One new GGOS video a year. · Continuous social media posts on GGOS and IAG related activities. · Four dedicated social media campaigns a year on geodetic products (every three months a different geodetic product will be promoted through social media posts, synchronised with Activity 2.1.c). · Statistics on the website or in social media.
2.1.b Provide keynote presentations on · Geodetic observations, services, and products with applications for society. · How geodetic products and services can help science, society, and policy.	EC prepares "standard" (oral or poster) presentations to be given by any colleague involved in geodesy.	On demand	· On demand.
2.1.c Compile the observation and product descriptions in ggos.org into summary factsheets that can be made available online to everyone through GGOS and can also be translated into national languages by appropriate national agencies.	CO [GGOS-P, BPS, BNO, SP, EC, GGOS-A]	Continuous	· Four factsheets a year (synchronised with Activity 2.1.a)
2.2.b Prepare keynote presentation(s) on geodetic infrastructure and why we need to maintain/expand it.	EC prepares a "standard" (oral or poster) presentation to be given by any colleague involved in	On demand	· On demand.

	geodesy.		
2.4.a Popularise the 'inverted geospatial pyramid'*. *Bevis et al., 2022; https://www.fgdc.gov/ngac/meetings/september-2022/geodesy-presentation-ngac-sep-2022.pdf	GGOS-P [CO, BNO, BPS, SP, EC, GGOS-A, GB]	2025	· An outreach package on the inverted geospatial pyramid.
2.4.c Presentations/contributions to regional conferences on development, land management and natural disaster mitigation showing the importance of geodesy.	EC prepares a "standard" (oral or poster) presentation to be given by any colleague involved in GGOS, in particular, in the GGOS-A.	On demand	· On demand.
3.4.a Produce 1 - 2-page brochures that all geodesists can use on what geodesy, GGOS and IAG are, what we offer and how essential geodetic infrastructure is for daily life and monitoring the Earth system.	GGOS-P, IAG-P [BNO, BPS, CO, EC, SP]	Continuous	· Two brochures a year.

Annex 2. External Stakeholders

In the context of this Implementation Plan, external stakeholders refer to groups, organisations, or entities outside GGOS. They have their own structure and strategic/implementation plans, and GGOS necessarily interacts with them to achieve the goals and objectives of the GGOS Strategic Plan. Effective collaboration involves engaging various stakeholders such as science organisations, academic researchers, industry partners, government agencies, non-governmental organisations, community members, etc. The key external stakeholders considered in this Implementation Plan are outlined below.

International Association of Geodesy

The primary external stakeholders for GGOS are the IAG and its components: Services, Commissions, Inter-Commission Committees and Projects. They all have a representative on the GGOS GB and therefore, they participate in the strategic direction of GGOS. The Services have representatives in both GGOS Bureaus; thus, participate in the operational strategy of GGOS. The Commissions, Inter-Commission Committees and Projects have two representatives in the GGOS SP and consequently participate in the scientific strategy of GGOS.

Multidisciplinary research in Earth Sciences

Collaboration with other Earth science organisations is essential to address complex issues that cut across multiple disciplines and to better understand the complexity of the Earth's dynamics. Key stakeholders in this area are:

- International Union of Geodesy and Geophysics (IUGG), https://iugg.org
- International Association of Cryospheric Sciences (IACS), https://cryosphericsciences.org
- International Association of Geomagnetism and Aeronomy (IAGA), http://www.iaga-aiga.org
- International Association of Hydrological Sciences (IAHS), http://iahs.info
- International Association of Meteorology and Atmospheric Sciences (IAMAS), www.iamas.org
- International Association for the Physical Sciences of the Oceans (IAPSO), https://iapso-ocean.org
- International Association of Seismology and Physics of the Earth's Interior (IASPEI), www.iaspei.org
- International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI), www.iavceivolcano.org
- Federation of Surveyors (FIG), www.fig.net

Standardisation

Stakeholders in the development, implementation and use of standards play a crucial role in ensuring that standards are relevant, effective and widely accepted. These stakeholders come from different sectors and bring different perspectives and expertise to the table. Here are the key external stakeholders for GGOS:

- International Astronomical Union (IAU), Commission A3 "Fundamental Standards", www.iau.org
- International Organization for Standardization (ISO), www.iso.org and its Technical Committee (ISO/TC 211), www.iso.org/committee/54904.html
- Committee on Data for Science and Technology (CODATA), https://codata.org

- Open Geospatial Consortium (OGC), www.ogc.org
- International Science Council (ISC) World Data System (WDS), https://worlddatasystem.org

Earth Observation

Stakeholders in Earth observation encompass a wide array of entities, each playing a crucial role in utilising and advancing the technologies and data associated with observing the Earth. The key external stakeholders for GGOS in this field are:

- Group on Earth Observations (GEO), https://earthobservations.org
- Global Climate Observing System (GCOS), https://gcos.wmo.int
- Global Ocean Observing System (GOOS), https://goosocean.org
- The European Space Agency (ESA), www.esa.int
- The National Aeronautics and Space Administration (NASA), www.nasa.gov
- Committee on Earth Observation Satellites (CEOS), https://ceos.org
- UN Environment Programme (UNEP), www.unep.org
- UN Office for Outer Space Affairs (UNOOSA), www.unoosa.org, International Committee on Global Navigation Satellite Systems (UNOOSA-ICG), https://www.unoosa.org/oosa/en/ourwork/icg/icg.html
- UN Office for Disaster Risk Reduction (UNDRR), www.undrr.org
- IUGG Commission on Geophysical Risk and Sustainability (GRC), https://iugg.org/associations-commissions/commissions/grc

Geodesy-related UN initiatives

This collaboration focuses on contributing to the sustainability of the Global Geodetic Reference Frame (GGRF) introduced by the UN Resolution A/69/L.53 adopted by the General Assembly on 26 February 2015 (https://ggim.un.org/documents/A_RES_69_266_E.pdf):

- UN Global Geodetic Centre of Excellence (UN-GGCE), https://ggim.un.org/UNGGCE/
- UN Global Geospatial Information Management (UN-GGIM), Subcommittee on Geodesy (SCoG), https://ggim.un.org/unggim-wg1/