



UNITED NATIONS GLOBAL GEODETIC CENTRE OF EXCELLENCE

MODERNISING GEOSPATIAL REFERENCE SYSTEM
CAPACITY DEVELOPMENT WORKSHOP

International Geodesy Initiatives & Partner Organisations

Ryan Keenan
Senior Consultant for UN-GGCE

HOW

Day 3, Session 2 [3_3_2]

Acknowledgements: Allison Craddock (IGS), Richard Gross (IAG), Sharafat Gadimova (UNOOSA), Laura Sanchez (GGOS), Ryan Keenan (FIG), Zuheir Altamimi (IUGG)

Summary

- An introduction to various organisations featuring geodesy and international geodesy initiatives including IUGG, IAG, IGS, GGOS, FIG, UN-ICG
- Volunteer organisations contribute significantly to Geodesy activities typically contributing with 'in kind' efforts (unpaid volunteers)
- Given the importance of the people within the Global Geodesy Supply Chain, their continued efforts are critical for sustainable geodesy
- Recommendations for participants to get involved



**STRONGER.
TOGETHER.**

Session Overview

Purpose of the Session

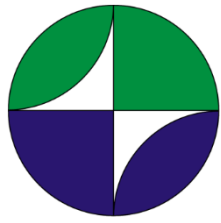
To provide participants with overview:

- International Geodesy Organisations and their initiatives
- Partners involved with the Geodesy community
- Setting the scene around opportunities for participation and collaboration

Open Q&A across the session



**STRONGER.
TOGETHER.**



IUGG | Mission

Founded in 1919, the International Union of Geodesy and Geophysics (IUGG) is the international organization dedicated to advancing, promoting, and communicating knowledge of the Earth system, its space environment, and the dynamical processes causing change.

Through its constituent Associations, Commissions, and services, IUGG convenes international assemblies and workshops, undertakes research, assembles observations, gains insights, coordinates activities, liaises with other scientific bodies, plays an advocacy role, contributes to education, and works to expand capabilities and participation worldwide.

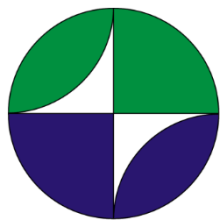


**International
Science Council**
The global voice for science

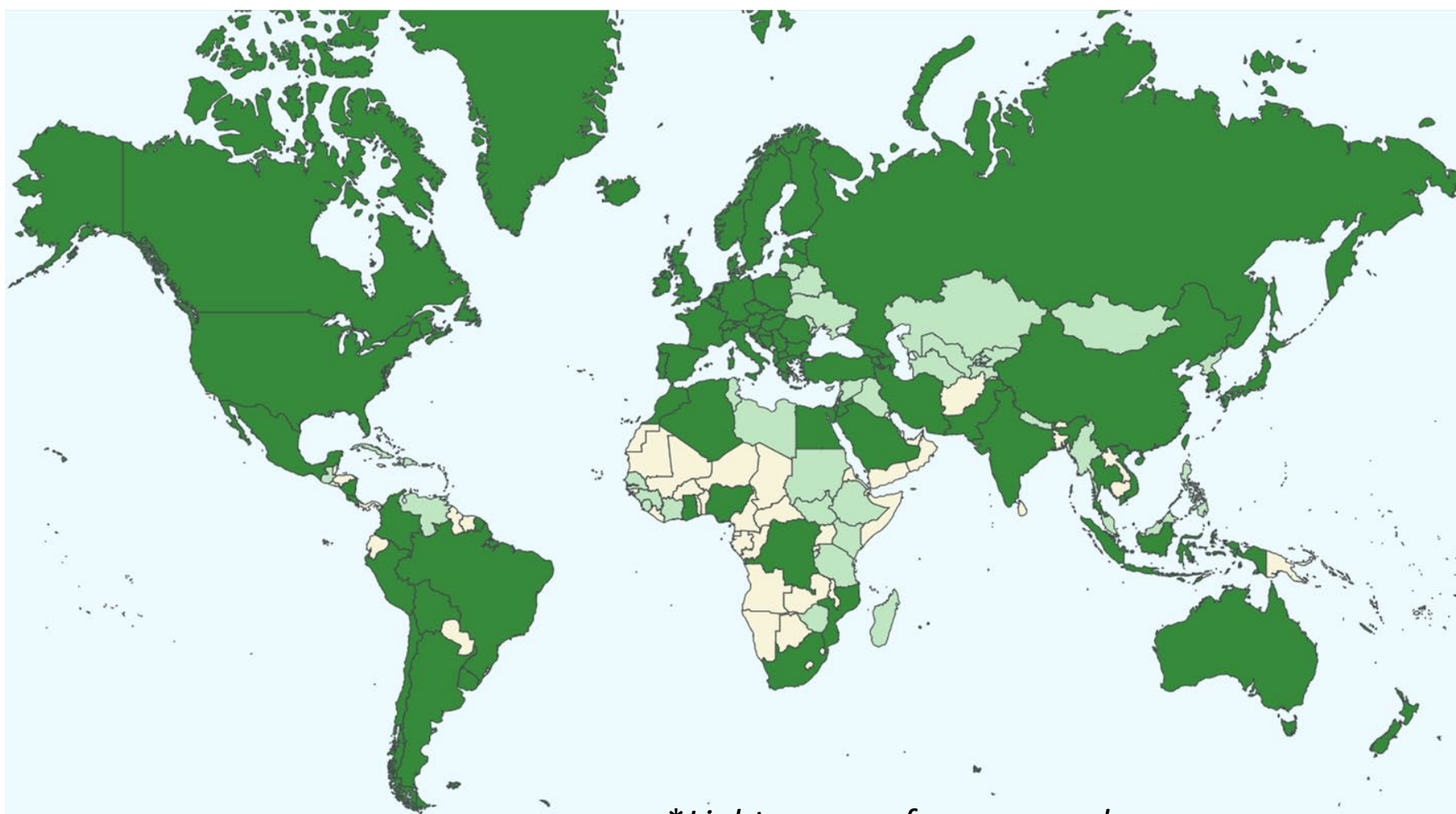
Funded by



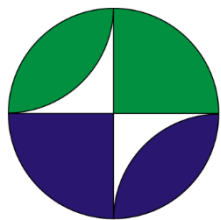
Deutsche
Forschungsgemeinschaft
German Research Foundation



IUGG | 74 Member Countries (dark green)



**Light green = former members*



IUGG | Association Scientific Assemblies



IAVCEI
International Association of Volcanology
and Chemistry of the Earth's Interior

Geneva, Switzerland
6-11 Jul 2025



IACS
International Association
of Cryospheric Sciences



IAMAS
International Association of Meteorology
and Atmospheric Sciences



IAPSO
International Association
for the Physical Sciences of the Oceans

Busan, Rep. of Korea
20-25 Jul 2025



IAGA
International Association
of Geomagnetism and Aeronomy



IASPEI
International Association of Seismology
and Physics of the Earth's Interior

Lisbon, Portugal
31 Aug - 6 Sep 2025



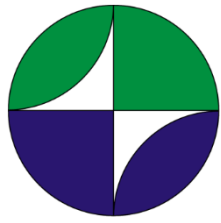
IAG/AIG
International Association
of Geodesy

Rimini, Italy
1-5 Sep 2025



IAHS/AISH
International Association
of Hydrological Sciences

Roorkee, India
5-10 Oct 2025



IUGG | Communications & E-Journal

- **Website** (www.iugg.org)
- **Social Media Channels**
(Facebook, X, YouTube)
- **E-Journal** (monthly Newsletter;
register at <http://www.iugg.org/publications/ejournals/>)
- **Annual Reports and Yearbooks**

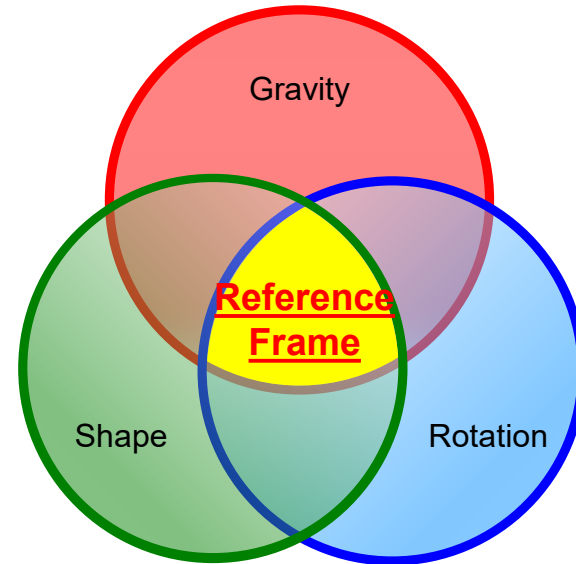


The International Association of Geodesy



Geodesy is the science of accurately measuring and understanding three fundamental properties of the Earth and their changes in time

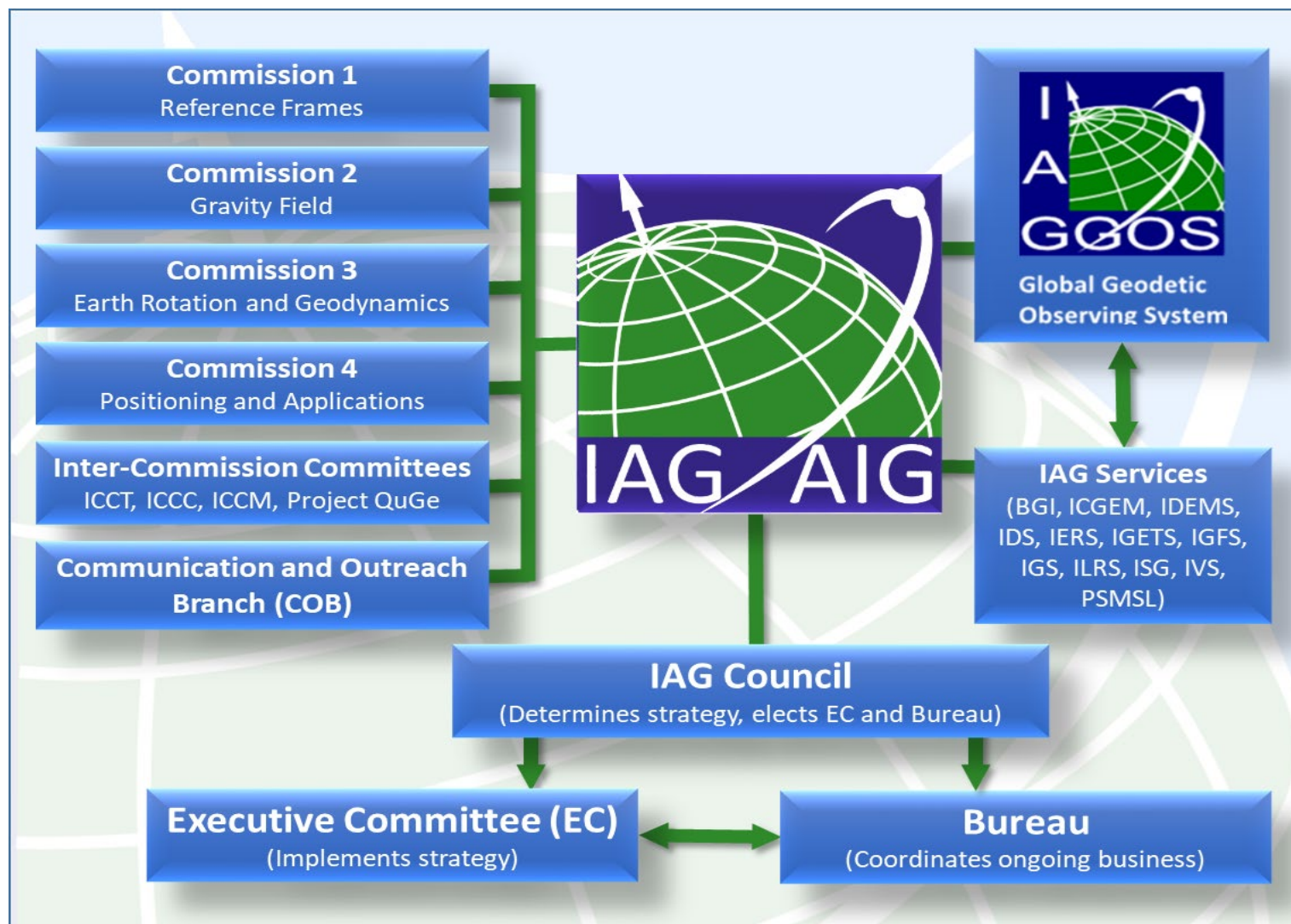
- Geometric shape
- Rotation and orientation in space
- Gravity field



Establishing and disseminating the
Terrestrial Reference Frame (TRF) is central
to Geodesy

International Association of Geodesy

Organizational Structure



- 4 Commissions
 - 3 Inter-Commission Committees
 - 1 Project
 - GGOS Global Geodetic Observing System
 - 12 Services
 - Communication and Outreach Branch
-
- Council
 - Executive Committee
 - Bureau
 - Office

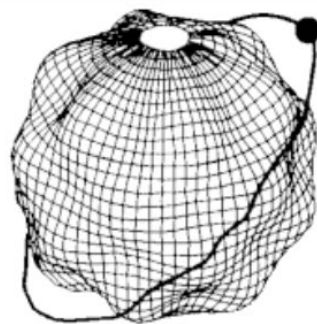
Geometric & General Services



source: ggoss.org



Gravity Services



ISG



Bureau Gravimétrique International
International Gravimetric Bureau

Global Geodetic Observing System

The Global Geodetic Observing System (GGOS)

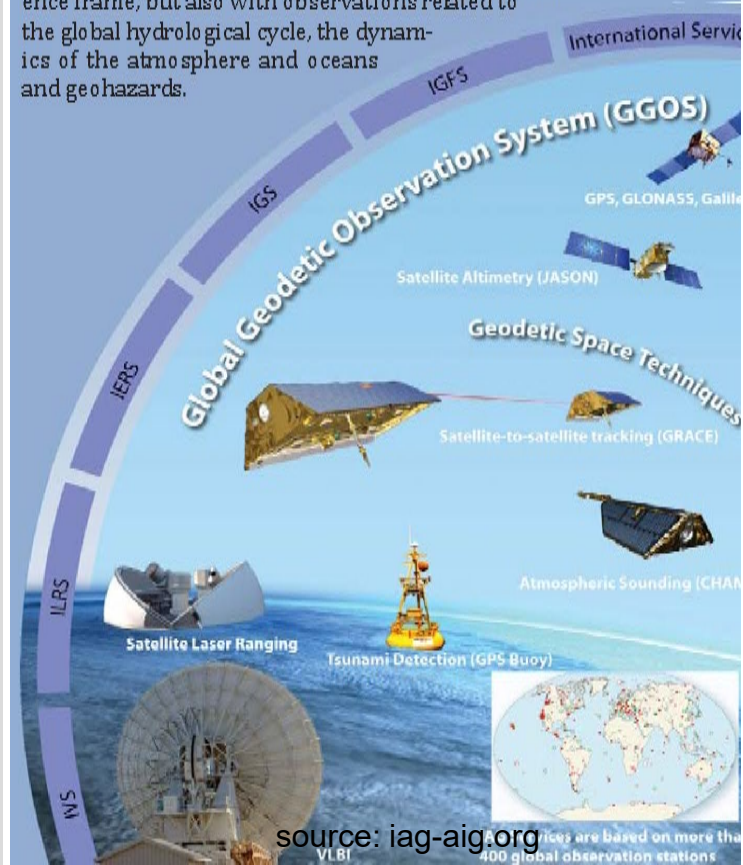
URL: <http://www.ggos.org>



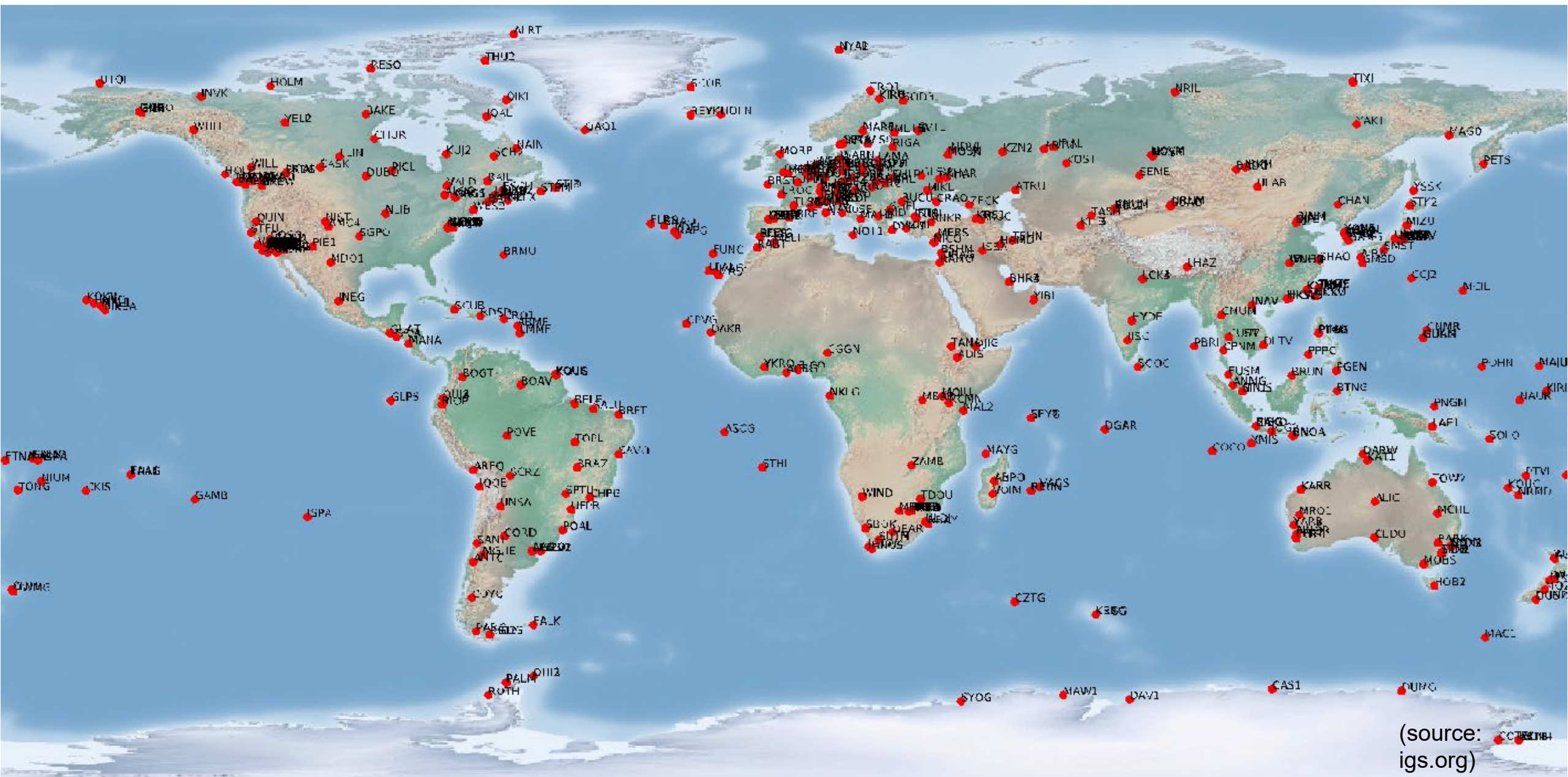
GGOS is an official component of IAG as well as a participating organization of the Group on Earth Observations (GEO).

GGOS provides observations of the three fundamental geodetic observables and their variations, that is the Earth's shape, the Earth's gravity field, and the Earth's rotational motion. Thus GGOS ensures the basis to maintain a stable, accurate and global reference frame, which is crucial for all Earth observation.

GGOS contributes to the Global Earth Observing System of Systems (GEOSS) not only with the global reference frame, but also with observations related to the global hydrological cycle, the dynamics of the atmosphere and oceans and geohazards.

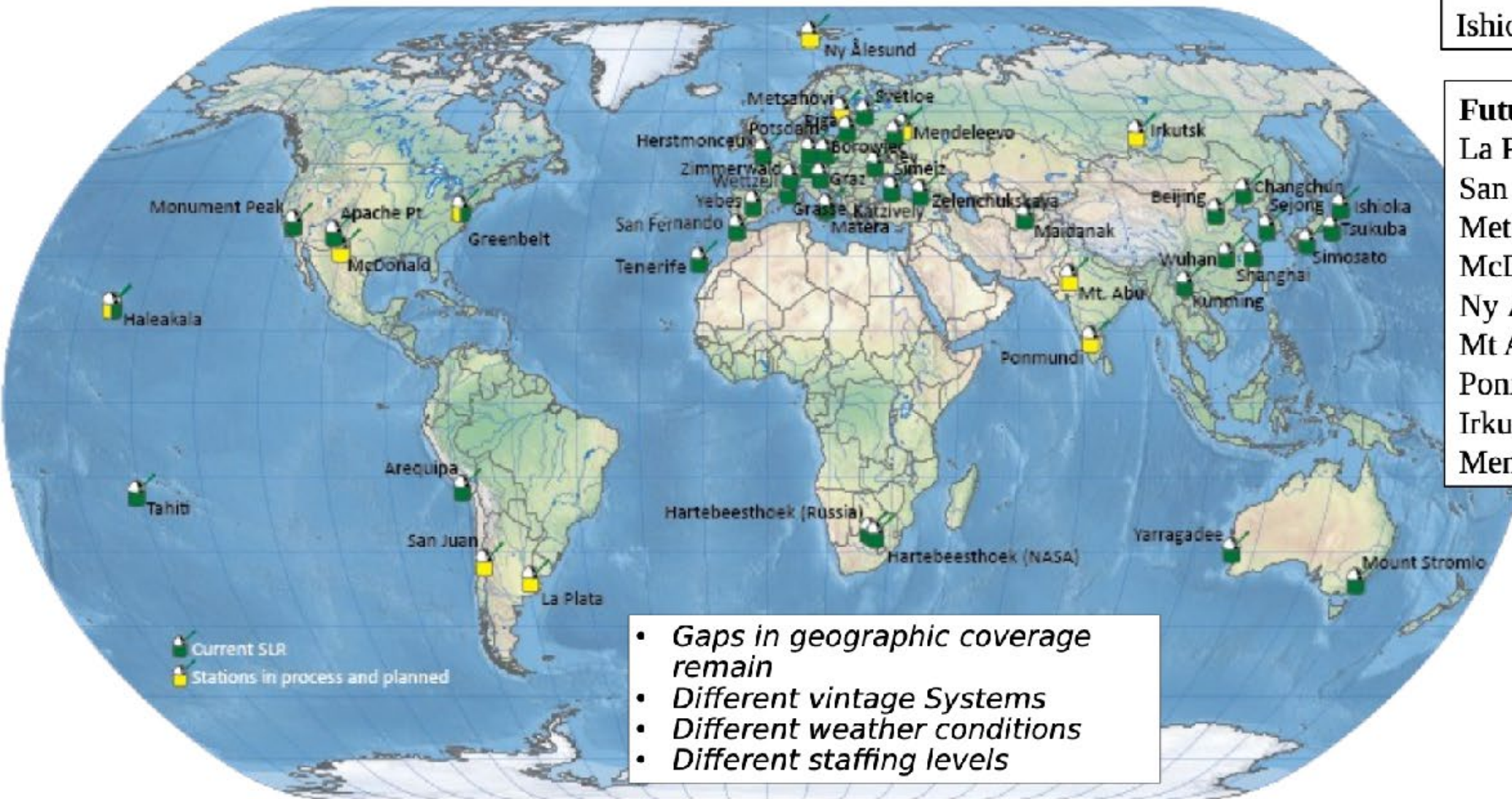


International GNSS Service (IGS)



International Laser Ranging Service (ILRS)

Current and Planned ILRS Network



New Stations (2023-2024)

Yebes, Spain

Ishioka, Japan

Future Stations (2024-2027)

La Plata, Argentina

San Juan, Argentina

Metsähovi, Finland

McDonald, TX, USA

Ny Ålesund, Norway

Mt Abu, India

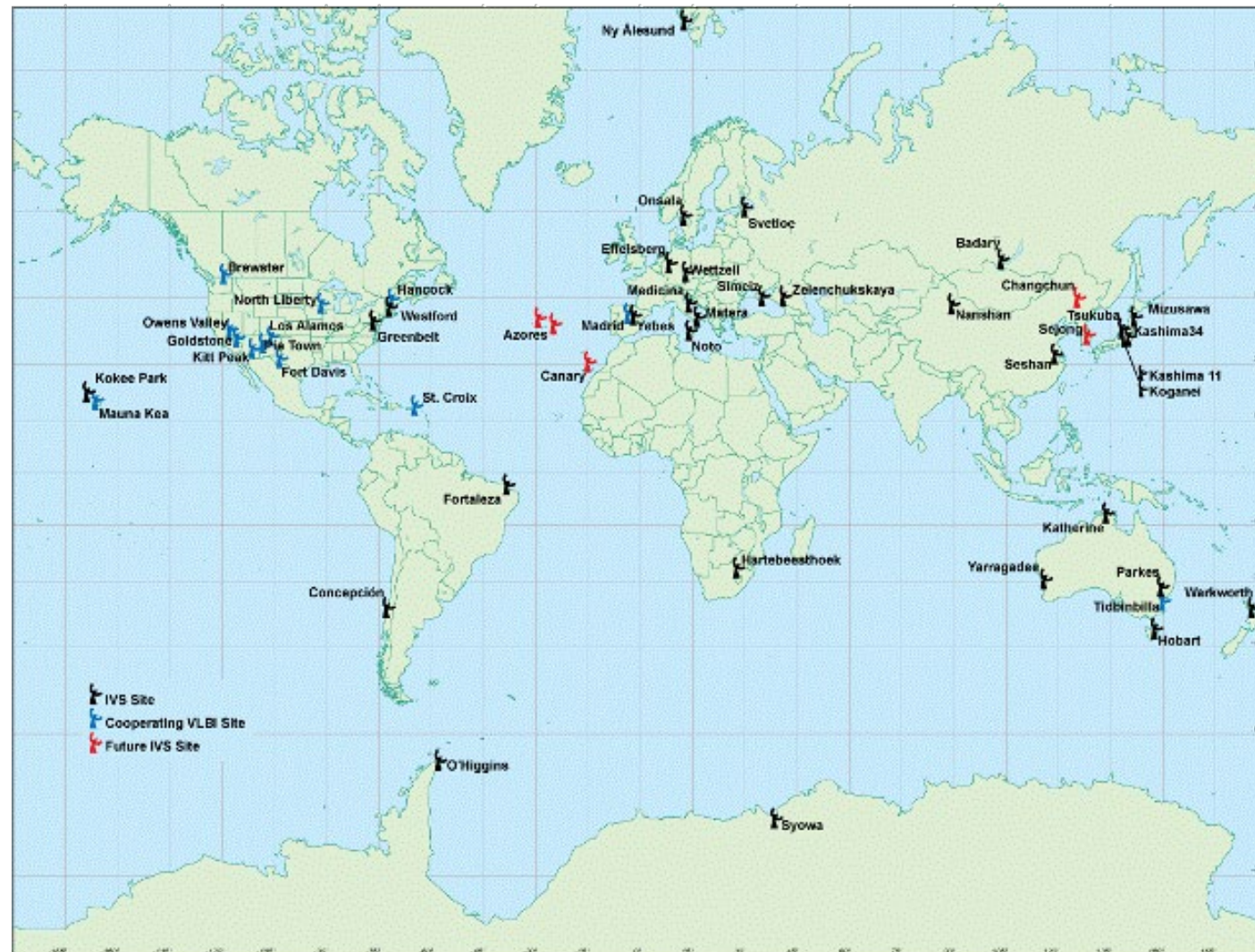
Ponmudi, India

Irkutsk (Tochka), Russia

Mendeleevo (Tochka), Russia

- Gaps in geographic coverage remain
- Different vintage Systems
- Different weather conditions
- Different staffing levels

International VLBI Service (IVS) for Geodesy and Astrometry



(source:
ivscc.gsfc.nasa.gov)

International DORIS Service (IDS)





GGOS
Global Geodetic
Observing System

<https://ggos.org>

Established by IAG

2003 as IAG Project; 2007 as full component of IAG

The observing system of the IAG

Organize the technique-specific Services under one unifying umbrella

Form a comprehensive geodetic observing instrument

Integrate the hitherto separate pillars of geodesy (shape, rotation, and gravity) into one consistent observing system

GGOS Goal: TRF accurate to better than 1 mm, stable to better than 0.1 mm/yr over a decade

Provide the geodetic expertise and infrastructure needed to monitor the Earth system and to conduct global change research

IAG Commissions and Services are the backbone of GGOS

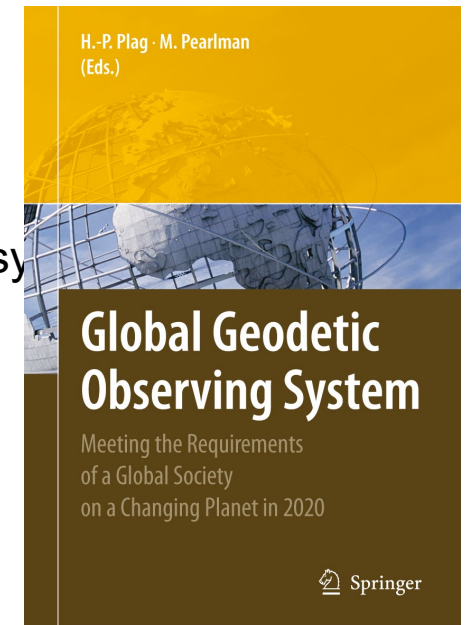
Represents IAG to Group on Earth Observations (GEO)



GGOS
Global Geodetic
Observing System

<https://ggos.org>

- Forum for international collaboration
 - Improve integrated, global geodetic infrastructure
 - Improve geodetic products
 - Unified Analysis Workshops co-organized with IERS
- Advocate for geodesy to broader community
 - Group on Earth Observations; Committee on Earth Observation Satellites
 - Provide Earth observations (including geodetic) needed to make informed decisions
 - UN Global Geodetic Center of Excellence and UN-GGIM Subcommittee on Geodesy
 - Emerging policy-making organizations in geodesy
 - Emerging forum for international collaboration
- Incubator for new initiatives in geodesy
 - Geohazards Monitoring (Chair: Tim Melbourne, USA)
 - Geodetic Space Weather Research (Chair: Michael Schmidt, Germany)
 - Artificial Intelligence for Geodesy (Chair: Benedikt Soja, Switzerland)
- Requirements-setting organization for geodesy
 - GGOS 2020 book and its update
 - Essential Geodetic Variables



<https://link.springer.com/book/10.1007/978-3-642-02687-4>



Exploring the IGS Network

Engaging with the Global GNSS Community

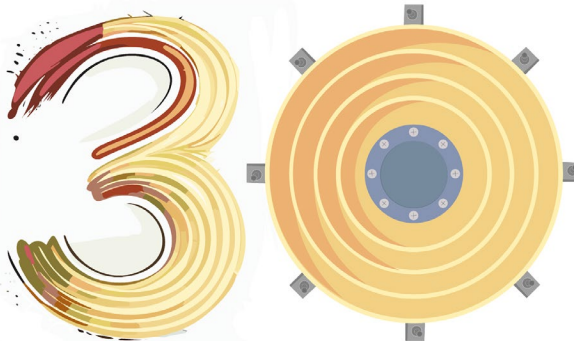


IGS Mission

The International GNSS Service (IGS) provides, on an openly available basis, the **highest-quality Global Navigation Satellite System (GNSS)** data, products, services in support of:

- the Terrestrial Reference Frame (TRF)
- Earth observation and research
- Positioning, Navigation and Timing (PNT)
- other applications benefitting science and society

CELEBRATING



YEARS OF IGS

IGS Goals

1

Serve as the premier source of the highest-quality GNSS related standards and conventions, data and products, openly available to all user communities.

2

Attract leading-edge expertise to pursue challenging, innovative projects in a collegial, collaborative, and creative culture.

3

Incorporate and integrate new developments, systems, technologies, applications, and changing user needs into IGS products and services.

4

Facilitate the integration of IGS into the International Association of Geodesy (IAG) Global Geodetic Observing System (GGOS) and other more broadly based Earth observing, geodetic, and global navigation systems and services.

5

Maintain an international federation with committed contributions from its members, and with effective leadership, management, and governance.

6

Promote the value and benefits of IGS to society, the broader scientific community, and in particular to policy makers and funding entities.

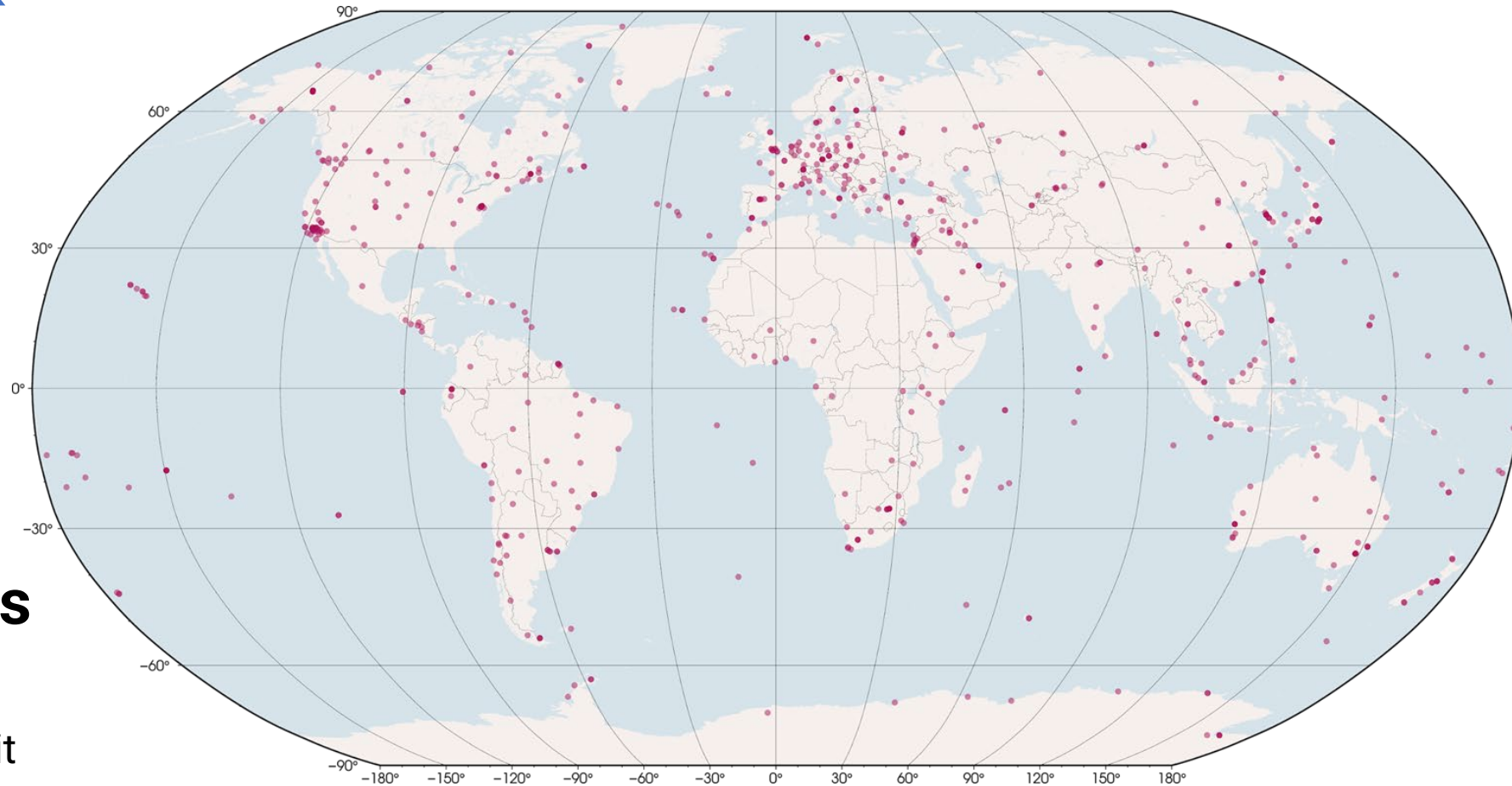
IGS Network

515*
stations in

116*
countries/regions

To explore all stations, visit
<https://network.igs.org>.

**may not be up to date*



IGS CORS Contributions from Africa

Currently, there are 20* African countries contributing CORS to the IGS Network, 34 countries don't have single CORS within their national territory. Most of the stations are maintained by foreign partners. There is a significant gap in central Africa, where contributions are notably lacking.



Benefits of contributing to the IGS Network

1

Global Impact: Contribute to a global effort in advancing precise positioning and understanding of Earth.

4

Contribution to Global Reference Frame: Contribute to the development and maintenance of a global reference frame crucial for various scientific and societal applications.

2

Support for Scientific Research: Support scientific research in geodesy, Earth sciences, and related fields by providing essential data.

5

Capacity Building: Access training resources and capacity-building initiatives aimed at enhancing skills in GNSS data analysis and interpretation.

3

Network Collaboration: Collaborate with a diverse network of international partners, fostering knowledge exchange and collaboration opportunities.

6

Recognition and Visibility: Gain recognition and visibility as a contributor to a globally known organization focused on Earth observation and positioning technologies.

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CORS Guidelines

The “[Guidelines for Continuously Operating Reference Stations in the IGS](https://files.igs.org/pub/resource/guidelines/Guidelines_for_Continuously_Operating_Reference_Stations_in_the_IGS_v1.0.pdf)” is now available to assist station owners and operators in planning and maintaining CORS. Translations to other languages than English would be welcome.



CORS Guidelines in a Nutshell

Site stability and signal quality

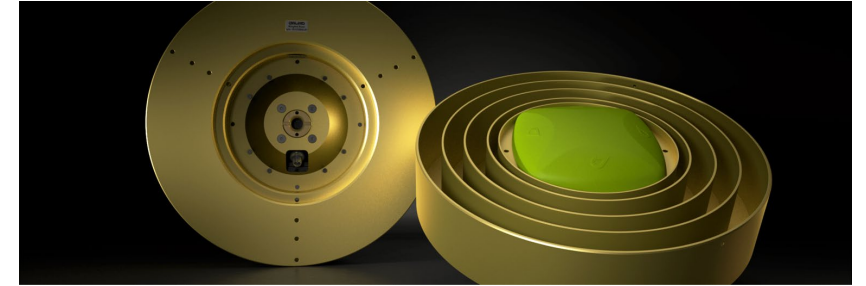
- Monuments ideally fixed to bedrock to provide long-term stability
- Sufficient height to minimise obstructions
- No obstructions above 10° elevation
- Simple design with low maintenance
- Minimise multipath and radio interference sources



Guidelines in a Nutshell

The right equipment: geodetic quality antennas and receivers

- Full-spectrum Multi-GNSS receivers and antennas with all-in-view tracking
- Preferably use of choke-ring antennas with Dorne-Margolin elements
- Antenna needs to have an absolute antenna calibration
- Use of antenna radomes is discouraged



Data Recording and Transmission

- Real-Time data is encouraged¹
- Minimum submission of RINEX 3/4 daily files²
(hourly and high-rate data is encouraged)



¹ https://files.igs.org/pub/resource/guidelines/Guidelines-for-IGS-Real-Time-Broadcasters-and-Stations_v1.0.pdf

² https://files.igs.org/pub/data/format/rinex_4.01.pdf

Site Log Manager 2.0

HomeMapAboutHelp

33 Stations

Filter

Search

ACRG00GHA

1

BAN200IND

BIK000KGZ

DAKA00SEN

ENAO00PRT

JOG200IDN

KIT300UZB

1

KSTU00RUS

LPGS00ARG

MIZU00JPN

NURK00RWA

NYA200NOR

OBE200DEU

OBE400DEU

1

OBER00DEU

OUS200NZL

POTS00DEU

RIO200ARG

1

Alerts

Welcome to SLM 2.0!

The new and improved IGS Site Log Manager 2.0 (SLM 2.0) is now available! For a detailed guide on the new system and what changed, please visit <https://slm.igs.org/help>. If you have any questions or concerns, please contact the Central Bureau at...
03/04/2023, 19:12:09

GeodesyML is Invalid.

The data for this site does not validate against GeodesyML schema version: GeodesyML/0.5
TASH00UZB
10/05/2023, 22:41:40

GeodesyML is Invalid.

The data for this site does not validate against GeodesyML schema version: GeodesyML/0.5
KIT300UZB
10/05/2023, 22:40:06

GeodesyML is Invalid.

The data for this site does not validate against GeodesyML schema version: GeodesyML/0.5
SUTM00ZAF
31/03/2023, 21:23:28

GeodesyML is Invalid.

Activity Log

ACRG00GHA

Publish

ACRG00GHA

Update

Identification

ACRG00GHA

Update

Receiver

ACRG00GHA

Update

Form

ACRG00GHA

Add

Receiver

ACRG00GHA

Log Upload

WUH200CHN

Publish

WUH200CHN

Update

Receiver

WUH200CHN

Update

Form

WUH200CHN

Add

Receiver

WUH200CHN

Log Upload

JOG200IDN

Publish

JOG200IDN

Update

Identification

JOG200IDN

Update

Receiver

JOG200IDN

Add

Receiver

JOG200IDN

Update

Antenna

JOG200IDN

Update

Form

JOG200IDN

Add

Antenna

JOG200IDN

Log Upload

Site Log Manager

The IGS Site Log Manager (SLM) is a web based online application designed for the purpose of managing the metadata of IGS CORS.

Register **your CORS**

You can register your CORS by filling out the form: <https://igs.org/network-resources>

A dedicated committee will assess your proposal and provide feedback.

[About IGS Network](#)[Downloadable Maps/Station List](#)[Propose a new IGS Site](#)[New Site Checklist](#)

Interested in providing a station for the IGS?

To initiate the application, review the [Guidelines for Continuously Operating Reference Stations \(CORS\) in the IGS document](#) and complete the online application below.

Agency or Organization *

Name *

Prefix	First	Middle	Last	Suffix

Conclusion

- The IGS plays a crucial role in advancing our understanding of Earth and supporting a wide range of applications benefiting science and society
- Through its global network of reference stations and collaborative efforts, the IGS provides high-quality GNSS data, products, and services essential for precise positioning and Earth observation
- A notable gap remains in central Africa that needs to be addressed through increased outreach and collaboration to ensure broader participation and representation from all regions
- We will continue advocating for the expansion of the IGS network, particularly in underrepresented areas

IGS Associate Membership

What is an IGS Associate Member?

The Associate Members of the IGS are described in the terms of reference as “...persons representing organizations that participate in any of the IGS components. The membership is balanced with respect to IGS components, organizational representation and geography, and is meant to represent institutions which contribute significantly to the IGS on a continuous basis”

Visit IGS Associate Membership Guidelines to learn more.

<https://igs.org/am/>



**STRONGER.
TOGETHER.**

Webinar: Tour de l'IGS - Spotlight on Africa - 04 June 2025



Tour de l'IGS 7th Stop: Spotlight on Africa

04 June 2025, 1200-1520 UTC

This 7th stop focuses on the African continent.

Virtual Organising Committee: Fernand Balé (Bureau National d'Etudes Techniques et de Développement, Côte d'Ivoire) and Babatunde Rabiun (National Space Research and Development Agency, Nigeria).

Registration: <https://forms.gle/A5nyo8g9sjUDog3D9>.

Time (UTC)	Speaker	Institution	Title
1200-1210	Fernand Balé; Babatunde Rabiun; Allison Craddock	Bureau National d'Etudes Techniques et de Développement, Côte d'Ivoire; National Space Research and Development Agency, Nigeria; NASA Jet Propulsion Laboratory & International GNSS Service Central Bureau, USA	Welcoming Remarks
1210-1230	Aslam Parker	South African Mapping Authority, South Africa	The TrigNet CORS network
1230-1250	Oumar Ka	National Mapping Agency, ANAT, Senegal	Modernizing Geodetic Infrastructure in Senegal: Operational GNSS Initiatives and Perspectives
1250-1310	Olusegun Jonah	SRI International, USA	Need for a Continuous Network of GNSS Receivers in Equatorial and Low-Latitude Africa: the CONGA Network



**STRONGER.
TOGETHER.**



International Federation of Surveyors
Fédération Internationale des Géomètres
International Vereinigung der Vermessungsingenieure

F.I.G. – A Partner to UN-GGCE

Presentation to UN-GGCE Geodesy Capability Development Workshop 2025



April 2025

Ryan Keenan – Chair, FIG Commission 5 Positioning & Measurement
Member, Task Force International Trends; Member, Asia Pacific CDN

Who is F.I.G.?

The International Federation of Surveyors!

- Established in 1878 in Paris
- Federation of national surveying associations and organisations
- Only international body representing all surveying disciplines
- UN-recognised Non-Governmental organisation (NGO) and non-profit organisation



*FIG – a global
umbrella organisation*

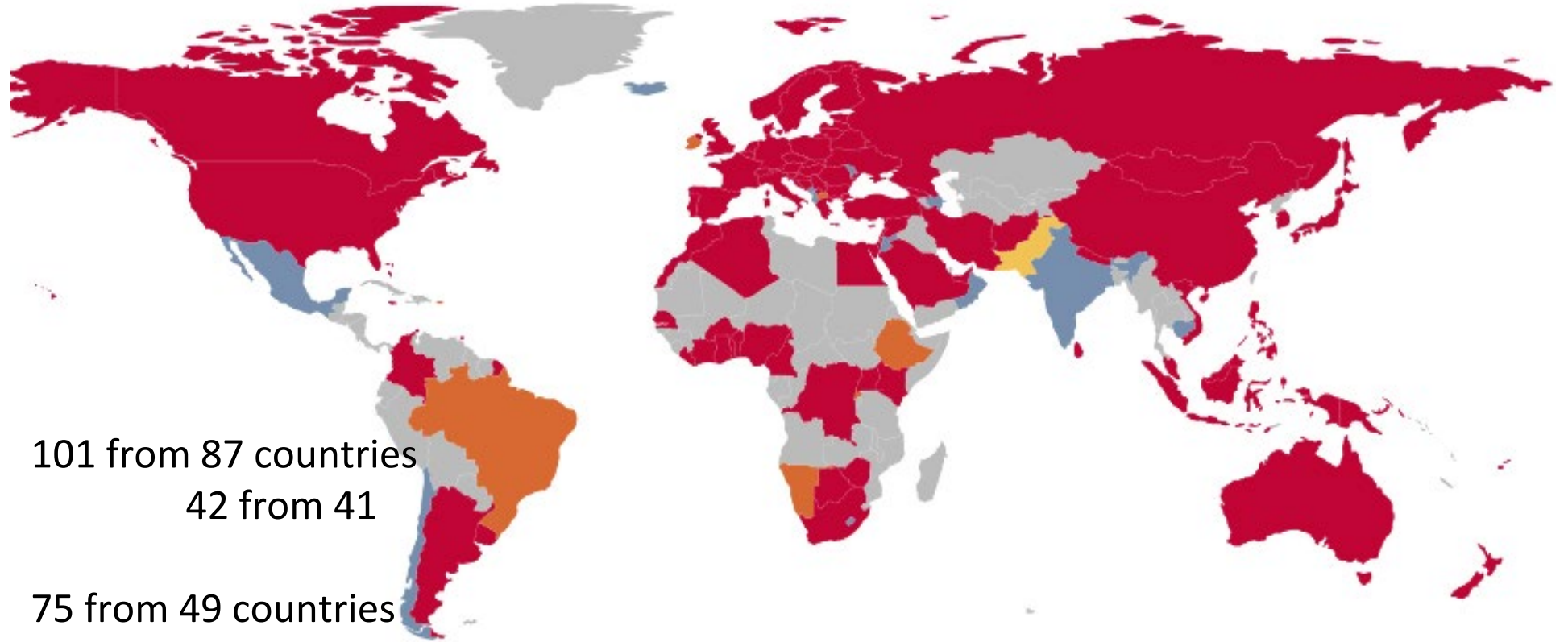
**FIG represents the interests of
surveyors worldwide**

WHAT



Who are the members of FIG?

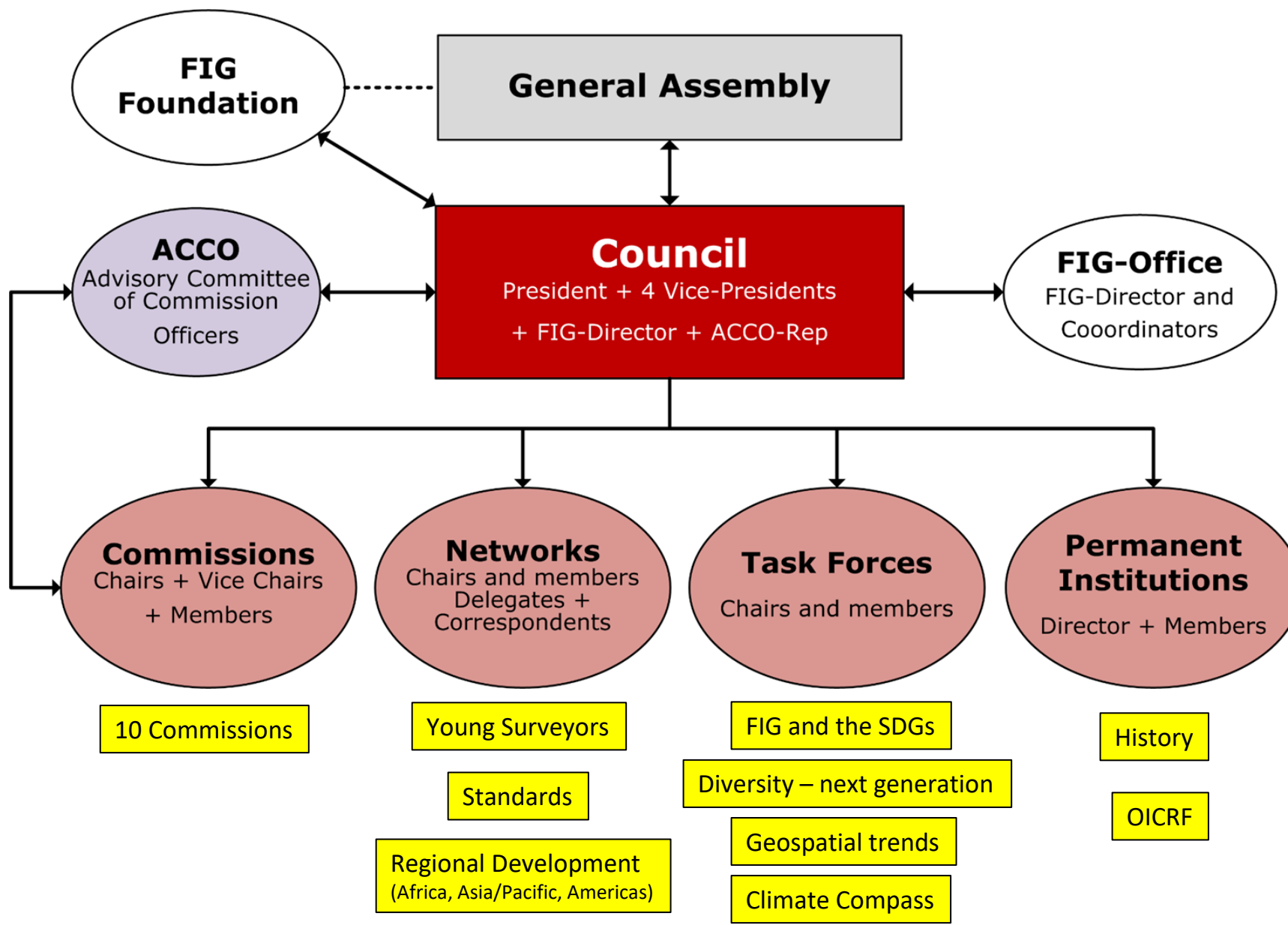
Over 120 countries represented in 2022 – more than 300,000 individuals



Membership categories:

- Member associations 101 from 87 countries
- Affiliate members 42 from 41 countries
- Academic members 75 from 49 countries
- Corporate members 20
- Correspondents 5
- Honorary presidents 8
- Honorary members 31
- Honorary ambassadors 2

How is **FIG** organized ?



HOW

Commission 4:

Hydrography

- Hydrographic Standards and Guidelines(WG 4.1)
- Sustainable Oceans and Hydrography (WG 4.2)
- Mapping the Plastic (WG 4.3)
- Hydrospatial Domain and Marine Administration(WG 4.4)
- Climate Change Induced Sea Level Rise and Adaptation (WG 4.5)

Commission 5:

Positioning and Measurement

- **Standards, Quality Assurance and Calibration (WG 5.1)**
- **3D Reference Frames (WG 5.2)**
- **Vertical Reference Frames (WG 5.3)**
- **GNSS (WG 5.4)**
- **Multi-Sensor-Systems (WG 5.5)**
- **Cost Effective Positioning (WG5.6)**
- **Resilient PNT (WG5.7)**

Commission 6:

Engineering Surveys

- Deformation Monitoring and Analysis (WG 6.1)
- Dynamic Structural Monitoring(WG 6.2)
- Applications of immersive technologies in Engineering Geodesy (WG 6.3)
- Engineering Surveying Outreach (WG 6.4)



NETWORKS

- Standards Network
- Regional Capacity Networks
 - Africa ARN (African Regional Network)
 - Asia/Pacific AP-CDN (Capability Development Network)
 - Americas
- Young Surveyors Network (YSN)

HOW

FIG YOUNG SURVEYORS NETWORK

- To **improve** the number of young professionals participating within FIG.
- To **help** young professionals in the beginning of their careers with contacts.
- To **increase** co-operation between the commissions and the students and young professionals network.



Task Forces

Current topics that need research and to advise on matters of an administrative or of a general policy nature.

Current Task Forces:

- FIG and the SDGs
- FIG Climate Compass Task Force
- The Role of FIG in International Trends and Future Geospatial Information Ecosystem
- The Surveyor's Profession: Evolutionary Diversity and Inclusion



HOW

FIG FOUNDATION

- Building a Sustainable Future



The FIG Foundation raises funds to secure a sustainable future for surveyors. Donations finance educational and capacity building projects and scholarships, especially in developing countries and countries in transition, and encourage research into all disciplines of surveying and help disseminate the results of that research.



WHAT

PUBLICATIONS

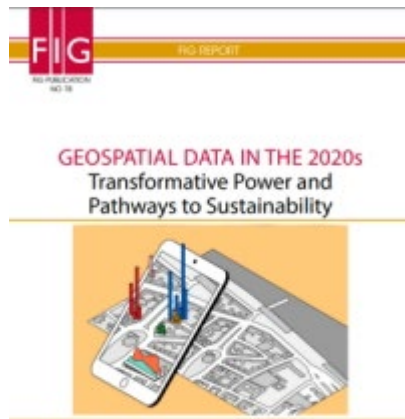
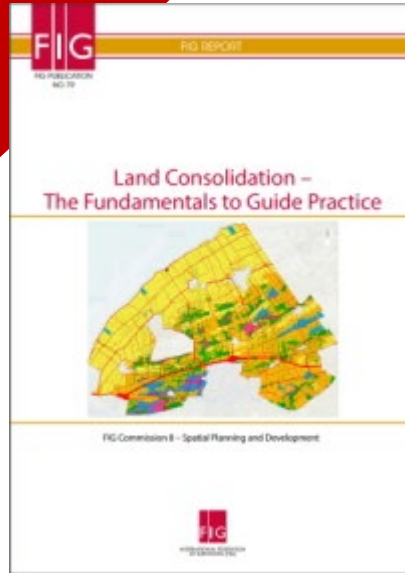


FIG Peer Review Journal

ISSN No 2412-916X

In 2006, FIG introduced a double blinded Peer Review Process for papers with an outstanding academic level or best practice. Since then, there has been an option to submit a paper for peer review each year at FIG Congresses and Working Weeks. Approximately 10 per cent of all presented papers at a FIG Conference are



Annual Review

FIG Publication Series – 81 Publications

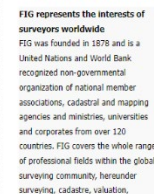
Conference Proceedings



ters and Cadastral Information for Tracking Gender and Tenure Issues in the Caribbean by Charisse



FIG represents the interests of surveyors worldwide



Home > Organisation > Task Forces > Sdg

FIG Commissions & SDG work



FIG Commissions and the Sustainable Development Goals

Below the relevant Sustainable Development Goals (SDGs), targets and indicators for each FIG Commission are mentioned. FIG members can contribute to the SDG's in two main ways. On the one hand they can create awareness and contribute to achieving the SDG's and the specific targets. On the other hand they can collect relevant data to contribute to the measurement of the targets by using the indicators.

To go directly to the individual Commissions SDG view, click on the links below:

- Commission 1 - Professional Standards and Practice
- Commission 2 - Professional Education
- Commission 3 - Spatial Information Management
- Commission 4 - Hydrography
- Commission 5 - Positioning and Measurement
- Commission 6 - Engineering Surveys
- Commission 7 - Cadastre and Land Management
- Commission 8 - Spatial Planning and Development
- Commission 9 - Valuation and the Management of Real Estate
- Commission 10 - Construction Economics and Management

Special sites

Three millennia of Measurement on Earth – Special edition
35 years of research – 3,000 pages – over 350 illustrations

Publications with partners

Web site
<https://www.fig.net/resources/publications/index.asp>



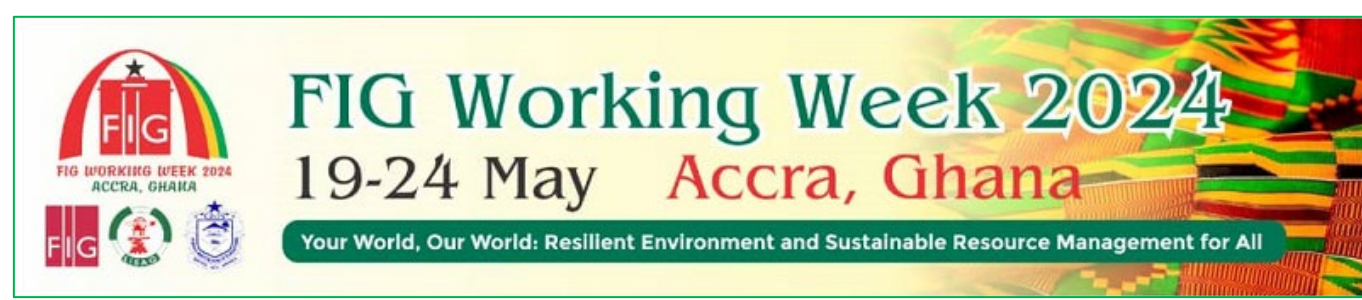


Recent Activities

- 1,500 attendees from 83 countries
- 72 Sessions, 25 Exhibitors
- Two days of pre-events
- Three days of Technical Program
- Two days of General Assembly and Task Force workshops



FACILITATED BY:
UN-HABITAT
FOR A BETTER URBAN FUTURE



https://www.fig.net/resources/proceedings/fig_proceedings/fig2024/index.htm





FIG Commission 5
Positioning and Measurement

WW Accra: RFIP Workshop 18/19 May 2024



Collaboration, Innovation and Resilience: Championing a Digital Generation

Brisbane, Australia 6–10 April



FIG Commission 5
Positioning and Measurement

Commission 5 Positioning and Measurement



Ryan Keenan
Chair (2023-2026)



Working Groups

- 5.1 Standards
- 5.2 3D Reference Frames
- 5.3 Vertical Reference Frames *(with Comm 4)*
- 5.4 GNSS
- 5.5 Multi-Sensor Systems *(with Comm 6 / IAG)*
- 5.6 Cost-effective Positioning
- 5.7 Emerging Technologies for PNT *(with IAG)*

**5 days, 1 pre-event, 7 sessions,
~55 presentations, ~670 attendees,
1000s of great memories yet ONE vision..**

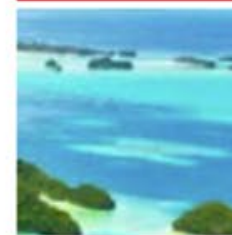


**Positioning and Measurement Technologies: Answering the
Question of Where**



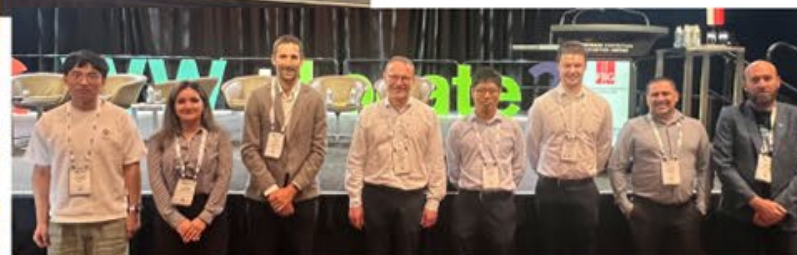
FIG Commission 5
Positioning and Measurement

Progress through Partnerships. Within FIG and beyond. Together.



Asia/Pacific
(AP-CPD)

SIDS with Asia Pacific CDN



Pacific
Community
Communauté
du Pacifique



Australian Government
Geoscience Australia



Toitū Te Whenua
Land Information
New Zealand



IGS
INTERNATIONAL
GNSS SERVICE



FIG Commission 5
Positioning and Measurement

Strengthening the Global Geodetic Reference Frame for Everyone. Together.



64 attendees, 22 countries, 5 continents including 3 funded attendees ->
- Nepal, Iran and Sri Lanka



Pacific Community
Communauté du Pacifique



Australian Government
Geoscience Australia



United Nations
Global Geodetic
Centre of Excellence

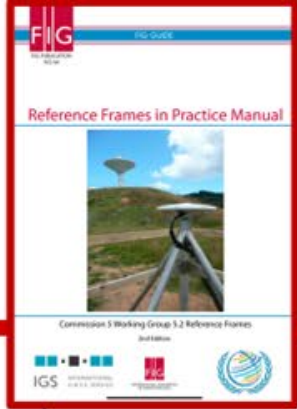
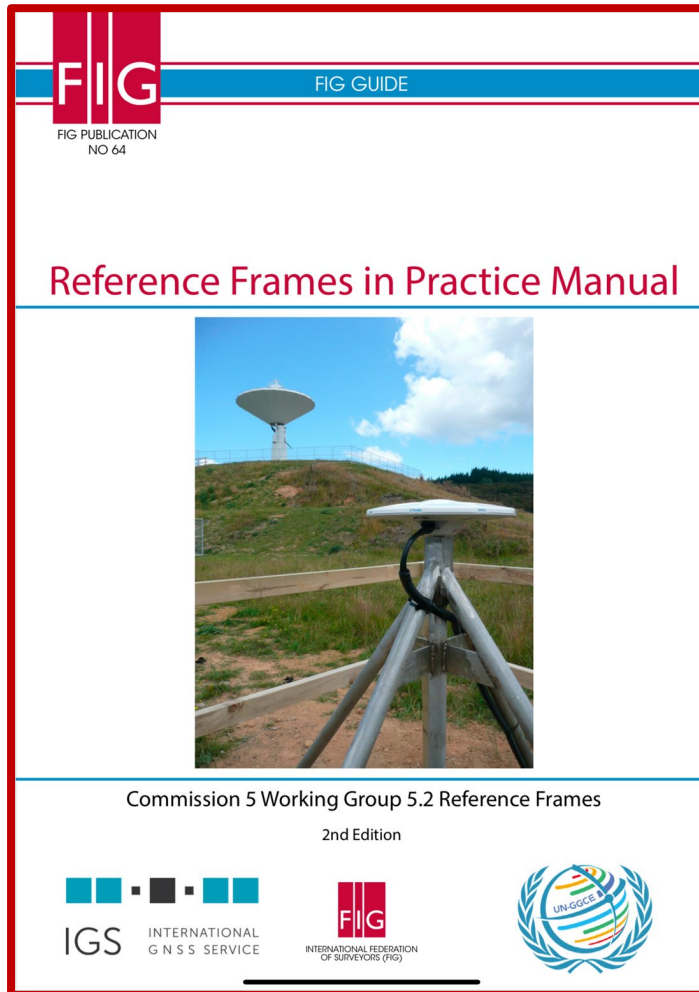


FIG Publication – RFIP Manual Ed.2 Update



- The 2024 update to the 2014 edition (Publication #64) was completed
- Including:
 - New Contributions from IGS and UN-GGCE
 - Updates on Global Geodesy Initiatives, and GNSS Constellations
- Announced at WW24 Accra during RFIP
 - Digital PDF available in English
 - Hardcopy & additional languages considered

<https://fig.net/resources/publications/figpub/pub64/Figpub64.pdf>



Upcoming Events (www.fig.net/events/index.asp)



XXVIII FIG CONGRESS
MAY 2026
Cape Town, South Africa

Solutions and Technologies
towards the 2030 Sustainable
Development Goals



FIG Working Week 2027
Stavanger Norway 23-27 May
The Power of Where for the new Generations

FIG WW2028 Paris, France
150th Anniversary



FIG WORKING WEEK
PARIS
150 YEARS 25-29 JUNE 2028





An Open Invitation....

FIG invites all to our upcoming Events, Commissions and Networks:

- Attend
- Participate
- Collaborate

<https://fig.net>

For information, contact: Ryan Keenan – Chair, FIG Commission 5
(<mailto:ryan@positioninginsights.com.au>)



International Committee on GNSS (ICG)



Recent Developments

18th Meeting of ICG



Annual Meeting of GNSS Providers

<https://www.unoosa.org/oosa/en/ourwork/icg/meetings/ICG-2024.html>

Hosted by Australia and New Zealand

•6 – 11 October 2024, Wellington, New Zealand

	AM		PM		
Sunday 6 October			1 st Providers' Forum Meeting (chaired by the United States)	Meeting with the Working Groups Co-chairs	
Monday 7 October	1 st Plenary Session of ICG - Welcome Remarks - GNSS Systems Updates	Lunch Break	Presentations by Members, Associate Members, Observers, Invited observers, etc. on matters of interest to ICG	Experts Seminar	
				Welcome Reception	
Tuesday 8 October			(in parallel) Working Groups Meetings	(in parallel) Working Groups Meetings (Continued)	
Wednesday 9 October			(in parallel) Working Groups Meetings (Continued)	Technical Tour	
Thursday 10 October	(in parallel) Working Groups Meetings (Continued)		2 nd Plenary session of ICG	2 nd Providers' Forum Meeting (Chaired by the United States)	
Friday 11 October	3 rd Plenary Session of ICG				



Working Groups within ICG



- ❑ **Systems, Signals and Services** (*United States & Russian Federation*): Compa spectrum protection; interoperability and service standards; system-of-system operations
- ❑ **Enhancement of GNSS Performance, New Services and Capabilities** (*India, China & ESA*): Future & novel integrity solutions; implementation of interoperable GNSS Space Service Volume (SSV) examination of performance of atmospheric models, *establish dialogue with space weather/RS* communities and its evolution;
- ❑ **Information Dissemination and Capacity Building** (*UNOOSA*): Focused on education and training programmes, promoting GNSS for scientific exploration (incl., *space weather and its effects on GNSS*)
- ❑ **Reference Frames, Timing and Applications** (*IAG, IGS & FIG*): Focused on monitoring and reference station networks

<https://www.unoosa.org/oosa/en/ourwork/icg/working-groups.html>

Geodesy-relevant Task Force in ICG



Publication of a Policy Brief on the Uses of GNSS for Disaster Risk Reduction

The “Applications of GNSS for Disaster Risk Reduction” Task Force is exploring how GNSS technology can enhance disaster risk reduction strategies and bolster natural hazard early warning systems. Currently, TF focuses on four GNSS-based techniques, which have broad applications, spanning for instance earthquakes, tsunamis, floods and solar storms

- *Precise Point Positioning (GNSS-PPP)*
- *Reflectometry (GNSS-R)*
- *Radio Occultation (GNSS-RO)*
- *Ground based Total Electron Content (GNSS-TEC)*

- ☐ To publish the policy Brief on the Uses of GNSS for Disaster Risk Reduction
- ☐ Website: <https://www.unoosa.org/oosa/en/ourwork/icg/working-groups/d.html>
- ☐ Templates on Geodetic and Timing References:
<https://www.unoosa.org/oosa/en/ourwork/icg/resources/Regl-ref.html>

International Volunteering

All of the groups mentioned are 'Voluntary' organisations

- typically contributing with 'in kind' efforts (unpaid volunteers)
- some Administrative roles may be salaried, but majority are not
- supporting one other (typically larger) initiatives and organisations

Given the importance of humans within the Global Geodesy Supply Chain, their continued efforts are critical for sustainable geodesy

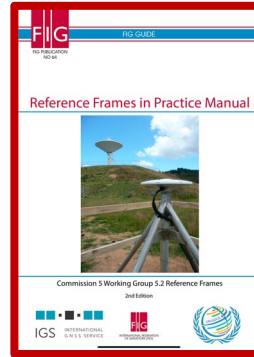
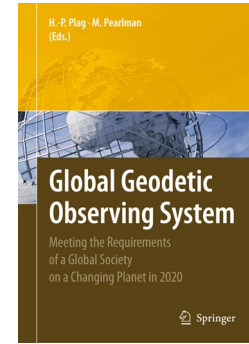
We strongly urge you to contribute where you can... use these organisations and networks to advance your learning, and your contributions for the greater good of geodesy



**STRONGER.
TOGETHER.**

Further Activities

- Check out Websites
(with resources, publications, videos)
- Review Publications IGS CORS Guidelines, FIG RFIP Manual
- Consider joining organisations, initiatives, WGs, commissions, networks and events
- Become a GGOS Affiliate
- Become an IGS Associate Member
- Get involved with FIG as Member (academic, commission, network etc)
Share your data!



**STRONGER.
TOGETHER.**

Summary

International Geodesy Initiatives and Partners

An understanding of the various Organisations featuring geodesy
International Geodesy Initiatives

- IUGG, IAG, IGS, GGOS

Partnerships

- FIG, UN-ICG



Volunteer organisations contribute significantly to Geodesy activities

- typically contributing with 'in kind' efforts (unpaid volunteers)
- supporting one another (typically larger) initiatives and organisations
- **Building capabilities to develop capacity**

Given the importance of humans within the Global Geodesy Supply Chain, their continued efforts are critical for sustainable geodesy

- Recommendations for participants to get involved



Q&A around these Initiatives and Partnerships

**STRONGER.
TOGETHER.**