

IAG vision on the implementation of the UN General Assembly resolution on the GGRF and its roadmap

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Outline

- IAG Components and their respective roles
- Members of 2019-2023 IAG Executive Committee
- GGRF in the context of UN-GGIM
- Key points of the UN GA resolution on the GGRF
- Geodesy & IAG: Some facts
- IAG role: guidance and science plan
- IAG contribution & vision: some suggestions for discussion



IAG Components

- **Bureau: President, Vice-President & Secretary General**
- **4 Commissions:**
 - Com 1: Reference Frames
 - Com 2: Gravity Field
 - Com 3: Earth Rotation & Geodynamics
 - Com 4: Positioning & Applications
- **Inter-Commission Committees**
 - on Theory - ICCT (Well established ICC)
 - *Climate Research (New)*
 - *Marine Geodesy (New)*
- **Projects**
 - *Planning Group on Novel Sensors and quantum technology*
- **Services: Geometry & Gravity-related services**
- **Global Geodetic Observing System (GGOS)**
- **Communication and Outreach Branch**

2019-2023 IAG Executive Committee

- **President:** Z. Altamimi (France)
- **Vice-President:** R. Gross (USA)
- **Secretary General:** M. Poutanen (Finland)
- **Immediate Past President:** H. Schuh (Germany)
- **Immediate Pas Sec. General:** H. Drewes (Germany)
- **Comm. 1 - Reference Frames:** Ch. Kotsakis (Greece)
- **Comm. 2 - Gravity Field:** A. Jäggi (Switzerland)
- **Comm. 3 - Earth Rotation & Geodynamics:** J. Bogusz (Poland)
- **Comm. 4 - Positioning & Applications:** A. Kealy (Australia)
- **Communication and Outreach Branch:** Sz. Rózsa (Hungary)
- **Service Representatives (3):** J. Böhm (Austria)
T. Herring (USA)
T. Otsubo (Japan)
- **Members at Large (2):** S. Costa (Brazil)
Y. Dang (China)
- **Inter-Commission Committee on Theory:** P. Novak (Czech Rep.)
- **Global Geodetic Observing System (GGOS):** TBD

IAG Components: Key messages

- **Commission 1**: Advancement of theory, realization and future needs in reference frame determination & representation
- **Commission 2**: Support and advocate for new gravity missions
 - Advance the development of the IHRS/IHRF
- **Commission 3**: Sub-commission on Seismo-Geodesy, with IASPEI
 - Contribution of Geodesy to natural hazards
- **Commission 4**: Embrace new sensors and technologies for positioning applications
- **ICCT**: Theoretical, but also applied Geodesy
- **IAG Services**: The best and accurate products possible
- **GGOS**: Should focus more on **Advocacy** to the outside, and promote the work of IAG, its Commissions and Services
 - Should not appear as IAG, but as an IAG Component in order to preserve the image of IAG within the IUGG and outside

Note to Geodesists from Latin America: you're encouraged to contribute to IAG components, Working/Study Groups...



The GGRF as defined in the road map?

- Geodetic framework
- It includes:
 - Geodetic observatories / Networks
 - Data collection, data analysis
 - ICRF, ITRF, EOPs & Height systems
 - Work forces and product generation systems
 - ...
- The UN-GGIM initiative is about the sustainability of the GGRF on the long-term

Key points of the UN GA resolution

- *Encourages* Member States and relevant international organizations to enhance **global cooperation** in providing technical assistance in geodesy for those countries in need
- *Urges* Member States to implement **open geodetic data sharing**
- *Invites* Member States to commit to **improve and maintain national geodetic infrastructure** as an essential means to enhance the GGRF
- *Invites* Member States to have **multilateral cooperation**
- Note to Latin America: refer to the UN GA resolution when preparing geodetic projects/proposals.



Geodesy & IAG: Some facts

- Geodesy is a fundamental science, the only science that quantifies Earth system changes, but needs to be well known by the public...
- IAG is a scientific association to advance geodesy, with no legal authority
- IAG provides geodetic products, via its services, critical to science & society
- BUT: IAG is not the owner of the geodetic infrastructure which is in danger of degradation
- We rely on the investments of NMAs, Space Agencies, universities and research groups
- But open data sharing is also critical to advance science
- The UN-GGIM initiative is an opportunity to sustain the geodetic infrastructure on the long-term. It is not a threat.
- IAG role is to provide guidance and science plan



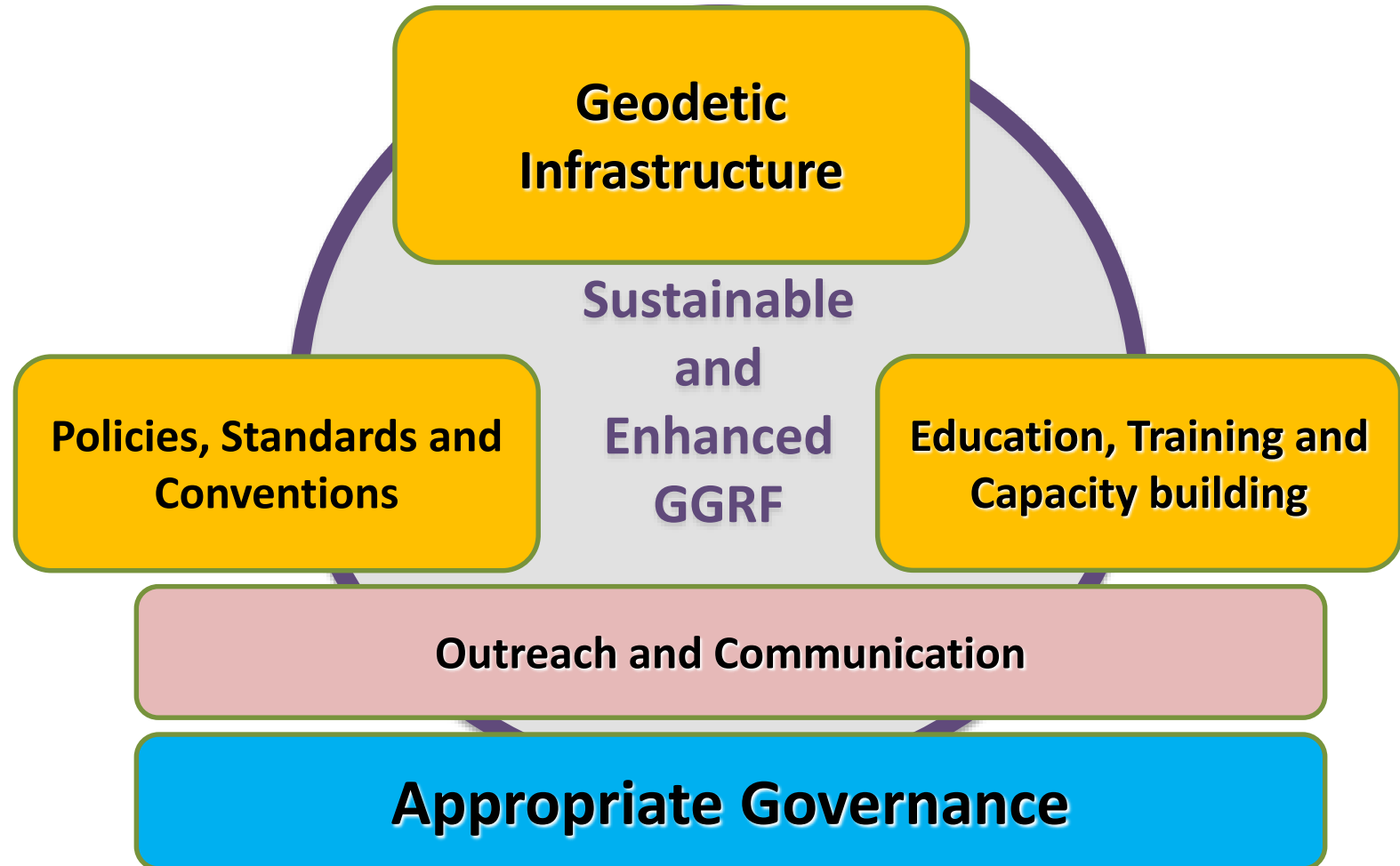
IGAG role is to provide guidance and science plan: How?

- Does not mean mathematical or theoretical formulation of the GGRF
- Means enhancement & sustainability of the GGRF (as defined in the GGRF road map), based on science requirements
- What are the science questions where geodesy provides answers?
- What are the geodetic products needed to address scientific & societal questions?
- What are the science requirements (precision, accuracy, timeliness) for each set of IAG geodetic products?
- Does the current geodetic infrastructure meet science & societal requirements? If not, what is missing & what is needed?
 - Do we need more SLR stations? How many? Geographic distribution? Technology? Etc.?
 - Do all countries have access to the ITRF, via GNSS technology?
- What are the gaps in gravity data, networks & gravity missions to meet the science and societal requirements for the establishment of:
 - The IHRF, national & regional height systems & geoids?
 - An absolute gravity network?
 - A global gravity field?

**IAG contribution & vision:
some suggestions for actions but open for discussion**

VISION of the UN Sub-committee on Geodesy

An accurate, sustainable and accessible Global Geodetic Reference Frame to support science and society



Geodetic Infrastructure: points for an action plan

What ?	How / Quantification ?	Who?
SLR Network & Products	How many sites, technology, etc. are needed? How many Data/Analysis Centers?	ILRS
VLBI Network & Products	How many sites, technology, etc. ? How many Data/Analysis Centers? Correlators? More frequent sessions with global coverage?	IVS
DORIS Network & Products	Any gaps in the network? How many Data/Analysis Centers?	IDS
GNSS Network & Products	Identify gaps for access to & densification of the ITRF	IGS, IAG/UN-GGIM regions(*)
Gravity Data & Satellite Missions	<ul style="list-style-type: none"> • Purpose (IHRF, Gravity field, networks of absolute gravity measurements, geoid) • Data sets, satellite missions 	IAG Com 2, GGOS Focus Area, IAG/UN-GGIM regions
Georisks	<ul style="list-style-type: none"> • Areas at risk (Tsunamis, flooding, seismic zones), • GNSS networks, new sensors, data & products 	IGS, IAG Commission 4, GGOS Focus Area, IAG/UN-GGIM regions

(*) Where Latin America contributions are expected

Education, Training & Capacity Building (ETCB): points for an action plan

What ?	How / Quantification ?	Who? In coordination with ETCB WG
Access to the ITRF using GNSS	Identify countries <ul style="list-style-type: none"> • with no GNSS infrastructure • who need assistance & capacity building in GNSS processing 	<ul style="list-style-type: none"> • IGS, FIG, IERS/ITRF Center, IAG/UN-GGIM regional entities • IAG/FIG Seminars • Donors, e.g. World bank?
National Height Systems & Geoid	Identify countries <ul style="list-style-type: none"> • with no levelling / gravity data • who need assistance & capacity building in data analysis 	<ul style="list-style-type: none"> • FIG, IAG Com 2, GGOS Focus Area, IAG/UN-GGIM regional entities • IAG/FIG Seminars • Donors, e.g. World bank?
...		

Data sharing, Policy, Standards and Conventions : points for an action plan

What ?	How / Quantification ?	Who? In coordination with Policy, Standards... WG
Standards & Conventions	<p>Identify ALL available geodetic standards : IAG, ISO, FIG?, including standardized analysis procedures</p> <p>Make them openly available: this needs negotiations with ISO</p>	IAG Services, IERS Conventions' Center, ...
Data sharing	<ul style="list-style-type: none"> • Raise the awareness of the importance of more openly share data (GNSS & Gravity) • Identify areas with no shared data that are critical to enhance IAG products • Encourage Member States to resolve their concerns that currently limit data sharing 	IGS, FIG, Com 2, IAG/UN-GGIM regional entities
...		

Outreach: points for an action plan

What ?	How / Quantification ?	Who? In coordination with Outreach WG
Establish a Global geodetic outreach program	Cooperation between COM experts in Member States	IAG COB, COB of IAG Services, Communication experts from IAG/UN-GGIM regional entities
...		

Governance: points for an action plan

- Governance is the most complex part of the process
- No single country can provide all the needed geodetic products
- A global cooperation and a governance mechanism are needed
- ==> Toward the creation of a **Global Geodetic Centre of Excellence (GGCE)**, under the auspices of UN-GGIM
- The GGCE modalities and structure still to be defined

What ?	How / Quantification ?	Who? In coordination with Governance WG
GGCE Mission	1) Enhanced global cooperation, 2) GGRF coordination, and 3) Provide technical assistance and capacity building ...	Mission defined??
GGCE Structure	Governing Council	Ministerial level?
GGCE Structure	International Advisory Committee	Geodesy experts : IAG, FIG,...
GGCE Financial Arrangements	Budgets for specific developments	Donors: Member states, private sector, ...

Summary

- The UN-GGIM initiative on the GGRF is an opportunity: the IAG should not miss
- The GGRF is about sustainability and enhancement of all what we do in geodesy, not the mathematical formulation
- The IAG is not the owner of the geodetic infrastructure
- The IAG has its place and role for guidance and science plan: **quantification of what is needed, based on science requirements**
- The Implementation plan of the GGRF road map needs to be revised & articulated in the context of the proposed Global Geodetic Center of Excellence (GGCE)
- The GGCE modalities and structure still need to be defined
- Latin America countries are encouraged to contribute to both IAG and UN-GGIM initiative on the GGRF