

United Nations Initiatives in relation with global geodetic reference frames

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Two UN Initiatives

- **International Committee on GNSS (ICG)**
 - Geodetic & Timing References
- **UN Global Geospatial Information Management (UN-GGIM)**
 - UN-GGIM WG on the Global Geodetic Reference Frame (GGRF)
 - UN GA Resolution on the GGRF

What & Why ICG ?

A forum to discuss Global Navigation Satellite Systems (GNSS) to benefit people around the world

ICG Vision

ICG vision is to ensure the best satellite based positioning, navigation and timing for peaceful uses for everybody, anywhere, any time

ICG Working Groups

- **WG A: Compatibility and Interoperability**
- **WG B : Enhancement of Performance of GNSS Services**
- **WG C: Information Dissemination and Capacity Building**
- **WG D: Reference Frames, Timing and Applications**

ICG WG-D: Reference Frames, Timing & Applications

WG-D Co-chairs:

Zuheir Altamimi, Ruth Neilan, Mikael Lilje, Chris Rizos

WG-D Members:

- GNSS Provider Representatives**
- ICG Associate Members: IAG, IGS, IERS, EUREF...**

Two Task Forces

- **Geodetic References**
 - Chair : Zuheir Altamimi
- **Timing References**
 - Chair: Felicitas Arias

It is all about geodetic and timing inter-operability of GNSS

WG D recommendations to the ICG

WG-D Main Recommendations

- **Alignment of Geodetic References and synchronization of Time References to international standards (ITRF and UTC)**
- **GNSS Satellite Antenna Calibrations & Retro-reflectors**
- **Templates on Geodetic and Timing References**
- **ITRS adoption by the ICG as the theoretical TRS for the alignment of GNSS TRFs to the ITRF**
- **GNSS Providers consider the possibility of making available the satellite data for better orbit dynamics modeling**
- **ICG Providers' Forum consider supporting the approval by the UN-GGIM Committee of Experts of the draft resolution on the GGRF & its submission to the UN General Assembly.**

UN-GGIM Initiative



UN-GGIM

United Nations Initiative on
Global Geospatial Information Management

Positioning geospatial information to address global challenges

ggim.un.org



GGIM
UNITED NATIONS INITIATIVE ON
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT

United Nation Global Geospatial Information Management (UN-GGIM)

UN GA Resolution on the Global Geodetic Reference Frame (GGRF)



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UN-GGIM Objectives

The promotion of global geospatial information to address key global challenges & to support improved decision-making:

- future trends for geospatial information
- development of a knowledge base
- a global geodetic reference system
- a global map for sustainable development
- ...



UN-GGIM WG on GGRF

- Created in 2013 by the Committee of Experts:
 - draft text of a United Nations General Assembly resolution on the:
Global Geodetic Reference Frame (GGRF)
 - a global geodetic roadmap based on international collaboration
- > 30 countries + IAG are members of the WG



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GGRF current status

The currently adopted GGRF in use today:

- The International Terrestrial Reference Frame (ITRF)
- Implemented by multiple geodetic techniques
- Developed by the International Association of Geodesy (IAG) and its technique services, using sophisticated physical and mathematical models
- Based on the “**best-effort**” principle, for the interest of science & society

==> Needs enhancement & sustainability to meet science and societal requirements



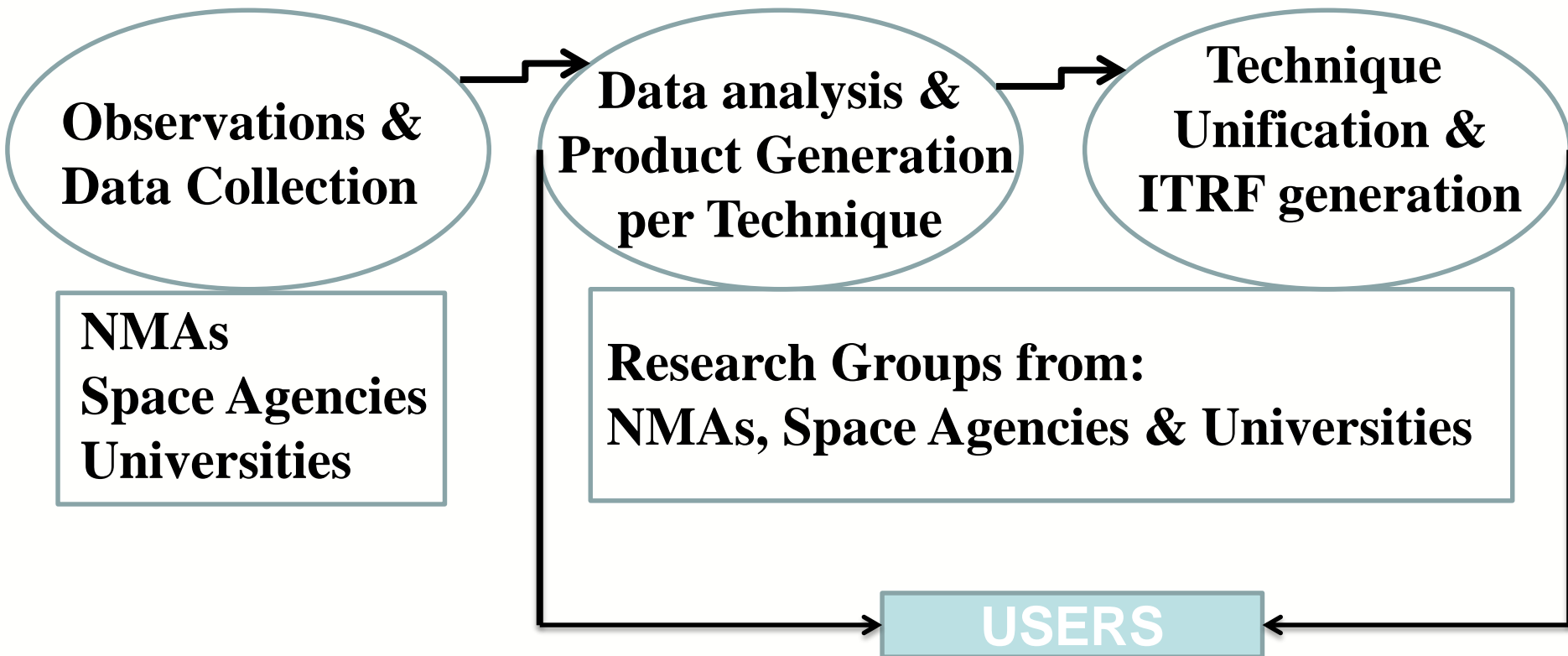
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GGRF current implementation



Schematic illustration of the chains leading to the ITRF generation



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Critical issues inhibiting the GGRF enhancement

- **Aging geodetic instruments, inhomogeneous network distributions & poor number of high quality instruments:**

==> * critical for the GGRF accuracy
 * need new generation systems

- **Based on the “best-effort” principle**

==> * Need high level mandate to sustain the GGRF
 * Inter-governmental cooperation => economical benefit

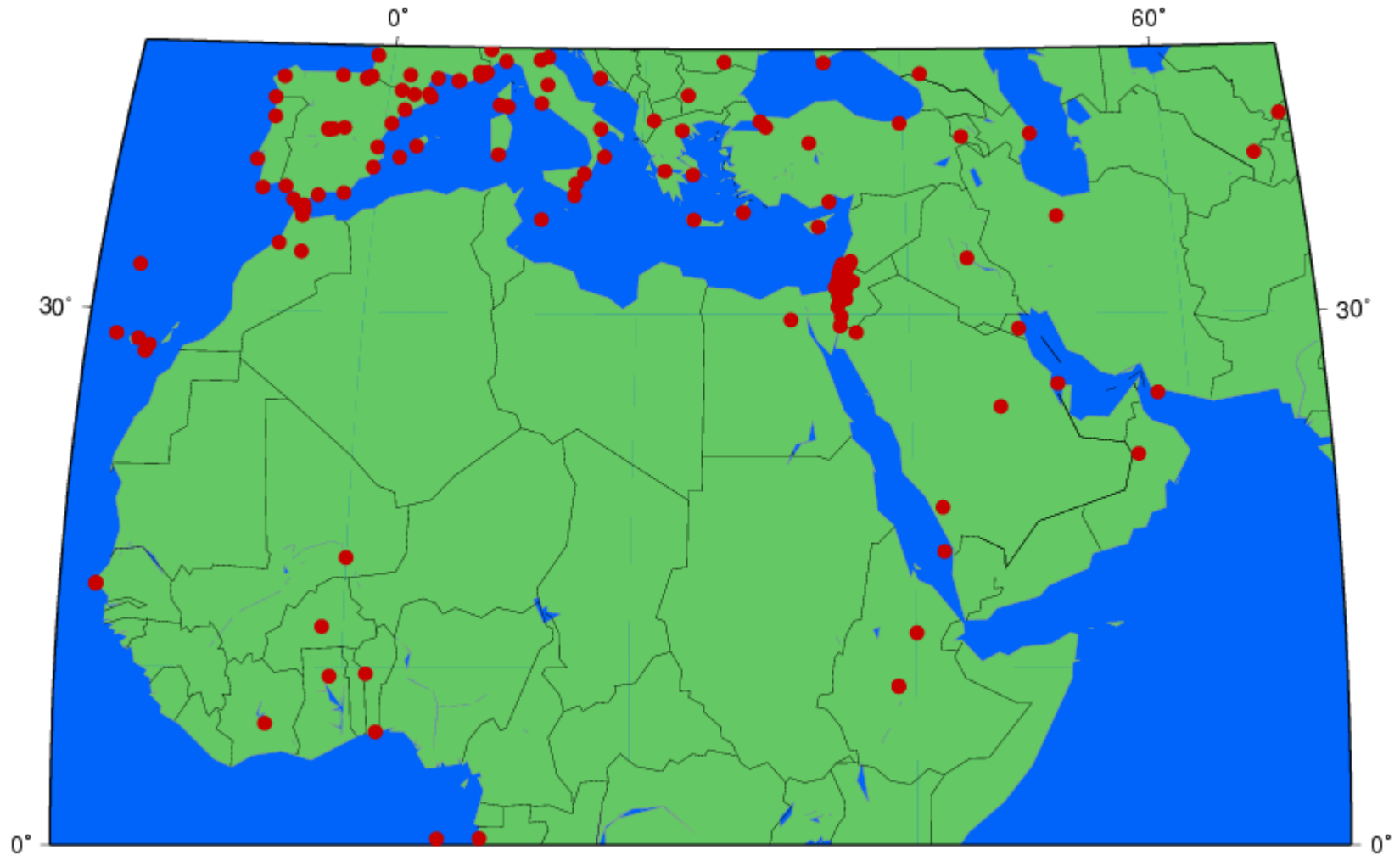
- **Many countries have poor access to the GGRF**

==> * provide technical assistance to countries in need & build modern geodetic infrastructure

==> improve interoperability of geospatial data



ITRF2014 Network: GNSS - Zoom



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Key Points of the UN GA Resolution

- Development & sustainability of the GGRF;
- Enhance global cooperation:
 - No one country can do this alone
 - Multilateral cooperation
 - Provide technical assistance for countries in need
- Implement open sharing of geodetic data, standards and conventions, on a voluntary basis
- Commit to improving & maintaining national geodetic infrastructure → Improve the GGRF
- Develop outreach programmes



GGRF Roadmap (1/2)

Outline of the Roadmap content:

- **Statement of benefit**
- **Barriers to improvement of the current situation**
- **Outreach before, during and after development of the roadmap**
- **Options for the way forward**



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GGRF Roadmap (2/2)

- Options for the way forward
 - Implementation of geodetic instrumentation
 - The associated data analysis
 - Product generation
 - Human resourcing (education)
 - Coordinated policies
 - **Governance**
 - Common standards
 - Methods and approaches (processes and workflows)
 - Options for sustainable investment including those made through strategic international partnerships



Conclusion

- **Two UN Initiatives Important for Geodesy**
- **Your contributions to both are welcome**
 - **ICG matters: Contact WG-D members**
 - **UN-GGIM GGRF WG: you can join the WG through your country UN-GGIM membership**