

UN-GGIM GGRF WG and the Roadmap

- Why a GGRF is needed ?
- UN GA Resolution on the GGRF
- GGRF Roadmap

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UN-GGIM

United Nations Initiative on
Global Geospatial Information Management

Positioning geospatial information to address global challenges

ggim.un.org

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Why a GGRF is needed ?

Geodesy: Positioning (location-based) and quantification of Earth changes in space and time, expressed in (related to) a Global Geodetic Reference Frame (GGRF):

- **Sea Level variations in space and time**
- **Tectonic Motion & crustal deformation**
- **Dislocations due to Earthquakes**
- **Tsunamis and Natural Hazards, rescue and safety of life**
- **Positioning, locations & navigations (ocean, land, air & space)**
- **National territory & land managements, precision agriculture, ...**
- **Interoperability of geospatial data**



What is the GGRF ?

- **Mainly: the International Terrestrial Reference Frame (ITRF), its access & regional densifications**
- **Infrastructure:**
 - Geodetic observatories/instruments
 - Data Centers, Analysis Centers, Combination Centers
 - Workforces
- **But also:**
 - Celestial Reference Frame
 - Gravity and Height Systems



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



Current Status of the GGRF

The currently adopted GGRF in use today:

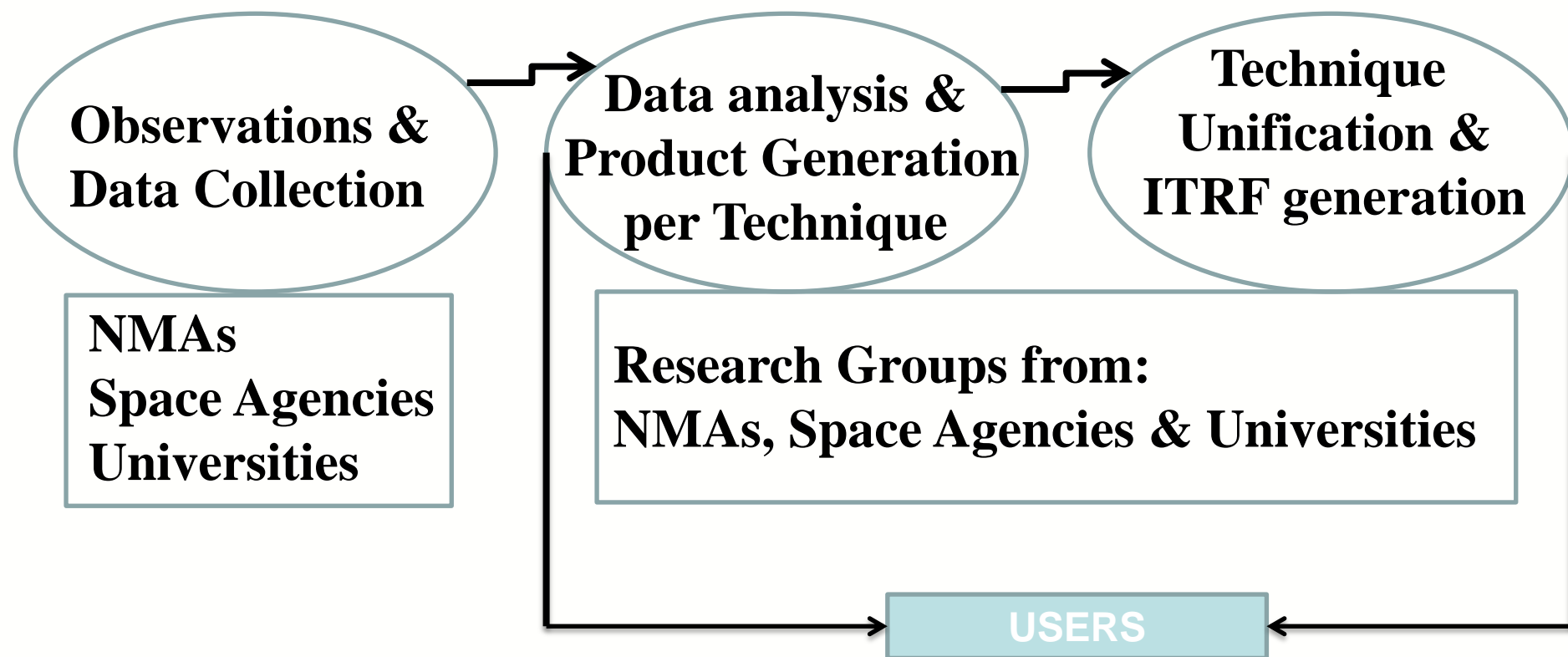
- The International Terrestrial Reference Frame (ITRF)
- Implemented by multiple geodetic techniques
- Developed by the IAG and its technique services
- More than 600 sites globally distributed
- **Based on the “best-effort” principle, for the interest of science & societal applications: ~200 institutions around the World**

And at the regional/national level:

- Almost all regional, national (but also global, e.g. WGS84) reference frames are aligned to & compatible with ITRF
- Densifications by Regional/National Permanent GNSS(GPS) networks.



ITRF implementation



Schematic illustration of the chains leading to the ITRF generation



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

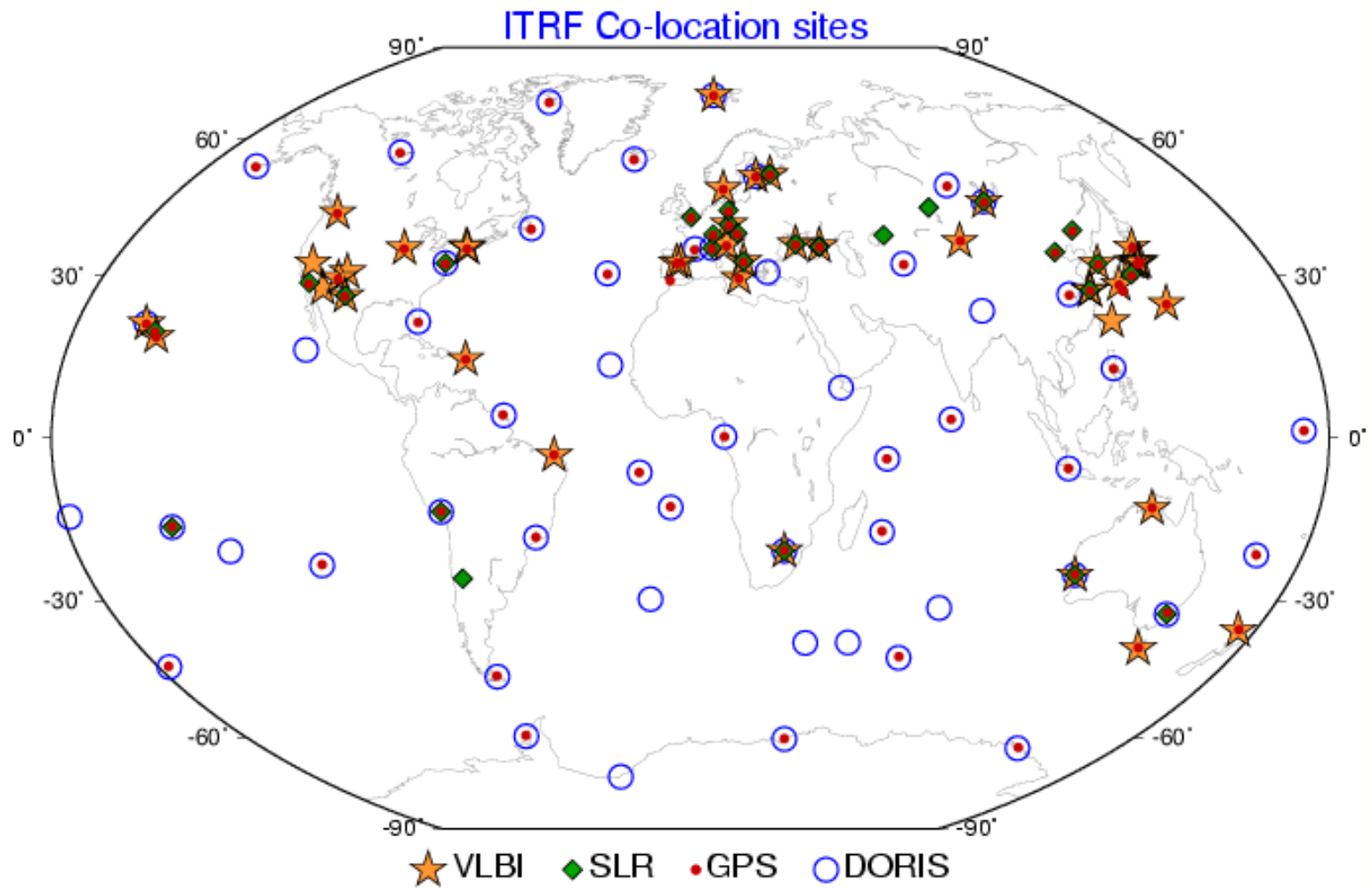
- **Many countries have poor access to the GGRF**

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

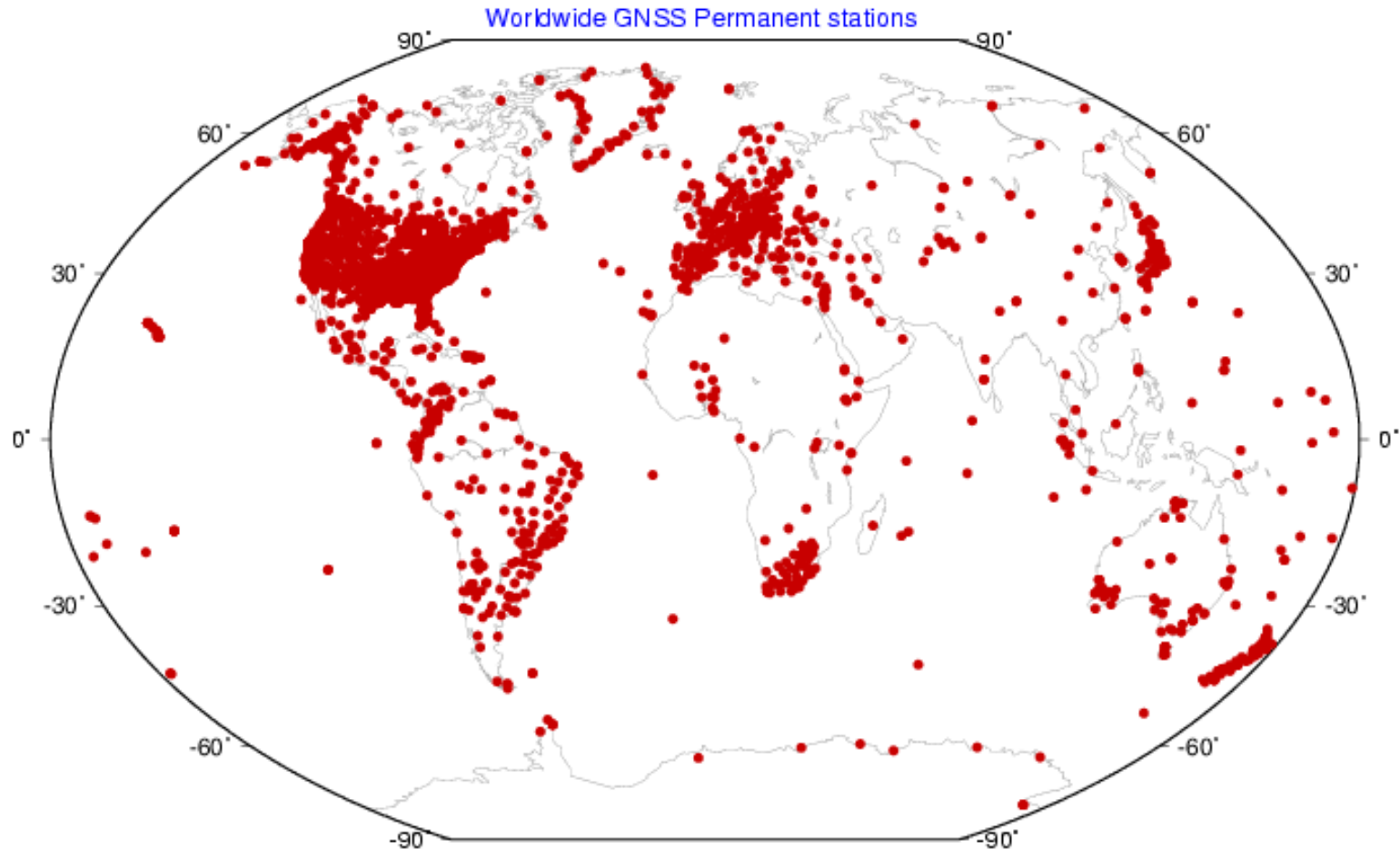
==> improve interoperability of geospatial data



Current ITRF Co-location sites



Example of > 2500 GNSS Permanent Stations



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UN-GGIM: GGRF: Roadmap



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Main Chapters of the Roadmap

- I. Executive Summary
- II. Introduction and Scope of Roadmap
- III. Current Situation: Status of the GGRF
- IV. Geodetic Infrastructure
- V. Policies, Standards and Conventions
- VI. Education, Training and Capacity Building
- VII. Communication and Outreach
- VIII. Governance
- IX. Recommendations

