Moderators
Fernand Bale and Nicholas Brown
Co-Chairs, UN-GGIM Subcommittee on Geodesy

Measuring the Earth
Nicholas Brown
Director of National Geodesy, Australia

The Subcommittee’s Plan
Allison Craddock
Director of IGS Central Bureau

FIG in Partnership with the Subcommittee
Diane Dumashie
President of FIG

Case Study – Africa
Fernand Bale
Directeur BNETD/CIGN

United Nations Global Geodetic Centre of Excellence
Panel discussion lead by Anne Jørgensen
230 km/s (828,000 km/h)
143 mi/s (514,000 mph)

@morn1415 https://youtu.be/fJuaPyQFrYk?t=8
Accurate datums AND Accurate data
Moderators
Fernand Bale and Nicholas Brown
Co-Chairs, UN-GGIM Subcommittee on Geodesy

Measuring the Earth
Nicholas Brown
Director of National Geodesy, Australia

The Subcommittee’s Plan
Allison Craddock
Director of IGS Central Bureau

FIG in Partnership with the Subcommittee
Diane Dumashie
President of FIG

Case Study – Africa
Fernand Bale
Directeur BNETD/CIGN

United Nations Global Geodetic Centre of Excellence
Panel discussion lead by Anne Jørgensen
UN GGIM 2023 Global Geodesy Forum
“Towards a Sustainable Global Geodetic Reference Frame”

The Subcommittee on Geodesy’s Strategic Plan

Allison Craddock
Director, International GNSS Service Central Bureau
National Aeronautics and Space Administration (NASA)
Jet Propulsion Laboratory - California Institute of Technology, USA

Zuheir Altamimi
Research Director, Institut National de l’Information Géographique et Forestière (IGN), and
Institut de Physique du Globe de Paris (IPGP), France

Daniel Roman
Chief Geodesist, National Geodetic Survey
National Oceanographic and Atmospheric Administration (NOAA), USA

Ryan Keenan,
International Federation of Surveyors (FIG)
UN GGCE IAC, Australia

© 2023 California Institute of Technology.
Government sponsorship acknowledged
The “why” behind the “where”

- The need to know our location on earth down to the smallest possible measurement may only be satisfied by international collaborations in geodesy.

- Global geodesy is dependent on findable, usable, and interoperable contributions from nations all around the globe, since no single country can maintain the Global Geodetic Reference Frame alone.

- By collaborating with the United Nations Subcommittee on Geodesy, international partners and stakeholders, the global geodetic community is able to collectively leverage limited assets to the top of current geodetic knowledge and capability.
Revised Role for Subcommittee

In view of the establishment of the GGCE and associated IAC
The UN GGIM Subcommittee on Geodesy’s Plan for Sustaining the Global Geodetic Reference Frame

**Strategic Actions**
- Steps toward Sustaining the GGRF

**Collaborative Priority Areas**
- Global Action through Local Implementation

**Comprehensive Needs Assessment**
- Listening to our Global Community

**Partnerships and Synergies**
- Going Far, Together.
The Subcommittee’s 7 Strategic Actions to Sustain the GGRF
As formulated at the Third Plenary Meeting of the Subcommittee on Geodesy, March 2023

- Global Geodesy Needs Assessment
- Prepare a State of Geodesy Report
- Support developing a Global Geodesy Development Plan
- Continue raising awareness and advocacy for global geodesy
- Engage in geodetic capacity and capability development
- Support and promote global coordination, coherence, and partnerships
- Develop branding and communication for geodesy
Delivering on Strategic Actions through Collaborative Priority Areas

Subcommittee on Geodesy Working Groups (as of March 2023)
The Subcommittee’s 7 Strategic Actions to Sustain the GGRF

Strategic Action #1
Conduct a **Global Geodesy Needs Assessment**

- To be done in **collaboration with partners:**
  - International Association of Geodesy (IAG)
  - International Federation of Surveyors (FIG) Commission 5 – Positioning and Measurement
- The Subcommittee will **support a stakeholder identification and mapping exercise** to be conducted by the UN GGCE
Establish a Working Group to conduct a global geodesy needs assessment for sustaining and extending the GGRF:

- Building upon the work and analyses of previous surveys
- Serving as a guide for an integrated response
- Leveraging expertise and resources from around the global geodesy community
- Engaging, consulting, and including regional committees of the UN GGIM

The Subcommittee on Geodesy will coordinate with the UN GGCE, its International Advisory Committee, Partners and Stakeholders to:
The Subcommittee’s 7 Strategic Actions to Sustain the GGRF

Strategic Action #2
Prepare a State of Geodesy Report (together with IAG and FIG)

Development and preparation of **factsheets** and **case studies** detailing geodesy’s role in:

- Climate studies, adaptation, and resilience
- Space missions
- Sea-level measurement
- Earthquakes and tsunami
- Autonomous transportation
- Economic value and contribution to GDP
- Sustainable Development Goals
- Sendai Framework for Disaster Risk Reduction

Develop a **concept note** and outline of contents for a State of Geodesy Report, incorporating findings from the Global Geodesy Needs Assessment

Findings from the Global Geodesy Needs Assessment

State of Geodesy Report Concept Note

26-Jul-23
The Subcommittee’s 7 Strategic Actions to Sustain the GGRF

Strategic Action #3
Contributing to a Global Geodesy Development Plan

Findings from the Global Geodesy Needs Assessment

State of Geodesy Report Concept Note and Outline

State of Geodesy Report

Global Geodesy Development Plan
The Subcommittee on Geodesy will coordinate with the UN GGCE, its International Advisory Committee, Partners and Stakeholders to:

Establish a Working Group to prepare a “State of Geodesy” report to include:

- Frameworks for describing geodesy’s complex and diverse contributions to society through a series of indicators
- Information for policy makers about how the GGRF plays a critical role in delivering impactful solutions toward achieving the Sustainable Development Goals (SDGs) and informing evidence-based decision making.
- Foundation for developing a “Global Geodesy Development Plan”
The Subcommittee’s 7 Strategic Actions to Sustain the GGRF

Strategic Action #4
Support and promote global coordination, coherence, and partnerships for a sustainable GGRF

- **Coordination with UN GGCE**: Support and facilitate as appropriate global coordination and coherence efforts by the UN GGCE and to avoid duplication.

- **UN GGIM Stakeholder Engagement**: Engage stakeholder and convene stakeholder meetings and appropriate events at annual sessions of UN GGIM. Link to UN GGIM Geospatial Societies.

- **Global Partner Collaboration**: Coherent coordinated calendar of events. Alignment with FIG, IAG, IUGG activities. Working with ISO TC/211.
The Subcommittee’s 7 Strategic Actions to Sustain the GGRF

Strategic Action #5

**Awareness** and **advocacy** for global geodesy

- **GGIM Side Events**
  - Convene geodesy side events at annual sessions of UN GGIM

- **Global Policy Reports**
  - Support and contribute to advocacy for geodesy in global reports:
    - WMO State of the Climate
    - UNEP Global Environment Outlook
    - As well as other stakeholder and partner report

- **Collaboration with GGCE**
  - Support advocacy activities
Strategic Action #6
Engage in capacity and capability development

Enhancing geodetic knowledge and innovation development through coordination with
• UN GGIM Regional Committees
• Partner Members

Support and contribute to capacity and capability development with
• UN GGCE

Leverage and support existing and ongoing capacity and capability development initiatives with
• Partner Members
The Subcommittee’s 7 Strategic Actions to Sustain the GGRF

Strategic Action #7

Develop **branding** and **communications**

Supporting development of a UN GGCE Communication and Knowledge Plan

Develop outreach and communication materials together with stakeholders and partners
Delivering on Strategic Actions 4, 5, 6, and 7 through Collaborative Priority Areas

The Subcommittee on Geodesy will coordinate with the UN GGCE, its International Advisory Committee, Partners and Stakeholders to:

Retain and strengthen a Working Group on Capacity and Education, guided by the Integrated Geospatial Information Framework (IGIF) Strategic Pathways, and continuing work to foster relationships with each of the regional committees of the UN-GGIM as well as non-governmental organisations (NGOs) and Intergovernmental Organisations (IGOs).

The efforts of this newly rebuilt Working Group will include – when appropriate – supporting global coordination, coherence, and partnerships for a sustainable global geodetic reference frame; raising awareness and advocating for global geodesy capacity and education; and developing relevant communications.
Next Steps toward a Global Geodesy Needs Assessment

*Listening to our global community, building on what we have learned*

2021 SCoG Geodetic Reference Frame Competency Survey: Building on 2018’s Initial Goal

Implement (Member States) self-assessment of their competency creating, maintaining and improving their national reference frames

ETCB WG updated the 2021 Survey

- To better understand regional ‘**Geodetic Capacity Development**’ needs
- What competencies are already possessed?
- What will needed for the future?

Invitation sent to all UN-GGIM Regions in June 2021

- Motivation for 2021 Survey and Who-How-Why they should respond
- Deadline end of Feb 2022
Next Steps toward a Global Geodesy Needs Assessment

Listening to our global community, building on what we have learned

Survey 2021 – Preliminary Results I

- Increased responses and details
- Deeper insights into the current competencies, qualifications and skill sets of the respondents

<table>
<thead>
<tr>
<th>Global Reference Frame Competency SURVEY</th>
<th>2018</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Questions</td>
<td>28</td>
<td>66</td>
</tr>
<tr>
<td>Number of Responses</td>
<td>98</td>
<td>207</td>
</tr>
</tbody>
</table>
Next Steps toward a Global Geodesy Needs Assessment

Listening to our global community, building on what we have learned

Survey 2021 – Preliminary Results

- Continued agreement with 2018 Survey => **Clear need for a sustained GGRF**
- Ongoing Challenges
  - Building Capacity
  - Maintaining Capability
  - Resources (Human, Fiscal, Political Support)
- Clear need of developing nations to receive assistance ETCB / knowledge transfer from developed nations, facilitated by a coordinating body
- Capacity & Education should be an integral part of an IGIF-based Country Action/Development Plan
- Findings & Results will be shared with SCoG in support of their Strategy for ensuring GGRF sustainability
- Expectations that the GGCE can facilitate and further action some findings
Next Steps toward a Global Geodesy Needs Assessment

Listening to our global community, building on what we have learned

2019 IAG Geodetic Infrastructure Survey

- Comprehensive survey administered by the International Association of Geodesy, in collaboration with the SCoG
- Respondents included all IAG technical services
- Outcomes included identifying the need for 20 SLR and VLBI instruments needed to fill critical gaps in the GGRF, as well as the need for 4 additional Data Centers and 6 additional Analysis Centers.
- Survey also indicated the need for substantial investment in new technology development.
Architecting a Global Geodesy Needs Assessment: Initial Tasks and Questions

- Stakeholder identification and mapping
  - How are these stakeholders affected by a sustainable GGRF?
  - How could a stakeholder affect adoption of geodetic infrastructure, skills, and capacity in their region?
  - What aspects of the GGRF does each stakeholder care most about?
  - How are stakeholders in the GGRF inter-related? How do they connect and share geodetic infrastructure and capacity?
- Identify areas of stakeholder needs and gaps to accessing and utilizing the GGRF
  - Where do these needs and gaps take place?
  - Who is impacted by these needs and gaps, and how?
  - What are some causes or shortcomings that contribute to these needs and gaps?
  - What policy solutions are already in place to address these needs and gaps? How can the Subcommittee fully leverage these existing resources?
- Identify policy solutions built on established practices, such as the Theory of Change
7 Strategic Actions for the GGRF:
Forming the foundation for an IGIF Operational Framework for Geodesy
Partnerships and Organizational Synergies

Going far, together.

Representatives from partner organisations are invited to join Subcomittee on Geodesy meetings and events to contribute their experience and expertise.

The Subcommittee strongly believes in being inclusive and welcomes the opportunity to work with other organisations also striving to sustain the GGRF.
Thank You!
Moderators
Fernand Bale and Nicholas Brown
Co-Chairs, UN-GGIM Subcommittee on Geodesy

Measuring the Earth
Nicholas Brown
Director of National Geodesy, Australia

The Subcommittee’s Plan
Allison Craddock
Director of IGS Central Bureau

FIG in Partnership with the Subcommittee
Diane Dumashie
President of FIG

Case Study – Africa
Fernand Bale
Directeur BNETD/CIGN

United Nations Global Geodetic Centre of Excellence
Panel discussion lead by Anne Jørgensen
Dr Diane Dumashie, FRICS
FIG President

Partnership:
UN GGIM Global Geodesy Forum

Tackling the Global Challenges:
People and Partnerships

UN GGIM 13, New York, USA
31st July 2023
Our Profession: Serving People and Planet

It is all about People!

• The 2030 Agenda: agreed and united global policy to transform the social, economic and environmental dimensions of humanity and our planet

• Context of considerable global challenges
  • Why Partnerships matter
President Kennedy Once Said 

“We Now Have the Power . . .
To Abolish Global Poverty
or . . . Abolish Human Life” . . .
Overview

1. FIG: Who What and Why

2. Shaping the Future: How

3. Partnerships: What and Who

4. Final Words
Overview

1. FIG: Who What and Why

2. Shaping the Future: How

3. Partnerships: What and Who

4. Final Words
1. Who and What: International Federation of Surveyors

FIG:

- Members organisation, (100 + countries)
- FIG Contribution: knowledge generation, outreach and capacity building
  - Professional: Standards
  - Institutional: Build capacity
  - Global Development: Regional/ International
How: Depth of experience
Survey and Geospatial
Activity and outputs with Commissions:
1. Professional standards & practice
2. Professional Education
3. Spatial information management
4. Hydrography
5. Positioning and measurement
6. Engineering surveys
7. Land management & cadastre
8. Spatial planning and economic development
9. Valuation and real estate
10. Construction economics
and, FIG Networks, Permanent Inst
‘Tackling the Global Challenges’
FIG action orientated theme

Five Forces:

• **Climate action** and the needs of a low carbon economy / also Energy and resources
• Rapid advances in **Technology and digital revolution**
• **Globalisation** and communication
• (Settlements and (Rapid) urbanisation)

Society's needs (and benefits):

• Transformational **societal** changes and expectations
• Profound changes in longevity and **demography**
The Next Decade: Act on the Trends

The SDGs were the crowning global achievement of 2015 and 2030 is close;

but survey professionals deal in global and local realities.

Are we still relevant?

Yes, with Purposeful and Continuing intent; but………..

• Jack Dangermond ESRI CEO ESRI UC, July 2023
It is all about People!

What does relevance look like?

We

• Are relevant to society for Their/Society benefit

• Bridge the gap between high level strategy/policy and actions on the ground

• Are recognised as a profession that is trusted, with high ethics and standards (keep building our capacity)

And

• Lead and contribute to sustainable development
Overview

1. FIG: Who What and Why
2. Shaping the Future: How
3. Partnerships: What and Who
4. Final Words
2. How: The Future We want to shape

Our work plan aims to deliver and demonstrate our resolve

Vision:
• Serving Society, benefitting people and the planet

Theme:
• Tackling the Global Challenges (Trends and crisis)
• Continue to develop capacity and grow to ensure that as individuals and a federation of members we remain relevant and capable of benefiting people and the planet
Work Plan Aims and Pillars

FIG Aims:

• Planet
• People
• Partnership
• Governance and Communication

Sustainability runs throughout our work

• Task Forces are our Pillars and focussed to unpack our Relevance & Societal benefit
• FIG Commissions and FIG community working together achieves our Theme

Above all,

FIG works in Partnership
Pillar i: Planet

Sustainability aim is making sure:

• We make the best use of land and marine resources, and
• Our cities and settlements are resilient and adaptive
• Play a more prominent role in the climate agenda

TF: 2030 Agenda & SDG’s,  
Chair: Paula Dijkstra  
TF: Climate Compass,  
Co Chairs: Roshni Sharma & Clarissa Augustinus
Pillar ii: People

• Sustainability is about making sure we demonstrate Equity, Diversity & Inclusion, leaving no one behind in our profession.....

• And build and maintaining our professional competence to ensure societal relevance

TF: Role in Trends and Geospatial Information Ecosystems
Chair: Abbas Rajabfard

TF: Evolutionary Diversity and inclusion in the Surveying Profession
• Chair: Stephen Diaba
FIG Working Weeks; Pillars & Partners
Build on Pillars

• 2023 Orlando – Sustainability & Climate
  – Protecting our world Conquering New Frontiers

• 2024 Accra – Planet & Resources
  – Building resilient environment

• 2025 Brisbane – Geospatial/ People
  – Collaboration, Innovation and Resilience:
    Championing a Digital Generation

And…,

• Congress - 2026 Cape Town
Overview

1. FIG: Who What and Why

2. Shaping the Future: How

3. Partnerships: What and Who

4. Final Words
3. Pillar iii: Partnerships

Sustainability is about making sure that both internal and external partnerships are working effectively and cultivating stronger engagement.

Our relationships:
- Effective (All) member engagement
- Building and working for mutual benefit with external partners, and
- Providing Institutional capacity development

And, with UN GGIM.....
UN GGIM

- Observer status
- Geospatial Societies (GS)
- Working Groups (LAM, Geodesy, DM + input Hydro)
- Regional working (Africa, Asia Pacific & Americas)

And……..

- Partner UN GGIM Subcommittee on Geodesy
FIG Partnership: Subcommittee on Geodesy

- Ryan Keenan, FIG Comm chair, Positioning and Measurement
- FIG Representative Subcommittee on Geodesy
  And
- FIG 2024 special session Africa GRF
- Centres of Excellence
Overview

1. FIG: Who What and Why

2. Shaping the Future: How

3. Partnerships: What and Who

4. Final Words
4. Tackling the Global Challenges

It is all about People!

Relevance requires a **Purposeful** and continuing intent to implement:

- Looking to societal contributions
- Looking to our people and profession

- Can only be done in **Partnerships**
Serving People and Planet
2030 and Beyond

Tackling the Global Challenges

• Faced with the magnitude of change in our World, on our Planet:

  • We can strengthen the use of geospatial information in all its forms
    If
    • We do the very best we can over the coming decades

Our professional relevance to society, is in our collective, partnership hands

President Diane Dumashie, New York  July 2023
Our Journey is far reaching!

Sustainable Development

PEOPLE
End poverty and hunger in all forms and ensure dignity and equality

PLANET
Protect our planet's natural resources and climate for future generations

PARTNERSHIP
Implement the agenda through a solid global partnership

PEACE
Foster peaceful, just and inclusive societies

PROSPERITY
Ensure prosperous and fulfilling lives in harmony with nature
Thank You

- WWW.fig.net
- President
  - FIG: Dr D Dumashie
  - ddd@dumashie.co.uk
Moderators
Fernand Bale and Nicholas Brown
Co-Chairs, UN-GGIM Subcommittee on Geodesy

Measuring the Earth
Nicholas Brown
Director of National Geodesy, Australia

The Subcommittee’s Plan
Allison Craddock
Director of IGS Central Bureau

FIG in Partnership with the Subcommittee
Diane Dumashie
President of FIG

Case Study – Africa
Fernand Bale
Directeur BNETD/CIGN

United Nations Global Geodetic Centre of Excellence
Panel discussion lead by Anne Jørgensen
Towards a Sustainable Global Geodetic Reference Frame

Case Study: Africa

IGS YKRO (Cote d’Ivoire)
PRESENTERS

Fernand BALE
Co-chair UN-GGIM/SCoG
fbale@bnetd.ci

Dr Ryan KEENAN
Chair, FIG Commission 5 - Positioning & Measurement
ryan.keenan@me.com
AGENDA

- Introduction
- Key Challenges in Africa
- Some Initiatives
  - Experiences from Cote d’Ivoire
  - JIGSAW - engaging CORS in Africa
- Recommendations
INTRODUCTION

In February 2015, the United Nations (UN) General Assembly adopted the resolution “A Global Geodetic Reference Frame for Sustainable Development” – the first resolution recognizing the importance of a globally-coordinated and supported approach to geodesy, involving all UN Member States.

Accordingly, the UN Global Geospatial Information Management (GGIM) Subcommittee on Geodesy (SCoG) is working towards developing an accurate and sustainable Global Geodetic Reference Frame (GGRF).

The question is where is Africa in that journey? What are our challenges? What initiatives are going on and the way forward?

We will try to answer these questions and then open the discussion to shape a way to go together towards a sustainable GGRF.

This presentation is based on our experiences, WG ETCB’s surveys held in 2018 and 2021 on Reference Frame Competency, and FIG Commission 5’s Reference Frames in Practise workshops; with an emphasis on GNSS CORS infrastructure thanks to their prevalence, ease of installation (relative to other sensors) and community benefit.
KEY CHALLENGES

01.
THERE ARE THREE IMPORTANT CHALLENGES

Advocacy
Advocacy of geodesy and its benefits to stakeholders and community in order to gain their support.

Capacity Building
There is a lack of people with sufficient knowledge, qualifications and skills in geodesy, obviously due to a lack of training institutions in that field in Africa.

International Collaboration
To mobilize resources to assist African countries in establishing and maintaining sustainable geodetic infrastructures and systems. Embrace the opportunity to share experiences and discuss ideas with experts from around the World.
Global Survey of Reference Frame Competency 2021

Self-Assessment of RFC as initiated by ETCB-WG
Survey 2021 – Preliminary Results I

• Increased responses and details

<table>
<thead>
<tr>
<th>GRFC SURVEY</th>
<th>2018</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Questions</td>
<td>28</td>
<td>66</td>
</tr>
<tr>
<td>No. of Responses</td>
<td>98</td>
<td>207</td>
</tr>
<tr>
<td>No. of Member States</td>
<td>65</td>
<td>101</td>
</tr>
</tbody>
</table>

• Deeper insights into the current competencies, qualifications and skill sets of the respondents
GRFC Survey 2021

Survey 2021 – Preliminary Results II – Reference Frames

- Geocentric Reference Frame on ITRF?
  - Yes: 73%
  - No: 15%
  - I'm not sure: 10%
  - No response: 2%

- National Vertical Reference Frame?
  - Yes: 85%
  - No: 6%
  - I'm not sure: 7%
  - No response: 2%
GRFC Survey 2021

Survey 2021 – Preliminary Results III – CORS Infrastructure

- CORS Presence?
  - Yes: 59%
  - No: 13%
  - No response: 10%
  - Not sure: 12%

- CORS Spacing?
  - Less than 50 km: 28%
  - Between 50 and 100 km: 28%
  - Between 100 and 200 km: 12%
  - More than 200 km: 12%
  - No response: 20%

- CORS Standards?
  - National and International standards: 34
  - National standard: 20
  - International standard: 13
  - Does not follow standards: 6
  - Other: 5
  - No response: 2

- CORS Services?
  - Observation files: For free: 30, For a fee: 20, Service not provided: 5
  - NTRIP: For free: 20, For a fee: 10
  - Marks and nodes: For free: 30, For a fee: 10
  - Coordinates: For free: 30, For a fee: 10
  - Heights: For free: 30, For a fee: 10
  - Gravity: For free: 30, For a fee: 10
Survey 2021 – Major Findings

• Continued agreement with 2018 Survey => Clear need for a sustained GGRF

• Ongoing Challenges
  • Building Capacity
  • Maintaining Capability
  • Resources (Human, Fiscal, Political Support)

• Clear need of developing nations to receive assistance ETCB / knowledge transfer from developed nations, facilitated by a Coordinating body

• CC (Capacity & Capability) should be an integral part of a CADP (Country Action Development Plan)
Next Steps

- Findings & Results will be shared with SCoG in support of their Strategy for ensuring GGRF sustainability
- Expectations that the GGCE can facilitate and further action some findings
- Final Report expected in 2024 Q1
  - Presentation to UN SCoG 2024?
  - Presentation at FIG WW 2024 Accra?

Ultimately ‘making Geodetic Capacity Development’ FAIR (findable, accessible, interoperable and reusable)
SOME EXAMPLES

02.
In Côte d’Ivoire we are taking advantage of the implementation of the Land Policy to modernize the national geodetic network. Why?

The rural land domain is estimated at 23,000,000 ha, while around 300,000 ha have land titles (August 2022). The challenge is that, the Government decided to achieve that program in 10 years.

Let’s assume that the project covers 500,000 ha per year, the work will take 46 years; and at a rate of 250,000 ha per year, it would take 92 years to complete the work. And currently we are at a rate of 5~6000 ha per year.

We saw the opportunity to advocate for a modern, accurate and reliable geodetic network that will improve surveying. That’s how the first national CORS network came to life in Côte d’Ivoire thanks to AFOR.
AFOR is the National Rural Land Agency in Côte d’Ivoire. With the support of the World Bank, it agreed to fund the establishment of that CORS network in two phases:

2021 – 2022 (~$1,5M):
- State of the national geodetic network;
- Reconstruction of damaged pillars;
- Establishment of a CORS network (5 stations);
- GNSS observations and calculation of new coordinates of the 1st order (43 points) and a third of the 2nd Order in ITRF 2014 (~200 points) previously in ITRF 96;
- Change management: training, sensitization, etc.

2024 – 2025 (budget in negotiation):
Add 16 more CORS stations and observe all the 2nd order

**As an impact**, this investment contributes to improving the quality of measurements, reducing the time of technical operations, and to the overall consistency of plans, thus avoiding overlaps and ambiguities that are sources of land disputes.
This map shows that around 5% of IGS stations are based in Africa (26/516), and there are no Analysis Centers within the region. We have 1 VLBI site based in South Africa; Our contribution to the GGRF can be improved.
Engaging CORS in Africa

- African is critical to supporting a sustainable GGRF for the region of Africa (AFREF) as demonstrated by a very low number of contributing GNSS CORS.
- Reports of many GNSS CORS across Africa, owned and operated by governments, universities, commercial organisations and associations, however little or no data evidence.
- There is limited measurement of capacity and capability
  - ‘You can’t know what you don’t measure’
RECOMMENDATIONS

03.
JIGSAW – The African CORS Initiative

Joining IGS with the African World

Scientific & Academic Communities

Governments & Development Agencies

Private Industry (regional and global)

FIG / IGS / UN-GGIM / Partners et al

Capacity Development Contributions (including):
- Resources (fiscal, human)
- Training Materials
- Equipment & Support
- Marketing & Outreach
- Networking
**JIGSAW - A New CORS Portal**

- Portal will be a multi-lingual means to share:
  - Known CORS locations and metadata
  - Known operators
  - Visualise the locations where GNSS surveying and positioning could be done
  - Visualise the locations for development
  - Authorities and Public will be aware of operational GNSS services and have access to metadata about accessing these CORS

- Portal will NOT provide data sets or live services
JIGSAW - Goals and Benefits

Goals
- Raise awareness of operational GNSS CORS (not provide data access to operational CORS)
- Highlight gaps in coverage for stakeholders
- Identify target areas for development, support, funding (will not directly fund)
- Support regional initiatives for GNSS CORS (not apply for funding)
- GNSS CORS owners/operators will proactively register and maintain their sites on the portal
- Go far, go together

Contents
- Provide a sustained information portal for operational GNSS CORS in Africa (not other regions)
- Display locations and metadata about these sites (not display real-time / archived data availabilities)
- Inform interested parties of the correct CORS owners/operators to contact
Africa - Going Far, Together

- Smart goals will facilitate greater collaboration and engagement, and possibly yield alternate sources of resources, in particular the private sector and independent experts who can provide technical assistance on the Continent.

- Take advantage of the JIGSAW Initiative to further strengthen partnerships and the contributions of developed countries to support developing countries at the global, regional and national level.
THANKS!

DO YOU HAVE ANY QUESTIONS?

CREDITS: This presentation template was created by Slidesgo, and includes icons by Flaticon, and infographics & images by Freepik
Moderators
Fernand Bale and Nicholas Brown
Co-Chairs, UN-GGIM Subcommittee on Geodesy

Measuring the Earth
Nicholas Brown
Director of National Geodesy, Australia

The Subcommittee’s Plan
Allison Craddock
Director of IGS Central Bureau

FIG in Partnership with the Subcommittee
Diane Dumashie
President of FIG

Case Study – Africa
Fernand Bale
Directeur BNETD/CIGN

United Nations Global Geodetic Centre of Excellence
Panel discussion lead by Anne Jørgensen
“In these testing times, described by the UN secretary general as a red alert for humanity, geodesy has a key role to play.”

His Excellency Ambassador Peter Thomson

UN-GGIM Global Geodesy Ambassador and UNSG’s Special Envoy for the Ocean