The International Federation of Surveyors (FIG)

What and who is FIG?

What can FIG do?

FIG AP CDN on Geospatial / Geodetic Infrastructure Modernisation

Rob Sarib - Chair FIG Asia Pacific
Capacity Development Network
Geospatial and GNSS CORS Infrastructure Forum
KL, Malaysia 16-17 October 2016
Established in Paris 1878;

Federation of national associations;

Represents all surveying disciplines;

UN-recognised non-government organisation (NGO);

Its aim is to ensure that the disciplines of surveying and all who practise them meet the needs of the markets and communities that they serve;

It provides an international forum for discussion and development aiming to promote professional practice and standards

Liaise with like minded organisations - UN GGIM, IAG

https://www.fig.net/
Through different membership categories 121 countries are represented in FIG.
The FIG Organisation
The FIG Council

Chryssy Potsiou  
TCG (Greece)  
President 2015-18

Rudolf Staiger  
DVW (Germany)  
Vice President

Bruno Razza  
CNGeGL (Italy)  
Vice President

PengFei Cheng  
CSGPC (China)  
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Copenhagen, DENMARK
“A modern and sustainable surveying profession in support of society, environment and economy by providing innovative, reliable and best practice solutions to our rapidly changing and complex world, acting with integrity and confidence about the usefulness of surveying, and translating these words into action.”
The FIG Council Workplan

Based around a theme of

**Ensuring the Rapid Response to Change Ensuring the Surveyor of Tomorrow**

- **Promote and Enhance** the Role of FIG within the Global, Regional and Local Environment

- Accomplish Internal FIG Structural Improvements

- **Support building the capacity of surveyors to manage technical, societal and economical changes and challenges.**
Based around a theme of

Ensuring the Rapid Response to Change Ensuring the Surveyor of Tomorrow

• Contribute to the global sustainable development agenda by focusing on three pillars:
  - providing fit-for-purpose solutions for security of tenure land administration,
  - providing support on property markets assessment and improvement and
  - providing technical support in developing technical specifications on the above topics.

• Continue to provide a global forum for discussion, communication and exchange of experiences and new professional developments.

• Continue to strengthen cooperation and to build partnerships with the relevant international organizations and regional professional bodies.
Ten FIG Commissions

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
FIG Commission 5

*The Mission of FIG Commission 5 - Positioning and Measurement*

- Focus on modern technologies, technical developments, methods, instruments applications
- Follow technical developments through collaboration with other FIG Commissions and other international organisations
- Support research, development and stimulate new ideas
- Collaborate with manufacturers on the improvement of instrumentation and associated software.
- Present and promote the work of the Commission and FIG
FIG Commission 5

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FIG Task Forces

- FIG Task Force on Institutional and Organisational Development
- FIG Task Force on Spatially Enabled Societies
- FIG Task Force on Developing Global Land Tools for Pro Poor Land Management
- FIG Task Force on Under-Represented Groups in Surveying
Outputs of AP CDN -

- Professional geospatial scientists and surveyors, *have the capability to address the regional social, economic, environmental and technological challenges* associated with the UN Sustainable Development Goals (SDGs).

- Regional capability and their activities have progressed through *alliances and relationships with* FIG, UN GGIM AP, relevant *like-minded bodies other agencies and/or development partners.*
Outputs of AP CDN -

• Regional geospatial and survey community are *self-reliant* and have a *culture and environment of learning, innovation, a blend of mature and young professionals, and a gender equity base.*

• Regional geospatial and surveying challenges are *resolved by a regional, unified, coordinated and collaborative* approach.
Collective FIG / UN GGIM “Capacity Development Network” (CDN) outcome -

“Responsible governance frameworks and integrated administrative systems of tenure (rights and interests) for land and marine, are underpinned by sustainable fit for purpose geospatial and survey infrastructure and information management”
What is capacity development?

*It is about understanding the challenges / obstacles that hinder an individual / organisation / community from accomplishing their objectives and then developing the necessary knowledge / skills / abilities / competencies / frameworks to achieve them.*
What is capacity development? It is also about ......

The process of learning to adapt to change.... (or shifting the paradigms of practice)

Who and how and where the decisions are made

Being supported by a sustained resource and political commitment to yield longer term results

Source: Allan Kaplan
FIG Asia Pacific Capacity Development Network

Source – Asia Pacific Network for Global Change Research

http://www.apn-gcr.org/programmes-and-activities/capable/
What are the Capacity Challenges?

- **Capability to respond and manage our changing land, marine and built environment** -
  - Mega-cities, smart-cities - *rapid urbanisation*; “2/3 in cities by 2050”

Figure 2.1 World population: total, urban and rural

Source – rics.org/futures

Source – http://www.imf.org
What are the Capacity Challenges?

- **Capability to respond and manage our changing land, marine and built environment** -
  - Sectors – housing; transport; utilities; asset, real estate and natural resource management.
What are the Capacity Challenges?

- **Capability to respond and manage our changing land, marine and built environment** -
  - Disruptive technologies – mobile internet, automation of knowledge work, IoT, cloud, robotics, autonomous vehicles (biggest impact 2025)
What are the Capacity Challenges?

- Capability to respond and manage our changing land, marine and built environment -
  - Disruptive technologies – mobile internet, automation of knowledge work, IoT, cloud, robotics, autonomous vehicles

Source: Frey and Osborne 2013
What are the Capacity Challenges?

- **Capability to respond and manage our changing land, marine and built environment** -
  - Climate change, sea level rise, earthquakes, tsunamis, cyclones, disaster and relief management
What are the Capabilities?

The ability (skill sets) to –

• Provide reliable, accurate and interoperable technical / administrative geospatial information for better informed decision making – “24 / 7 and real time”?

• Collect, calculate, analyse, record, and visualise geospatial information – via “disruptive technologies”?

• Convey professional advice to support - design, risk assessment, investment analysis, asset and resource deployment – broadening of skills?

• Innovate in multi disciplinary teams – “connecting / pooling” talent to facilitate doing more with less consumption of diminishing resources
What are the Capabilities?

The ability (skill sets) to –

- “Lead, negotiate, influence, collaborate, and understand commercial influences” – source rics.org/futures
- “Advocate, promote and communicate relevance” – leaders, decision makers, politicians, attracting young professionals

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<thead>
<tr>
<th>What's decreasing</th>
<th>What needs to increase</th>
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<tbody>
<tr>
<td>Transactional activity</td>
<td>Leadership</td>
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<td>Administrative tasks</td>
<td>Client focus</td>
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<td>eg bills of quantities</td>
<td>Collaboration</td>
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<td>Residential valuation</td>
<td>Ethical behaviour</td>
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<td>Sustainability</td>
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<td>Data analysis</td>
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<td>Improving productivity of assets</td>
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<td>Risk management</td>
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<tr>
<th>What's not desirable</th>
<th>What's needed today</th>
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<tbody>
<tr>
<td>Silo working</td>
<td>Outcomes focus</td>
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<td>Early specialisation</td>
<td>Communication</td>
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<td>Conflicts of interest</td>
<td>Integrated programme</td>
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<td>and cost management</td>
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<td>Skills for handling greater complexity</td>
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<td>Interdisciplinary working</td>
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<td>Change management</td>
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<td>Advisory services</td>
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<td>Understanding new technology</td>
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How skills and work in surveying are changing

Source – rics.org/futures
What can FIG do to enhance Capacity?

Organise, facilitate and actively participative in -

• Discussion forums
• Meetings
• Seminars
• Workshops
• Technical Sessions

Advocate co-operation and collaboration

at FIG Working Weeks, FIG Regional Conferences and other related FIG symposiums or events.

http://www.fig.net/events/future_events/index.asp
Reference Frame In Practice Seminar – Manila
June 2013

Regional Case Studies; IGS Services; APREF Status and Determination; Reference Frame Infrastructure; Gravity and the World Height System; Multi-GNSS Environment; Going Geocentric; Dynamic Datums; The Role of Manufacturers Geodetic Infrastructure
Reference Frames - The Future; Next Generation Positioning Infrastructure ; Global Geodetic Reference Frame and CORS ; Geoid, Gravity and Vertical Datum Determination ; Multi-GNSS Environment and PPP ; Ubiquitous Positioning and Kinematic Measurements ; Cost Effective Positioning ; Standards and Recommended Practices for Positioning and Measurement
Vertical Reference Frame In Practice Seminar – Singapore July 2015

Vertical Reference Frames technical overview; Time Dependence and Transformations; Airborne Gravity Data Collection and Analysis; International GNSS Service; Vertical Deformation; GNSS Heighting; Case Studies
Datum Unification and Kinematics Technical Seminar – Christchurch May 2016

3D Reference Frames / Datums; Vertical Reference Frames / Datums; Kinematic Frames and Deformation Modelling; Case Studies; International Geodesy Initiatives; Geodetic Infrastructure and GIS; Geodetic Software
Various Technical Forums, Seminars, Meetings – Pacific Island Countries and Territories 2013-2016
Access to conference / seminar technical proceedings – papers and presentations from 1898 to present - [http://www.fig.net/resources/proceedings/index.asp](http://www.fig.net/resources/proceedings/index.asp)

Access to FIG general activities and workings –
- “e” newsletter - [http://www.fig.net/resources/enews/index.asp](http://www.fig.net/resources/enews/index.asp)
- articles - [http://www.fig.net/resources/articles_about_fig/index.asp](http://www.fig.net/resources/articles_about_fig/index.asp)
FIG Resources

FIG Surveyors Reference Library

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Commissions involved:
- Commission 1
- Commission 2
- Commission 3
- Commission 4
- Commission 5
- Commission 6
- Commission 7
- Commission 8
- Commission 9
- Commission 10
- History
- Young Surveyors
- Mine surveying
- Photogrammetry
- Postprocessing
- Professional practice
- Property taxes
- Quantity surveying
- Real estate development
- Remote sensing
- Risk management
- Security of tenure
- Spatial planning
- Standards
- Tunnel surveying
- Urban renewal
- Valuation

Keywords:
- Access to land
- Affordable housing
- Bridge surveying
- Cadastre
- Capacity building
- Cartography
- Coastal zone management
- Cost management
- CPR
- Curricula
- Information management
- Digital cadastre
- Education
- e-Governance
- Engineering survey
- Environmental management
- Geomatics
- Geospatial information/gis
- GIS
- GPS
- GISD
- History
- Hydrography
- Implementation of plans
- Informal settlements
- Land distribution
- Land management
- Land readjustment
- Laser scanning
- Legislation
- Laser scanning technology
- Marine cadastre
- Maritime cadastre

Other keywords:
- please enter only one
- keyword per field;
- the search condition is 'OR'

Title of the document:
- (the specified wording is search anywhere within the title)

Author (separate multiple criteria with a semicolon the search condition is 'OR')

Publications

Selected publications related to surveying are published on this site. These publications are published by FIG, partners and organisations that FIG co-operates with.

FIG Publications

FAO Publications

World Bank Publications

United Nation Publications

JB GIS Publications

Other Publications

http://www.fig.net/resources/publications/index.asp

http://www.fig.net/resources/databases/srl/search.asp
Institutional and Organisational Development

Spatially Enabled Society

A GUIDE FOR MANAGERS

Daniel Seidler and Abbas Rejabifard

Supported by:

GSDI

FIG Publications, Reports, Guidelines
FIG Publications, Reports, Guidelines

Fit-For-Purpose Land Administration

FIT-FOR-PURPOSE LAND ADMINISTRATION
GUIDING PRINCIPLES FOR COUNTRY IMPLEMENTATION

SECURING LAND AND PROPERTY RIGHTS FOR ALL
FIG Publications, Reports, Guidelines

The Surveyor’s Role in Monitoring, Mitigating, and Adapting to Climate Change

The Contribution of the Surveying Profession to Disaster Risk Management
FIG Publications, Reports, Guidelines

FIG Report
Cost Effective GNSS Positioning Techniques
FIG Commission 5 Publication
2nd Edition

FIG Guide
Reference Frames in Practice Manual
May 2014
Reference Frame in Practice Manual

- Foreword / Introduction - Matt Higgins, Australia and Graeme Blick, New Zealand

- *Geodesy and Global Reference Frames* – Prof. Chris Rizos, Australia

- *Global Terrestrial Reference Systems and Frames* – Dr. Neil D. Weston and Dr. Tomás Soler, USA

- *Regional and National Reference Frames* - Richard Stanaway, Australia

- *Height Systems* – Dr. Daniel R. Roman, National Geodetic Survey, NOAA, USA

- *Transforming Between Datums* - Graeme Blick and Chris Crook, Land Information New Zealand
Transforming Between Datums in Non-static Reference Frames - Nic Donnelly, New Zealand

Reference Frame Parameter Estimation and Testing via the technique of Least Squares; Testing Measurements and Least Squares Parameter Estimates – Dr. Roger Fraser, Australia

Global Navigation Satellite Systems – Prof. Chris Rizos, Australia

GNSS CORS Networks and Linking to ITRF - Rob Sarib, Australia, Mikael Lilje, Sweden

The International GNSS Service (IGS) - Nic Donnelly, New Zealand

Standards and Traceability of Terrestrial Reference Frames - David Martin, France
1. **Assessing the status and condition** of your geospatial / geodetic infrastructure and systems - SWOT your “geospatial data model / framework”
2. **Understanding the role / responsibilities of your agency** in the various elements of geospatial and geodetic infrastructure management.

Source - Matt Higgins “A model for organisational roles within a Positioning Infrastructure”
3. **Developing Strategic / Operational** (incl. capacity building) **plans** that are aspirational but realistic, achievable, focused on national / regional challenges and flexible to accommodate a rapidly changing industry.....
Geospatial / geodetic infrastructure strategy considers –

- **Sustainability** - meeting the needs of current and future generations

- **Useability / Accessibility** to the whole community on reasonable terms and open to a growing user base, including those requiring new approaches to data delivery

- **Collaboration** – established, managed and maintained in cooperation with International, Regional, National, State, Local Authorities, and with industry

- **Innovation** – capitalise on the latest research and development

- **Accuracy** – capable of meeting the accuracy and quality requirement of users
Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

Geospatial / geodetic infrastructure strategy considers –

- **Digital Enablement** – capable of meeting common operating standards and the needs of users through enhanced digital infrastructure / systems

- **Multi-dimensions** – integrate horizontal, vertical and time varying components

- **Extensibility** – architecture to accommodate changes so as to extend its capability and function

- **Open Standards** – Support the use of open standards and interoperability with other jurisdictions and industry where appropriate.
4. Ensuring Geospatial Reference System (GRS) / geodetic framework are integral to a nation’s “fundamental or foundation” datasets ..... underpins / enables!

- "common asset" of location information to make decisions that affect people's safety, prosperity, and environment
- comprising of the best available, most current, authoritative source of foundation spatial data which is standardised and quality controlled

5. **TECHNICAL components** GRS / geodetic framework

- **IGS compliant GNSS CORS** that are the spine of a GRS; contribute to ITRF / APREF.

- **GRS mathematically aligned with ITRF / APREF realisations**

- Control networks are a hierarchy of **rigorously propagated co-ordinates and uncertainties** - integrity, reliability and accuracy are “fit for purpose”

- Geoid model and / or defined height system to **integrate vertical surfaces**
Utilising and benefitting from the **multi GNSS environment** and space based measurement technology
Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

- Adhering to *international standards, guidelines and practices*
- Facilitating *interoperability and unification amongst geospatial information datasets and systems* at all levels – local, national, regional, and global

![Diagram showing fundamental datasets](image)

- Geocoded addressing
- Land parcel and property
- Elevation and depth
- Land cover
- Imagery
- Administrative boundaries
- Geospatial Reference System
- Fundamental Datasets
- Aviation
- Water and maritime
- Transport
- Place names
The capability to support global observing systems for accurate scientific research modelling - inter / intra tectonic plate deformation, sea level monitoring, climate change, atmospherics
Aligning with new mass-market wide area positioning technology and applications i.e. regional and global real time positioning services delivered by satellite, digital communications, and the Internet.

Utilising or benefiting from quality imagery / satellite data, the development of new mapping technologies and products.
“Good co-ordination begins with good co-ordinates”

Dave Doyle FIG Regional Conference Costa Rica 2007