The International Federation of Surveyors (FIG)

What and who is FIG?

What can FIG do?

FIG AP CDN on Geospatial / Geodetic Infrastructure Modernistaion

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

The International Federation of Surveyors (FIG)

Established in Paris 1878;

Federation of national associations;

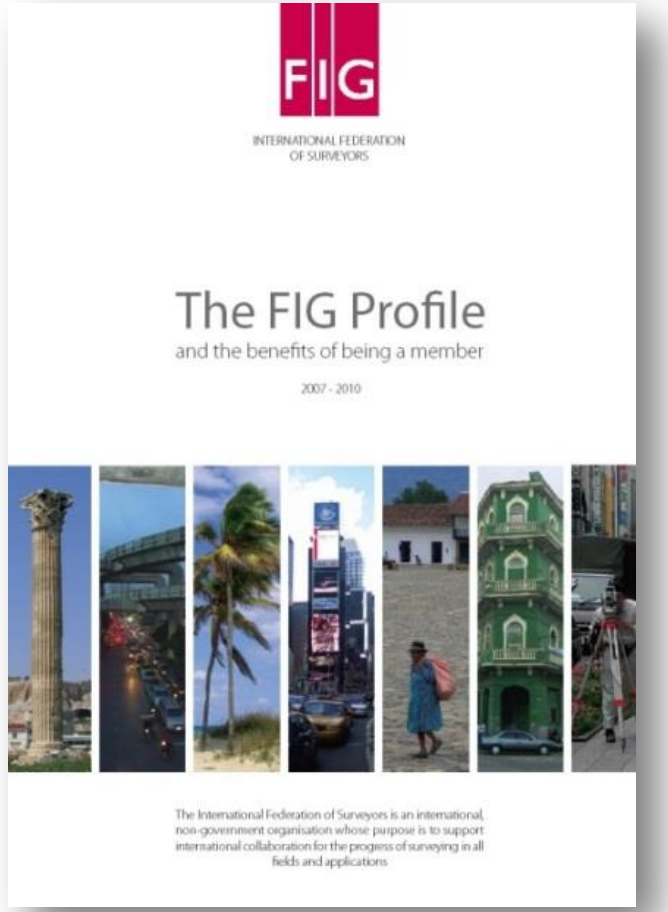
Represents all surveying disciplines;

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;

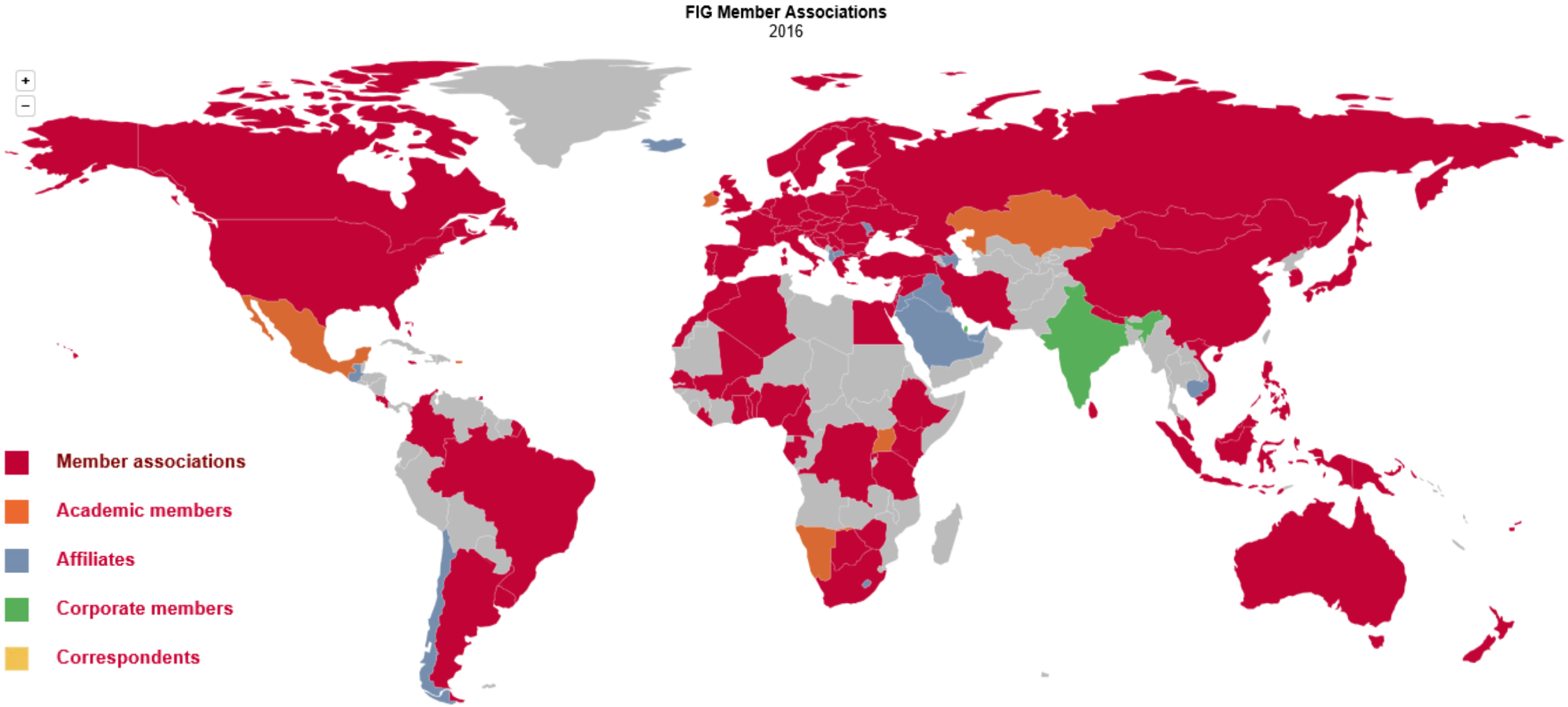
It provides an international forum for discussion and development aiming to promote professional practice and standards

Liaise with like minded organisations - UN GGIM, IAG



https://www.fig.net/

International Fédération of Surveyors
Fédération Internationale des Géomètres
Internationale Vereinigung der Vermessungsingenieure



Through different membership categories 121 countries are represented in FIG

The FIG Organistaion

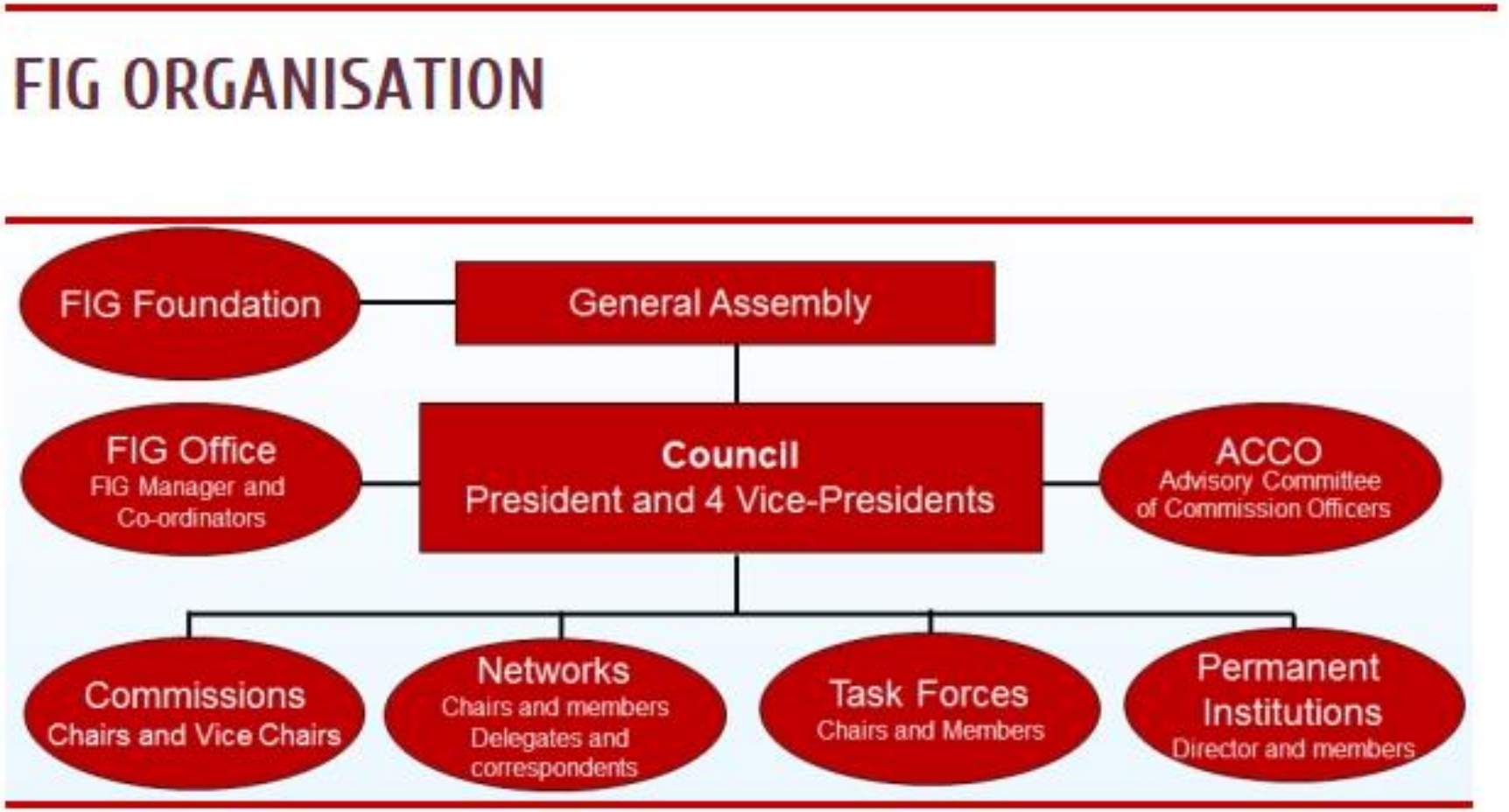


FIG Engine room

FIG Engine room

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)
Vice President

Diane Dumashie
RICS (UK)
Vice President

Mr **Mikael Lilje** (2017-2020)
Sweden

Dr **Orhan Ercan** (2017-2020)
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The FIG Vision

*"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.***

FIG Council Workplan

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 Commission 5

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FIG Commission 5

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Working Group Chair
Working Group 5.6 – Cost Effective Positioning

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FIG Task Forces

FIG Task Force on Real Estate Market Study

FIG Africa Task Force

FIG Task Force on Surveyors and the Climate Change

Internal Task Forces

FIG Task Force on Mutual Recognition of Qualifications

FIG Task Force on Property and Housing

FIG Task Force on Commission Structure

FIG Task Force on Scientific Journal

FIG Task Force on Corporate Members

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

FIG Networks

FIG Regional Capacity Development Network

Africa FIG Regional Network (ARN)

Asia/Pacific FIG Capacity Development Network

FIG Young Surveyors Network

Eva-Maria Unger,
Austria

Paula Dijkstra,
The Netherlands

FIG Standard Network

FIG Asia Pacific Capacity Development Network

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***.

aseanFLAG
UN-GGIM UNITED NATIONS INITIATIVE ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT
FIG
The World Bank
ADB Asian Development Bank
IAG
JUPEM
IFC International Finance Corporation World Bank Group

FIG Asia Pacific Capacity Development Network

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.

FIG Asia Pacific Capacity Development Network

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"

FIG Asia Pacific Capacity Development Network

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.

FIG Asia Pacific Capacity Development Network

What is capacity development? ***It is also about ……***

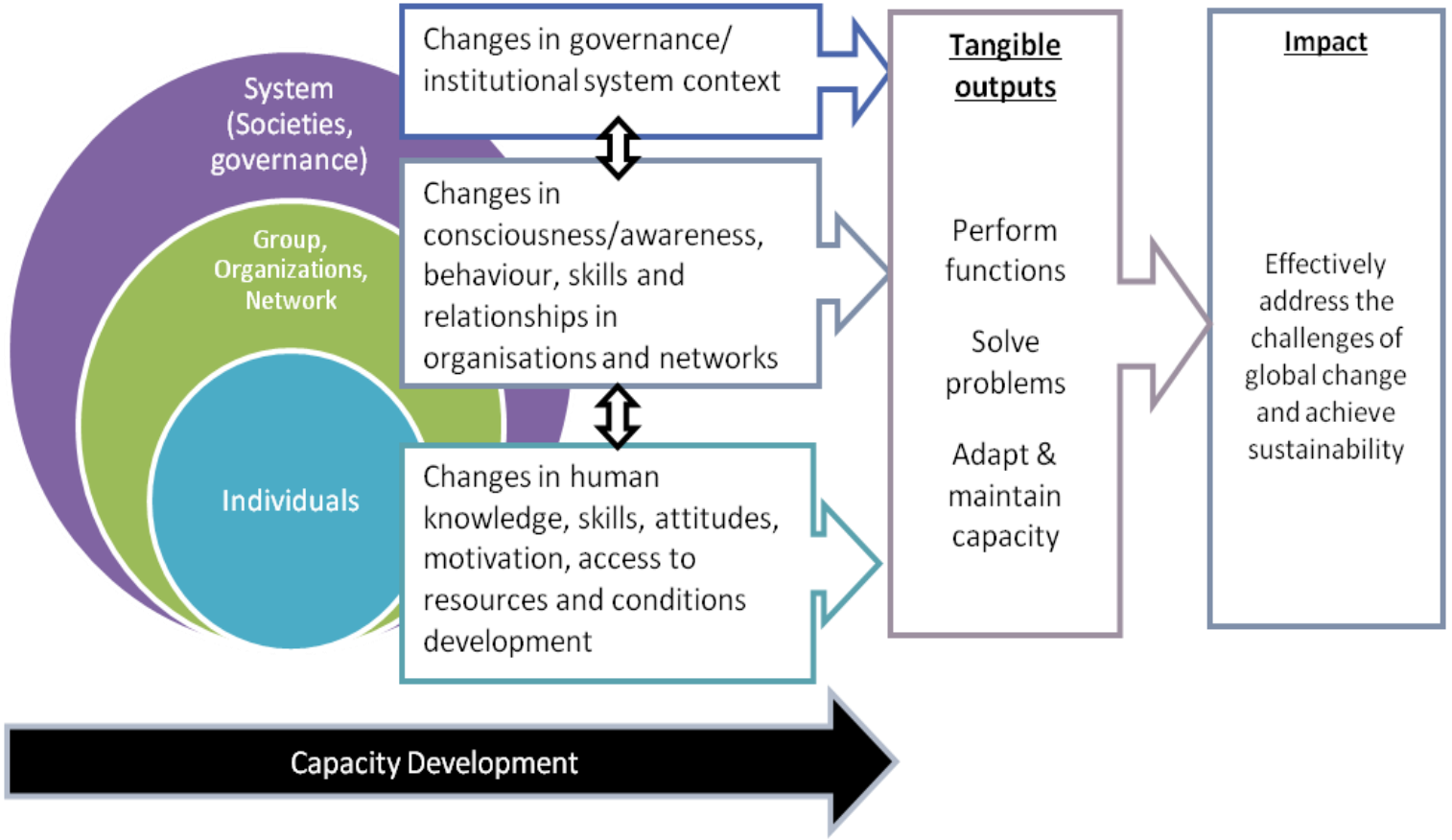
The process of learning to adapt to change….
(or shifting the paradigms of practice)

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



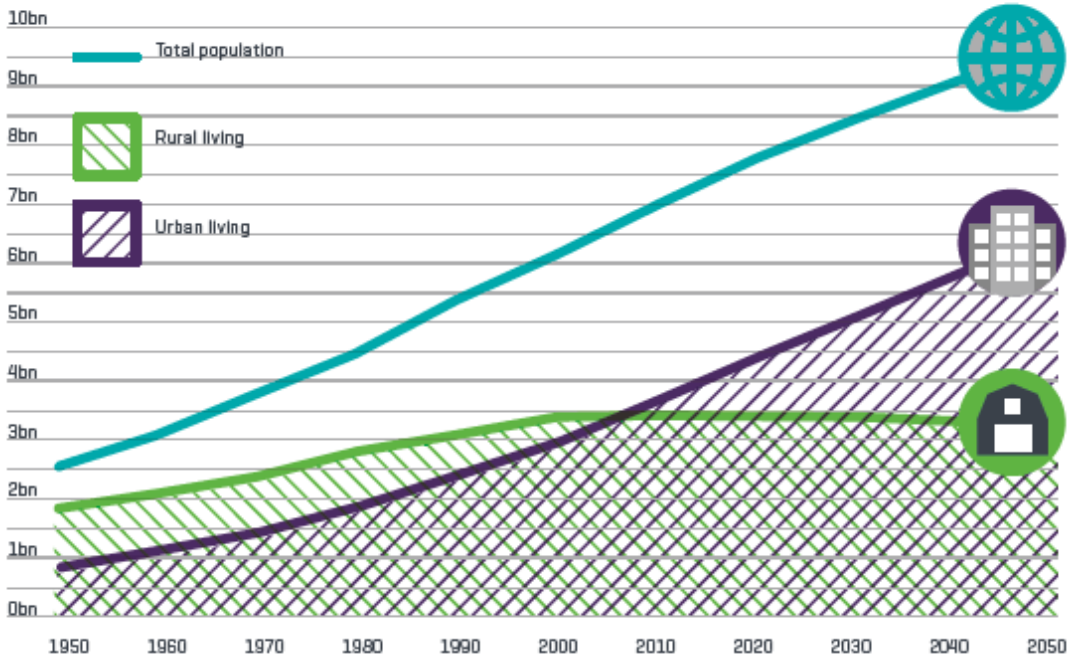
Source – Asia Pacific Network for Global Change Research

http://www.apn-gcr.org/programmes-and-activities/capable/

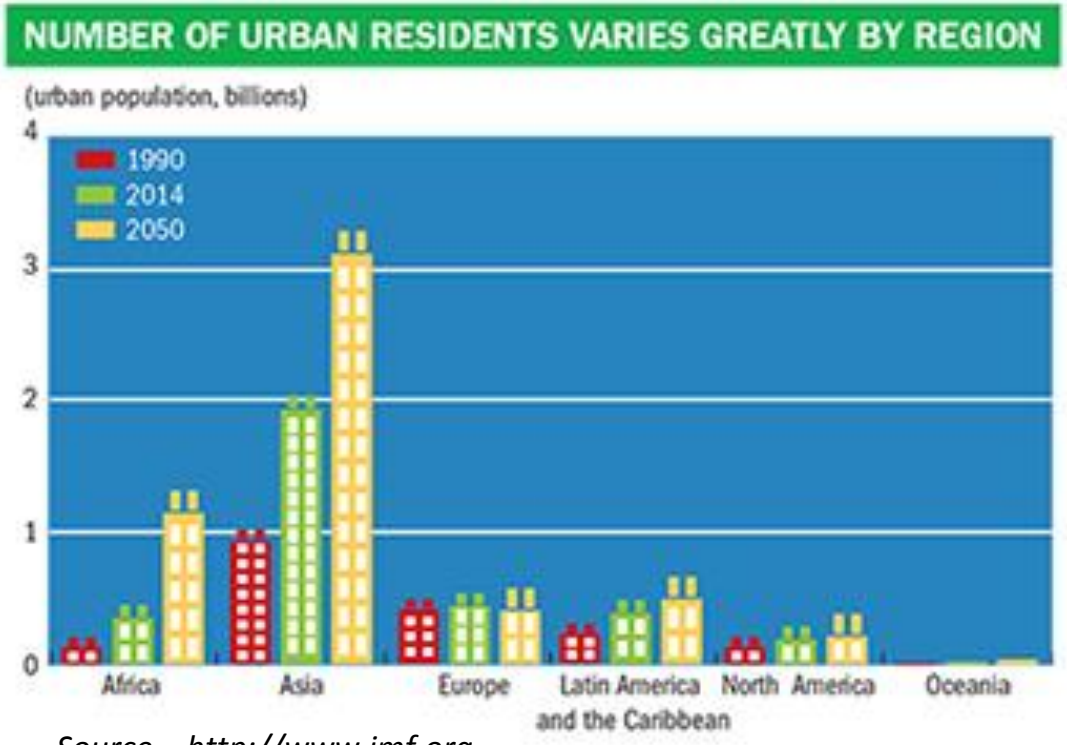
What are the Capacity Challenges?

- ***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.*

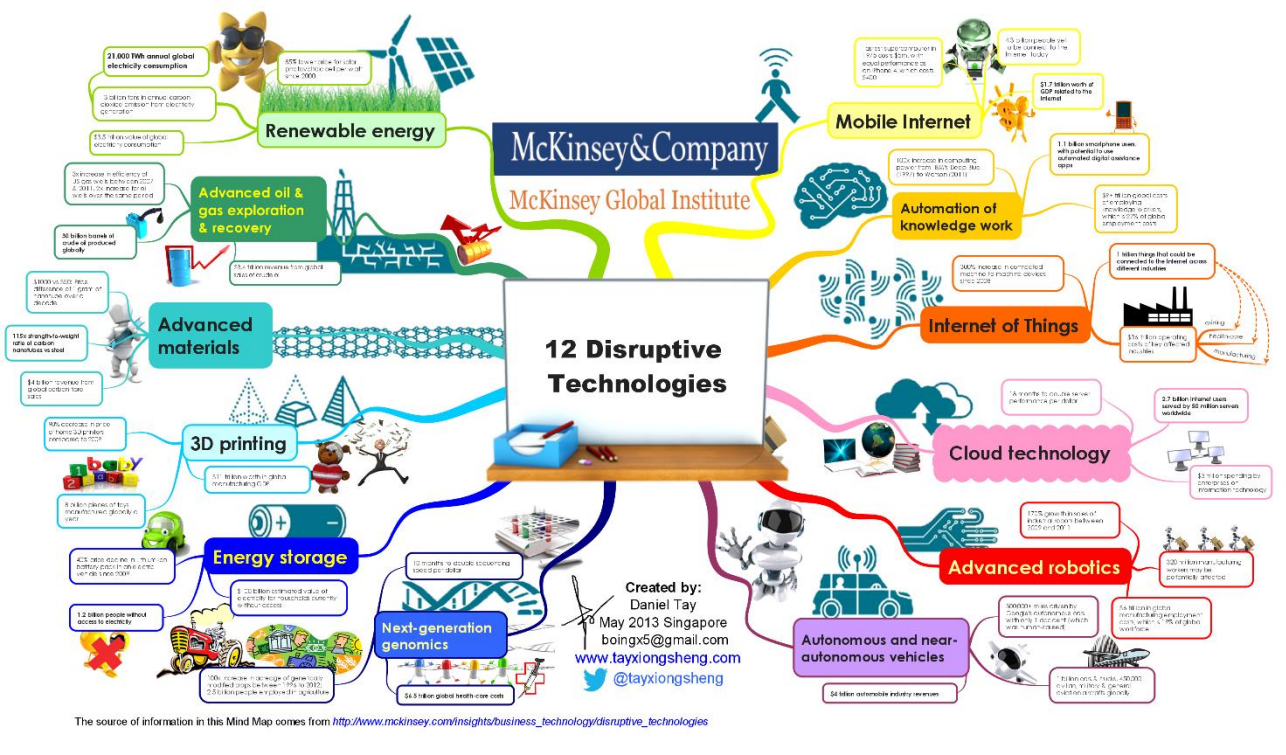


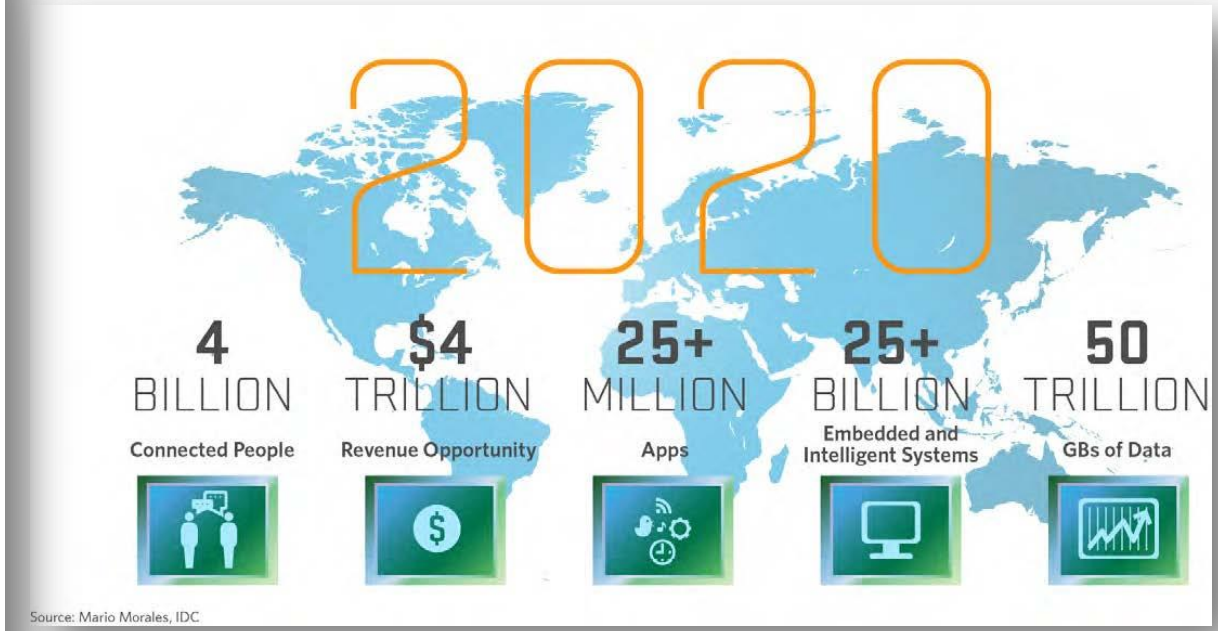




What are the Capacity Challenges?

- ***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)

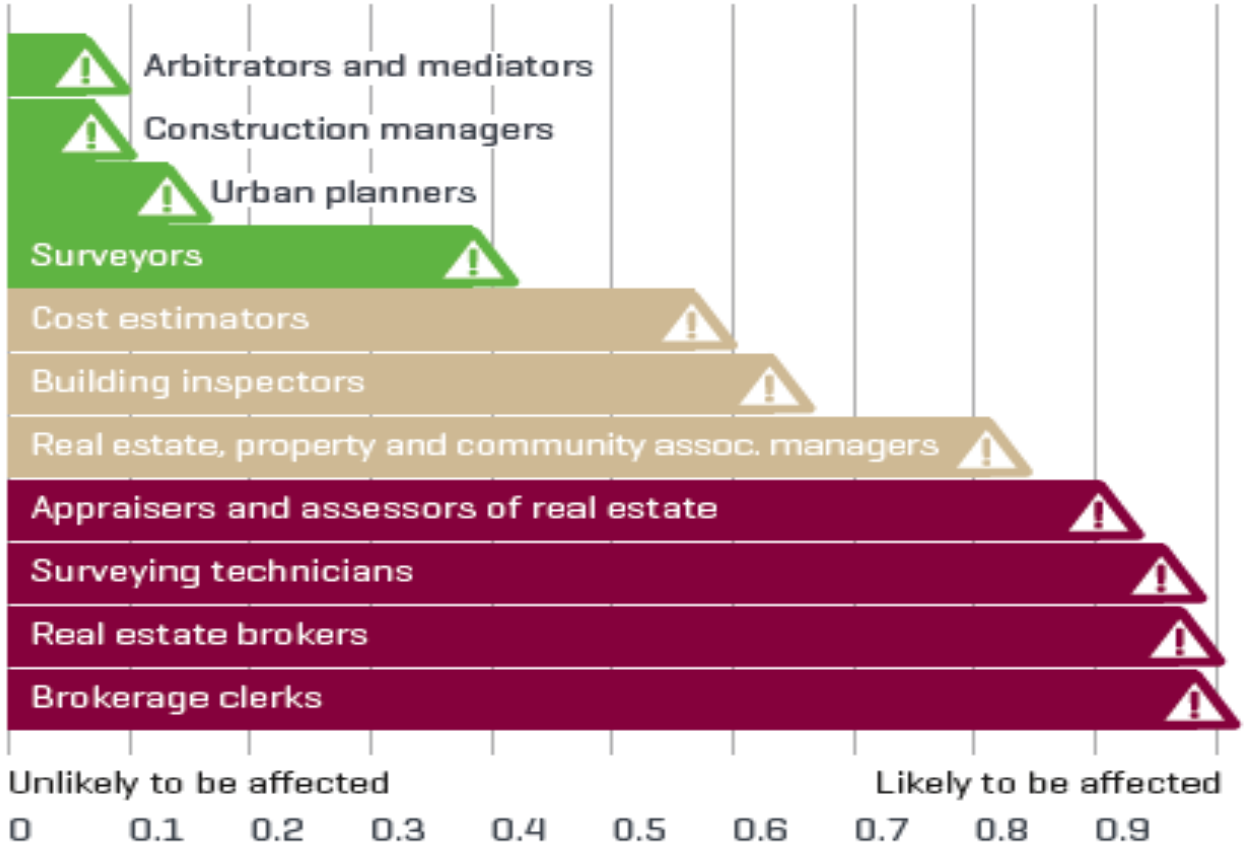




What are the Capacity Challenges?

- ***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

Figure 4.2 Probability of professions being affected by technology



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

What's decreasing	What needs to increase
Transactional activity	Leadership
Administrative tasks eg bills of quantities	Client focus
Residential valuation	Collaboration
	Ethical behaviour
	Sustainability
	Data analysis
	Improving productivity of assets
	Risk management

What's not desirable	What's needed today
Silo working	Outcomes focus
Early specialisation	Communication
Conflicts of interest	Integrated programme and cost management
	Skills for handling greater complexity
	Interdisciplinary working
	Change management
	Advisory services
	Understanding new technology

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

Special Technical Forums and Sessions – Kuala Lumpur June 2014



FIG KUALA LUMPUR 2014 XXV FIG Congress "Engaging the Challenges, Enhancing the Relevance" 16 - 21 JUNE 2014, MALAYSIA

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 Information / Knowledge / Experiences - FIG Resources

Access to conference / seminar technical proceedings – papers and presentations from 1898 to present - 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
- articles - http://www.fig.net/resources/articles_about_fig/index.asp

FIG Resources

FIG Surveyors Reference Library

[Back] [Search]

Commissions involved:
(check all that apply;
the search condition is 'OR')

- ☐ Commission 1
- ☐ Commission 2
- ☐ Commission 3
- ☐ Commission 4
- ☐ Commission 5
- ☐ Commission 6
- ☐ Commission 7
- ☐ Commission 8
- ☐ Commission 9
- ☐ Commission 10
- ☐ History
- ☐ Young Surveyors

Keywords:
(check all that apply;
the search condition is 'OR')

- ☐ Access to land
- ☐ Affordable housing
- ☐ Bridge surveying
- ☐ Cadastre
- ☐ Capacity building
- ☐ Cartography
- ☐ Coastal Zone Management
- ☐ Cost management
- ☐ CPD
- ☐ Curricula
- ☐ Deformation measurement
- ☐ Digital cadastre
- ☐ Education
- ☐ e-Governance
- ☐ Engineering survey
- ☐ Geoinformation/GI
- ☐ GIM
- ☐ GPS
- ☐ GSDI
- ☐ History
- ☐ Hydrography
- ☐ Implementation of plans
- ☐ Informal settlements
- ☐ Land distribution
- ☐ Land management
- ☐ Land readjustment
- ☐ Laser scanning
- ☐ Legislation
- ☐ Low cost technology
- ☐ Marine cadastre
- ☐ Mine surveying
- ☐ Photogrammetry
- ☐ Positioning
- ☐ Professional practice
- ☐ Property taxes
- ☐ Quantity surveying
- ☐ Real estate development
- ☐ Remote sensing
- ☐ Risk management
- ☐ Security of tenure
- ☐ Spatial planning
- ☐ Standards
- ☐ Tunnel surveying
- ☐ Urban renewal
- ☐ Valuation

Other keywords:
(please enter only one
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the search condition is 'OR')

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2. ☐
3. ☐
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(the specified string is search
anywhere within the title):

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

http://www.fig.net/resources/databases/srl/search.asp

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

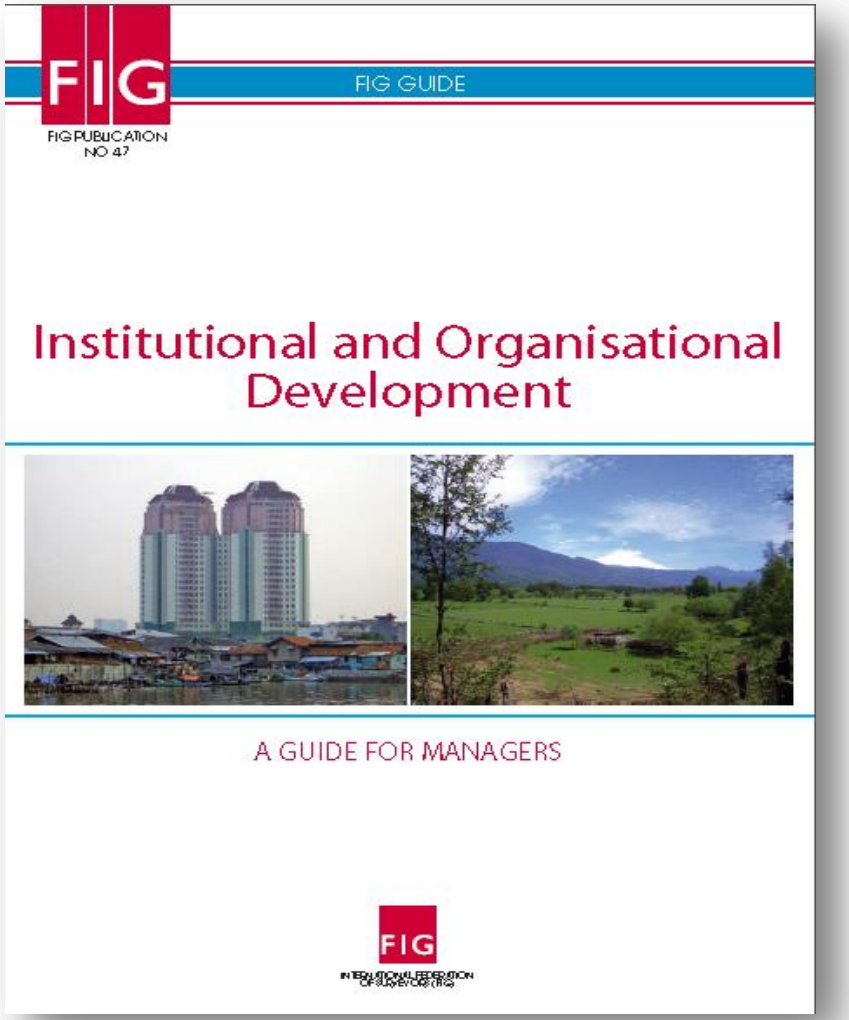
United Nation Publications

JB GIS Publications

Other Publications

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

FIG Publications , Reports, Guidelines



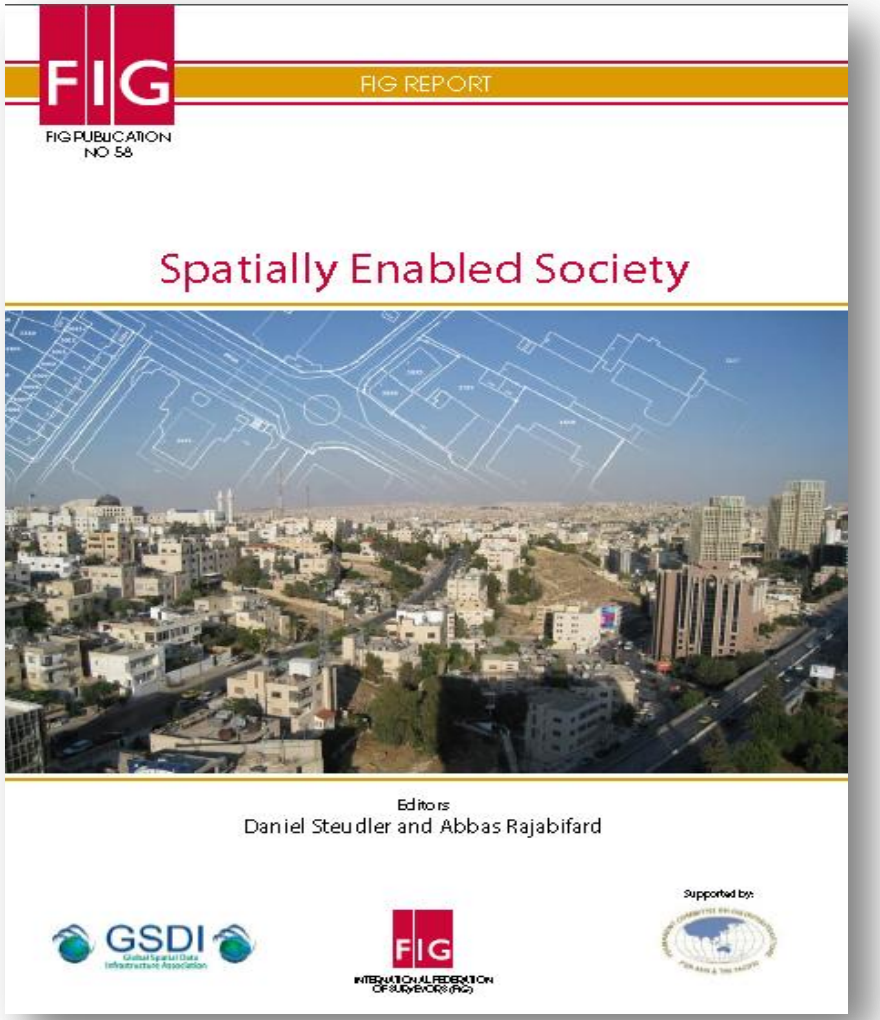
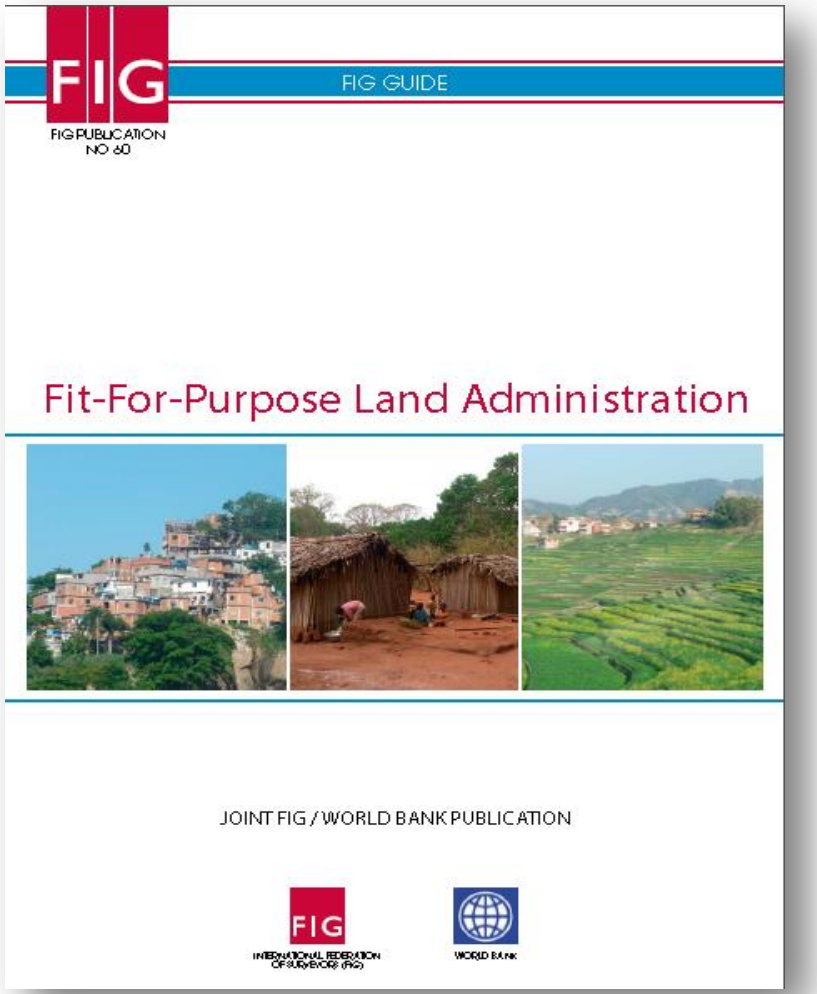
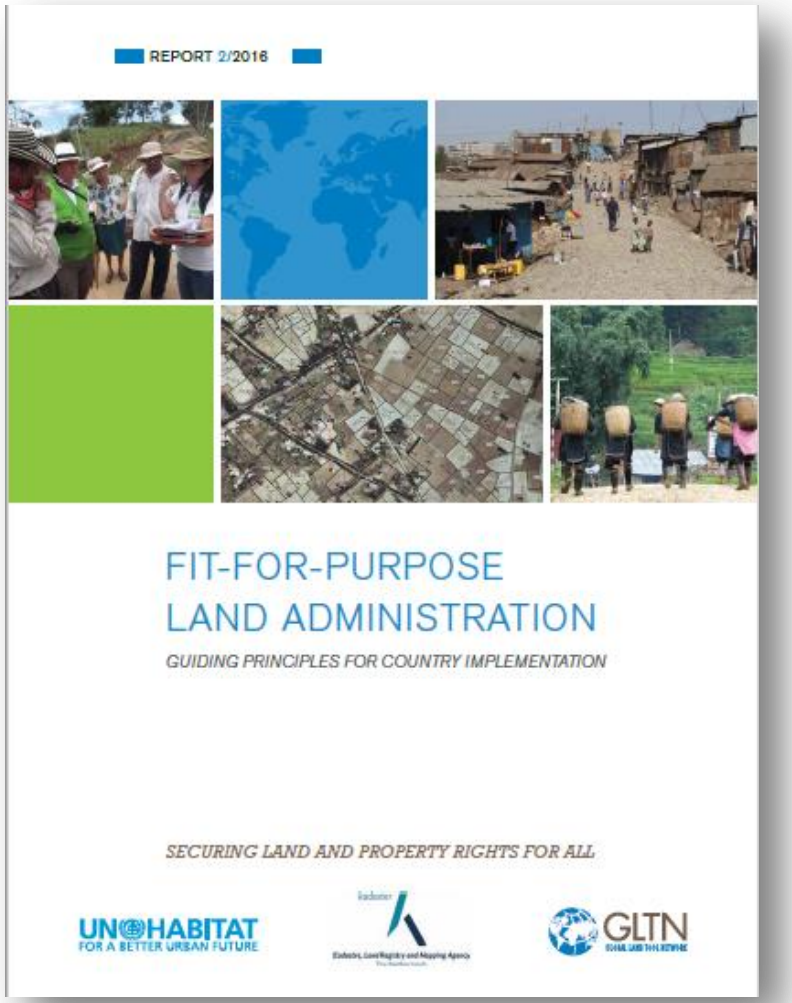


FIG Publications , Reports, Guidelines





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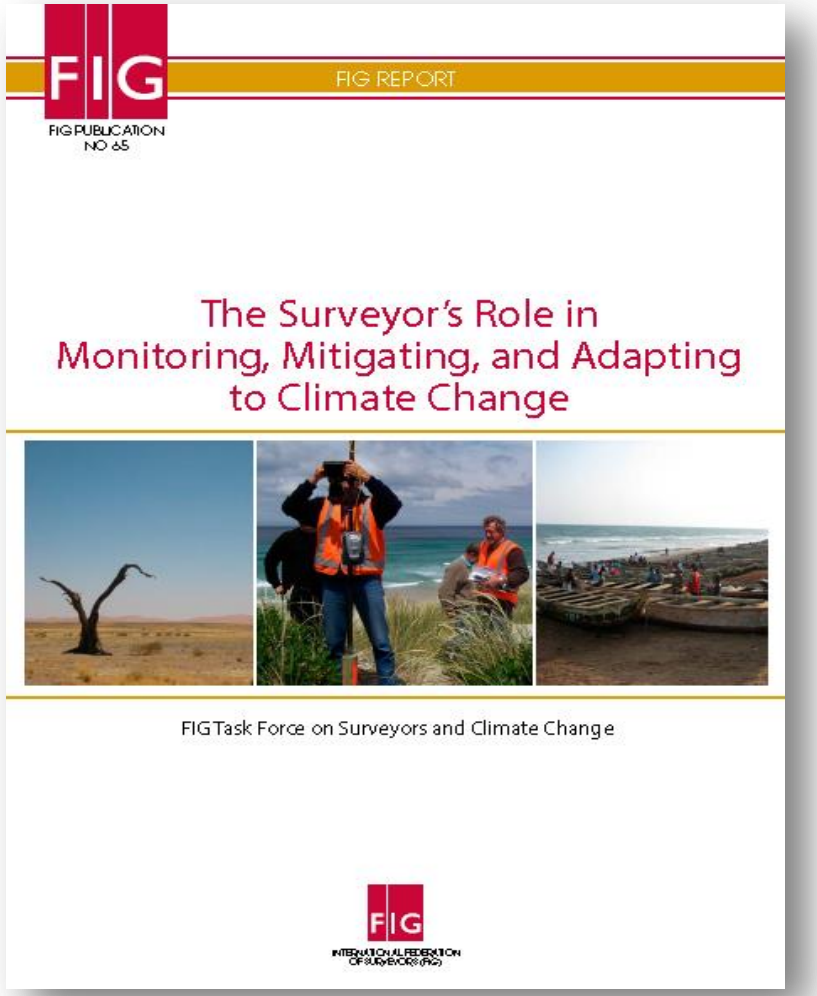

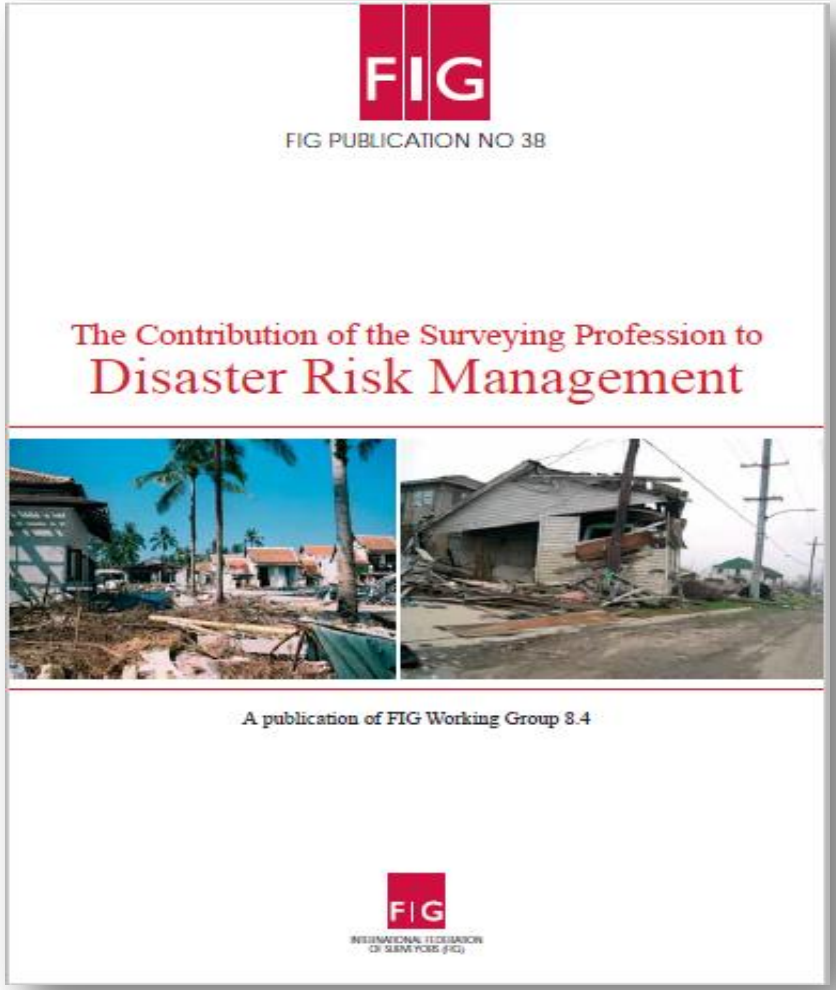

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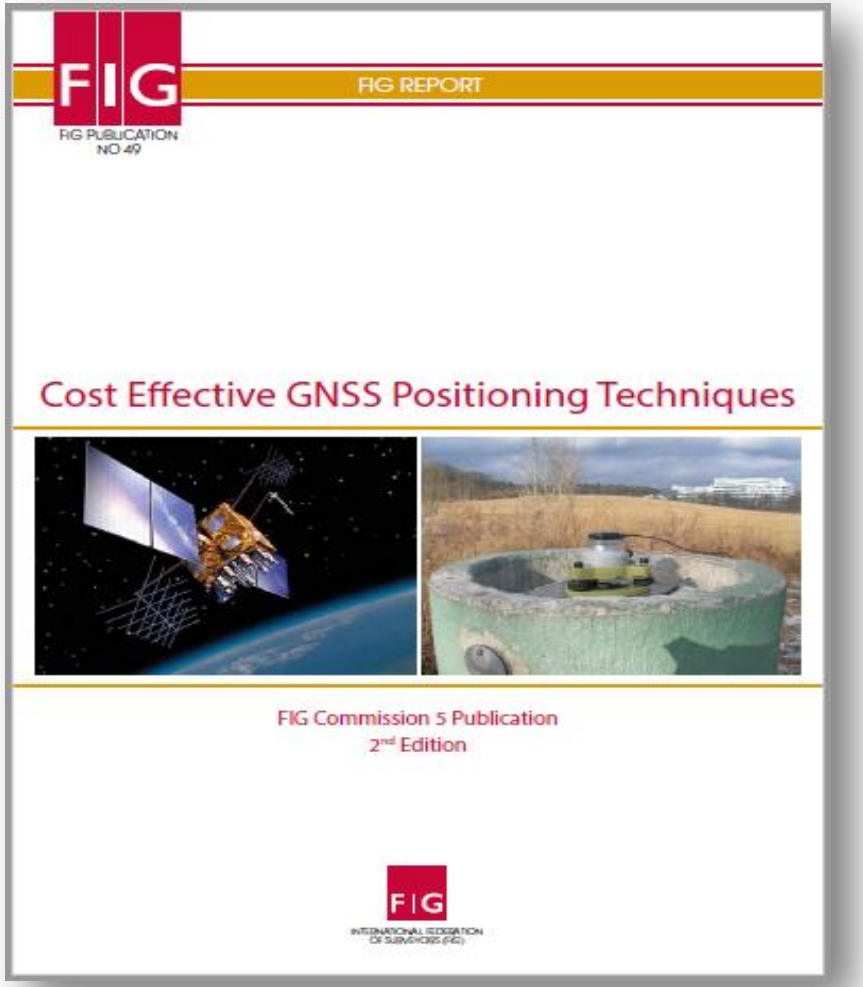
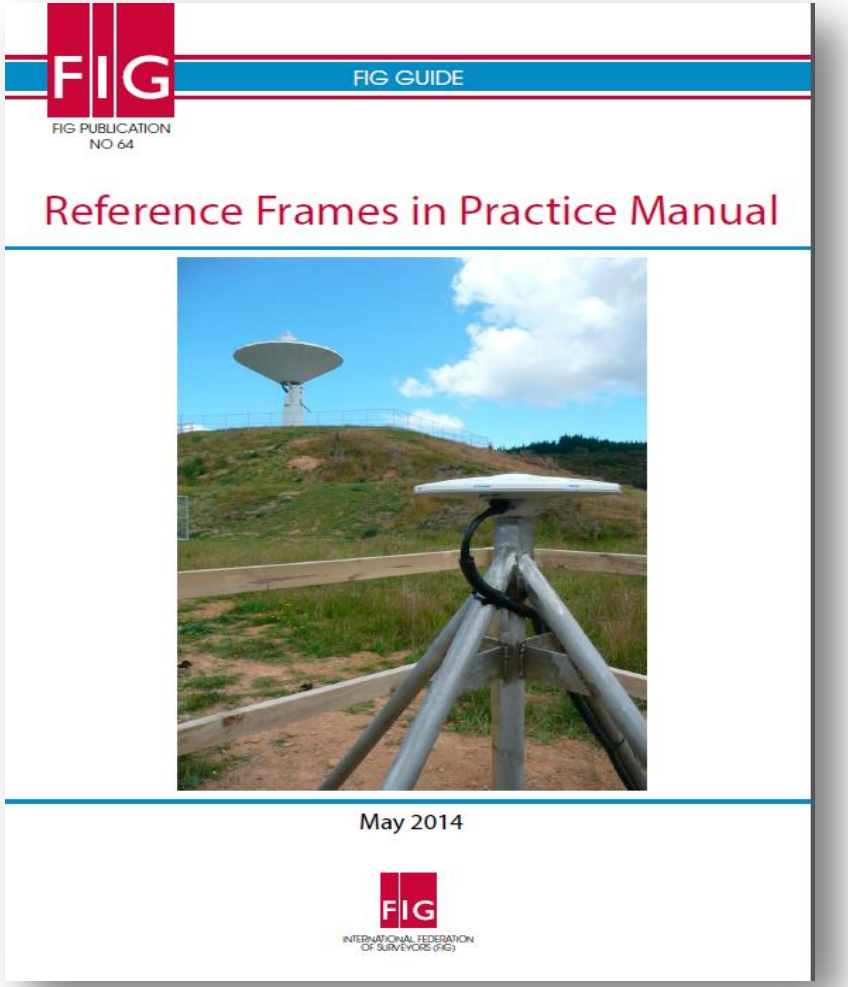
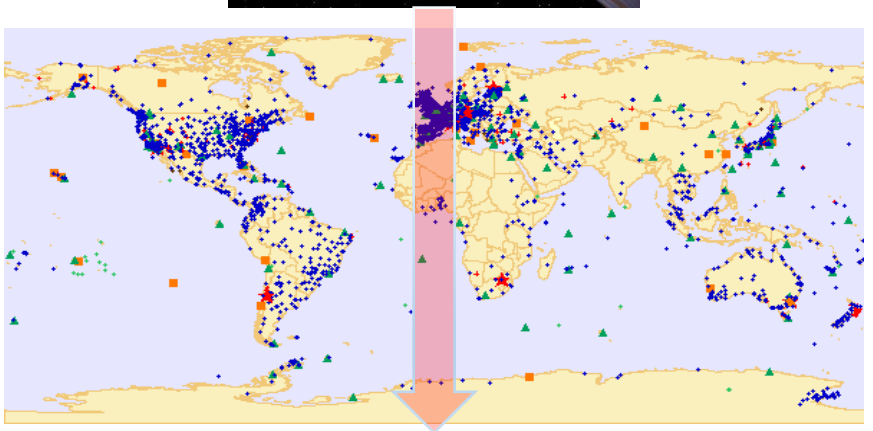
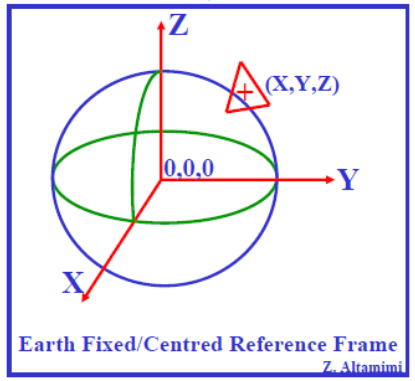




Reference Frame in Practice Manual

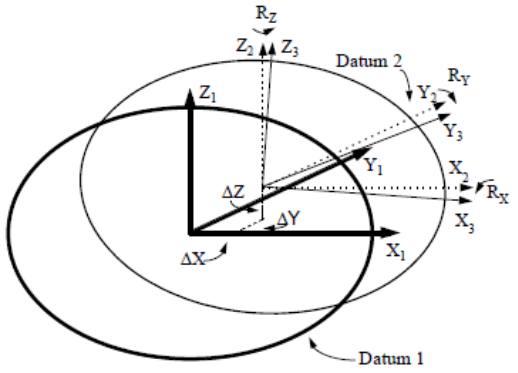
- Foreword / Introduction - Matt Higgins, Australia and Graeme Blick, New Zealand
- ***Geodesy and Global Reference Frames*** – Prof. Chris Rizos, Australia
- ***Global Terrestrial Reference Systems and Frames*** – Dr. Neil D. Weston and Dr. Tomás Soler, USA
- ***Regional and National Reference Frames*** - 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





Reference Frame in Practice Manual

- ***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



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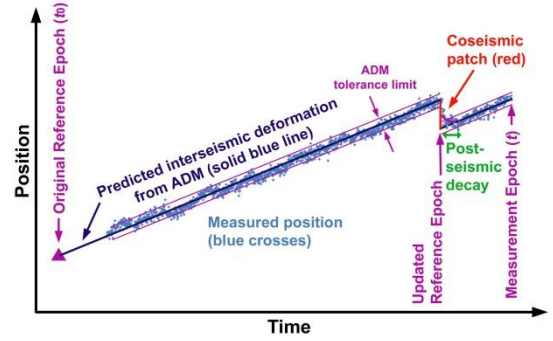
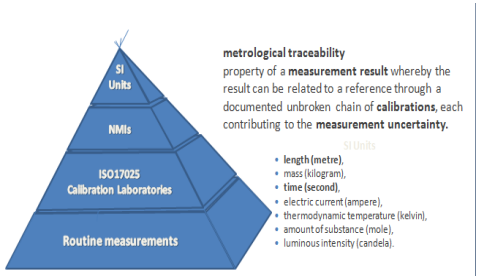




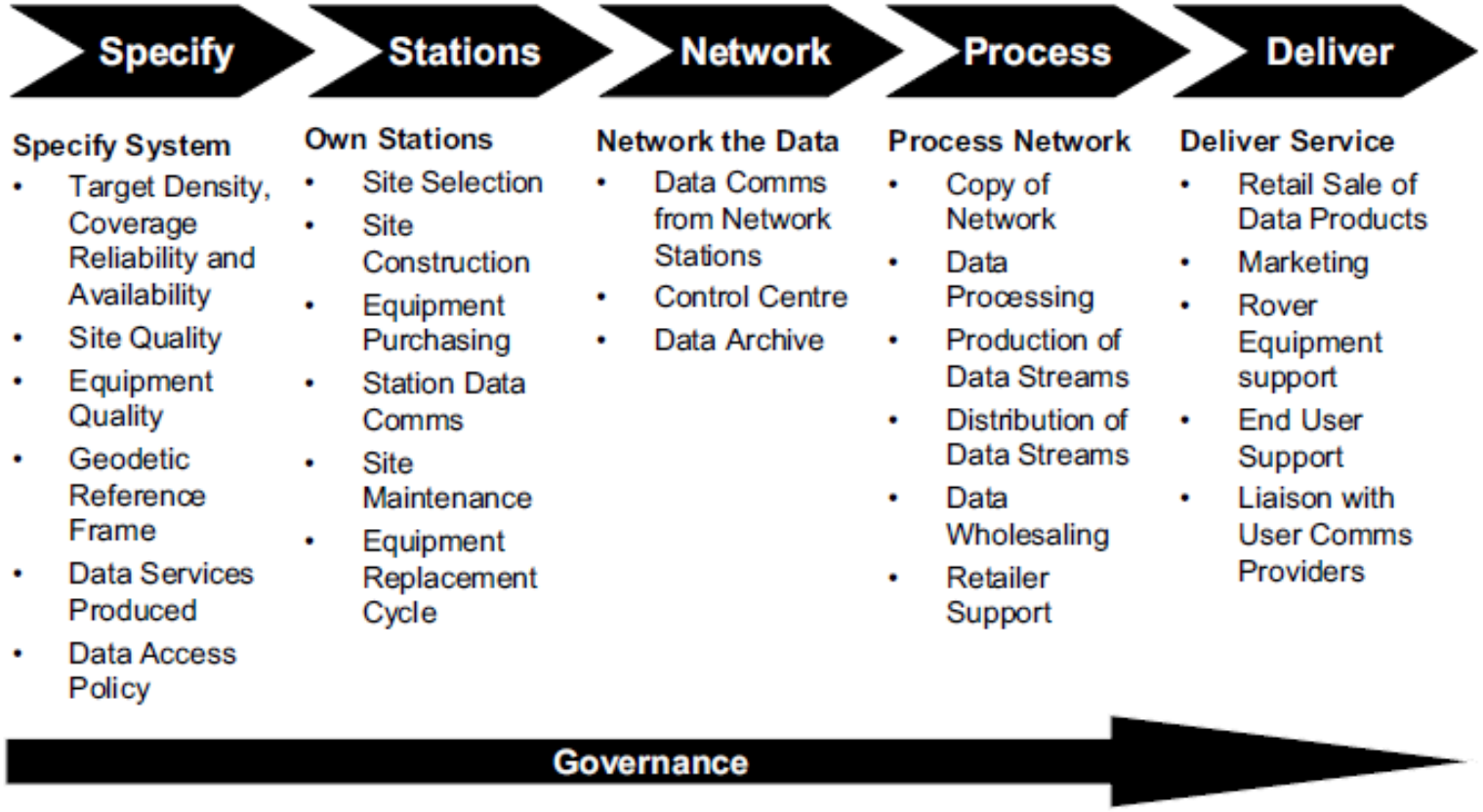
Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

1. ***Assessing the status and condition*** *of your geospatial / geodetic infrastructure and systems - SWOT your "geospatial data model / framework"*

Framework Source © Dr. Vanessa Lawrence CB, Gilles Albaredes, John Schonegevel, Maurits van der Vlugt

Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

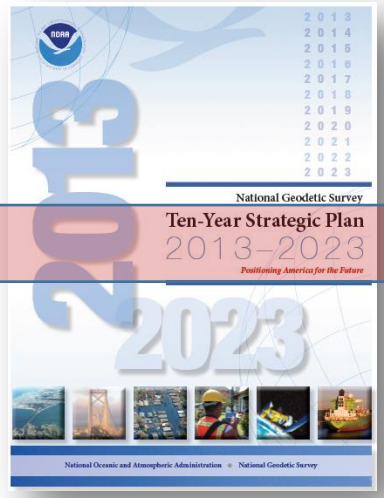
2. ***Understanding the role / responsibilities of your agency*** *in the various elements of geospatial and geodetic infrastructure management*

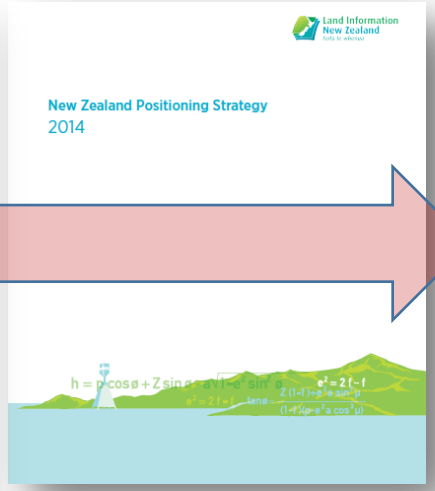


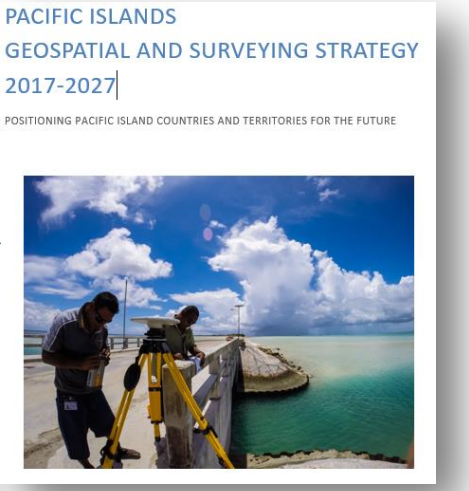
Source - Matt Higgins "A model for organisational roles within a Positioning Infrastructure"

Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

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…..*







Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

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.*

Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

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*

Source - http://www.anzlic.gov.au/fsdf-themes-datasets

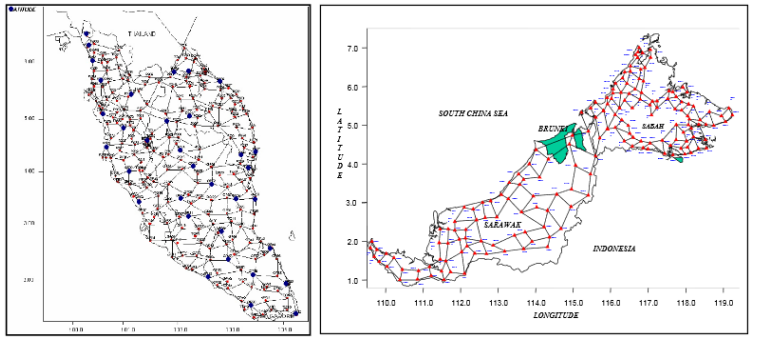
Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

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

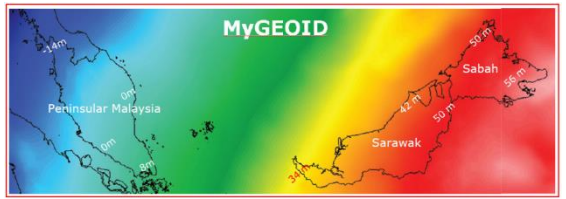
- ***IGS compliant GNSS CORS*** *that are the spine of a GRS ; contribute to* ***ITRF / APREF****.*
- *GRS* ***mathematically aligned with ITRF / APREF*** *realisations*

International Terrestrial Reference Frame ITRF APREF

- *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***



Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

- *Utilising and benefitting from the **multi GNSS environment** and space based measurement technology*

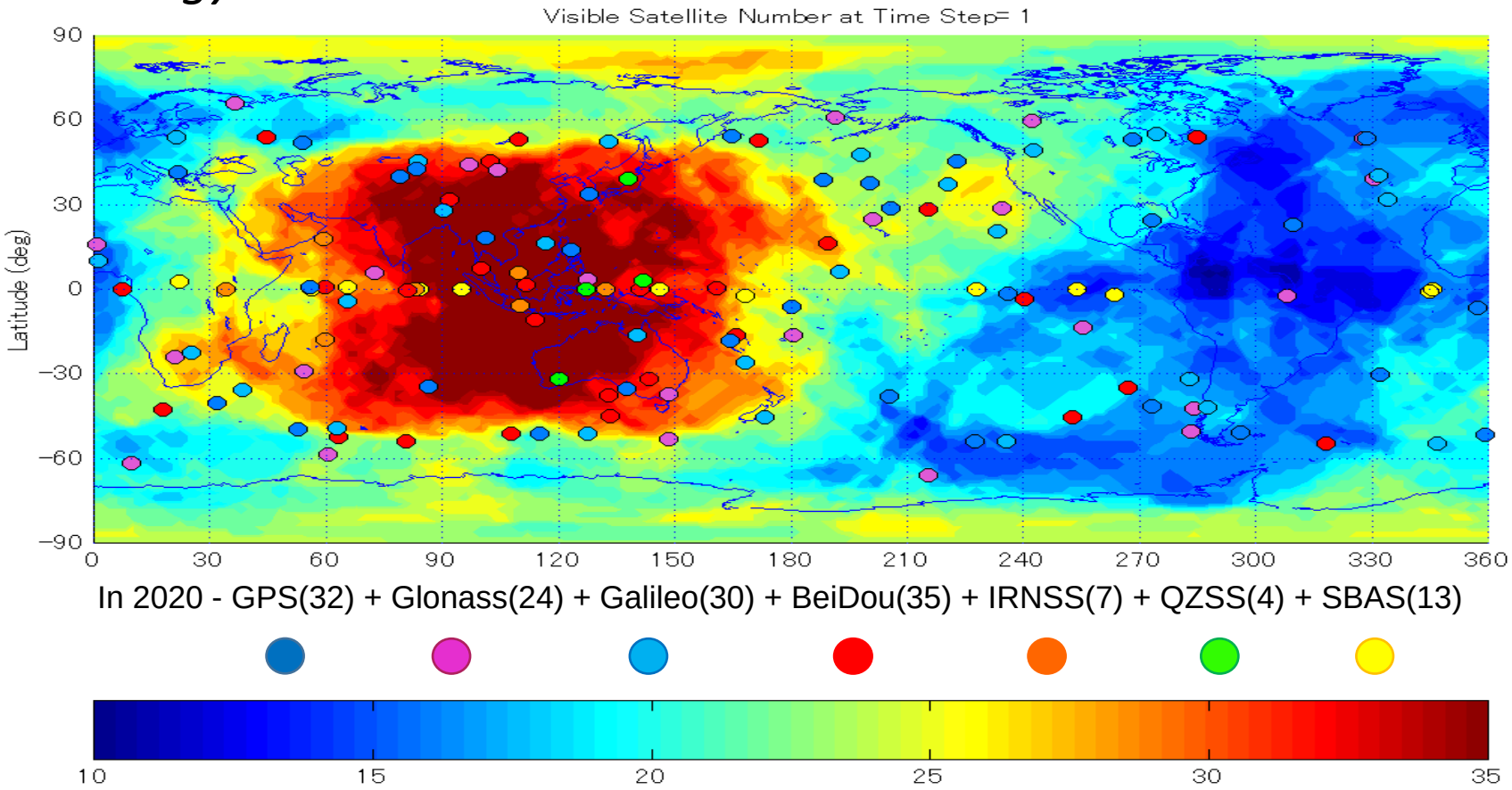
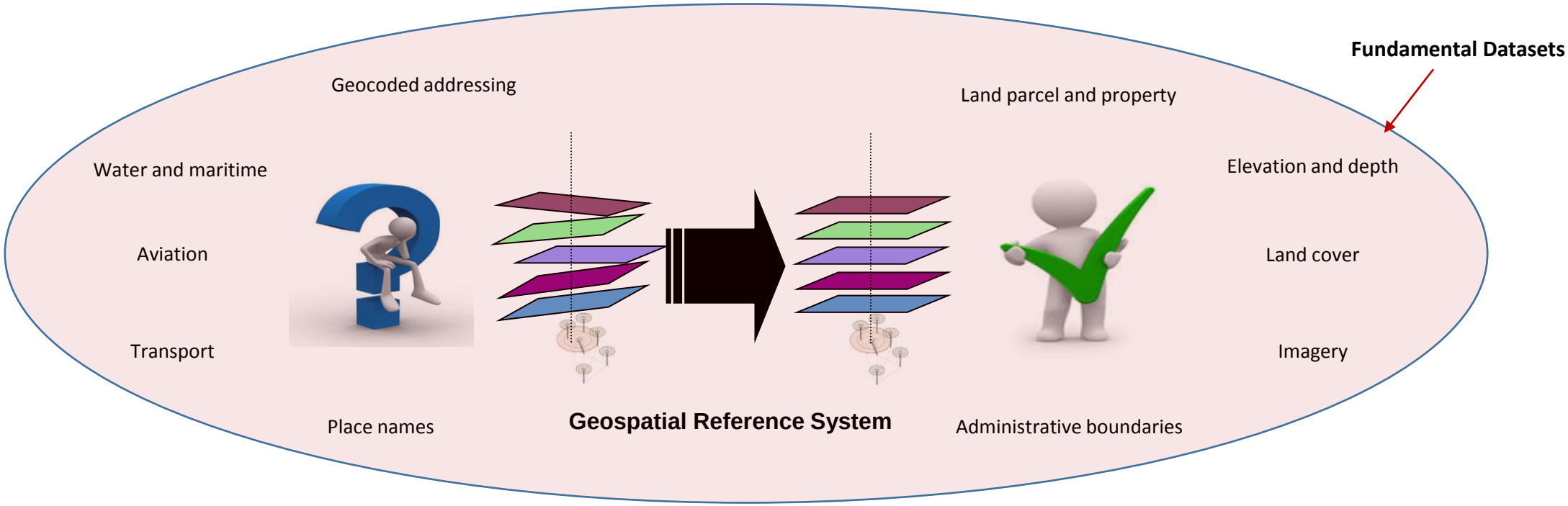


Figure courtesy Prof Chris Rizos, UNSW

Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

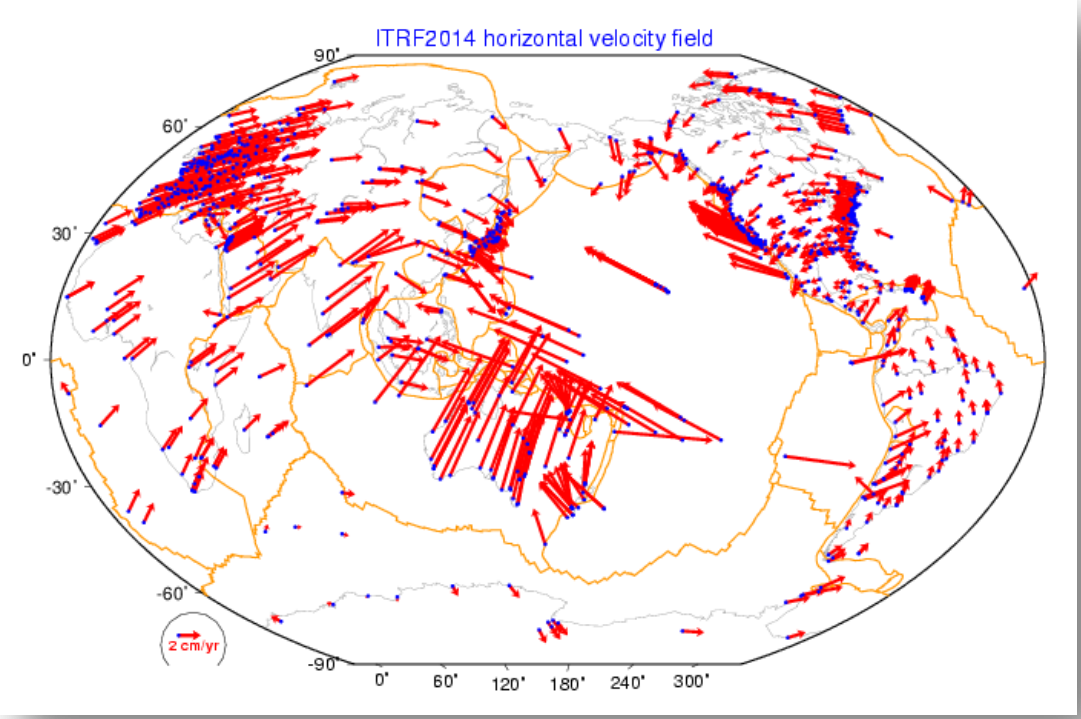
- *Adhering to **international standards, guidelines and practices***

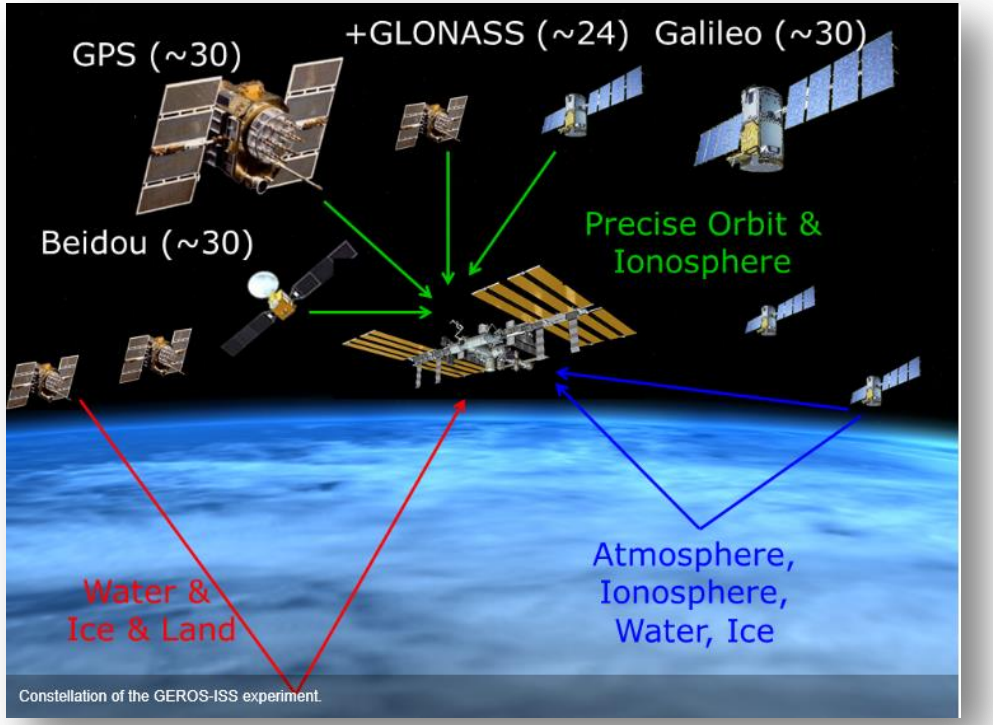
- *Facilitating **interoperability and unification amongst geospatial information datasets and systems** at all levels – local, national, regional, and global*



Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

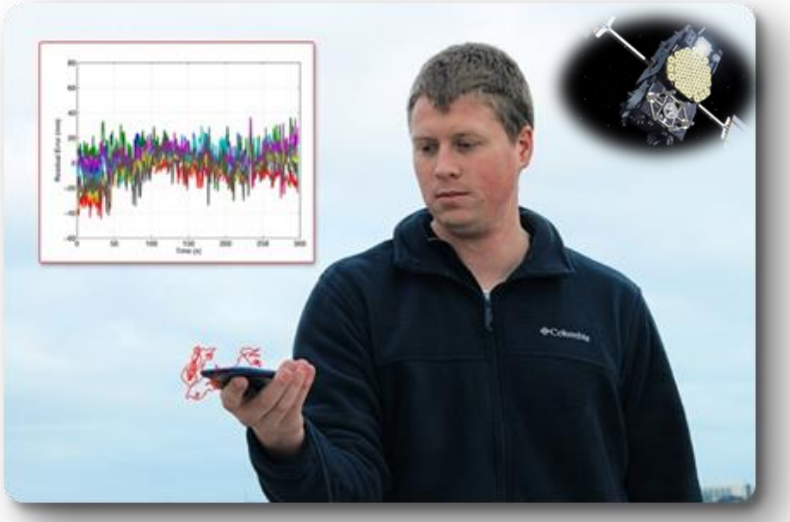
- *The **capability to support global observing systems for accurate scientific research modelling** - inter / intra tectonic plate deformation, sea level monitoring, climate change, atmospherics*



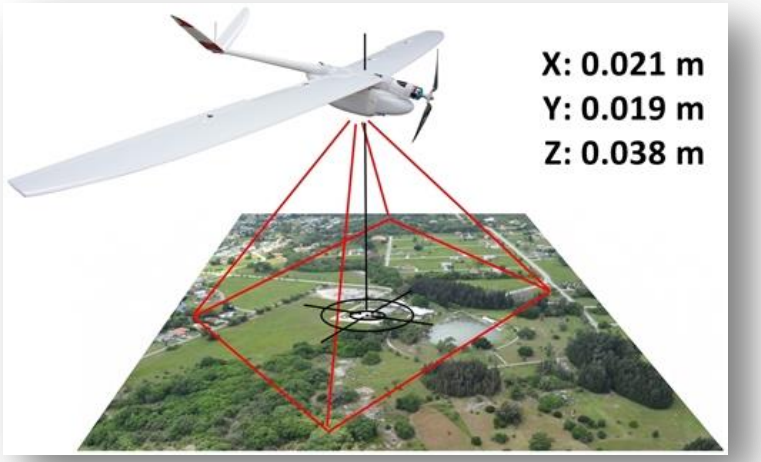


Capacity Building Options for Geospatial / Geodetic Infrastructure Modernisation?

- *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***



The International Federation of Surveyors (FIG)

The quest for capacity development – making it work

"Don´t start what you can´t sustain"

Provisions for ongoing updating and possible upgrading are crucial and must be established up front.

Capacity development relates to societal awareness, institutional and organisational reform, and education and training of human resources.

The way forward includes understanding and cooperation between UN-agencies, professional organisations, and national governments

To drive and manage the change process there must be effective knowledge-sharing to ensure that lessons learned and good practice are widely implemented.

Stig Enemark FIG African Capacity Deveolpement Network Nairobi 2015

"Good co-ordination begins with good co-ordinates"

Dave Doyle FIG Regional Conference Costa Rica 2007

https://www.fig.net/