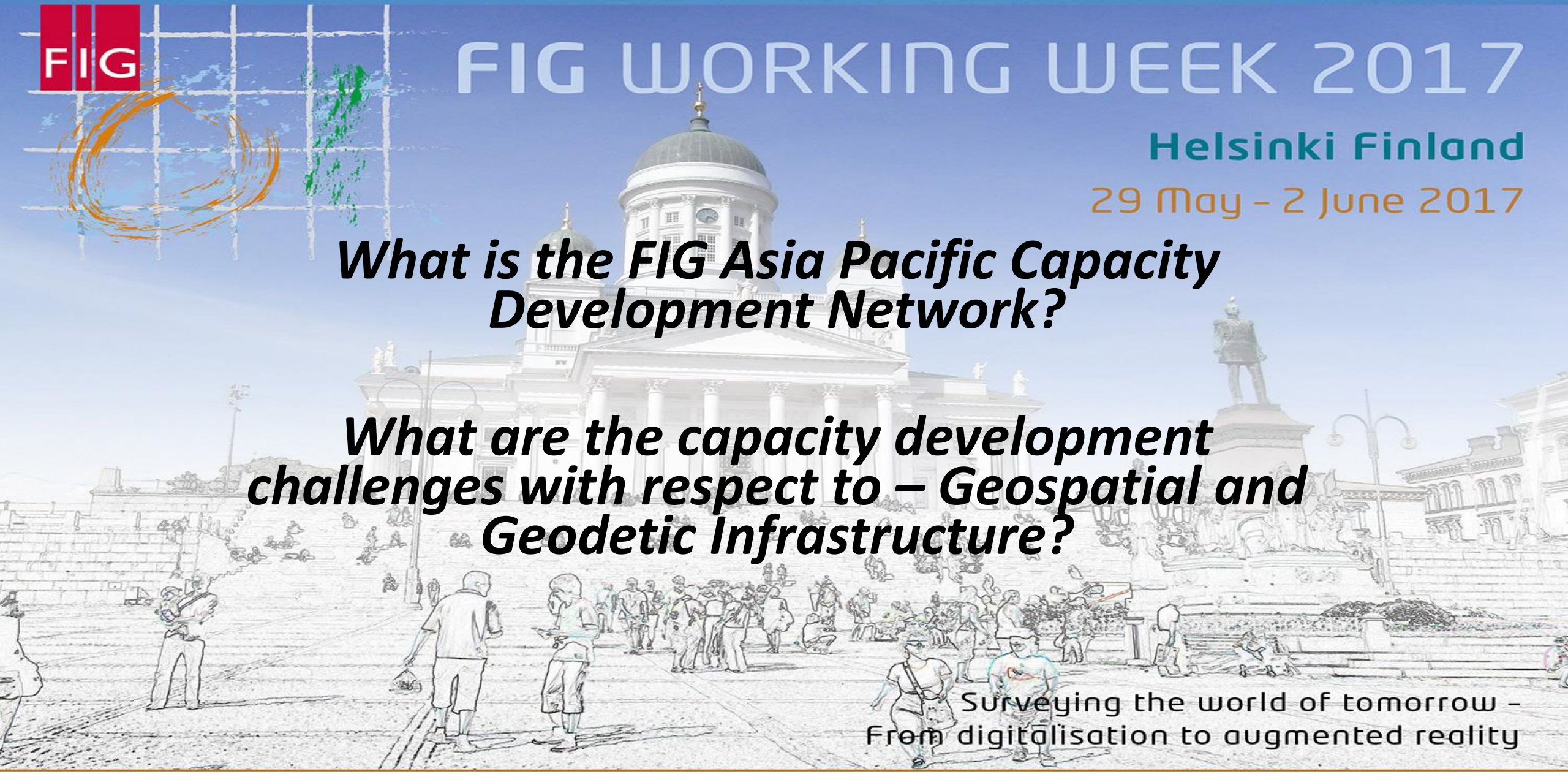


What is the FIG Asia Pacific Capacity Development Network?

What are the capacity development challenges with respect to – Geospatial and Geodetic Infrastructure?

Organised by

Platinum Sponsors:

The International Federation of Surveyors (FIG)

Established in Paris 1878;

Federation of national associations;

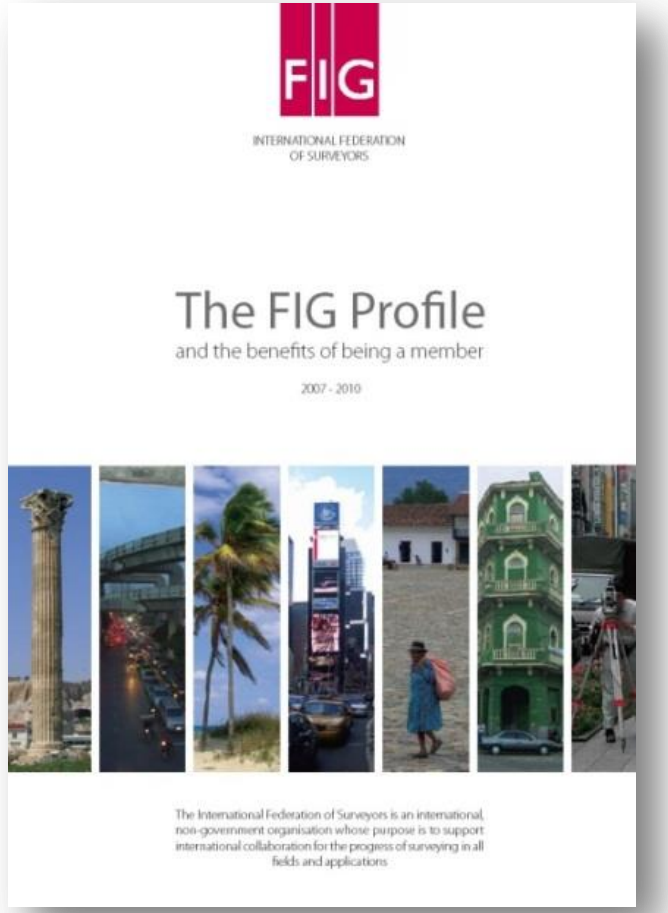
Represents all surveying disciplines;

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;

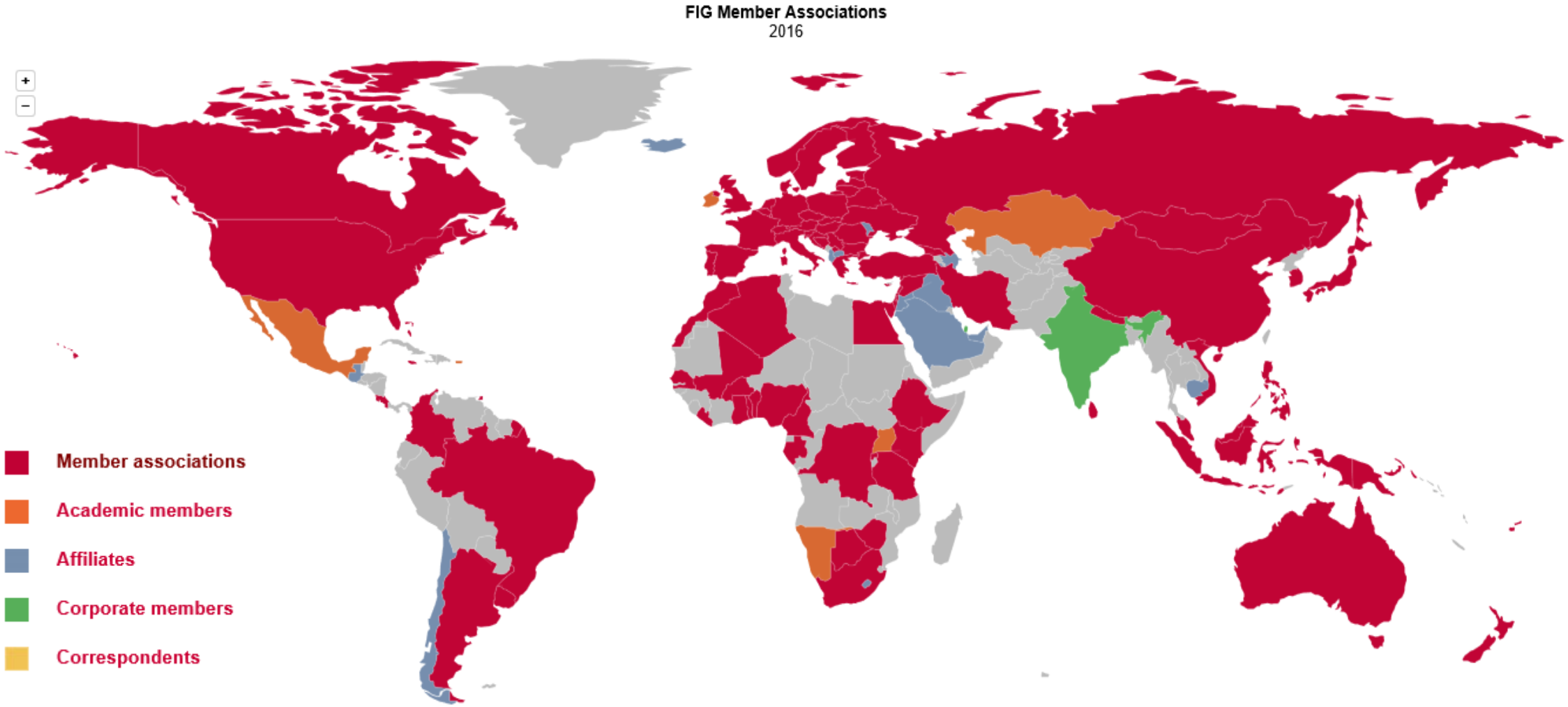
It provides an international forum for discussion and development aiming to promote professional practice and standards

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

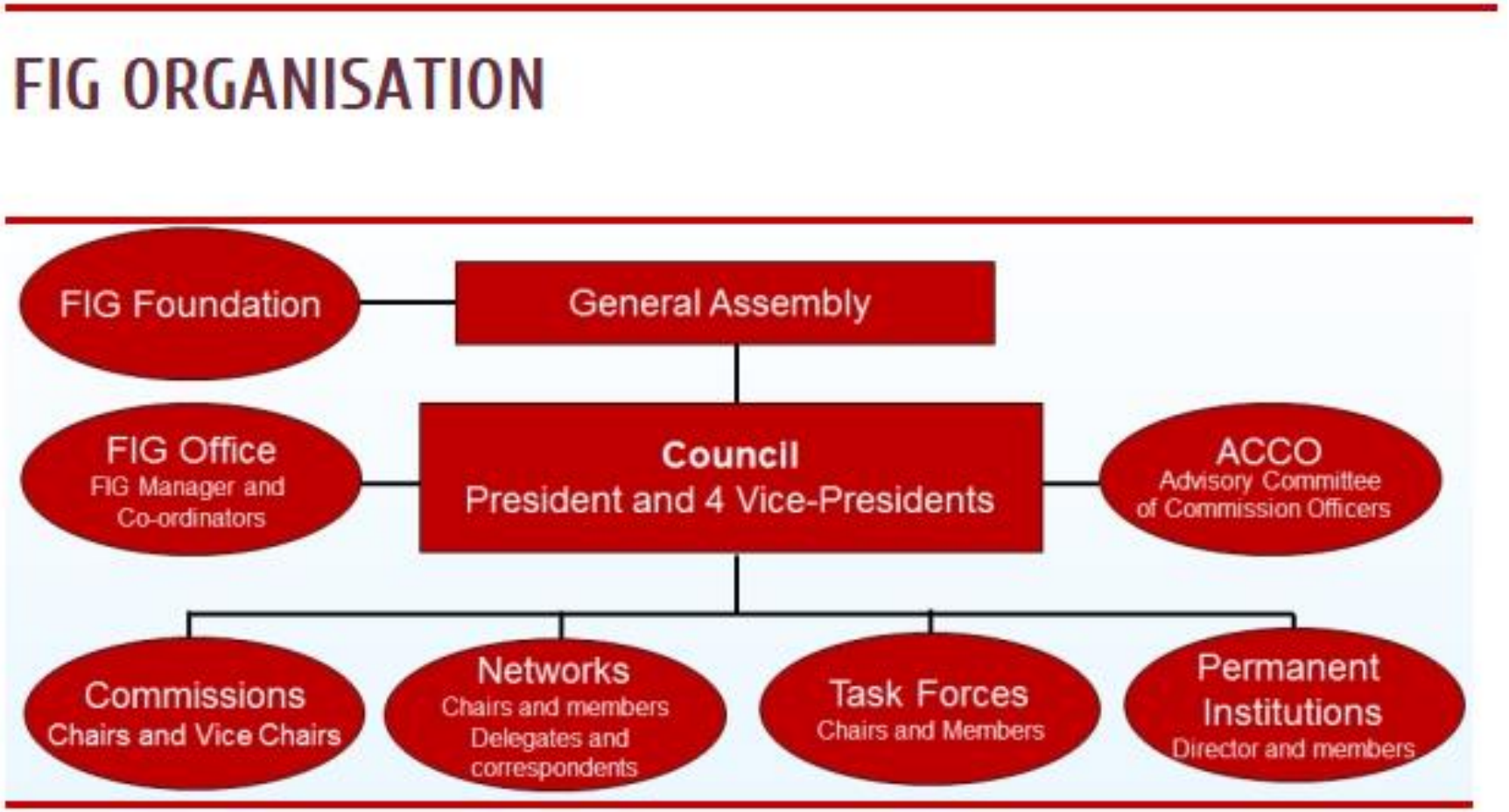


FIG Engine room

FIG Engine room

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 ……

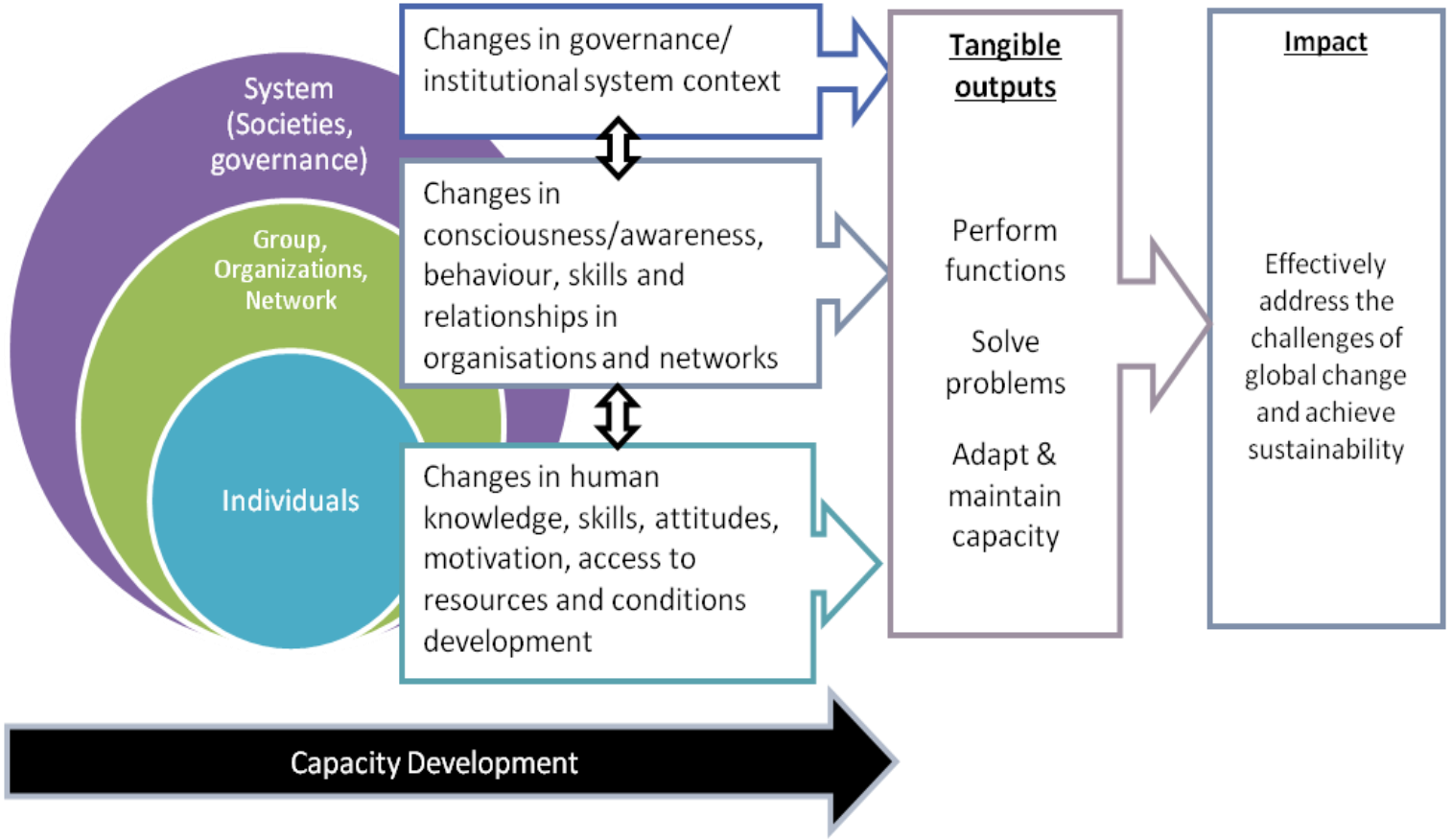
The process of learning to adapt to change….
(or shifting the paradigms of practice)

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

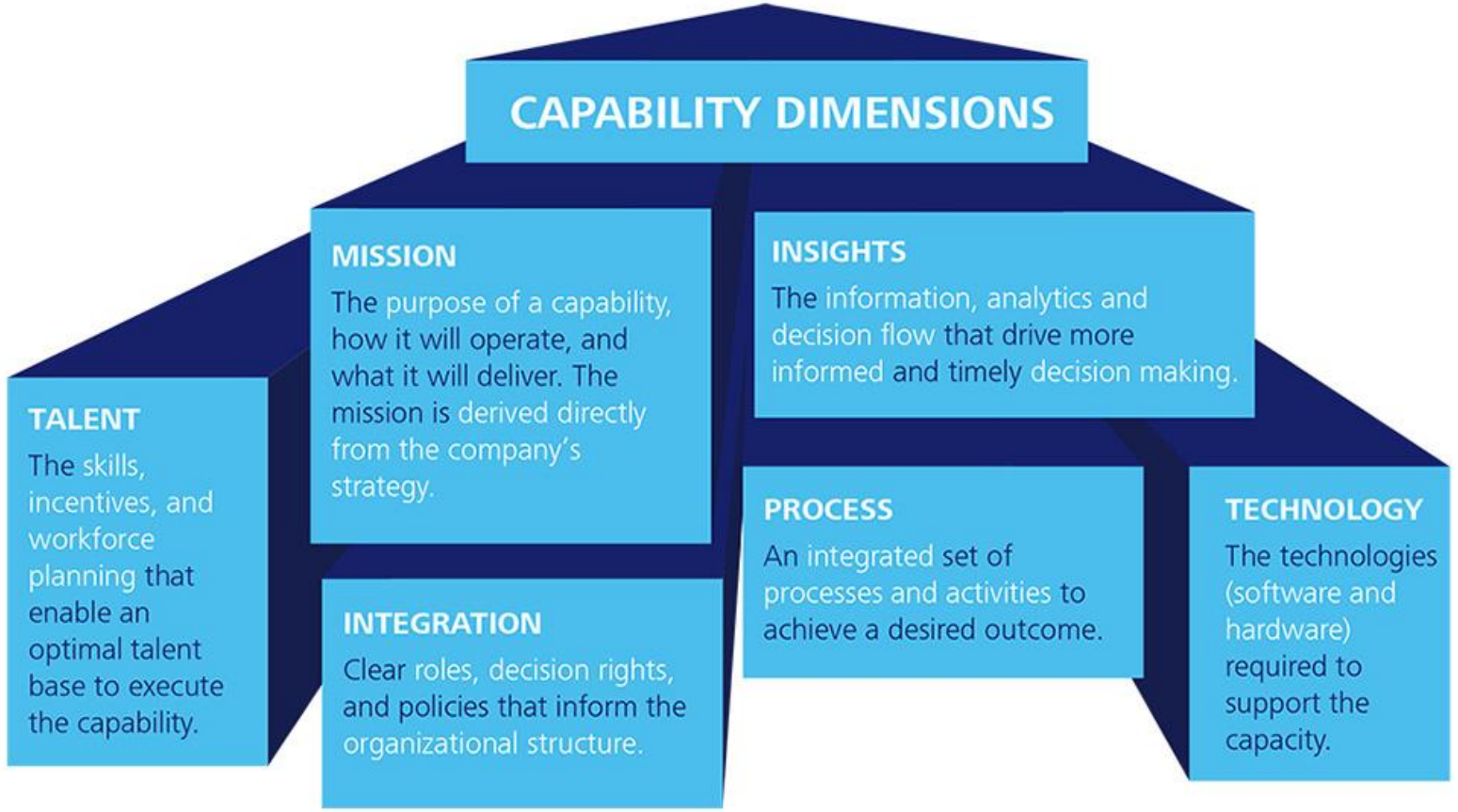
FIG Asia Pacific Capacity Development Network



Source – Asia Pacific Network for Global Change Research

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

FIG Asia Pacific Capacity Development Network



Source – Deloitte – "…… illustrates some of the building blocks that, as an integrated set, serve as the foundation of an organizational capability."

FIG Asia Pacific Capacity Development Network

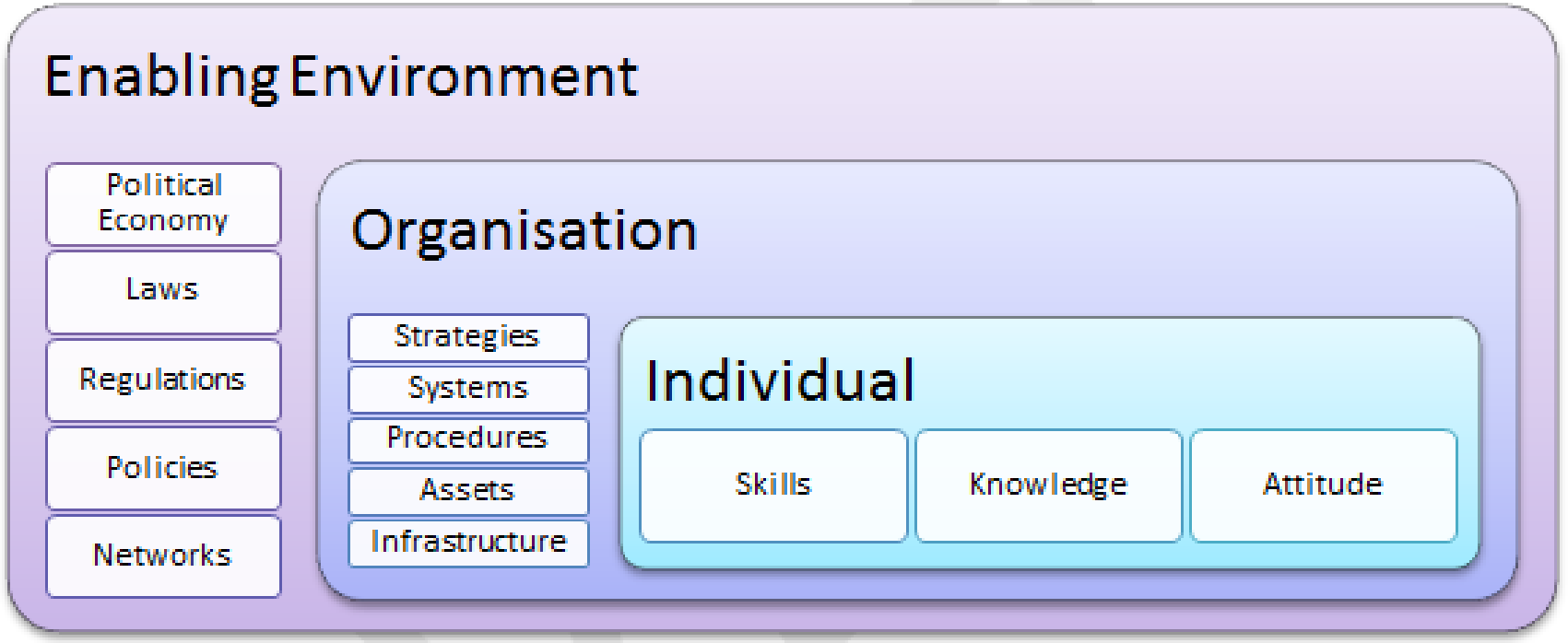


Figure 2 Inter-related levels of geospatial and surveying capacity.

Source – PGSC DRAFT Strategy 2017-27

FIG Asia Pacific Capacity Development Network

Collective FIG / UN GGIM AP "Capacity Development Network" 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"

Modernisation !

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***.

Australian Aid

NEW ZEALAND FOREIGN AFFAIRS & TRADE Aid Programme

The World Bank

ADB Asian Development Bank

USAID FROM THE AMERICAN PEOPLE

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

Network of individuals or representatives from –

- Pacific Geospatial Surveying Council
- Pacific Community - Geoscience Division
- Australian Government agencies - Geoscience Australia, Bureau of Meteorology,
- New Zealand Government agencies - Land Information New Zealand (LINZ),
- Asean Flag
- Geospatial Information Authority of Japan

FIG Asia Pacific Capacity Development Network

Network of individuals or representatives from -

- UN GGIM AP Working Groups, UN ICG
- International Association of Geodesy (IAG) Working Groups
- FIG Commissions, FIG Young Surveyors Network, and FIG Corporate entities
- Professional Surveying Organisations - Surveying and Spatial Sciences Institute (SSSI), New Zealand Institute of Surveyors (NZIS), Fiji Institute of Surveyors (FIS), Japan Federation of Surveyors (JFS)

FIG Asia Pacific Capacity Development Network

Role of the FIG AP CDN of professionals -

- An independent advocacy role to the Asia Pacific geospatial and surveying community
- Provision of technical, administrative and professional support and information
- Organise, facilitate and actively participative in -
  - Discussion forums
  - Meetings
  - Seminars
  - Workshops
  - Technical Sessions
- Encourage co-operation and collaboration

FIG Asia Pacific Capacity Development Network

FIG Working Week 2016

CHRISTCHURCH, NEW ZEALAND
2–6 May 2016

Recovery from disaster

Role of Surveyors – in disaster management. "Build back better" and developing resilience

Datum Unification and Kinematics Technical Seminar
FIG WW - 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

http://www.fig.net/fig2016/commission5.htm

SIDS Workshop - Responding to Climate Change and Security of Tenure : The Role of Land Professionals FIG WW - Christchurch May 2016




Vulnerabilities for SIDS; Challenges faced by SIDS in the land sector; Climate change, vulnerability and the risk of natural disasters; Urbanisation; and Challenges for improved land governance.

"FIG Christchurch Declaration on Responding to Climate Change and Tenure Insecurity in Small Island Developing States - The Role of Land Professionals'

https://www.fig.net/resources/proceedings/fig_proceedings/fig2016/ppt/sids/christchurch_declaration_sids.pdf

Geospatial and GNSS CORS Infrastructure and Systems Forum UN GGIM AP, Kuala Lumpur Oct 2016

Status of Regional Geospatial and GNSS CORS Infrastructure and Systems ; Why Geospatial / Geodetic Infrastructure ; Link to SGDs; Reference Frames and GNSS CORS Theory ; Modernisation of Geospatial / Geodetic Infrastructure ; Role of Organisations and Sectors

FIG AP CDN and UN-GGIM-AP WG1 – "The Geodetic Reference Frame Resolution"

http://www.un-ggim-ap.org/

Various Technical Forums, Seminars, Meetings – Pacific Island Countries and Territories 2013-2016

Independent advocacy and advisory role to the Asia Pacific geospatial and surveying community, in particular the Pacific Geospatial and Surveying Council (PGSC)

Pacific Height Datum Workshop – Saturday 26 Nov 2016

An interactive workshop on height datums and practical height survey issues or problems.

- Why an accurate height datum is important - Dr John Dawson (UN GGIM AP WG1)
- Heighting Fundamentals and Ellipsoidal Height System – Mr. Nicholas Brown (GA)
- Bathymetry – Mr. Jens Kruger (PC Geoscience)
- The Geoid and Geoid Models - Mr. Matt Amos (LINZ)
- Summary, Actions and Discussion.

FIG AP CDN and UN GGIM AP WG 1 - Activities 2017

Participation in –

- General Assembly / Technical Sessions
- UN GGIM GGRF Meeting
- Asia Pacific Capacity Development Network Meeting
- UN Resolution on GGRF
- FIG Commission 5 Annual Meeting
- Regional Bodies Forum

FIG AP CDN and UN GGIM AP WG 1 - Activities 2017

- Vertical Reference Frame in Practice - ***Kobe, Japan, 29-30 July 2017*** in conjunction with the IAG-IASPEI Joint Scientific Assembly

- Workshop - ***Kamamoto, Japan*** in conjunction with the UN-GGIM-AP Plenary Meeting, ***October 2017***

- Reference Frames - ***China, September 2017***

- Modernising Datum Workshop Operational GNSS CORS, Pacific Islands ***- February 2019***

FIG Asia Pacific Capacity Development Network

Discussion -

- Capacity Building challenges
- Expanding the network and opportunities
- Exploring more technical involvement from other Commissions on related challenges
- How can activities be done better

FIG Asia Pacific Capacity Development Network

What are the capacity development challenges with respect to – Data, Maps, Geospatial and Geodetic Infrastructure?

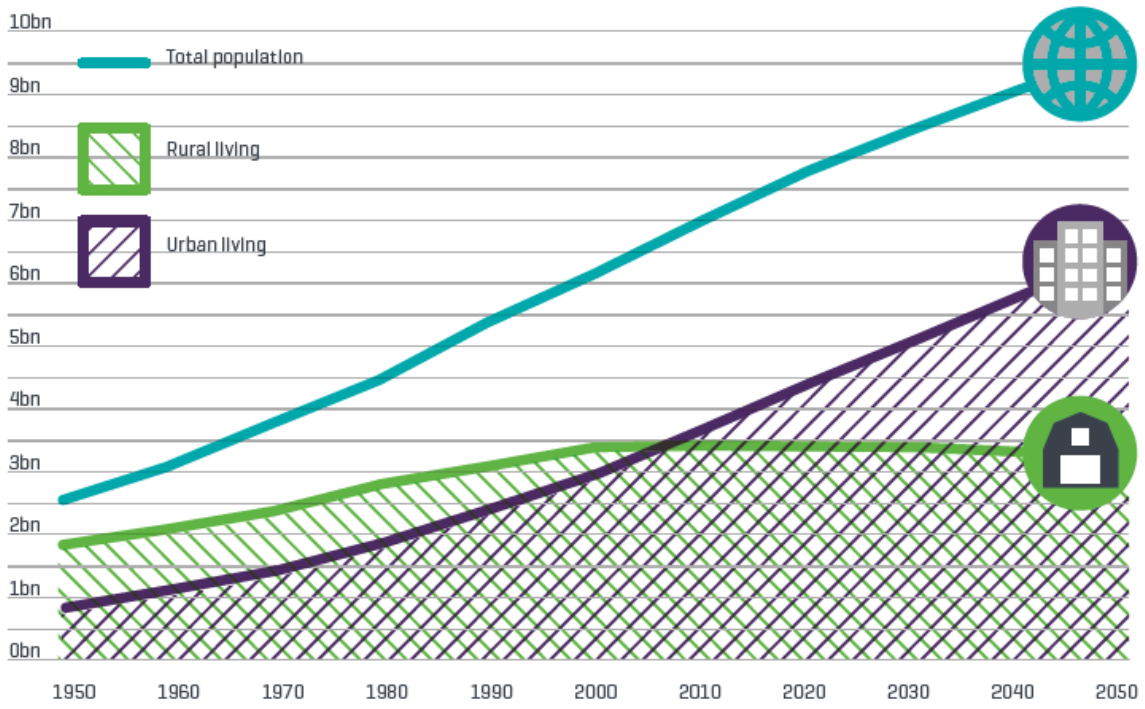
FIG Asia Pacific Capacity Development Network

What are the technical, social, economic changes or trends that are going to impact skills with respect to – Data, Maps, Geospatial and Geodetic Infrastructure?

What are the Trends / Changes?

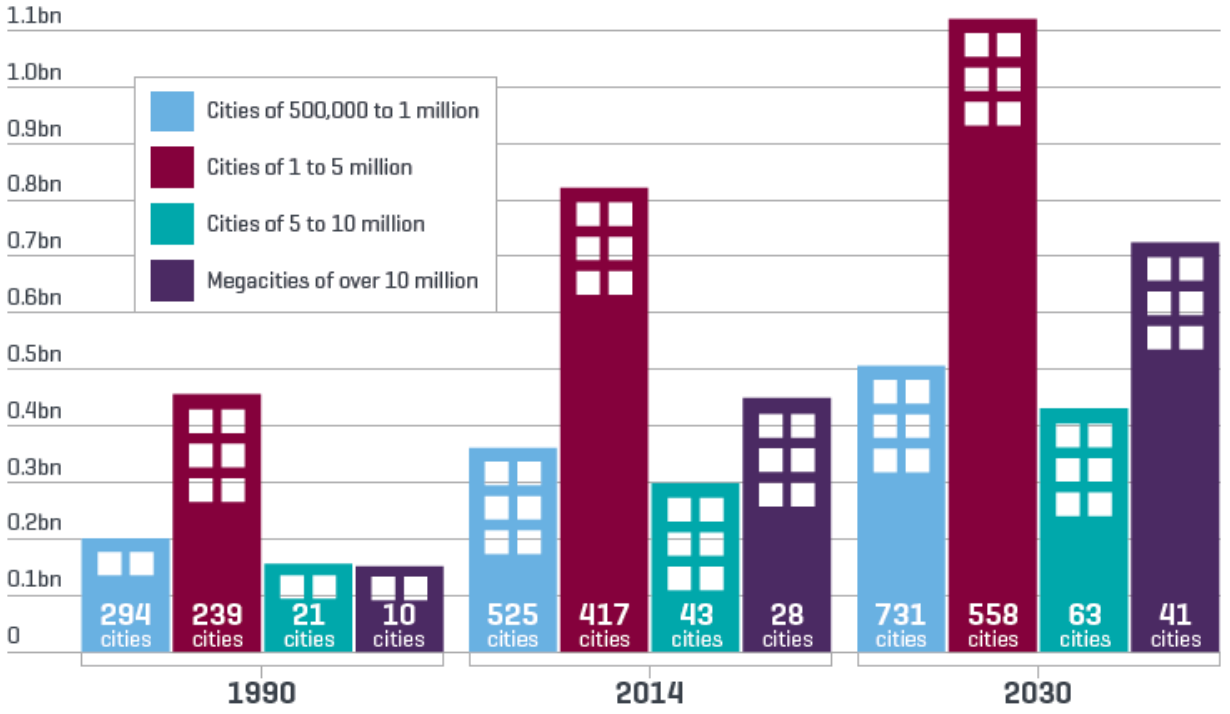
- Mega-cities, smart-cities - ***rapid urbanisation ;*** *"2/3 in cities by 2050"*

Figure 2.1 World population: total, urban and rural



Source: UN DESA

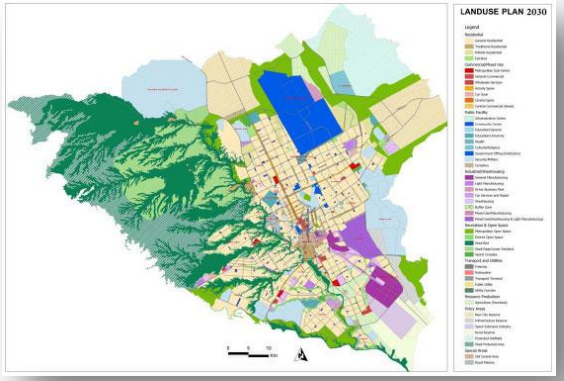
Figure 2.2 City populations 1990, 2014, 2030



Source: UN DESA

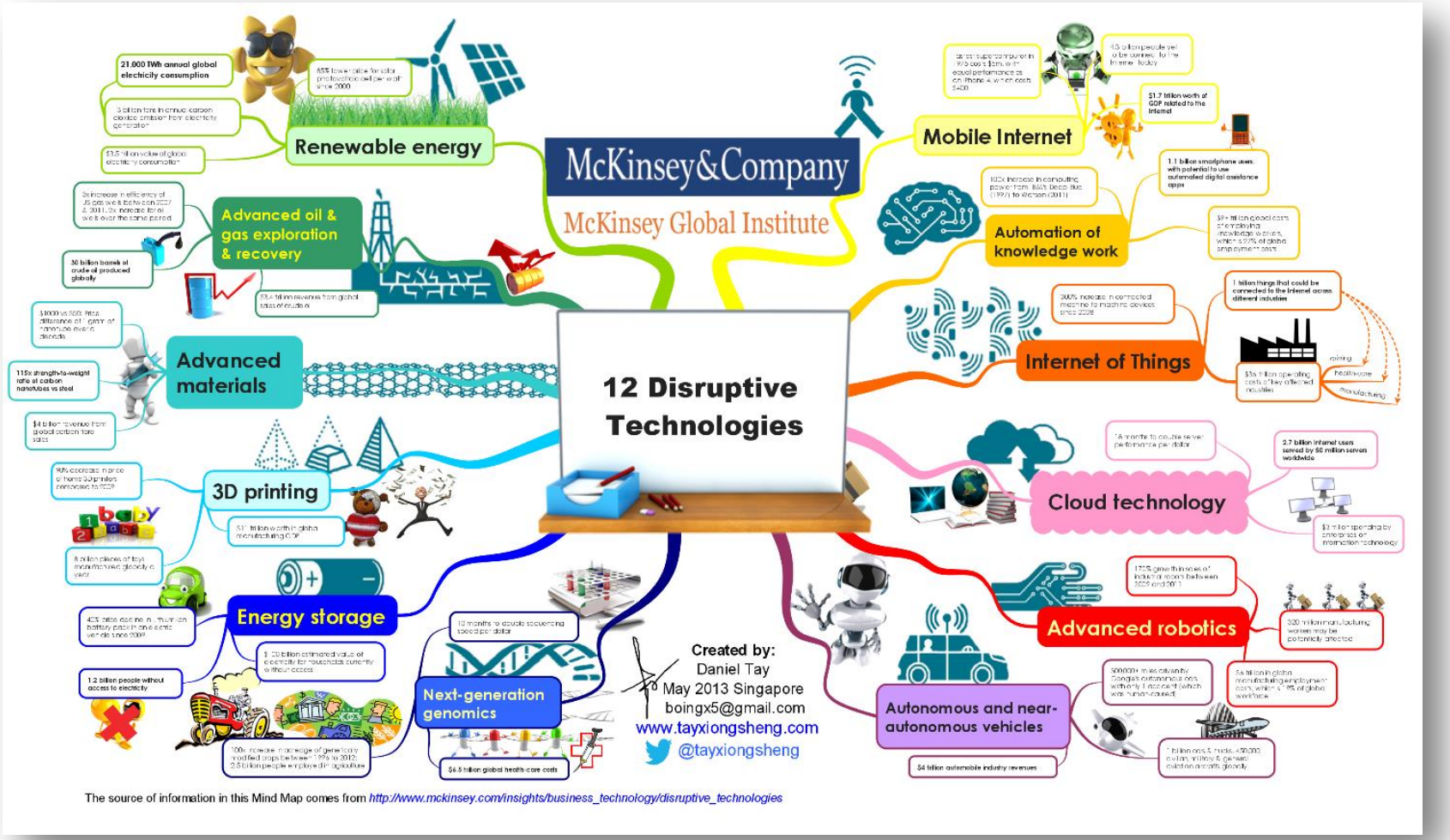
What are the Trends / Changes?

- ***Rapid Urbanisation will impact -***
  - Provision of urban planning
  - Sustainable development
  - Management of utilities and services – power, water, waste, transport
  - Infrastructure and asset administration
  - Affordable and efficient housing
  - Environmental management
  - Food / resource prod. and mgt.



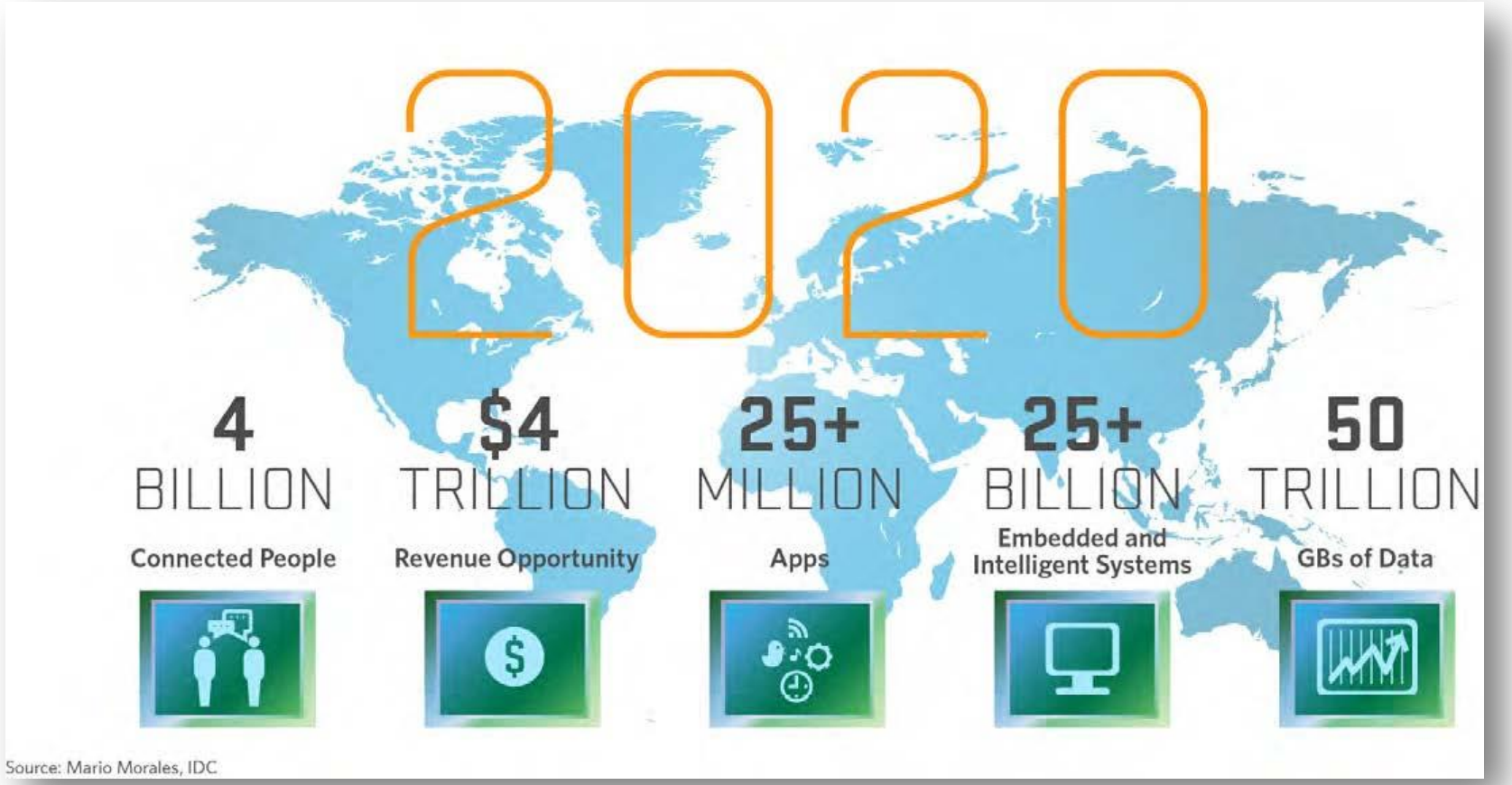
What are the Trends / Changes?

- ***Disruptive technologies***
  (biggest impact 2025)
  - ➢ Mobile internet,
  - ➢ Automation of knowledge work,
  - ➢ IoT,
  - ➢ Cloud,
  - ➢ Robotics,
  - ➢ Autonomous vehicles
  - ➢ 3 D printing



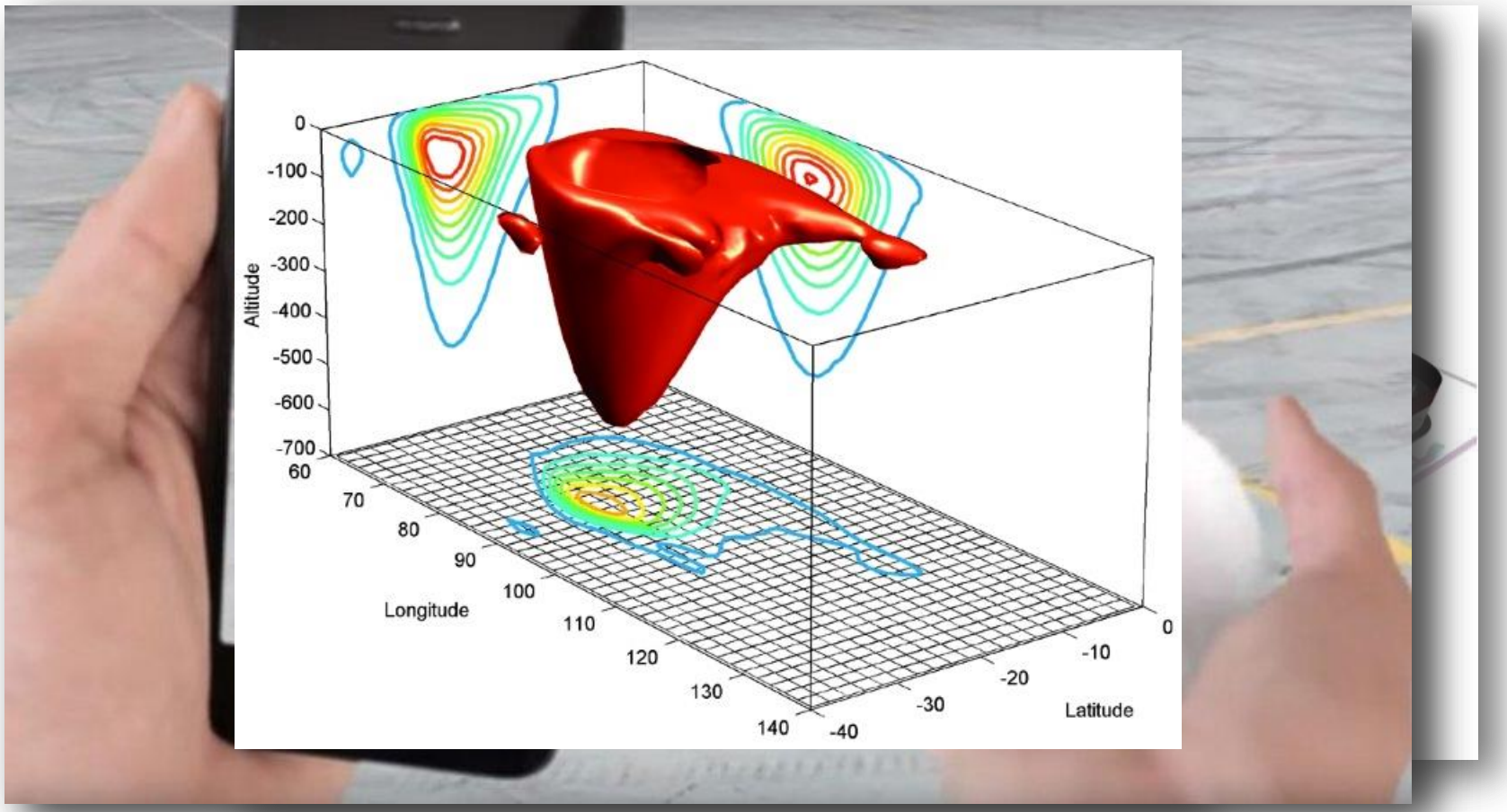
What are the Trends / Changes

- ***Impacts –***
  - ➢ Greater connectivity
  - ➢ Real time streaming and analysis ,
  - ➢ Revenue and business opportunities,
  - ➢ More “apps”
  - ➢ Embedded intelligent systems,
  - ➢ ↑’ed data volumes,
  - ➢ Privacy / legal matters – custodianship, ownership, liability etc



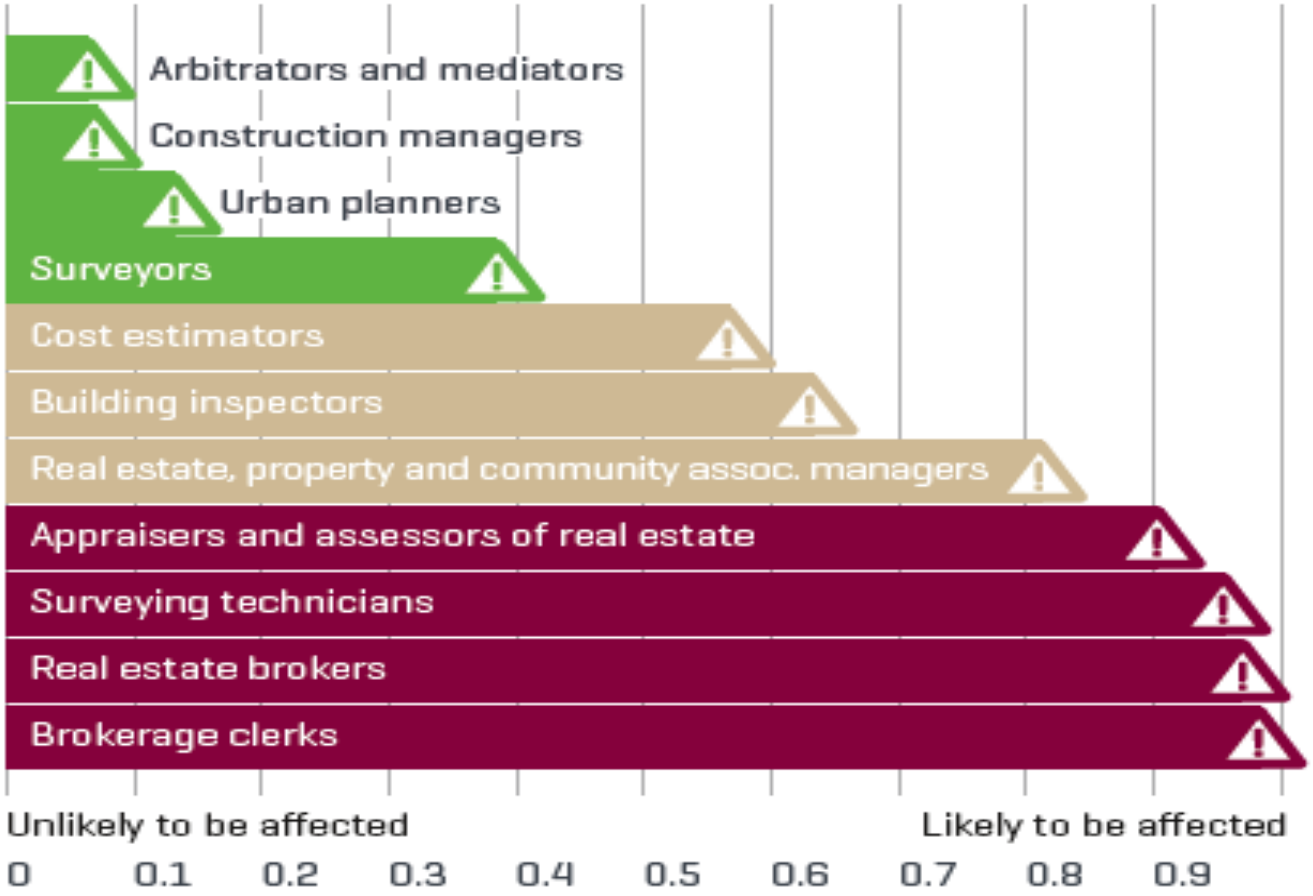
What are the Trends / Changes?

- ***Digital mapping –***
  - BIM and 3-D systems
  - Product /resources / asset inventory and tracking
  - Merging of physical and virtual worlds
  - Computational and visualisation software



What are the Trends / Changes?

Figure 4.2 Probability of professions being affected by technology

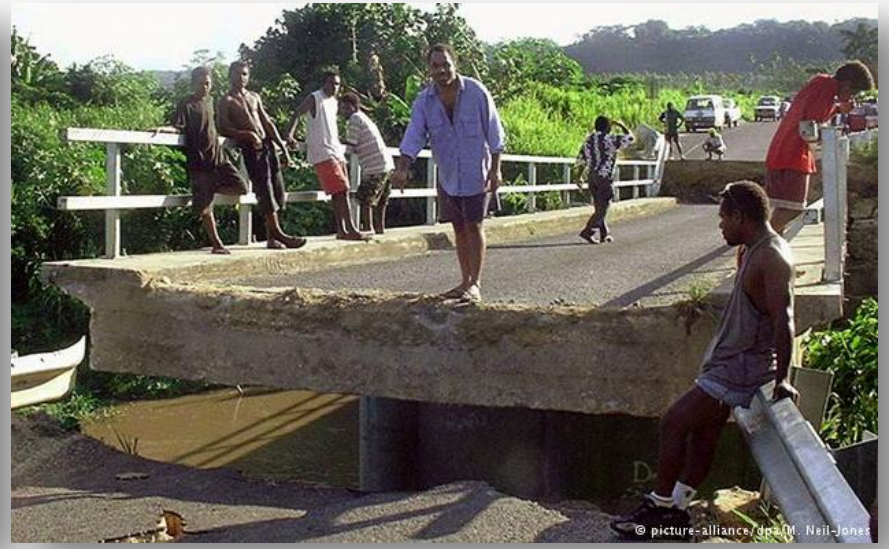


Source: Frey and Osborne 2013

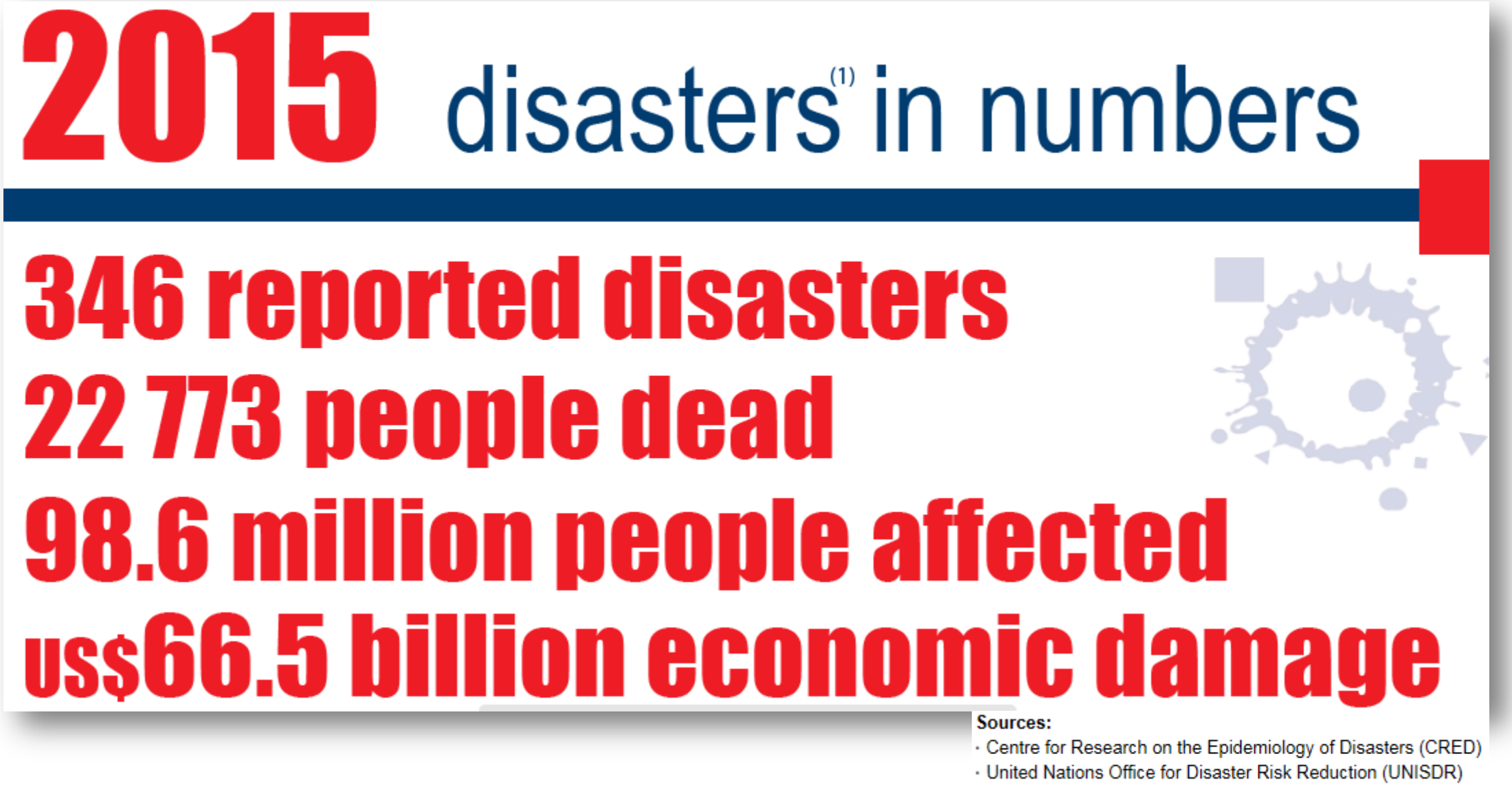
Environmental changes

- ***Climate change, sea level rise, earthquakes, tsunamis, cyclones***

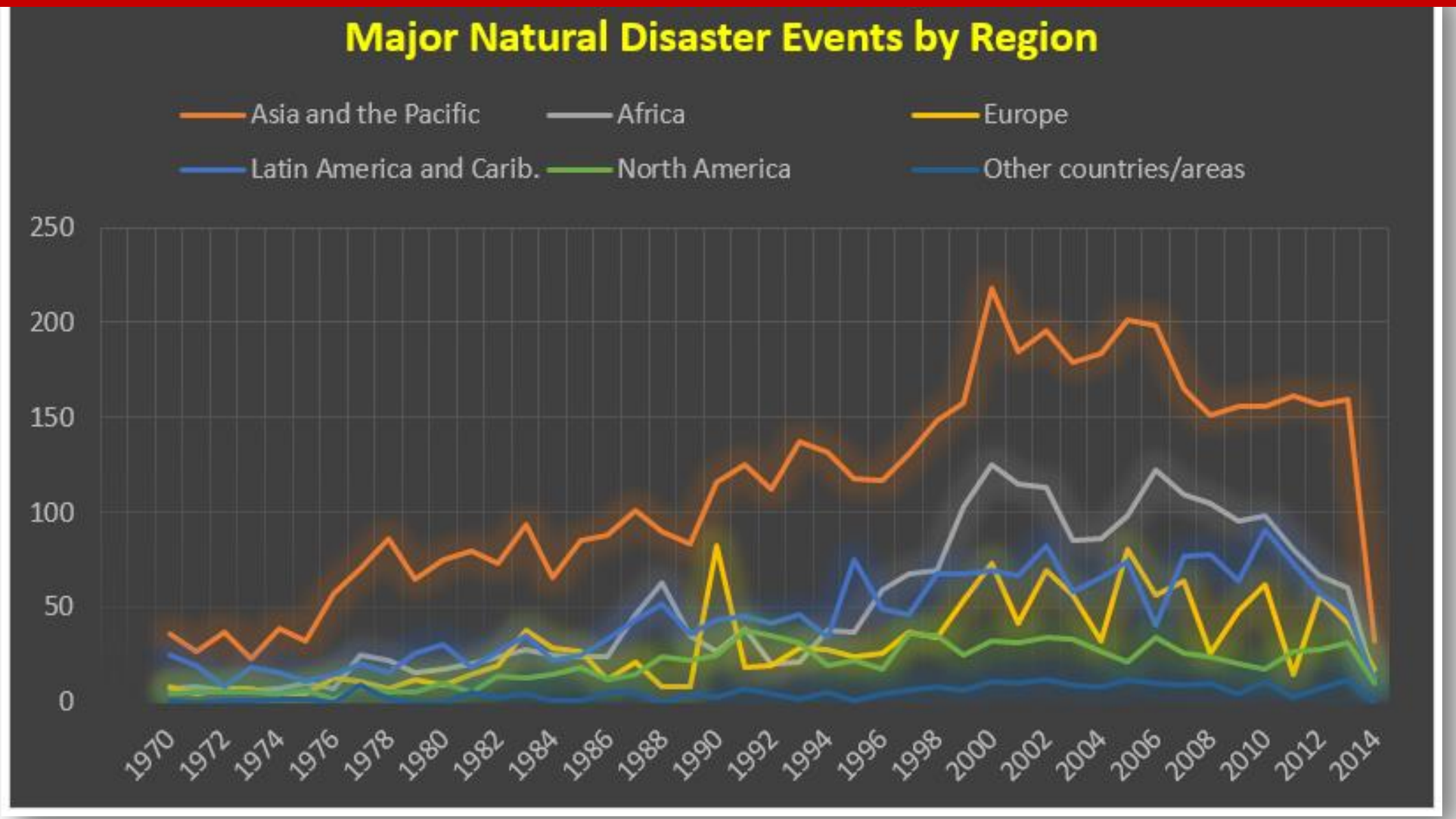
- ***Impacts –*** capability to manage disaster relief, re-construction and build resilience



Environmental changes

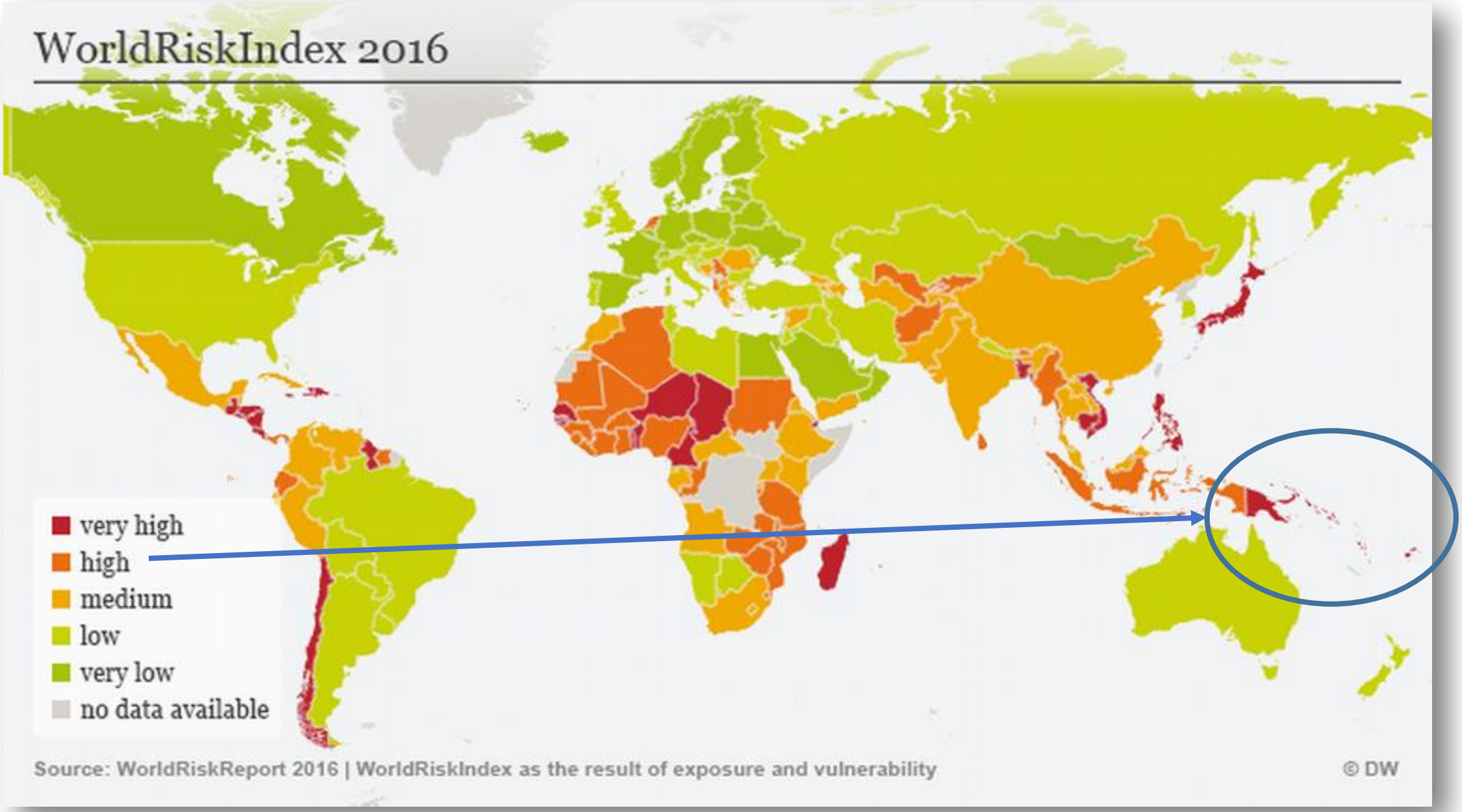


Environmental changes

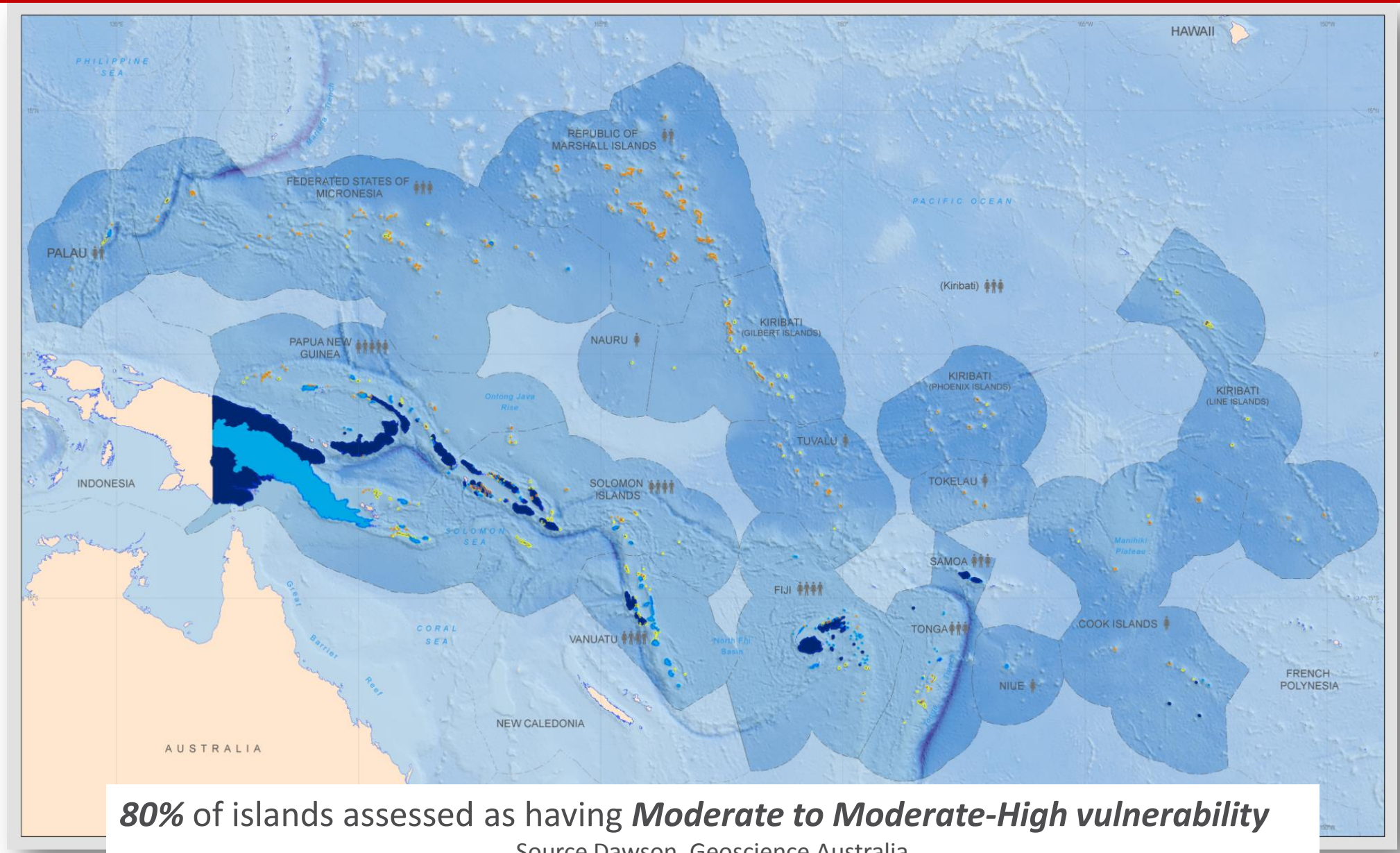


Statistics on major natural disasters compiled by the United Nations Economic and Social Commission for Asia and the Pacific

Environmental changes



Environmental changes



80% of islands assessed as having ***Moderate to Moderate-High vulnerability***

Source Dawson, Geoscience Australia

What are the Capabilities?

The ability (skill sets) to –

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

- ***Collect, calculate, analyse, evaluate, record, and visualise*** geospatial information and data – 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 ('softer' skill sets) to –

- ***Lead, negotiate, influence, collaborate, and understand commercial influences***

- ***Advocate, promote and communicate relevance*** – influence leaders, decision makers, politicians; attract a diverse group of professionals

- ***Develop / administer business plans***; outcome / output focused; have qualitative and quantitative monitoring / evaluation framework – justifying why we do things?

- ***Sustain "development" –*** implement a plan within the region to be self reliant and self determinate

What are the Capabilities?

How skills and work in surveying are changing….

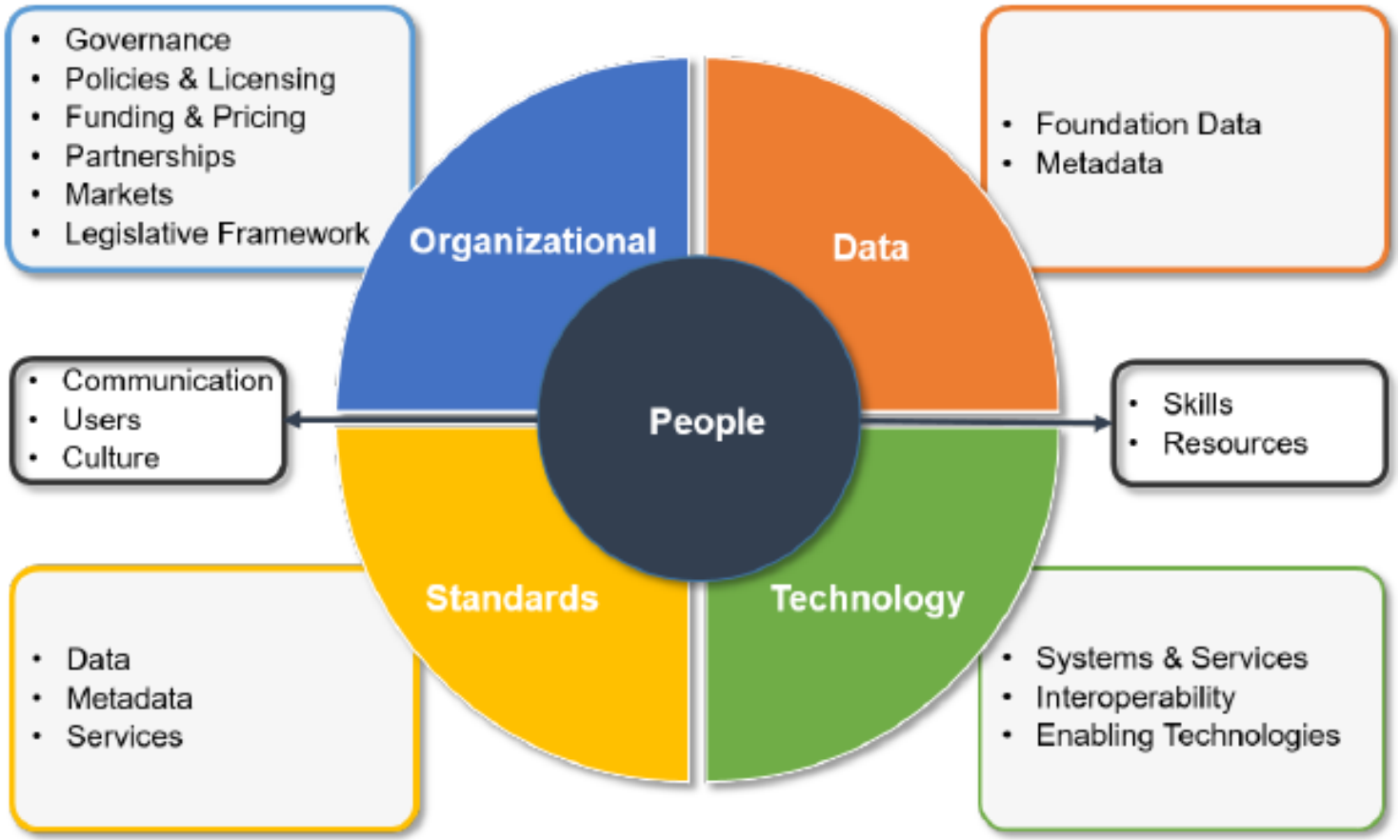
What's not desirable	What's needed today
Silo working	Outcomes focus
Early specialisation	Communication
Conflicts of interest	Integrated programme and cost management
	Skills for handling greater complexity
	Interdisciplinary working
	Change management
	Advisory services
	Understanding new technology

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

Source – rics.org/futures

Capacity Development - Options for Geospatial / Geodetic Infrastructure Modernisation

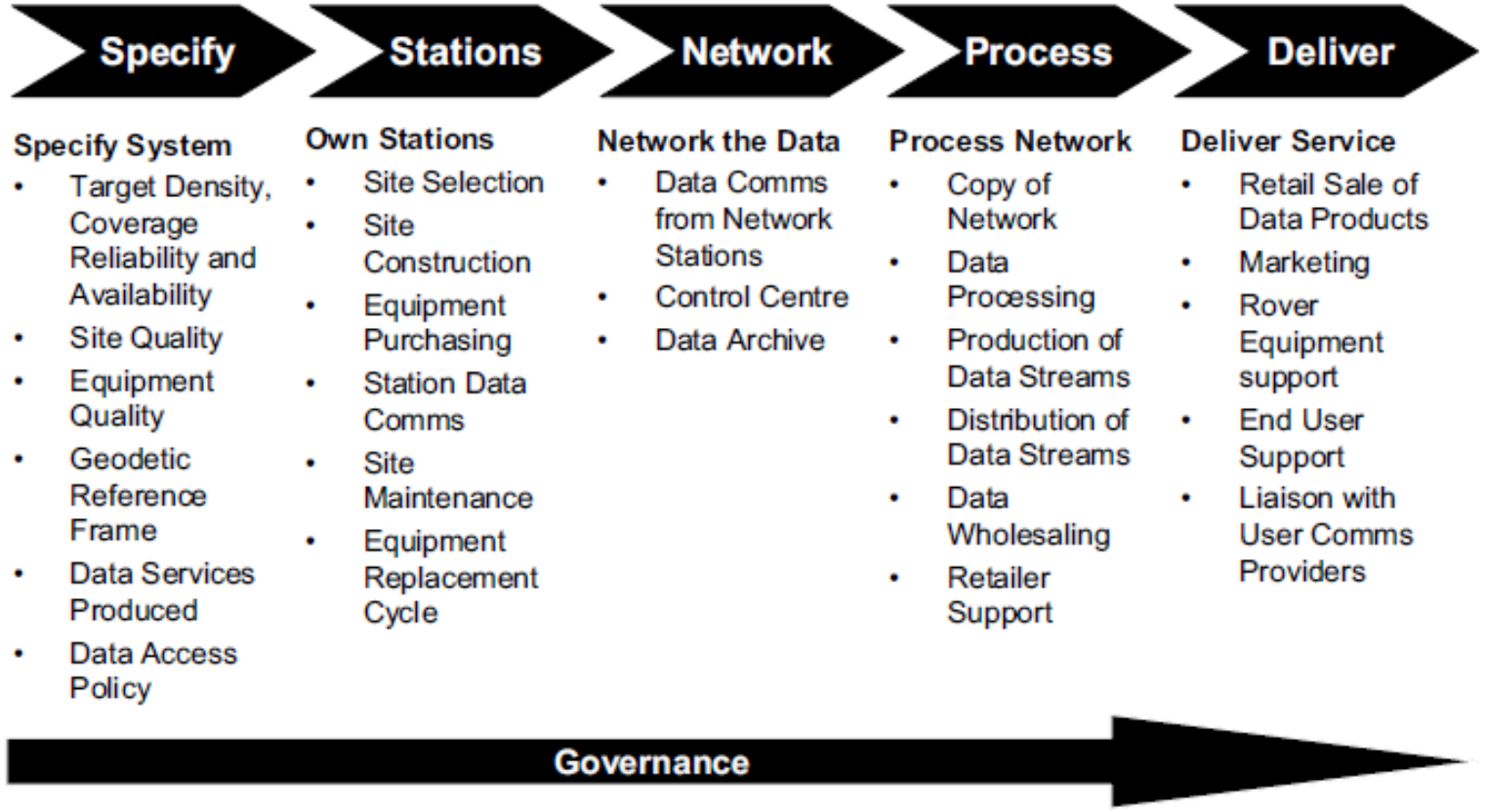
1. ***Assess the status and condition*** *of geospatial / geodetic infrastructure and systems - SWOT "geospatial data model / framework"*



Framework Source

Capacity Development - Options for Geospatial / Geodetic Infrastructure Modernisation

2. ***Understand / define the role / responsibilities of an agency*** *in the various elements of geospatial and geodetic infrastructure management*



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

Capacity Development - Options for Geospatial / Geodetic Infrastructure Modernisation

3. ***Develop 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 Development - Options for Geospatial / Geodetic Infrastructure Modernisation

4. ***Ensure 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

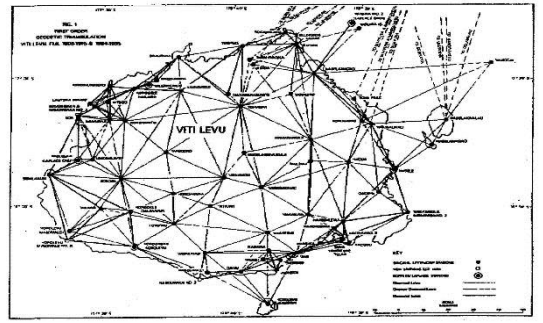
Capacity Development - Options for Geospatial / Geodetic Infrastructure Modernisation

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

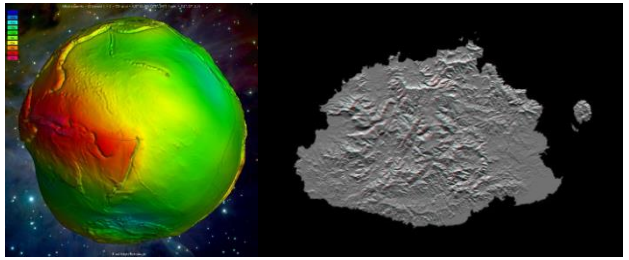
- ***IGS compliant GNSS CORS*** *that are the spine of a GRS ; contribute to* ***ITRF / APREF****.*

International Terrestrial Reference Frame 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*** *(land and water, intertidal zone)*

Capacity Development - Options for Geospatial / Geodetic Infrastructure Modernisation

- *Utilise and benefit from the **multi GNSS environment** and space based measurement technology*

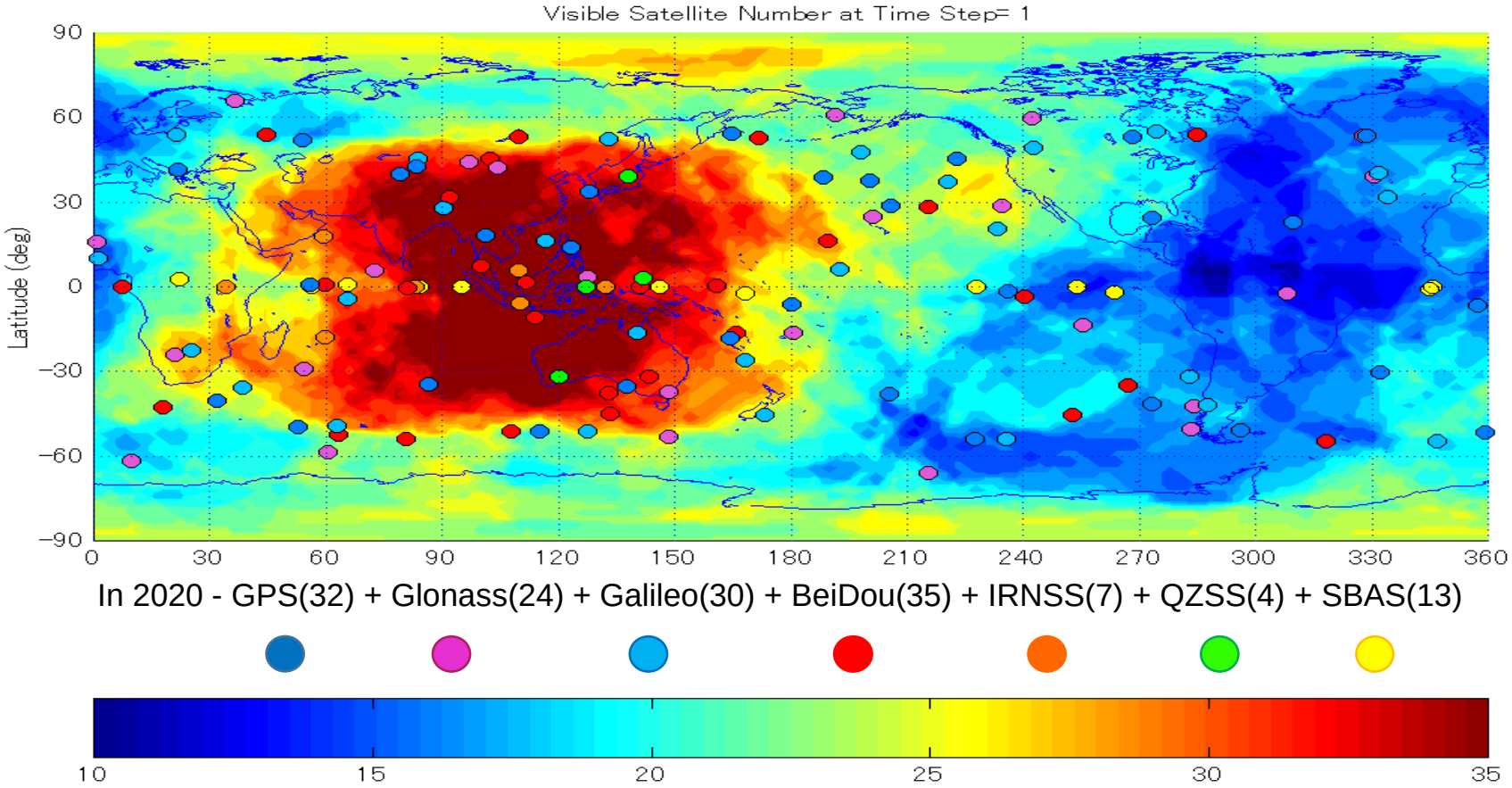


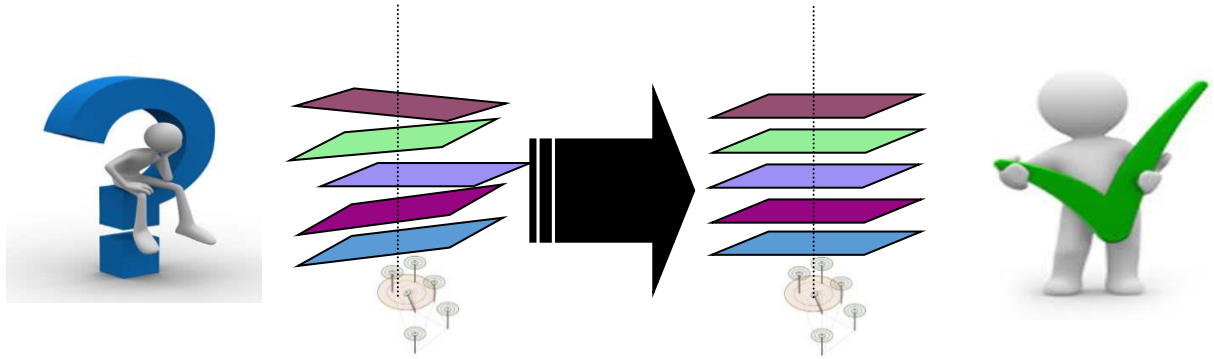
Figure courtesy Prof Chris Rizos, UNSW

Capacity Development - Options for Geospatial / Geodetic Infrastructure Modernisation

- *Adhere to **international standards, guidelines and practices** (includes metadata)*

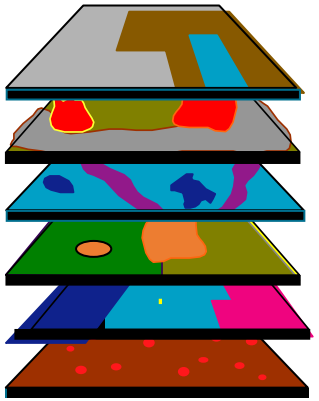
- *Facilitate **interoperability and unification amongst geospatial information datasets and systems** at all levels – local, national, regional, and global via **Location Intelligence***

High quality, timely and reliable data



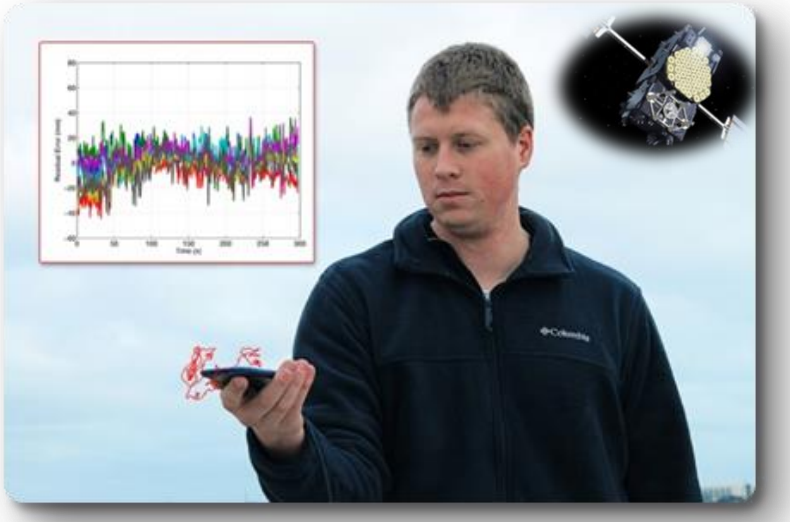
Geospatial Reference System

Geodetic
Elevation
Water/Ocean
Land use/cover
Transport
Cadastre
Population
Infrastructure
Settlements
Admin. Bdys.
Imagery
Geology/soils
Observations etc.

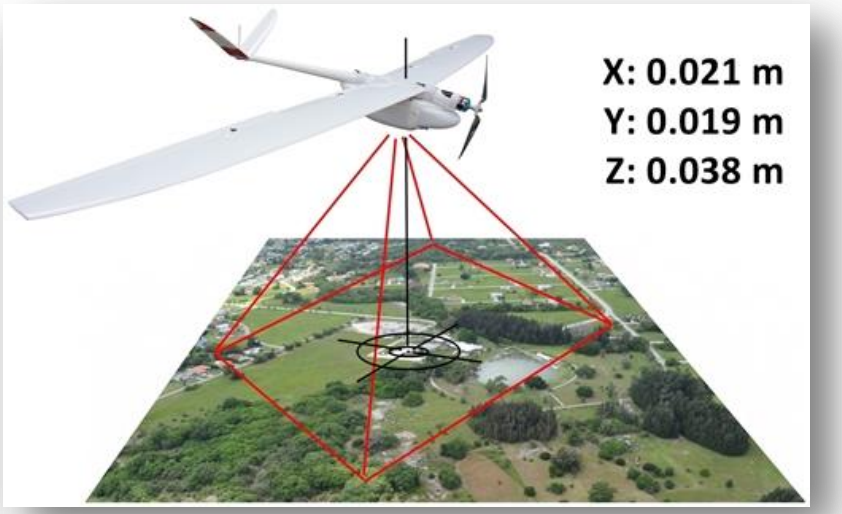


Capacity Development - Options for Geospatial / Geodetic Infrastructure Modernisation

- *Align **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*

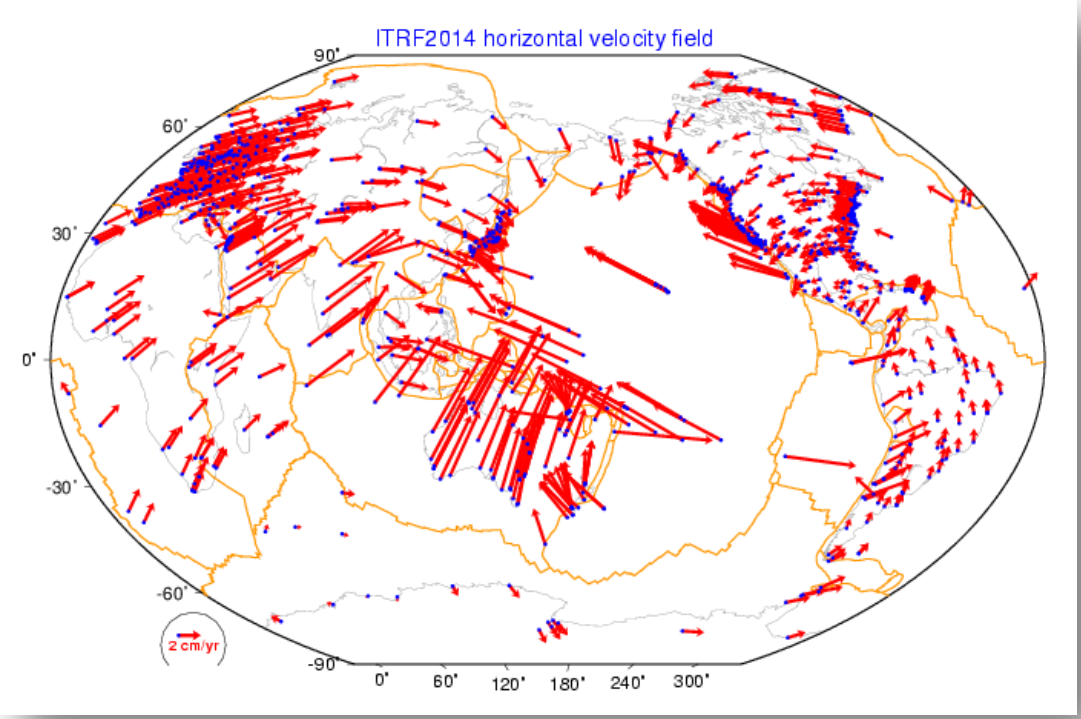


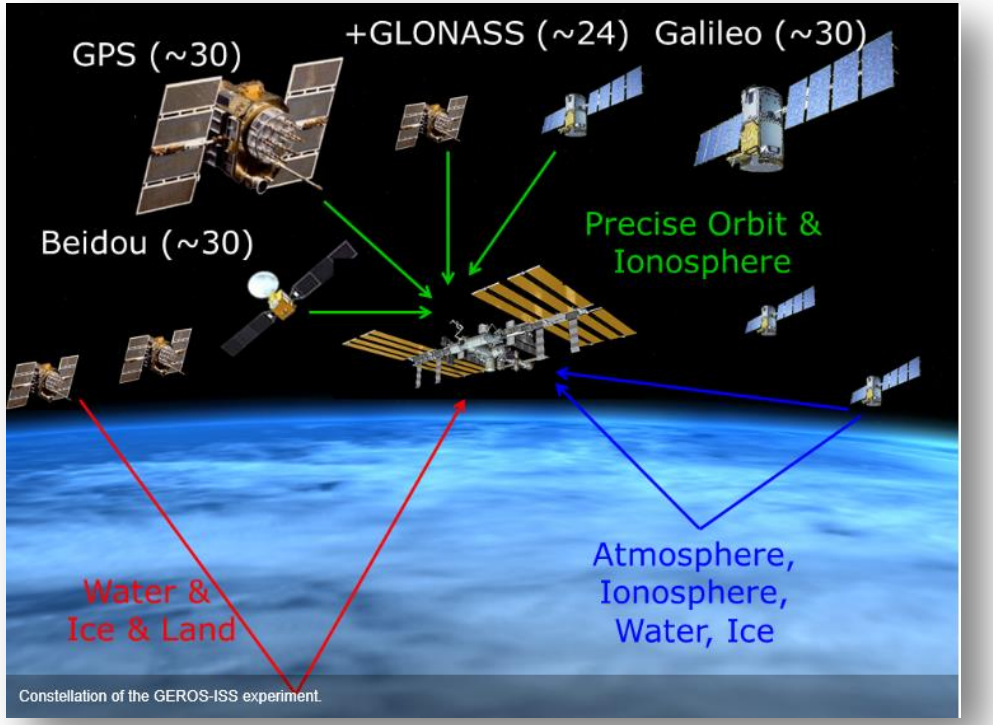
- ***Utilise or benefit from quality imagery / satellite data, the development of new mapping technologies and products***



Capacity Development - 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*





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

"We now have the will and opportunity to make an impact.."

Greg Scott UN GGIM AP Plenary Meeting Malaysia 2016

https://www.fig.net/