

***Perspectives and Status
Asia Pacific
Capacity Development Network***

Rob Sarib – FIG

John Dawson – UN GGIM AP WG1 Reference Frames

UNITED NATIONS
WORLD GEOSPATIAL
INFORMATION CONGRESS



Deqing, Zhejiang Province, China
19-21 November 2018

The International Federation of Surveyors (FIG)

Established in Paris 1878;

Federation of national associations;

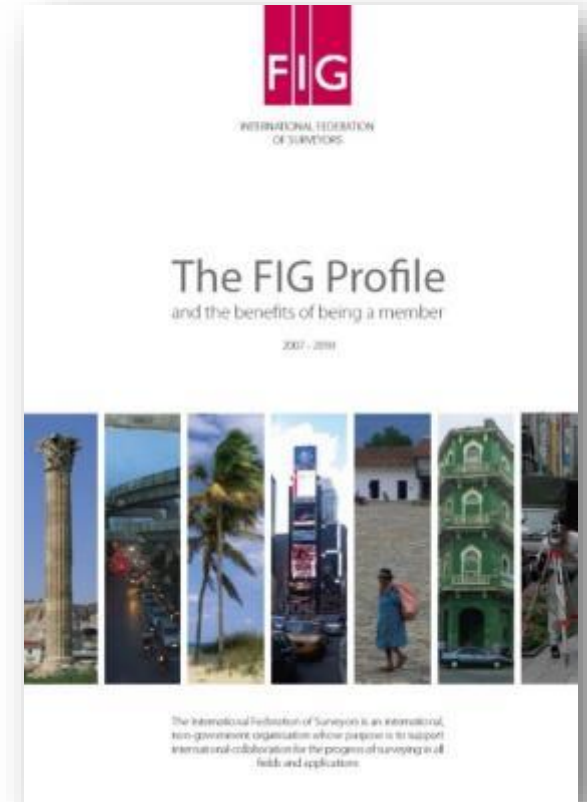
Represents all surveying disciplines;

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



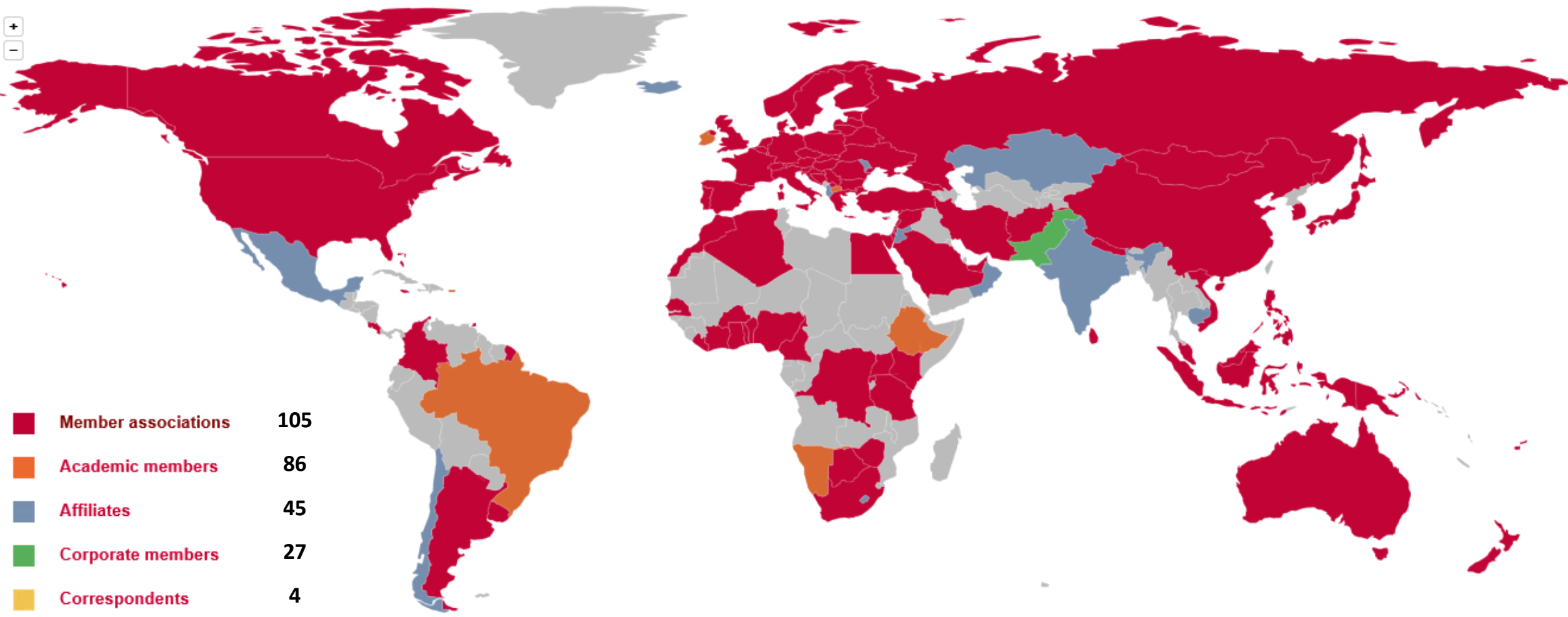
<https://www.fig.net/>



UN-GGIM
UNITED NATIONS INITIATIVE ON
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT

The International Federation of Surveyors (FIG)

FIG Member Associations
2018



Through different membership categories over 115 countries are represented in FIG and more than 250 000's professional surveyors

The International Federation of Surveyors (FIG)

FIG ORGANISATION

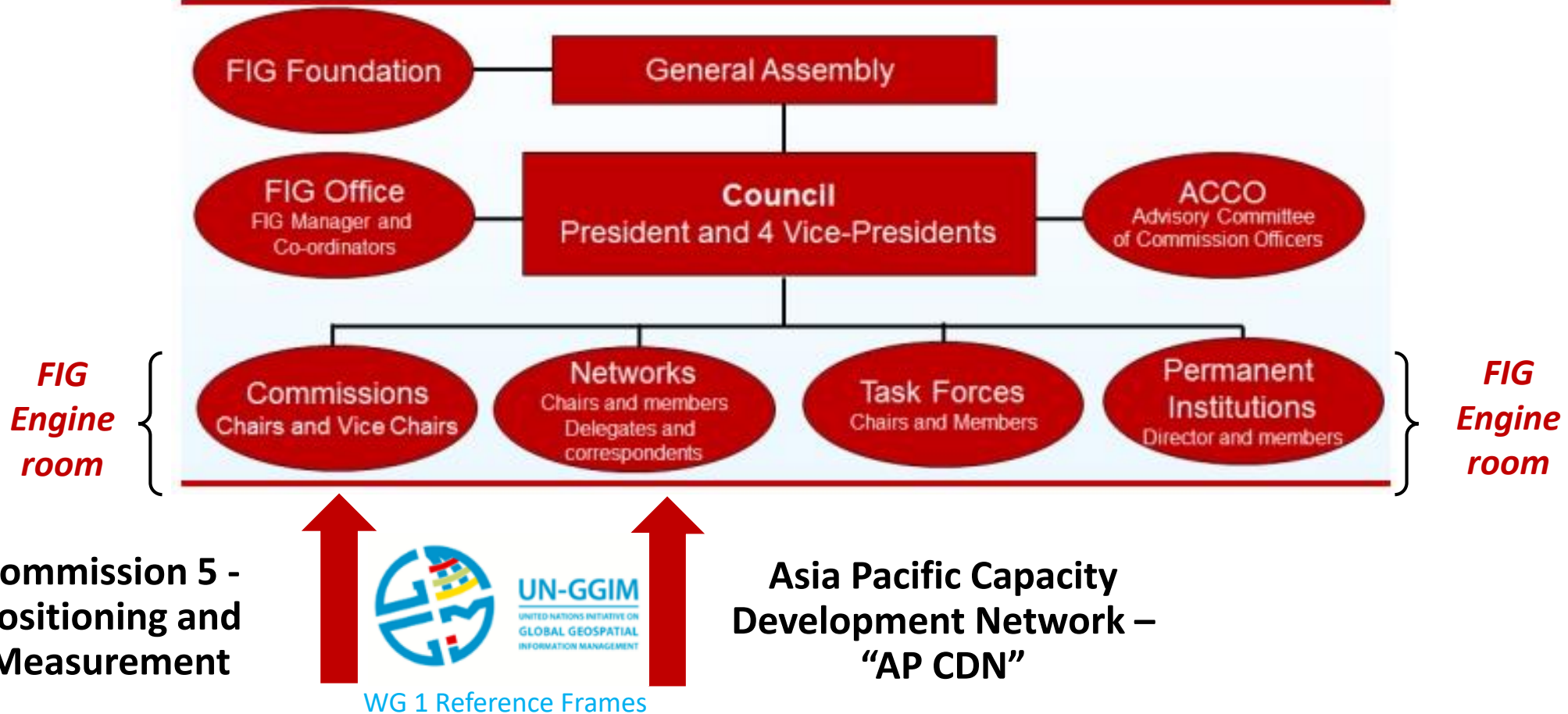


FIG AP CDN Network



Different organisations who represent a diverse group of members BUT we work

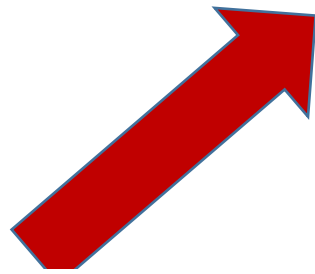
collaboratively and co-operatively towards a **common** mission and vision.

Our roles, our “members”, and our objectives **are strategically aligned** to ensure our finite resources are used wisely.

Academia?

FIG AP CDN Collective Mission / Outcome

“Responsible governance frameworks and integrated administrative systems of tenure (rights and interests) for land and marine, are underpinned by sustainable fit for purpose geodetic / geospatial infrastructure and information management”



Modernisation !



FIG AP CDN Outputs / Indicators

- Geospatial and Surveying professionals -
 - have ***the capability to address the regional social, economic, environmental and technological challenges***
 - are self-reliant and have a culture and environment of learning, innovation, a blend of mature and young professionals, and a gender equity base
- Activities have progressed through ***alliances and relationships*** with relevant like-minded bodies and / or development partners.
- Challenges are resolved by a ***regional, unified, coordinated and collaborative approach***

Role & Function of the FIG AP CDN

- 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***
- ***Connecting and engaging*** professional networks



Activities of the FIG AP CDN

- Datum Unification and Kinematics Technical Seminar (FIG Comm 5) and Pacific Geospatial Surveying Council (PGSC) Meeting – FIG WW Christchurch, May 2016
- Geospatial / GNSS CORS Infrastructure and Systems Forum, UN GGIM AP Plenary – Kuala Lumpur, Oct 2016
- Pacific Heights Datum Workshop, Suva, Nov 2016
- Pacific GIS / RS Users Conference and PGSC Meeting – Suva, Dec 2016
- AP CDN meeting – FIG WW Helsinki, May/June 2017

Activities of the FIG AP CDN

- Fundamental geodetic reference frame theory earth dynamics and deformation - Kobe July 2017
- Sharing / exchanging geodetic data – Kumamoto Oct 2017
- Land Governance Seminar - Manilla Dec 2017
- Workshop on Legal & Policy Framework for Geospatial Information - Nuku'alofa, Mar 2018
- Reference Frame Workshops and AP CDN meeting – FIG Congress Istanbul, May 2018
- Operational Aspects of GNSS CORS – Suva, Sept 2018

***Challenges and trends affecting Geospatial and
Geodetic Infrastructure; and Surveyors***

The global geospatial information trends identified

- Impact of rapid urbanisation, and smart cities
- Influence of disruptive technologies and digitisation – “automation, autonomous, applications - AAA”, mobile internet devices
- Importance of disaster / emergency management and building resilience – “before, during and after”
- Real time measurement earth dynamics
- Modernisation of geospatial reference systems / datums / GNSS CORS
- Permeation of ubiquitous positioning into the community – “the where is concept”
- Demographic of workforce and work preference is more diverse



The challenges being experience by geospatial / survey mapping agencies, such as

- Continually justifying role, existence, value and importance (decision makers – executive mgt / financial / political)
- Modernising legislation, developing relevant and agile policies and guidelines
- Updating and complying with industry standards and practices
- Ensuring foundation (fundamental) data has integrity - accurate, current, facilitates integration and interoperability AND in a modern information system (open source?)
- Spatial information / datasets “open”, “shared” or with limited restrictions
- Administering and visualising information in 3 dimensions + temporal component
- Leveraging the power of the internet, mobile phones, web-based data portals, crowd sourcing, web services

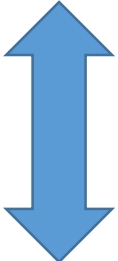
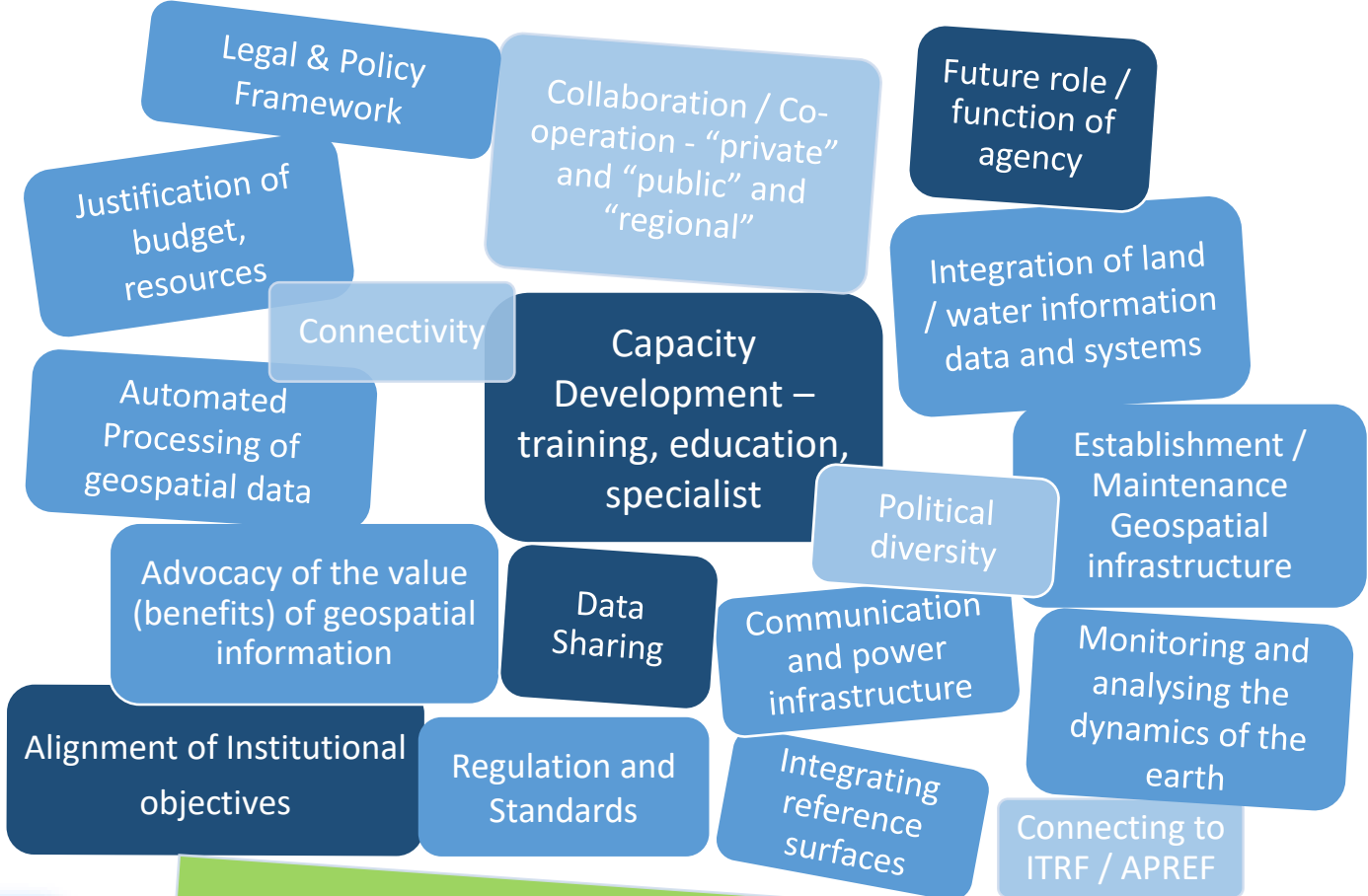


The challenges being experience by geospatial / survey mapping agencies, such as

- Provision of data in the “cloud”, via distributed web services, data retrieval through catalogues and visualisation via Web Map Services... in near real time...
- Modelling and monitoring of the dynamics of the earth and environment in real time
- Implementation of dynamic reference frames and datums
- Building and maintaining geospatial / geodetic infrastructure and systems
- Modernising land administration systems to ensure indefeasibility of registration of rights, restrictions and responsibilities
- Responsible governance – accountability to the community
- Securing resources
- Balancing priorities – legal, technical, organisational, data, and people



The Never Ending Challenges

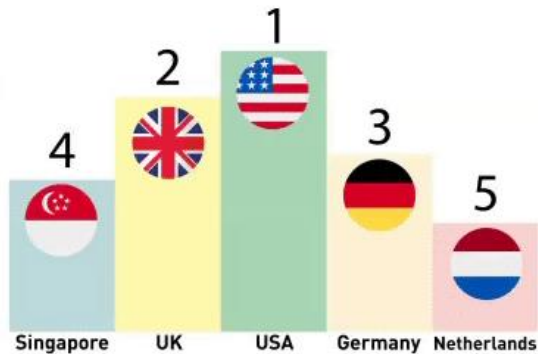


Legal, Technical, Organisational, Data, People, Standards?

Balancing the PRIORITIES?

Countries Geospatial Readiness Index 2018

The world's most geospatial ready countries



LEADERS		
Rank 2018	Country	Score
1	USA	67.777
2	UK	40.633
3	Germany	37.540
4	Singapore	34.977
5	The Netherlands	33.352
6	China	32.171
7	Canada	31.963
8	Denmark	31.376
9	Switzerland	30.673
10	France	30.625

CGRI-2018, GeoBuiz' 18

Characterised by –

- Intelligent geospatial data (maps etc) as a highly advanced tool for decision making.
- Data is digital , interactive and has effective visualization
- Incorporation of geospatial information and technology in workflow management
- Provide solutions for traditional sectors such as agriculture, construction, and disaster management, but ALSO for specialized sectors like real-estate, building engineering, architecture, banking and financial services, retail and logistics, forestry etc
- Geospatial technology business programs are part of national programs
- Collaboration occurs with a diverse group of industry bodies, professional member networks, commercial institution in products / applications (hardware, software, and content)

***Geospatial and Surveying Professionals MUST
enhance their capabilities to tackle these trends
and challenges BUT how?***

UNITED NATIONS
WORLD GEOSPATIAL
INFORMATION CONGRESS



Deqing, Zhejiang Province, China
19-21 November 2018

FIG Asia Pacific Region Capacity Development Strategy



Collaboration is the KEY !

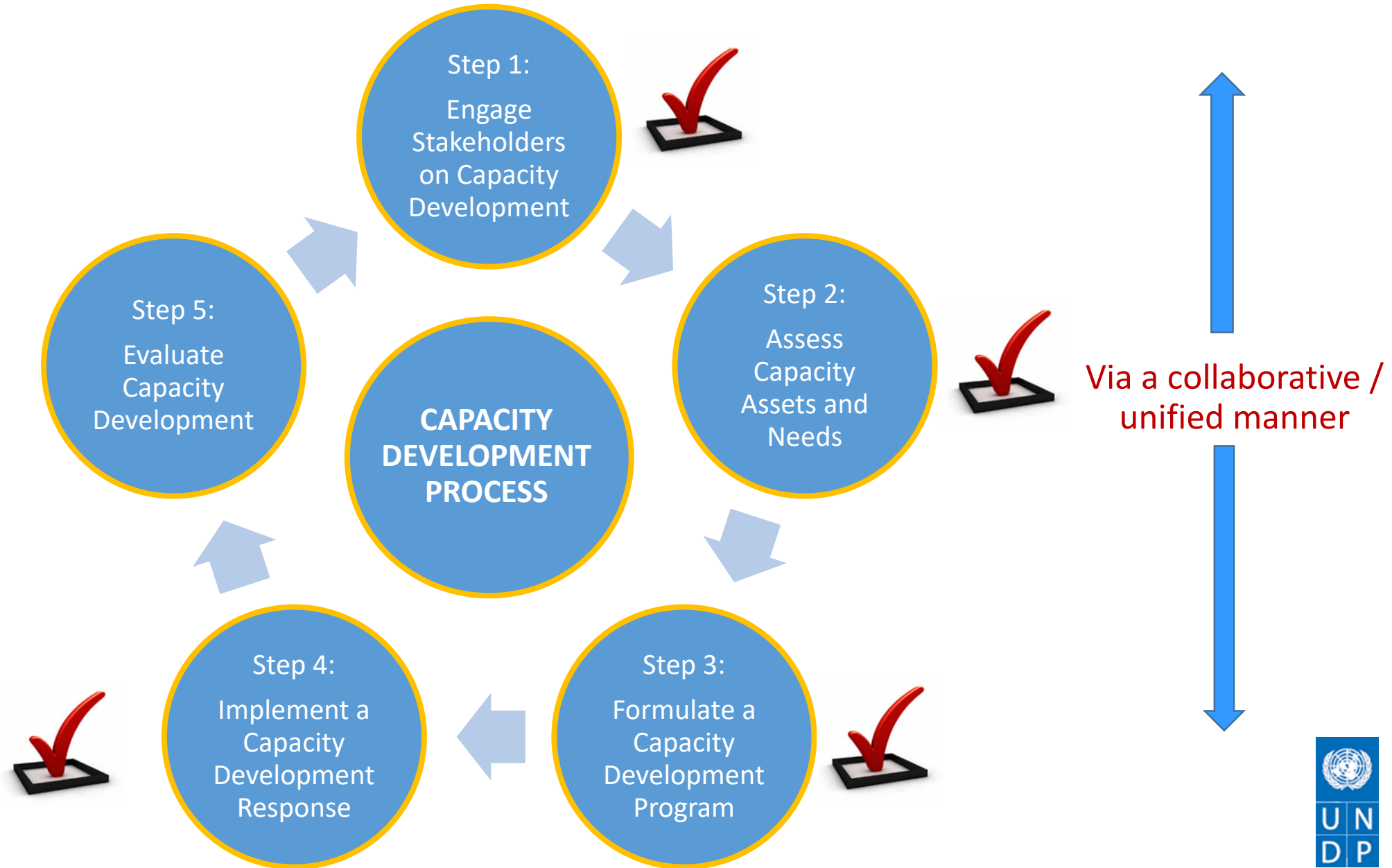
Organisations / Regions / Countries needed to consider -

WHY do we need to develop our capacity? What will be its purpose? Drivers – social, economic, political?

WHOSE capacities need to be developed? Which groups or individuals need to be empowered? Local / Regional?

WHAT KINDS of capacities need to be developed to achieve the broader development objectives? Technical & Non-technical?

Capacity Development Process



Discover the “why” that will unify agencies and influence the decision makers (and politicians)



**UNITED NATIONS
WORLD GEOSPATIAL
INFORMATION CONGRESS**



**Deqing, Zhejiang Province, China
19-21 November 2018**

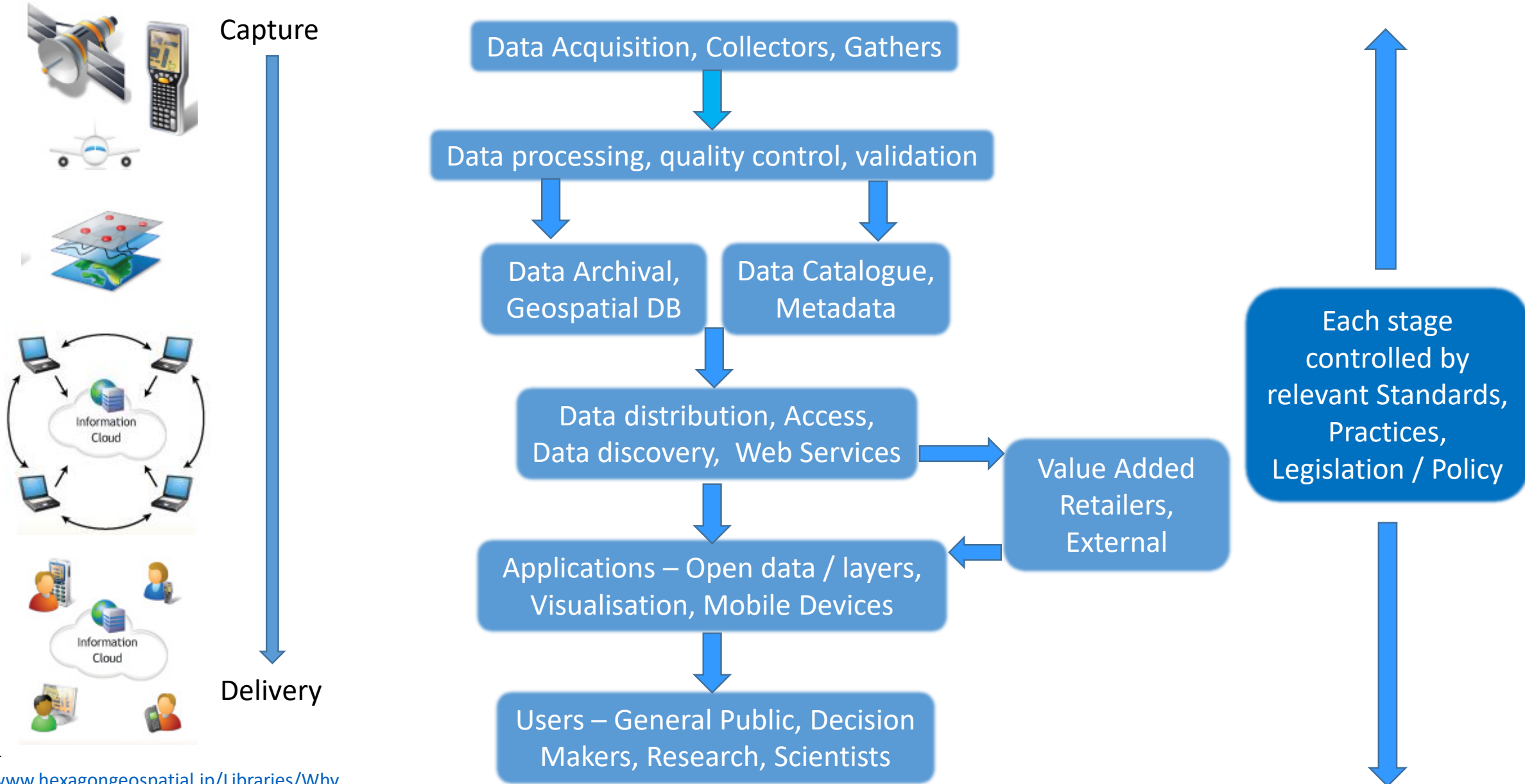
Understand your geospatial information (foundation datasets)



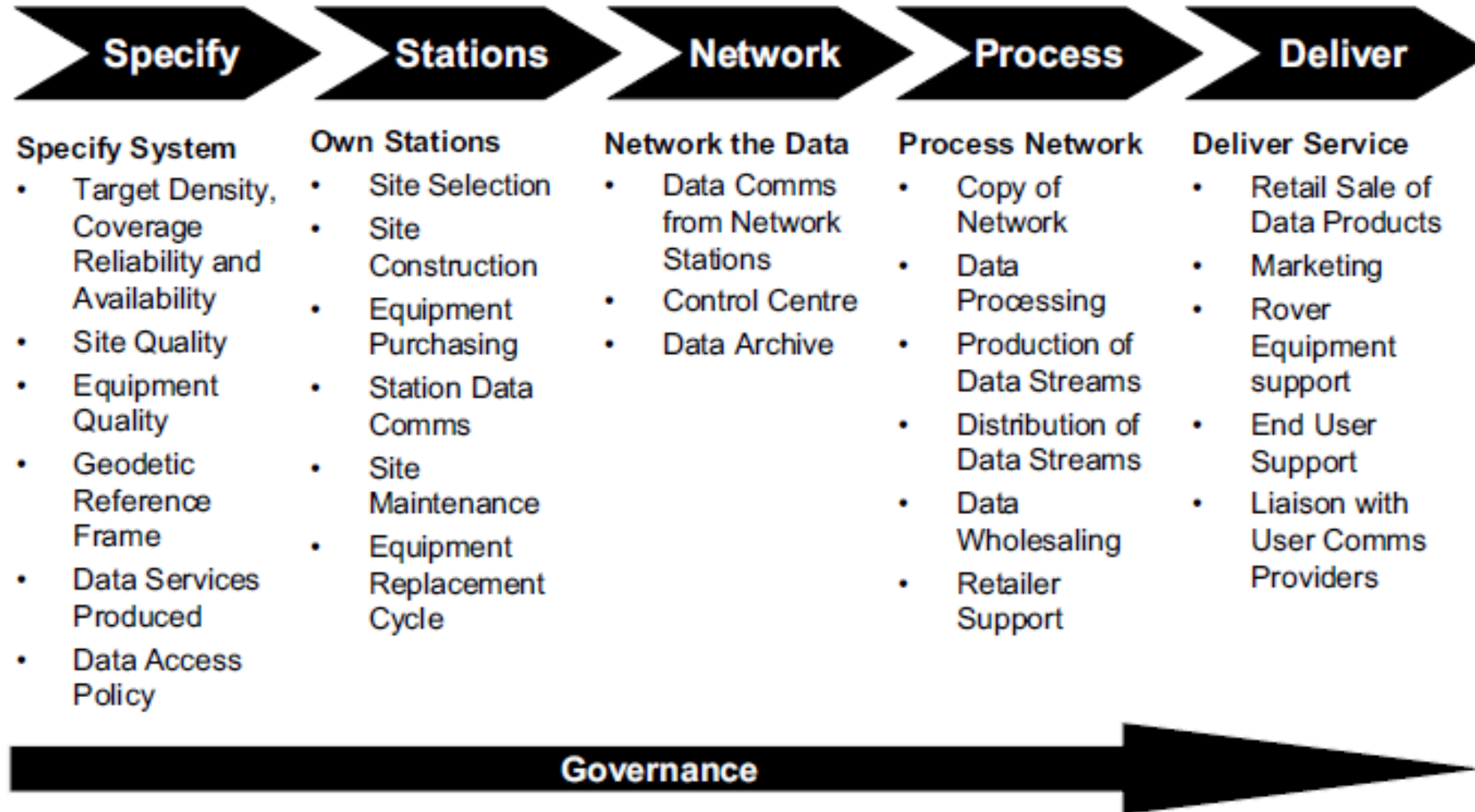
Source - <http://www.anzlic.gov.au/fsdf-themes-datasets>

- Common asset of location information ***to facilitate informed decision making*** that affects people's safety, prosperity, and environment
- Comprising of the ***best available, most current, authoritative*** source of foundation geospatial data which is ***standardised and quality*** controlled

Role in Generic Geospatial Information Cycle?



Role in managing GNSS CORS infrastructure?

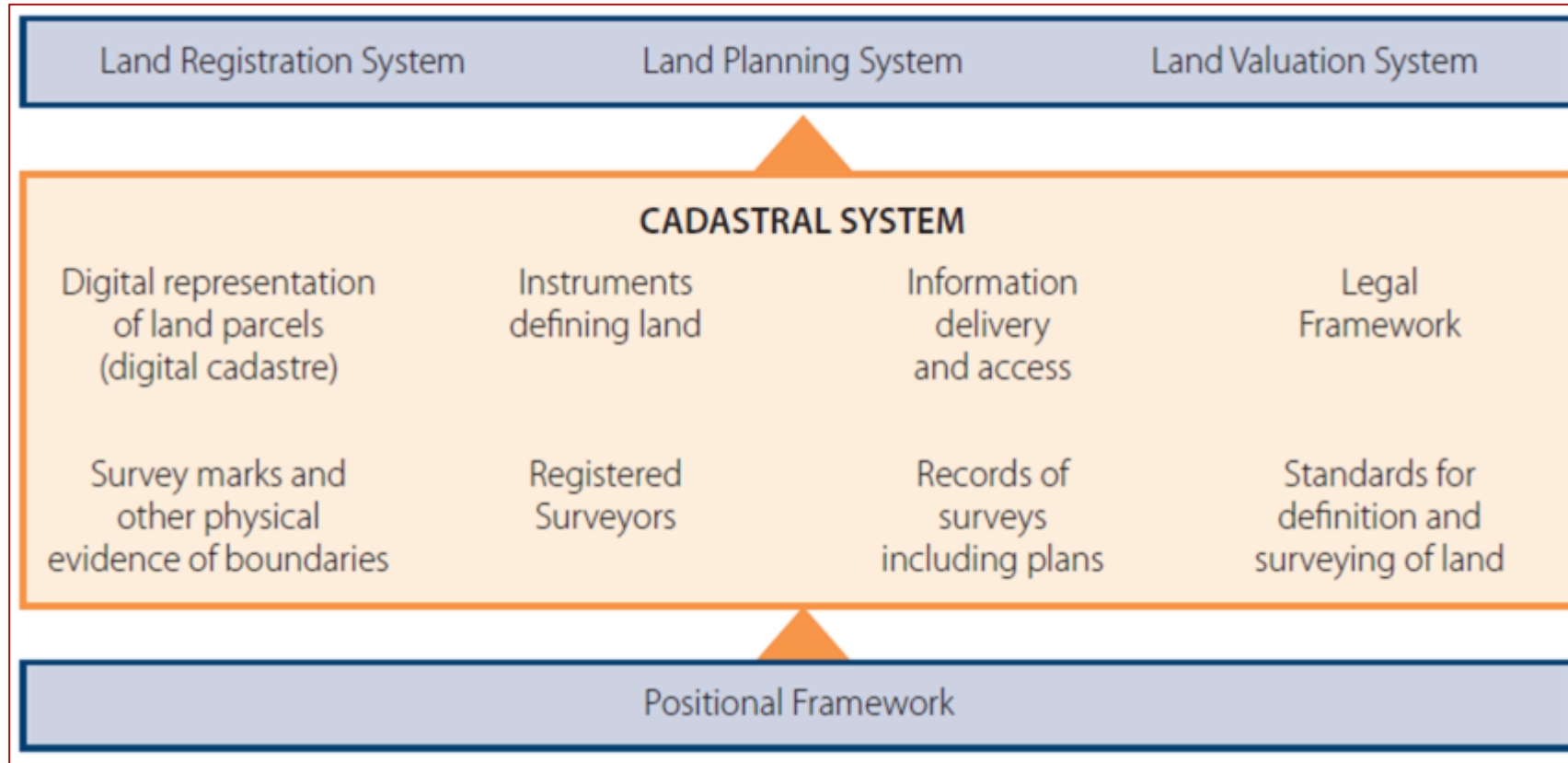


Source - Matt Higgins "A model for organisational roles within a Positioning Infrastructure"

Understand land / water Administration, Management, and Governance

- Administration a *system that provides infrastructure for*
 - *securing land / water tenure* (rights, restrictions, responsibilities),
 - *determining valuation* and taxation of land / water,
 - *land / water use planning* and
 - *development of built environment* - utilities, construction
- Management *processes for the use and development of land /water resources*
- Governance framework of *legislation, policies, processes and institutions by which land / water , property and natural resources are managed*

Modern Land (Water) Administration System



Source - <https://www.icsm.gov.au/sites/default/files/Cadastre2034.pdf>

- ***Defines and records*** the location and extent of property rights, restrictions and responsibilities - 3 dimensions plus a temporal (time) component
- ***Geometric representation*** of land and real property boundaries (digital visualisation)
- Must be easily, uniquely and accurately ***identified in a common reference system or geodetic datum or geospatial reference system***

Level	Competency Requirements	Training provided by	
1	Basic understanding of: <ul style="list-style-type: none"> • GNSS • Reference frames, including geoid models, vertical and horizontal datums 	<ul style="list-style-type: none"> • Educational institutions – universities and polytechnic institutes • Government mapping agency • Private companies 	Countries that might have one CORs and maintain a traditional geodetic network of reference marks – e.g. small Pacific Island Nations?
2	The above plus knowledge of: <ul style="list-style-type: none"> • Constructing, building and running a small CORs network • GNSS processing using standard software - e.g. Trimble, Compass Solution (ComNav), LGO(Leica),.... • Least squares processing and provision of datum access • Geoids models, precision, determinations and basic implementation • Implementation of a vertical datum including use of geoid models 	<ul style="list-style-type: none"> • Educational institutions – universities and polytechs • UN-GGIM Geodesy Capacity Group • FIG • Government mapping agency • Private companies 	Countries with small CORs network and those who adopt global Reference frames for their nation reference frames – e.g. Fiji?
3	The above plus high knowledge of: <ul style="list-style-type: none"> • Implementing and running large CORs networks • High end GNSS processing and datum access • Geoid model computation and implementation into a vertical datums • Monitoring earth dynamics and including in datum realization • Geodetic database management 	<ul style="list-style-type: none"> • Specialized courses – e.g. geoid school • UN-GGIM Geodesy Capacity Group • IAG and FIG • Government mapping agency • Private companies 	Countries with a more extensive CORS and developing their own specialized national and vertical datum – e.g. New Zealand and Sweden?
4	The above plus expert knowledge of: <ul style="list-style-type: none"> • Reference frame determination and computation • High end GNSS analysis and processing • SLR including analysis and processing • VLBI including analysis and processing • Gravity collection, processing and geoid determination • Analysis centre – combining various geodetic techniques to determine reference frame parameters • Use of other potential geodetic techniques – e.g. DORIS and InSAR 	<ul style="list-style-type: none"> • IAG • Specialist training courses run by NASA/JPL – e.g. on VLBI or SLR • Private companies • Specialized software training courses – e.g. Bernese 	Countries engaged in Global Reference frame determination and Geodesy Science - e.g. US, Australia and Germany?

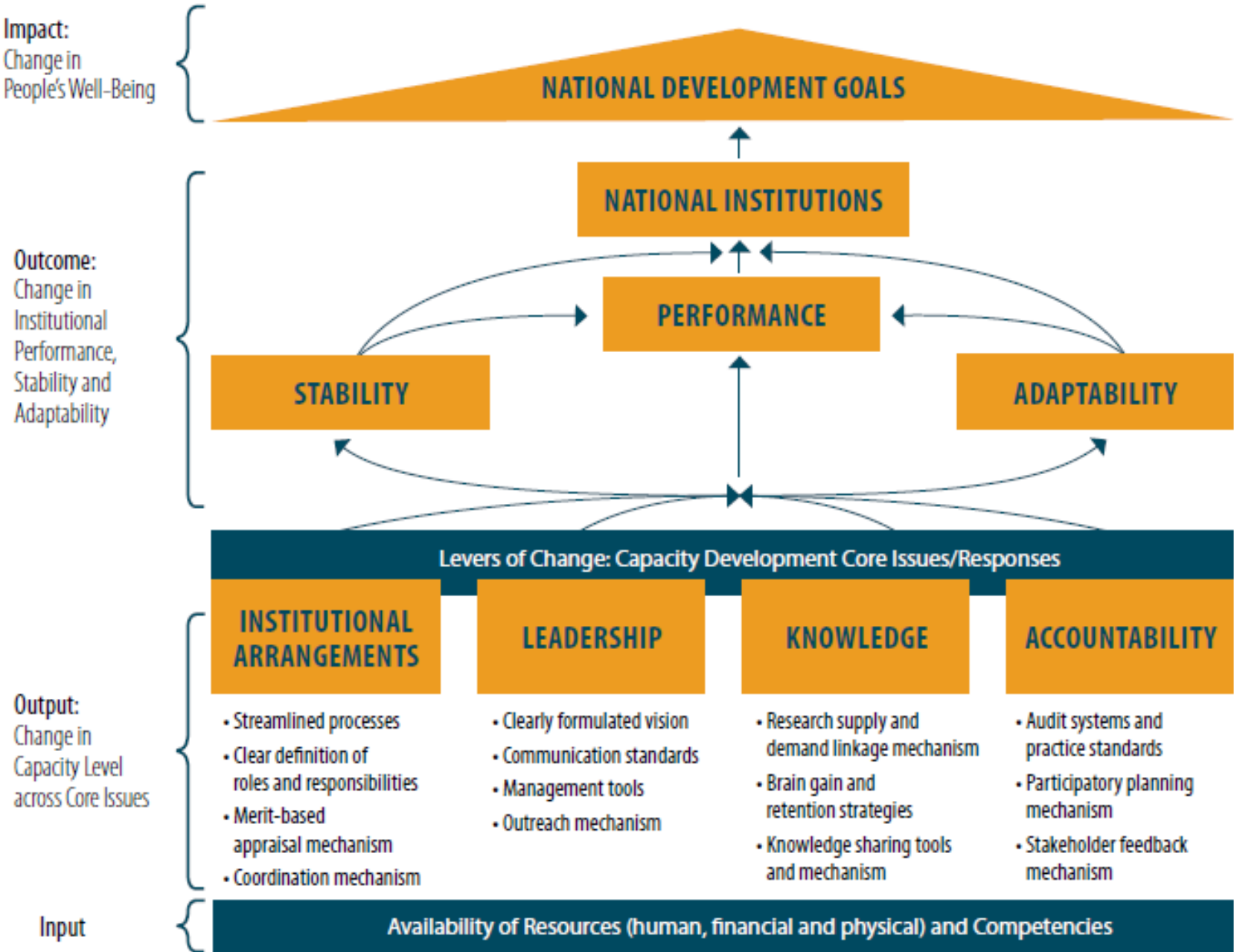
Capabilities / Competencies for the Future

Our profession and leaders of organisations need to have skills to -

- Prepare for **continuous change** by transforming their attitude towards change, **be progressive in their thinking, be agile, be less risk adverse**
- **Collect, process, deliver, reliable, accurate, interoperable and “24/7” geospatial information** to decision makers in real time via a combination of **“disruptive technologies”, crowd sourcing techniques, and web services**
- Convey **professional advice and services** to facilitate design, risk assessment, investment analysis, asset management and resource deployment.
- **Innovate in multi-disciplinary teams** to effectively manage diminishing resources, increased data volumes; and resolve legal data matters such as privacy, custodianship, sharing, liability etc.



Capacity Development Strategy, Framework , Implementation



Capacity Development Strategy , Framework, Implementation

Plans that are aspirational but realistic, achievable, focused on national / regional challenges and flexible to accommodate a rapidly changing industry



Plans are fundamental to resourcing proposals and capturing the political will !

Summary – FIG APCDN

To develop capability organisations and agencies need to consider –

- Formulating a capacity building strategy, framework and implementation plans for a **country / sub regions** that are linked to the **needs / priorities / objectives** of the nation or broader community
- Intelligent **real time geospatial information and systems** for decision making across many sectors
- Identifying **core competencies** for geospatial / geodetic surveying
- Investigating who can provide the required **professional or capacity development**
- Examining **mutual recognition of professional qualifications OR accreditation**
- **Sustainable solutions** that enhance **self-reliance and development**
- Formalising **collaboration** with FIG AP CDN, UN GGIM AP, UN ETCB etc

Future of Collaboration ?



Foundations of SUCCESS

Good Will and Volunteerism is NOT Sustainable !

New “modus operandi?”

MoUs to formalise Collaboration -

- Shared objectives and expectations*
- Defined roles and responsibilities*
- Measurable benefits and value*
- Shared commitment*

Summary – FIG APCDN

Moving forward the FIG AP CDN recommend more capacity building for geospatial and surveying professionals and *decision makers* wrt –

- Understanding the *value and importance* of geospatial and geodetic information
- Forming *capacity development plan(s)* for geospatial professionals / geodesists / surveyors – national / regional?
- Developing *strategic and operational plans* for the organisation aligned with national / regional objectives
- *Modernising* legislation, policy, standards & practices and guidelines
- Preparing proposals and *business cases* for national geospatial or geodetic or capacity development initiatives and resourcing (or specific projects)
- *Technical matters* - geospatial and geodetic infrastructure, systems and operations
- Building a framework to *share our knowledges and experiences* – “a body of knowledge”

Collaborative Workshops for 2019 ?



8-10 April 2019, Melbourne Convention Centre, Melbourne

FIG WORKING WEEK 2019
Hanoi, Vietnam 22 - 26 April 2019
Geospatial information for a smarter life and environmental resilience

International Federation of Surveyors
Vietnam Association of Geodesy, Cartography and Photogrammetry

15TH SOUTH EAST ASIA SURVEY CONGRESS
15-18 August 2019 • Darwin Convention Centre

COLLABORATION **COMMUNICATION** **CAPACITY-BUILDING**

FIG Asia Pacific Capacity Development Network

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 Development Network
Nairobi 2015

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

Dave Doyle FIG Regional Conference Costa Rica 2007

"As for training its people...ASEAN should take advantage of the digital revolution to ensure interoperability of digital systems within the region – that is the digital systems developed in one country can be used in others too"

PM Lee Hsien Loong, Singapore – 33rd ASEAN Summit 2018



<https://www.fig.net/>

DISCUSSION

Looking Forward: Future activities (coming year?)

- **Report on the questionnaire;**
 - Regional based reporting and discussion. What are the barriers in each region?
- **Building a knowledge database**
 - Find recourse to compile existing material available online
 - Update FIG publication on “Reference Frame in Practise”
- **Potential new questionnaire**
 - In-deep questions regarding the barriers, why capacity building is needed, who requires capacity building, what capacities are required, and how these should be delivered and by whom
- **Resourcing**
 - Explore opportunities for long-term resourcing and the application of the Integrated Geospatial Information Framework

DISCUSSION

For discussion;

- Regarding Education, Training and Capacity Building and our proposed action for coming year(s), do you agree?
- The importance of the regions, how can we engage them and have them taking more ownership of training and capacity building?
- The questionnaire notice impediments regarding funding, resources as well as political will. How can we as Subcommittee on Geodesy together work on these issues?
- What is the role of industry sector in training?