



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

Asia Pacific Capacity Development Network



2020/21 General Assembly Report

Chair Rob Sarib



eWORKING WEEK 2021 20-25 JUNE

SMART SURVEYORS FOR LAND
AND WATER MANAGEMENT

CHALLENGES IN A NEW REALITY

FIG Asia Pacific Capacity Development Network



FOUNDATIONS of SUCCESS

Good Will and Volunteerism is NOT Sustainable

***Formalise collaboration / co-operation - Shared objectives and expectations ;
Defined roles and responsibilities ; Measurable benefits and value ;
Shared commitment***

FIG Asia Pacific Capacity Development Network



Co-operate with organisations who represent a diverse group of members

Work *collaboratively* to build the *capabilities* of geospatial and surveying professional to meet the *challenges of the future*

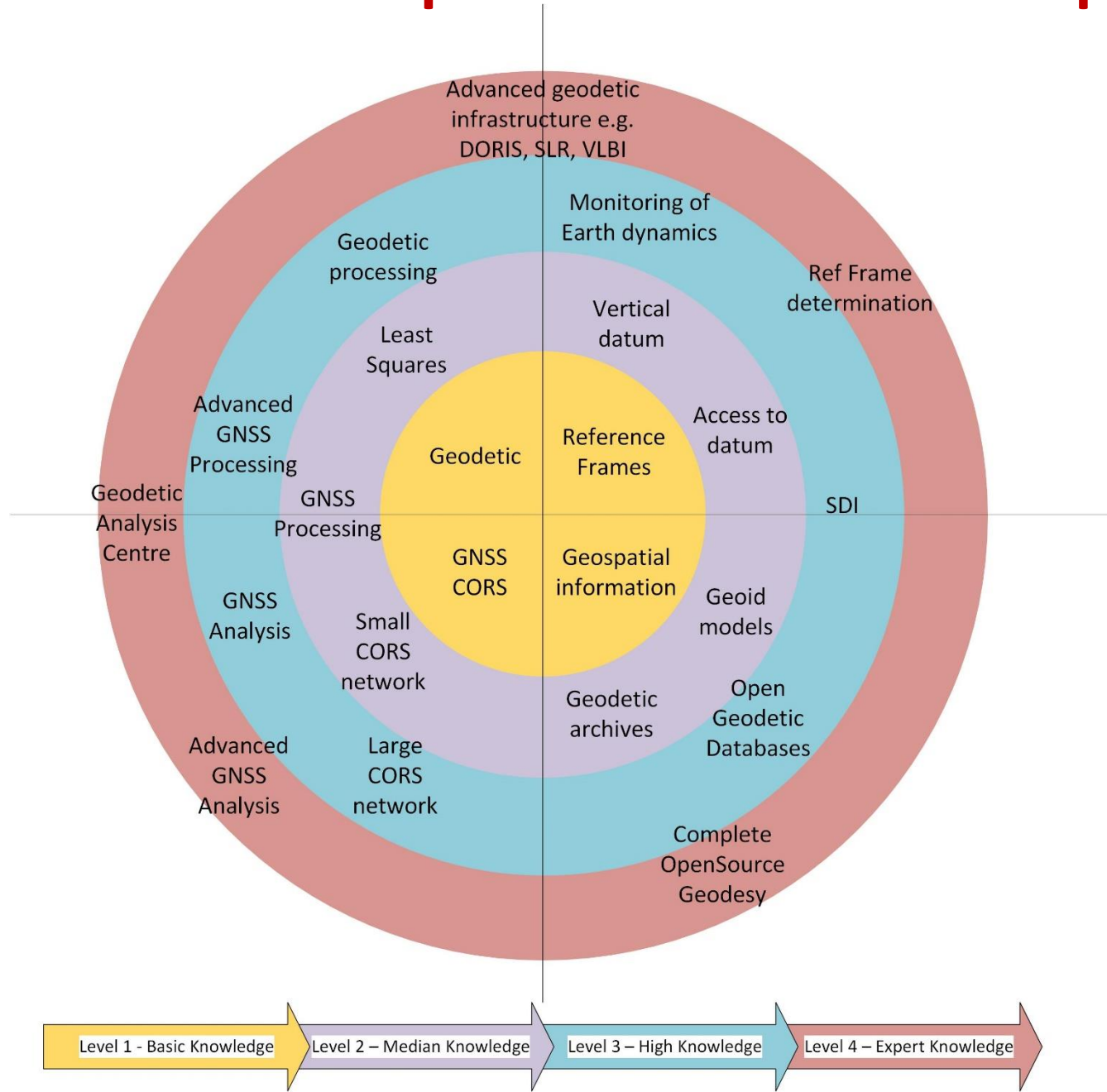
FIG AP CDN – Capabilities to be Developed

Level	Competency Requirements	Training provided by	Comments
1	<p>Basic understanding of:</p> <ul style="list-style-type: none"> • GNSS • Reference frames, including geoid models, vertical and horizontal datums • Geospatial information integration and interoperability 	<ul style="list-style-type: none"> • Educational institutions – universities and polytechnic institutes • Government geodetic, survey and mapping agency • Private companies • Global Geodetic Centre of Excellence (GGCE) participant 	<p>Countries that might have one CORs and maintain a traditional geodetic network of reference marks.</p>
2	<p>The above plus knowledge of:</p> <ul style="list-style-type: none"> • Constructing, building and running a small CORs network • GNSS processing using standard commercial / consumer off-the-shelf software • 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 / IAG • Government geodetic, survey and mapping agency • Private companies • GGCE participant 	<p>Countries with small CORs network and those who adopt global Reference frames for their nation reference frames.</p>

FIG AP CDN – Capabilities to be Developed

3	<p>The above plus high knowledge of:</p> <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 / FIG • Government geodetic, survey and mapping agency • Private companies • GGCE participant 	<p>Countries with a more extensive CORS and developing their own specialized national and vertical datum.</p>
4	<p>The above plus expert knowledge of:</p> <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 space or government geodetic, survey and mapping agency – e.g. on VLBI or SLR • Private companies • GGCE participant • Specialized software training courses – e.g. Bernese and GipsyX 	<p>Countries engaged in Global Reference frame determination and Geodesy Science.</p>

FIG AP CDN – Capabilities to be Developed



Level 1 - Basic Knowledge

Level 2 – Median Knowledge

Level 3 – High Knowledge

Level 4 – Expert Knowledge

FIG AP CDN - Delivery of Capacity Development

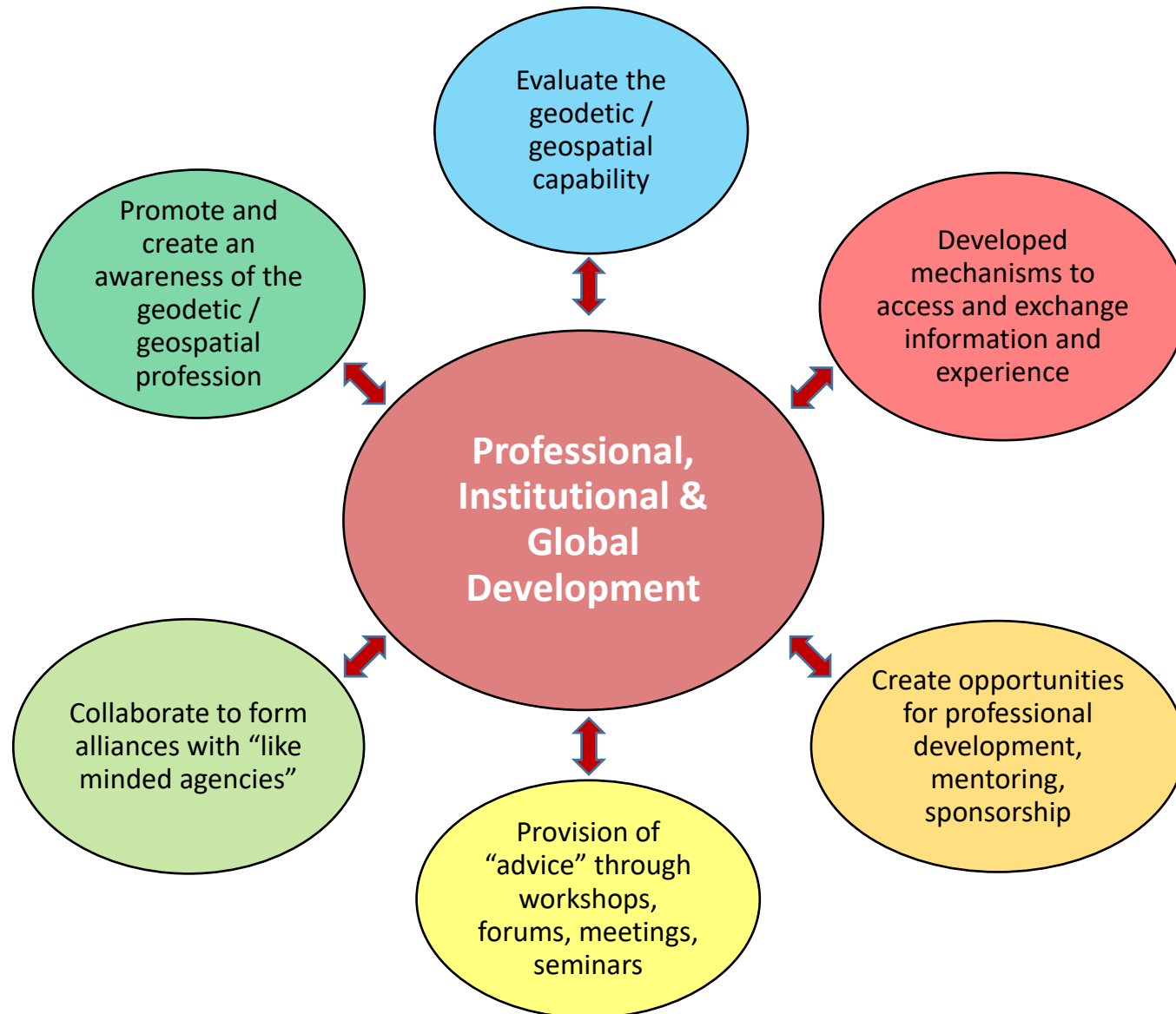


FIG AP CDN – 2020 Activities



- **UN Global Geodetic Centre of Excellence – Progress from the UN-GGIM Sub Committee on Geodesy** - Martin Lidberg (Sweden), Laila Loevhoeiden (Norway), Nicholas Brown (Australia), Johannes Bouman (Germany) and Jorgensen Anne (Norway)
- **A Global Survey of Reference Frame Competency in terms of Education, Training and Capacity Building (ETCB): Results, Analysis and Update** - Ryan Keenan (Australia), Allison Craddock (USA), Mikael Lilje (Sweden) and Robert Sarib (Australia)
- **Capacity Development Program for a Modernised Geodetic Framework** -Robert Sarib (Australia)

https://www.fig.net/fig2020/technical_program.htm

FIG AP CDN – 2020 Activities

March/April 2020 International Issue

VOLUME 19 - ISSUE 2

<https://flickread.com/edition/html/index.php?pdf=5e54f8b386d1d#24>

- GIS
- GPS
- CAD
- REMOTE SENSING
- PHOTOGRAMMETRY
- SURVEYING
- CARTOGRAPHY
- IMAGE PROCESSING
- BUSINESS GEOGRAPHICS

March/April 2020 | Volume 19 | Issue 2

Geo:

GeoConnexion International Magazine



FIG UPDATE

CAPACITY DEVELOPMENT FOR GEODETIC SURVEY ORGANISATIONS

LEADERS OF GEODETIC SURVEY ORGANISATIONS MUST DISCOVER AND DEFINE THE CASE FOR CAPACITY DEVELOPMENT PROGRAMMES. ROBERT SARIB EXPLAINS HOW AND LOOKS AT THE FOUR ELEMENTS NECESSARY FOR SUCCESS

In a fast and hectic region, geodetic survey organisations (GSOs) have to navigate their way through the rapidly changing business landscape of a dynamic economy. Despite the decreasing power capacity of national budgets, the availability of capital analysis, the increasing demand for geospatial data, and the growing reliance on geospatial data, GSOs are expanding their skills to meet the growing demand for geospatial data and the growing demand for geospatial data.

As a result of this, GSOs are facing a number of challenges. The first is the need to invest in new technology and equipment. The second is the need to attract and retain skilled staff. The third is the need to improve the efficiency of their operations. The fourth is the need to expand their services to new markets.

Capacity development is the process of enhancing the skills, knowledge, and abilities of individuals and organisations to meet the demands of a changing world. It is a key element of sustainable development and is essential for the success of any organisation.



They have had to invest in new technology and equipment. They have had to attract and retain skilled staff. They have had to improve the efficiency of their operations. They have had to expand their services to new markets.

The case for CDGs

To gain the benefits of a CDG, a GSO must first define the case for a CDG. This involves identifying the benefits of a CDG and the costs of a CDG. The benefits of a CDG include improved efficiency, reduced costs, and increased capacity. The costs of a CDG include the investment in new technology and equipment, the cost of training, and the cost of recruitment.

Leadership management

Leadership management is the process of setting the vision and strategy for an organisation. It involves defining the organisation's mission, vision, and values, and developing a strategy to achieve these goals. Leadership management is essential for the success of any organisation.

Knowledge

Knowledge is the information and skills that an individual or organisation possesses. It is essential for the success of any organisation. Knowledge can be gained through education, training, and experience.

Accountability

Accountability is the obligation of an individual or organisation to report on their actions and to be held responsible for the results of those actions. It is essential for the success of any organisation.

understandings, agreements, formal, and/or informal arrangements, social industry norms or expectations. From a management perspective, it involves frameworks associated with financial reporting, accountability, performance management, human resource management and environment.

Overall, it is about creating clarity of direction, roles and responsibilities, in financial, information data cycle and managing information in the supply and demand of geospatial information.

Our recommendations for the future

The geospatial community has a role to play in the development of a sustainable and resilient geospatial industry. This can be achieved through a number of key actions, including:

- Improving the quality of geospatial data and information.
- Enhancing the capacity of geospatial organisations.
- Promoting the use of geospatial data and information.
- Encouraging innovation and research in geospatial technology.
- Supporting the development of a sustainable and resilient geospatial industry.

AP CDN'S RECOMMENDATIONS

The AP CDN's recommendations are based on the findings of the survey and the analysis of the data. They are intended to provide a guide for geospatial organisations and individuals who are interested in capacity development.

- **Leadership management:** Leaders should define the vision and strategy for their organisation and ensure that it is aligned with the needs of the community.
- **Knowledge:** Organisations should invest in training and development to ensure that their staff have the skills and knowledge needed to meet the demands of a changing world.
- **Accountability:** Organisations should be transparent about their actions and the results of those actions, and should be held accountable for the results of those actions.

The latest geo...

Position

The Australasian magazine of surveying, mapping & geo-information

February/March 2021 – No. 111

feature

Pushing boundaries Geodetic modernisation

Evidence from countries and territories

Efforts to develop local capacity for geodesy in both tech and making serious headway in the Asia Pacific region. He from the Pacific Islands showcasing the latest developments courtesy of the United Nations Committee on Global Geospatial Information Management and FIG's Asia Pacific Capacity

Introduction

By – Allison Craddock and Rob Sarib

Global geodesy is dependent on findable, accessible, inter-operable and reusable (FAIR) contributions from nations all around the globe. Experts state, no single country can maintain the Global Geodetic Reference Frame (GGRF), thus regional collaboration amongst countries to leverage their limited assets, geodetic infrastructure, knowledge and capabilities to perform precise measurements is a necessity.

To support regional collaboration between government geodetic survey organisations (GSDs) and non-government organisations (NGOs), countries employ, to varying degrees, the United Nations Global Geospatial Information Management (UN GGIM) and World Bank 'Integrated Geospatial Information Framework (IGIF)'. This guiding framework facilitates a common approach to preparing national or country action plans (CAPs) for the development, integration, strengthening and maximisation of geodetic and geospatial infrastructure and systems, as well as resourcing, and developing capabilities. For some countries it is a 'roadmap and pathway' to reducing the geodetic and geospatial digital divide with their more prosperous neighbours, securing socio-economic prosperity, and providing justification or rationale for development partner funding of geodetic or geospatial projects.

Briefly, there are nine strategic pathways within three main areas of influence, anchoring the IGIF, which are governance, technology, and people. The nine strategic pathways attempt to foster and amplify the innovative and integrative nature of geospatial information by making it accessible to governments,

businesses, academia, and civil society to optimise or generate new products, services, and applications that provide evidence-based decision-making.

Broadly speaking, the IGIF and formulation of CAPs serve a collaborative roadmap to help governments develop, access, and use geospatial information to make policies and more accurately develop and development resources. FIG GSDs, using both the IGIF and local to concrete recommendations on establishing national geodetic geospatial infrastructure / system improving geodetic capabilities tangible outcomes for the GSD stakeholders. Also, with strict harmonised organisational plan GSDs are empowered with opt to partner with traditional and traditional geospatial groups e from NGOs, commercial entities academic institutions, and sector agencies who have access to technology, and knowledge.

The implementation strategy tools for the IGIF and CAPs are in several documents and most which were finalised and released early 2020. However, several countries from the Pacific Islands Countries Territories (PICTs), recognise potential benefits of operations parts of the IGIF in various positions, and commenced to action planning to advance the modernisation of their geodetic build geodetic and geospatial capability, and to leverage into collaborative efforts.

The following are case studies from three national, and one regional, which demonstrate the activity modernisation in the PICTs.

feature

modernisation programs in CAPs, there are also other initiatives that will require assistance, such as –

- Revision of legislation of the Native Lands Act, and relevant Survey legislation to align with Tuvalu's IGIF and CAP aspirations, and
- Upgrading of Tuvalu's Navigation Charts, to assist commercial shipping and cruise liners to navigate Tuvalu's waters safely, thus improve the trade and tourism industry, once the COVID-19 influences have subsided.

Embracing challenges through Partnerships, Pacific Geospatial & Surveying Council (PGSC) and the Pacific Community (SPC)

by – Andriak Lal, senior geodetic surveyor

In November 2014, a group of Pacific regional surveying and geospatial experts met in the margins of the annual Pacific Geospatial Information Systems and Remote Sensing (GIS/RS) User Conference in Suva, Fiji. It was at this meeting that the PGSC was first envisaged and a charter governing its mission and objectives was developed. In addition, the Pacific Community (SPC) established the Pacific Geospatial and Surveying Partnership Desk to provide secretariat services and support the PGSC in achieving its goals and objectives.

Briefly, the PGSC, is an independent regional advisory body that provides a forum for Pacific Island geospatial information and survey authorities to discuss and address regional challenges. The PGSC aims to collaborate with regional and international organisations, associations, educational institutions and technical groups to support progress on national, regional and global development objectives for sustainable development in the Pacific enabled by world-class geospatial information and surveying services.

The 14 country members of the PGSC subscribe that geospatial information underpins the majority of economic and

sustainable development activities in the world today. The services provided by Pacific Island geospatial scientists and surveyors contribute to the security and well-being of Pacific people, supporting numerous industries and sectors. These include: natural resource management, civil engineering, climate change adaptation, disaster risk reduction, transport, land ownership, health, and agriculture to name a few.

The SPC is the principal scientific and technical organisation in the Pacific region, proudly supporting development since 1947. From a geodetic modernisation perspective the SPC Geodetic Survey Team deliver professional advice and services to the PICTs. This primarily involves provision of instrumentation; onsite technical guidance or support on numerous field survey operations or techniques; processing and management of geodetic data; geodetic datum and positioning matters; GNSS base stations; GNSS measurements for survey control, monitoring, cadastral or geospatial activities; and precision leveling monitoring surveys, including assisting with tide gauge measurements for the Pacific Sea Level & Monitoring Project in the Pacific.

Partnerships are critical to the successful implementation of the Pacific Geospatial and Surveying Council Strategy 2017-2027. The responsibilities of regional surveyors and geospatial managers frequently correspond to broader initiatives, which all contribute toward achievement of United Nations Sustainable Development Goals. The PGSC relies upon collaboration, and is an important contributor towards sustaining a GGRF, and global efforts to improve positioning and geospatial information management.

The goals of the PGSC, the Partnership Desk and SPC are focused on:

- Positioning
- Geospatial Policy & Data Management
- Capacity Building
- Since 2014 the PGSC, Partnership Desk, SPC and development partners such



20 position February/March 2021



as International Association of Geodesy (IAG), UN GGIM AP, UN Office of Outer Space Affairs, FIG and neighbouring GSDs, have cooperated to enhance and engage the geospatial and surveying community in the PICTs. This has been achieved through supporting, organising and hosting various activities in the region such as seminars, workshops, capacity development events, and meetings, as well as online forums and webinars on identified geodetic or geospatial topics and challenges.

Recently, in August 2020, the 3th Pacific Geospatial and Surveying Council (PGSC) meeting was held virtually from the 11th to 14th and 23rd August 2020, and was hosted by the SPC in Suva, Fiji. There were almost 200 attendees each day, to participate in virtual panel discussions on presentations from international experts, regional partners and PGSC members. The meeting, like previous ones, was an opportunity for the PGSC members and partners to report, collaborate and plan on leadership, standards and technology, sustainability, and capacity development, in line with the PGSC Strategy 2017-2027. Please refer to the web locations for the article regarding this meeting Pacific calls for Integrated Geospatial Information Management, and for meeting proceedings.

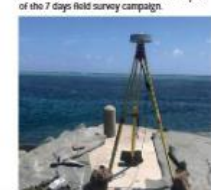


Modern Geodetic Infrastructure – Key to Consistency and Efficiency

by – Sanjesh Kumar, senior surveyor, Asakala Tabua, surveyor-general Fiji

Fiji is highly vulnerable to natural disasters such as cyclones, coastal inundation and flooding due to climate change and subsequent sea level rise. These natural events affect the food security, livestock, infrastructure, health, housing and livelihoods of more than 800,000 Fijians. It is therefore critical for Fiji to mitigate the influence of natural disasters and climate change. Surveyors can alleviate this impact by applying their skills to disaster preparedness, building resilience, quantifying the environmental and social changes, and providing qualitative analysis. The keys to monitoring and measuring such changes is access to reliable satellite positioning technology, high resolution and accurate geospatial data and information. Underpinning these activities, Fiji recognised the need and importance of a consistent, comprehensive and modernised geodetic reference frame, and positioning network.

To achieve a modernised datum, Fiji has embraced the challenges and



identified the action required to migrate from a local datum to a GGRF, in August 2015. This mandate to modernise their geodetic datum, also set the roadmap for the integration, interoperability and management of geospatial information and systems at the local, national, regional and global level.

Prior to modernisation, Fiji's geodetic datum was based on the World Geodetic System 1972 (WGS72) and comprised of a network of triangulation and trilateration observations, which interconnected the main and outermost islands. The adjustment and propagation of coordinates for the datum were significantly biased by survey inconsistencies and produced survey uncertainties in the order of several decimetres. Despite this, WGS72 met user's need for a period of time, however today this reference frame and the accuracy of the co-ordinates, can no longer satisfy the requirements of modern-day geospatial demands or applications, such as real-time positioning, and autonomous vehicles. Also, with the advent of accurate geospatial data being readily available, rapid technological changes, geospatial trends and digital disruption, the management of the 'gap' is more complex and challenging. With this in mind, the Fiji government saw the establishment of a modern geodetic infrastructure and datum as pathway to bridging the gap. The government also acknowledged the necessity to build the capacity and capabilities of its people to ensure a sustainable geodetic reference frame for the future.

Briefly, datum modernisation started with the construction of eight (8) GNSS CORS across Fiji. These stations complemented two (2) GNSS CORS, managed by Geoscience Australia and the SPC. Soon after the construction of the GNSS CORS, survey teams were

deployed to carry out reconnaissance and identification of existing 'passive' geodetic control stations (GSDs) that could be connected to the GNSS CORS, and form the fiducial observations for the geodetic network adjustment.

In order for this geodetic field campaign to be successful, collaboration and assistance with the Fiji Hydrographic Office, Fiji Navy, SPC, PGSC and Partnership Desk was necessary. The campaign involved more than sixty (60) survey personnel and included a three-day workshop in the operation of GNSS survey equipment. This training and capacity building for the survey personnel was facilitated by the SPC and Partnership Desk in October 2019.

The field campaign involved, the occupation of 164 GSDs with GNSS receivers, and was divided into three (3) phases. The GSDs were occupied continuously for 7 days, and each phase was completed in November 2019, December 2019 and February 2020 respectively. A number of these GSDs occupied were existing Doppler stations, and first order trigonometric stations, which were originally observed in the early 1980s. Observations on first order trigonometric geodetic stations were primarily on the islands of Viti Levu and Vanua Levu, as well as the Maritime Islands. Other observations were taken to selected parcels, and standard survey marks in major towns and cities.

A substantial amount of the GNSS survey data acquired during the field survey campaign will be used to validate the position of Fiji's existing geodetic system and the determination of a new geodetic datum aligned to the ITRF/ GGRF. The GNSS data will subsequently be integrated with the Pacific GNSS CORS Network for the computation of the new transformation parameters, and be the primary network adjustment of Fiji's

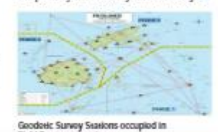


FIG AP CDN – Related 2020 Activities



The 5th Pacific Geospatial & Surveying Council Meeting

11-12 August 2020- Open Participation

- Formal opening
- Regional updates and emerging issues

13-14 August 2020- Members Only

- PGSC business and governance

Invitations, agenda, and details to follow
Contact pgsc_desk@spc.int with queries

- Report - <https://www.councilpacificaffairs.org/news-media/pacific-calls-for-integrated-geospatial-information-management/>
- Technical Papers - <http://pgsc.gem.spc.int/5th-meeting-papers/>
- PGSC Meeting Outcome - <http://pgsc.gem.spc.int/wp-content/uploads/2020/09/PGSC-5-Outcome-statement-and-declaration-Final-1.pdf>

FIG AP CDN – Related 2020 Activities



The screenshot shows the UN-GGIM-AP website header with the logo and navigation menu. The main content area features a large image of a tropical beach with turquoise water and a sandy shore. Below the image is a navigation bar with tabs for Overview, Agenda, Participants, Logistics, Documents, and Recording. To the right, there is a 'Downloads' section listing agenda documents for the plenary and working groups.

UN-GGIM-AP
REGIONAL COMMITTEE OF
UNITED NATIONS
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT
FOR ASIA AND THE PACIFIC

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Home

Ninth Plenary Meeting of UN-GGIM-AP



BIG

Overview Agenda Participants Logistics Documents Recording

Downloads

- Agenda_Plenary 9
- Agenda_WG1
- Agenda_WG2
- Agenda_WG3

- Proceedings and Resolutions –
<https://www.un-ggim-ap.org/meeting/ninth-plenary-meeting-un-ggim-ap>

Engagement, Communication, Collaboration and Sharing

FIG AP CDN – Related 2021 Activities



UN-GGIM

UNITED NATIONS
COMMITTEE OF EXPERTS ON
GLOBAL GEOSPATIAL
INFORMATION MANAGEMENT

Subcommittee on Geodesy

GLOBAL GEODESY FORUM

THE POWER OF WHERE –
THE VALUE OF GEODESY TO SOCIETY

Date: Earth Day, Thursday, 22 April 2021 | **Time:** 10:30 am – 12:00 noon (UTC) / 6:30 am – 8:00 am (EDT-New York)

With an Opening Address from
His Excellency Ambassador Peter Thomson
UN Secretary-General's Special Envoy for the Ocean
Global Geodesy Ambassador

For program details and recording, please visit the forum website at –

http://ggim.un.org/meetings/2021/Global_Geodesy_Forum/

FIG AP CDN – Work Plan Objectives

Advocate the importance of modernising a geodetic datum



Discover flexible, agile and accessible means to enhance core competencies and share technical knowledge / experiences



Demonstrate the benefits of capacity development and collaboration



Resolve capability and administrative challenges



Work with FIG African Regional Network and other 'like' regional bodies (ie SIRGAS)



Development of a new FIG AP CDN website



Leverage partnerships / opportunities to discover and improve pathways for professional development and mutual recognition of qualifications.



Engagement, Communication, Collaboration and Sharing

FIG AP CDN – Liaisons / Activities with Partners

(GSOs, IAG, UNOOSA, UN GGIM AP / SCoG ETCB etc)

- Advocacy and exposure that organisational change, capacity building, and integrated action planning will -
 - Support geodetic and geospatial infrastructure modernisation
 - Reduce the digital divide / technical skills gap between the developed and emerging economies,
 - Achieve the Sustainable Development Goals, and
 - Better manage disasters before, during and after.
- Support the Global Geodetic Reference Frame (GGRF) and the UN GGIM Integrated Geospatial Information Framework (IGIF) via -
 - Development of the Geodetic and Positioning thematic layer for the implementation of the IGIF
 - Educational, training, capacity building initiatives of the Global Geodetic Centre of Excellence (GGCE) that will empower emerging countries to contribute to a sustainable GGRF.

Engagement, Communication, Collaboration and Sharing

Capacity Development (CD) Initiatives

- Technical geodetic and geospatial seminars
 - Fundamentals of geodetic surveying
 - GNSS CORS and positioning infrastructure and applications
 - Vertical reference – surfaces, geoids, tides, gravity, datum integration.
 - Manipulation and integration of geodetic / geospatial datasets (cadastre)
 - Geospatial information - dataset and database management, integrated systems and interoperability of databases, visualisation, dissemination / access
 - Combining geodetic and geospatial information measurement techniques and their applications – imagery, LiDAR, tidal, positioning etc



Engagement, Communication, Collaboration and Sharing

Capacity Development (CD) Initiatives

- “Soft skills” geodetic and geospatial information seminars
 - Preparing CD organisational / operational plans; align plans with country action planning, GGRF, IGIF; “why, what and how”; change management
 - Understanding and leveraging the interaction of CD with GGRF, IGIF, GGCE
 - Developing a Geodetic and Positioning layer / framework for the IGIF - similar to “FELA – Framework for Effective Land Administration”
 - Developing / Modernising the legal, policy, standards and practices, guides frameworks
 - Advocating / exposing the importance of what we do and produce to decision makers; benefits to science, society and the environment; materials or mechanisms that do this effectively



Engagement, Communication, Collaboration and Sharing

FIG e-Working Week - Challenges in a New Reality



eWORKING WEEK 2021 20-25 JUNE
SMART SURVEYORS FOR LAND
AND WATER MANAGEMENT
CHALLENGES IN A NEW REALITY



Session - Coordination of Global to Regional Geodetic Efforts through the United Nations

Commission: 2 & 5

Discussion paper

A Geodetic and Positioning Thematic Layer – Identifying Tools to Connect the GGRF and IGIF

Allison Craddock (USA), Graeme Blick (New Zealand), Ryan Keenan (Australia), Mikael Lilje (Sweden) and Rob Sarib (Australia)

Future 2021 Activities

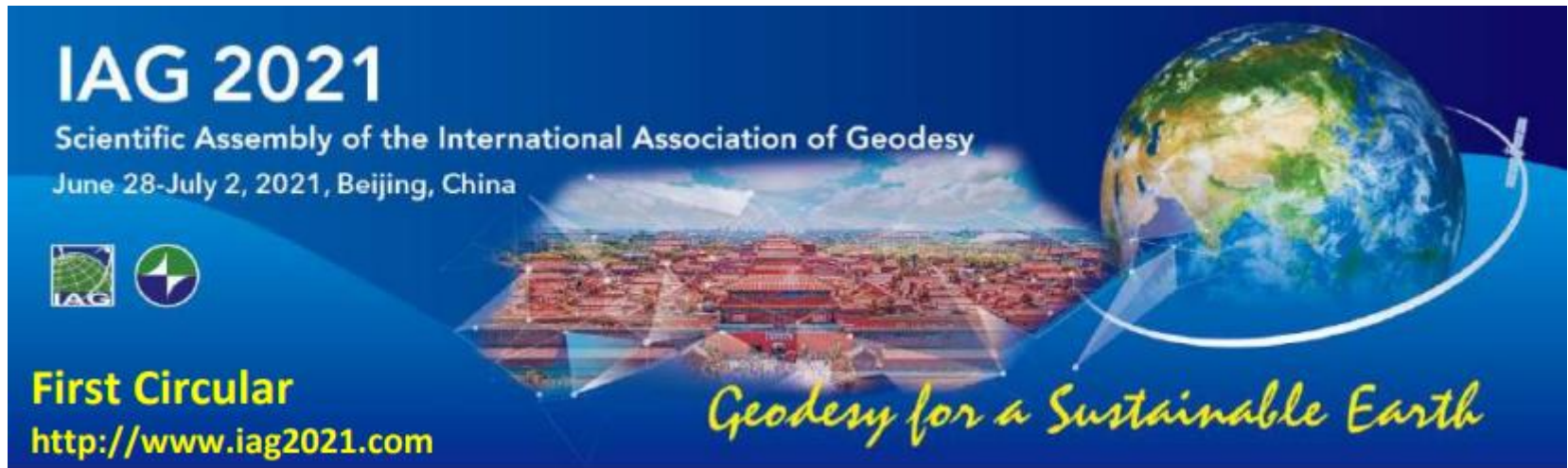
UN SCoG ETCB & UN GGIM

**2021 Regional Geodetic Capacity
Development Questionnaire**



*Opportunity to
have your say!*

Future 2021 Related Activities ?



Symposium 5, Session 6: Geodesy contributions to address societal challenges

This session solicits contributions focusing on aspects of :

- Development of sustainable Global Geodetic Reference Frame (GGRF)
- Global and Regional collaboration to sustain GGRF
- Recent progress from the UN, GEO and other stakeholders
- Common challenges in geodesy that are related to societal issues

Future 2021 Related Activities ?

Possible GNSS CORS / Modernising Geodetic Datums / Capacity Development sessions

United Nations/Mongolia Workshop on
the Applications of Global Navigation Satellite Systems

ULAANBAATAR, MONGOLIA, 25 - 29 OCTOBER 2021

Organized jointly by
UN OOSA and
Mongolian Geospatial Association

Co-organized and co-sponsored by
International Committee on Global Navigation Satellite Systems and
Agency for Land Administration and Management, Geodesy and Cartography
of the Government of Mongolia



UNITED NATIONS
Office for Outer Space Affairs

SPACE4SDGS



BRINGING THE BENEFITS OF SPACE TO HUMANKIND