Positioning in the Pacific Islands

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Presentation Outline

• Introduction
• History
• Positioning in the Pacific Islands
• Importance
• Building Capacity & Resilience
• Future Directions
• Pacific Geospatial & Surveying Council
SPC Member Countries
SPC Geoscience Division Goal

“to apply geoscience and technology to realise new opportunities for improving livelihoods of Pacific communities.”

Country Office: Honiara, Solomon Islands. 
For contact details – Website: www.spc.int Email: spc@spc.int
Global Geodetic Reference Frame

The UN-GGIM Roadmap...

In February 2015 the UN General Assembly adopted the resolution “A Global Geodetic Reference Frame for Sustainable Development” - the first resolution recognizing the importance of a globally-coordinated approach to geodesy.

As per UN Resolution A/69/L.53

In the Pacific...Australia, Fiji, New Zealand, Papua New Guinea, Samoa, Solomon Islands, Tuvalu, Vanuatu
Positioning Infrastructure underpins ALL Infrastructure
Topographical Maps and Hydrographic Charts
Pacific Sea Level Monitoring Project (PSLMP)

- The Pacific Sea Level Monitoring (PSLM), operates under the Climate and Oceans Support Program in the Pacific (COSPPac). It is a continuation of the 20-year South Pacific Sea Level and Climate Monitoring Project (SPSLCMP)
- Comprises of a tide gauge network component and geodetic monitoring component
- To monitor sea level over a long time period, vertical crustal movement of the earth needs to be accounted for, to provide an absolute reading from the tide gauge
- Geodetic monitoring component is maintained by Geoscience Australia
  - Providing a long term height time series of data
  - Consistent, accurate, global geocentric terrestrial reference frame – ITRF2008
  - Meeting accuracy requirements to match the expected sea level rise determined from over a century previous global tide gauge measurements of 1mm/annum
Pacific Sea Level Monitoring Project

Participating Countries:
- Palau
- Marshall Islands
- Kiribati
- Nauru
- Federated States of Micronesia
- Manus Island
- Solomon Islands
- Tuvalu
- Samoa
- Tonga
- Niue
- Cook Islands
- Fiji
- Vanuatu
- Papua New Guinea
- Australia
- Canberra


Tide Gauge Station
GNSS Station (CORS) – Lautoka, Fiji.

- Established in November 2002; Supported by Survey Department - Fiji

13 sites across the pacific

- 1 x permanent tide gauge at each, measuring local sea level
- 1 x Constant GNSS station at each, measuring local earth movement in an absolute coordinate system
- Regular levelling survey between the tide gauge and CGNSS station allow absolute determination of the vertical height of the tide
GNSS Station (CORS) – Lautoka, Fiji.

- IGS Network

Online GNSS Solutions

- AUSPOS, OPUS, PositioNZ, Canadian PPP
Maritime Boundaries of the Pacific Island Countries
Geodetic Reference Frame - Pacific

Legend
- Pacific Countries
- American Territories
- Australian Territories
- Pacific Countries (Local Reference)
- French Territories
- New Zealand Territories
- British Territories
- Pacific Countries (ITRF)
Tonga Geodetic Reference TGD2005
Fiji Islands Geodetic Reference Frame

THE DEFINITION AND ADJUSTMENT OF THE FIJI GEOGRAPHIC DATUM -1986
J. Hannah and J. Maseyk
Department of Survey and Land Information, Wellington, New Zealand

Fiji Map Grid (FMG1986) is based on the Gauss-Krüger Transverse Mercator projection where:
- Latitude of Origin = 17° 00' South
- Central Meridian = 178° 45' East
- Scale Factor at Origin = 0.999854
- False Northing = 4 000 000m
- False Easting = 2 000 000m
- Ellipsoid of reference = WGS 72
  where \( a = 6378135m \)
  \( \frac{1}{f} = 298.26 \)
GNSS Surveys
Tide Gauge Installation & Tide Watch
Hydrographic Surveys
Topographical Surveys – RTK GNSS
Local Vertical Reference Frame

- A local Constant GNSS site can provide the opportunity to perform accurate baseline measurements when the user only has 1 geodetic quality GNSS receiver available.

- Having observations from a CORS available will allow local Lands & Survey departments to update their current network of survey control from a Local coordinate system onto the International Terrestrial Reference Frame [currently ITRF2008].
Cadastre and Satellite Imagery
GNSS Surveys – Reference Image Points
GNSS Surveys & Satellite Imagery
Reef Delineation Surveys - GNSS

Tauu Islands
(Papua New Guinea)
Why it is Important?

• Natural Disasters
• Climate Change
• Sea Level Changes
• Urban Development
• and etc.
Building Capacity & Resilience

• Survey Technology

• Field Survey Operations
  – Planning
  – Geodetic/Hydrographic/Topographical Surveys
  – Survey Data Processing & Analysis
  – Reporting

• Survey Standards & Specifications

• Survey Guidelines
Future Directions

• Geodetic Infrastructure
• Global Geodetic Reference Frame
• Geodetic Registry (Spatial Database)
• Capacity Development for Pacific
Pacific Geospatial & Surveying Council

• Independent regional body advancing geospatial and surveying standards and capacity

• Established in the margins of the GIS/RS User Conference in November 2014

• Governed by the PGSC Charter endorsed by 11 Pacific Island governments

• Supported by PGSC Partnership Desk (SPC)

For more info, visit: http://gsd.spc.int/pgsc/
PGSC Vision

*Sustainable development in the Pacific enabled by world class geospatial information and surveying services*
PGSC Strategy

- 10-year regional plan for developing geospatial and surveying capacity
- Collaborative process
- Member ownership
Purpose

1. To demonstrate the critical nature of geospatial and surveying information and services and the development and maintenance of these services in the Pacific region;

2. To articulate the collaborative aspirations of the region’s geospatial and surveying professionals in advancing capacity;

3. To guide the development of sustainable geospatial and surveying information and services in Pacific Island Countries & Territories, and;

4. To serve as an entry point for engagement with internal and external partners.
PGSC Strategy Goals

1. Leadership and Visibility
   • The PGSC enables regional leadership, guidance and support for members to engage stakeholders and the community on geospatial and surveying activities.

2. Standards and Technology
   • Countries across the region adopt a modern Geodetic Reference Frame (GRF) and improved technology underpinning geospatial systems and applications.

3. Sustainability
   • Geospatial and surveying activities at the national and regional level are supported by a diverse and sustainable resource base.

4. Capacity Building
   • The geospatial and surveying community is self-reliant with a culture supportive of learning innovation and gender equity.
Thank You