

MIGRATION FROM LOCAL DATUM (FGD86) TO INTERNATIONAL RECOGNISED DATUM (ITRF)

By: Asakaia Tabua
Paserio Samisoni
Sanjesh Kumar

Ministry of Lands & Mineral Resources

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History

1978

5 years

1983

New Zealand Government review the survey and mapping activities in Fiji and recommended for the establishment of a Datum for Fiji.

New Zealand S established a local reference datum for Fiji called the Fiji Geodetic Datum 1986 (FGD86) which is base on the World Geodetic Systems 1972 (WGS72).

Is FGD86 Relevant?

- ❖ Has poor accuracy with a significant difference of over 20 meters with International Terrestrial Reference Systems (ITRS).
- ❖ Fiji Geodetic Datum 1986 is outdated compare to international standard.

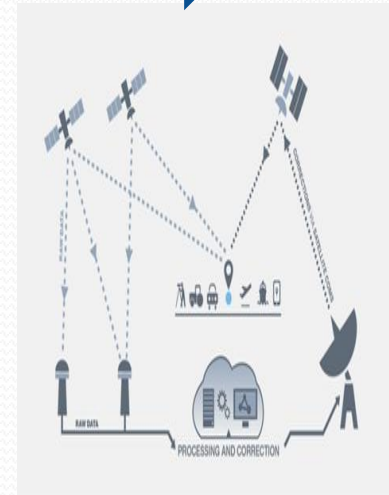
RELEVANCY

1983

Fiji Geodetic Datum 1986 (FGD86)

IRRELEVANT

32 years



2015

Fiji recognize the importance to migrate from FGD86 to International recognize datum (ITRF) later in 2015.

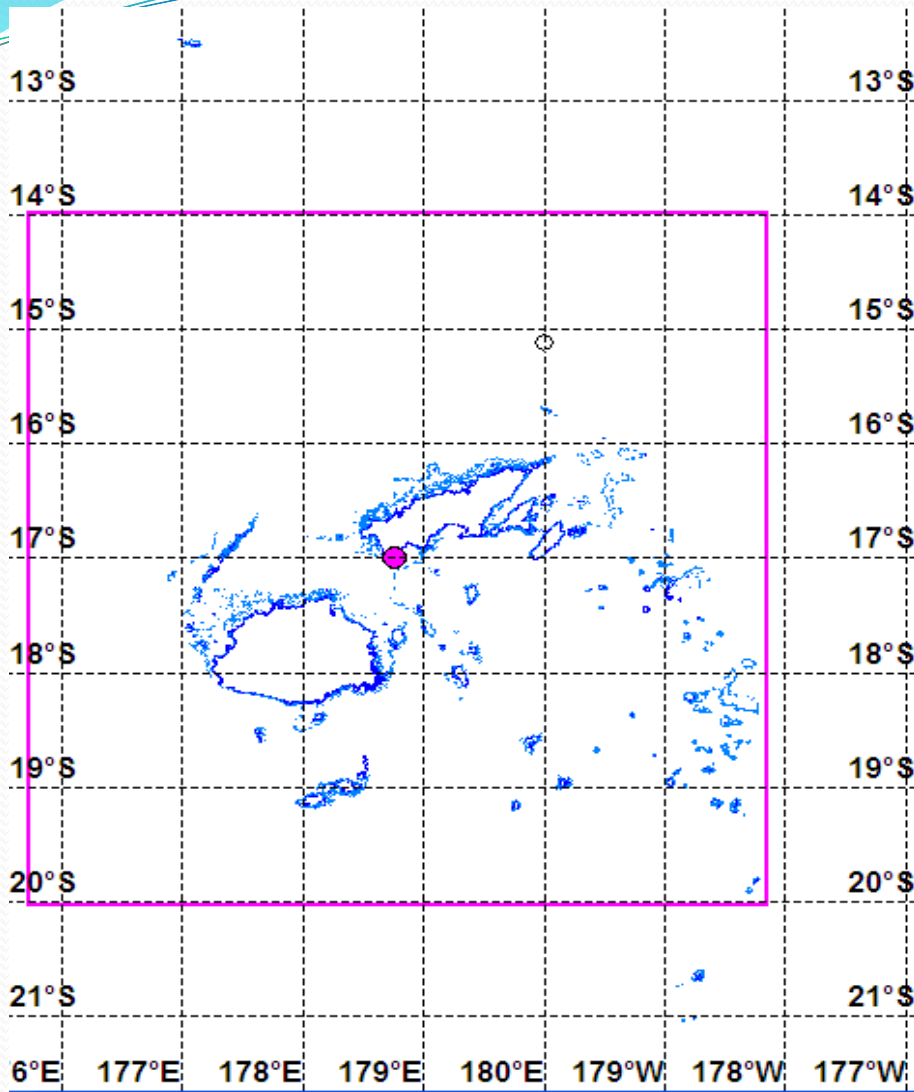
WGS72 versus WGS 84

The local Fiji Geodetic Datum is not compatible to the modern technology used by Civil Aviation Authority, Navigation Organisation and other Organisations relying heavily on satellite for positioning



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Fiji Map Grid



Hemisphere South
Central Scale Factor 0.9998500000
Central Meridian 178.45000000
Zone Width 6.0
False Latitude 17.0000000000
False Easting 2000000.00
False Northing 4000000.00
Minimum Latitude -22.00
Maximum Latitude -13.00
Projection - Transverse Mercator

DO FIJI NEED TO ADOPT MODERN DATUM?

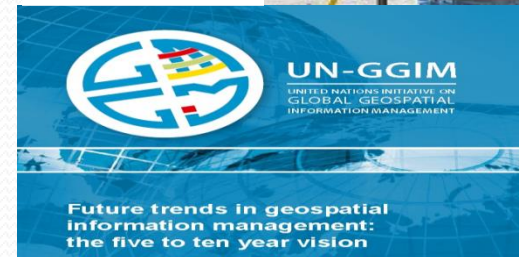
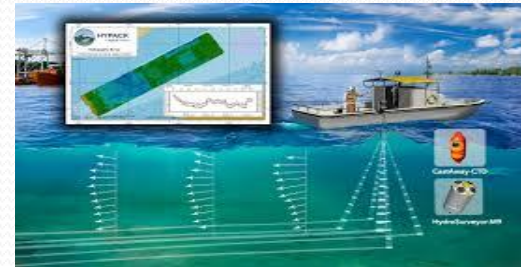
❖ International Civil Aviation Organization

- AFL **in dire** need for a review/resurvey of their respective AERODROME DATA so as to comply with (ICAO) requirement

❖ International Hydrography Organization

❖ International Federation of Surveyors (FIG)

❖ UN-Global Geospatial Information Management (UN-GGIM)



HOW IT BENEFIT COMMUNITIES

- International Civil Aviation Organisation (ICAO) recognised the adoption of modernised geodetic datum to effectively and efficiently monitor safety aspects of air traffic control and expected route flights to follow. This will lead to a more dynamic airspace which can reduce aircraft congestion.
- GPS is a 24/7, all weather system, that can be used with satellite based communications to provide an invaluable aid to Navigation and in times of distress.
- The Transport Industry will rely on GPS; truck fleets, taxis, courier companies and commercial shipping will use GPS to monitor fleet movements.
- Safety and emergency services and law enforcement agencies will be major beneficiaries of GPS. They will use GPS for navigation to get to a location easily and quickly.

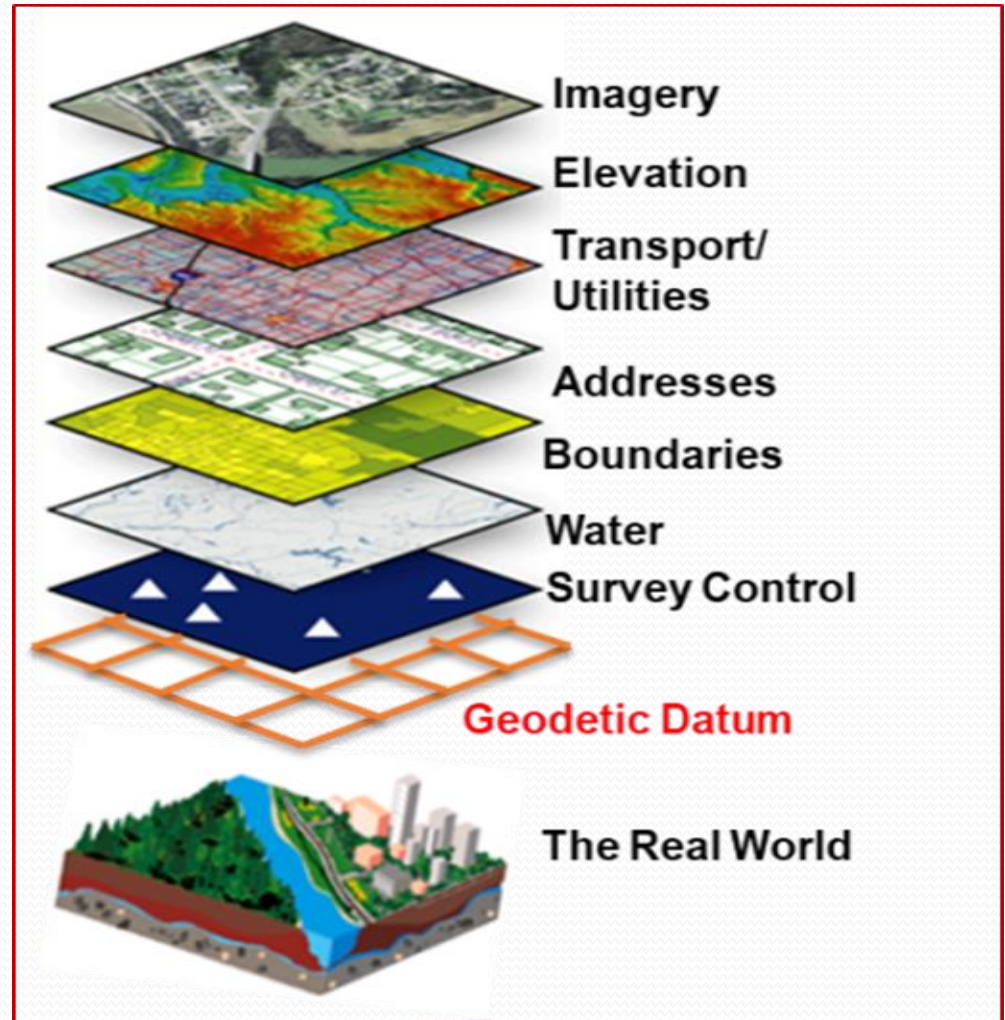
Economic and Scientific importance

- Precise location of Geographic Information assist in addressing issues such as:
 - ✓ Sea level and climate change monitoring,
 - ✓ Natural hazard and disaster management
 - ✓ Industrial application including mining, agriculture, transport and construction industry.
 - ✓ Safer air, land and sea navigation;
 - ✓ Spatial data interoperability; and
 - ✓ Land management

Importance of Datum

Basis of Geospatial Information

Data is underpinned by common reference system or geodetic datum



Basis of geospatial information for Sustainable Development

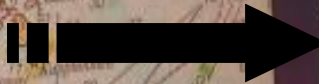
National Mapping
Cadastre

Natural Hazards

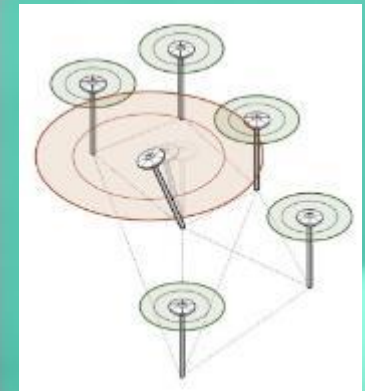
Emergency Management

Transport

Construction



Land use planning
Geoscience (sea level rise,
neo-tectonics etc.)
(many more)



WHAT HAPPEN AFTER 32 YEARS

GLOBAL GEODETIC REFERENCE FRAME (GGRF) UN RESOLUTION



- Ambassador Peter Thomson- Fiji's Permanent Representative to the United Nations in New York has been requested to sponsor the tabling of this Resolution to the General Assembly (GA).
- The resolution was table in 2015 and adopted by the GA



5th Session of UN-GGIM - 2015

6th August 2015 – Joint Meeting – Norway and Fiji Delegation



Fiji Government Cabinet Decision

- 1st September 2015 - Cabinet approved the project to modernize Fiji's datum

60. H.E. Ms. Mereseini R Vuniwaqa, Government Minister, Ministry of Lands & Mineral Resources

61. Mr Asakaia Tabuabisataki, Acting Principal Surveyor, Ministry of Lands and Mineral Resources

62. Ms. Akata Takala, Geospatial Information Management, Ministry of Lands & Mineral Resources

63. Mr. Peni Suveinakama, Second Secretary, Permanent Mission of Fiji to the United Nations

Modern Datum

- By establishing new a geodetic datum, it enable Fiji to move towards its own national spatial data infrastructure, and also aligning to the global infrastructure. This ensured compatibility across various geographic information systems at the local, regional, national and global level.

FIJI GEODETIC DATUM PROJECT

OBJECTIVES

- ❑ To upgrade the existing local datum to internal standard

FIJI DATUM PROJECT PLAN

FIJI DATUM PROJECT PLAN

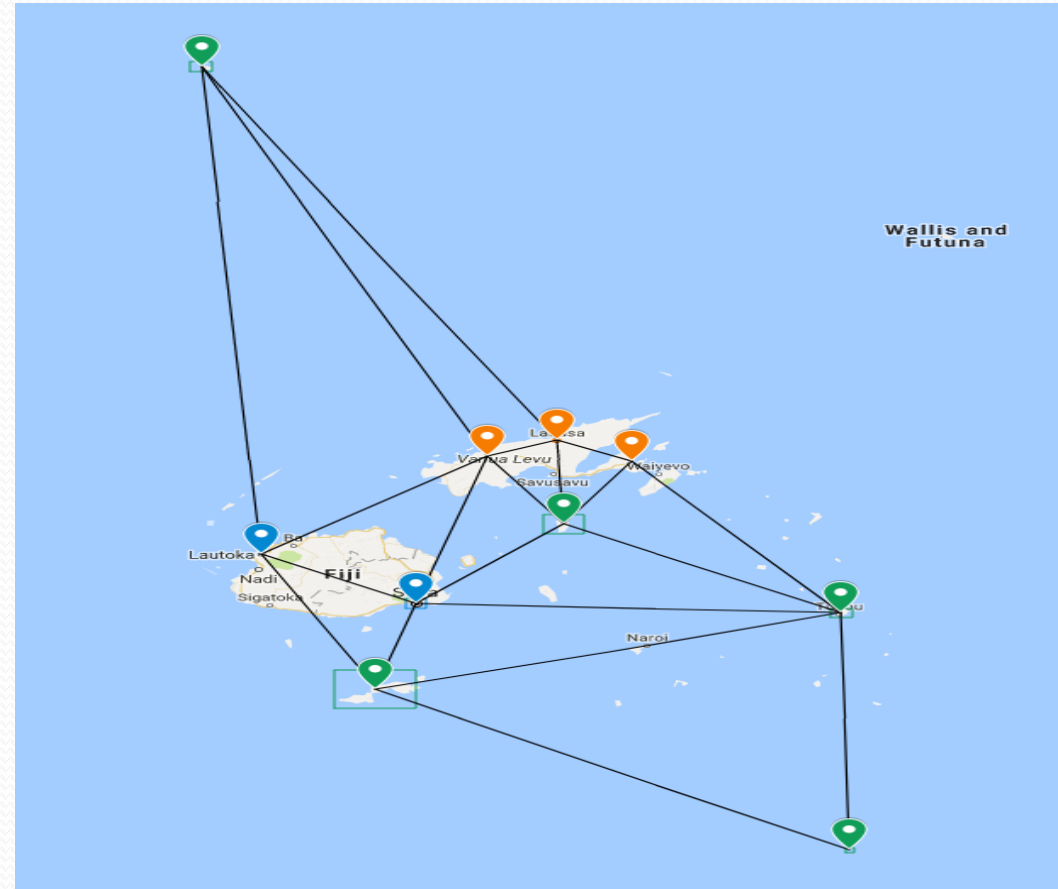
The project is scheduled for three (3) years with budgetary provision of approximately \$2.4m

Phase One

- Select the international datum and reference epoch to be adopted as the basis of the new national datum.
- Physical infrastructure establishment across Fiji - GNSS Continuously Operating Reference Station (CORS) network

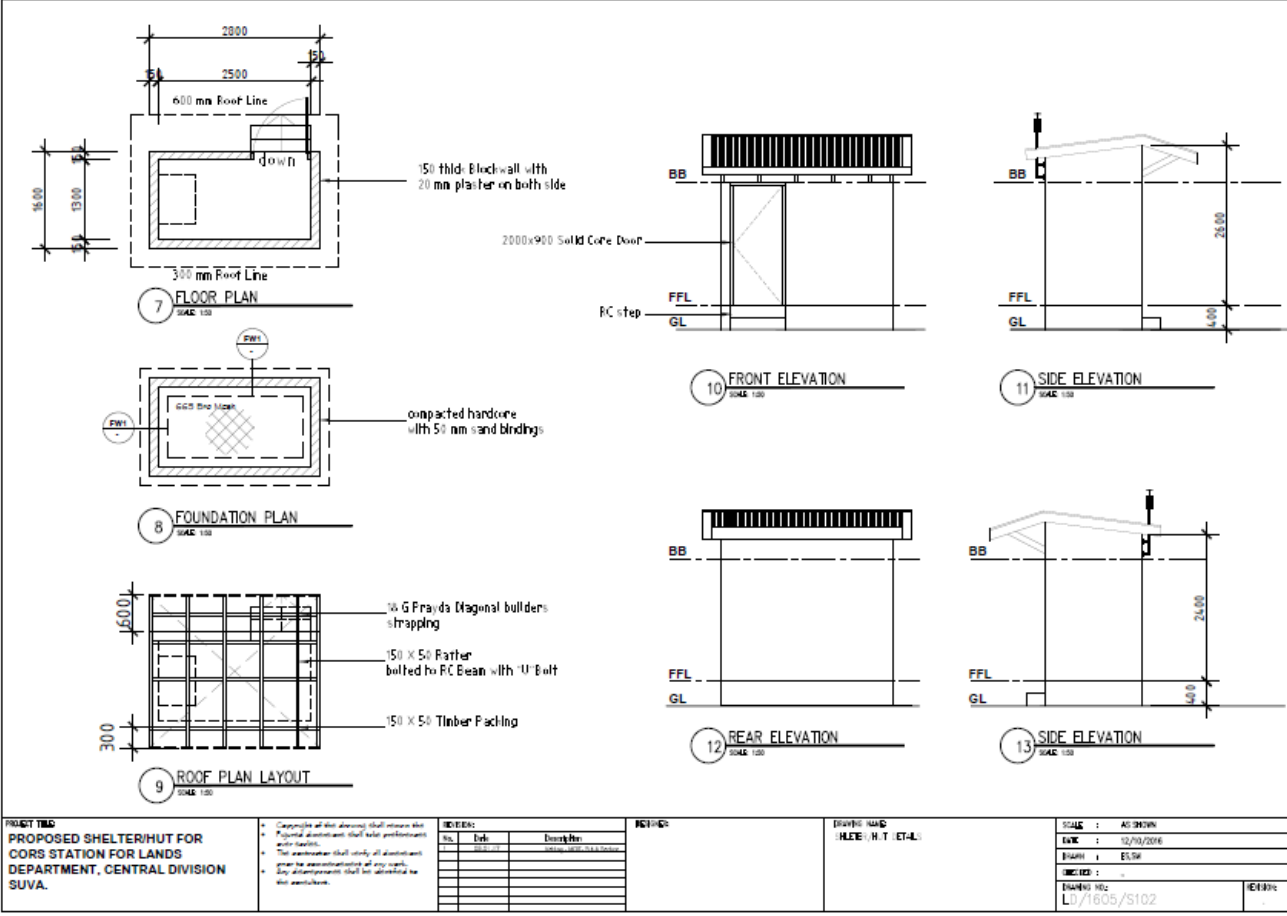
FIJI CORS NETWORK

- Geosciences Australia
 - LAUTOKA
 - SUVA
- High Target Sites
 - LABASA
 - TAVEUNI
 - NABOUWALU
- Leica Geosystems
 - ROTUMA
 - KORO
 - KADAVU
 - LAUTOKA
 - ONO

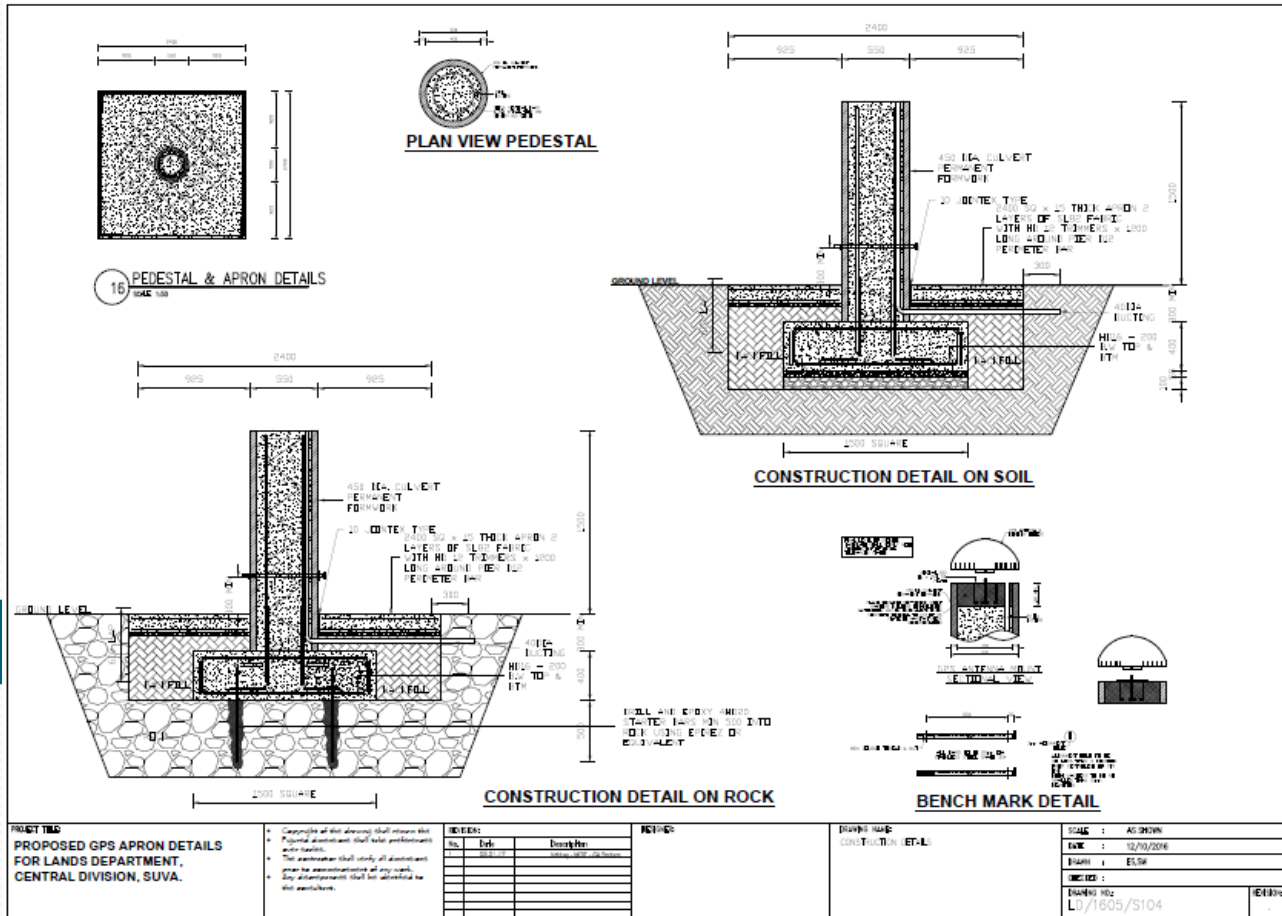


STANDARD

HUT

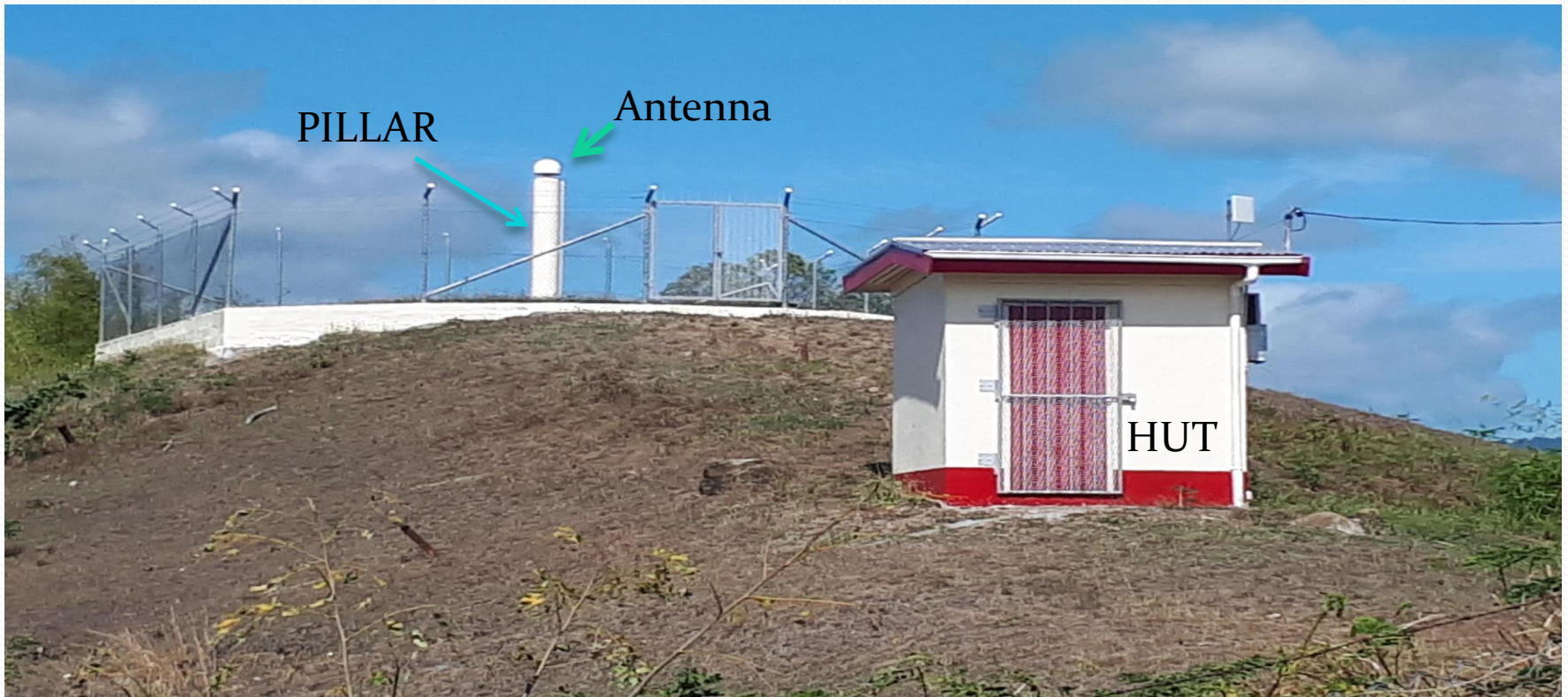


STANDARD



Pillar 1

LABASA CORS



NABOUWALU CORS



TAVEUNI CORS



ROTUMA CORS



KADAVU CORS



ONO – I - LAU CORS



LAKEBA CORS



HARDWARE

RECEIVER



ANTENNA



Con't

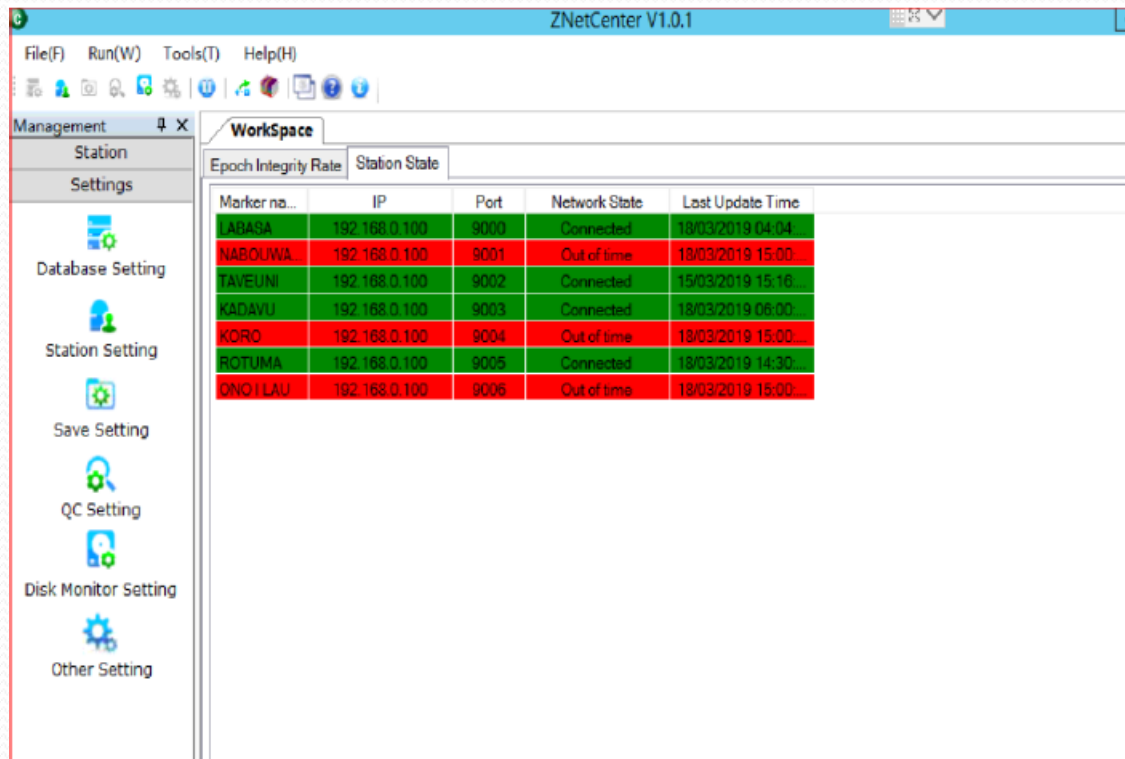
RECEIVER



ANTENNA



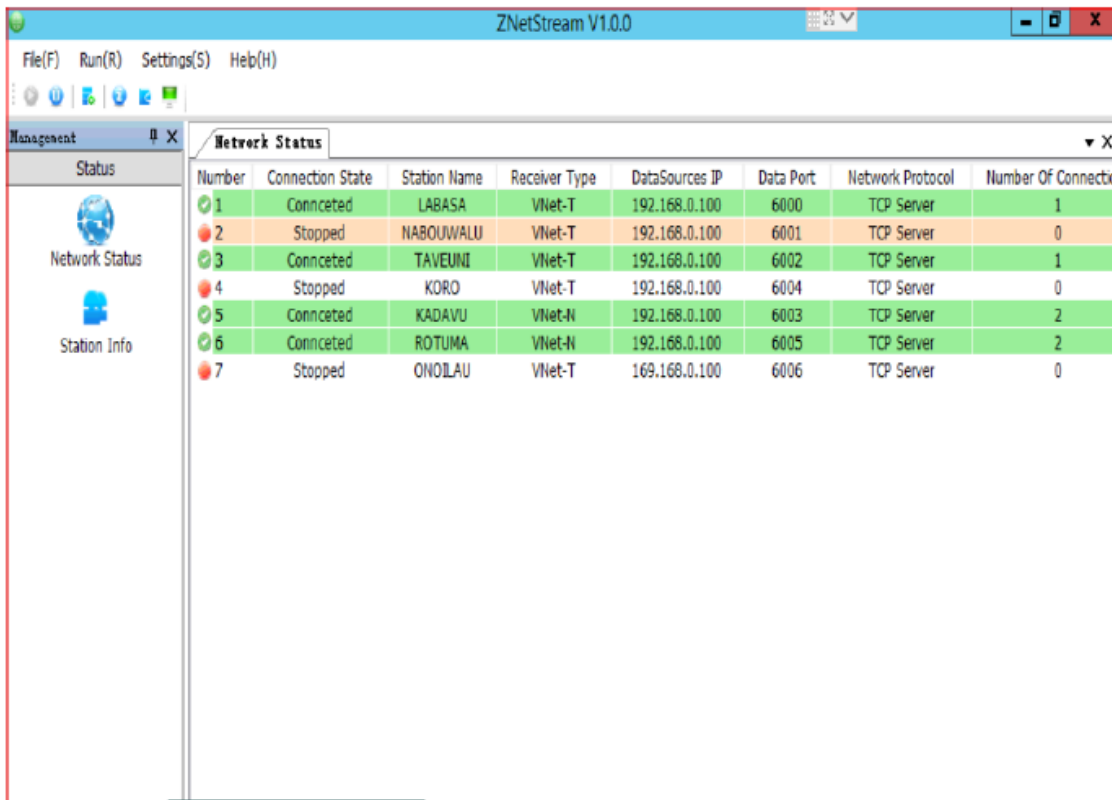
SOFTWARE



ZNetCenter

-> Rinex Logging and Quality Checking

Con't



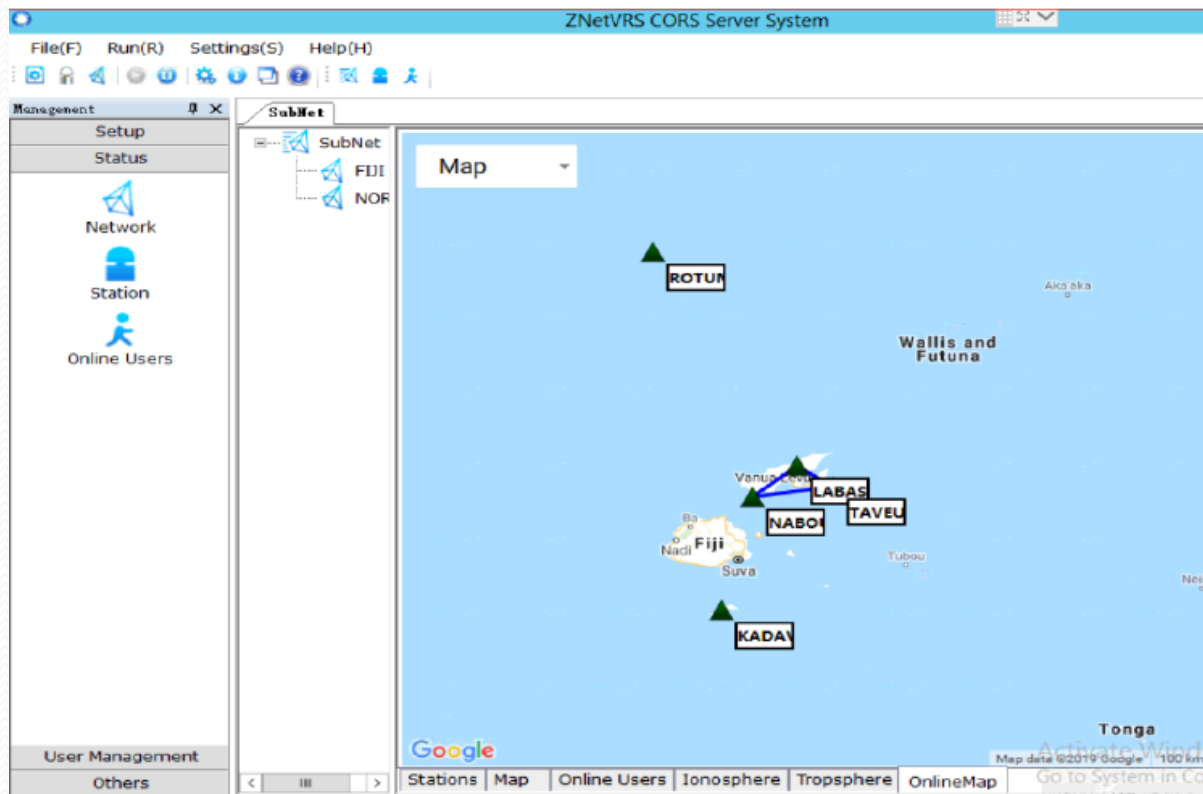
The screenshot shows the ZNetStream V1.0.0 application window. The title bar reads "ZNetStream V1.0.0". The menu bar includes "File(F)", "Run(R)", "Settings(S)", and "Help(H)". The main window is divided into a "Management" sidebar on the left and a "Network Status" table on the right. The sidebar has "Status" selected, with "Network Status" and "Station Info" options. The table lists 7 stations with their connection states, names, receiver types, data source IP addresses, data ports, network protocols, and the number of connections.

Number	Connection State	Station Name	Receiver Type	DataSources IP	Data Port	Network Protocol	Number Of Connection
1	Conncted	LABASA	VNet-T	192.168.0.100	6000	TCP Server	1
2	Stopped	NABOUWALU	VNet-T	192.168.0.100	6001	TCP Server	0
3	Conncted	TAVEUNI	VNet-T	192.168.0.100	6002	TCP Server	1
4	Stopped	KORO	VNet-T	192.168.0.100	6004	TCP Server	0
5	Conncted	KADAVU	VNet-N	192.168.0.100	6003	TCP Server	2
6	Conncted	ROTUMA	VNet-N	192.168.0.100	6005	TCP Server	2
7	Stopped	ONOILAU	VNet-T	169.168.0.100	6006	TCP Server	0

ZNetStream

-> Data Stream and Data Splitting

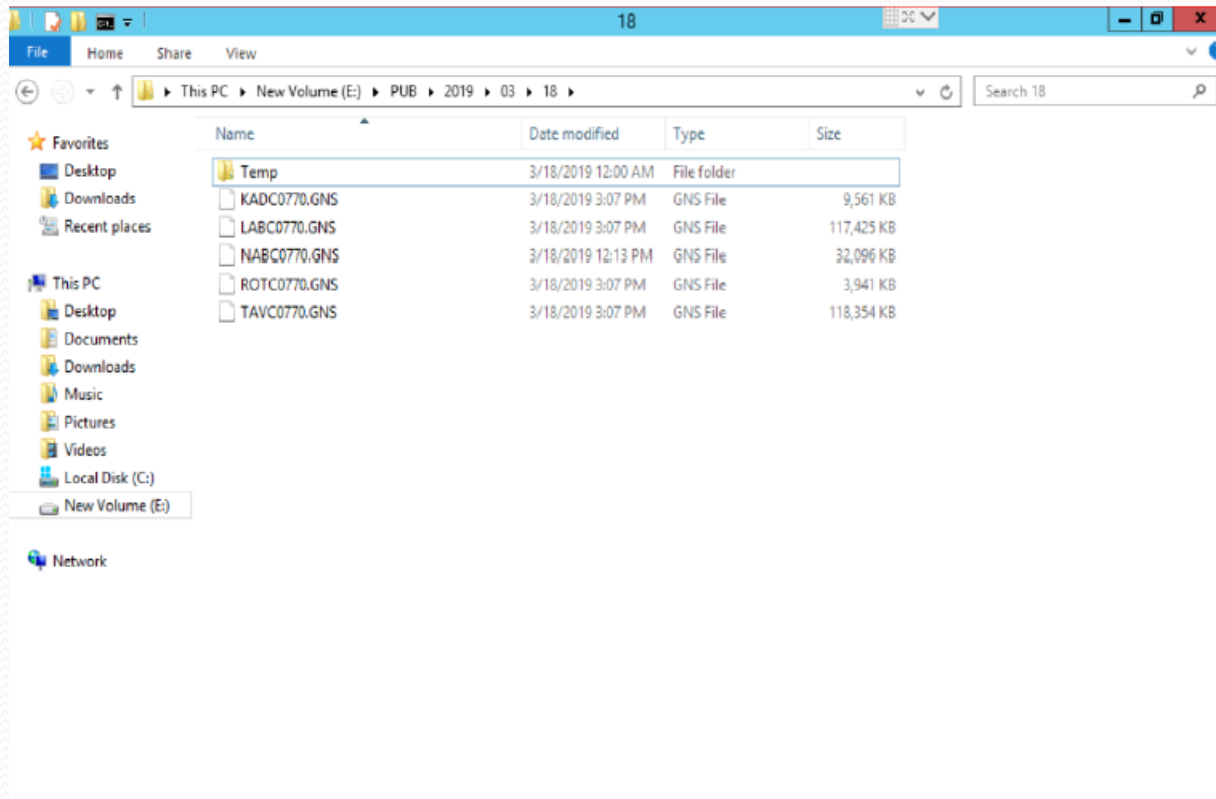
Cont.



ZNetVRS

-> Multi-base system for Baseline solving & error modeling.
Also providing Ntrip Service.

TRACKING OF RAW DATA

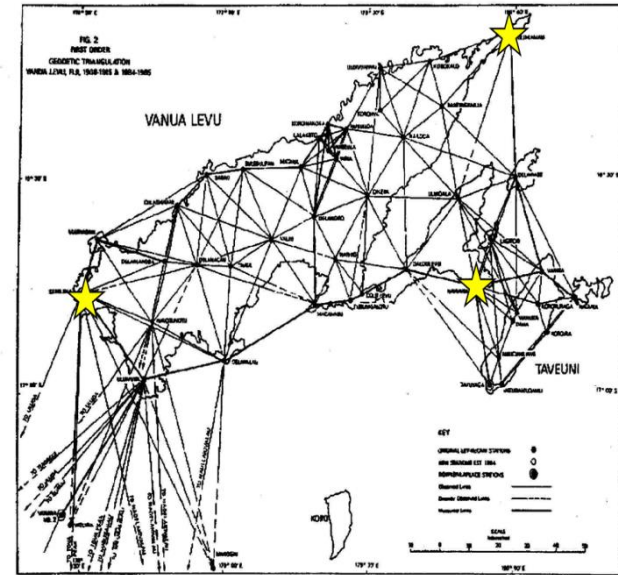
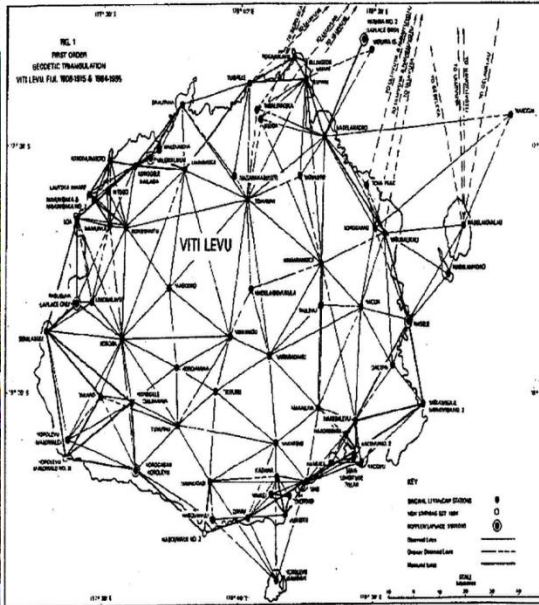


-> Raw satellite data is downloaded to the Server in Suva from the 5 base stations

FIJI DATUM PROJECT PLAN

Phase Two

Field Campaign - High level passive control marks resurveyed with Continuous Observation across Fiji by the use of GNSS equipment for 24/7.



IMPLEMENTATION PLAN

Datum Project GNSS Survey Campaign

May 2019



PROJECT SPECIFICATIONS & IMPLEMENTATION PLAN

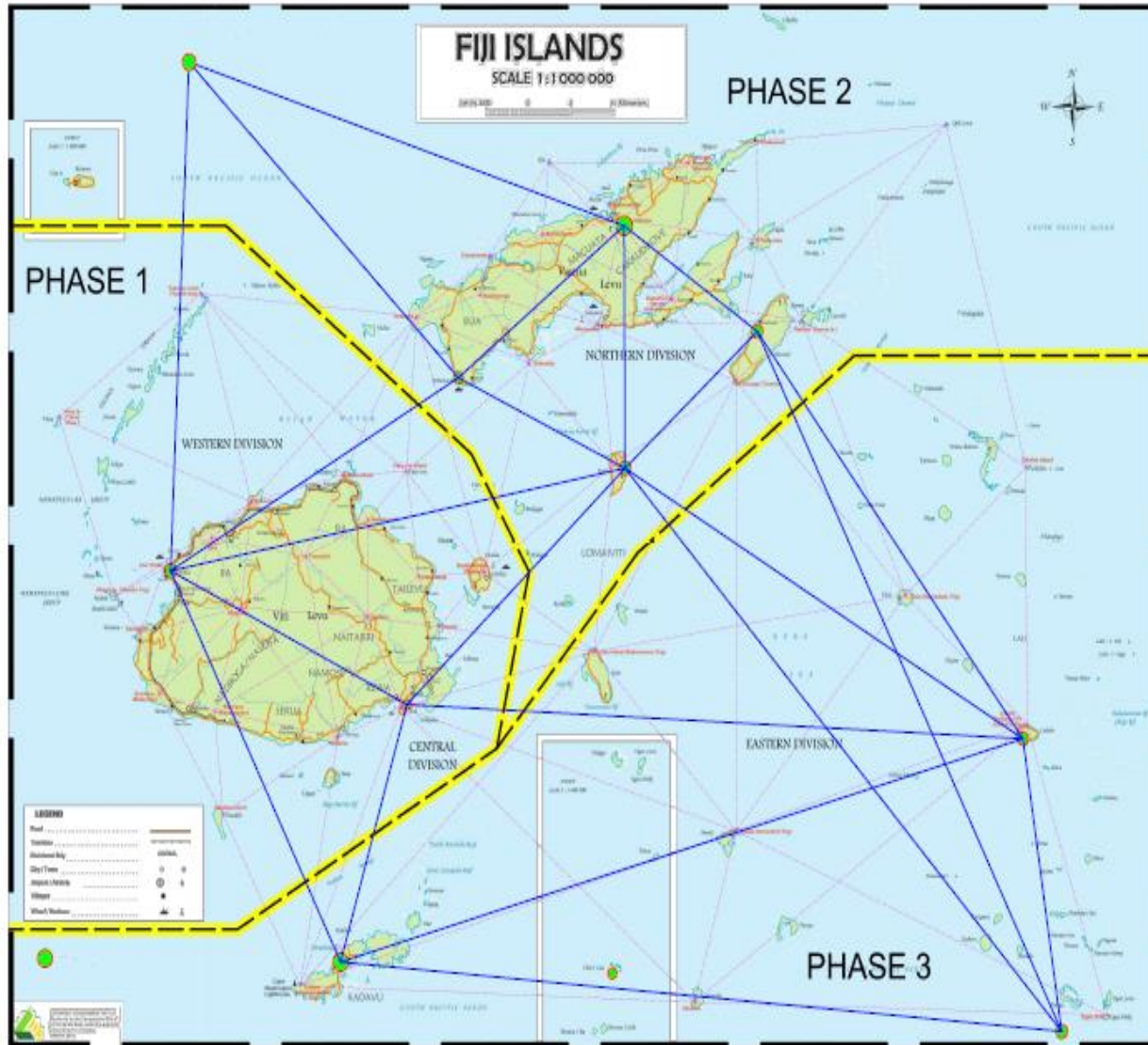
MODERNIZING FIJI'S GEODETIC DATUM PROJECT

MAY - DECEMBER 2019

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Field Campaign Work Plan



Vanua
Occupy 29
Stations

Levu-
Trig

Viti Levu

Occupy 30
Trig
Stations

Southern Fiji -
Occupy 13 Trig
Stations

CHALLENGES

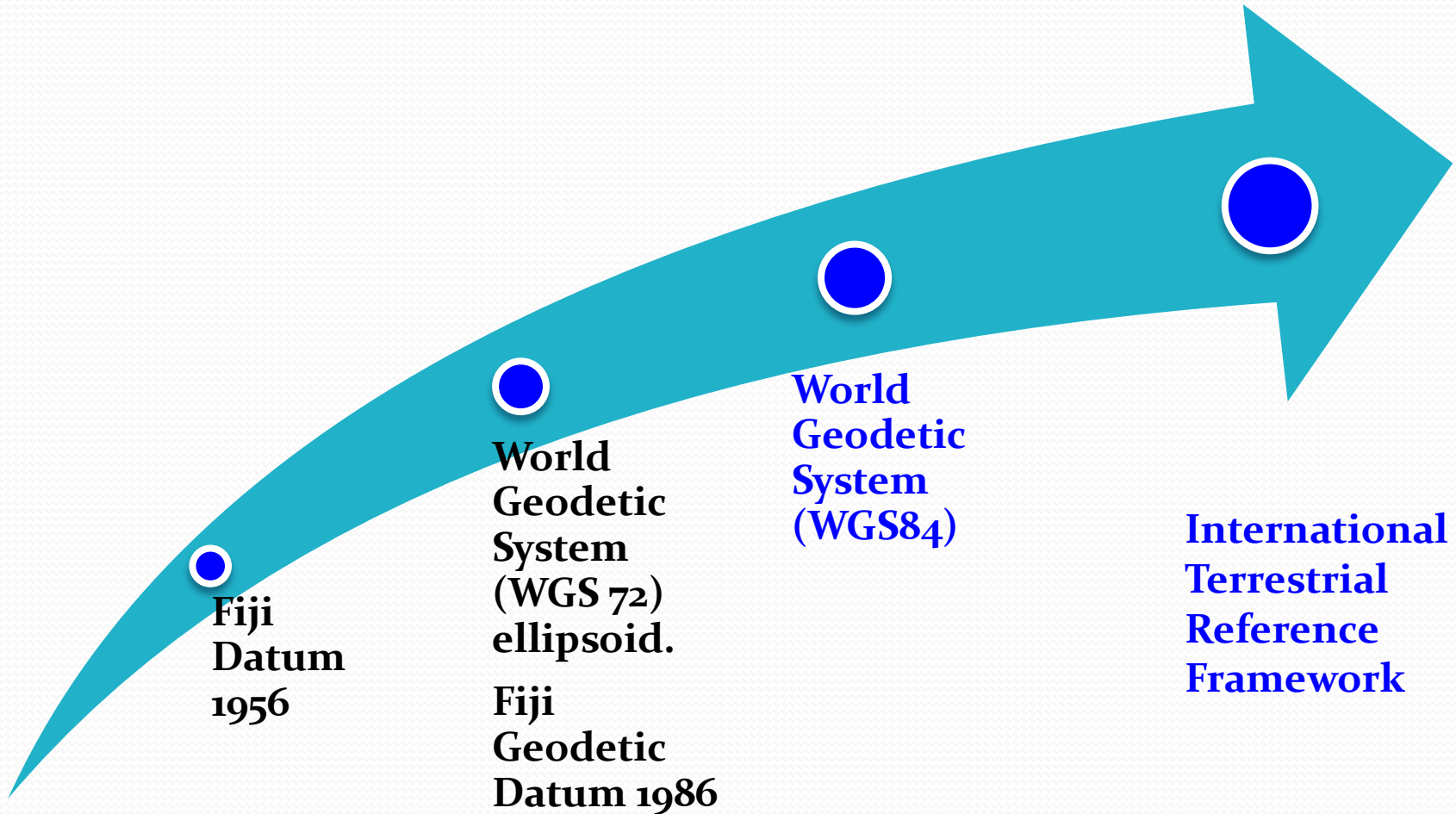
- Availability of GNSS Equipment
- Human resources
- Accessibility to all Trig stations
- Communications

FIJI DATUM PROJECT PLAN

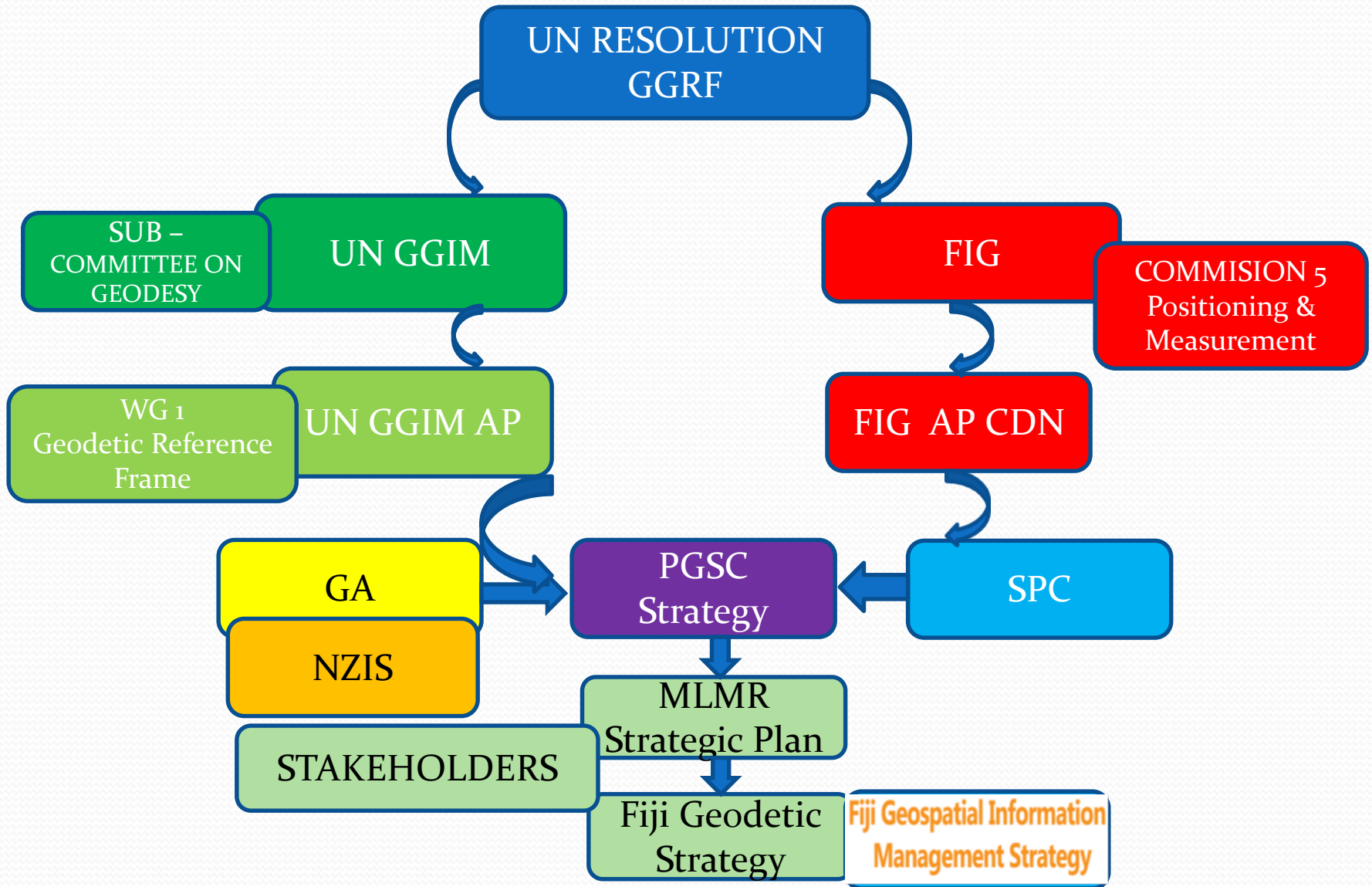
Phase Three

- Development of National Transformation Parameter;
- Development of standards and documentation including a Fiji Datum technical manual describing the datum and associated map projection;
- Creation of a dataset of geodetic observations that would support national geodetic adjustment and
- Data management and dissemination
- A program of education and CPD for Stakeholder & industry

FROM WGS72 - ITRF



Fiji Geodetic Strategy Model



Priorities Area

- Accessibility to ITRF station
- Establishing more GNSS CORS across Fiji
- Transforming of existing geospatial information to new datum
- Formulate new Policy and Guideline
- Updating Relevant Legislation

THANK
YOU

