


# **MODERNISING THE FIJI GEOSPATIAL REFERENCE SYSTEM PROJECT**





# WHERE WE START?

- ▶ Resolution Adopted at the UN General Assembly held 26<sup>th</sup> February 2015
  - ▶ Resolution 69/266 “A Global Geodetic Reference Frame for Sustainable Development.
  - ▶ PGSC Strategy Goal 2 – Positioning - Supporting countries to modernise their Geodetic Reference Frames and align to the Global model
  - ▶ Fiji Government Cabinet Decision – Modernizing Fiji’s Geodetic Datum
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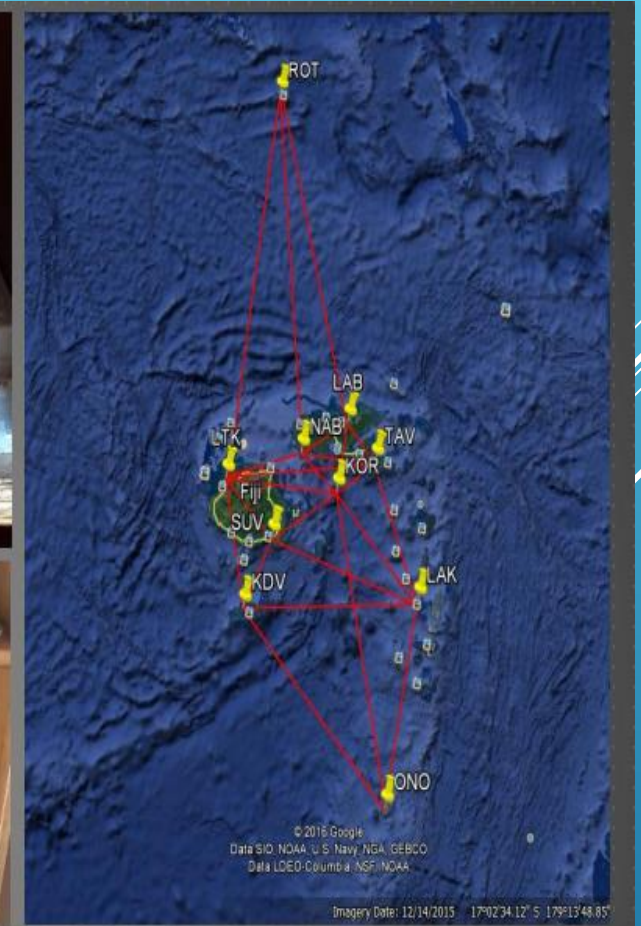
# WHY FIJI NEEDS TO ADOPT A GGRF?

To modernize Fiji's Local Reference Systems to  
Global Geodetic Reference Frame.





# GEODETIC INFRASTRUCTURE





# FIELD SURVEY CAMPAIGN



Three Phases of Field survey campaign



10-16 November 2019



7-15 December 2019



26 Jan – 2 Feb 2020

Human Resources  
65 Personnels

Equipment  
16 Trimble GNSS  
11 Leica GNSS

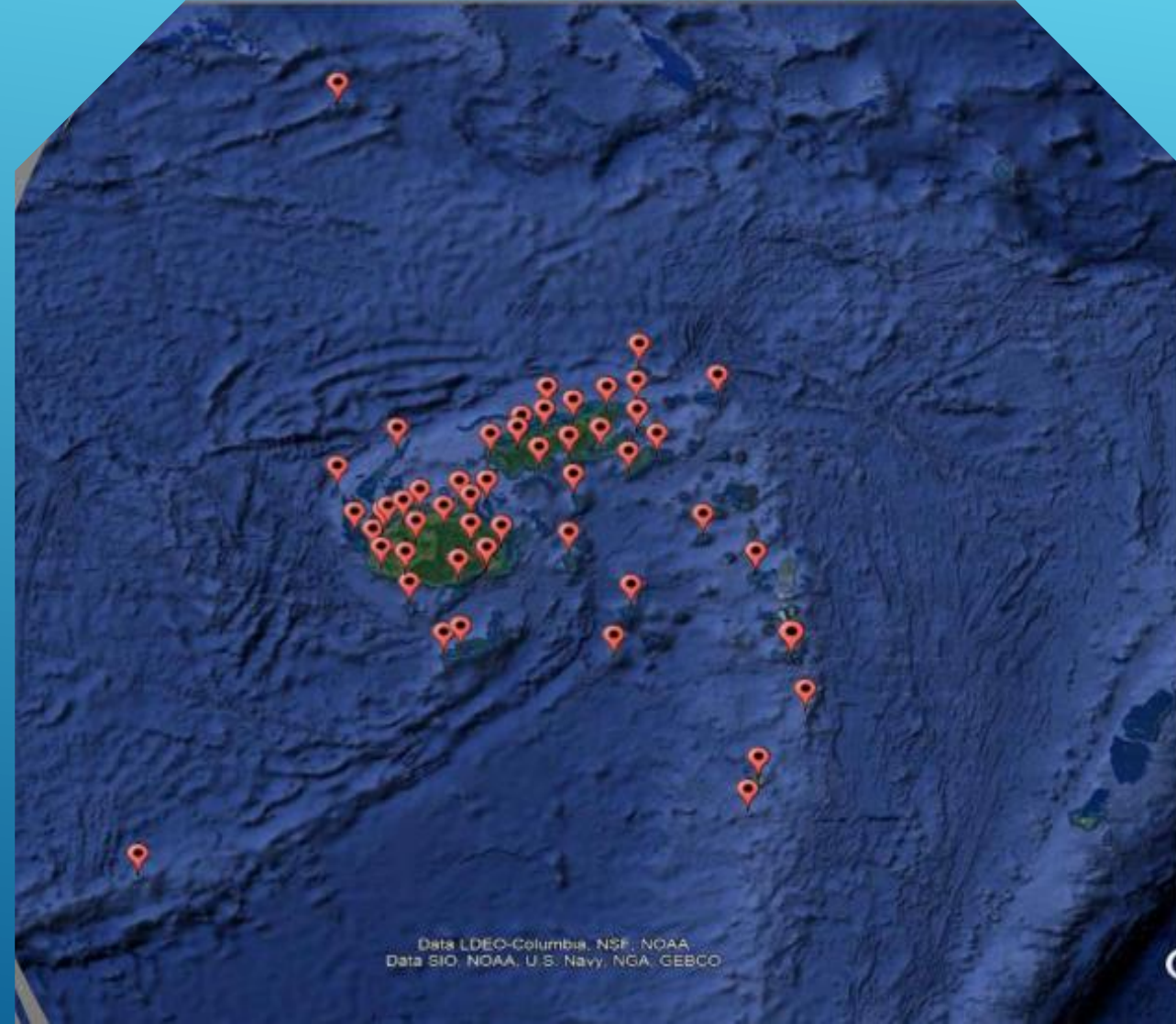




# STATIONS OCCUPIED

## Stations Occupied

- 51 stations – 7 days
- 104 stations 6 hours
- 43 stations – 1 hr



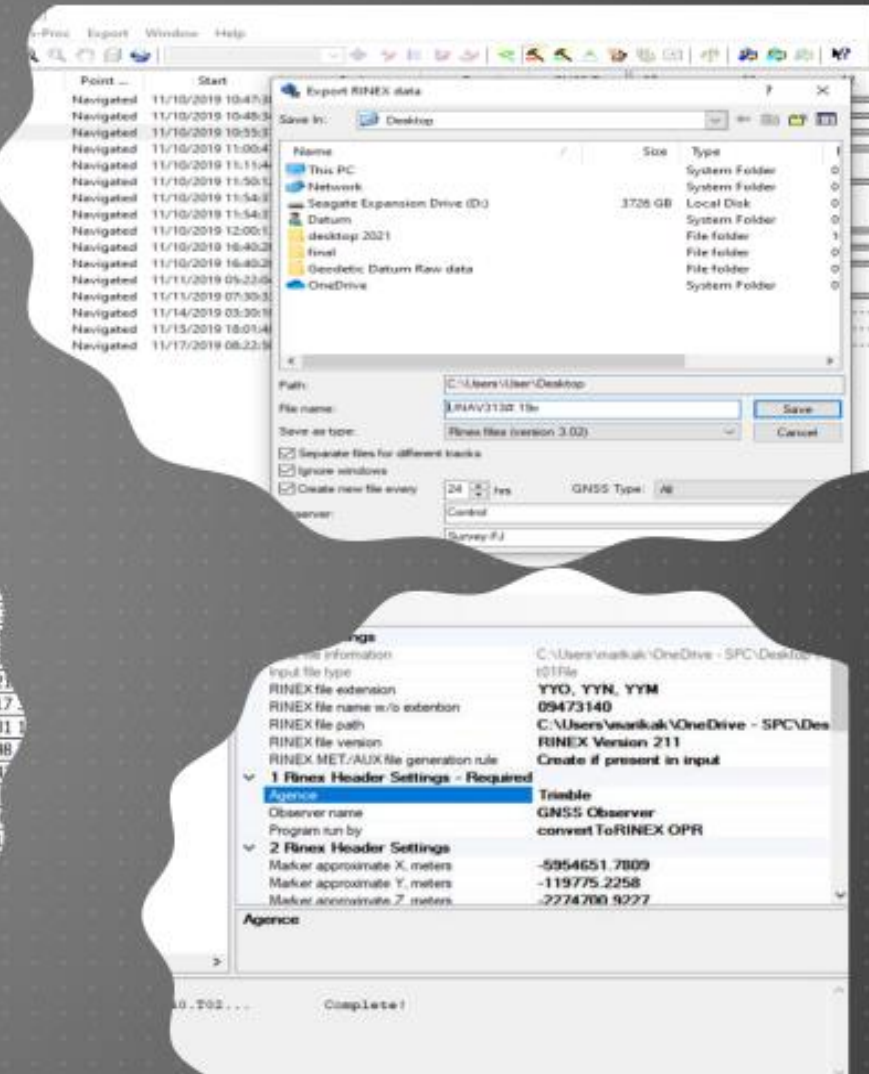


# GNSS DATA VALIDATION

- ▶ Data Storage
- ▶ Data Downloading
- ▶ Data Conversion
- ▶ Data format
- ▶ GNSS Occupation Summary
- ▶ Locality Diagrams
- ▶ Field Survey Sheets
- ▶ Data Source
- ▶ Check and verify meta data



VITI LEVU & SURROUNDING ISLANDS			
WGS 72			
Latitude	Longitude	MSL Ht	Latitude
18 08 35.28307 S	178 26 24.43342 E	68.57	18 8 35.279 S
		1.889	18 14 53.483 S
17 51 36.91470 S	178 36 31.20563 E	50.353	17 51 36.910 S
18 30 55.011 S	177 38 49.063 E	8.8	18 30 54.9704 S
18 09 16.64688 S	177 36 48.24271 E	329.58	18 9 16.6462 S
18 05 31.25589 S	177 21 56.39777 E	237.96	18 5 31.2558 S
17 49 34.2528 S	178 17 31.57718 E	149.83	17 49 34.2502 S
17 41 6.58906 S	178 31 10.58872 E	628.56	17 41 6.5862 S
17 40 16.05061 S	178 48 32.17230 E	625.69	17 40 16.0561 S
17 47 29.46092 S	177 43 52.85371 E	888.75	17 47 29.4610 S
17 52 41.52648 S	177 17 3.54343 E	228.99	17 52 41.5269 S
		1323	17 36 53.1252 S
17 29 15.05356 S	178 17 44.70744 E	481.58	17 29 15.0519 S
17 19 41.52831 S	178 11 8.27595 E	203.2	17 19 41.5257 S
17 18 58.29670 S	178 27 58.66570 E	31.78	17 17 11.6775 S
17 25 14.49082 S	177 46 43.06777 E	368.67	17 25 14.4907 S
		480.4	17 32 39.0999 S
17 39 4.43158 S	177 23 37.39203 E	33.8	17 39 4.4320 S
		64.83	17 40 19.3 S
		1.49	
		65.5	


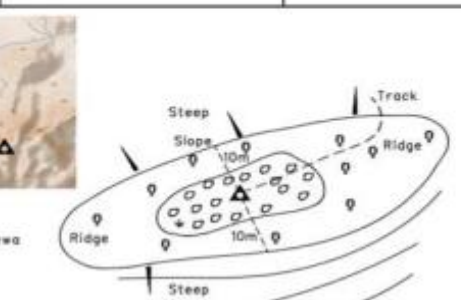

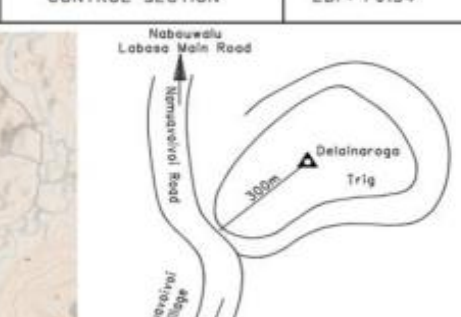




# GEODETIC DATA VALIDATION

Fiji Geodetic Stations Survey Campaign Metadata												
Station ID	Station Name	Occupation Period	Interval	Reason Type	Antenna Type	Base Station	Height (m)	Base Height	Antenna Method	Frequency	Classified By	Build Operation
ST01	Naitasiri	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST010001	5.00	5.00	GPS	1000	ST01	ST01
ST02	Yasuni	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST020001	5.00	5.00	GPS	1000	ST02	ST02
ST03	Labasa	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST030001	5.00	5.00	GPS	1000	ST03	ST03
ST04	Makuluva	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST040001	5.00	5.00	GPS	1000	ST04	ST04
ST05	Macuata	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST050001	5.00	5.00	GPS	1000	ST05	ST05
ST06	Nacala	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST060001	5.00	5.00	GPS	1000	ST06	ST06
ST07	Savani	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST070001	5.00	5.00	GPS	1000	ST07	ST07
ST08	Yasuni	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST080001	5.00	5.00	GPS	1000	ST08	ST08
ST09	Labasa	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST090001	5.00	5.00	GPS	1000	ST09	ST09
ST10	Macuata	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST100001	5.00	5.00	GPS	1000	ST10	ST10
ST11	Naitasiri	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST110001	5.00	5.00	GPS	1000	ST11	ST11
ST12	Yasuni	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST120001	5.00	5.00	GPS	1000	ST12	ST12
ST13	Labasa	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST130001	5.00	5.00	GPS	1000	ST13	ST13
ST14	Macuata	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST140001	5.00	5.00	GPS	1000	ST14	ST14
ST15	Naitasiri	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST150001	5.00	5.00	GPS	1000	ST15	ST15
ST16	Yasuni	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST160001	5.00	5.00	GPS	1000	ST16	ST16
ST17	Labasa	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST170001	5.00	5.00	GPS	1000	ST17	ST17
ST18	Macuata	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST180001	5.00	5.00	GPS	1000	ST18	ST18
ST19	Naitasiri	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST190001	5.00	5.00	GPS	1000	ST19	ST19
ST20	Yasuni	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST200001	5.00	5.00	GPS	1000	ST20	ST20
ST21	Labasa	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST210001	5.00	5.00	GPS	1000	ST21	ST21
ST22	Macuata	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST220001	5.00	5.00	GPS	1000	ST22	ST22
ST23	Naitasiri	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST230001	5.00	5.00	GPS	1000	ST23	ST23
ST24	Yasuni	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST240001	5.00	5.00	GPS	1000	ST24	ST24
ST25	Labasa	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST250001	5.00	5.00	GPS	1000	ST25	ST25
ST26	Macuata	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST260001	5.00	5.00	GPS	1000	ST26	ST26
ST27	Naitasiri	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST270001	5.00	5.00	GPS	1000	ST27	ST27
ST28	Yasuni	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST280001	5.00	5.00	GPS	1000	ST28	ST28
ST29	Labasa	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST290001	5.00	5.00	GPS	1000	ST29	ST29
ST30	Macuata	Continuous	1 day	RTK, Axiom	Trimble NetR9	ST300001	5.00	5.00	GPS	1000	ST30	ST30

Station ID	Start Time	Duration	Campaign	File Name	RRS1 Version	Ant Height	Ant Method	Ant Manufacturer
CDVA	10/11/19 1300hrs UTC	7days	Phase 1	14492152.19a 14492153.19a 14492160.19a 14492161.19a	3.02	1.692	BDN	Tronide
ELMS	10/11/19 1300hrs UTC	7days	Phase 1	42701180.19a 42701181.19a 42701186.19a 42701170.19a 42701180.19a 42701180.19a 42701200.19a	3.02	1.996	BDN	Tronide
NARD	10/11/19 1300hrs UTC	7days	Phase 1	NARD0160.19a	3.02	1.625	Hook Height	Leica
GALL	10/11/19 1300hrs UTC	7days	Phase 1	MORL0190.19a	2.11	1.766	Hook Height	Leica
UNWV	10/11/19 1300hrs UTC	7days	Phase 1	UNWV0140.19a UNWV0150.19a	3.02	1.79	Hook Height	Leica
CR01	10/11/19 1300hrs UTC	7days	Phase 1	CR010130.19a	3.02	1.688	Hook Height	Leica
LULU	10/11/19 1300hrs UTC	7days	Phase 1	LULU.19a	3.02	1.707	BDN	Tronide
MATU	10/11/19 1300hrs UTC	7days	Phase 1	MATU0130.19a	2.11	1.625	Hook Height	Leica
OGGA	10/11/19 1300hrs UTC	7days	Phase 1	OGGA0130.19a	2.11	1.665	Hook Height	Leica

COUNTRY: FIJI ISLAND: VANUA LEVU PROVINCE: MACUATA	MINISTRY OF LANDS & MINERAL RESOURCE CONTROL SECTION	POINT ID: BULE DATE: 26-01-20 LDP: FJ133
 <p>Bulebulewa</p>	 <p>Locality Diagram Not To Scale</p>	
COUNTRY: FIJI ISLAND: VANUA LEVU PROVINCE: BUA	MINISTRY OF LANDS & MINERAL RESOURCE CONTROL SECTION	POINT ID: ROGA DATE: 26-01-20 LDP: FJ134
	 <p>Locality Diagram Not To Scale</p>	

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FIIJ GEODETIC DATUM 2019 - 2020 GNSS OCCUPATION REPORT

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STATION NAME: CEVA I RA

4 CHARACTER ID: CEVA

LOCATION: CEVA I RA I ISLAND

COUNTRY: FIIJ

TYPE OF SURVEY MARK: 20mmx1.220mm STEEL ROD ENCASED BY 30mmx0.5mm  
ALUMINIUM PIPE IN SITU IN CONCRETE.

ORTHOMETRIC HEIGHT OF SURVEY MARK:  
(MEAN SEA LEVEL DATUM)

OBSERVATION START DATE/DAY: 09/11/2019

UTC TIME: 2257hrs

OBSERVATION END DATE/DAY: 17/11/2019

UTC TIME: 0007hrs

GNSS RECEIVER TYPE: TRIMBLE

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MODEL: TRIMBLE R10

SERIAL NUMBER: 5333441663

FIRMWARE VERSION: 4.81

GNSS ANTENNA TYPE: TRIMBLE

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MODEL: TRMR10

SERIAL NUMBER: 5333441663

HEIGHT OF GNSS ANTENNA ABOVE STATION MARK: 1.643m  
(VERTICAL MEASUREMENT)

DESCRIPTION OF THE POINT ON THE GNSS ANTENNA

THAT THE ANTENNA HEIGHT REFERS TO:

BOTTOM OF QUICK RELEASE

ANTENNA HEIGHT TO ARP - 1.692m

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ATTACH ADDITIONAL INFORMATION AND DIAGRAMS THAT MAY BE USEFUL FOR FIELDS  
PROCESSING THE DATA AND ANALYSING THE RESULTS.



# SURVEY REPORT

## Fiji Geodetic Datum Surveys



### PACIFIC COMMUNITY DATA RELEASE REPORT No. 7/2022

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## Ministry of Lands & Mineral Resources

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28/01/2022

Rhonda Robinson  
Acting Director  
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Dear Mrs Robinson

### Request for Support and Assistance – Fiji Geodetic Datum Survey Data Capacity

Greetings and best wishes to you for 2022.

Fiji moved the motion at the United Nations General Assembly 2015 for a Resolution (A/RES/69/266) towards "A Global Geodetic Reference Frame for Sustainable Development" which was adopted by the United Nations General Assembly in its 80th plenary meeting held on 26th February 2015.



Ministry of Lands & Mineral Resources



Pacific Geospatial and Surveying Council

20/04/2022

Ms. Alison Rose  
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Dear Ms. Rose

### Request for Support and Assistance – Fiji Geodetic Datum

Greetings from Fiji and the Pacific.

Fiji moved the motion at the United Nations General Assembly 2015 for a Resolution (A/RES/69/266) towards "A Global Geodetic Reference Frame for Sustainable Development" which was adopted by the United Nations General Assembly in its 80th plenary meeting held on 26th February 2015.

To adopt the resolution, Fiji is advancing from the geodetic datum (mapping reference system) defined in 1986 based on World Geodetic System 1972 (WGS72) ellipsoid, to align to the Global Geodetic Reference Frame. In doing so, it would be introducing a geodetic datum which is totally compatible with the rest of the world and has been adopted by other countries in the Pacific region, such as Australia, New Zealand, Niue, Samoa, Tonga.

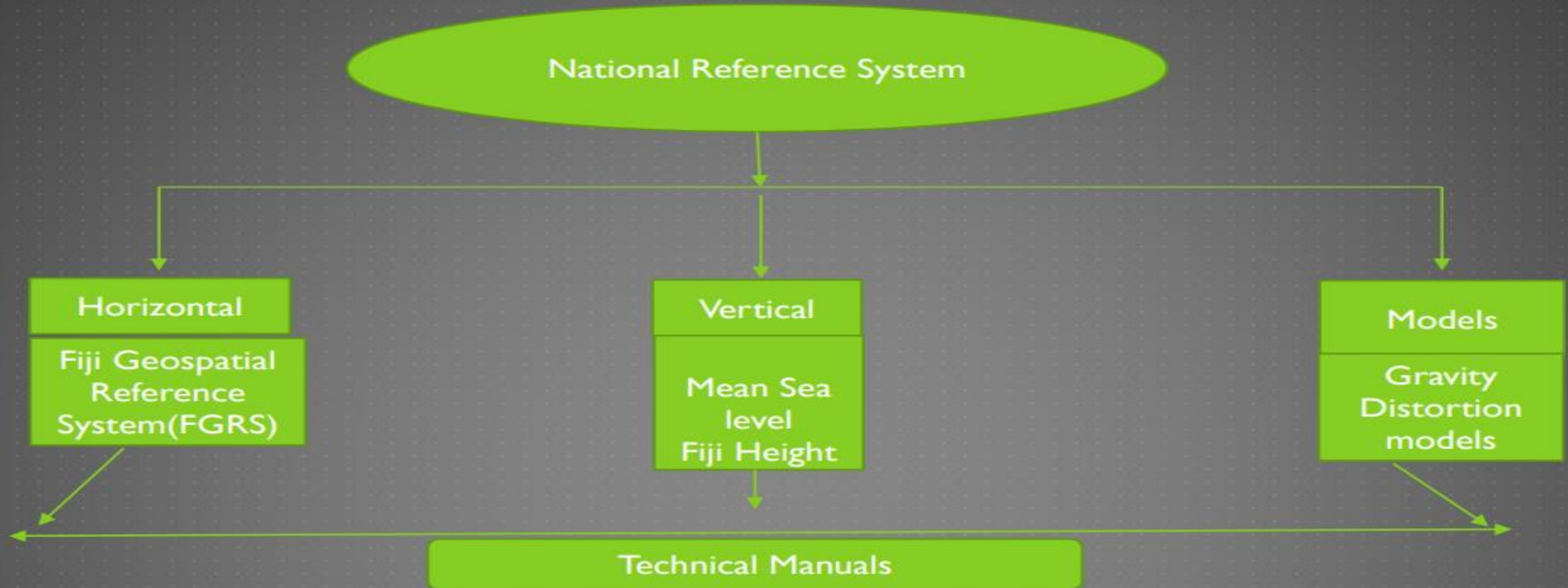


# OUR NEEDS

1. Discussion and agreement on the scope of work to be done to modernize the Fiji Geospatial Reference System, including Fiji Geodetic Datum, physical height datum and geoid model, transformation parameters, standards, technical documentation and education material.
2. Discussion and agreement on incorporating the eight GNSS CORS into the Asia Pacific Reference Frame.
3. Analysis of GNSS CORS and campaign data.
4. Discussion and agreement on choice of which realization of International Terrestrial Reference Frame (and epoch) to align the Fiji Geodetic Datum with.
5. Undertake the national adjustment to create the new Fiji Geodetic Datum.
6. Discussion and agreement on height datum and geoid model development.
7. Undertake the geoid model development to create a new Fiji Height Datum.
8. Development of transformation parameters from historical datums to new datums.
9. Discussion on steps Fiji should take to update international standards (EPSG and ISO Geodetic Register)



# FIJI GEOSPATIAL REFERENCE SYSTEMS

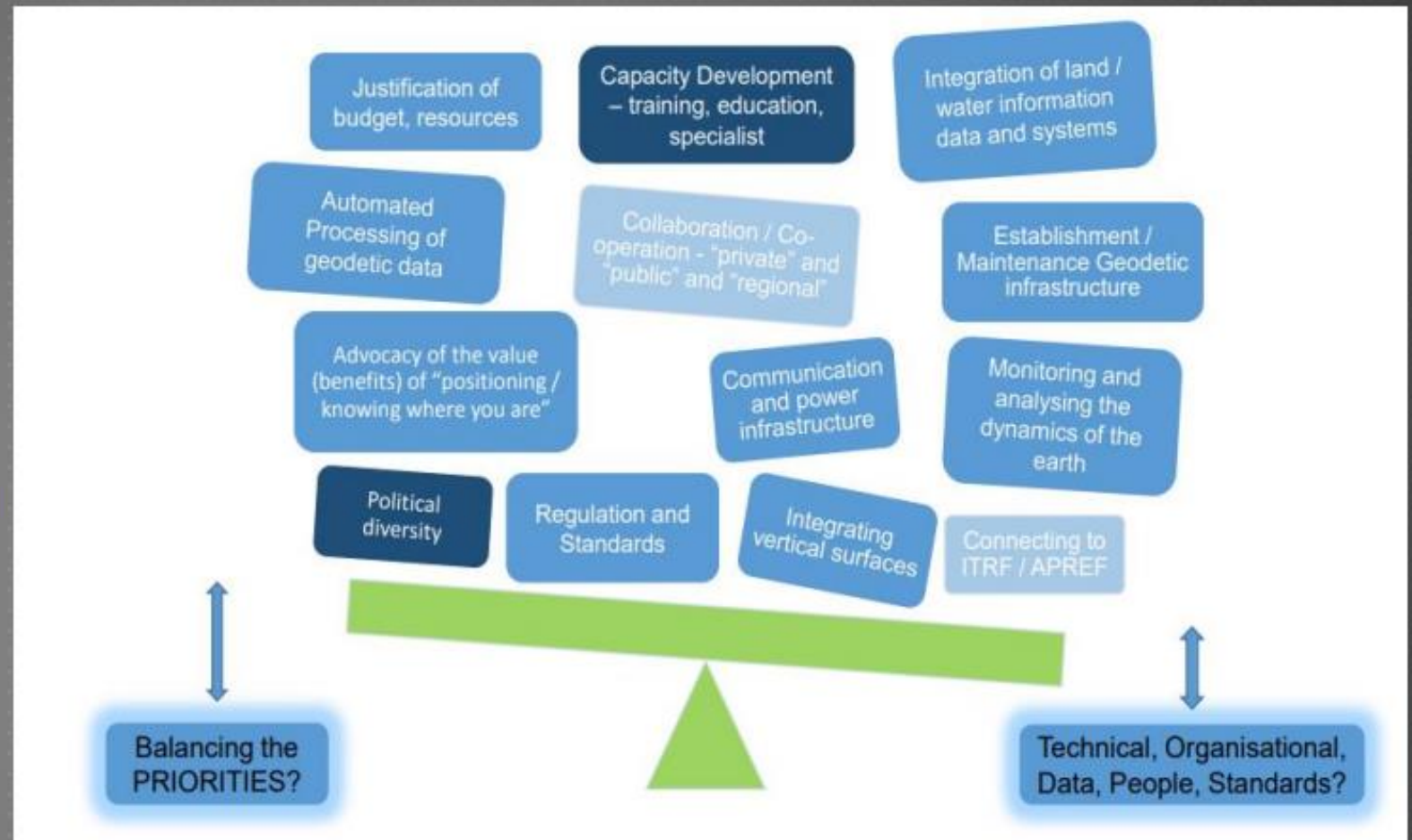


- Modernising Fiji Geospatial Reference System Roadmap
- Modernising Fiji Geospatial Reference System Technical Project Plan (Fiji Geodetic Datum, physical height datum and geoid model, transformation parameters, standards, technical documentation and education material.)
- FGRS Technical Manual



# CHALLENGES

- ▶ Operational Capacity
- ▶ Processing Capacity
- ▶ Data Storage
- ▶ Data Sharing
- ▶ Data Downloading
- ▶ Data Conversions
- ▶ GNSS CORS maintenance and infrastructure
- ▶ Data accessibility
- ▶ Technical Infrastructure





# CAPACITY BUILDING NEEDS



- Development of Policy and legal framework
- Understanding HOW modern datum contribute to country's economy
- How modern datum address emerging issues (Climate Change & Sea Level Rise)
- Sustainability of the datum (Experience and qualified Personnel)
- Transforming of existing geospatial information to new datum
- Formulate new Policy and Guideline
- Managing Geodetic Infrastructure



**THANK YOU**

