

Geodetic Datum and Land Information Fiji Islands



Meizyanne Hicks & Asakaia Tabua
Ministry of Lands & Mineral Resources
Government of Fiji

Andrick Lal
Geoscience Energy Maritime Division
Pacific Community (SPC)

**UN-GGIM International Seminar on Effective Land
Administration**

**Session 5 - Availability and accessibility of reliable, timely
and quality land information**

19 May 2022, Suntec Convention Centre, Singapore.

Geodetic Datum of Fiji

Fiji Map Grid 1986

FMG1986 (Gauss-Krüger Transverse Mercator):

Latitude of Origin = $17^{\circ} 00'$ South

Central Meridian = $178^{\circ} 45'$ East

Scale Factor at Origin = 0.999854

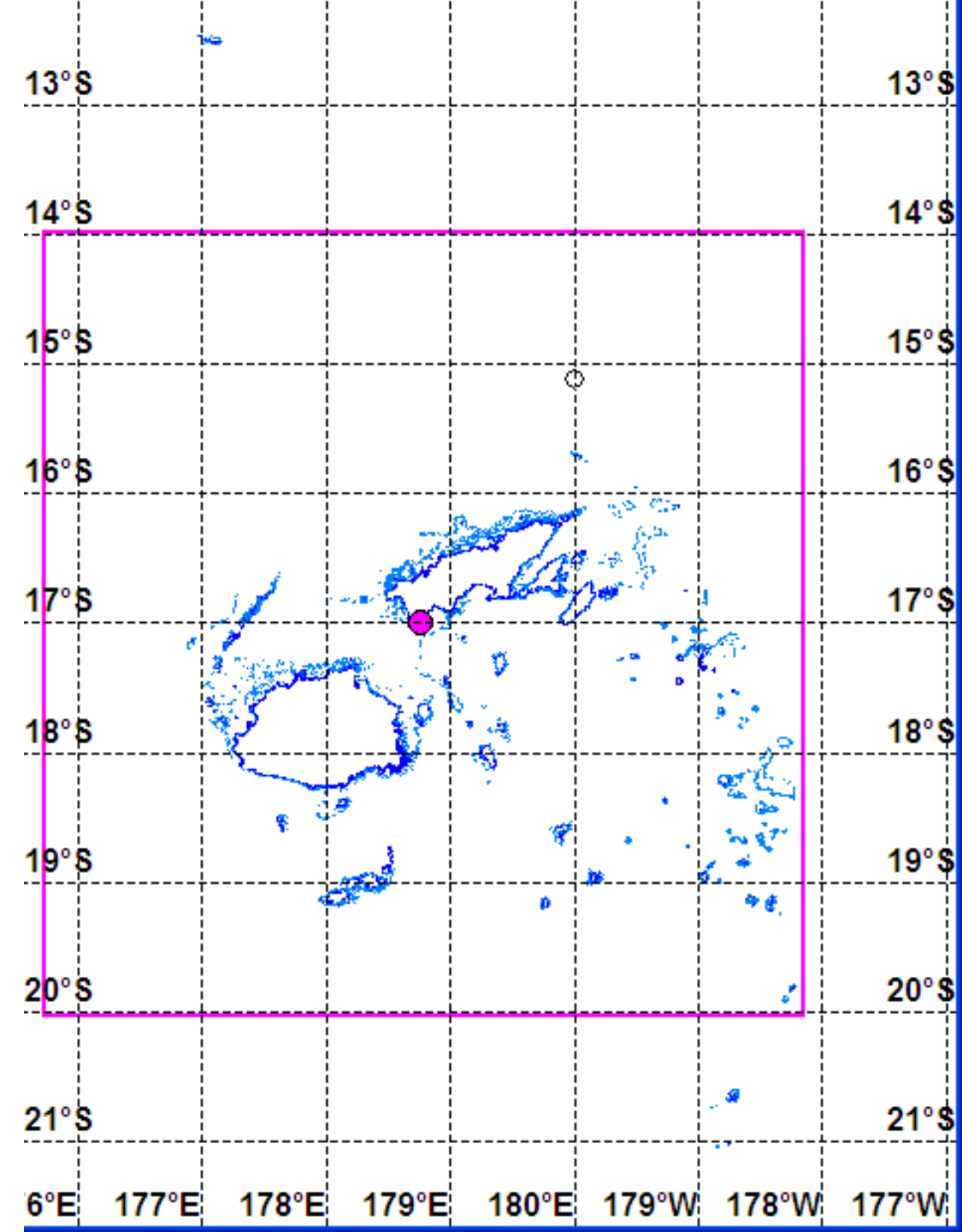
False Northing = 4 000 000m

False Easting = 2 000 000m

Ellipsoid of reference = WGS 72

where $a = 6378135\text{m}$

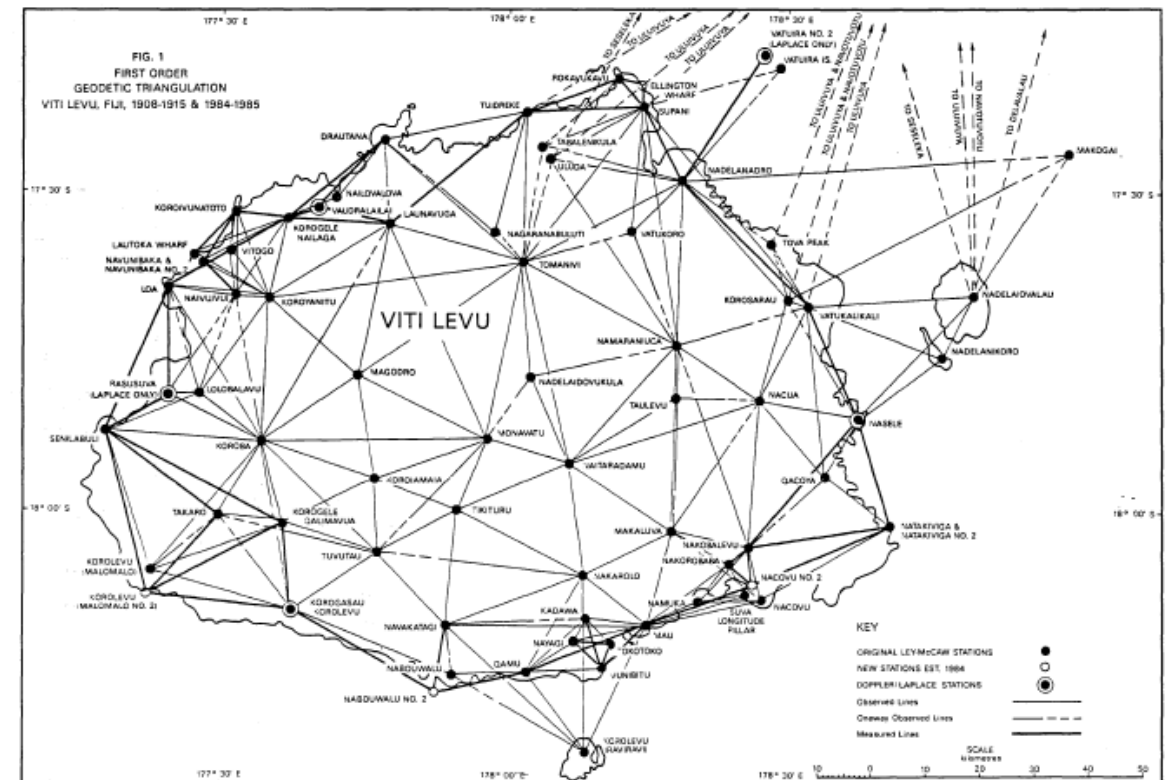
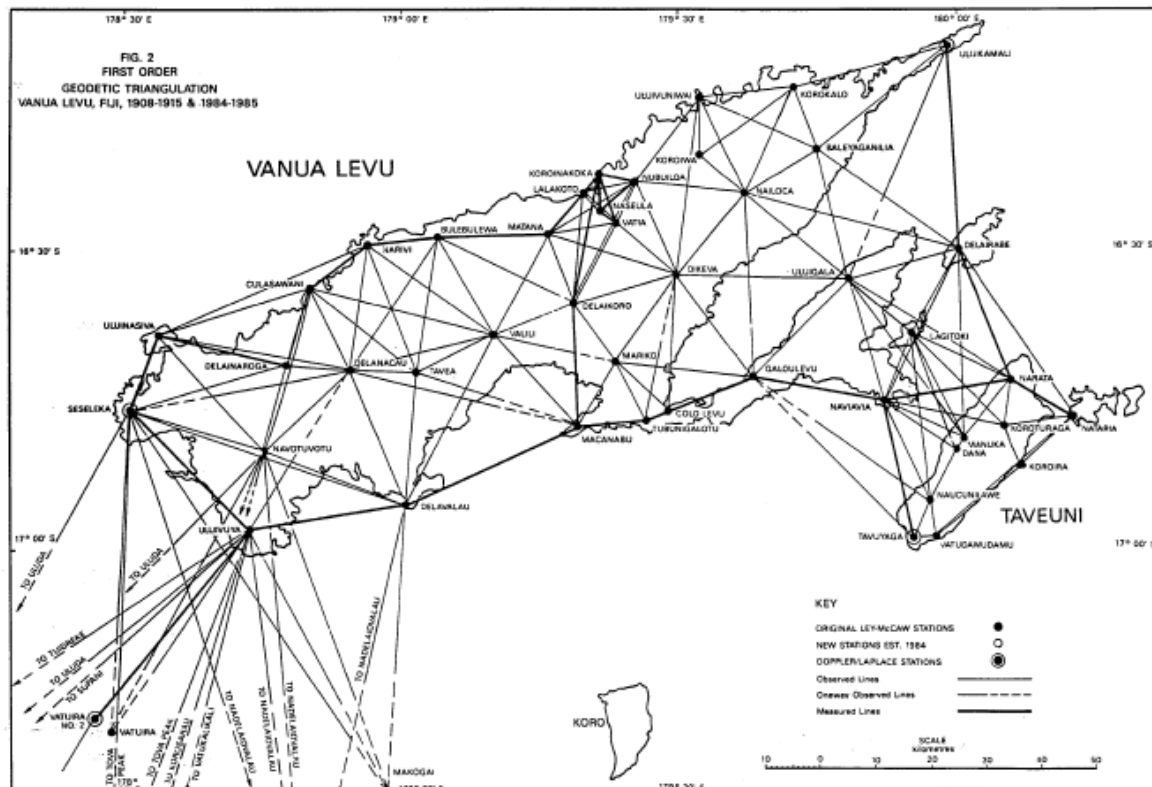
$1/f = 298.26$



Geodetic Datum of Fiji

The Definition and Adjustment of the Fiji Geodetic Datum - 1986

- J. Hannah and J. Maseyk
- Department of Survey and Land Information, Wellington, New Zealand





Land Tenure – Fiji Islands

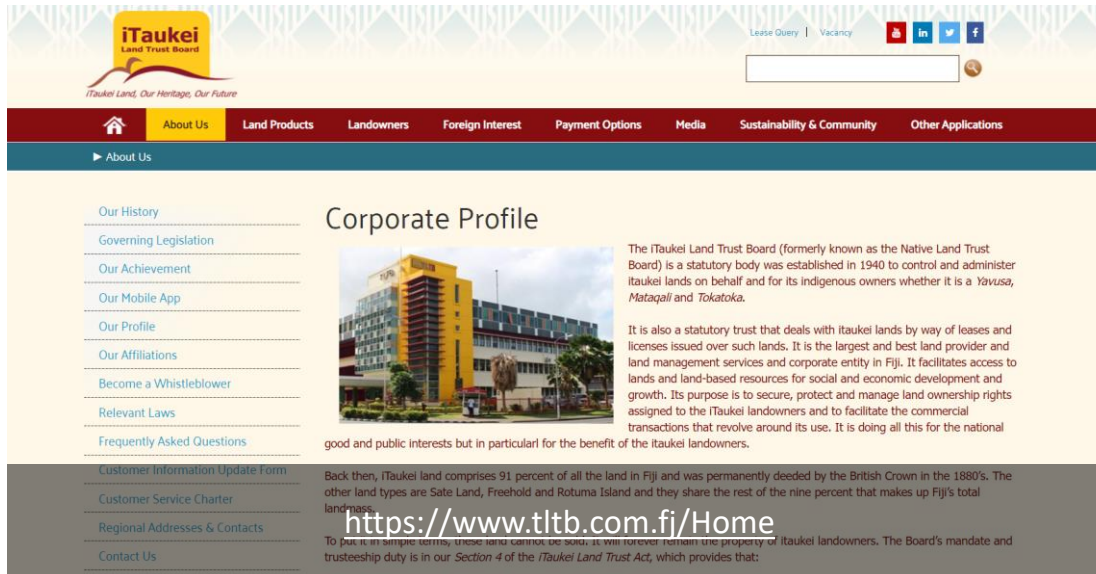
Native (I’Taukei) Land – 89.1%

Freehold Land – 7.0%

State Land – 3.9%



Land Management Authorities - Fiji



iTaukei Land Trust Board
iTaukei Land, Our Heritage, Our Future

Lease Query | Vacancy

Home About Us Land Products Landowners Foreign Interest Payment Options Media Sustainability & Community Other Applications

► About Us

Our History
Governing Legislation
Our Achievement
Our Mobile App
Our Profile
Our Affiliations
Become a Whistleblower
Relevant Laws
Frequently Asked Questions

Corporate Profile

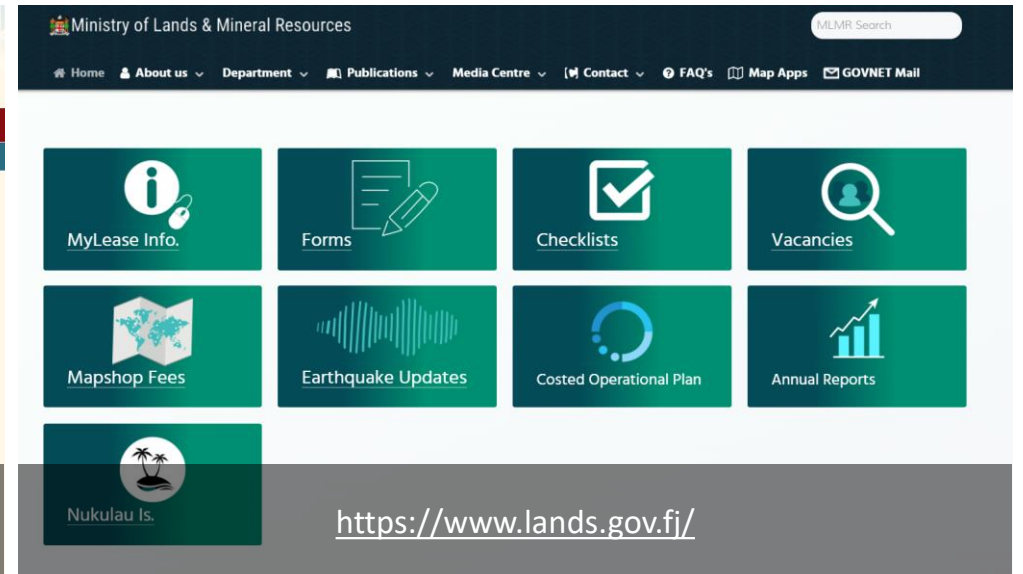
The iTaukei Land Trust Board (formerly known as the Native Land Trust Board) is a statutory body was established in 1940 to control and administer iTaukei lands on behalf and for its indigenous owners whether it is a Yavusa, Mataqali and Tokatoka.

It is also a statutory trust that deals with iTaukei lands by way of leases and licenses issued over such lands. It is the largest and best land provider and land management services and corporate entity in Fiji. It facilitates access to lands and land-based resources for social and economic development and growth. Its purpose is to secure, protect and manage land ownership rights assigned to the iTaukei landowners and to facilitate the commercial transactions that revolve around its use. It is doing all this for the national good and public interests but in particular for the benefit of the iTaukei landowners.

Back then, iTaukei land comprises 91 percent of all the land in Fiji and was permanently deeded by the British Crown in the 1880's. The other land types are Sate Land, Freehold and Rotuma Island and they share the rest of the nine percent that makes up Fiji's total landmass.

To parcel in the iTaukei land and control the land, it was to recover the property of iTaukei landowners. The Board's mandate and trusteeship duty is in our Section 4 of the iTaukei Land Trust Act, which provides that:

<https://www.tltb.com.fj/Home>



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Nukulau Is.

<https://www.lands.gov.fj/>

Land Management Authorities - Fiji

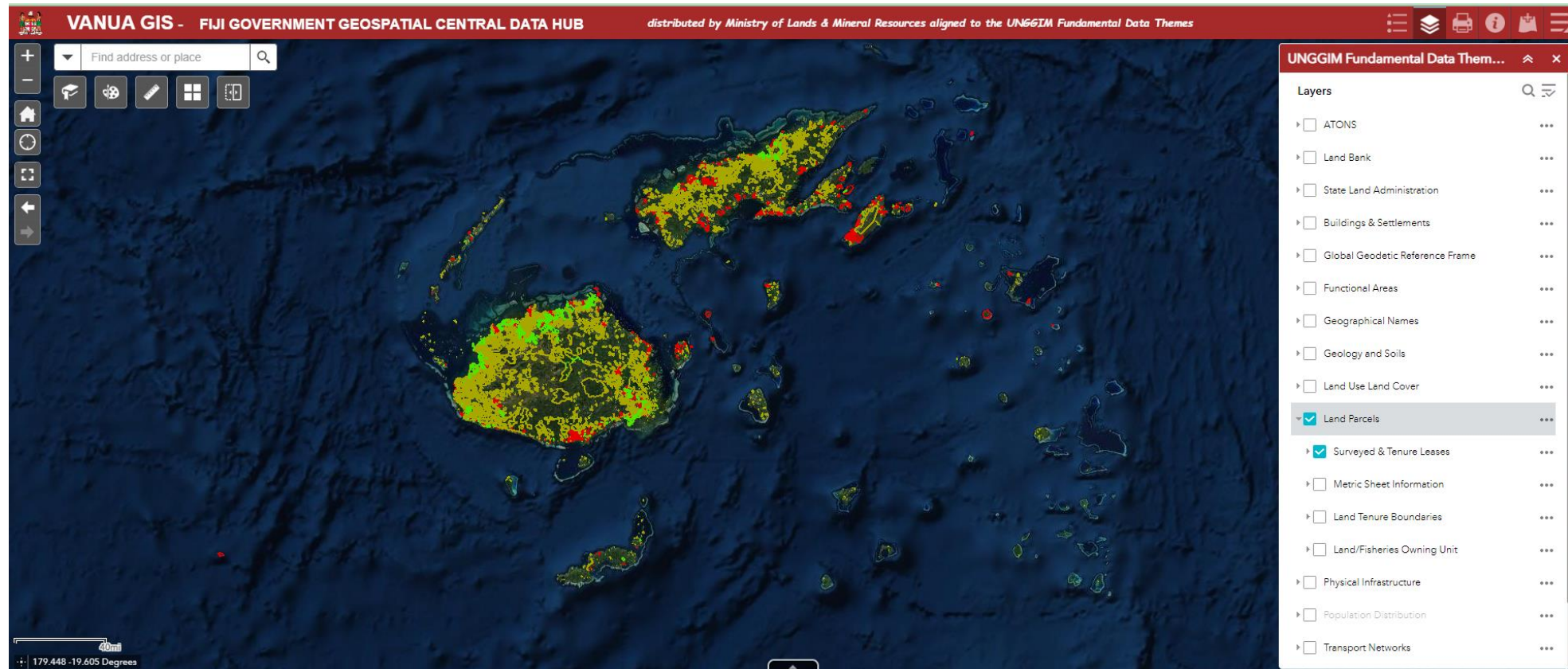


The screenshot shows the Housing Fiji website. The top navigation bar includes links for Home, About Us, Product & Services, Development, Payment, Careers, Media, Contact Us, and PRB. A green banner at the top reads "The easiest way to finance your property with our home loan." Below this, there are three blue buttons: "Loans", "Mortgage", and "News Feed". Under "Loans", there is a yellow sign that says "REFINANCING". Under "Mortgage", there is a dark blue box that says "MORTGAGEE SALE". Under "News Feed", there is a dark blue box that says "SURVEY FOR RESIDENTIAL LEASE". At the bottom, there is a grey box with text about bringing in current house/land loans and amalgamating them, and another grey box with text about the Mortgage Protection Insurance Policy. A URL <https://www.housing.com.fj/> is visible in the bottom right corner.

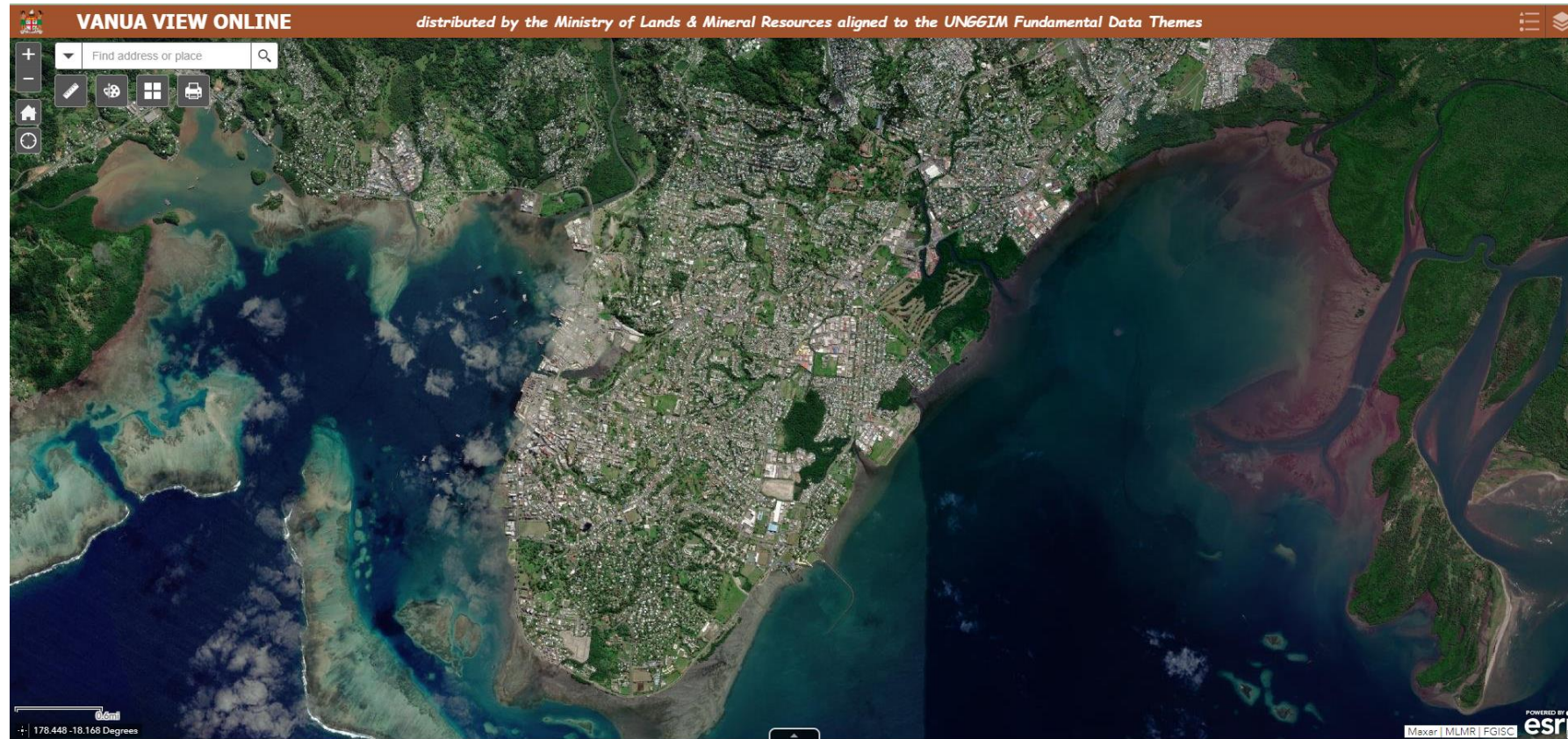


The screenshot shows the Registrar of Land, Titles & Deeds Office website. The top navigation bar includes links for SERVICES, NEWS & PUBLIC NOTICES, GALLERY, VACANCIES, FAQs, and CONTACT US. A blue banner at the top reads "REGISTRAR OF LAND, TITLES & DEEDS OFFICE". Below this, there is a paragraph: "The Office of the Registrar of Titles deals with land, titles and deeds registration for Fiji. The Registrar of Titles is the sole custodian of all the land titles and deeds documents." Underneath, there is a "Services" button and four blue circles representing different services: "TITLES", "DEEDS", "CHARITABLE TRUST", and "RELIGIOUS BODIES". At the bottom, there is a dark blue footer with the Fiji coat of arms, the text "digitalFiji", a URL <https://www.justice.gov.fj/registrar-of-titles/>, and contact information for the Registrar of Titles Office, including the address "Level 1, Suva House, Victoria Parade, Suva, Fiji" and the phone number "Phone: (679) 3308600".

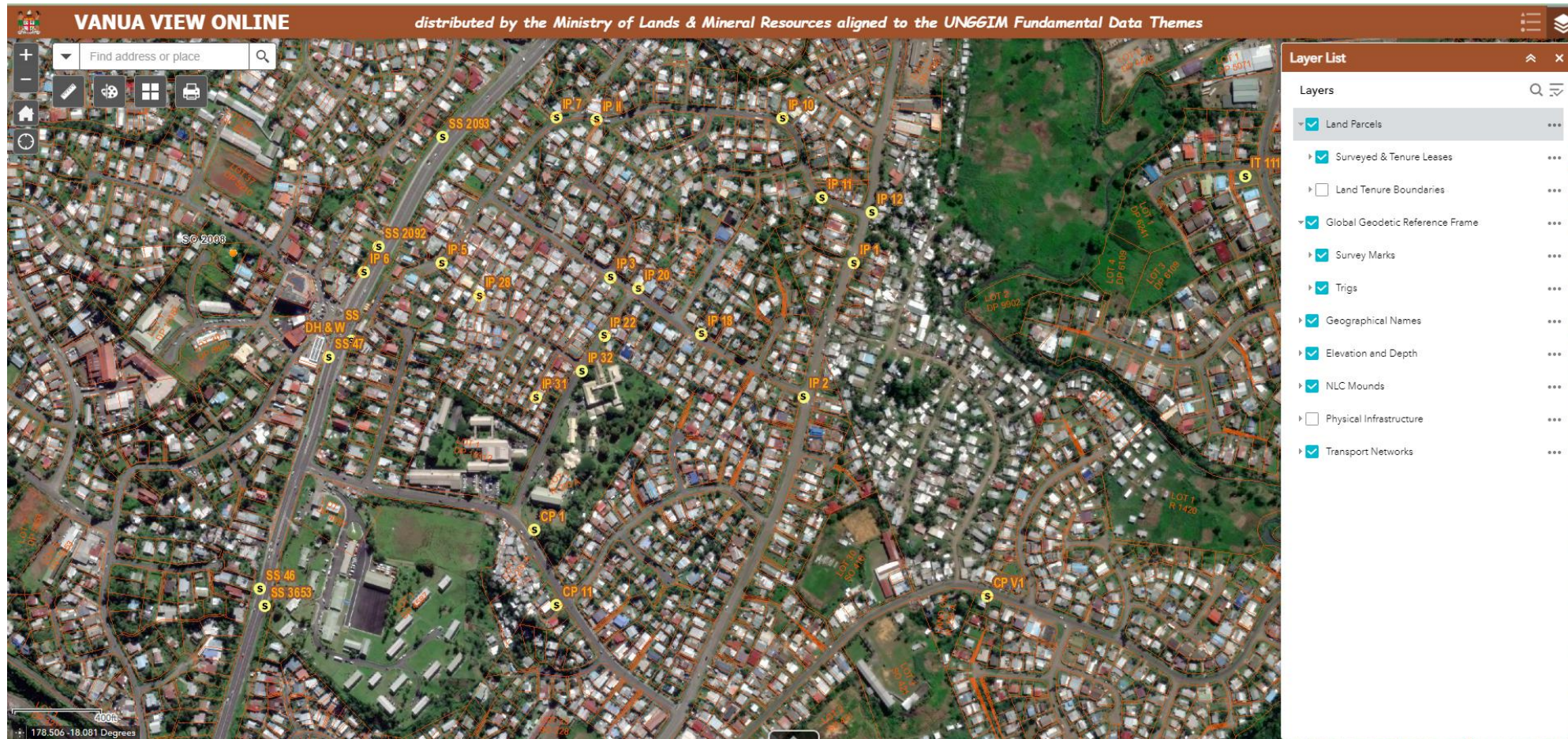
Land Information Fiji - Vanua GIS



Land Information Fiji - Vanua View



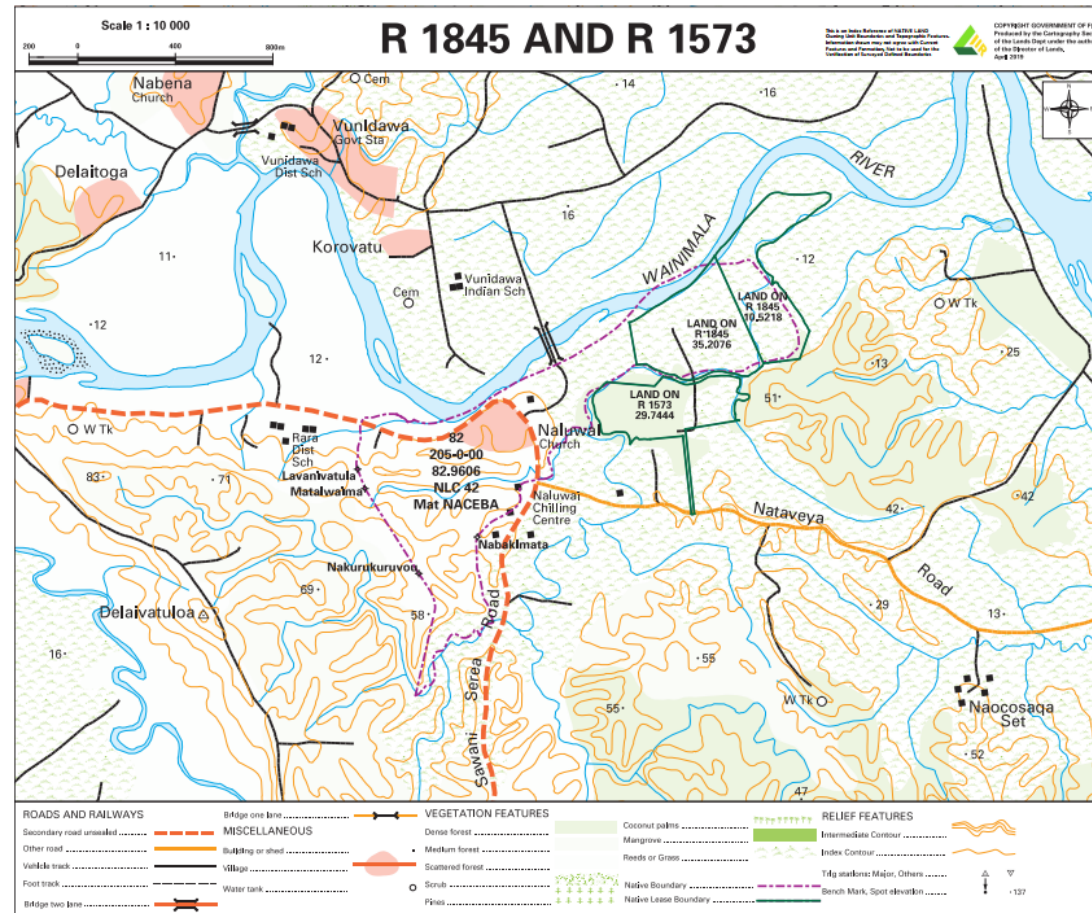
Land Information Fiji - Products



Land Information Fiji - Products



Land Information Fiji - Products



Geodetic Reference Frame - Fiji

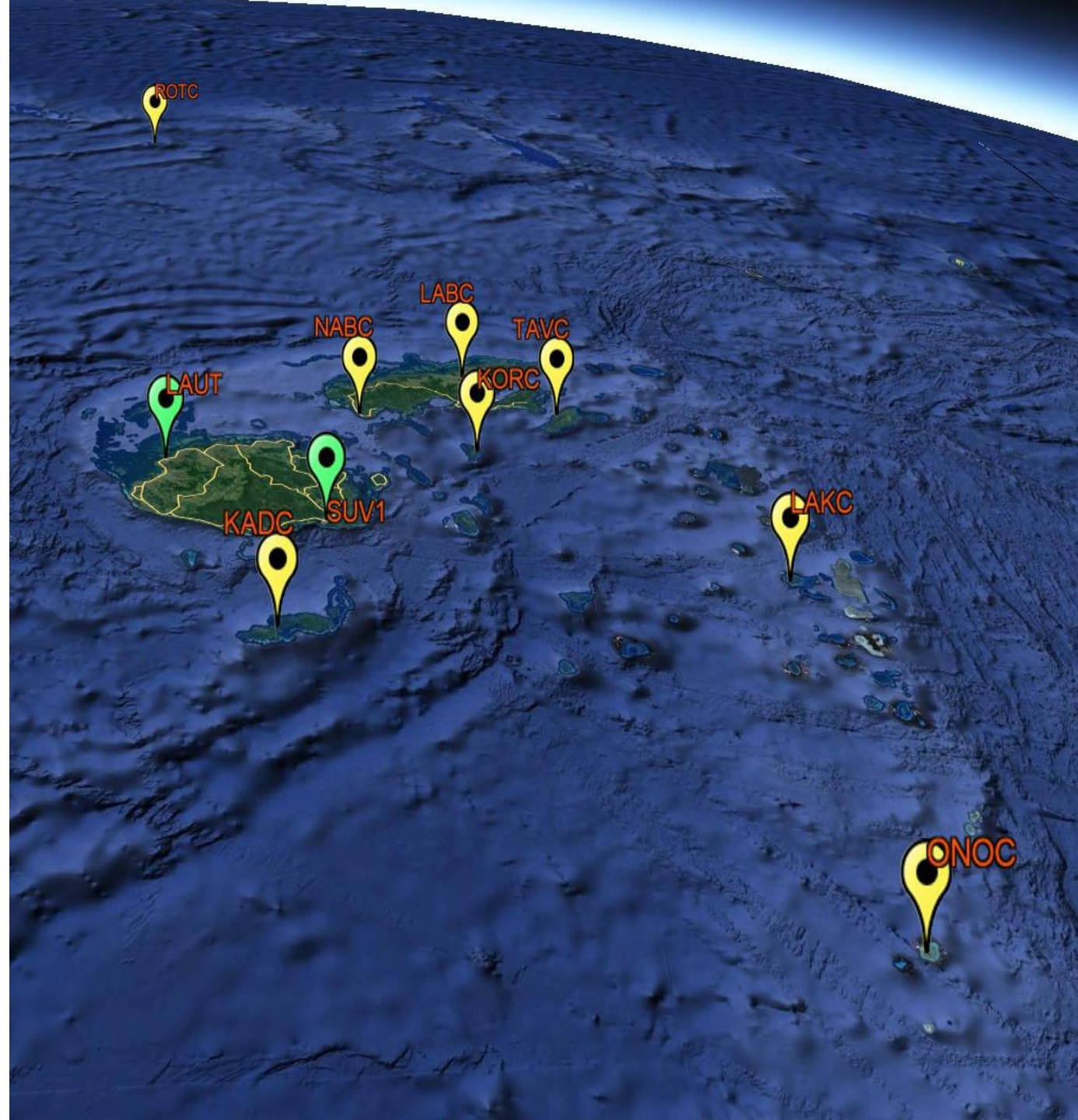
- United Nations General Assembly 2015
 - Resolution 69/266 – “A global geodetic reference frame for sustainable development”; adopted in its 80th plenary meeting held 26th February 2015
- Pacific Geospatial and Surveying Council Strategy Goal 2 (GGRF)
- Cabinet Paper - CP(15) 169; 29th August 2015
- Cabinet Decision 207 – Modernising Fiji’s Geodetic Datum; 29th August 2015
- National Development Plan (November 2017)
- 2018-2022 Ministry of Lands & Mineral Resources Strategic Plan

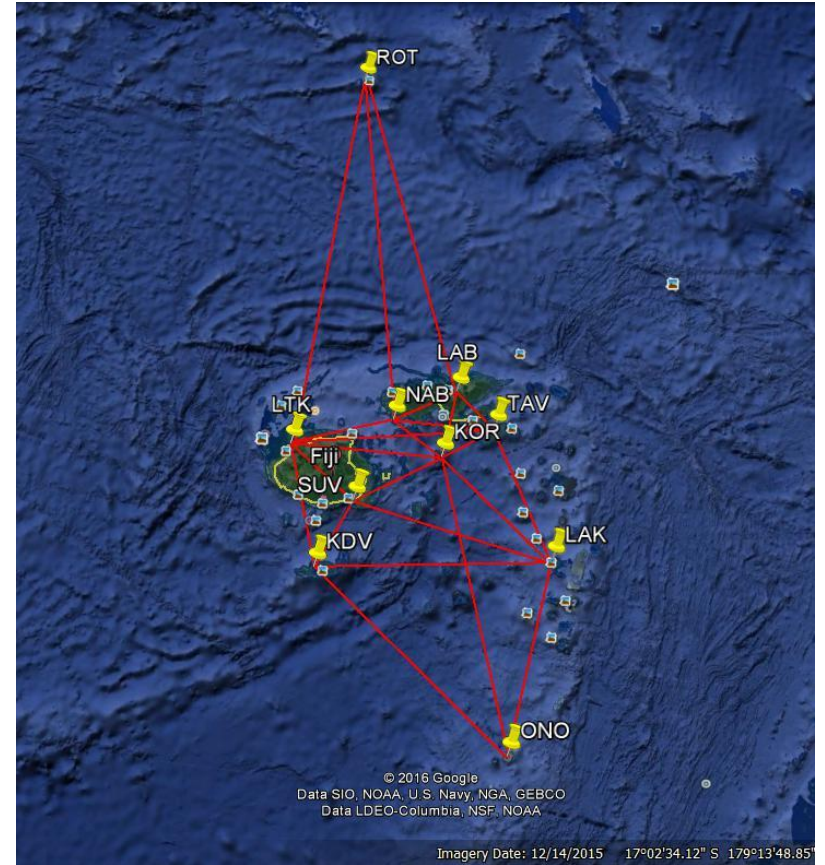
Geodetic Reference Frame of Fiji Islands

Control Section
Ministry of Lands & Mineral Resources
Government of Fiji

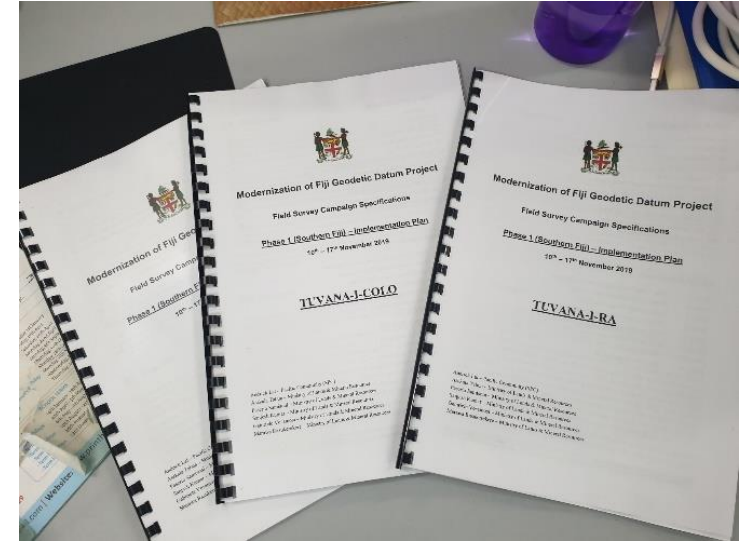
Fiji Hydrographic Office
Fiji Navy
Government of Fiji

Oceans & Maritime Programme
Geoscience Energy Maritime Division
Pacific Community





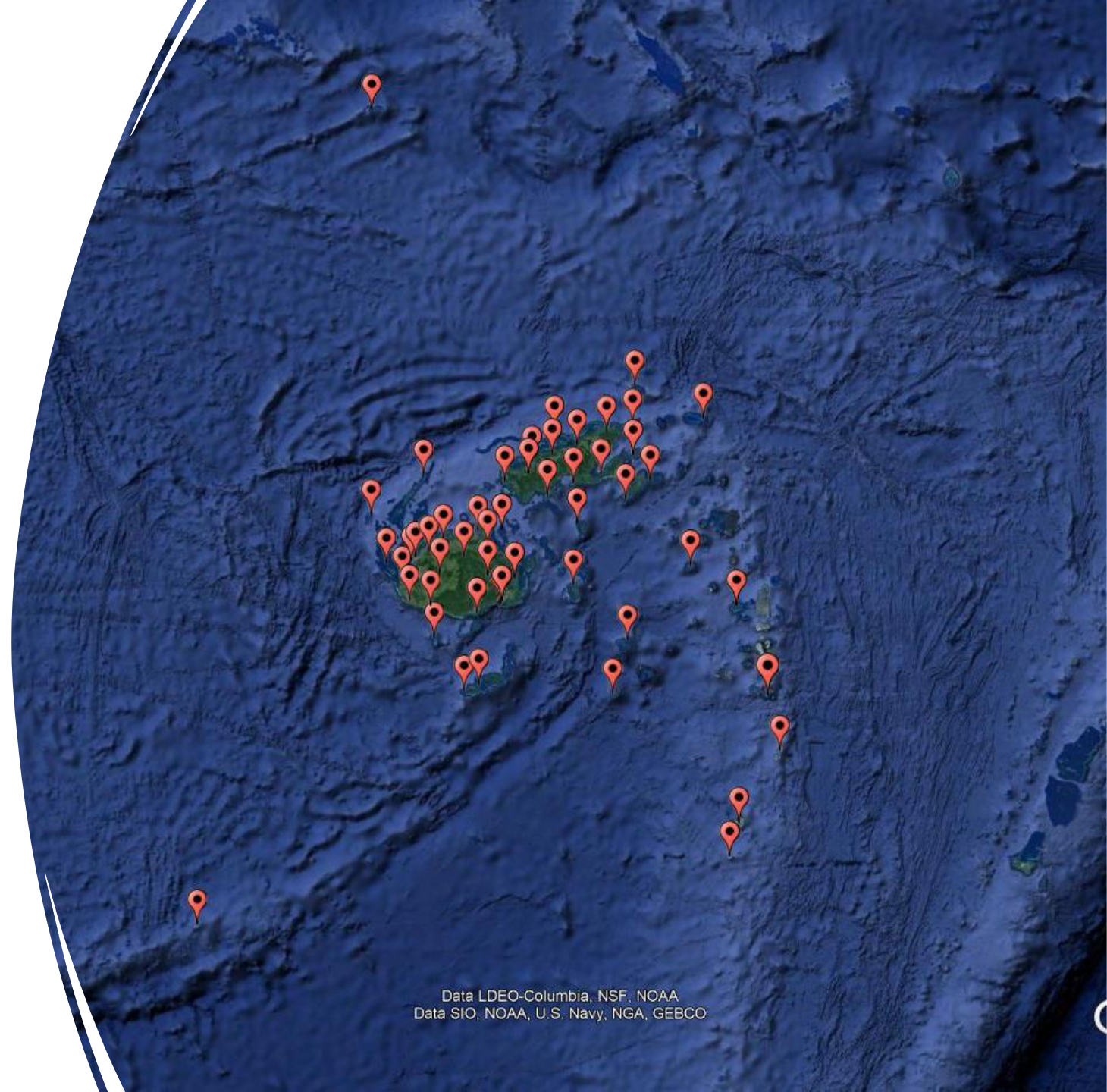
The Geodetic Infrastructure



Geodetic Survey Operations

Geodetic Survey Activities

- **Three Phases**
 - 10-16 November 2019
 - 7-15 December 2019
 - 26 January – 2 February 2020
- **GNSS Static Occupations**
 - 51 Stations – 7 days
 - 104 Stations – 6 hours
 - 43 Stations – 1 hour
- **Survey Personnel**
 - 65 (Surveyors/ Technicians/ Survey Assistant/ Casuals)
- **Survey Equipment**
 - Trimble (16) and Leica (11)
- **Transportation**
 - Naval Vessels/ Local Ferries/ Vehicles

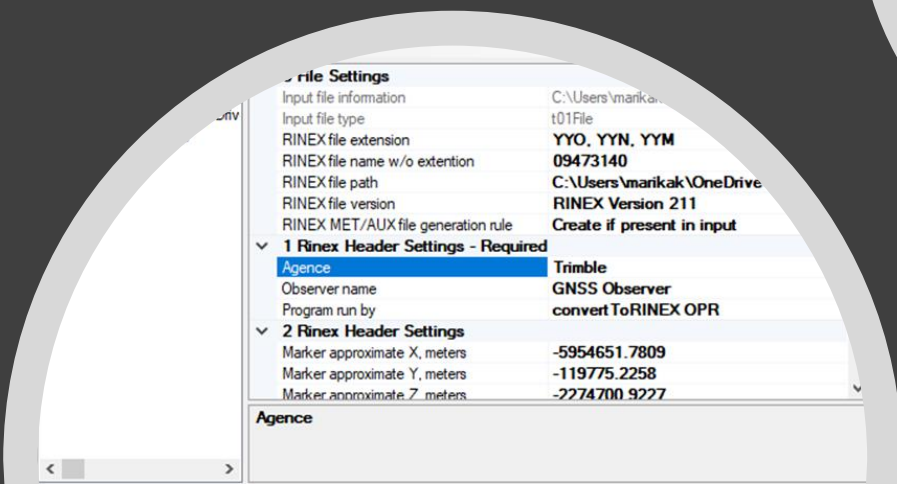
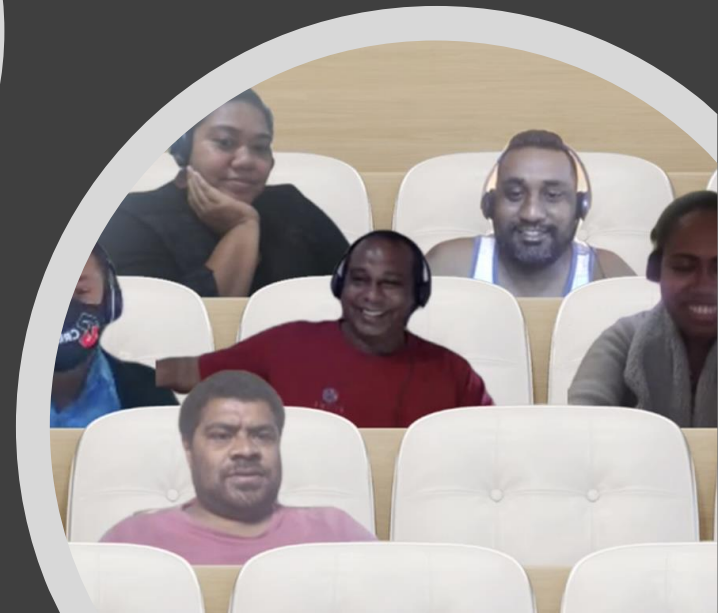
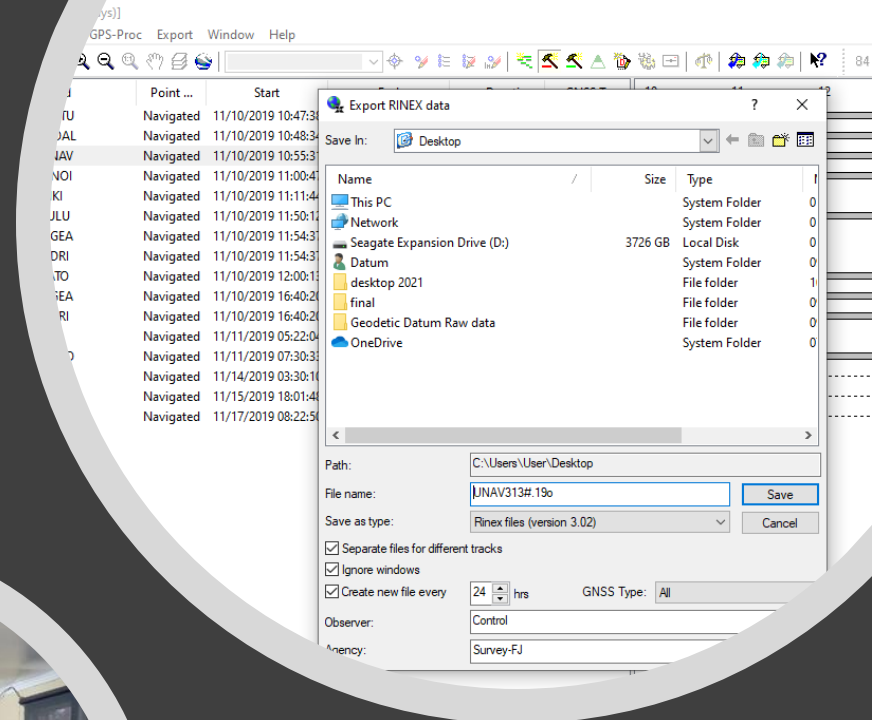


Data LDEO-Columbia, NSF, NOAA
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Geodetic Survey Data Handling

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

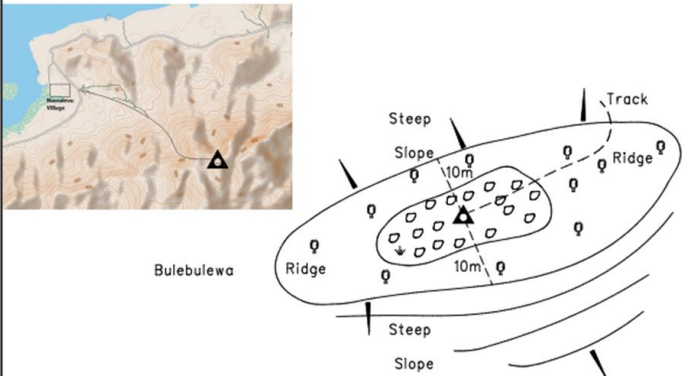
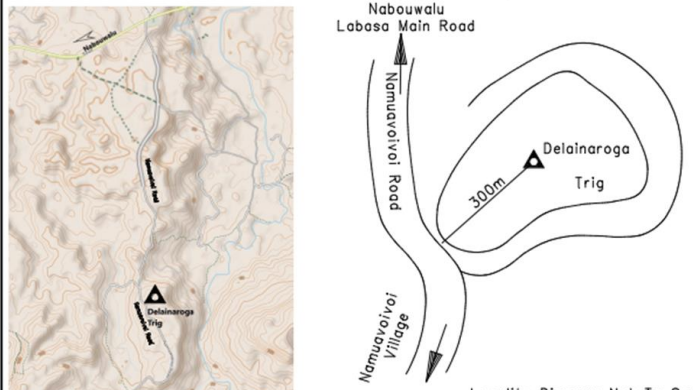
VITI LEVU & SURROUNDING ISLANDS			
Latitude	Longitude	MSL Ht	Latitude
18 08 35.28307 S	178 26 24.43342 E	68.57	18 8 35.279 S
17 51 36.91470 S	178 36 31.20563 E	1.889	18 14 53.483 S
18 30 55.011 S	177 38 48.063 E	50.353	17 51 36.910 S
18 09 16.64688 S	177 36 48.24271 E	8.6	18 30 54.9204 S
18 05 31.25589 S	177 21 56.39777 E	329.58	18 9 16.6462 S
17 49 34.2528 S	178 17 31.57718 E	237.96	18 5 61.2558 S
17 41 6.38906 S	178 31 10.58672 E	149.83	17 49 34.2502 S
17 40 16.05061 S	178 48 32.17230 E	628.56	17 41 6.5862 S
17 47 29.46092 S	177 43 52.85371 E	625.69	17 40 16.0561 S
17 52 41.52648 S	177 17 3.54343 E	888.75	17 47 29.4610 S
17 29 15.05356 S	178 17 44.70744 E	228.99	17 52 41.5269 S
17 19 41.52831 S	178 11 8.27595 E	1323	17 36 53.1252 S
17 58 29.670 S	178 27 58.66570 E	481.58	17 29 15.0519 S
17 25 14.49082 S	177 46 43.96777 E	203.2	17 19 41.5257 S
17 39 4.43158 S	177 23 37.39203 E	31.78	17 17 11.6775 S
		368.67	17 25 14.4907 S
		480.4	17 32 39.0999 S
		33.8	17 39 4.4320 S
		64.83	17 40 19.38 S
		1.49	
		65.5	16.4



Geodetic Survey Data Handling

Fiji Geodetic Stations Survey Campaign Metadata												
Station ID	Station Name	Occupation Period	Interval	Receiver Type	Antenna Type	Rinex Version	Vertical Ht (m)	Rinex Height	Antenna Method	Firmware	Checked By	Field Operator
LAUT	Lautoka	Continuous	1sec	JEPT POLARIS	JVRINGANT DM	5.2.0			ARP			GA
SUV1	Suva	Continuous	1sec	Trimble NetRS	TRM55971.00	4.19			ARP			SPC
LABC	Labasa	Continuous	1sec	VNET10T-D	HI-TARGET AT-53501	3.02			ARP	C200		CONTROL
NABC	Nabouwalu	Continuous	1sec	HI-TARGET VNET10T-D	MTA73303(MTTS)	3.02			ARP	C200		CONTROL
TAVC	Taveuni	Continuous	1sec	HI-TARGET VNET10T-D	MTA73303(MTTS)	3.02			ARP	C200		CONTROL
KORC	Koro	Continuous	1sec	Leica GR50	Leica AR20	3.02			ARP	4.11.006		CONTROL
LAKC	Lakelba	Continuous	1sec	Leica GR50	Leica AR20	3.02			ARP	4.11.006		CONTROL
ONOC	Ono-i-Lau	Continuous	1sec	Leica GR50	Leica AR20	3.02			ARP	4.11.006		CONTROL
KADC	Kadavu	Continuous	1sec	Leica GR50	Leica AR20	3.02			ARP	4.11.006		CONTROL
ROTC	Rotuma	Continuous	1sec	Leica GR51	Leica AR21	3.02			ARP	4.11.006		CONTROL
CEVA	Ceva-i-ra	7 DAYS	1sec	TRIMBLE R10	TRMR10	3.02	1.642	1.692	Bottom of Notch	4.81	MT&MR	Posale
BUKE	Delainabulewa (Kadavu)	7 DAYS	10sec	TRIMBLE NET R9	TRM557971.0	3.02	1.978	1.934	Bottom of Notch	5.87	MT&MR	Sakumono
NAKO	Nakoroqoro (Olae)	7 DAYS	10sec	LEICA GS10	LEIA3102	3.02	1.265	1.625	Hook height	5.05	MT&MR	Sia
OALA	Kororosi (Moala)	7 DAYS	10sec	LEICA GPS 1200	LEIA3102	2.11	1.404	1.764	Hook height	4.0	MT&MR	Nautalai
UNAV	Lakeba(GPS - Nadrala)	7 DAYS	1sec	LEICA GS16	LEIG016	3.02	1.38	1.740	Hook height	8.0	MT&MR	Jeonni
CIKI	Cikobia-i-lau	7 DAYS	15sec	LEICA GS10	LEIA3102	3.02	1.333	1.693	Hook height	5.05	MT&MR	Gabriele
LULU	Cikakulu (Coral)	7 DAYS	10sec	TRIMBLE NET R9	TRM557971.0	3.02	1.751	1.707	Bottom of Notch	4.85	MT&MR	Daniel
MTKU	Matuku	7 DAYS	10sec	LEICA GPS 1200	LEIA3102	2.11	1.263	1.623	Hook height	4.0	MT&MR	William C
OGEA	Ogea Orisi	7 DAYS	10sec	LEICA GPS 1200	LEIA3102	2.11	1.185	1.545	Hook height	4.0	MT&MR	Lui
NATO	Natoua	7 DAYS	10sec	LEICA GPS 1200	LEIA3102	2.11	1.272	1.632	Hook height	4.0	MT&MR	Niko

Station ID	Start time	Duration	Campaign	File Name	RINEX Version	Ant Height	Ant Method	Ant Manufacturer	Field Operator
CEVA	10/11/19 1200hrs UTC	7days	Phase 1	16633153.190 16633133.190 16633140.190 16633201.190	3.02	1.692	BQR	Trimble	T
BUKE	10/11/19 1200hrs UTC	7days	Phase 1	42703140.190 42703150.190 42703160.190 42703170.190 42703180.190 42703190.190 42703200.190	3.02	1.934	BON	Trimble	T 2 2
NAKO	10/11/19 1200hrs UTC	7days	Phase 1	NAKO3140.190	3.02	1.625	Hook Height	Leica	L
OALA	10/11/19 1200hrs UTC	7days	Phase 1	MOAL3130.190	2.11	1.764	Hook Height	Leica	L
UNAV	10/11/19 1200hrs UTC	7days	Phase 1	UNAV3140.190 UNAV3130.190	3.02	1.74	Hook Height	Leica	L
CIKI	10/11/19 1200hrs UTC	7days	Phase 1	CIKI3130.190	3.02	1.693	Hook Height	Leica	L
LULU	10/11/19 1200hrs UTC	7days	Phase 1	LULU.190	3.02	1.707	BON	Trimble	T 2 2
MTKU	10/11/19 1200hrs UTC	7days	Phase 1	MATU3130.190	2.11	1.623	Hook Height	Leica	L
OGEA	10/11/19 1200hrs UTC	7days	Phase 1	OGEA3130.190	2.11	1.545	Hook Height	Leica	L

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

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FIJI 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 SLAND

COUNTRY: FIJI

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

=====

MODEL: TRIMBLE R10

SERIAL NUMBER: 5333441663

FIRMWARE VERSION: 4.81

GNSS ANTENNA TYPE: TRIMBLE

=====

MODEL: TRMR10

SERIAL NUMBER: 5333441663

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

DESCRIPTION OF THE POINT ON THE GNSS ANTENNA

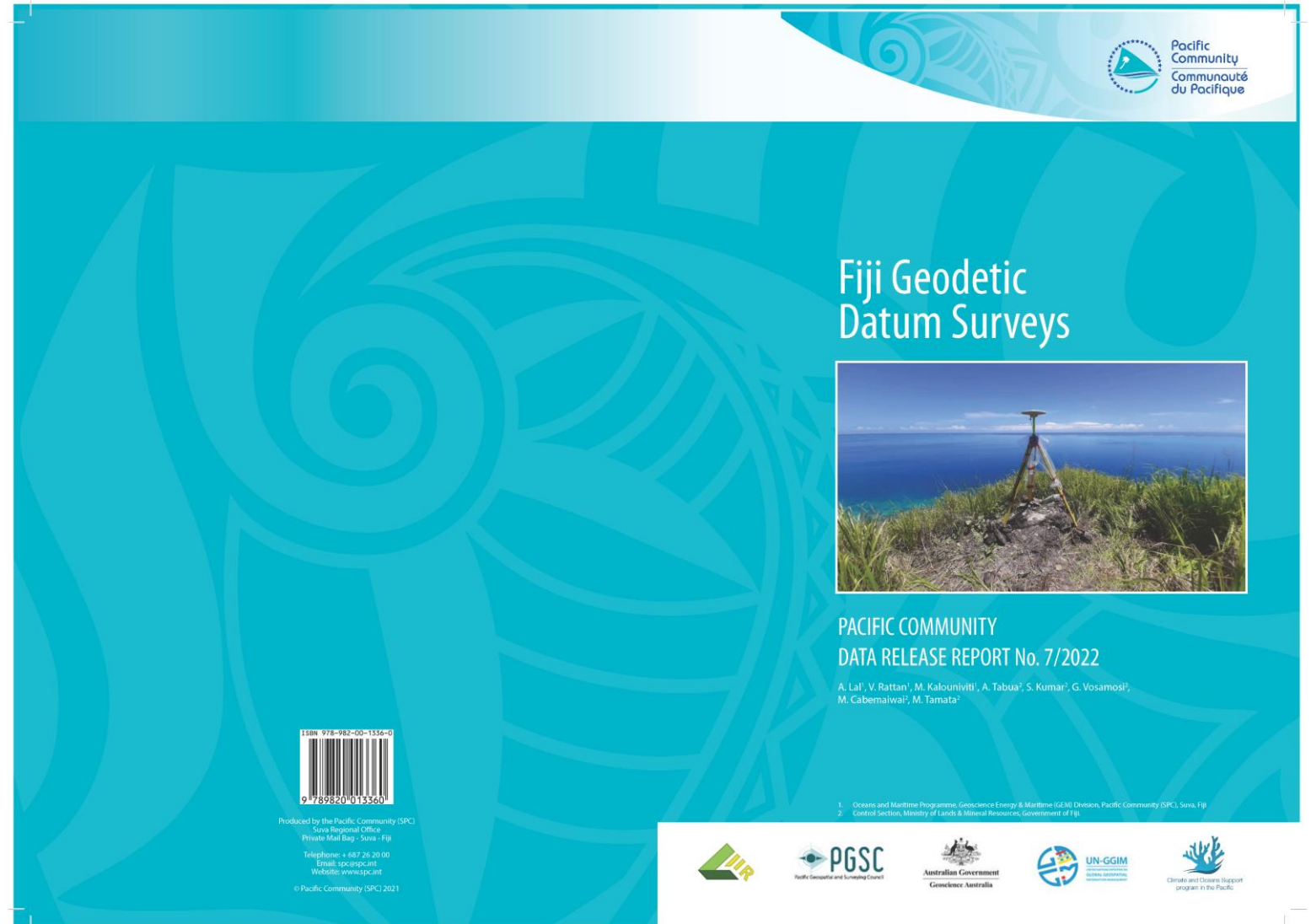
THAT THE ANTENNA HEIGHT REFERS TO:

BOTTOM OF QUICK RELEASE

ANTENNA HEIGHT TO ARP - 1.692m

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

Data Release Report

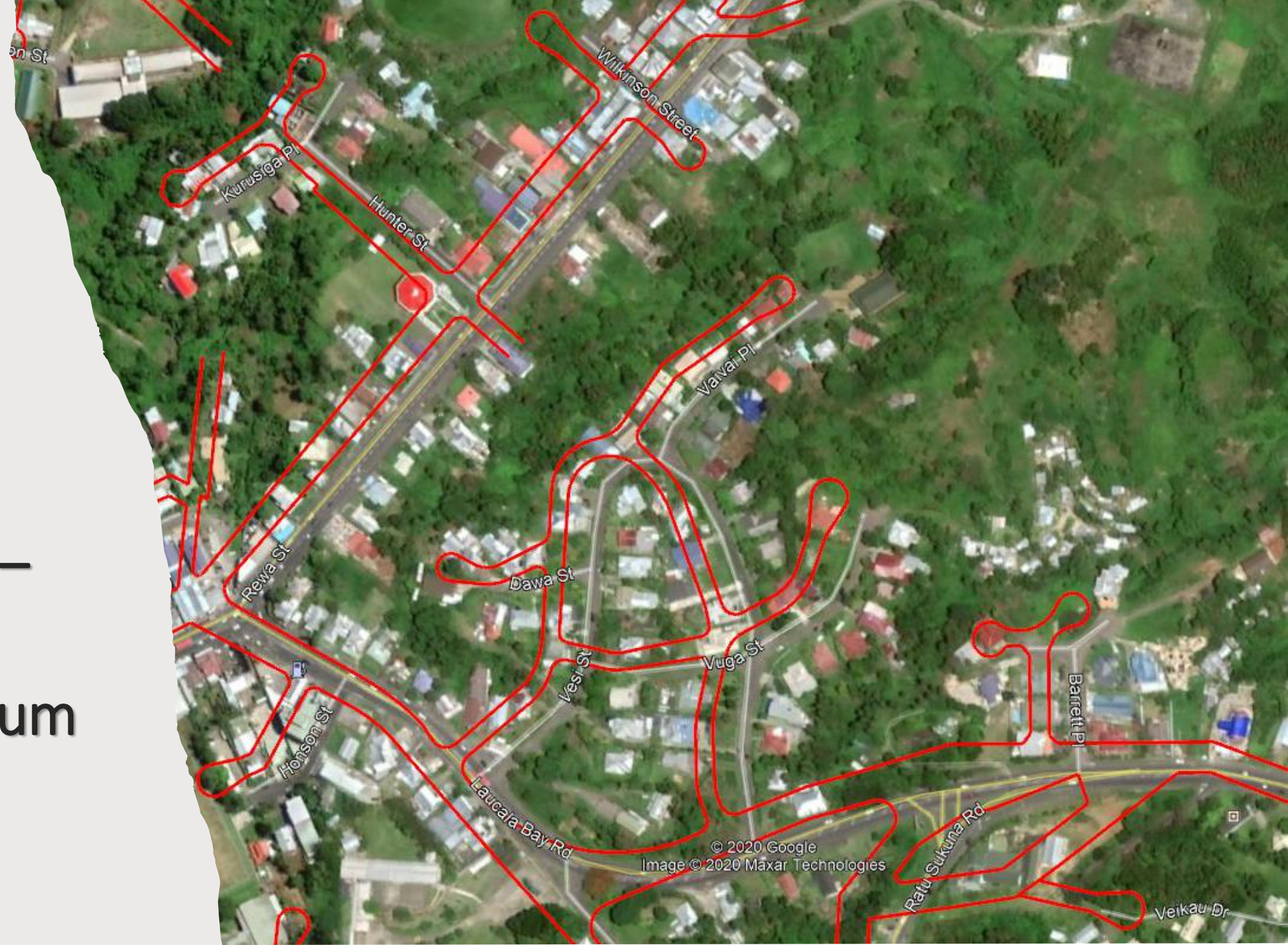


Way Forward

- **Geospatial Data Management & Policy**
- **Datum Definitions**
 - Horizontal Reference Frame
 - Vertical Reference Frame
- **Datum Transformation & Tools**
- **GNSS CORS infrastructure maintenance plan**
- **Monitoring GNSS CORS**
- **Capacity Building**



Positioning – WGS72 vs WGS84 Datum



Vinaka and Thank You

