



# Reference Frame in Practice Workshop 1A

## Status of Geodetic Infrastructure in the Pacific Region – Case Studies

## Republic of Vanuatu

*Ripablik blong Vanuatu* (Bislama)

*République de Vanuatu* (French)



Flag



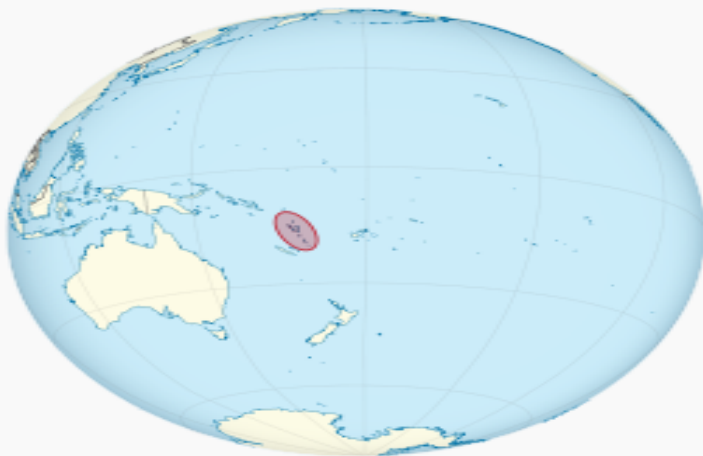
Coat of arms

**Motto:** "Long God yumi stanap" (Bislama)

(In God we stand<sup>[1][2][3]</sup>)

**Anthem:** "Yumi, Yumi, Yumi" (Bislama)

("We, We, We")



**Capital**  
(and largest city)

Port Vila  
 17°45'S 168°18'E

**Official language(s)**

Bislama  
English  
French

Presenter :

Mr Martin Sokomanu

Surveyor General

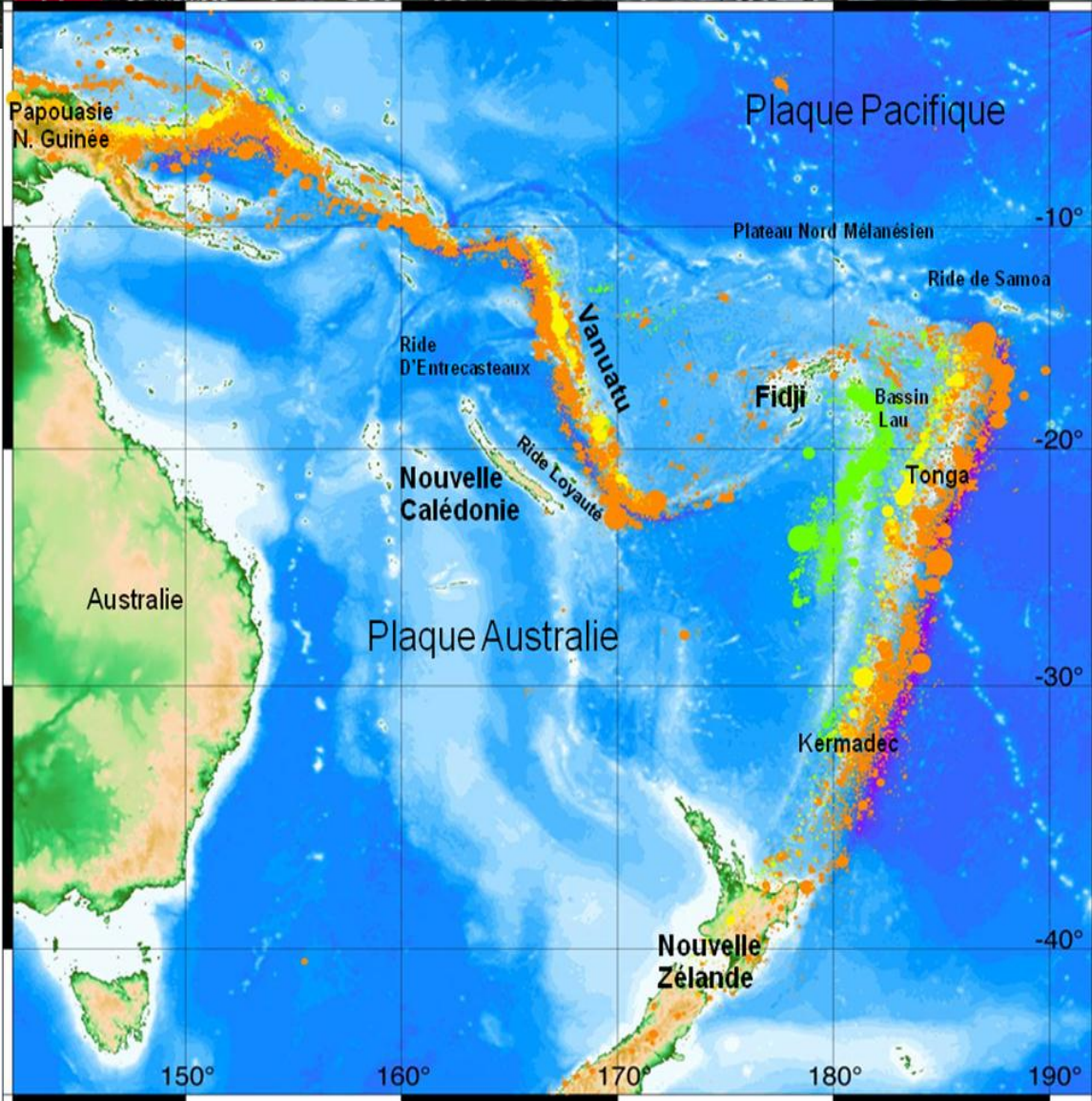
Department of Lands, Surveying and Registry

Ministry of Lands and Natural Resources

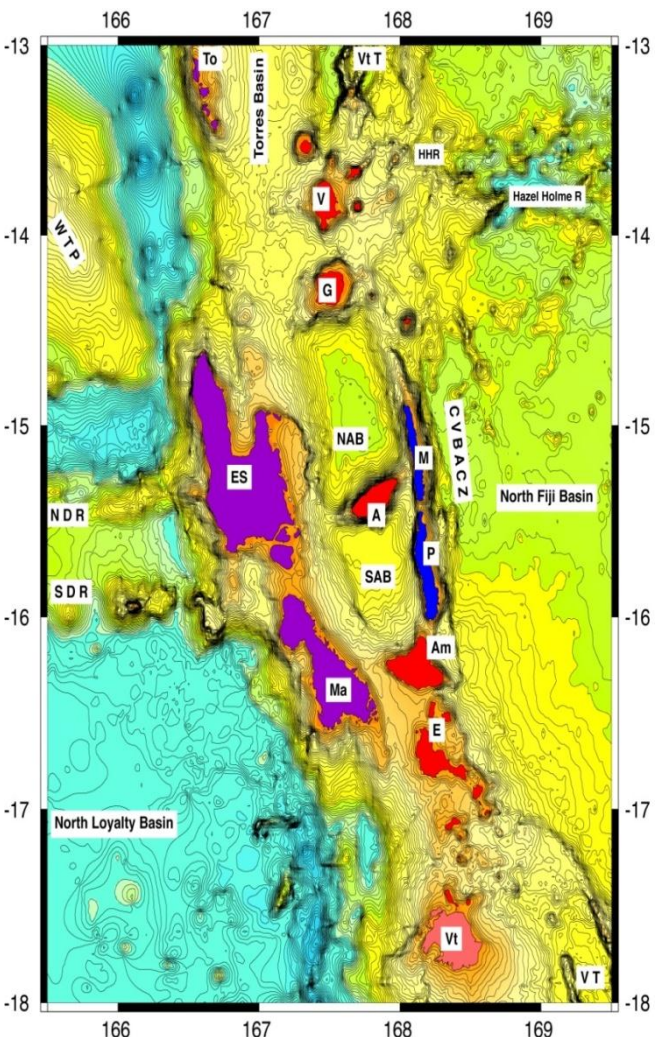
**Vanuatu**  
DISCOVER WHAT MATTERS

# FIG Pacific Small Island Developing States Symposium

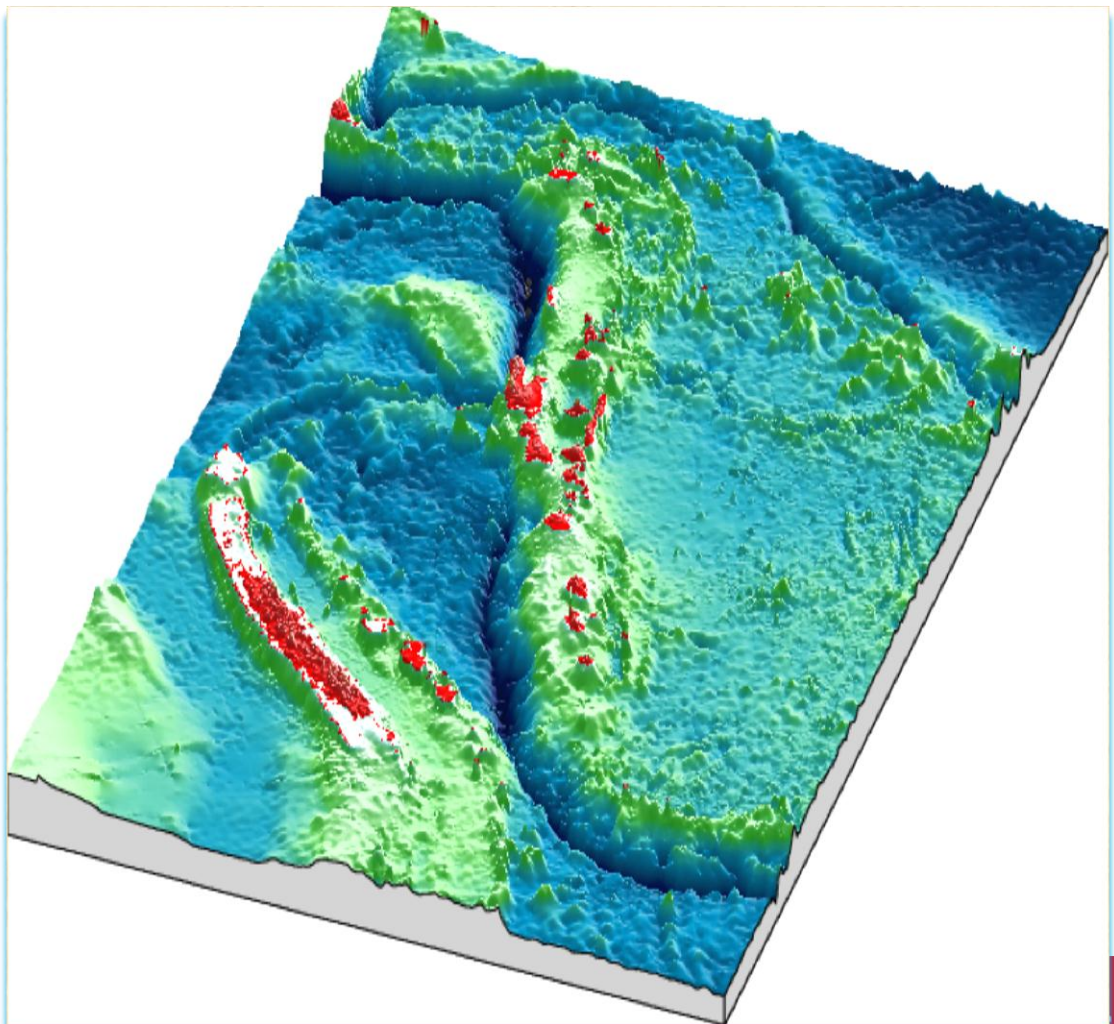
Policies and Practices for Responsible Governance



# GEOLOGY OF VANUATU



Bathymétrie de la partie centrale de l'arc de Vanuatu (Pelletier, 1999 modifié). Isobathes 100m



# Geodetic Infrastructure in Vanuatu

surveying, mapping and geospatial communities.



# ESTABLISHED GEODETIC NETWORK

**Institutions: 1960s – 1980**

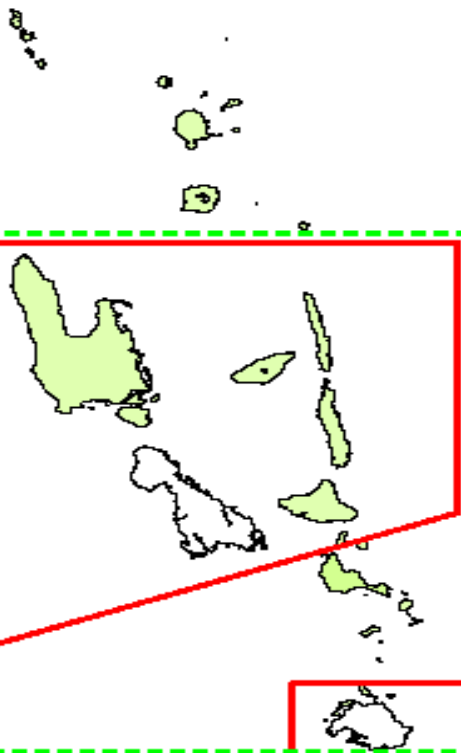
INSTITUTE GEOGRAPHIC NATIONAL (IGN)

DIRECTORATE OF OVERSEAS SURVEYS (DOS)

**Institution: 1984 - 1986**

Royal Australian Survey Corps (RASC)

# TWO DATUMS ON INTERNATIONAL SPHEROID



**Ellipsoid:** International

Major semi-axis

6,378,388.0000

Minor semi-axis

6,356,911.9460

Flattening 1/297.0

## DOS NORTHERN BLOCK

**Vanuatu Northern Datum** - also referred to as **SANTO (DOS) 1965**

**Origin:** Brigstoke

Latitude 15° 35' 40.0000" South

Longitude 167° 06' 50.0000" East

Height (MSL) 2.742m

Geoid/Spheroid Separation Assumed to be 0.0m

## DOS SOUTHERN BLOCK

## IGN NORTHERN BLOCK

**Vanuatu Southern Datum** - also referred to as **BELLEVUE (IGN)**

**Origin:** Bellevue (IGN)

Latitude 17° 44' 17.3997" South

Longitude 168° 20' 33.2501" East

Height (MSL) 141.4m

Geoid/Spheroid Separation Assumed to be 0.0m

## IGN SOUTHERN BLOCK



## TEN (10) TM Projections for Cadastral Surveys

All T.M. projections in the New Hebrides are based on the International spheroid :  $a = 6378\ 388\ \text{metres}$   
 $ee = 0.006\ 722\ 670\ 020$

Projection Date required for CSD.9810.03 and CSD.9810.04

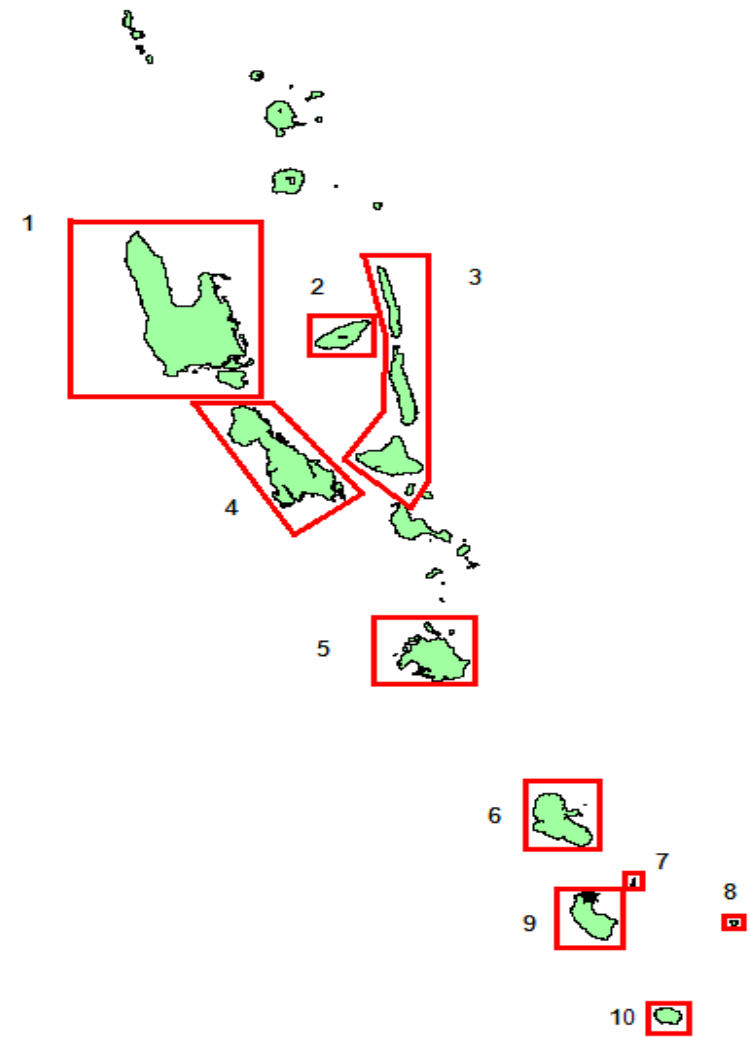
Projection	UTM 58 ✓	UTM 59 ✓	TM AOBA ✓	
FN	10 000 000m000	10 000 000m000	12000m000	19
FE	800 000m000	500 000m000	<del>4000m000</del>	20
k	0.9996	0.9996	1.0000	21
Lat	0 00 00.0000	0 00 00.0000	-15 22 17.1221	22
Long	165 00 00.0000	171 00 00.0000	167 50 00.3420	23
m	0m0000	0m0000	-1700 107m901	24

*Handwritten notes: 12000m000, 18000m000*

Projection	TM SANTO ✓	TM-M-P-A-P	TM MALAKULA
FN	20116m783	60 000m000	60350m350
FE	80467m132	40 000m000	50291m960
k	1.0000	1.0000	1.0000
Lat	-15 35 58.0294	-15 58 56.1497	-16 09 34.9188
Long	167 06 34.8479	168 11 05.6079	167 29 40.5354
m	-1725 340m543	-1767 701m704	-1787 336m933

Projection	TM 1977 ✓	TM ERROMANGO	TM ANIWA
FN	17 541m065	30 000m000	20-000m000
FE	14 845m106	30 000m000	20 000m000
k	1.0000	1.0000	1.0000
Lat	-17 40 54.2815	-18 50 00.0000	-19 15 00.0000
Long	168 15 42.2815	169 10 00.0000	169 88 00.0000
m	-1955 781m755 ? -1955 796m022	-2 083 245m371 ?	-2 129 367m987 ?

Projection	TM TANNA	TM FUTUNA	TM ANATOM
FN	30 000m000	20 000m000	30 000m000
FE	30 000m000	20 000m000	30 000m000
k	1.0000	1.0000	1.0000
Lat	-19 30 00.0000	-19 32 00.0000	-20 12 00.0000
Long	169 20 00.0000	170 13 00.0000	169 48 00.0000
m	-2 157 042m565	-2 160 732m566	-2 234 535m490



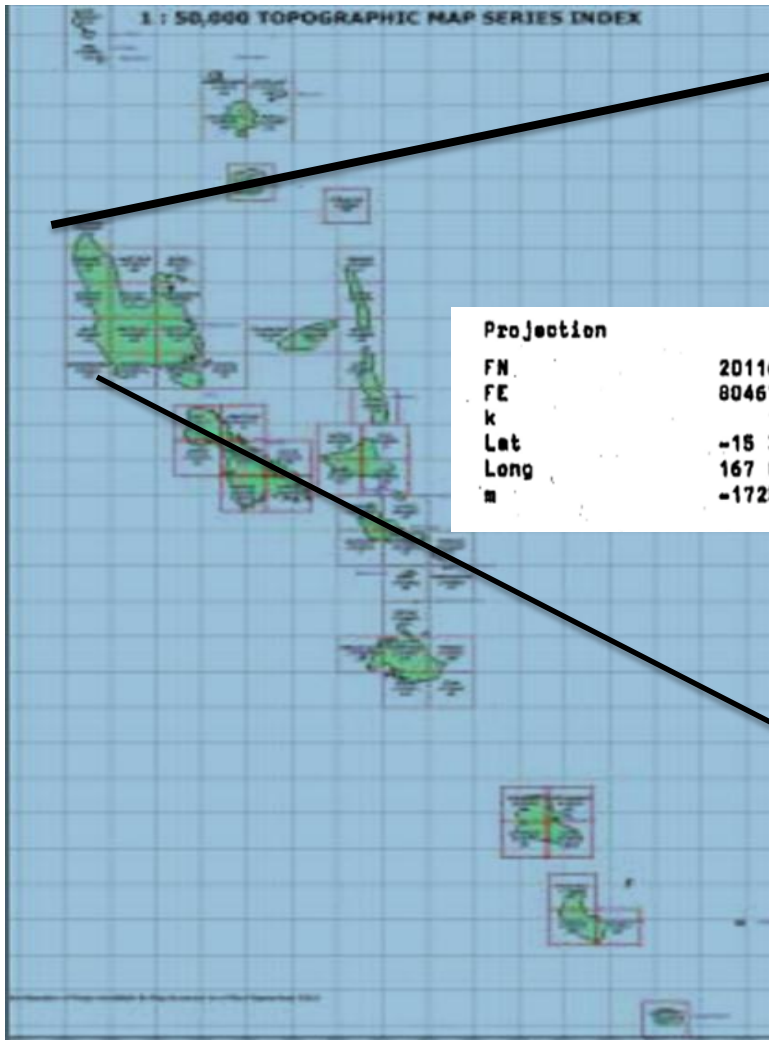




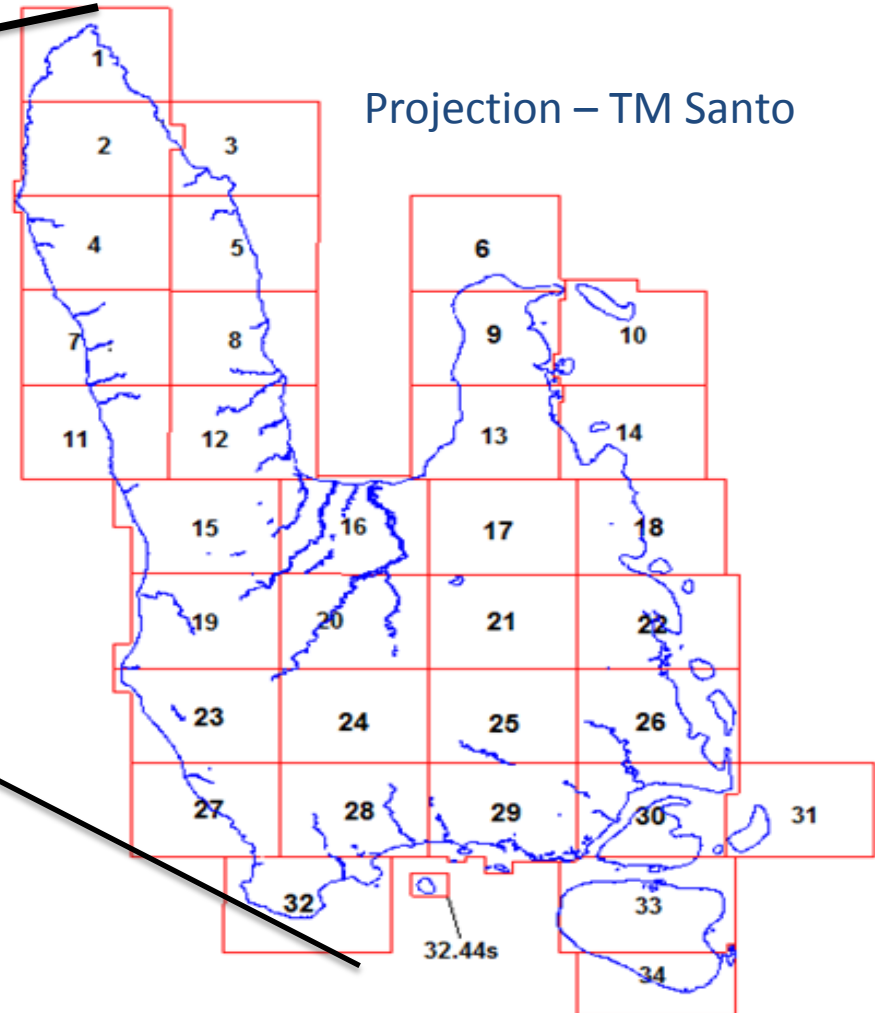
Fiji 18–20 September 2013

CC-BY 2.0 photo by Matt Wright

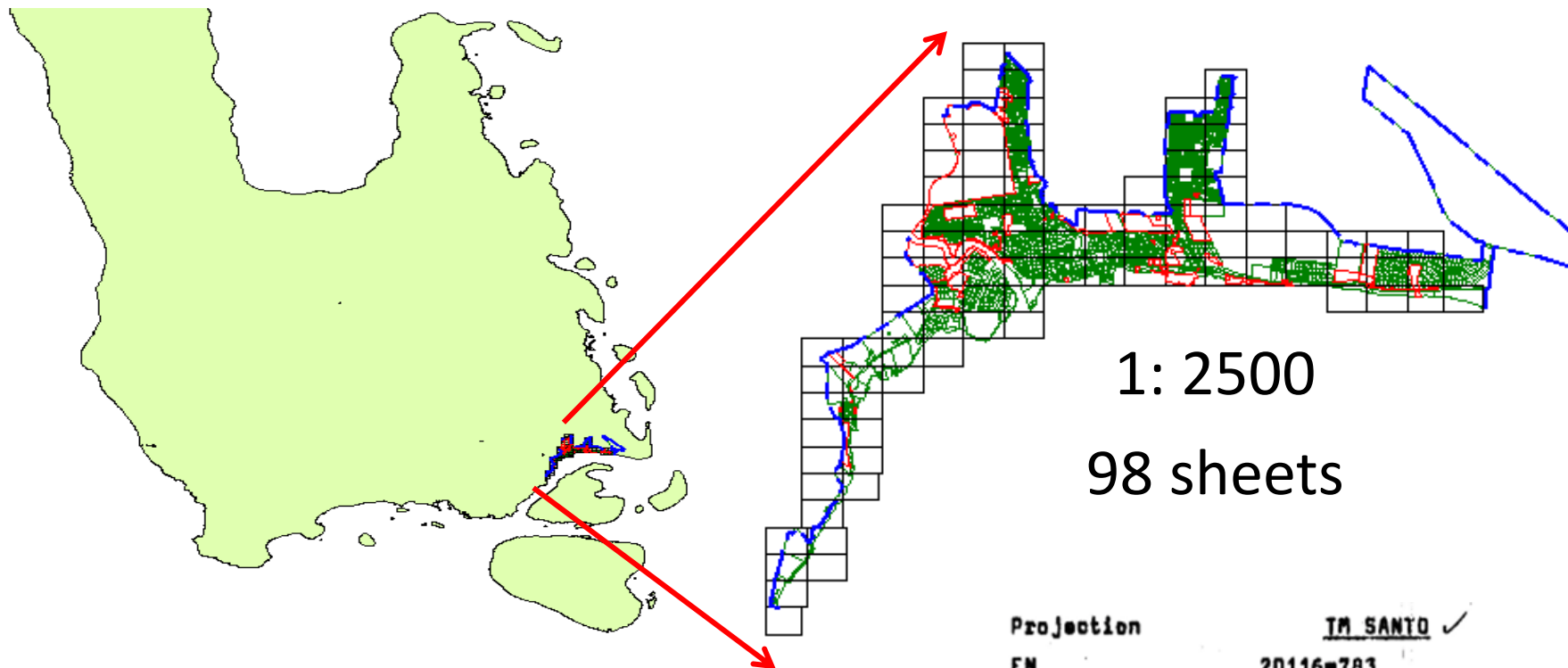
## 1: 20,000 cadastral sheets – 34



Projection	<u>TM SANTO</u> ✓
FN	20116m783
FE	80467m132
k	1,0000
Lat	-15 35 58.0294
Long	167 06 34.8479
m	-1725 340m543



# 1: 2500 SANTO Urban Cadastral Sheets

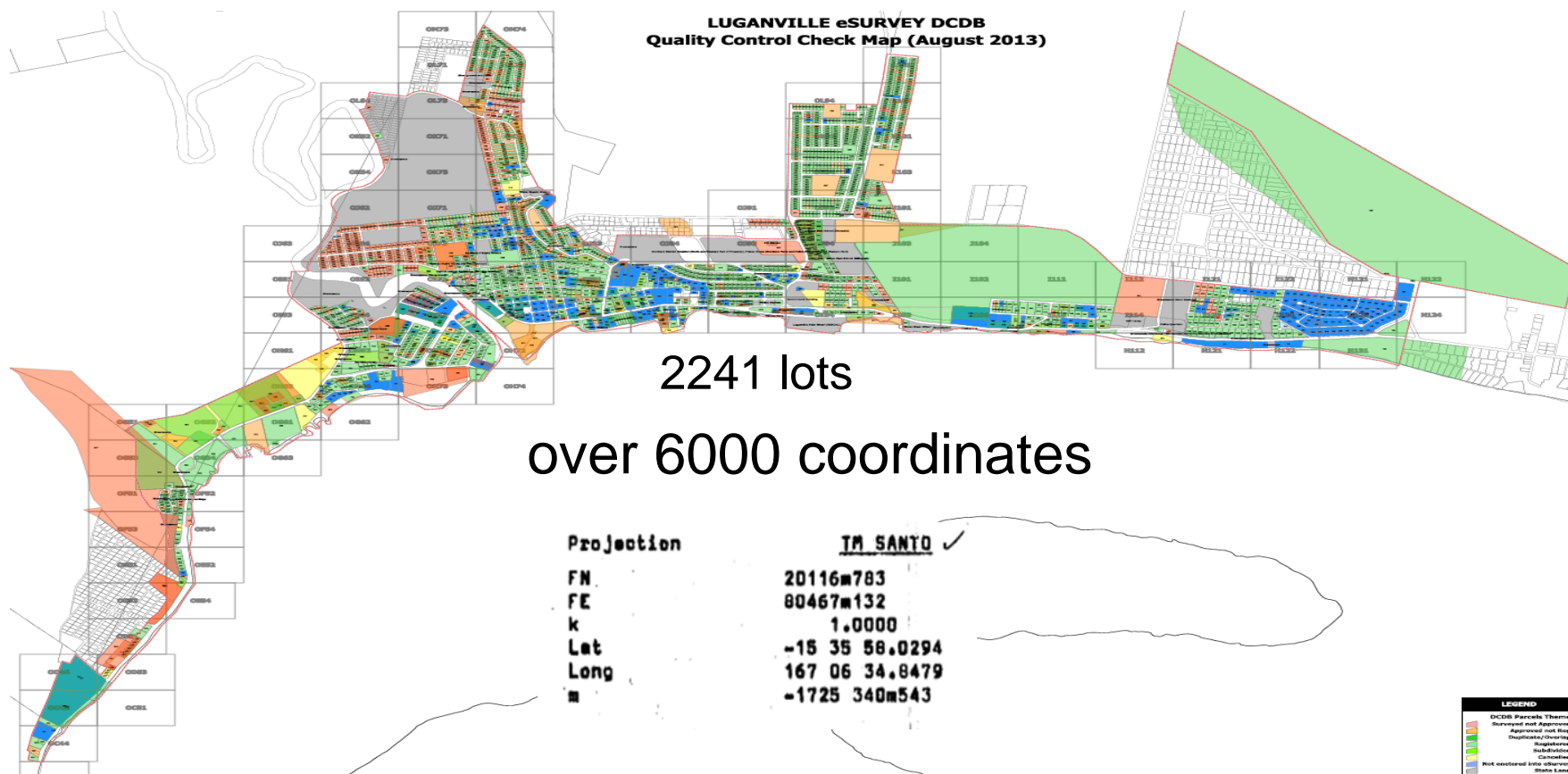


1: 2500  
98 sheets

<b>Projection</b>	<b>TM SANTO</b> ✓
<b>FN</b>	20116m783
<b>FE</b>	80467m132
<b>k</b>	1.0000
<b>Lat</b>	-15 35 58.0294
<b>Long</b>	167 06 34.8479
<b>m</b>	-1725 340m543

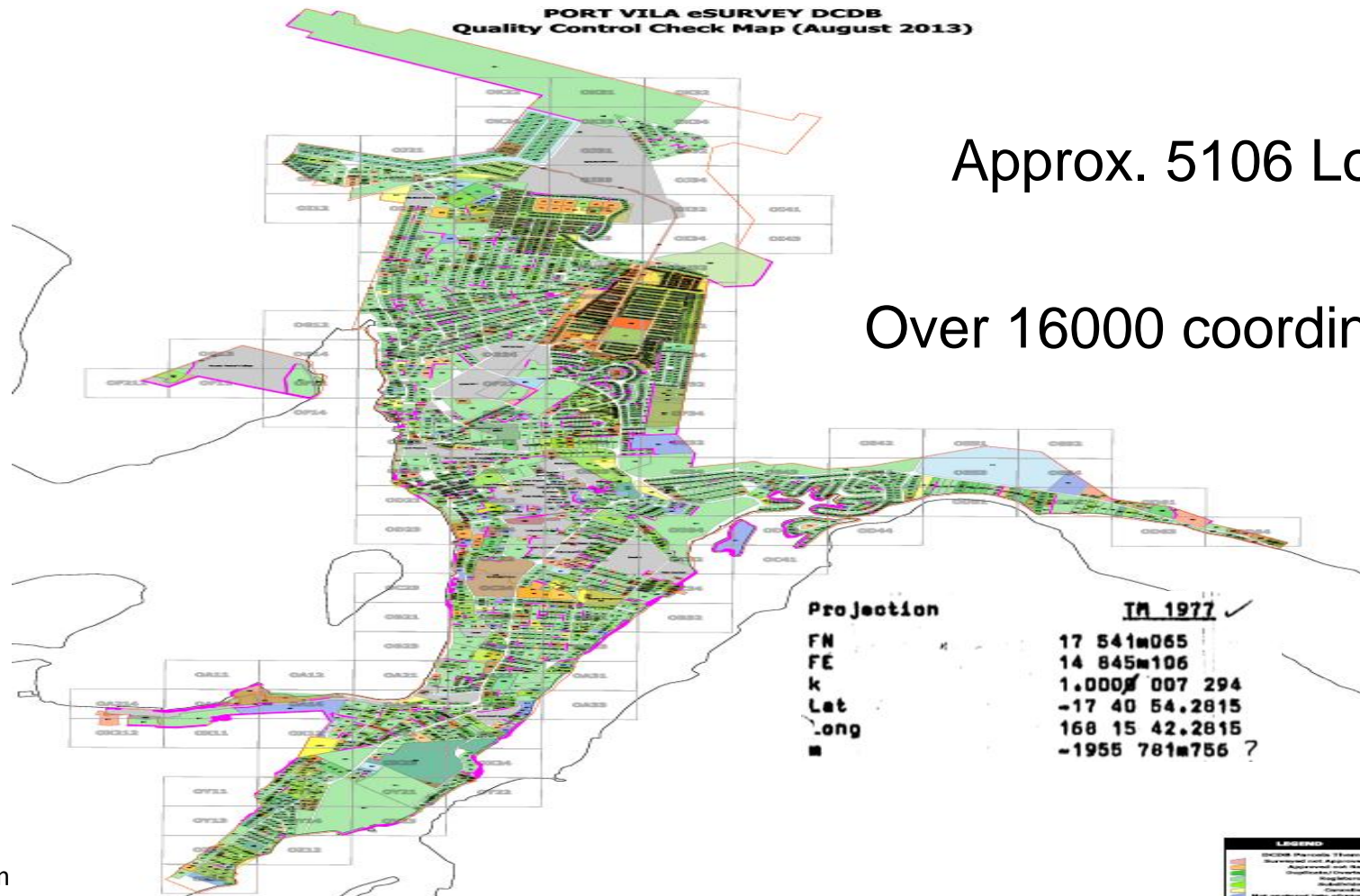
## Luganville Digital Cadastral Database (DCDB)

Supported by MAMA GRAON PROJECT



# Port Vila - Digital Cadastral Database (DCDB)

## Supported by MAMA GRAON PROJECT





# CURRENT ISSUES

The DCDB is being created by entry of the coordinates of boundaries from cadastral survey information.

It is essential that all data in THE DCDB is based on the same geodetic datum and is on the same map projection.

The DCDB is the base layer for the national Geographic Information System (GIS).

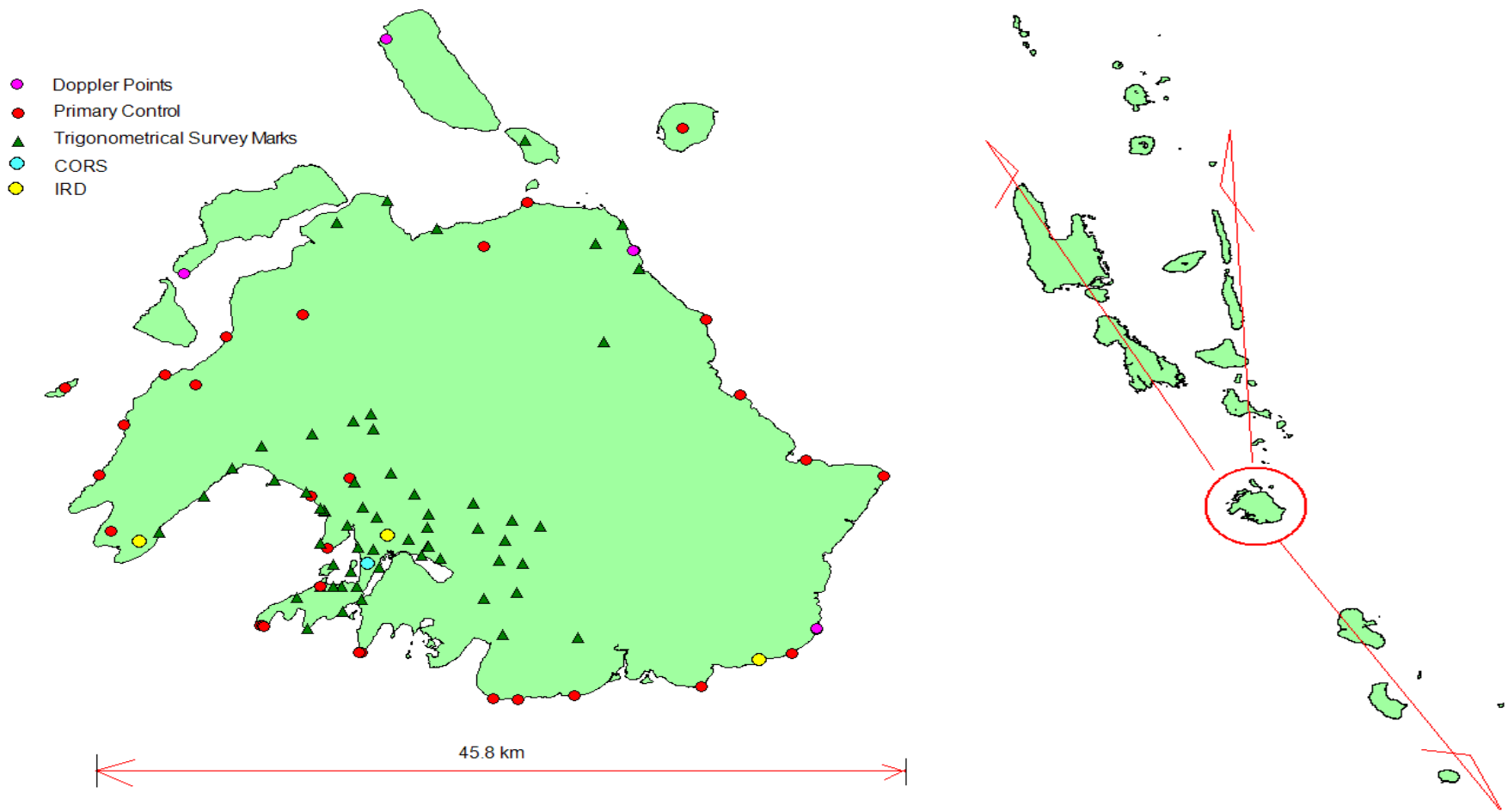
Unless the base layer is homogeneous it is impossible to integrate other layers of data into the National Geographic Information System.

# WHAT NEXT ????

IN SUPPORT TO THE UN-GGIM GLOBAL INITIATIVES :

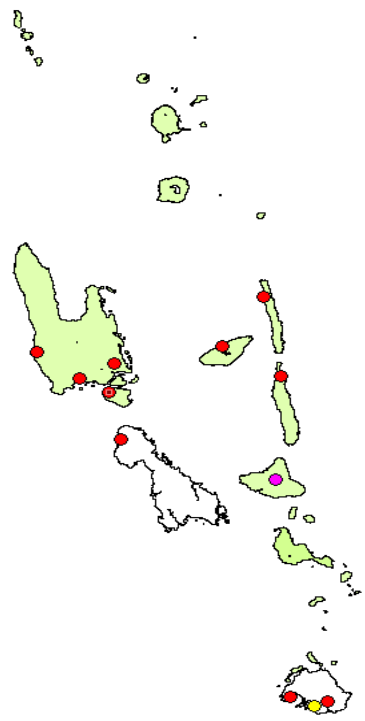
## Unified Single Geodetic Datum for Vanuatu

## We Require assistance towards developing a single Geodetic Datum for Vanuatu on ITRF2008



# GEODETTIC INFRASTRUCTURE TO SUPPORT SINGLE DATUM FOR VANUATU

10 CGPS BASE STATIONS THAT HAVE BEEN ESTABLISHED BY IRD



- IRD CGPS Stations
- IRD Semi Permanent GPS Station
- Geoscience CORS Station





# GEODETTIC INFRASTRUCTURE TO SUPPORT SINGLE DATUM FOR VANUATU

## Geoscience CORS



# GEODETIC INFRASTRUCTURE TO SUPPORT SINGLE DATUM FOR VANUATU

## Vertical Component

1993 – Tide Gauge established by the National Tidal Facility of Flinders University in Australia.

South Pacific Sea Level and Climate Monitoring Project (SPSLCMP)



## WHAT WE NEED :

### TECHNICAL SUPPORT:

- GNSS EQUIPMENT
- GNSS POST PROCESSING SOFTWARE
- GEODETIC ADJUSTMENT SOFTWARE

### TECHNICAL SUPPORT:

INTERNATIONAL GEODETIC SURVEY SPECIALIST



**VINAKA  
TANKIU TUMAS  
MERCI BEACOUF**

