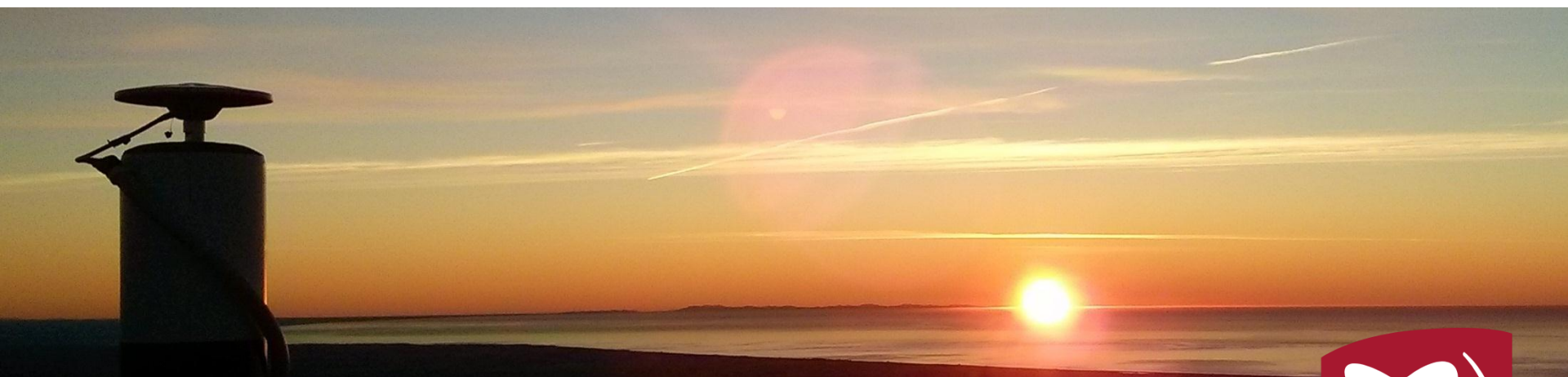




The contribution of the GeoNet and PositionZ GNSS networks to IGS



E. D'Anastasio¹, P. Gentle², M. Amos²

¹ GNS Science

² LINZ



GeoNet & PositionNZ networks: Facts & Stats

~ 200 CORS sites

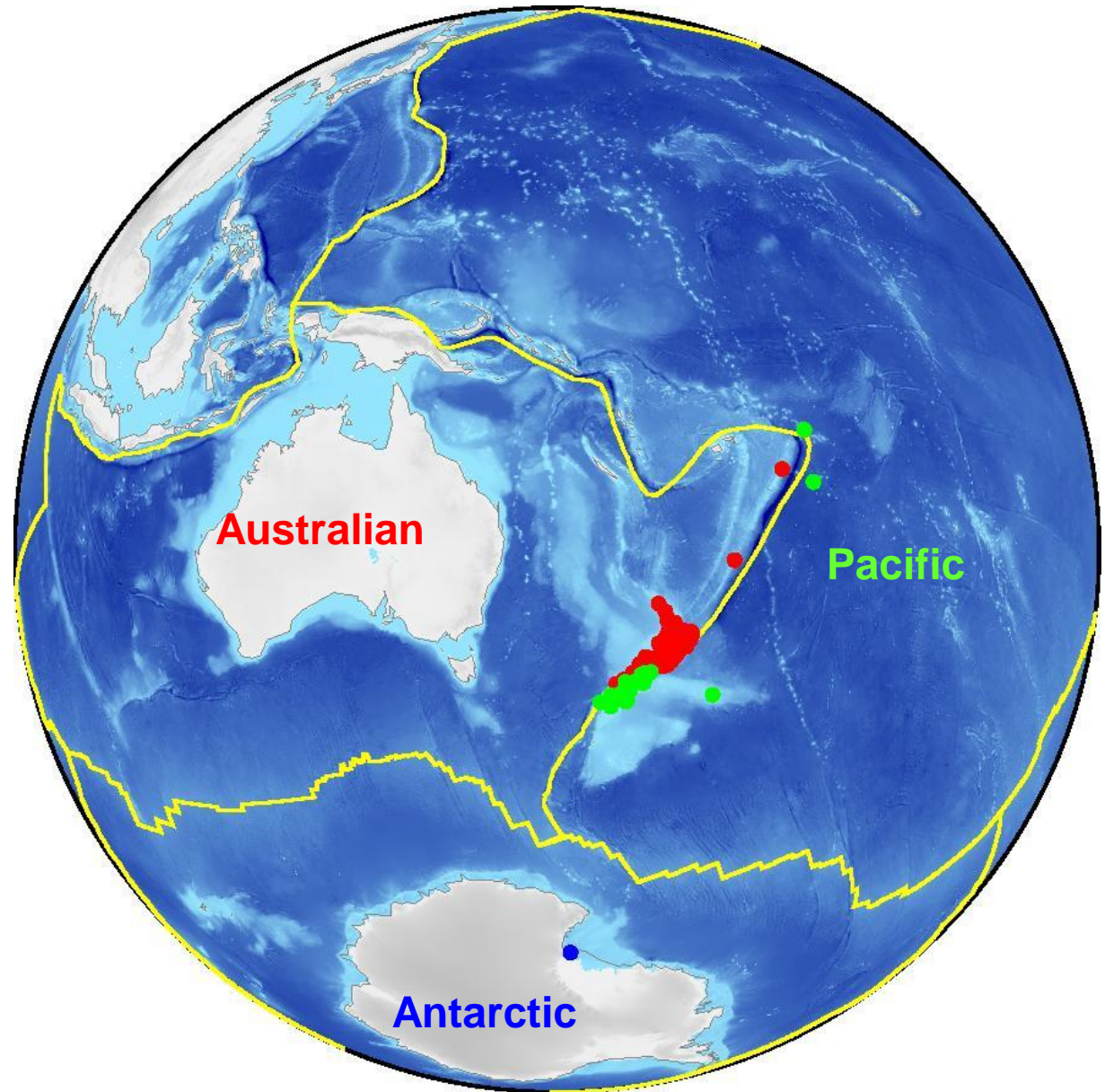
3 sites out of New Zealand:

- Tonga
- Samoa
- Antarctica

3 tectonic plates

7 sites contributing to IGS
(International GNSS Service)

1 site contributing to MGEX
(IGS Multi-GNSS Experiment)



The GeoNet and PositionNZ continuous GNSS networks



<http://www.linz.govt.nz>

37 CORS sites

30s hourly and daily RINEX

1s 15min RINEX

35 sites : Real Time (PositionNZ-RT)



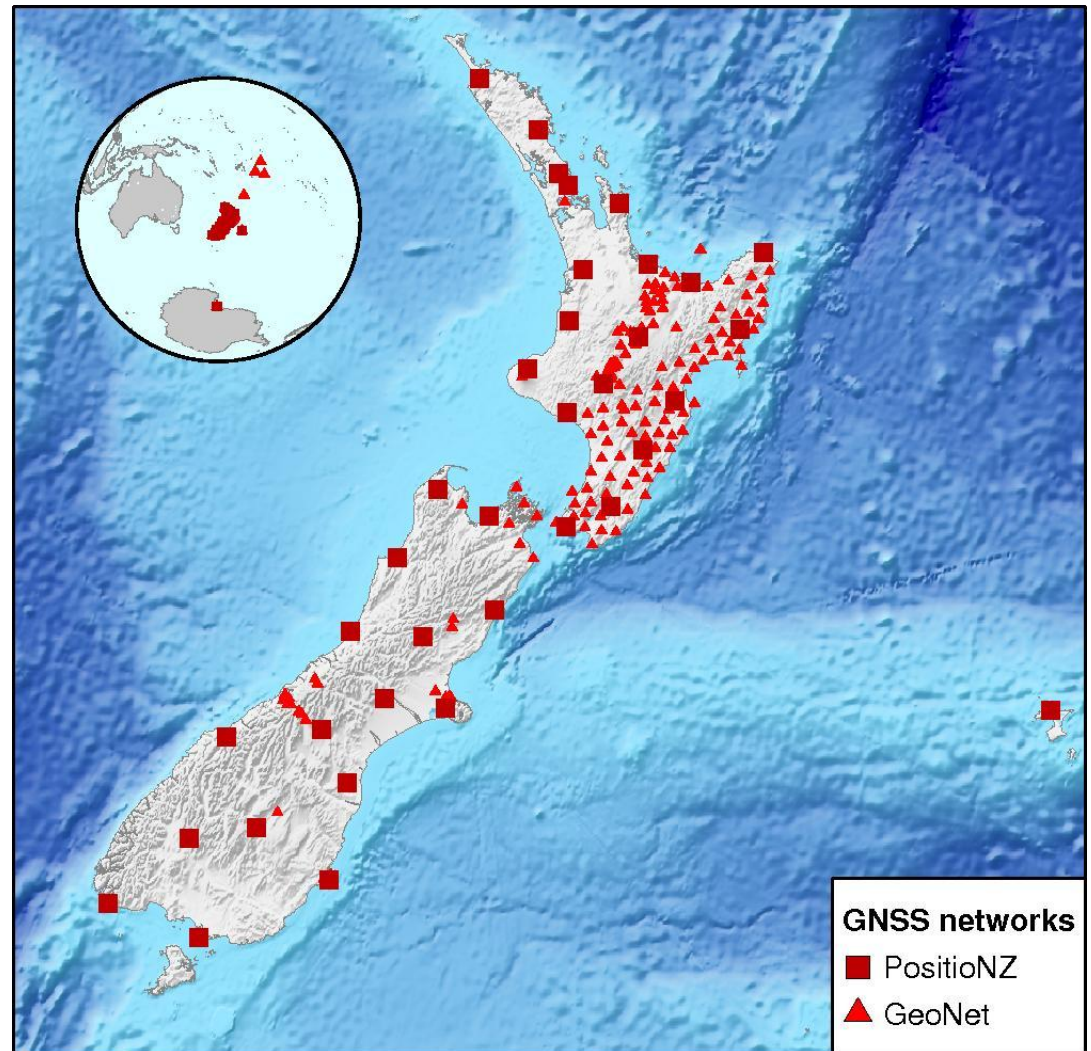
<http://info.geonet.org.nz>

159 CORS sites

30s hourly and daily RINEX

1s data stored locally

4 sites : Real Time (PositionNZ-RT)



Otago University Survey Department & NIWA contributing with 4 sites

GNSS constellations: current tracking status



<http://www.linz.govt.nz>

35 sites: GPS&GLO

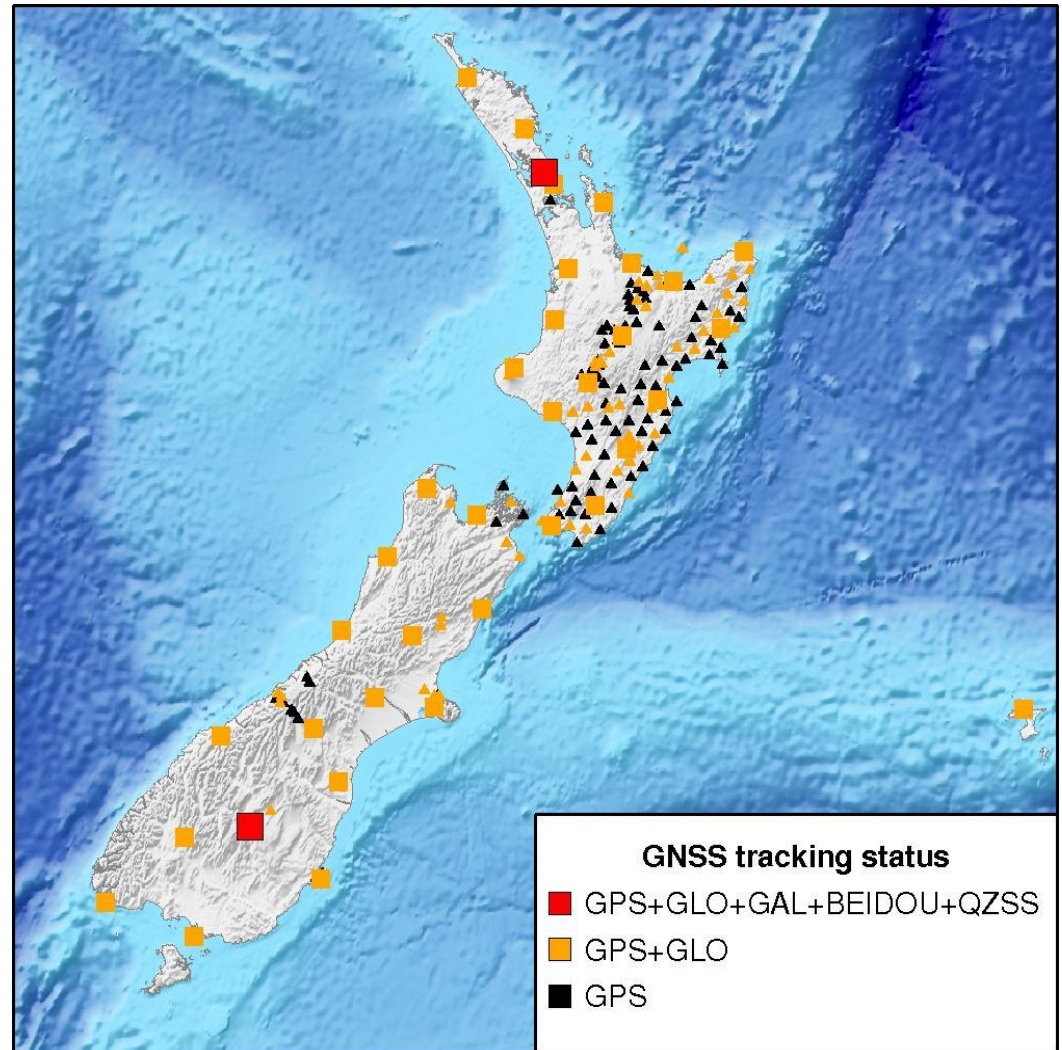
2 sites: full-GNSS



<http://info.geonet.org.nz>

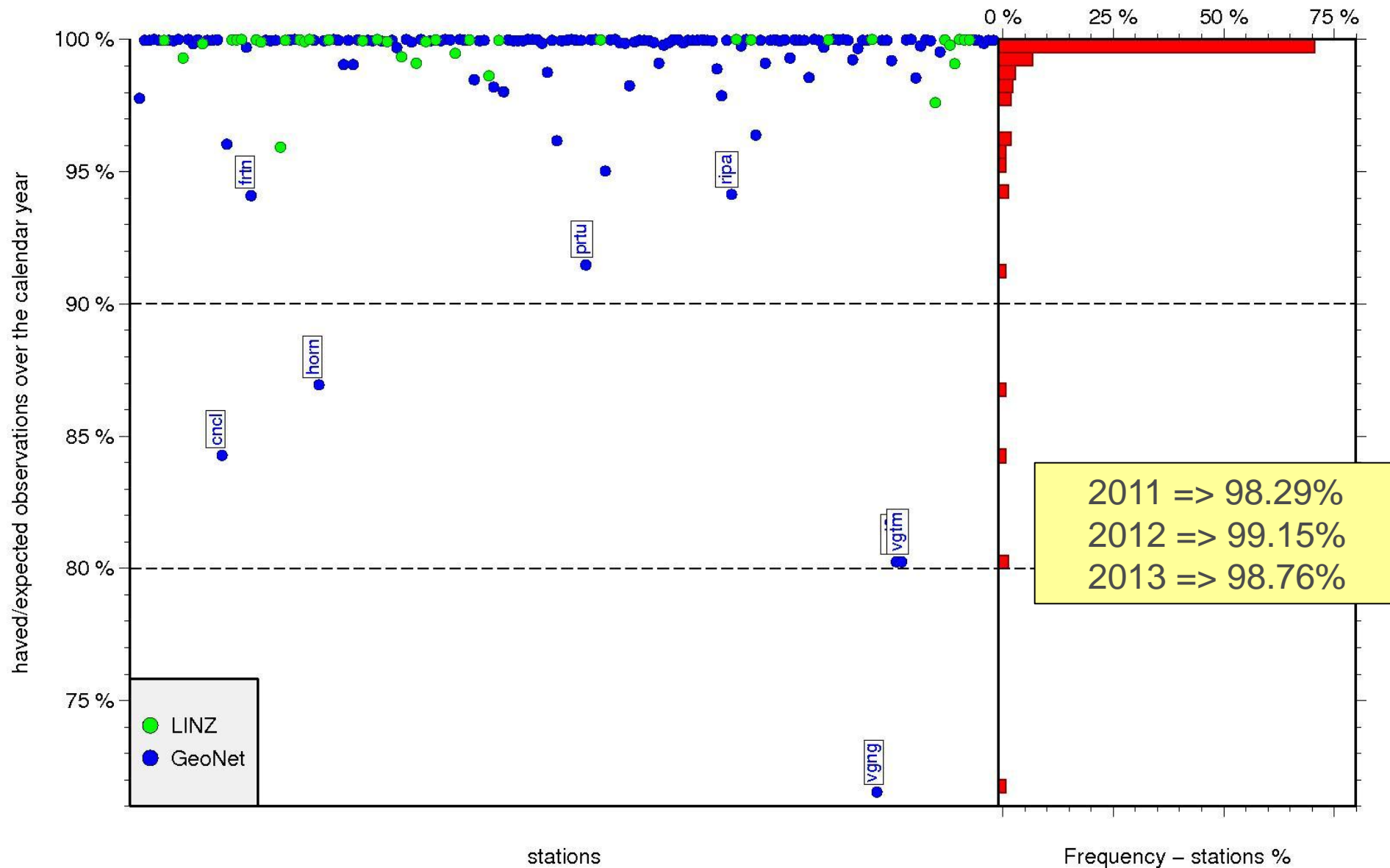
101 sites: GPS

58 sites: GPS&GLO

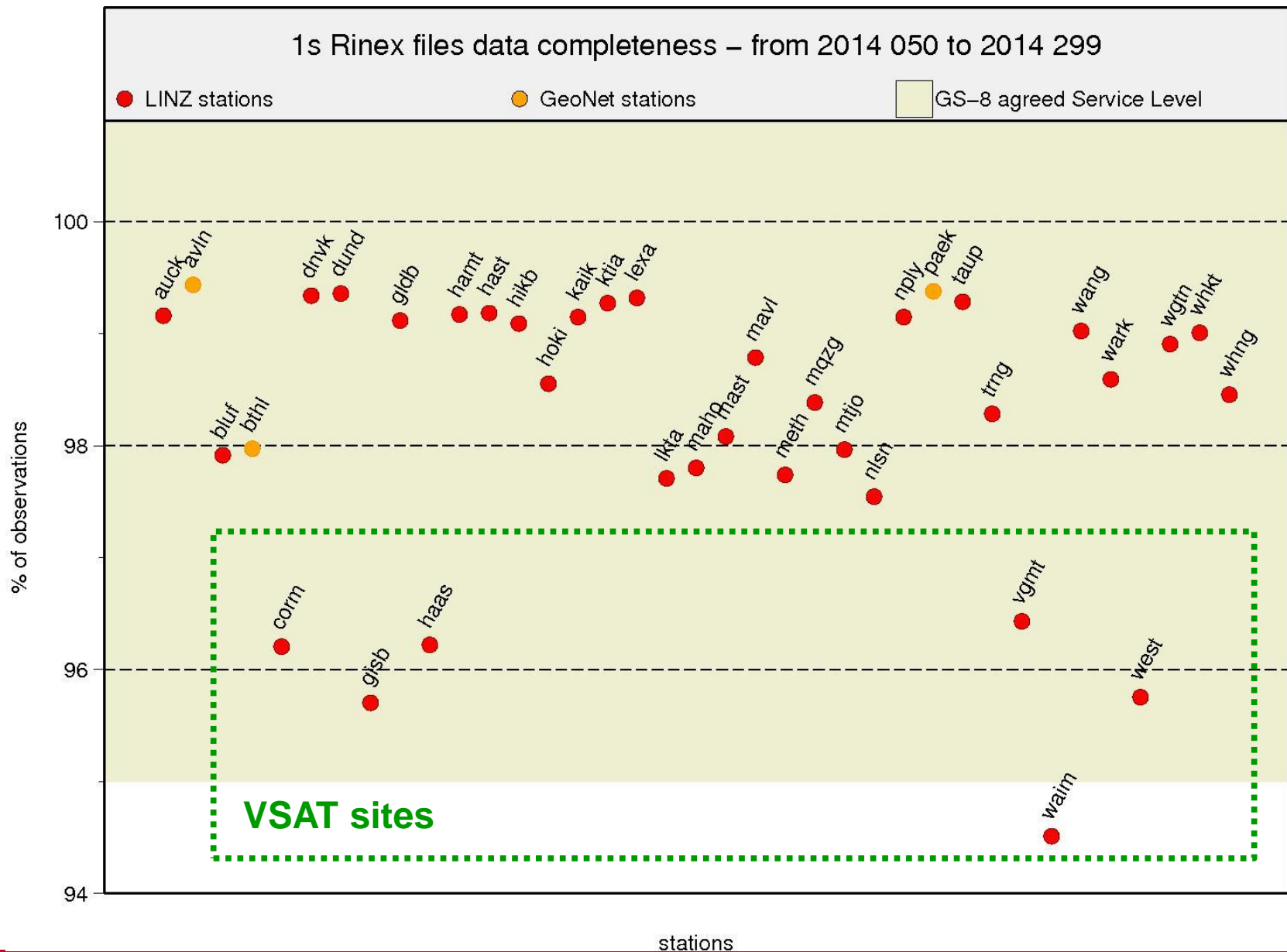


GeoNet and PositionZ performance: 30s daily files completeness

2014 (334 days) – 30s RINEX files data completeness (overall 99.02%)



PositionZ-RT performance: 1s data (from streaming) completeness

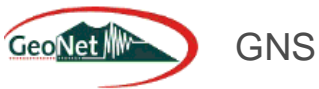


PositionZ and GeoNet IGS sites



6 sites within New Zealand

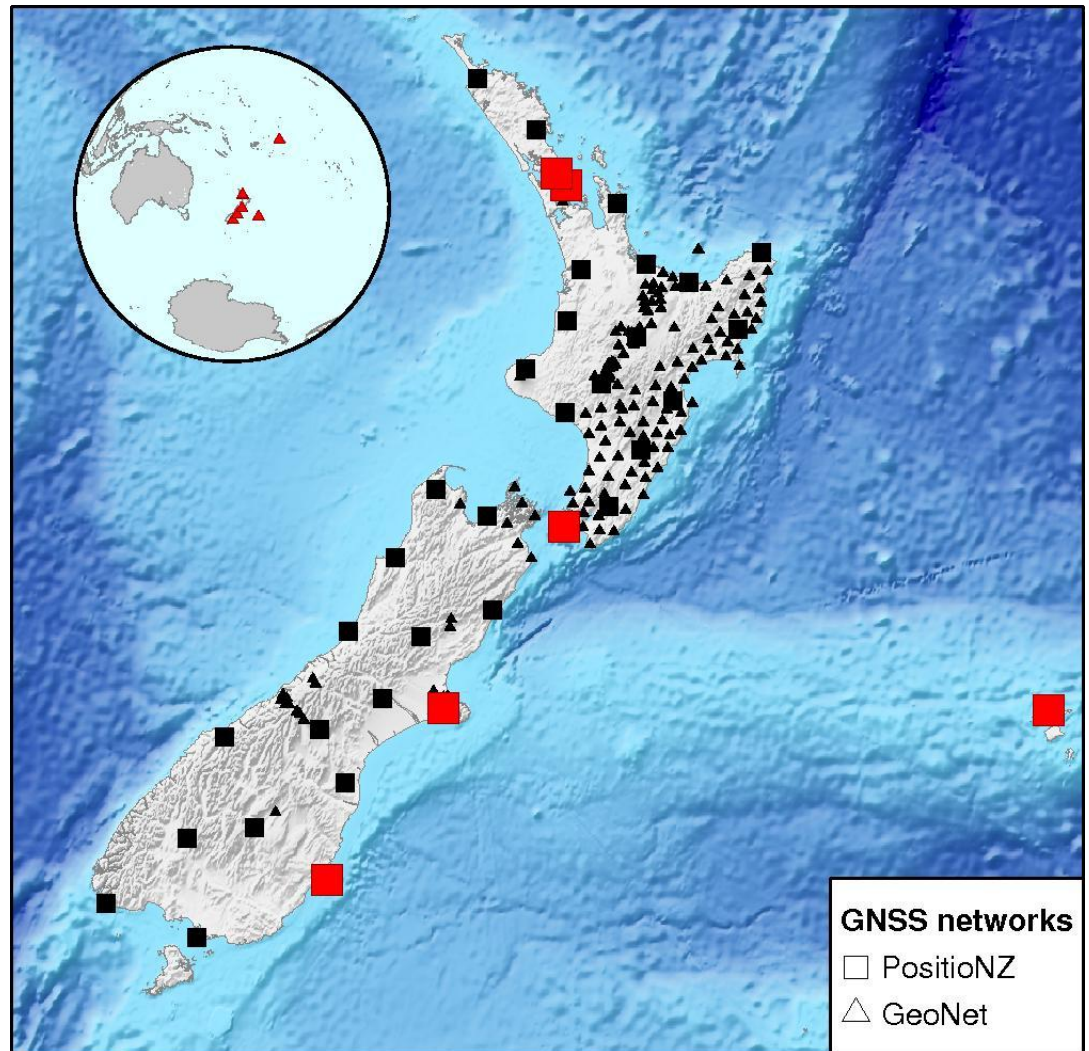
- Trimble NetR9 GNSS receivers
- Trimble Zephyr Geodetic 2 antennas

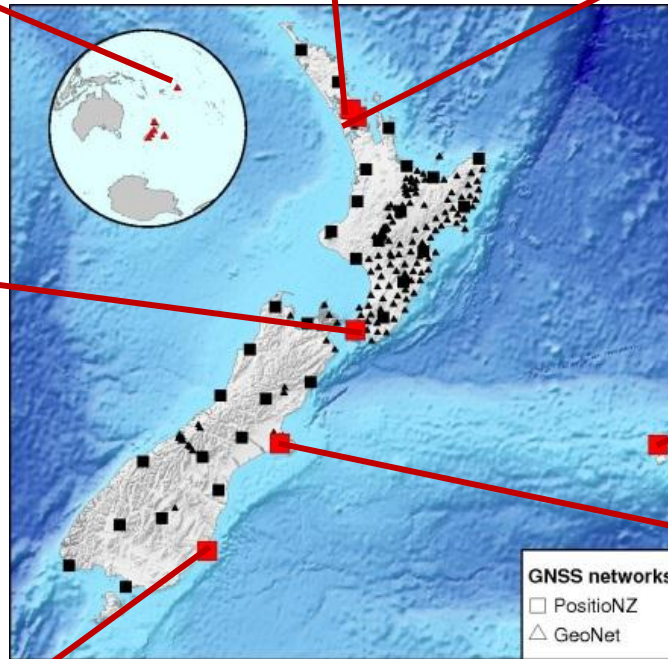


1 site in Samoa (Faleolo, Apia)

- Trimble NetRS GPS receiver
- Trimble Zephyr Geodetic 1 antenna

1 site in Niue Island (NIUM) operated by GNS until 2014, then upgraded and operated by Geoscience Australia





PositionNZ and GeoNet IGS sites

Contribution to IGS network as network operator

RINEX 2.11 files

30s hourly and daily data uploaded to CDDIS and IGN ftp repositories

RTCM 3.0 streaming

Real time data stream distributed to IGS RTS (Real-time Service)

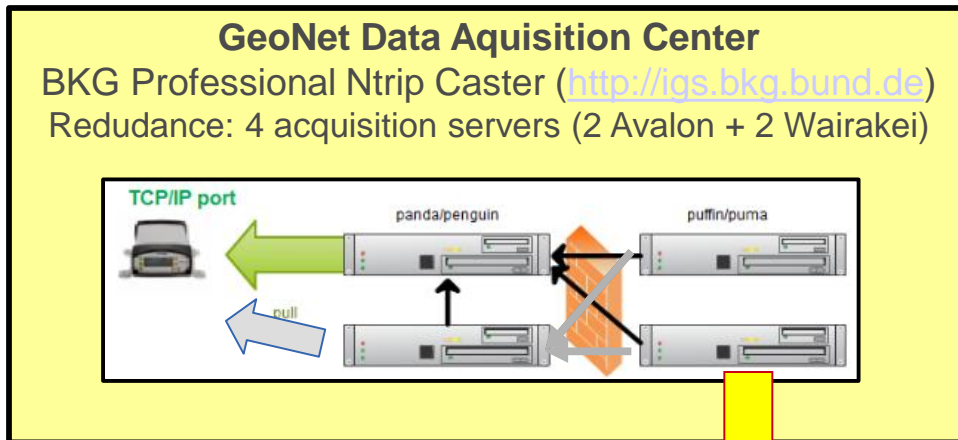
GNSS Metadata

Site log data maintained via IGS Site Log Manager Tool (<http://slm.igs.org>)



WARK (Warkworth) – GNSS antenna and VLBI
Became an IGS site in 2013

PositionNZ-RT: contribution to IGS-RTS (IGS Real Time Service)



<http://apps.linz.govt.nz/positionz>

PositionNZ-RT – Current Status

For information on using the PositionNZ-RT real time service visit the [main PositionNZ-RT page](#).

Statistics are updated every 10 minutes. To ensure the refresh your page. Map locations are approximate, and position.

PositionNZ Real Time Service

Code	Network	Latency 1 Hr (s)	Latency 24 Hr (s)	Completeness 1 Hr (%)	Completeness 24 Hr (%)
AUCK	LINZ	1.07	0.84	100	98.41
AVLN	GeoNet	0.61	0.65	100	99.27

PositionNZ-RT users
(> 150 active users)

IGS Real Time Network

(<http://www.igs.org/rt>)

© Alberding GmbH
 Permalink
 170.33203, -38.75408

IGS Site Log Manager: webtool for metadata maintenance

<http://slm.igs.org>

User guide available on the IGS website

IGS Site Log Manager - Mozilla Firefox

File Edit View History Bookmarks Tools Help

IGS Site Log Manager

slm.igs.org/slm.php

QUICK SEARCH ? Station: **WARK** + New Upload View / Diff Download Submit

Elisabetta

8 Stations

AUCK	19
CHAT	37
CHTI	41
DUND	32
FALE	33
MQZG	22
WARK	17
WGTN	23

0. Site Form

1. Site Identification >>> 1

1a - Overview
1b - Monument
1c - Geologic Characteristics 1

2. Site Location

3. GNSS Receiver 1

4. GNSS Antennas 3

5. Surveyed Local Ties 3

6. Frequency Standard

7. Collocation Information

8. Meteorological Instr. >>>

9. Local Ongoing Cond. >>>

10. Local Episodic Effects

11. On-Site, Point of Contact 3

12. Responsible Agency Info 3

13. More Information >>> 3

WARK 1 - Site Identification - Overview

Site Name * Warkworth GPS

Site Long Name * WARK00NZL

Monument Inscription * none

IERS DOMES Number * 50243M001

CDP Number none

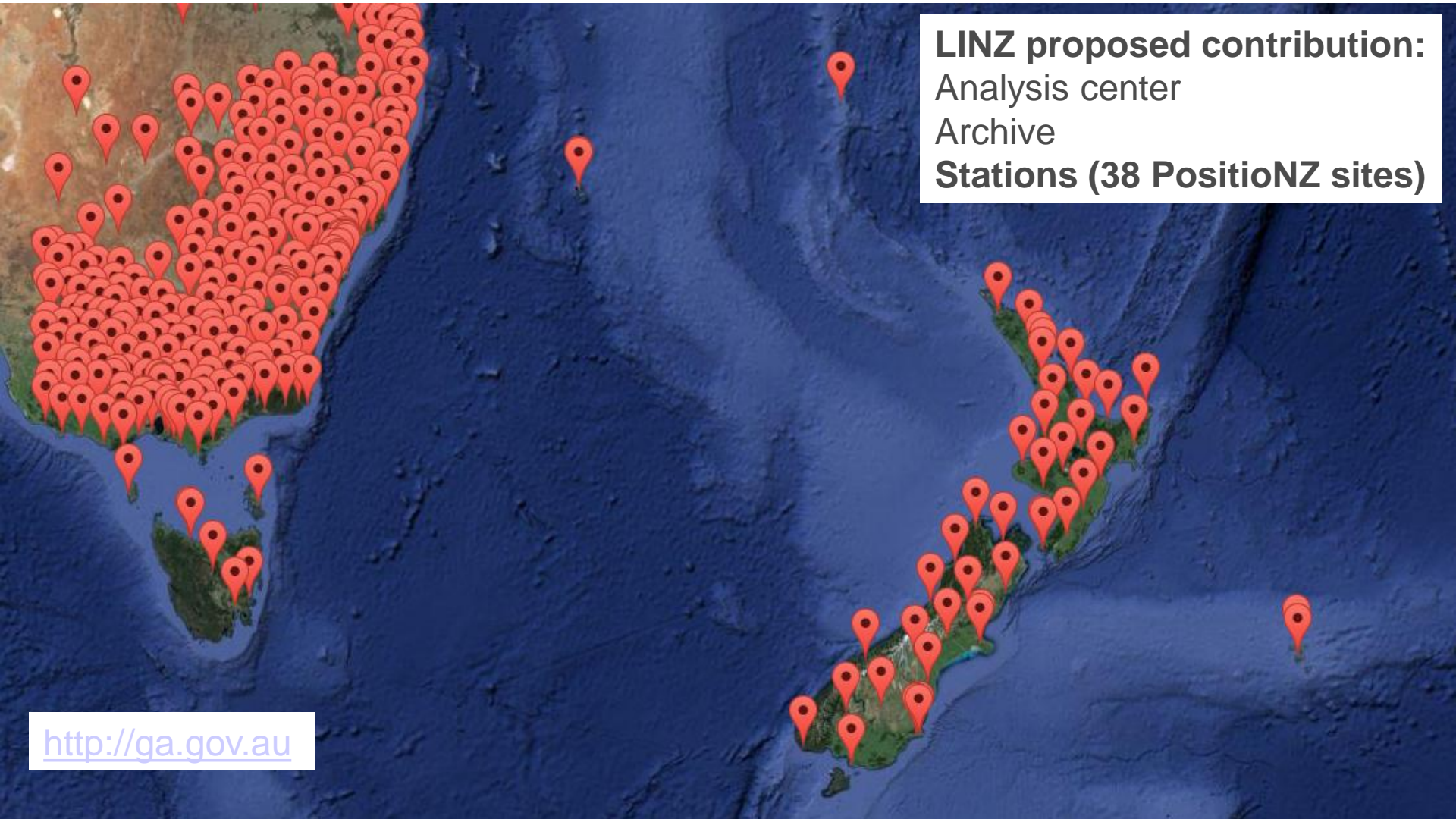
Date Installed * 2009-01-01T00:00Z Clear

Updated: 2014-10-21 07:34:02 [View Edit History]

Cancel Save Submit to IGS

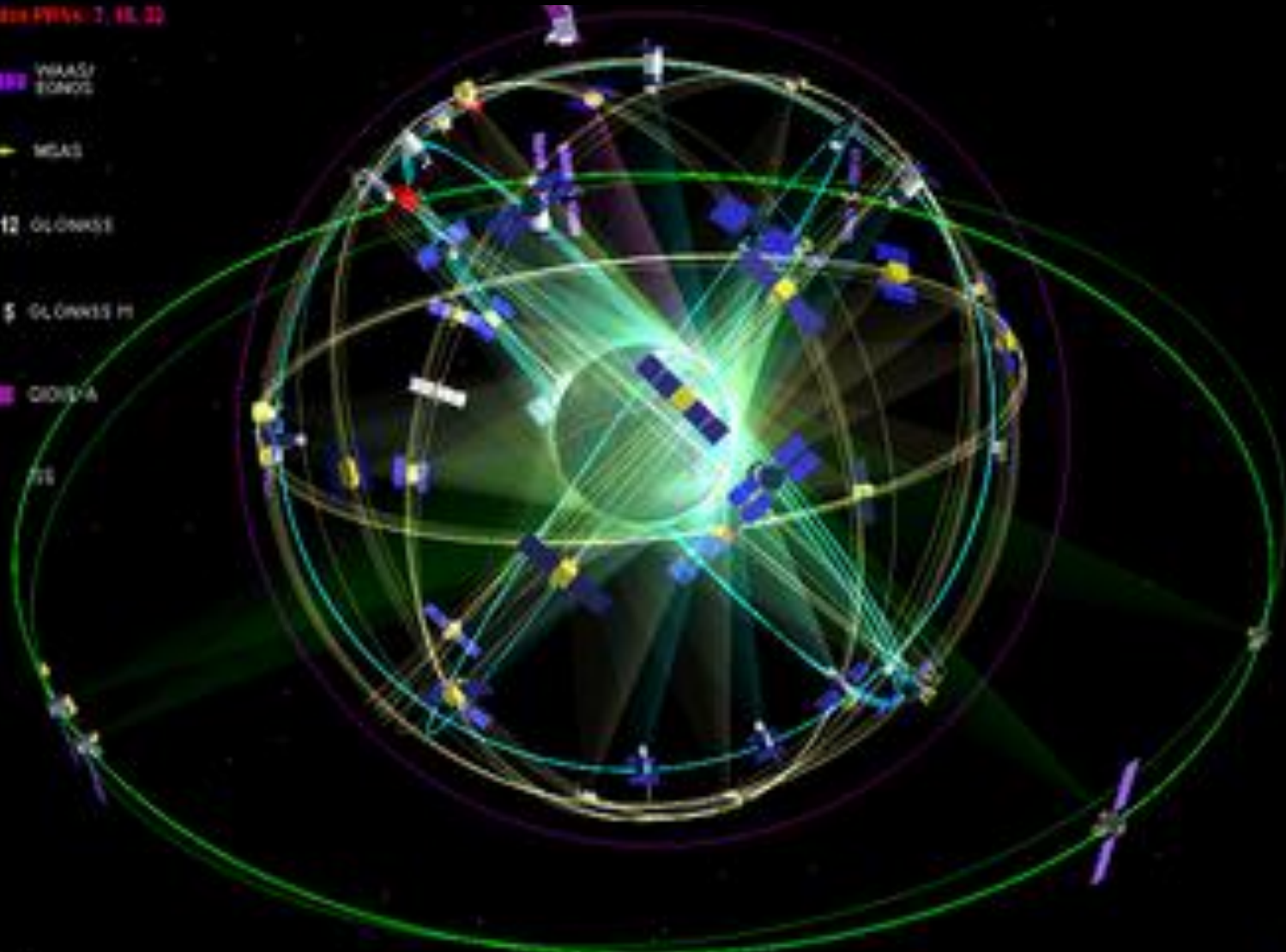
Contribution to APREF: Asia Pacific REference Frame

LINZ is the APREF participating agency for New Zealand



Multi-GNSS: the future

- 15 GPS Block IIR
- 16 GPS Block IIR-M
- Galileo satellites PRN 1, 15, 22
- IRIDIUM IIR
- IRIDIUM IIR-M
- 12 GLONASS
- 5 GLONASS M
- GLONASS
- 75



11 Sep 2007 17:51 UTC
Time factor: x500

Almanac week: 420

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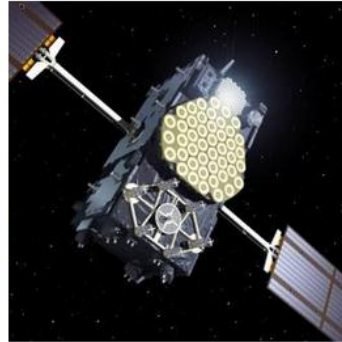
Contribution to IGS Pilot Project (MGEX)



GPS



GLONASS



Galileo



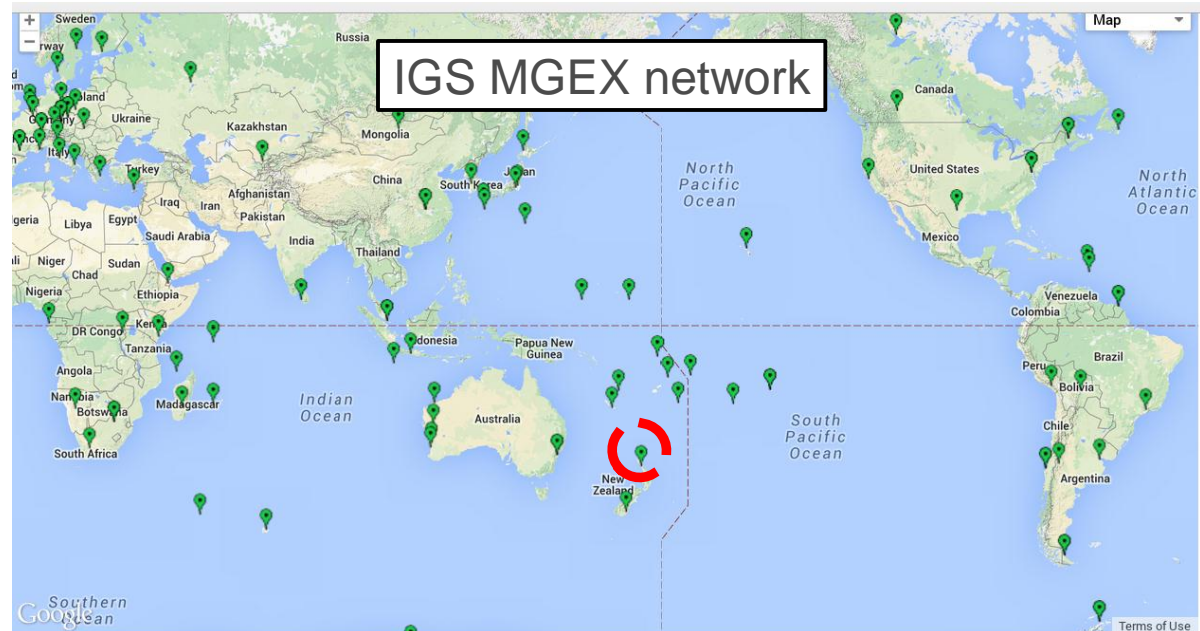
BeiDou



QZSS

MGEX = Multi-GNSS Experiment

<http://igs.org/mgex>



WARK

(Warkworth) –

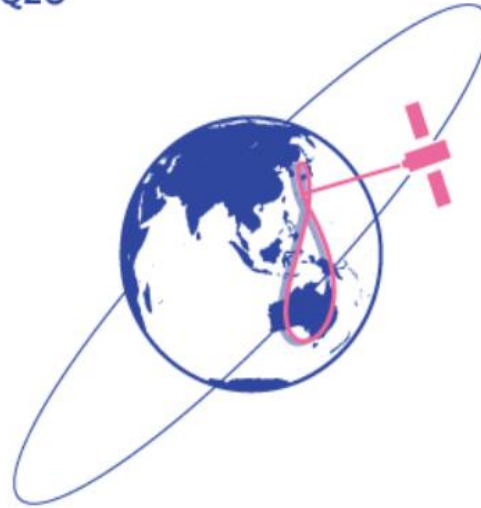
tracking GPS.

Other projects

QZO

<http://www.qzs.jp>

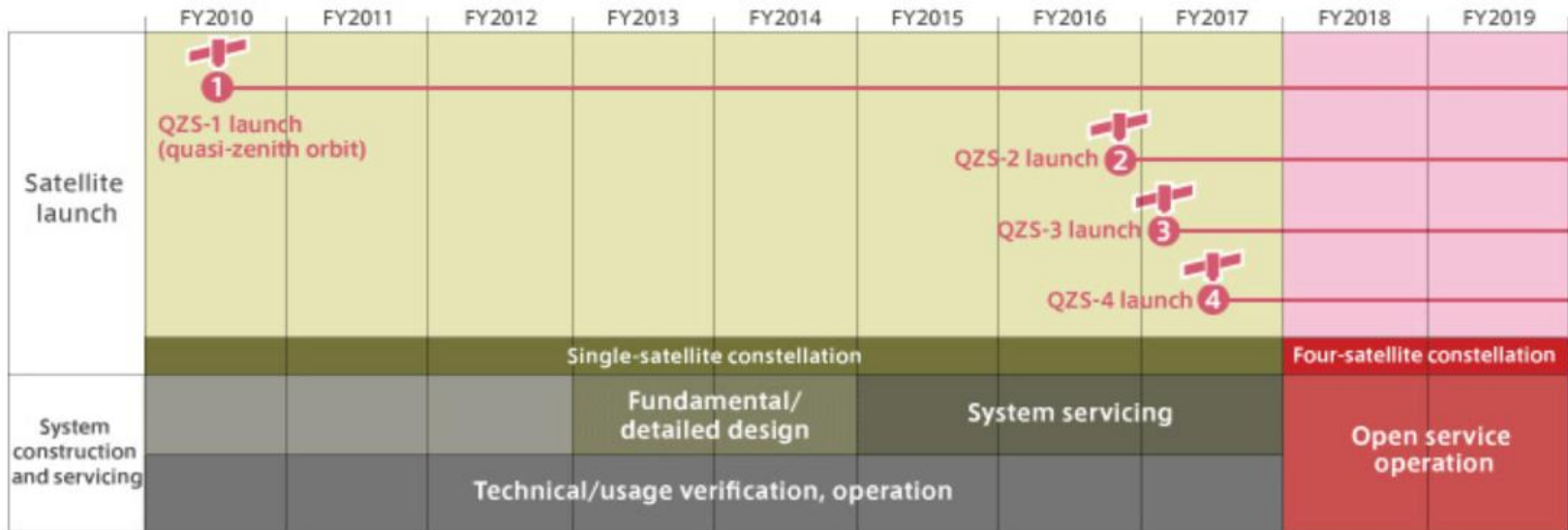
QZSS = Quasi-Zenith Satellite System
Japanese satellite constellation



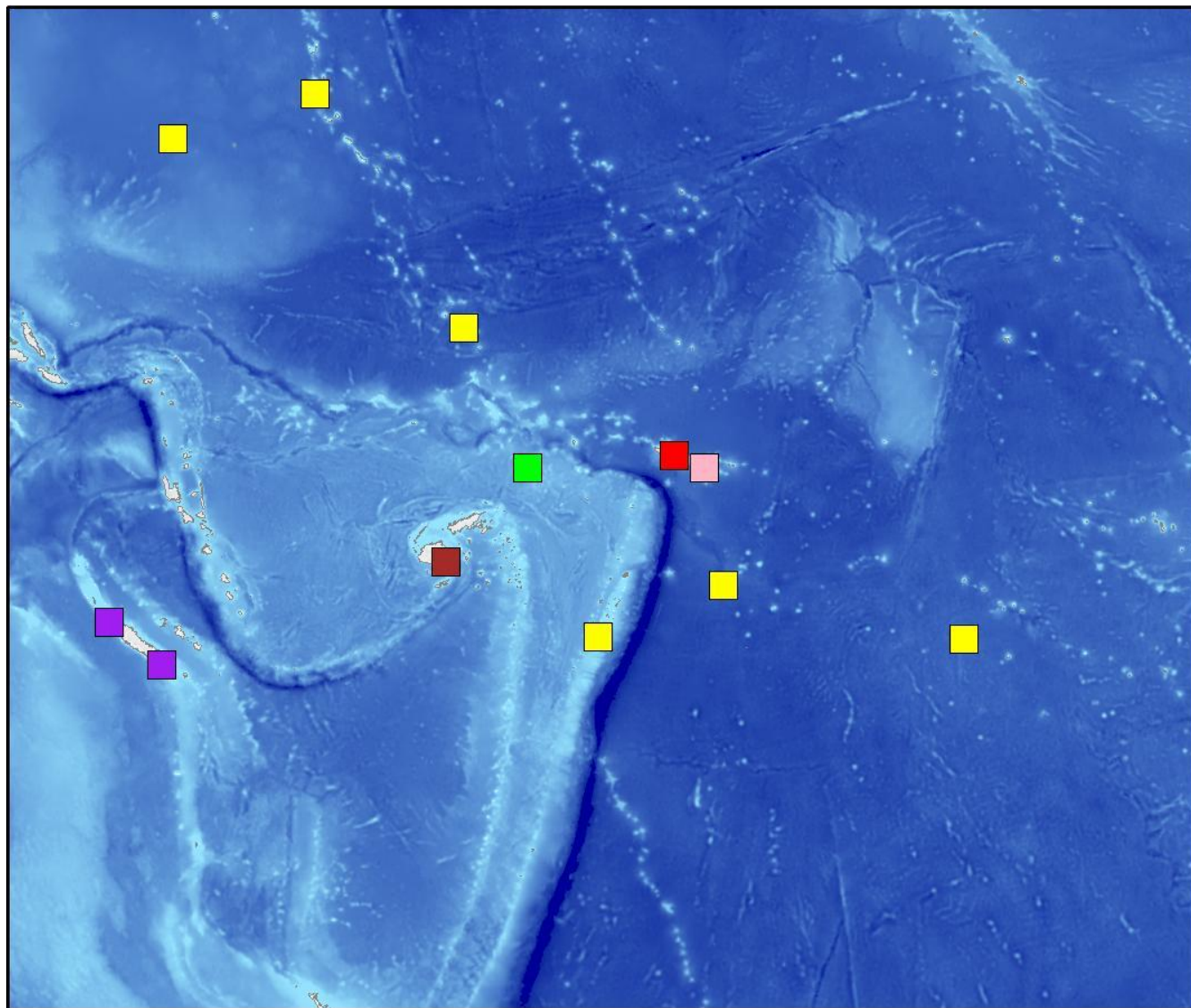
Collaborations with:

Japan Space Agency
(WARK_BINEX)







Queensland University of Technology
(WARK and LEXA rnx3)



IGS Network in SW Pacific



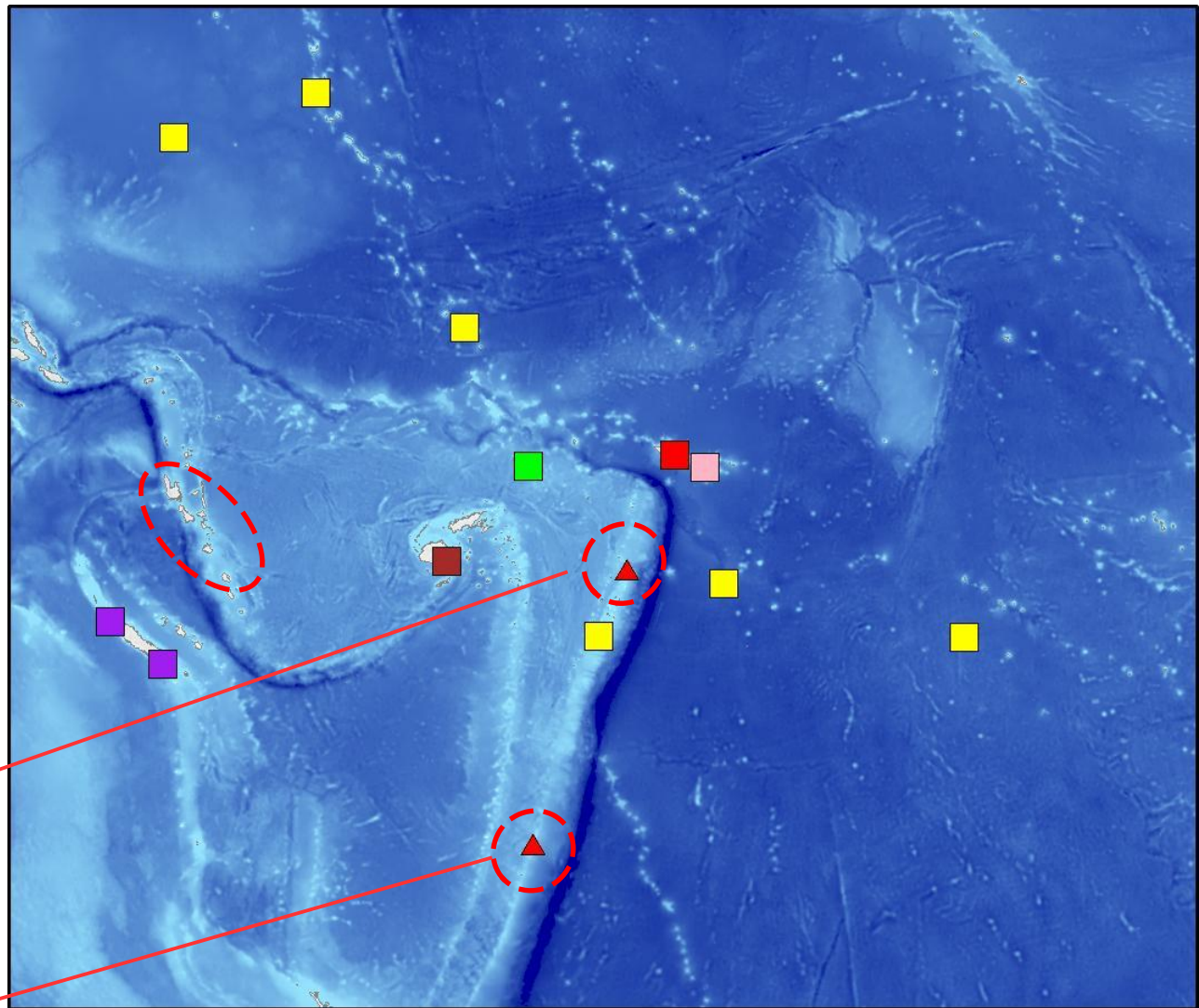
IGS Contributors

- | | |
|--|--|
|  Centre National d Etudes Spatiales |  DITTT Department of Land |
|  Geoscience Australia |  GNS Science |
|  NOAA National Geodetic Survey |  Pacific GPS Facility |

IGS Network in SW Pacific: increase the contribution of New Zealand

VAVS
Vava'u, Tonga

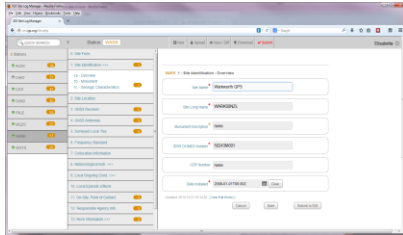
RAUL
Raoul Island, New
Zealand



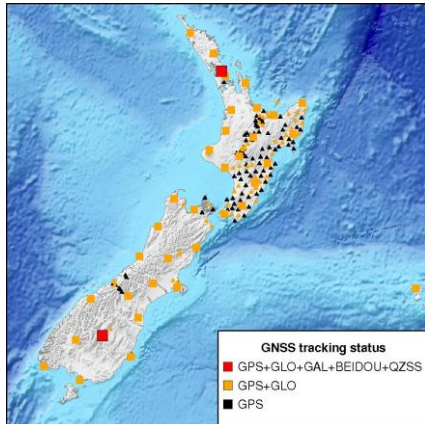
IGS Contributors

- | | |
|------------------------------------|--------------------------|
| Centre National d Etudes Spatiales | DITTT Department of Land |
| Geoscience Australia | GNS Science |
| NOAA National Geodetic Survey | Pacific GPS Facility |
| GNS Science non-IGS | |

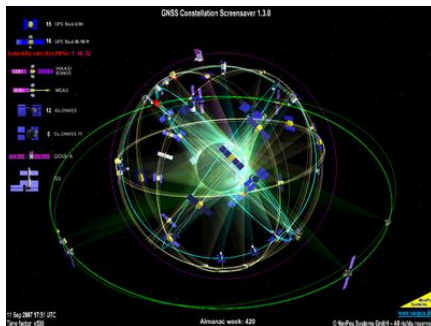
PositionNZ and GeoNet – near future plans



conform to IGS metadata distribution standards: IGS Site Logs and XML files



increase number of “**full-GNSS**” tracking PositionNZ sites



facilitate multi-GNSS projects (collaboration with Geoscience Australia)

Thanks to all our collaborators within GNS and LINZ

Background material

GPS: 27 to 36 SVs



GLONASS: 24 to 30 SVs



Galileo: 26 to 30 SVs



BeiDou: 36 SVs



QZSS: 3+ SVs



IRNSS: 5+ SVs



SBAS: 14 to 20 SVs



1160 1180 1200 1220 1240 1260 1280 1300
Frequency (MHz)

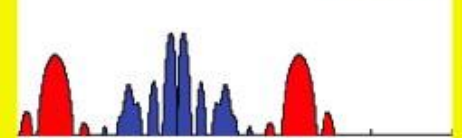


FIGURE 1 Prospective satnav signal structures, with open signals in blue and restricted signals in red

GeoNet and PositionZ performance:

data quality indicators

Range of good values

MP1 = 0.1 – 0.5 m

MP2 = 0.1 – 0.5 m

OBS = above 20000

