

# Land Information New Zealand – where does positioning fit in?

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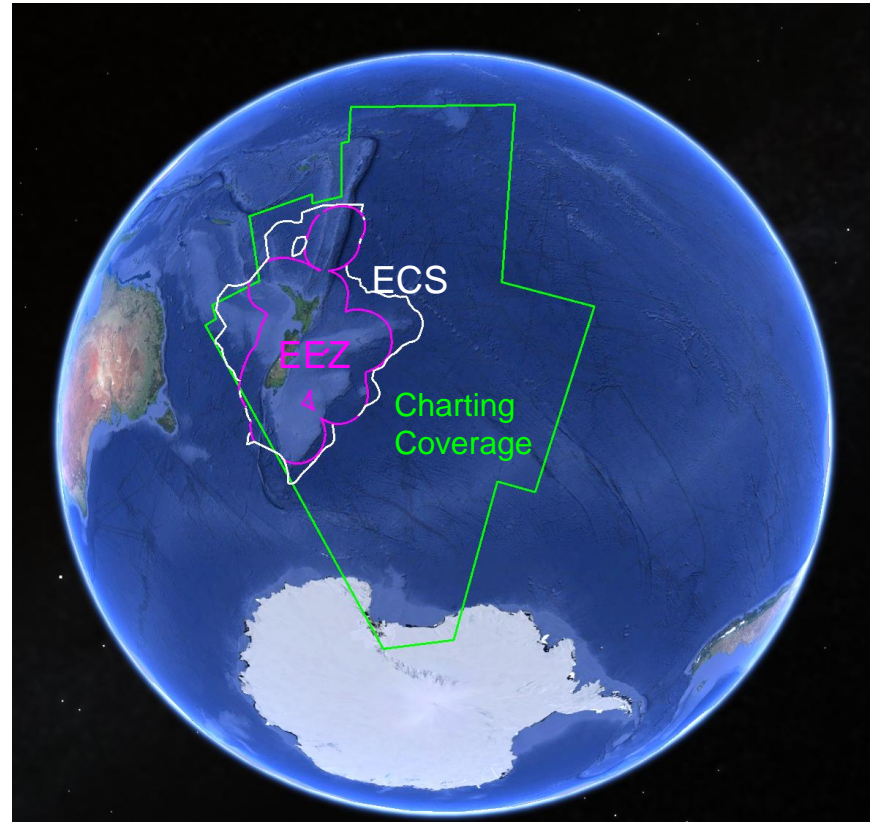
# New Zealand setting



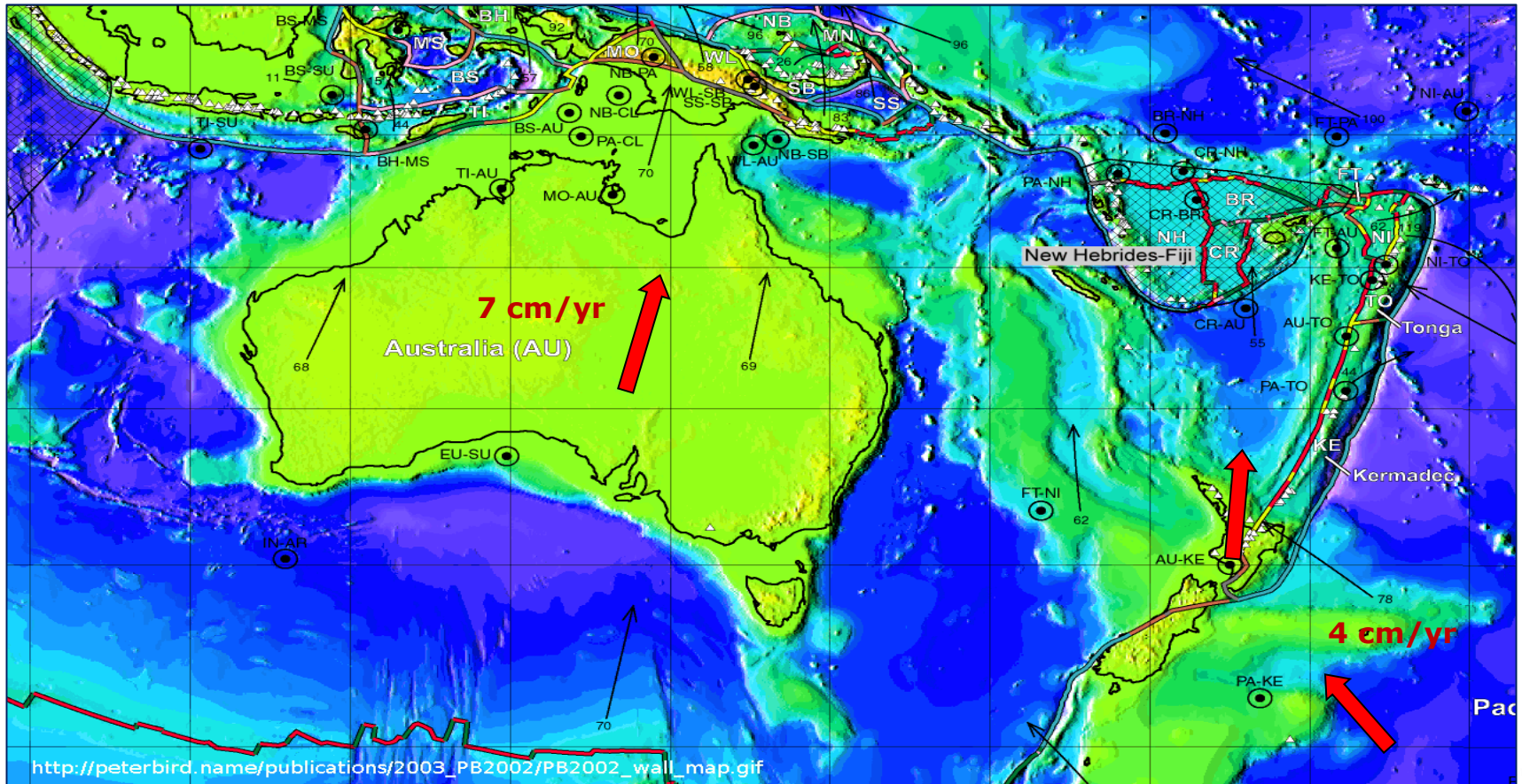
# Area of responsibility



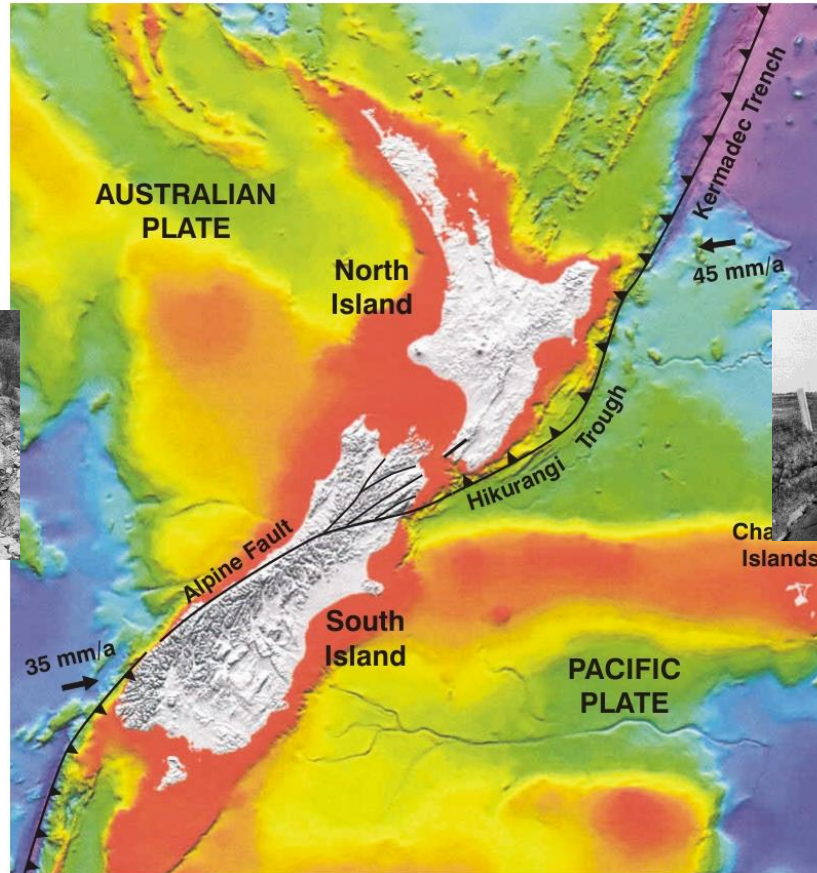
Land area 270km<sup>2</sup>  
ECS 23 greater



# Tectonic setting



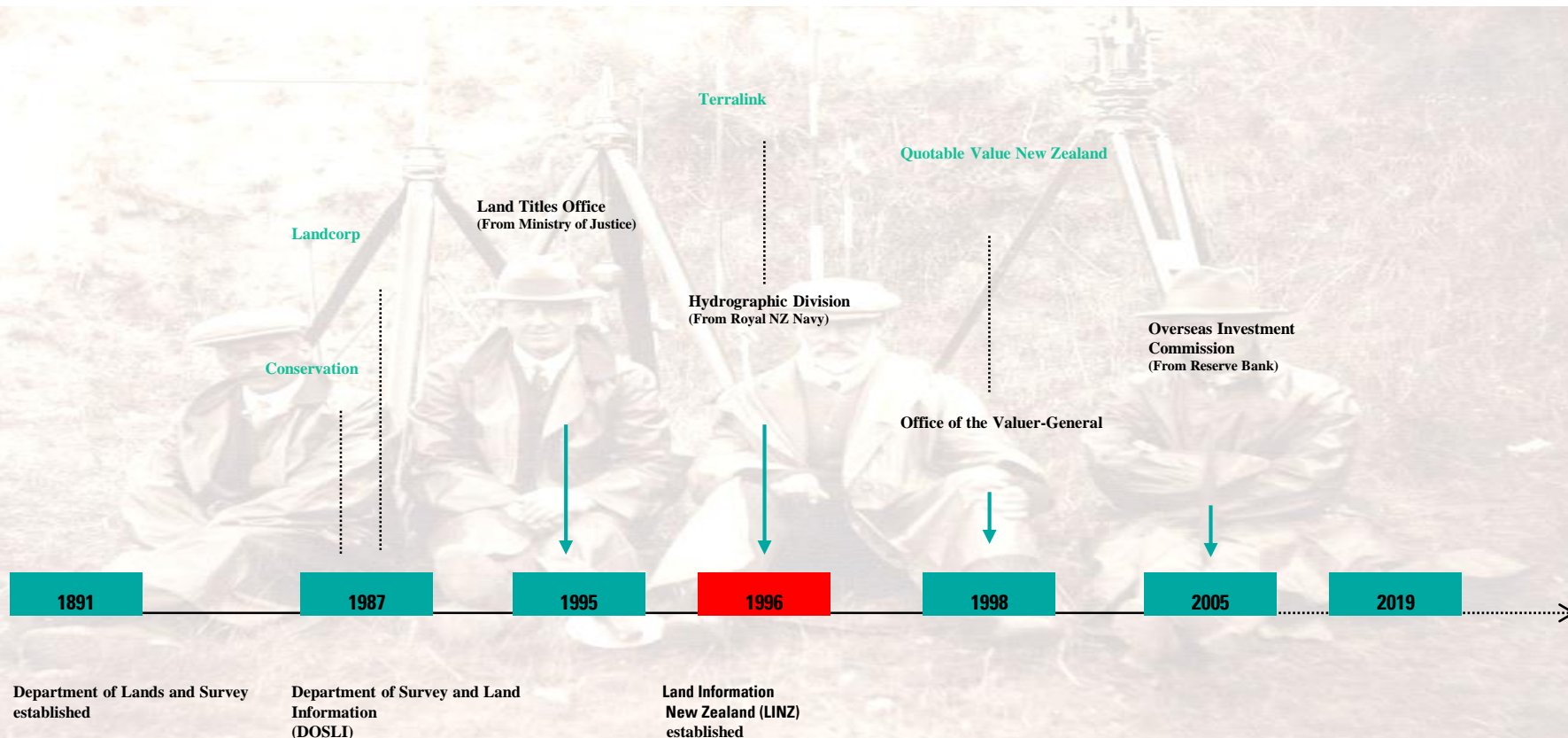
# Crustal Dynamics in New Zealand



# Land Information New Zealand



# LINZ yesterday and today



# Positioning and resilience





# Maps, addressing and imagery



# Place naming



AORAKI  
MOUNT COOK  
104 km

LAKE TEKAPO  
3 km

Bullock Wagon Trail  
(in Bad Weather)

Bullock Wagon Trail

# Charting and hydrographic services



# Property rights



# Crown lands



# Overseas Investment Office



# LINZ data services



← → ↻ <https://data.linz.govt.nz/search/?q=imagery> ☆

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# LINZ's vision



## The Power of 'Where' drives NZs Success

10 fold increase in the value  
of geospatial information



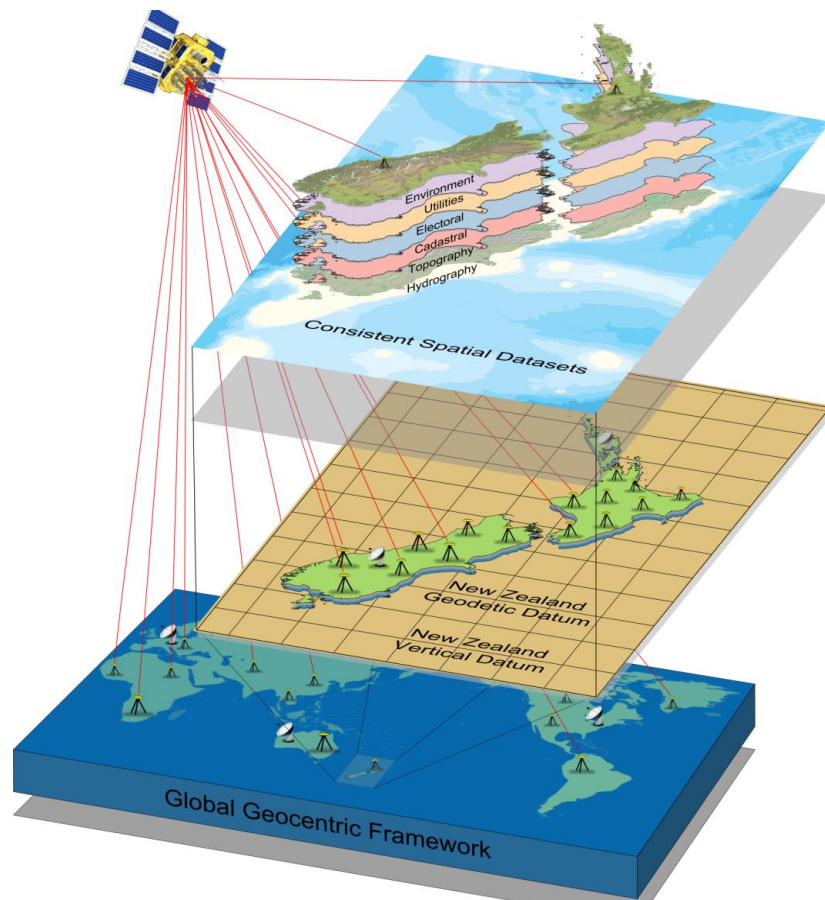




**So where does GNSS fit in?**



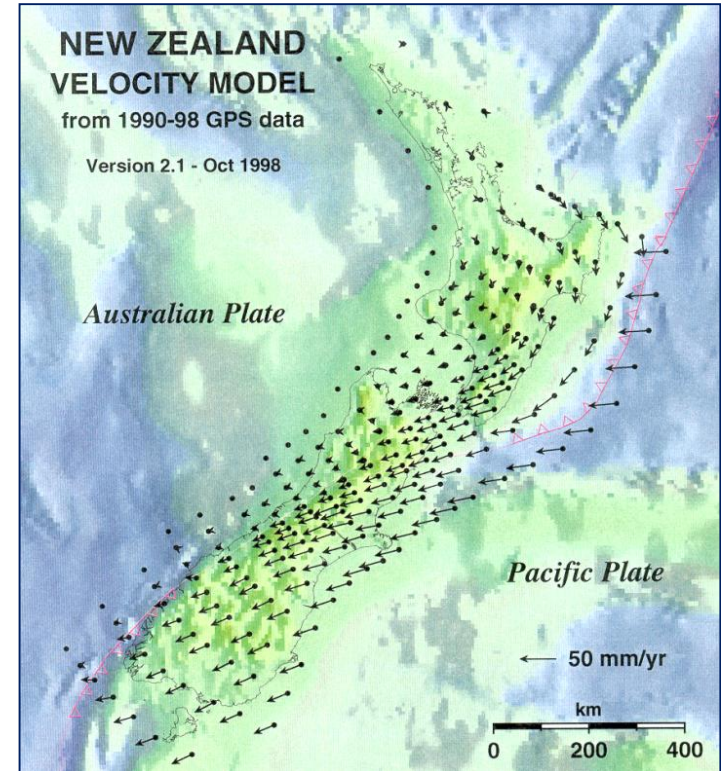
# LINZ – a location agency



# New Zealand Geodetic Datum 2000



- Semi-dynamic datum
- Originally deformation model from GPS surveys 1990-1998
- Now includes GNSS from CORS and campaign surveys
- Regularly updated for earthquake induced deformation



# National GNSS network - PositioNZ



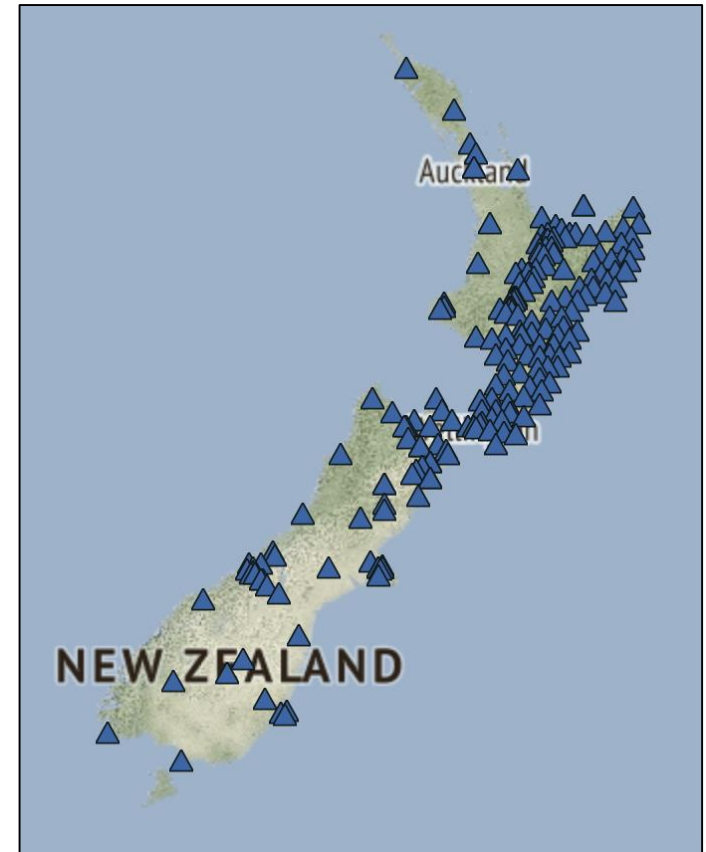
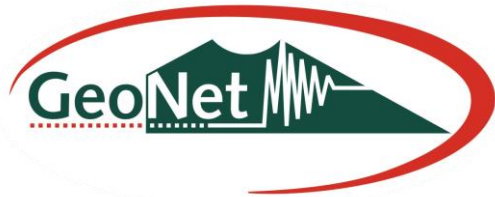
- 35 on the mainland of NZ
- 1 on the Chatham Islands
- 4 in Antarctica
- PositioNZ PP
- 1" streaming
- Open data



# National GNSS network - GeoNet



- 40 PositionNZ
- 180+ GeoNet
- 50+ Private



# Contribution to ITRF



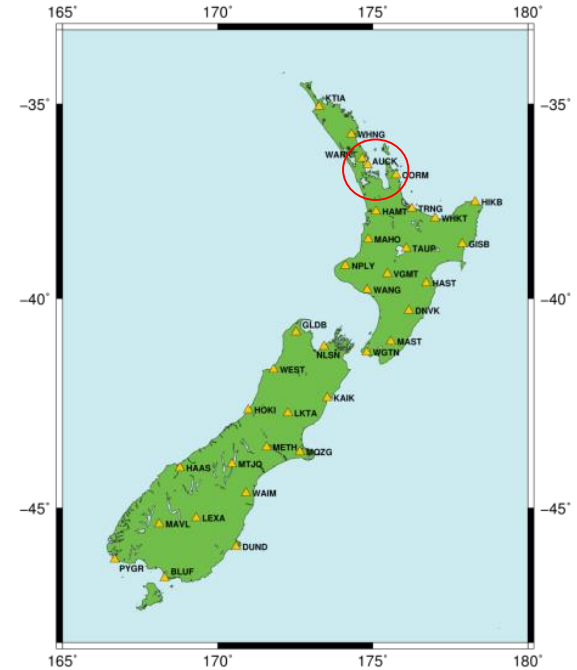
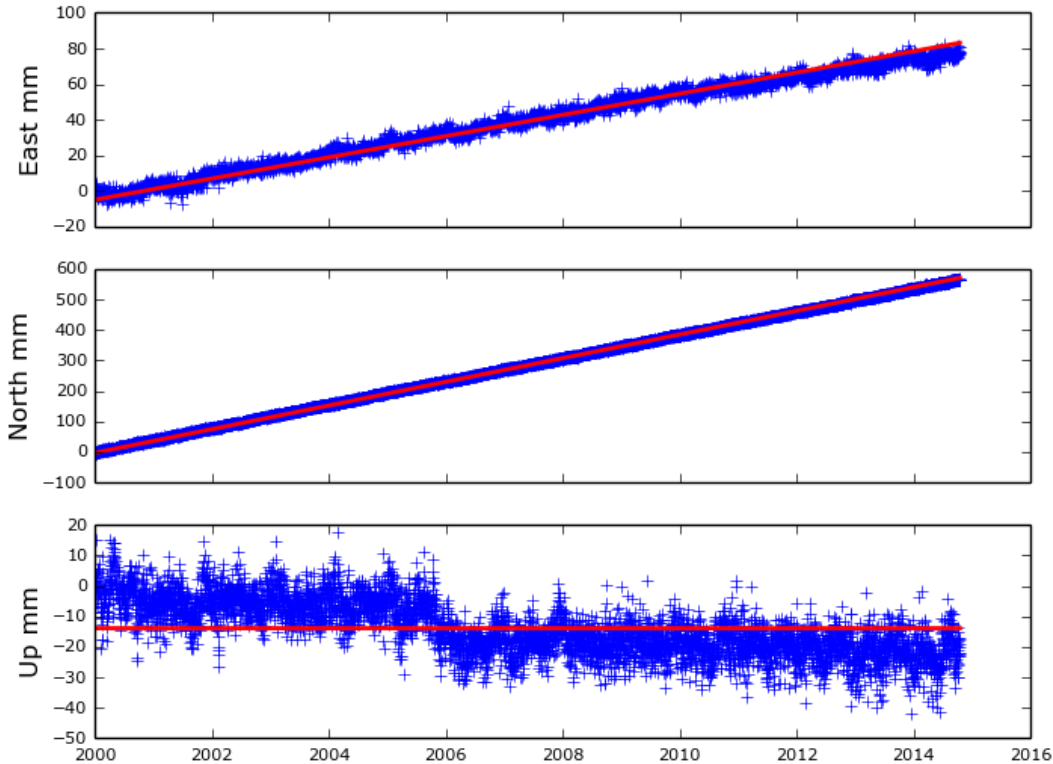
● IGS GNSS

□ DORIS

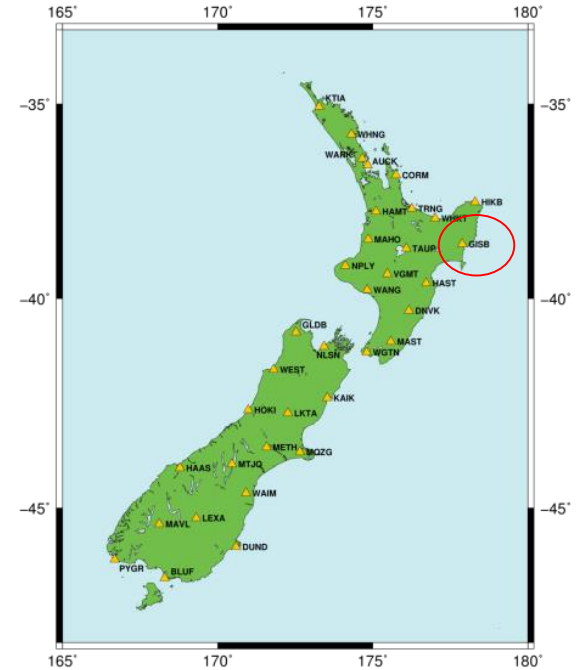
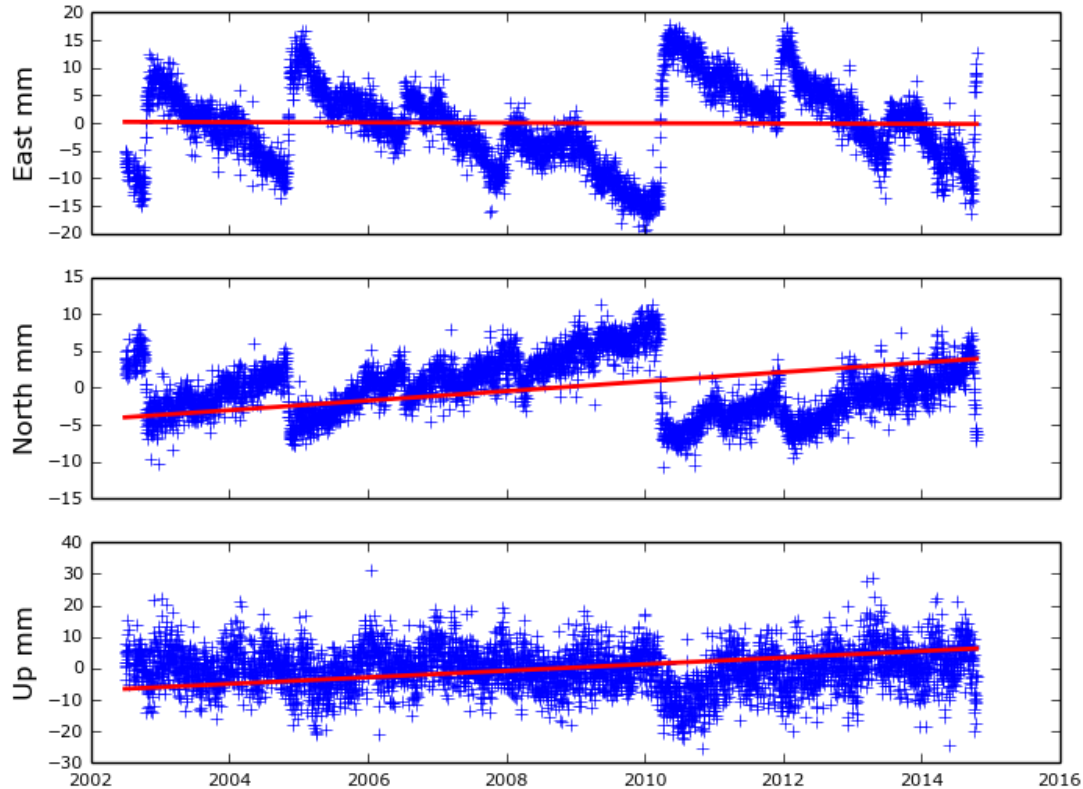
□ VLBI



# Auckland

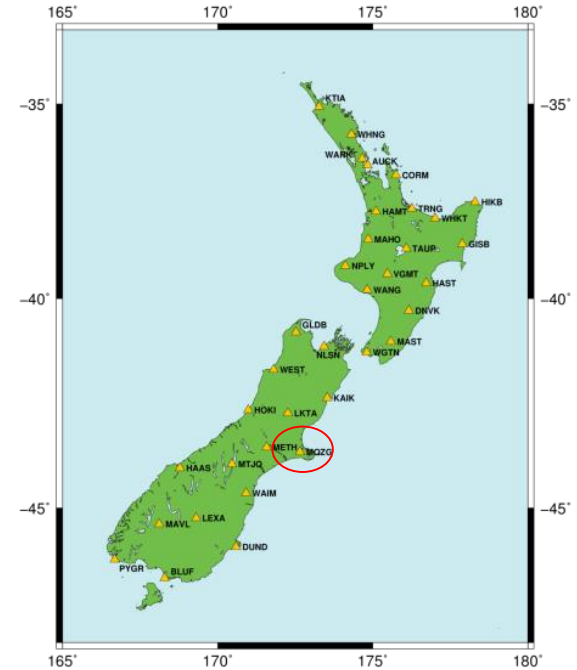
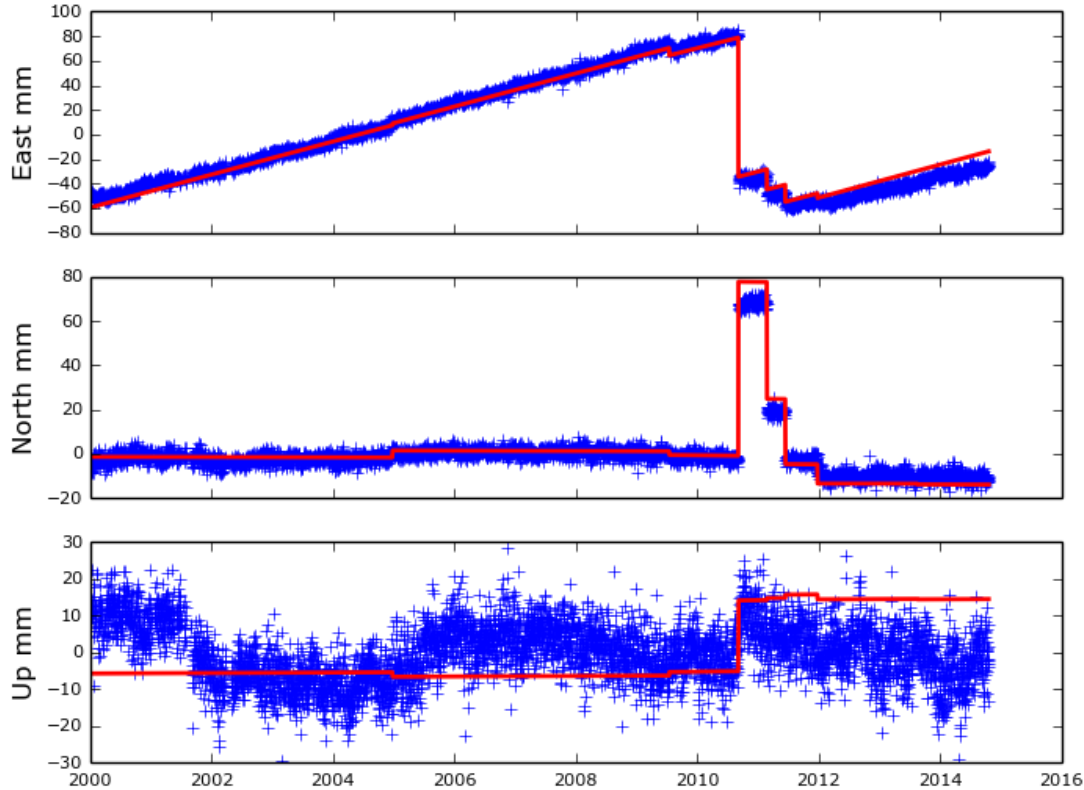


# Gisborne slow earthquakes

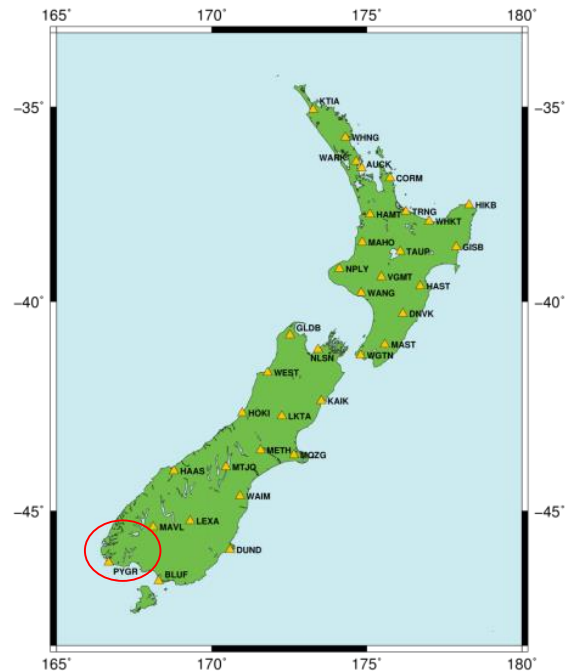
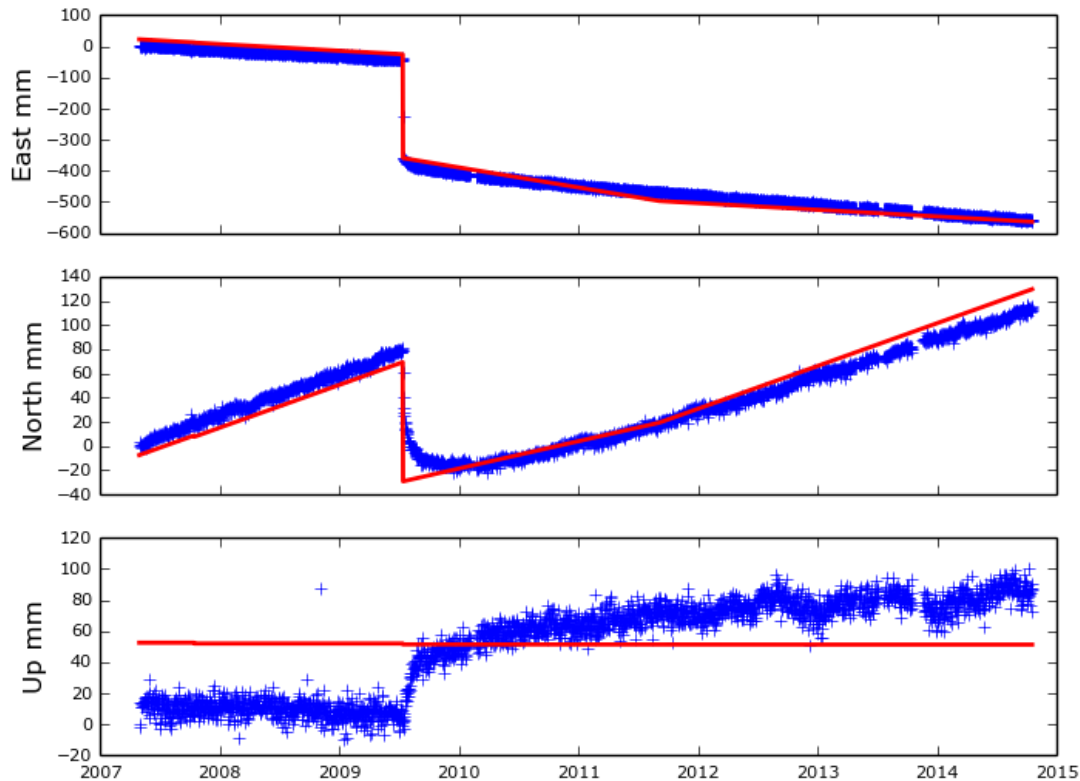




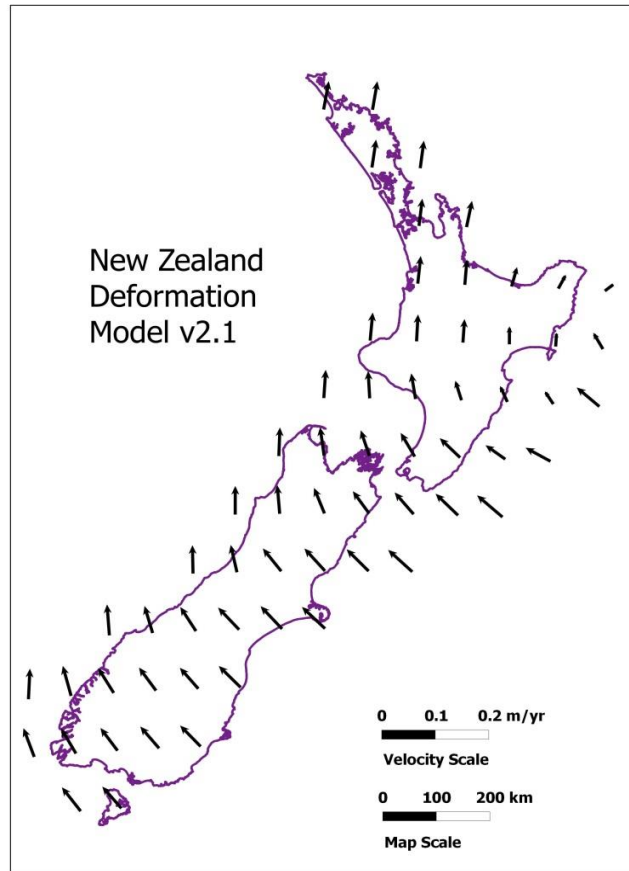
# Canterbury earthquakes



# Fiordland post seismic recovery

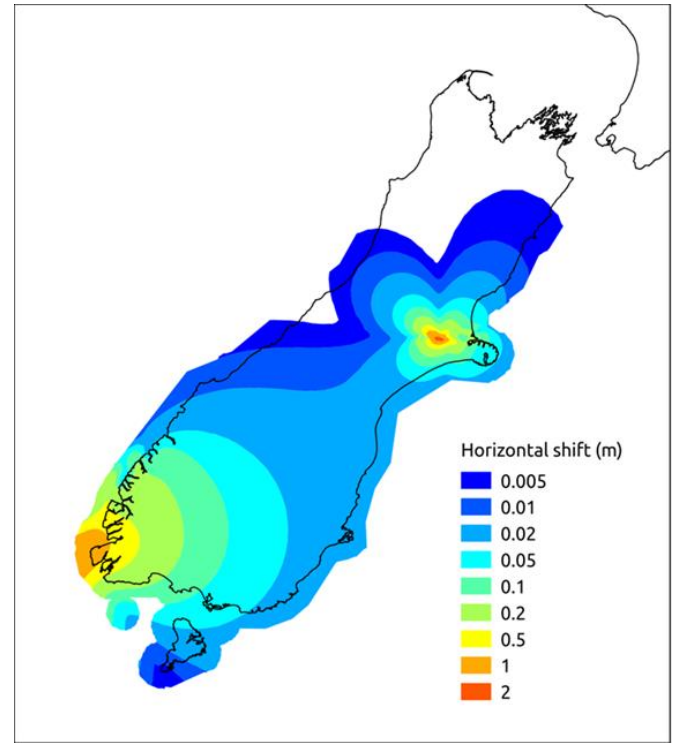
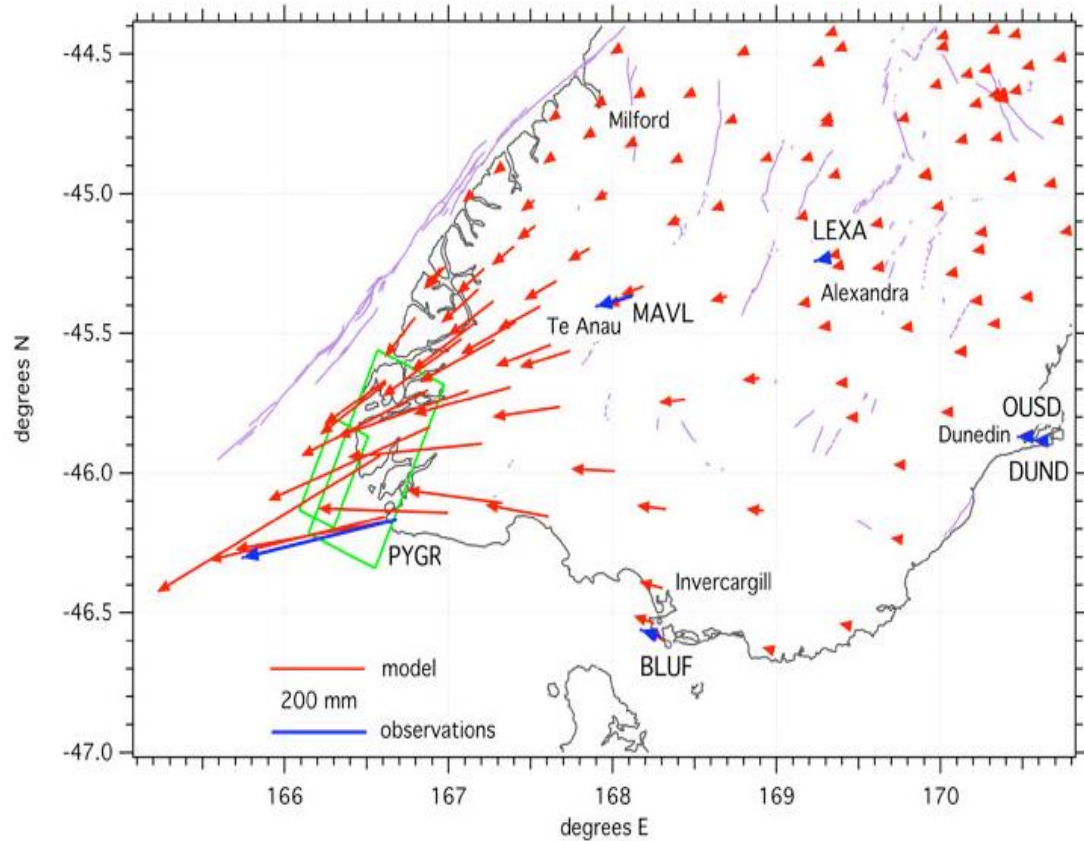


# Enhancing the deformation model



Continuously updated and refining  
using GNSS data

# Adding patches





# SPAN: Southern Positioning Augmentation Network

# SPAN – A decade in the making

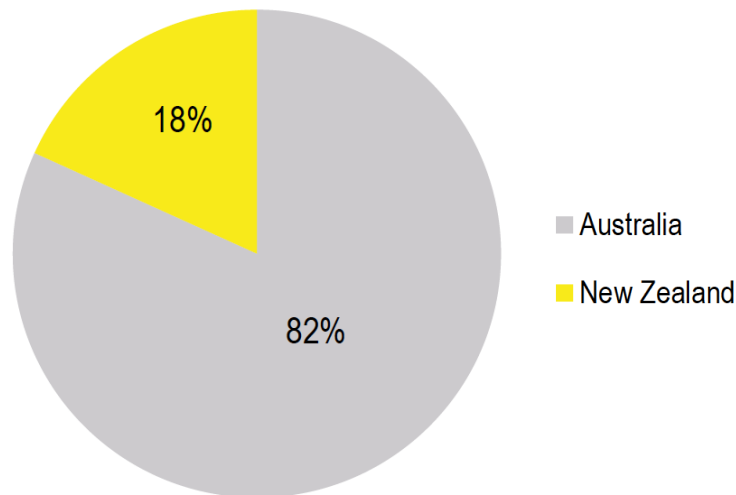


- 2011 Australian Government review:
  - Cost of establishing SBAS in Australia to cover aviation operations at smaller aerodromes not justified
- 2014 New Zealand Government study:
  - The benefits to NZ aviation alone do not out-weigh the cost of developing and operating a SBAS
- 2019 Joint Australia-New Zealand benefit study
  - The benefits of SBAS are significant to both economies

# Benefits of SBAS



- New Zealand: AU\$1.4b
- Australia: AU\$6.2b



Evaluated over 30 years

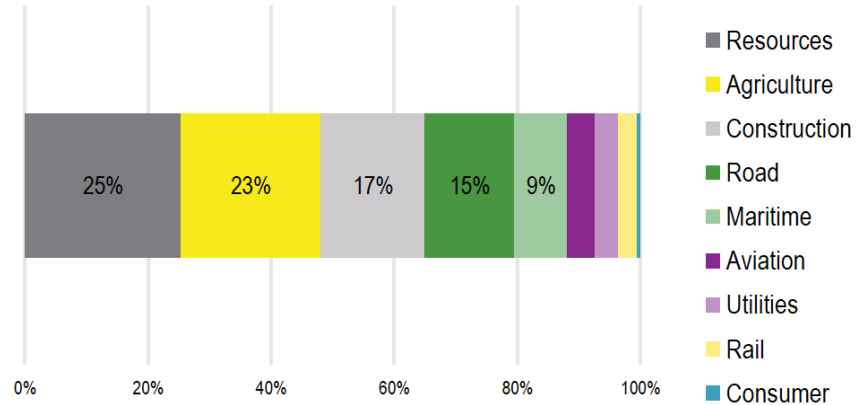
Report available at:

<https://frontiersi.com.au/project/satellite-based-augmentation-system-test-bed/>

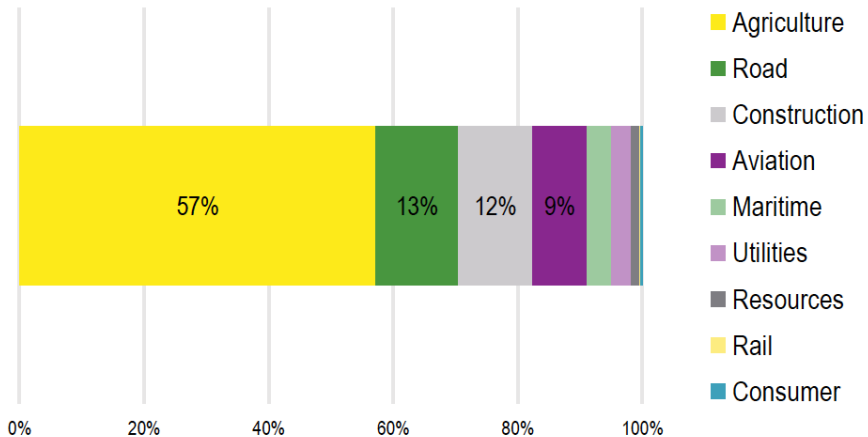
# Benefits by Sector



Australia



New Zealand





# SPAN – Progress to date



- Australia announced funding in Budget 2018
- New Zealand received funding in Budget 2019
- Tender to be issued in early 2020
- Aiming for aviation certification in 2023
- Test-bed signals continue until 31 July 2020

# SPAN - Services



- L1 SBAS (GPS) – aviation certified
- DFMC SBAS (GPS and Galileo)
- PPP



