



**Australian Government**  

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**Geoscience Australia**

*Toitu te*  
**Land**  
*whenua*  
**Information**  
*New Zealand*



# **A unified GPS post-processing service for Australia and New Zealand**

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**LINZ**



# Project background

- Collaborative project between GA and LINZ
- Re-engineer current AUSPOS service using Bernese
- NZ provide access to NZGD2000 through PositionNZ Network
- Improve usability, functionality and latency

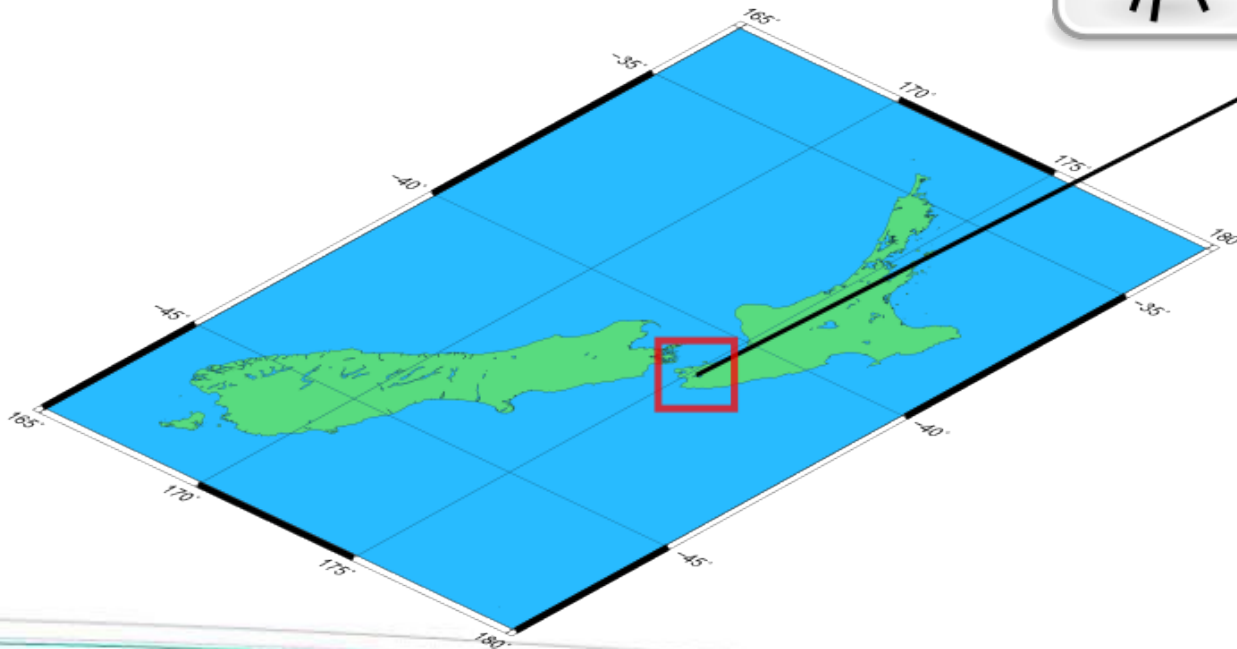
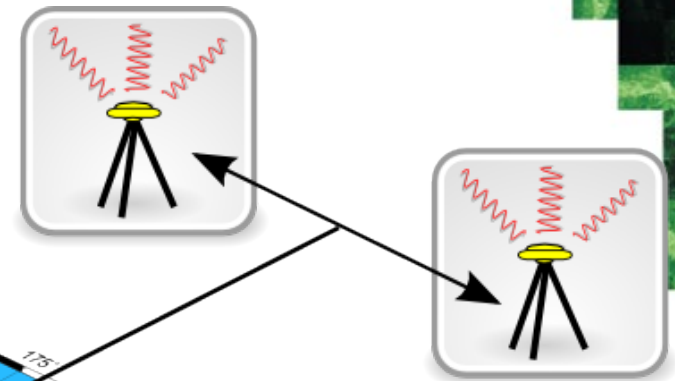


# What the service will provide

- Internet based GPS processing service
- Requires GPS data from one or more roving receivers
- Post processing only
- Makes use of IGS products

# Traditional GPS survey approach

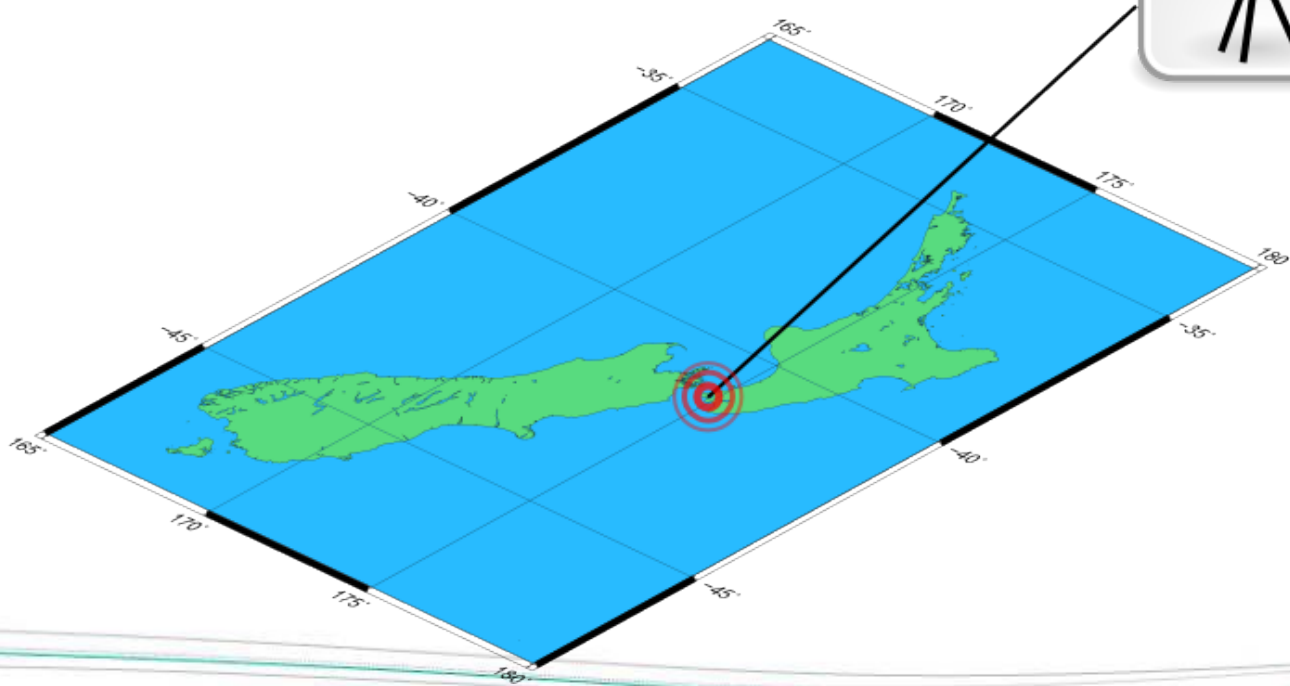
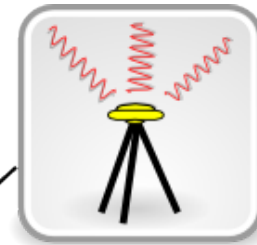
- Relative GPS positioning
  - cm level positioning with two or more receivers requires users to understand and extract existing geodetic infrastructure



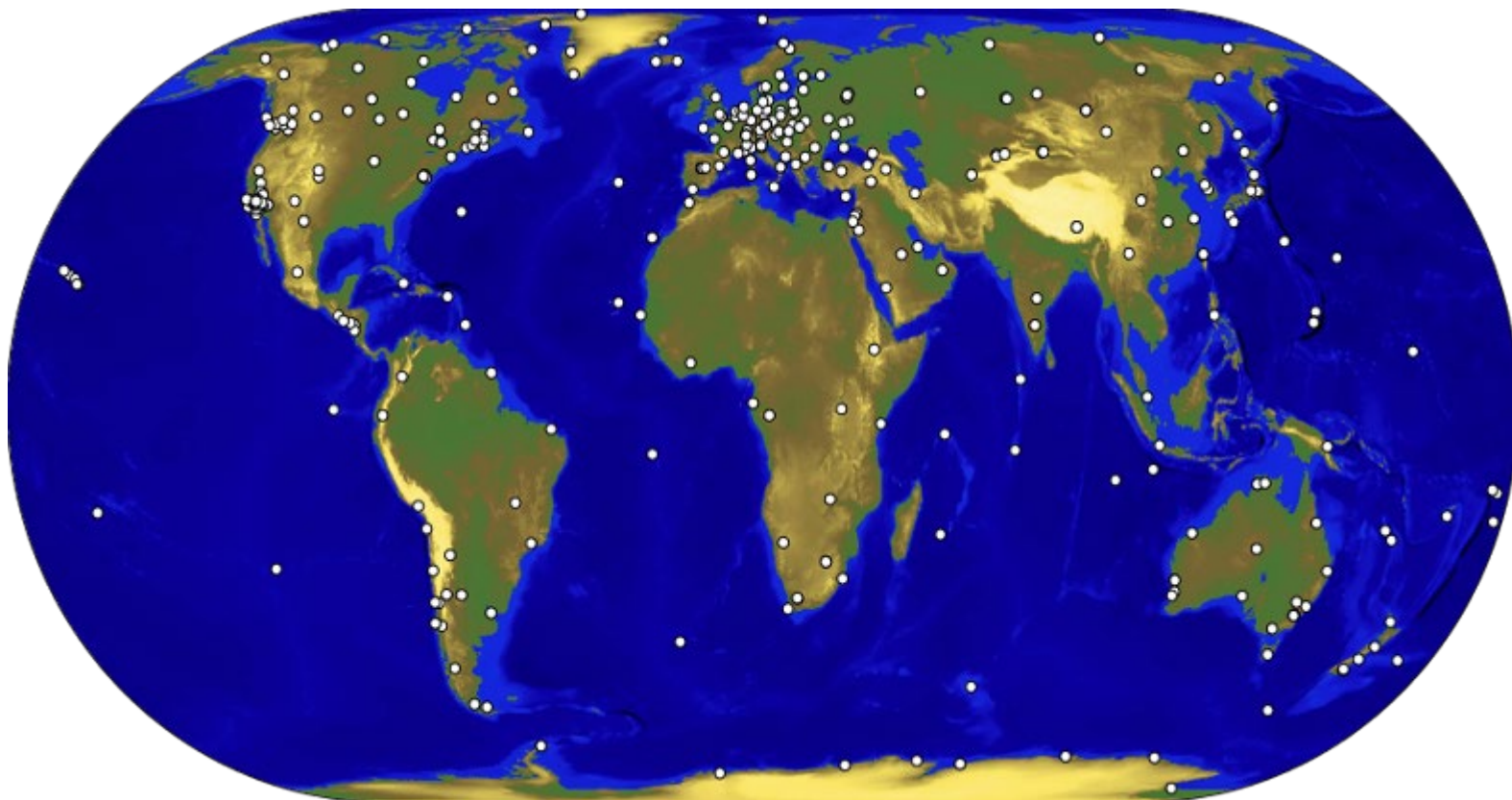


# Online GPS Service Approach

- “Absolute” GPS positioning
  - cm level positioning with one or more receivers
  - geodetic infrastructure ‘invisible’ to the user

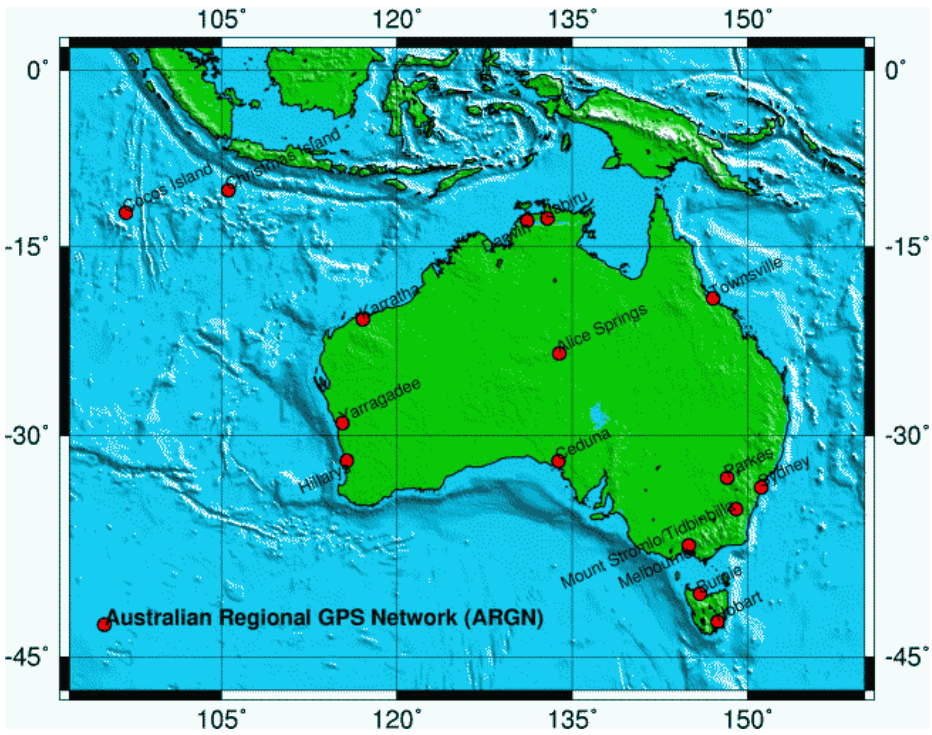


# IGS Network

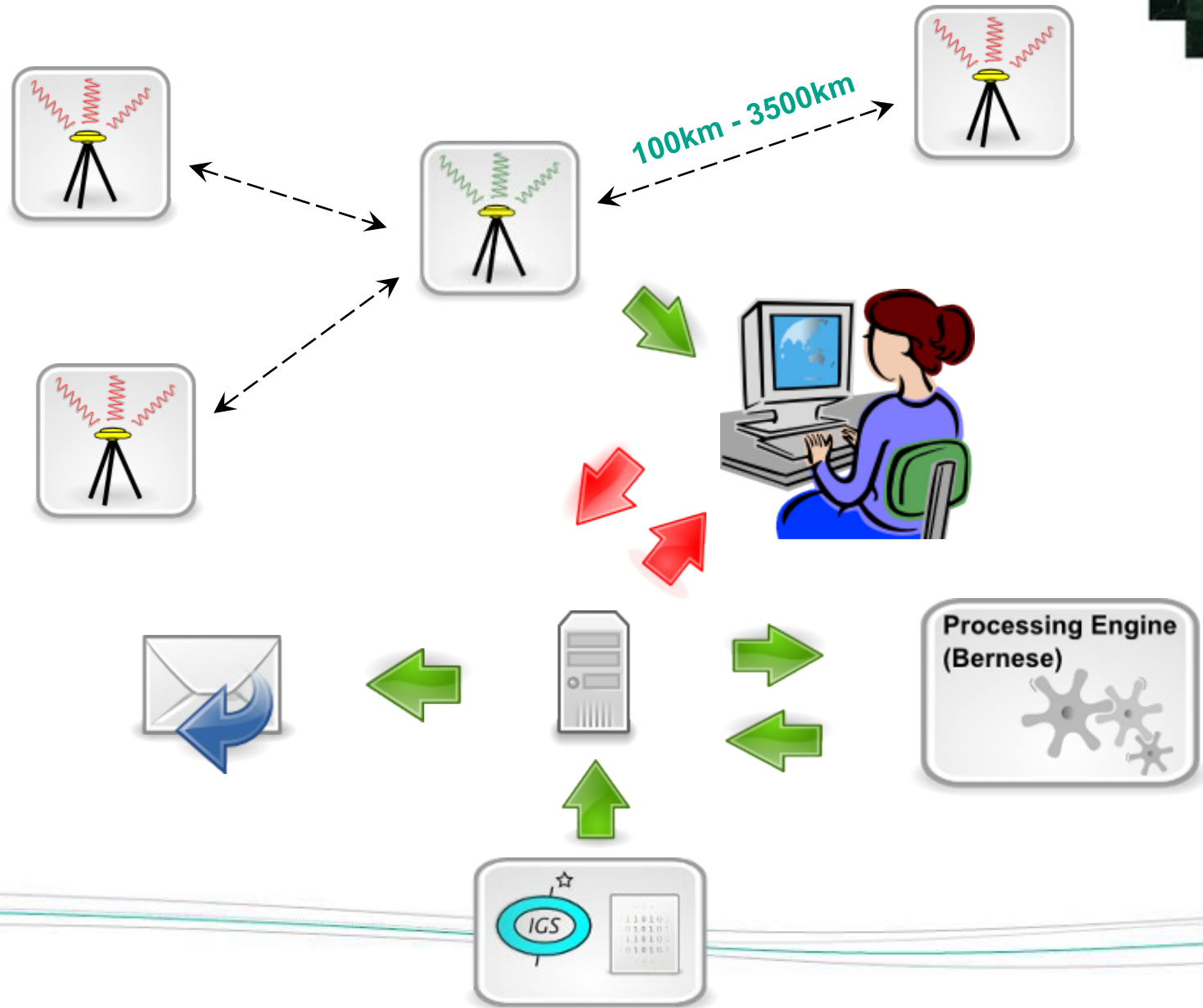




# Regional CORS Networks





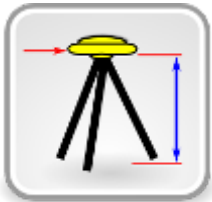

# How will it work?



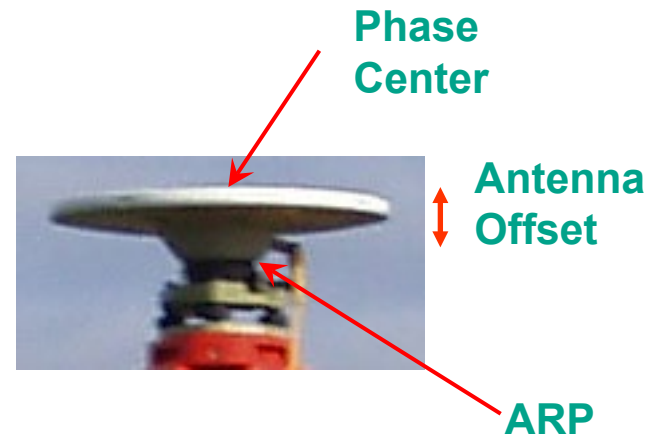
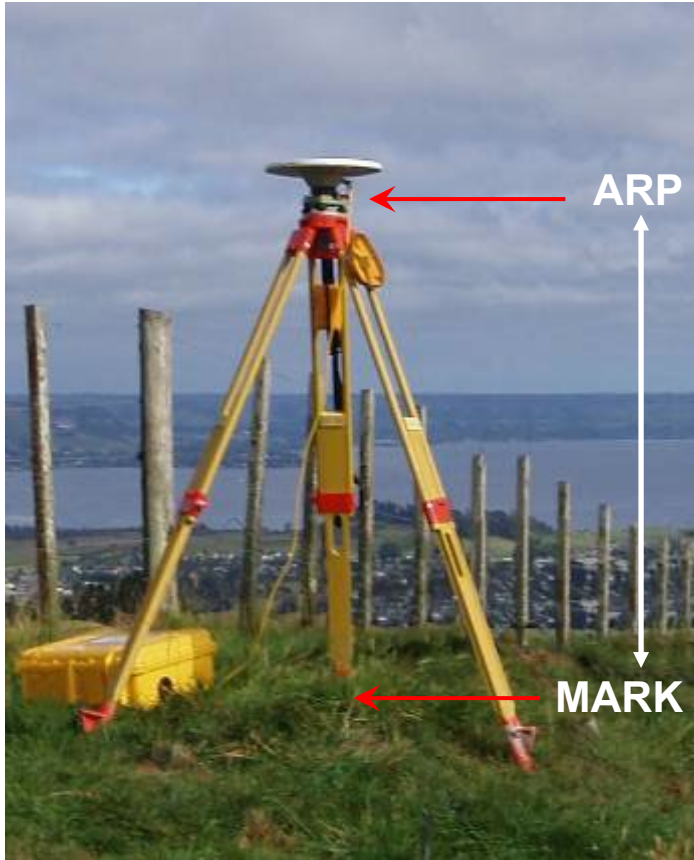




# What will the user need?

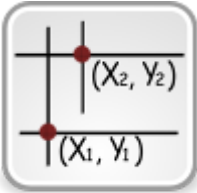


	<p>Email Address</p>
	<p>Dual-frequency (L1/L2) Minimum 1 hour, recommended 6 GLONASS is not processed</p>
	<p>Height (Mark to ARP) Type</p>
	<p>Session Type Final Product Processing Report Output (PDF, TXT, XML)</p>

# Antenna Details



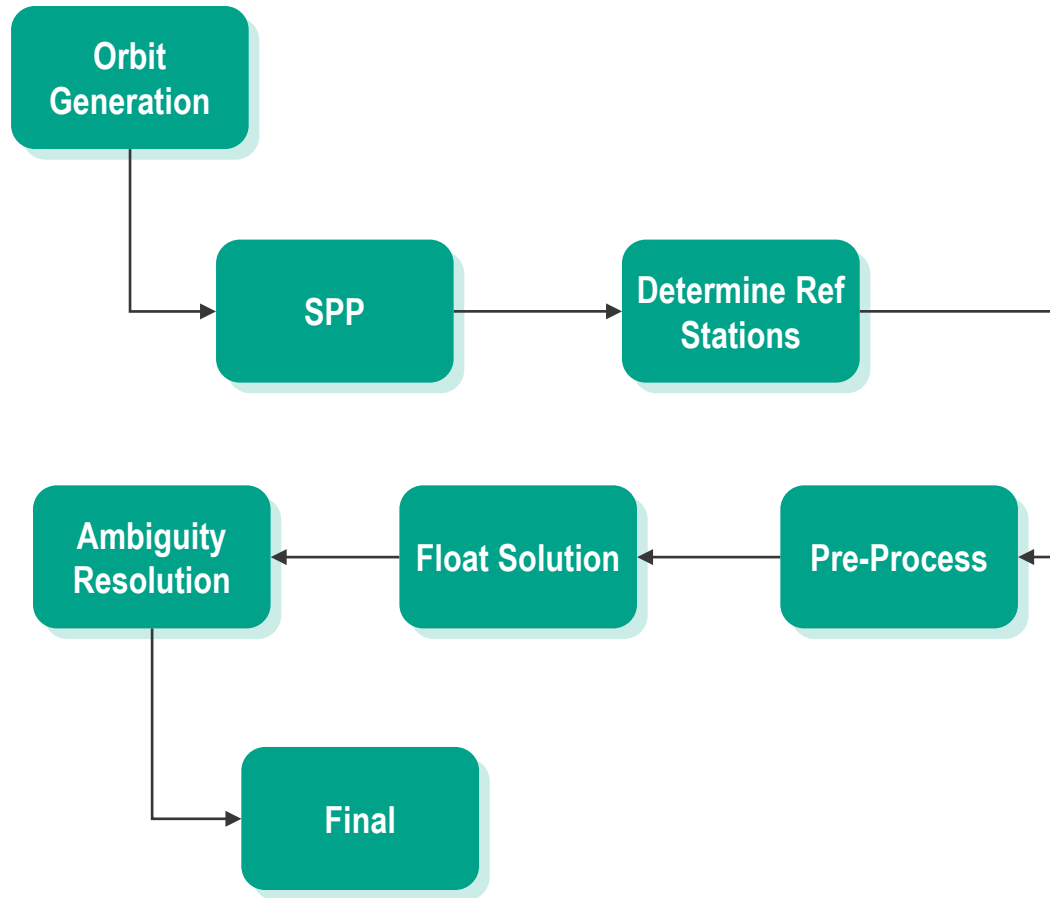


# Processing Output

 A square icon with a white background and a grey border. It features a coordinate grid with two red dots. The top-right dot is labeled $(X_2, Y_2)$ and the bottom-left dot is labeled $(X_1, Y_1)$ .	<p>ITRF coordinates Datum coordinates National grid coordinates</p>
 A square icon with a white background and a grey border. It features a stylized globe showing the Earth's continents and oceans.	<p>Quality of processing Reference metadata</p>
 A square icon with a white background and a grey border. It features the word 'SINEX' in large, bold, green letters. Above and below the word are several lines of binary code (0s and 1s).	<p>Solution data for integration with other packages</p>



# General Processing Stages







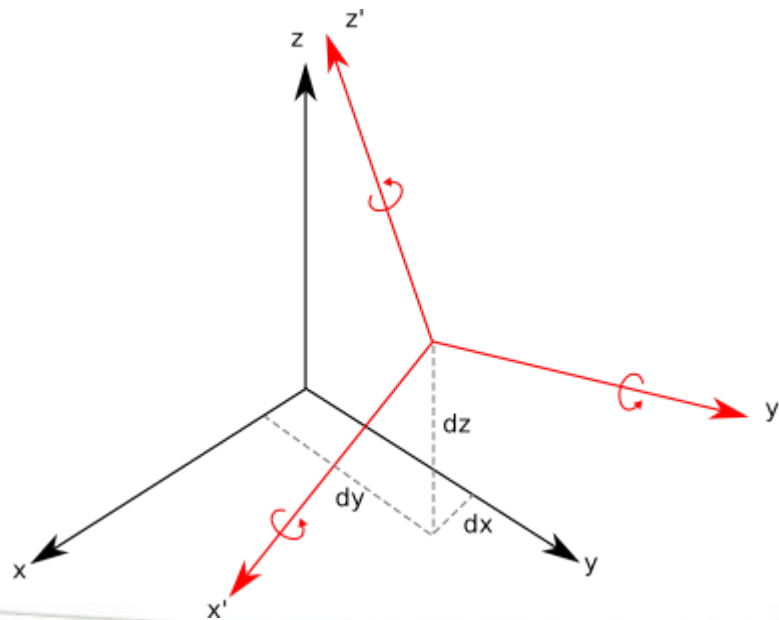
# Reference Station Coordinates

- IGS stations
  - Adopted from IGS cumulative solutions
- Regional network stations
  - Fixing IGS stations and velocities
  - Solution velocities used for coordinate propagation for Non-NZ station
  - Reference station prediction model used for NZ stations



# Transformation to GDA and NZGD2000

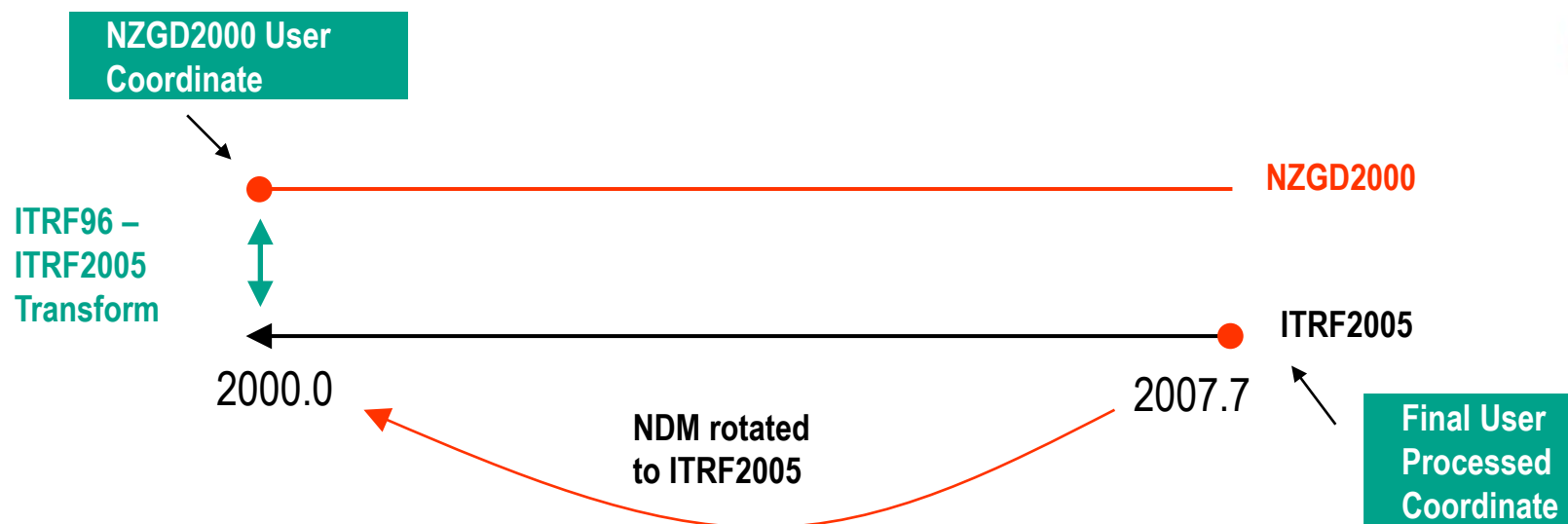
- Service GPS processing in terms of ITRF2005
- GDA based on ITRF92 (**reference epoch 1994-01-01**)
- NZGD2000 on ITRF96 (**reference epoch 2000-01-01**)
- 14 parameters transformation required for GDA





# Transformation to NZGD2000

- Transform to NZGD2000 will use LINZ National Deformation Model (NDM)





# Expected Accuracy

- 0.005m RMS for data span  $> 24$ hours
- 0.008m RMS for data span  $\sim 4$ hours
- 0.020m RMS for data span  $\sim 2$ hours





# Applications for service

- Geodetic low order surveys
- Geodetic network quality control
- Reference control for topographic and engineering surveys
- Cadastral survey applications



# Summary



- Still in development
- Late 2008
- LINZ in conjunction with GNS is
  - Improving accuracy of NDM
  - Developing station prediction model
- Rapid static processing feature to be added