



Australia's national positioning program

Dr John Dawson, Section Leader Positioning



Geoscience Australia's Role

- Geoscience Australia is Australia's pre-eminent public sector geoscience organisation
- Federal government agency
- We are the nation's trusted advisor on the geology and geography of Australia
- We apply science and technology to describe and understand the Earth for the benefit of Australia

Space Responsibilities



Space Coordination Committee

A consolidated summary of civilian space-related activities being conducted by Commonwealth Government agencies represented on the Australian Government Space Coordination Committee (SCC)

The SCC provides a forum for information sharing between Australian Government agencies on civilian space activities

- Australian Communications and Media Authority
- Attorney-General's Department
- Bureau of Meteorology
- Commonwealth Scientific and Industrial Research Organisation
- Department of Communications and the Arts
- Department of Defence
- Department of the Environment
- Department of Foreign Affairs and Trade
- Department of Industry, Innovation and Science
- Department of Infrastructure and Regional Development
- Geoscience Australia



Australian PNT Working Group (PNT-WG)

Chaired by Geoscience Australia

Reports to the Space Coordination Committee (SCC)

Draws together key Australian Government agencies involved in PNT to advise the SCC on the status and future of positioning in Australia

Quarterly meetings with industry presentations

Key discussion points from include:

- Spectrum management
- International engagement
- Hosting of GNSS ground infrastructure
- Planning for the NPI
- Critical Infrastructure
- Datum modernisation



NPI Advisory Board (NPI-AB)

Chaired by Geoscience Australia

Reports to the Geoscience Australia
Management

The Board provides strategic guidance on NPI design and implementation in response to current and future requirements across government, industry and research.

Draws together key GNSS experts from state and federal government, academia and the private sector

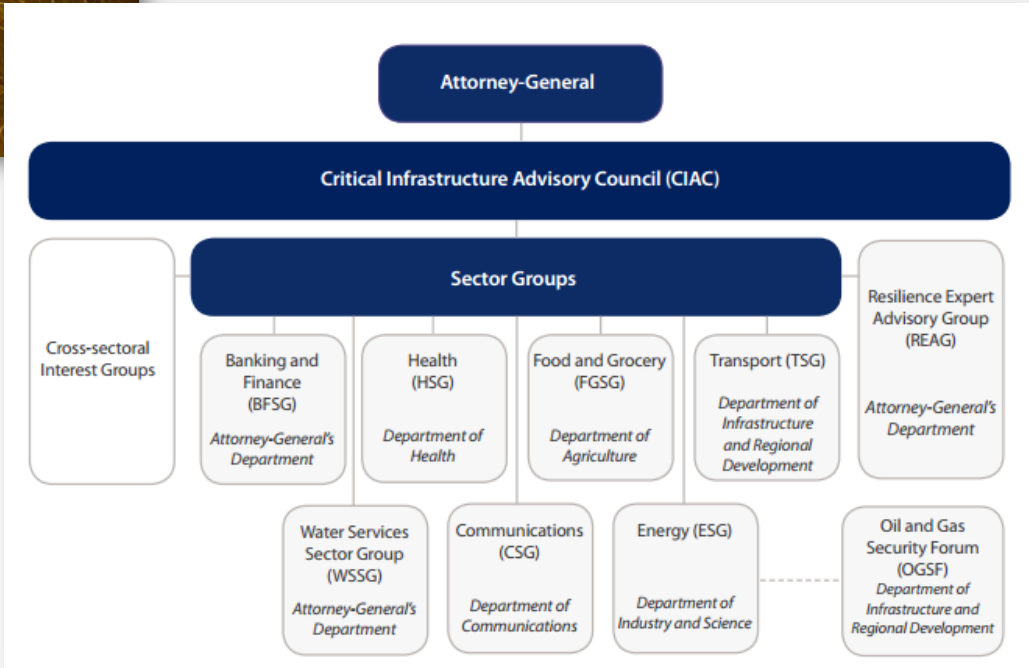


Critical Infrastructure



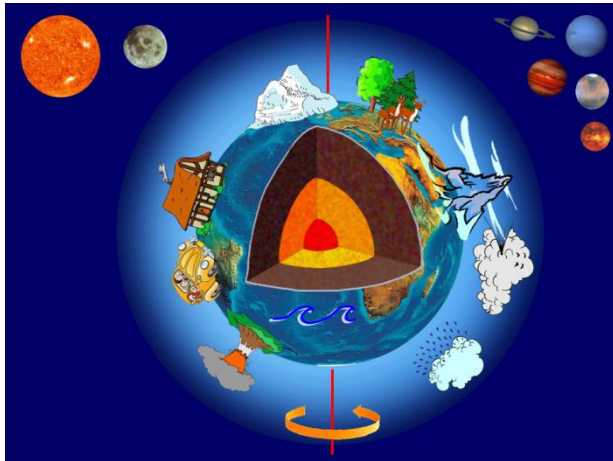
The Space Community of Interest (CoI) is a cross-sectoral interest group within the Attorney General's Trusted Information Sharing Network (TISN)

The Space CoI is analysing risks associated with Australia's dependencies on space-based assets

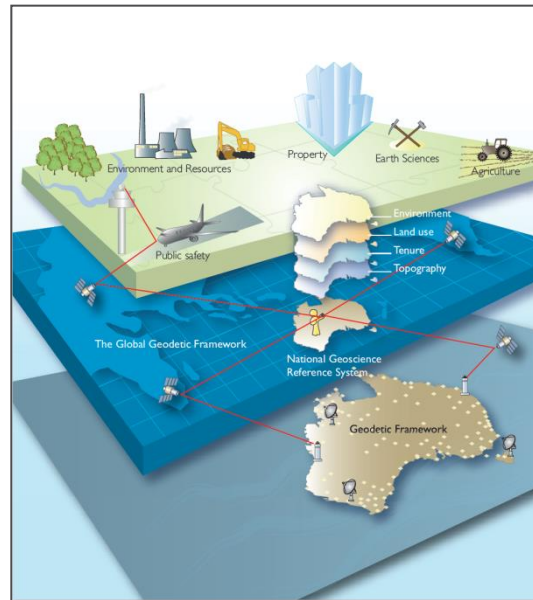


National Positioning: Why

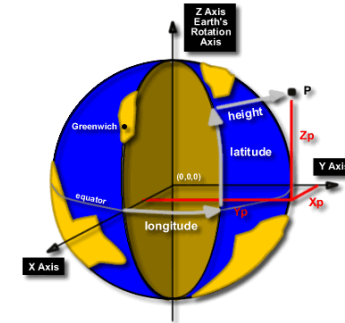
Earth System Science



Geodetic Infrastructure

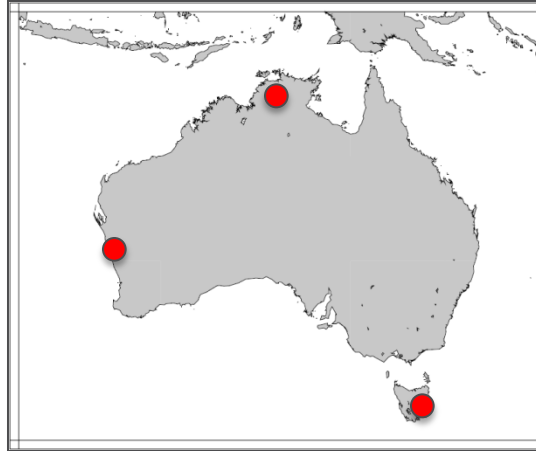


Societal Applications



National Positioning: radio astronomy

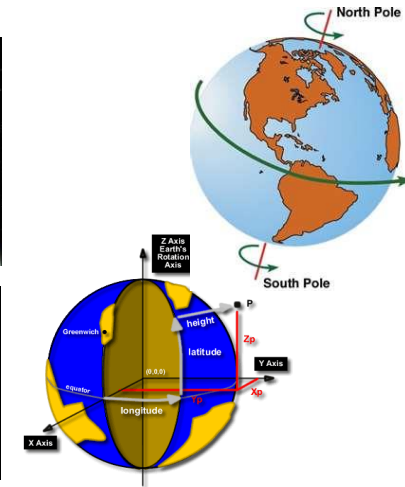
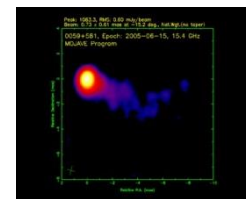
Katherine VLBI, Northern Territory



Yarragadee VLBI, Western Australia



Hobart VLBI, Tasmania





GNSS

Beidou

SLR

DORIS

VLBI

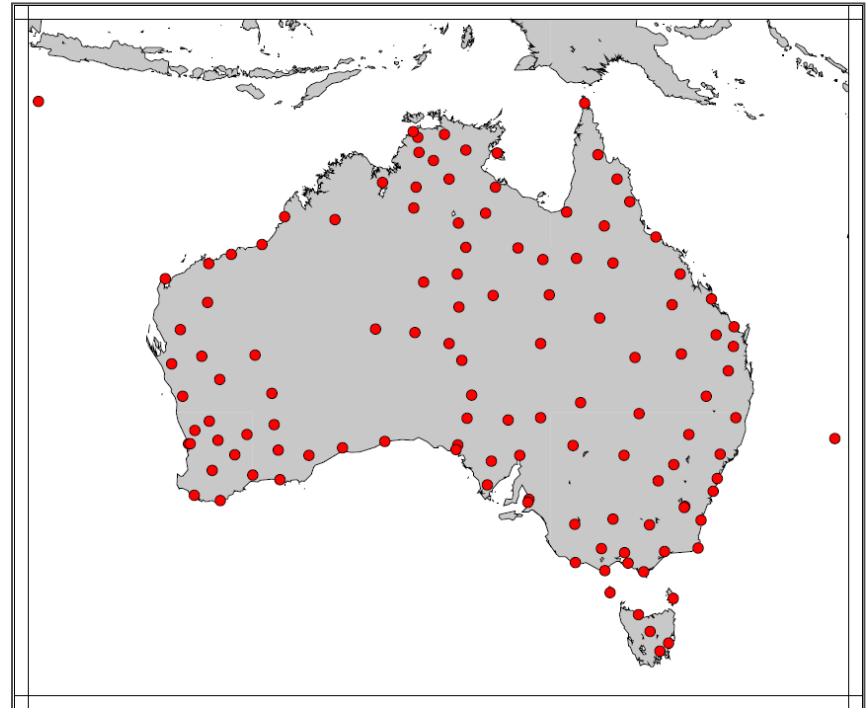
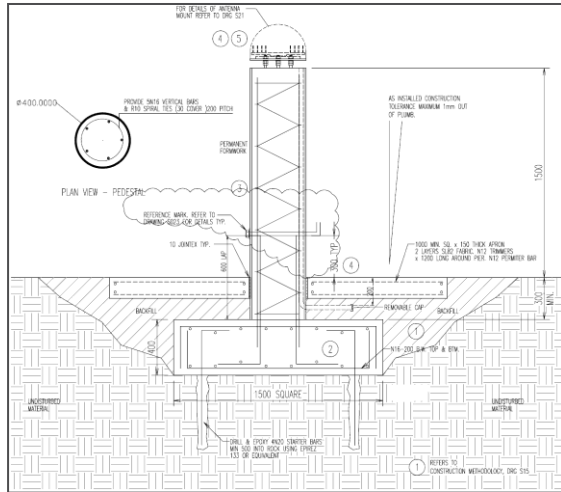
Gravity

Yarragadee Geodetic Observatory, Western Australia



Mount Stromlo Geodetic Observatory, ACT

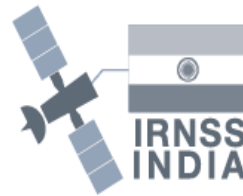
National Positioning: GNSS



New constellations and signals

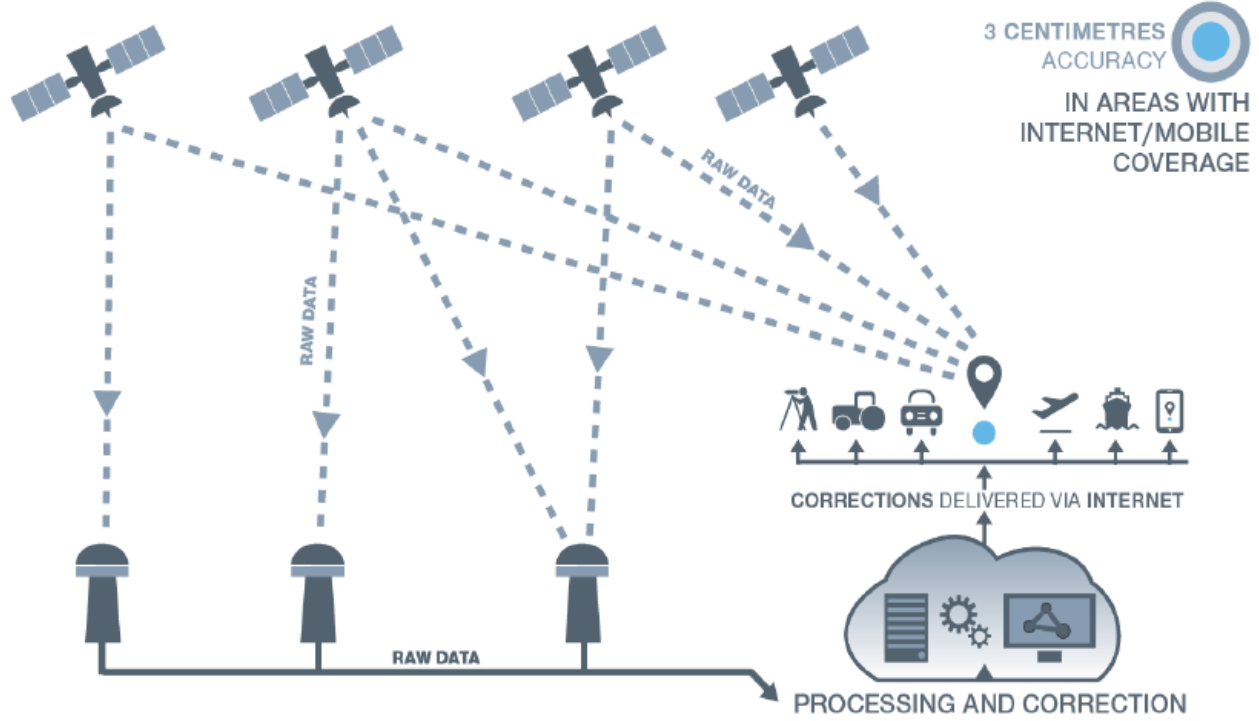


AUSTRALIA'S NETWORK OF
GNSS GROUND STATIONS



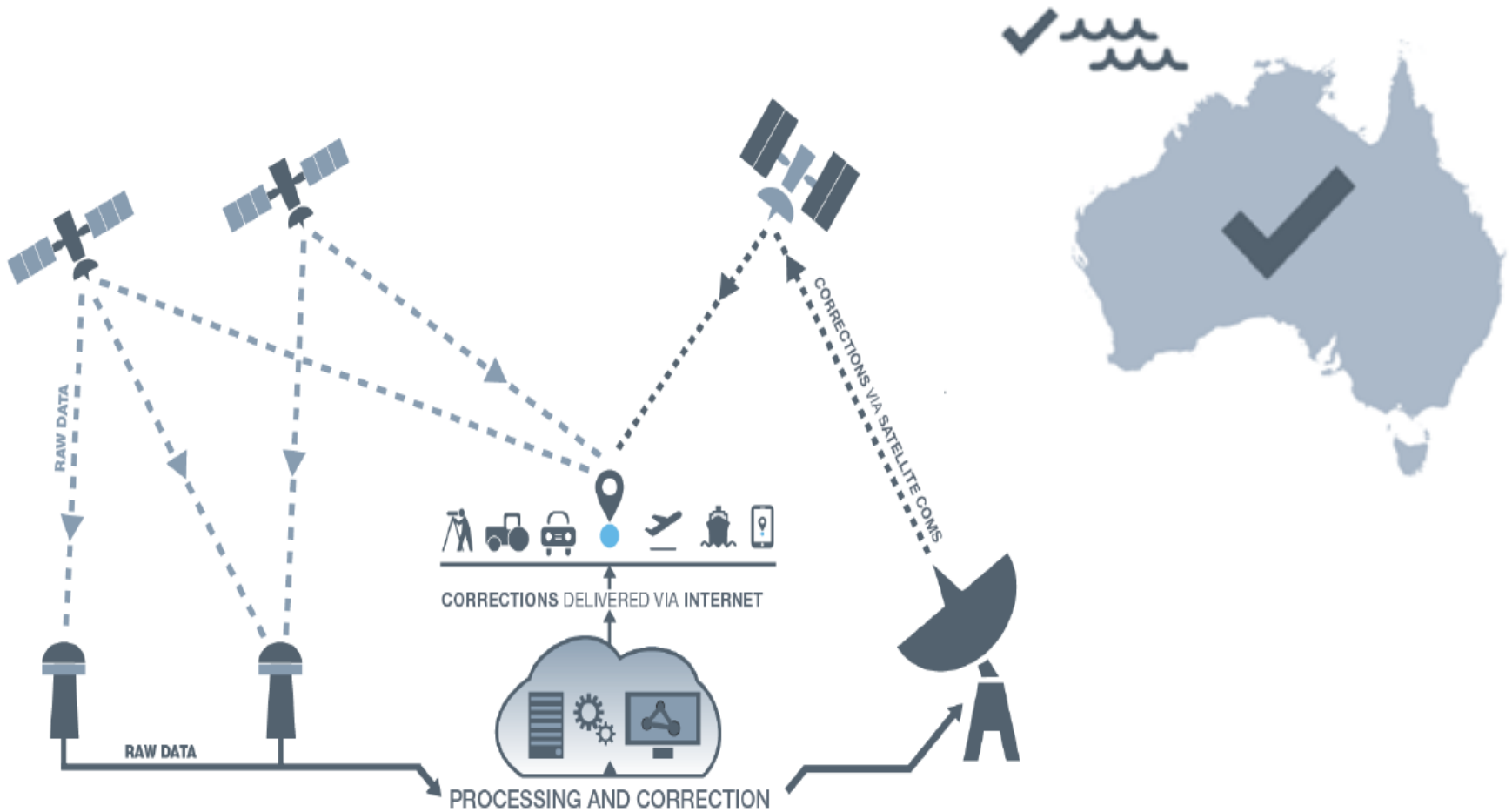
GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS)

National Positioning: CORS infrastructure



National Positioning: Satellite delivery

NATIONAL COVERAGE VIA SATELLITE

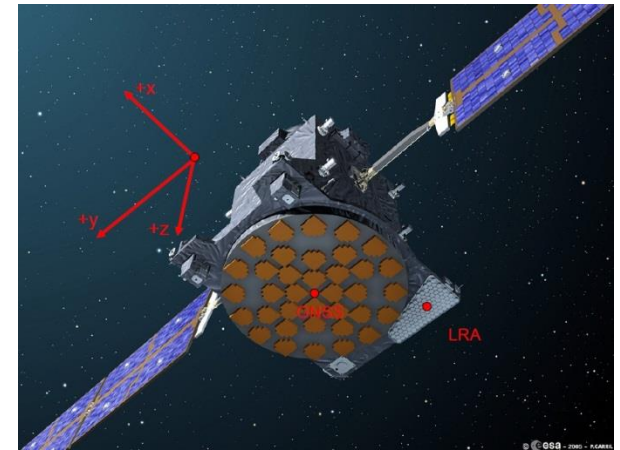
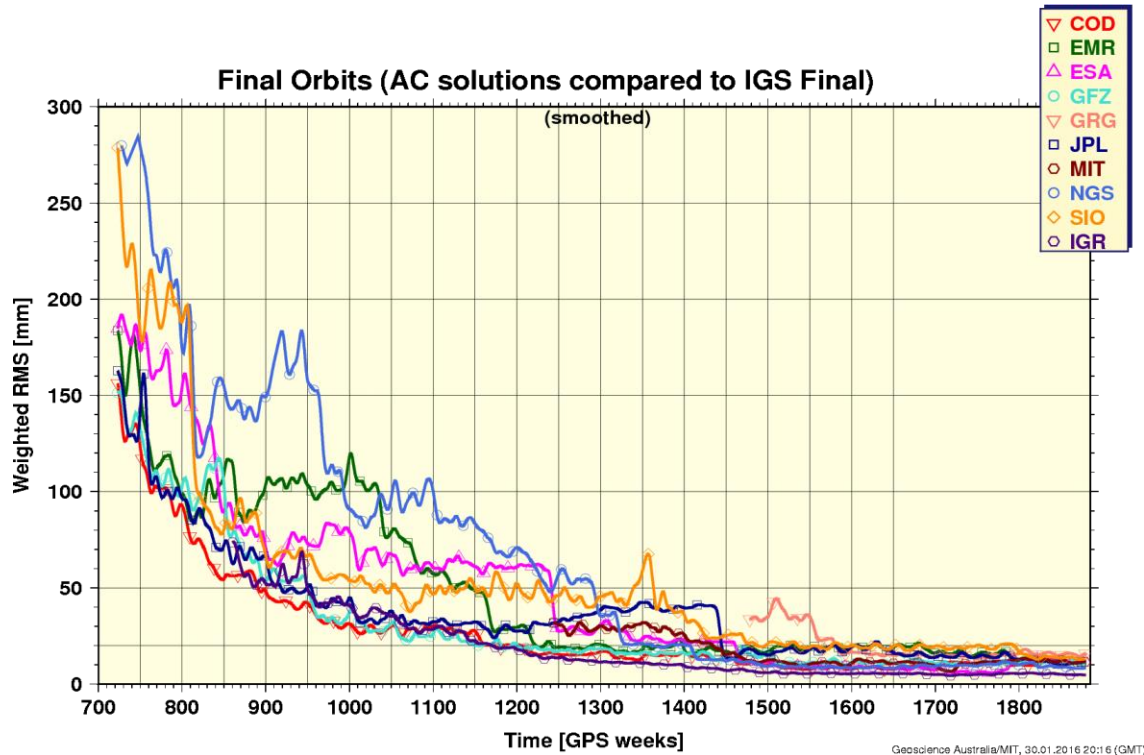


SBAS Testbed



- Accuracy, Integrity, Accessibility, Resilience
- Quantified economic benefits
- Current and future applications/industry
- Justification for investment in Positioning

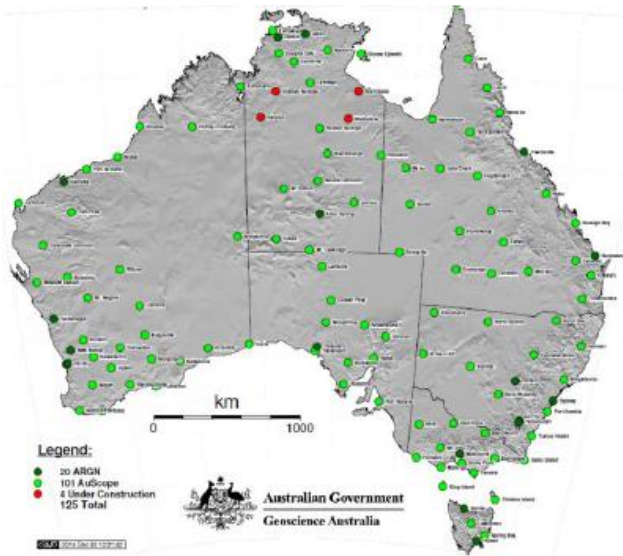
International GNSS Service Analysis



- Geoscience Australia and MIT partnership
- IGS final, rapid and ultra-rapid products

Australian Collaboration on GNSS Infrastructure

Australia

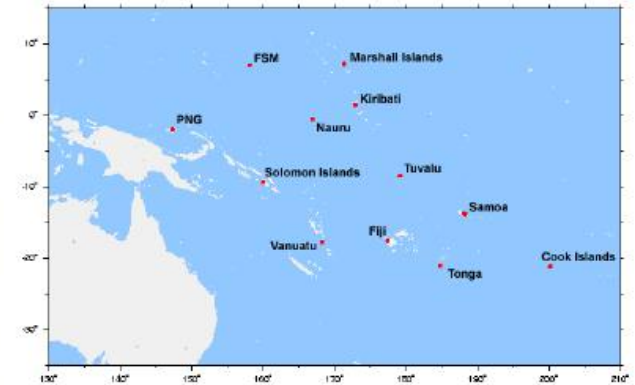


Australia-Japan



JAXA QZSS Master Station
Mount Stromlo, Canberra

Australia-Pacific



Australia-China

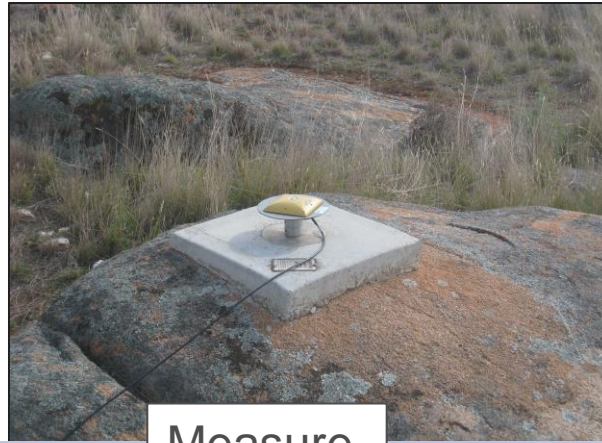


National Positioning: Science

Process: Coal Seam Gas



Source: Australian Broadcasting Corporation (2011)



Measure

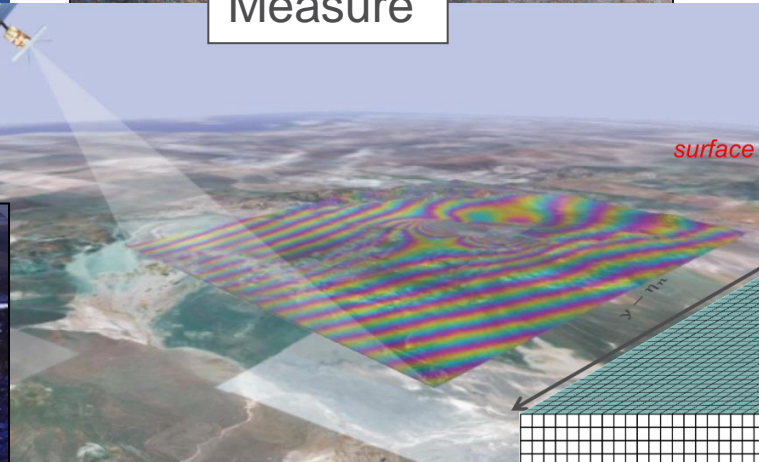


Model

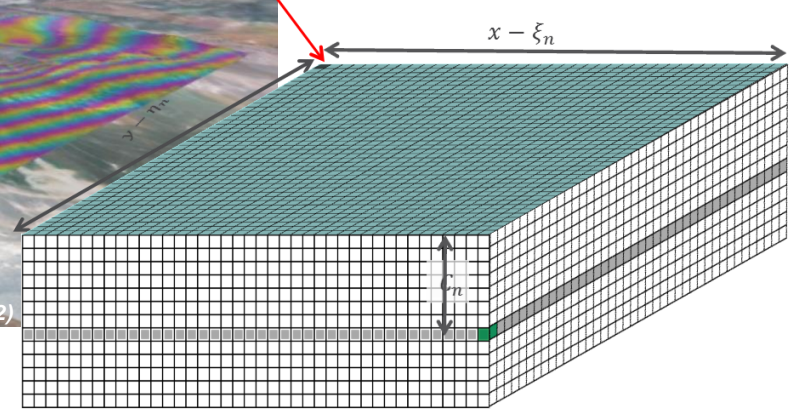
surface deformation at $(x, y, 0)$

$x - \xi_n$

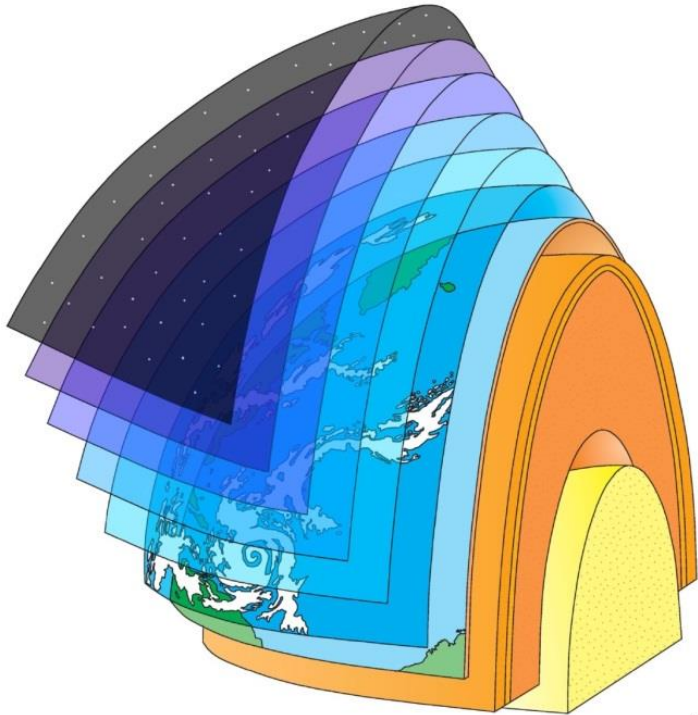
Process: Seismic



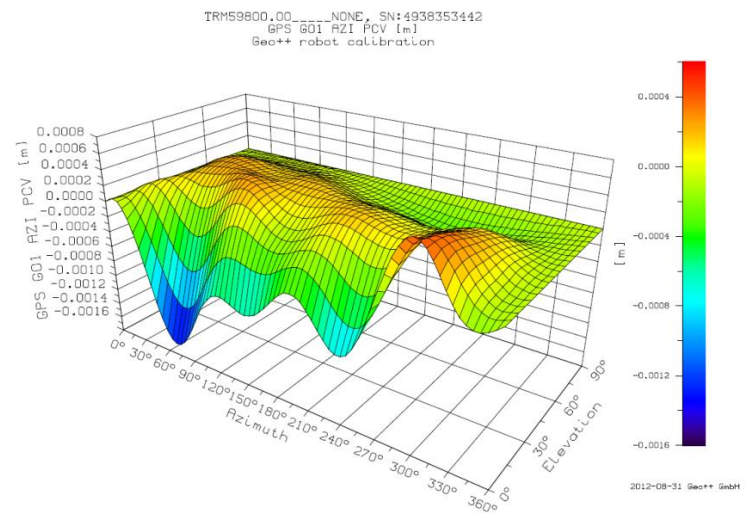
Source: International Association of Geodesy (2012)



National Positioning: Weather Forecasting



GNSS Antenna Calibration



QZSS Activity

- JAXA and Geoscience Australia agreement to operation monitor station at Mount Stromlo (**agreement now expired**)
- JAXA and Geoscience Australia agreement to share real-time QZSS data (**ongoing**)
- Satellite Laser Ranging from the two Australian stations, part of the International Laser Ranging Service, ILRS (**ongoing**)
- Cooperative Research Centre for Spatial Information (CRCSI)
 - LEX signal experiments in agriculture

National Positioning: Final Thoughts

How should governments be involved?

- Do nothing
- Encourage uptake
- Provide infrastructure
- Provide services
- Facilitate service provision
- Monitor services to support industry and government
- Provide sovereign capability



Australian Government
Geoscience Australia



Australia's national positioning program

Dr John Dawson, Section Leader Positioning

