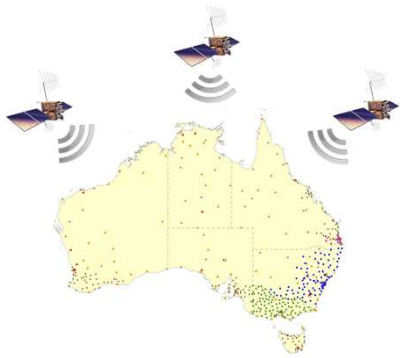
Australian Government
Geoscience Australia

Australia's National Positioning Infrastructure

John Dawson, Grant Hausler, Gary Johnston



Australia's National Positioning Infrastructure

Presentation:

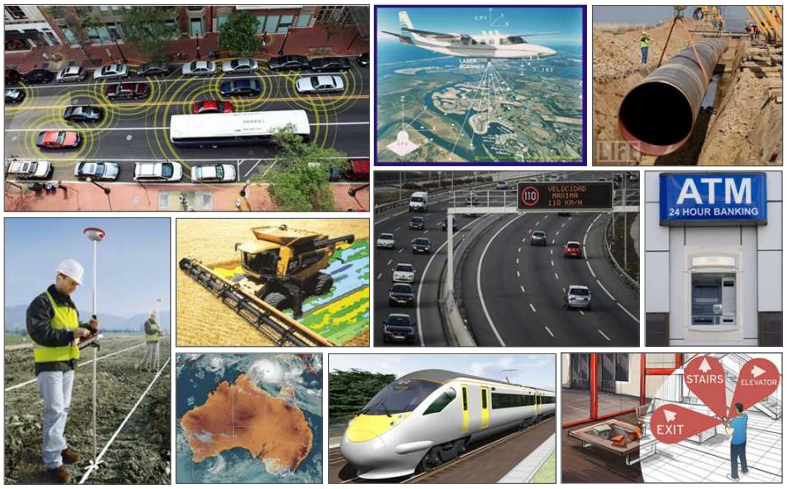
→ Importance of positioning to Australia

→ Australia's National Positioning Infrastructure (NPI)

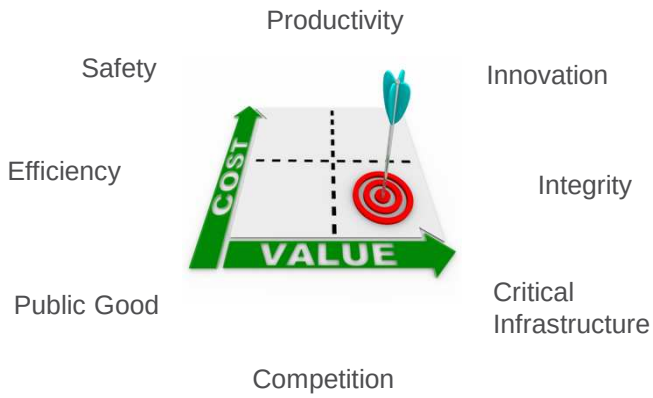
→ Recent development in National Positioning Policy

→ Efforts towards improving Australia's NPI

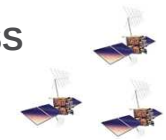
Position, Navigation & Timing (PNT)



PNT Information is Valuable



A Multi-GNSS Future



US - GPS

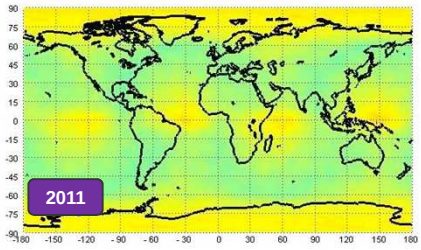
Russia - GLONASS

China - Beidou

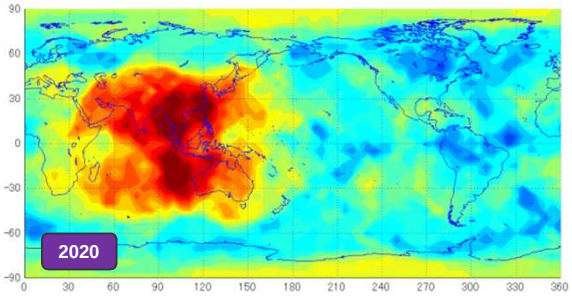
Europe

Japan - QZSS

India - IRNSS



Average satellite coverage: 8-10



Average satellite coverage: >40

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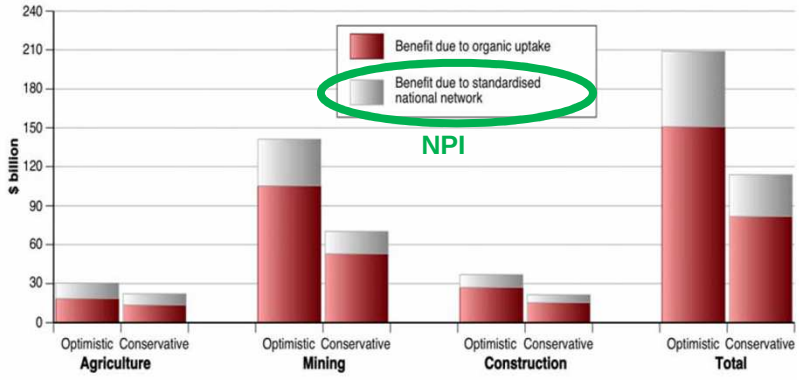
Economic Benefits

Precise satellite positioning technology could potentially add up to 2.1% to Australia's GDP by 2030 through productivity gains in **mining, construction** and **agriculture** alone

PRESENT VALUE OF FUTURE PRODUCTIVITY GAINS — 2009-2030



(The Allen Consulting Group, 2008)

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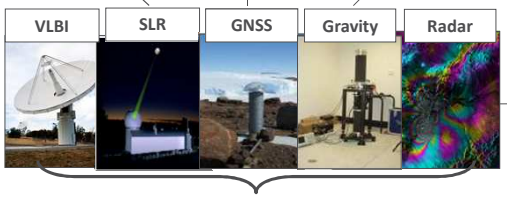
The Australian Geodetic Observing Program

Mount Stromlo and Yarragadee SLR Stations

GNSS networks in Australia, the South Pacific, and Antarctica

Absolute Gravity
Australia
Antarctica
FG5 instrument

Hobart, Yarragadee and Katherine stations



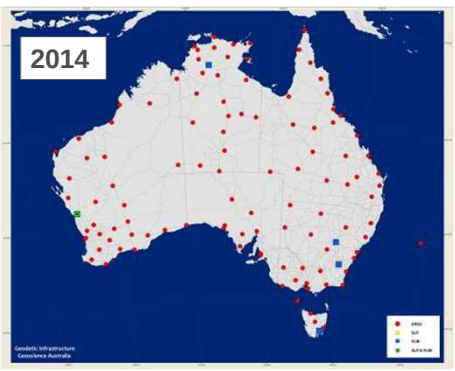
Mapping supporting crustal deformation surveys

GNSS antenna calibration

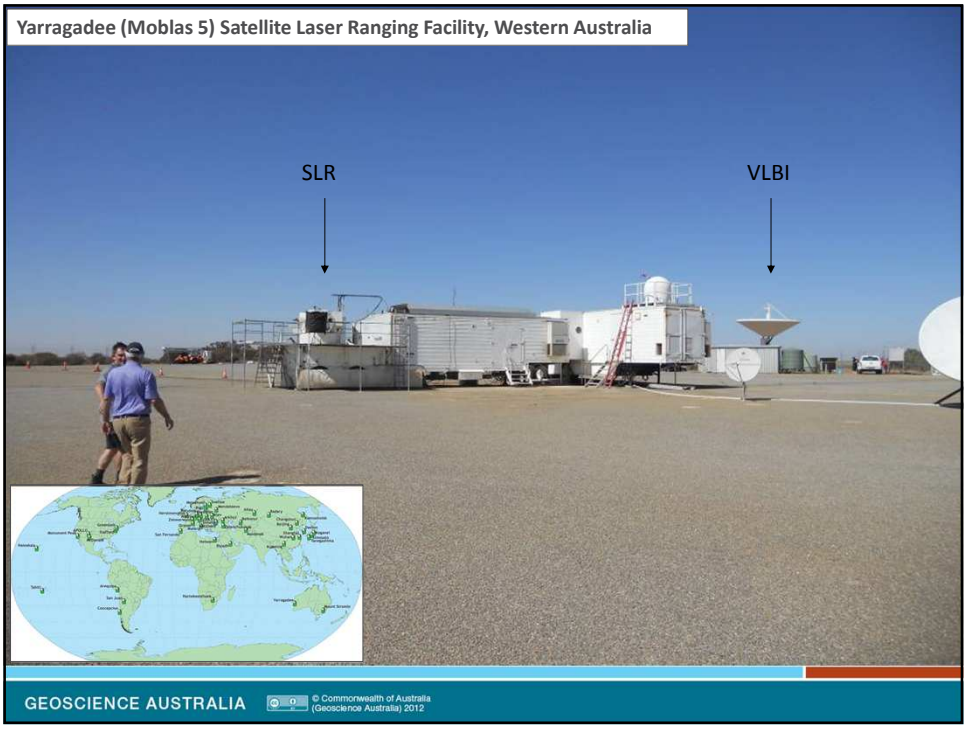
Precision collocation surveys and analysis

Campaign surveys supporting crustal deformation surveys

GNSS Infrastructure



Yarragadee (Moblas 5) Satellite Laser Ranging Facility, Western Australia



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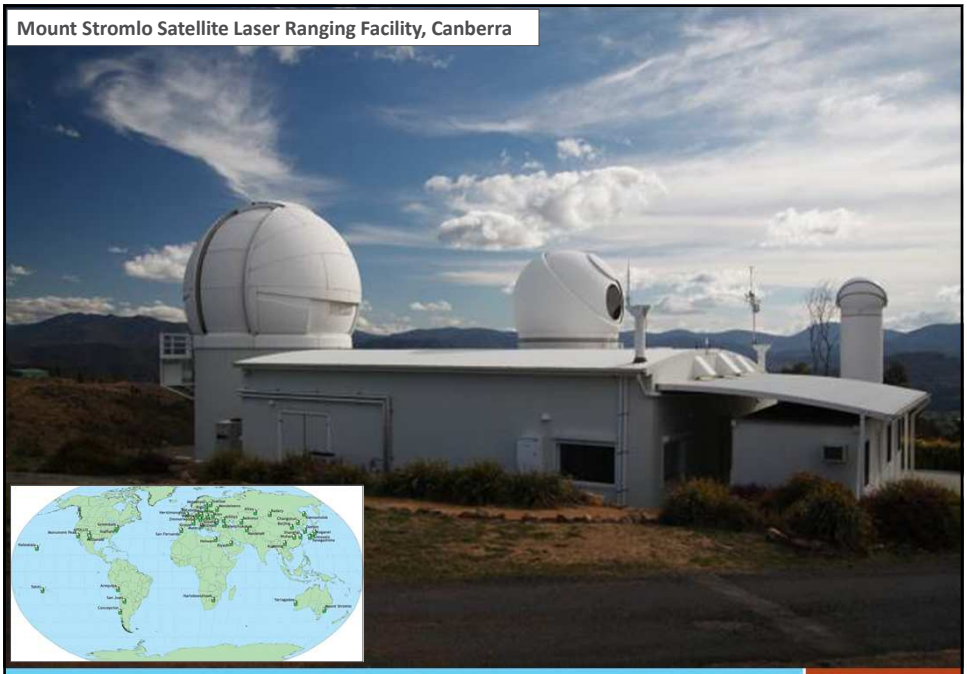
Mount Stromlo Satellite Laser Ranging Facility, Canberra



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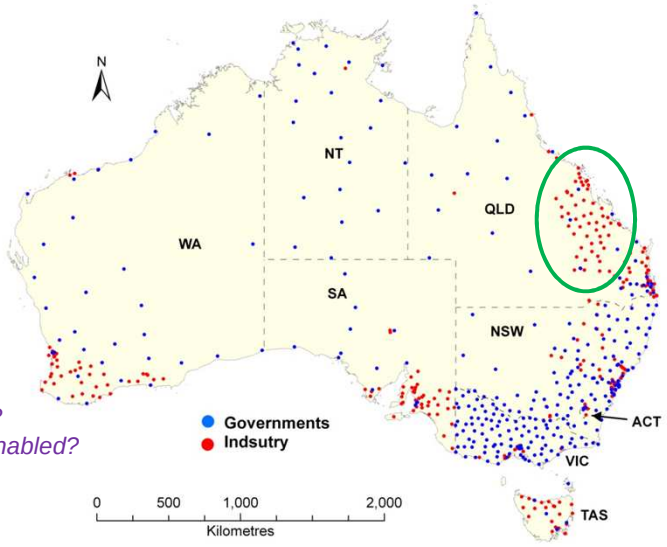
GNSS Antenna Calibration

Absolute GNSS antenna models
→ GEO++ system
→ Support crustal deformation surveys
→ Improves Australia contribution to the International GNSS Service (IGS)

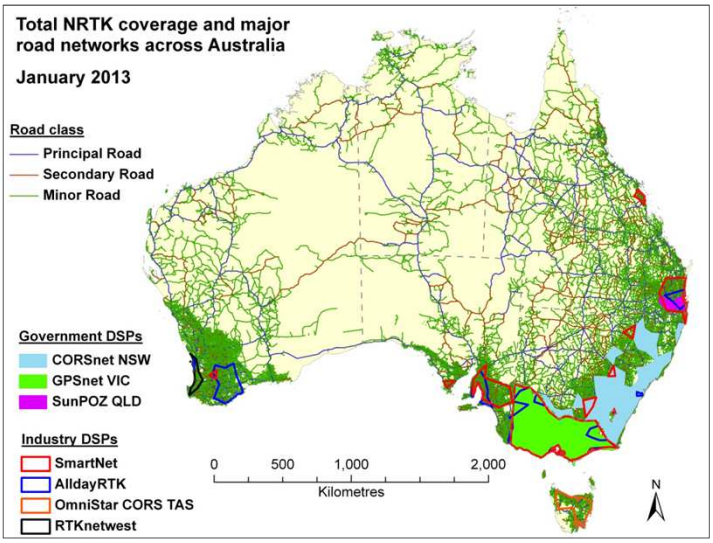
Absolute GNSS antenna models
→ Satellites and geodetic antennas
GNSS bias research
Seismic research
→ Earthquake simulation with GNSS tracking
Equipment testing and certification
→ Industry applications

Ground infrastructure - who owns what, and where?



- *Standardised?*
- *Multi-GNSS enabled?*
- *Sustainable?*
- *Certified?*
- *Accessible?*

…or the lack thereof



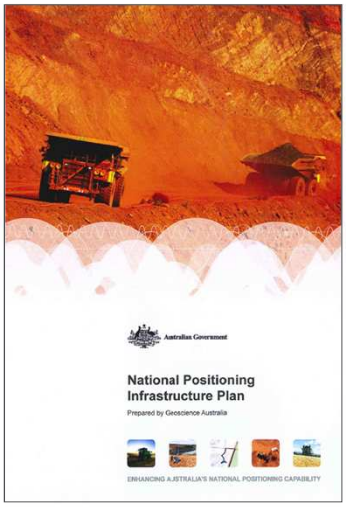
National Positioning Infrastructure Plan

A coordinated whole-of-government approach to building a NPI that supports government and industry PNT services

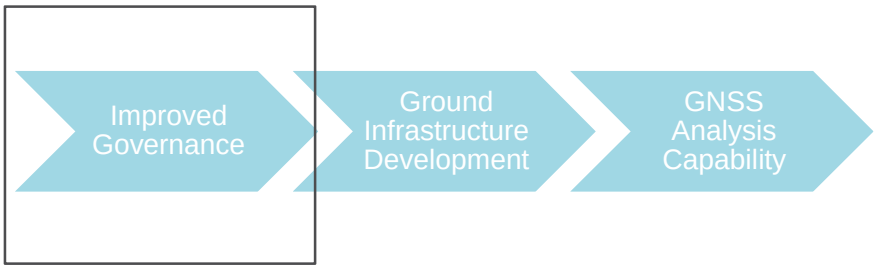
A recognised need to identify current and future performance and regulatory requirements for:

- Accuracy
- Transparency
- Integrity
- Standardisation
- Certification
- Interoperability
- Risk mitigation
- Privacy

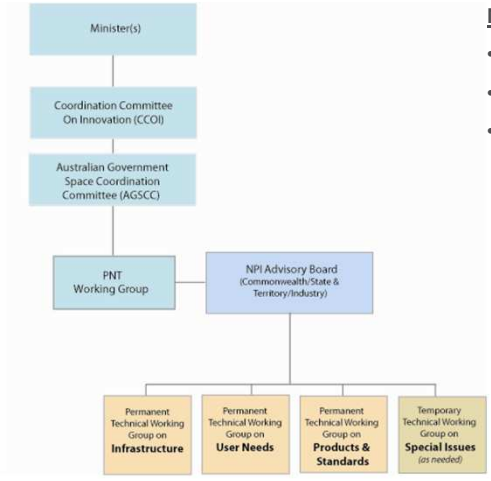
A vision to assure instantaneous, reliable and fit-for-purpose PNT services anywhere and anytime across the Australia landscape and beyond - a natural evolution in a globally connected world



Building Australia's NPI



NPI Governance Structure



NPI Advisory Board

- Reports to Government
- Encourages broad participation
- Addresses key implementation and ongoing utilisation issues
  - Standards
  - Users needs analysis (product specification)
  - Infrastructure design
  - Sustainability models
  - Spectrum Management
  - Augmentation delivery methods (e.g. SBAS)

Improved International Engagement

Engagement with system providers

→US, China, Japan

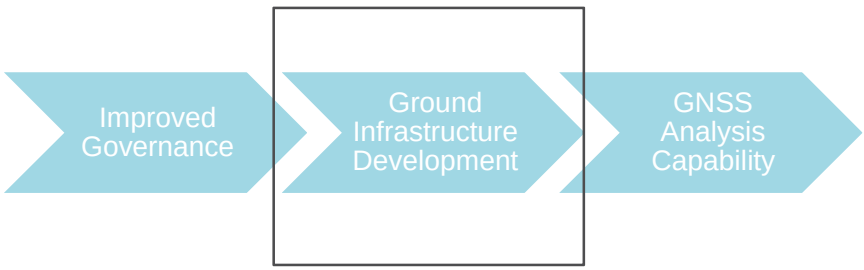
Supporting multi-GNSS

→ Japanese Multi-GNSS Monitoring Network (MGM)

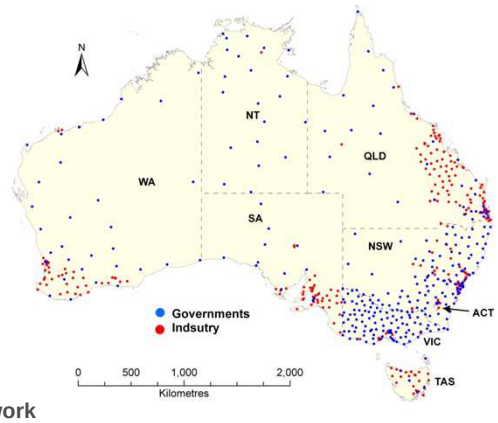
→ IGS Multi-GNSS Experiment MGEX

JAXA QZSS Master Station
Mount Stromlo, Canberra

Building Australia's NPI

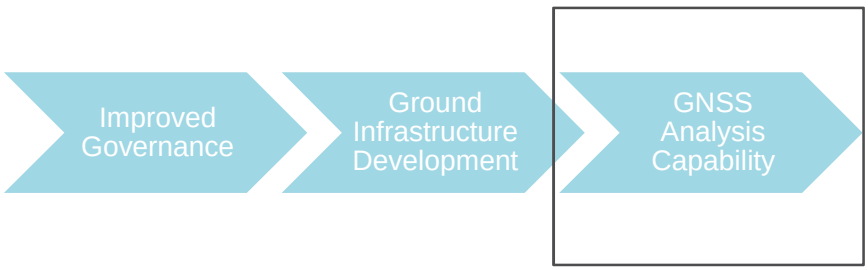


Ground Infrastructure Development



- Standardised infrastructure
- Densified, high integrity national network
- Support for real-time PNT applications, nationally
- Integrated, interoperable & connected

Building Australia's NPI



Australian Sovereign GNSS Analysis Capability

Provision of products and services that provide access to the datum and underpin geospatial data collection

An ability to contribute to Global Geodetic Observing System e.g., Global Geodetic Reference Frame (ITRF), International GNSS Service

A research capability to support improved positioning into the future

An ability to monitoring the performance/integrity of the GNSS e.g., expert evidence on the performance of GNSS, legal traceability of position

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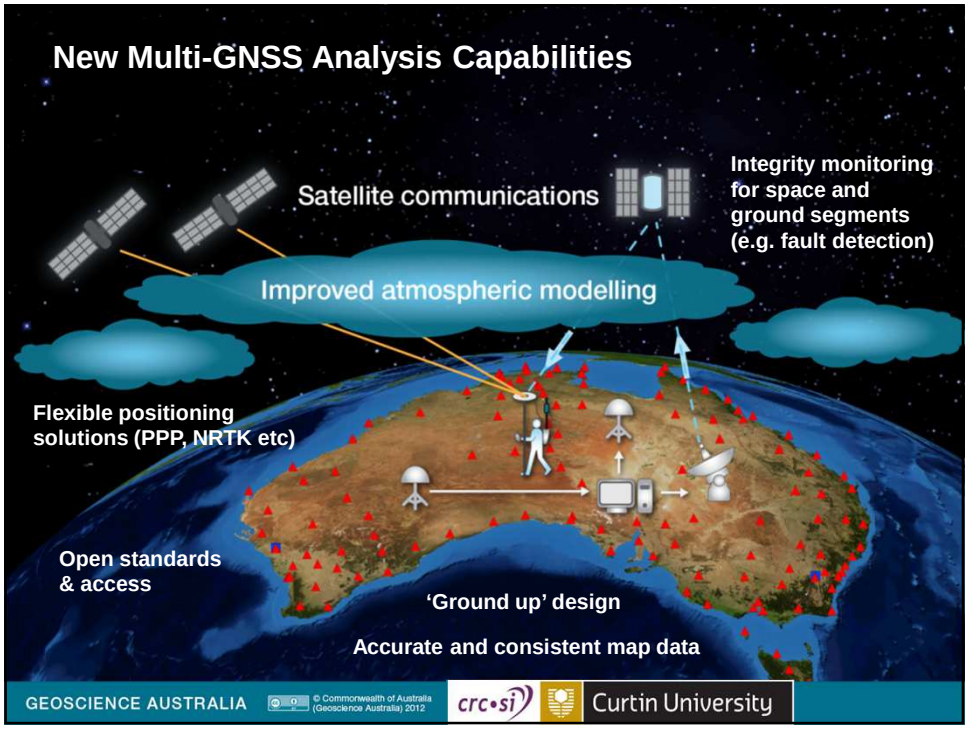
New Multi-GNSS Analysis Capabilities



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Final Remarks

- The NPI Plan has been developed
- Governance arrangements are being established
- The design of ACS is underway – joint Auscope / GA / CRCSI project
- Densification and unification of infrastructure will continue
- Australian industry will expand its competitiveness through the use of precise positioning
- Opportunities for producing, communicating, applying, validating and improving precise positioning information will emerge
- Australia government will champion multi-GNSS technologies