



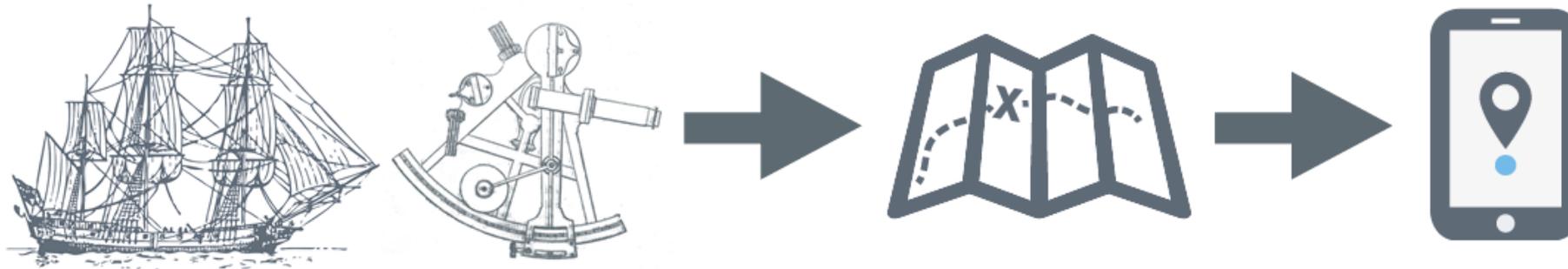
# An Update from Australia and New Zealand

Meeting of the U.S. Civil GPS Service Interface Committee

Dr John Dawson, GA, Dr Matt Amos, LINZ



# Why - Positioning, Navigation and Timing (PNT)



~\$ **1.1** b



Adopting precise positioning technology in the mining industry was estimated to have increased output by \$1 085 million in 2012 alone.

Mining

~\$ **723** m



Precise positioning technology in the construction sector was estimated to have increased output by \$723 million in 2012.

Construction

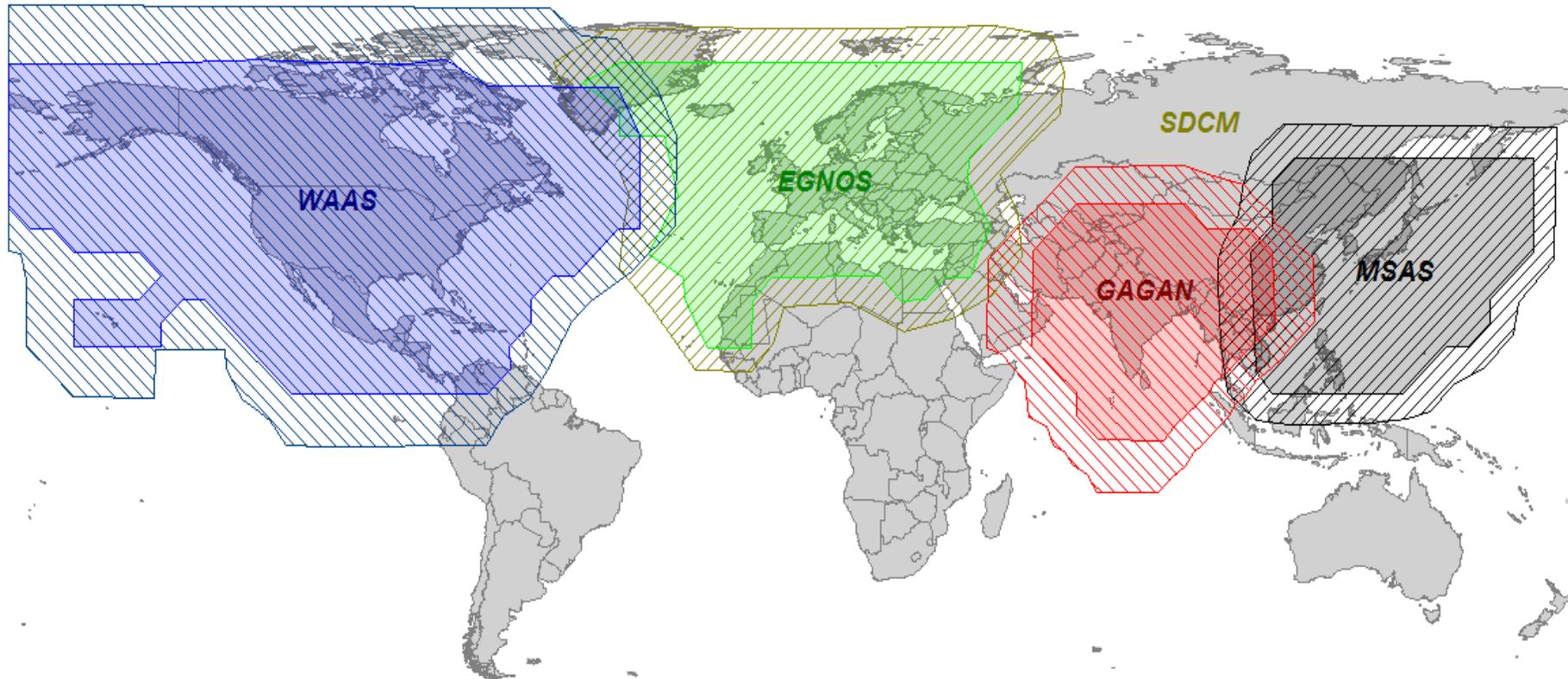
~\$ **466** m



Precise positioning technology was estimated to have increased yields by up to \$466 million in 2012.

Agriculture

# Satellite-Based Augmentation System (SBAS)



# What is the value of SBAS?

- 10 industry sectors:
  - Road, rail, aviation, maritime, agriculture, mining, construction, spatial, consumer, utilities
  - 28 projects



## What is the value of SBAS?

- Economic benefits analysis considers:
  - Health and safety
  - Operational savings – labour
  - Operational savings – other productivity
  - Environmental
  - Capital expenditure avoided
  - New revenue
- Project → sector x uptake(time) → economy
- Public report by Q1 2019

# SBAS Test-bed

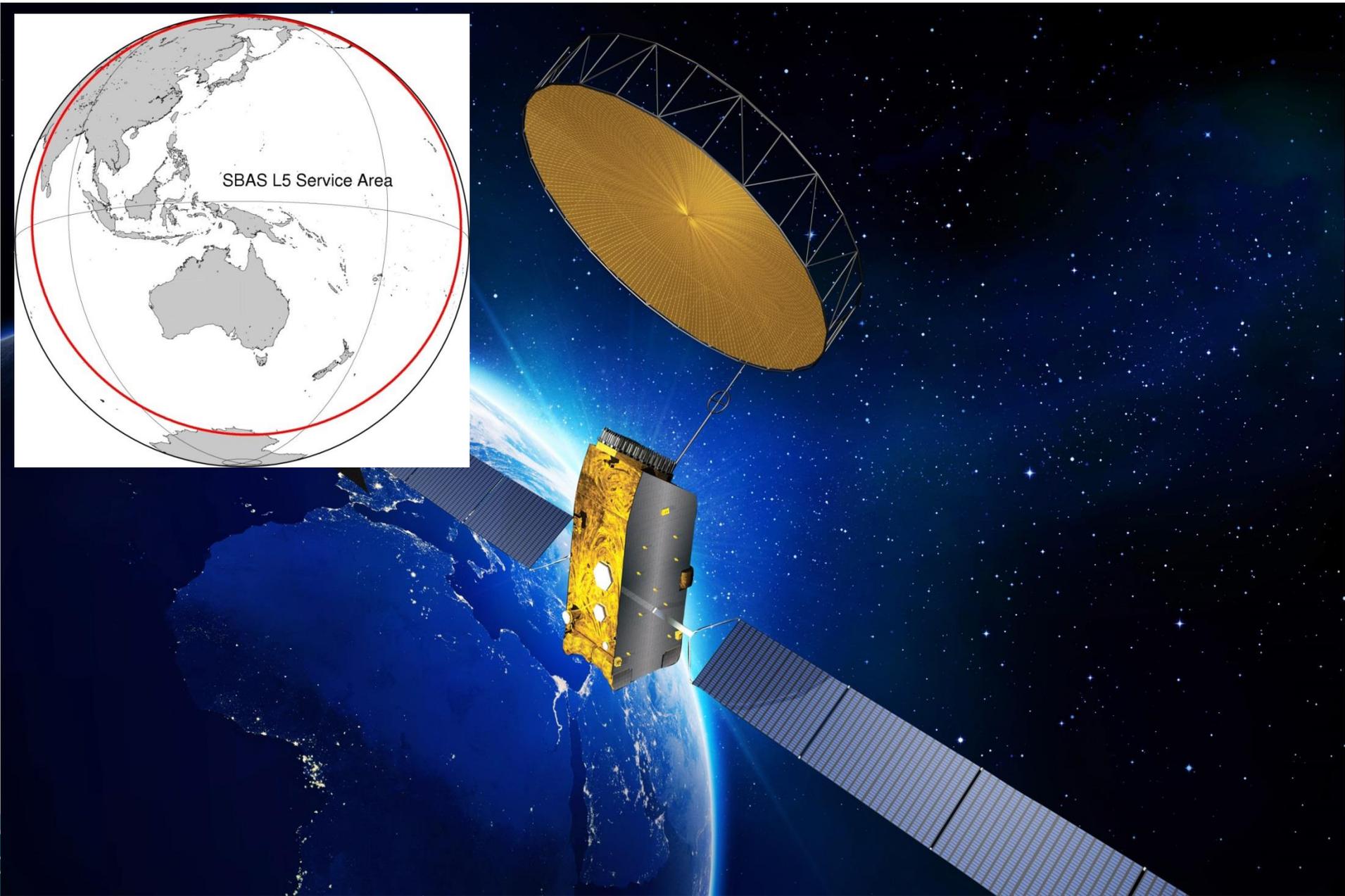
2-year SBAS Testbed Project Completing February 2019



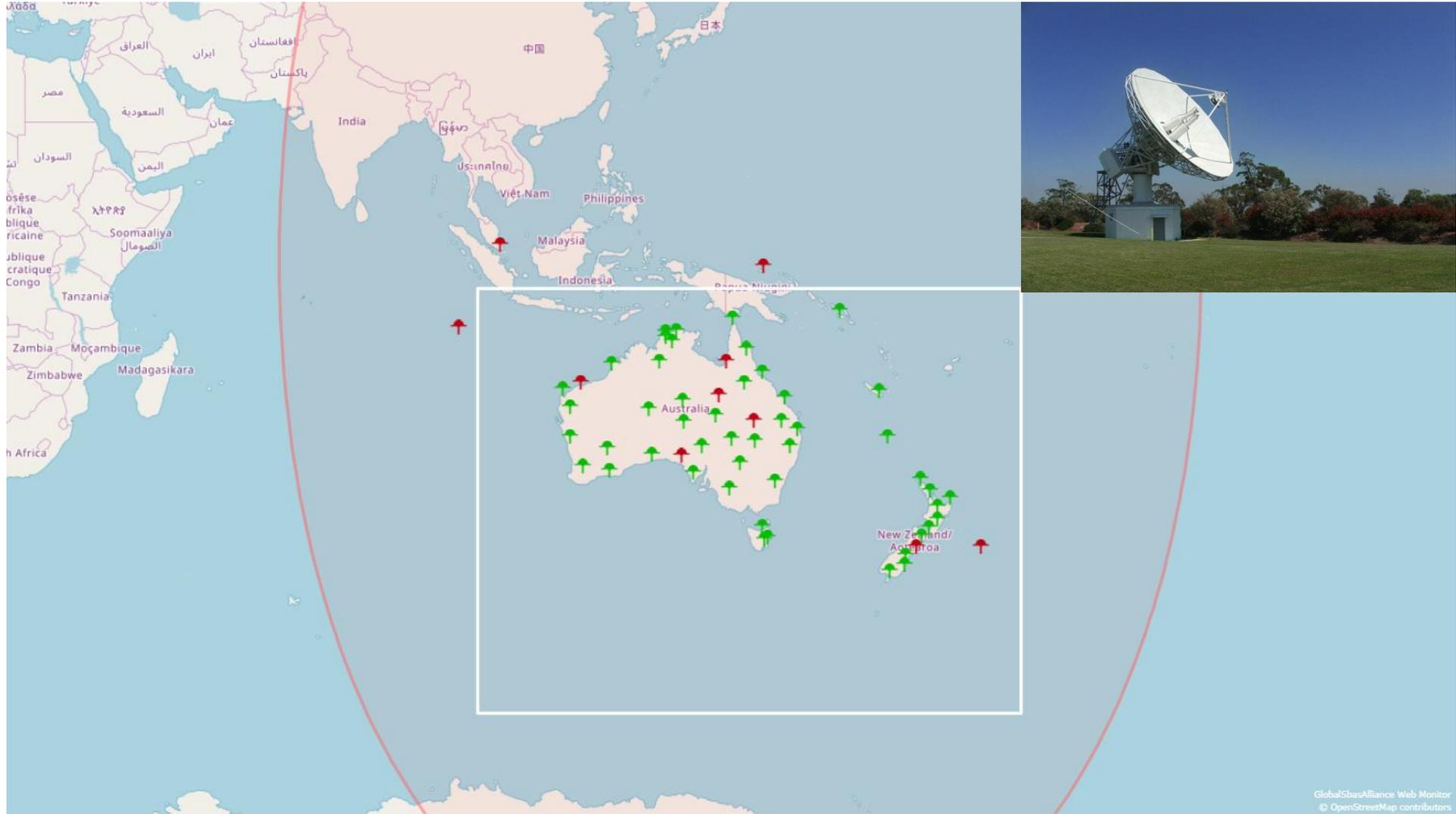
Australian Government  
Geoscience Australia



# SBAS: Inmarsat 4F1 GEO Satellite



# SBAS Test-bed: CORS Infrastructure



# SBAS Test-bed Performance

## Kinematic Platform 15-hour Segment

Solution	Horizontal RMS (m)	Vertical RMS (m)
SBAS	0.40	0.50
PPP	0.05	0.10

# 2018-19 Australian Federal Budget

- Funding allocation for better satellite positioning
  - Satellite-Based Augmentation System (SBAS)
  - National Positioning Infrastructure
  - Ongoing operational funding

# Australia's Approach

Integrated national positioning system



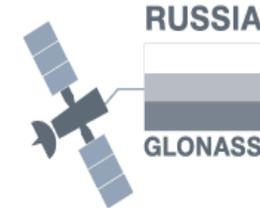
L1 GPS SBAS (aviation)  
DFMC SBAS open service  
Open access PPP (10cm)

High reliability core network  
Open CORS data  
Open source software

# Australia's Opportunity: GNSS



AUSTRALIA'S NETWORK OF  
GNSS GROUND STATIONS



GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS)

Strong research capability, multi-GNSS, applications focus

# Australia's GNSS Infrastructure

## Government (Commonwealth/State/Territory) and Industry CORS Infrastructure

June 2015

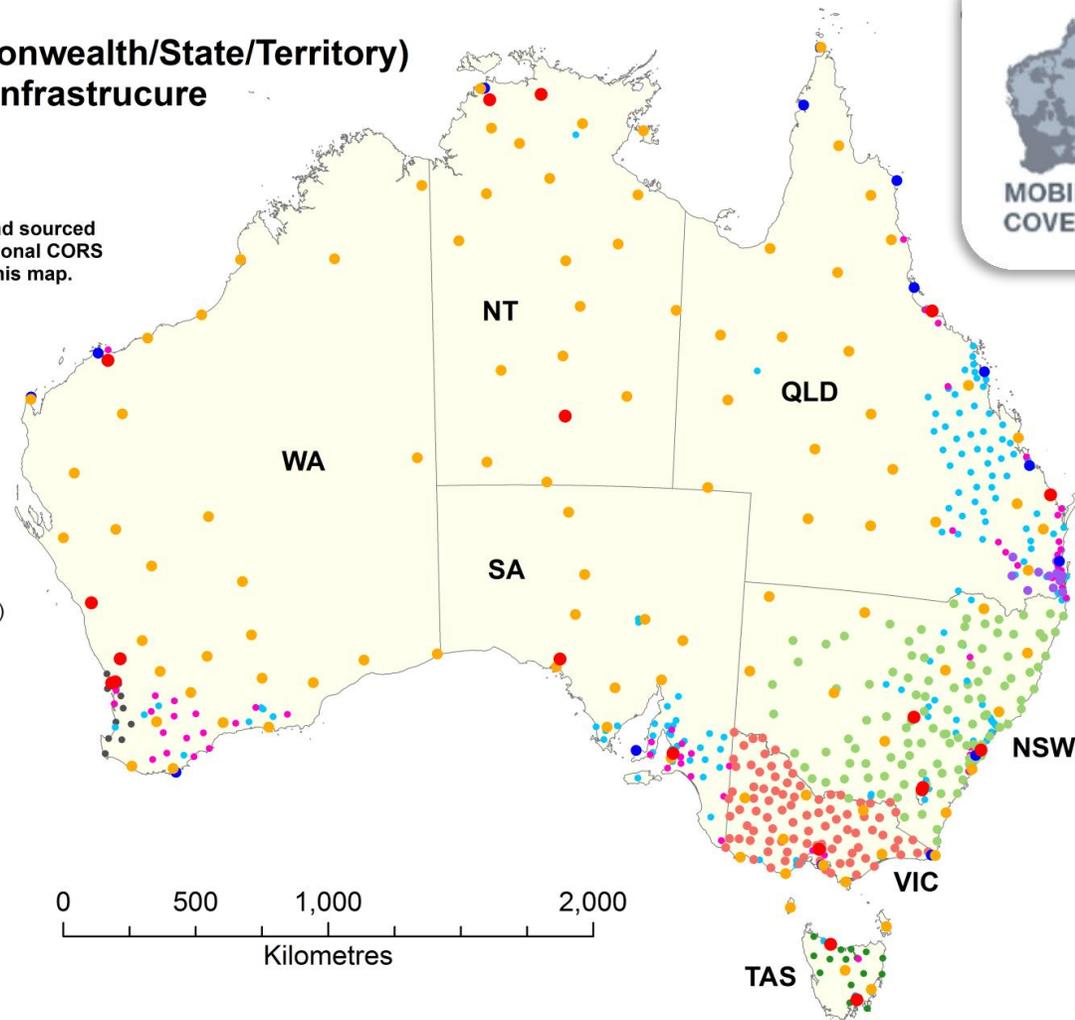
\*Location details are approximate and sourced from public datasets meaning additional CORS may exist that are not displayed on this map.

### Government

- ARGN (Comm)
- AuScope (Comm/State/Territory)
- AMSA (Comm)
- CORSnet NSW
- DNRM QLD
- DSE GPSnet VIC

### Industry

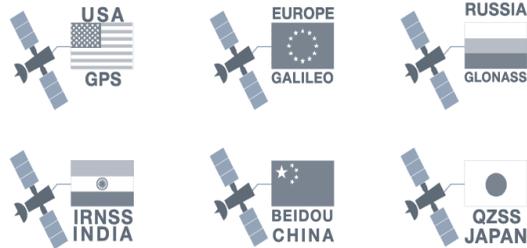
- AllDayRTK
- Trimble/OmniSTAR
- RTKnetwest
- SmartNet



# Open Source Software



AUSTRALIA'S NETWORK OF GNSS GROUND STATIONS



GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS)



Positioning



Orbits/clocks



Timing



QA'd Data

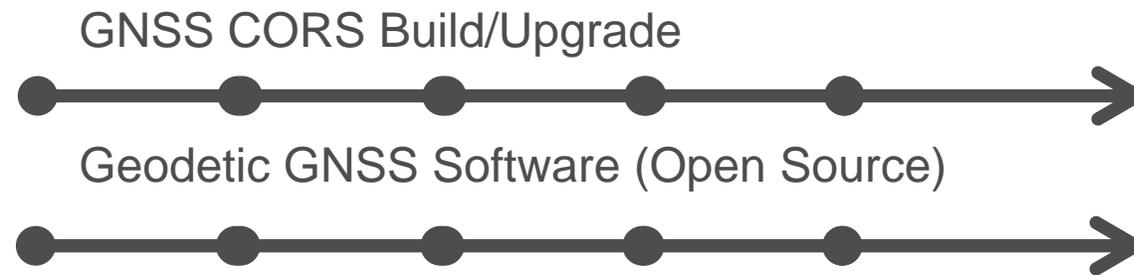
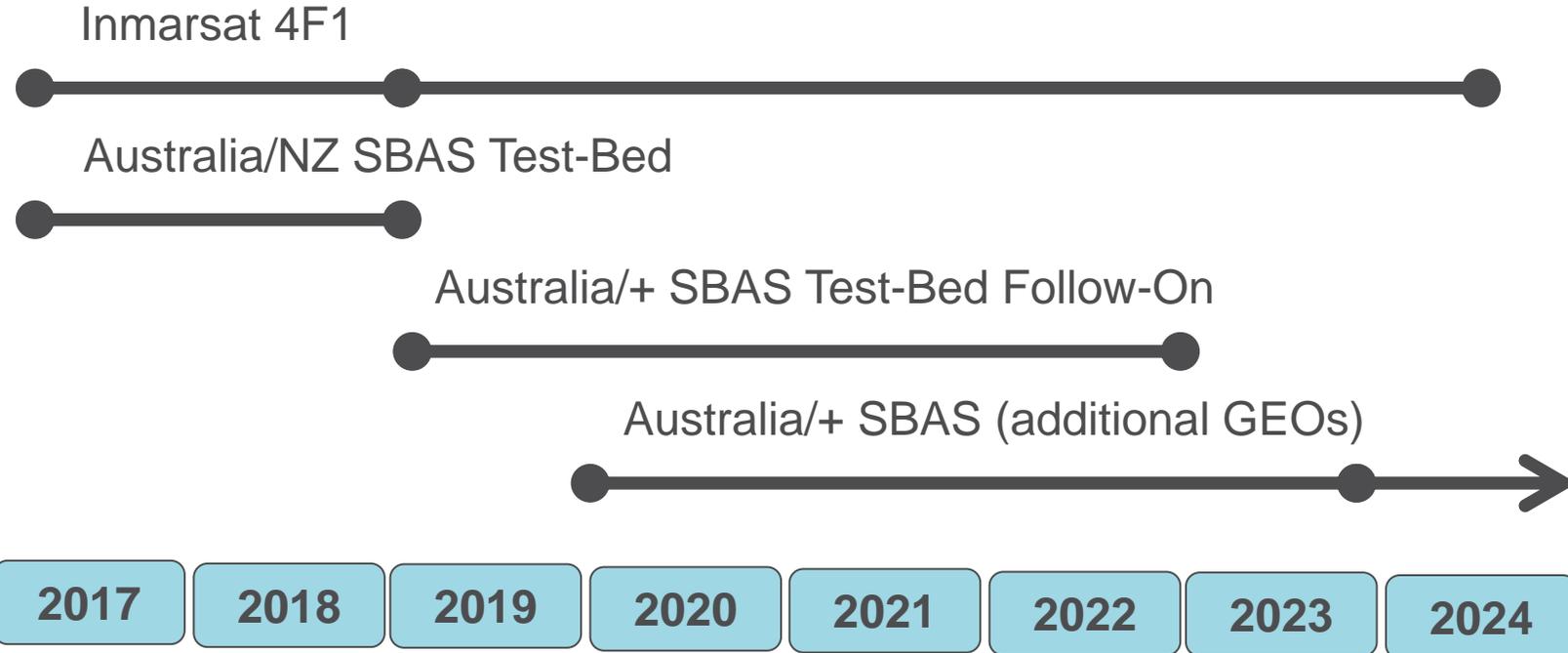


Atmosphere



Open software

# Australia's Progress and Plans



## More Information



<http://www.ga.gov.au/sbas>

<https://www.linz.govt.nz/sbas>



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