



Collaboration, Innovation and Resilience: Championing a Digital Generation

Brisbane, Australia 6–10 April

A Unified Approach to Australia's Positioning Infrastructure

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Presented at the FIG Working Week 2025 in Brisbane, Australia



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NPIC
↓

National Positioning Infrastructure Capability

a unified approach to Australia's positioning infrastructure

Ryan Ruddick

Director, GNSS Infrastructure and Informatics

Positioning Australia

COLLYN

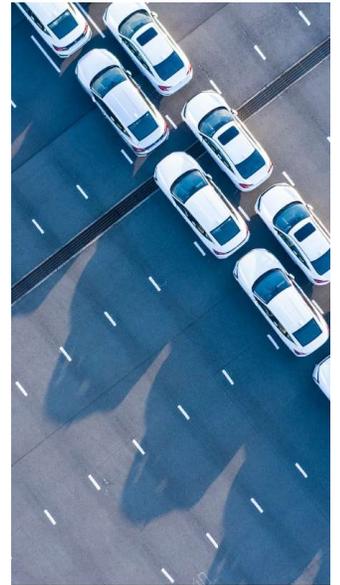


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High Accuracy Positioning Applications

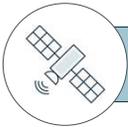


Positioning technologies are being used to grow our food, build our roads, and keep our communities safe.

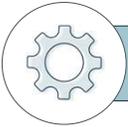


Positioning Australia Program

In 2018, the Australian Government made a significant investment to establish and operate a world-class positioning capability focused on supporting regional Australia and Australian businesses.



We are building a satellite-based augmentation system.



We have built a multi-GNSS analytical toolkit.



We have expanded Australia's fundamental geodetic GNSS network.



We have opened access to over 500 GNSS CORS across Australia.





Australian Government
Geoscience Australia

Positioning
Australia

Physical Infrastructure – Commonwealth Operated

The ARGN provides the fiducial framework for positioning in Australia. Through NPIC it has been expanded to be a **200-station network** that spans all of Australia and its external territories.

Collaborative Partners



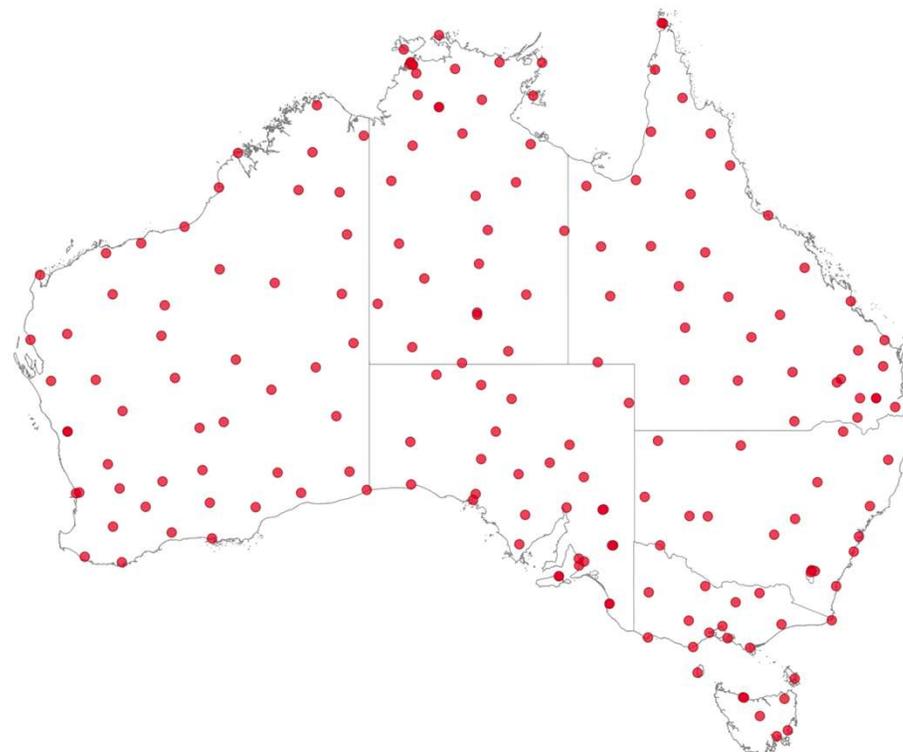
Department of Transport and Planning



Department of Resources



Key Construction Partners





Australian Government
Geoscience Australia

Positioning
Australia

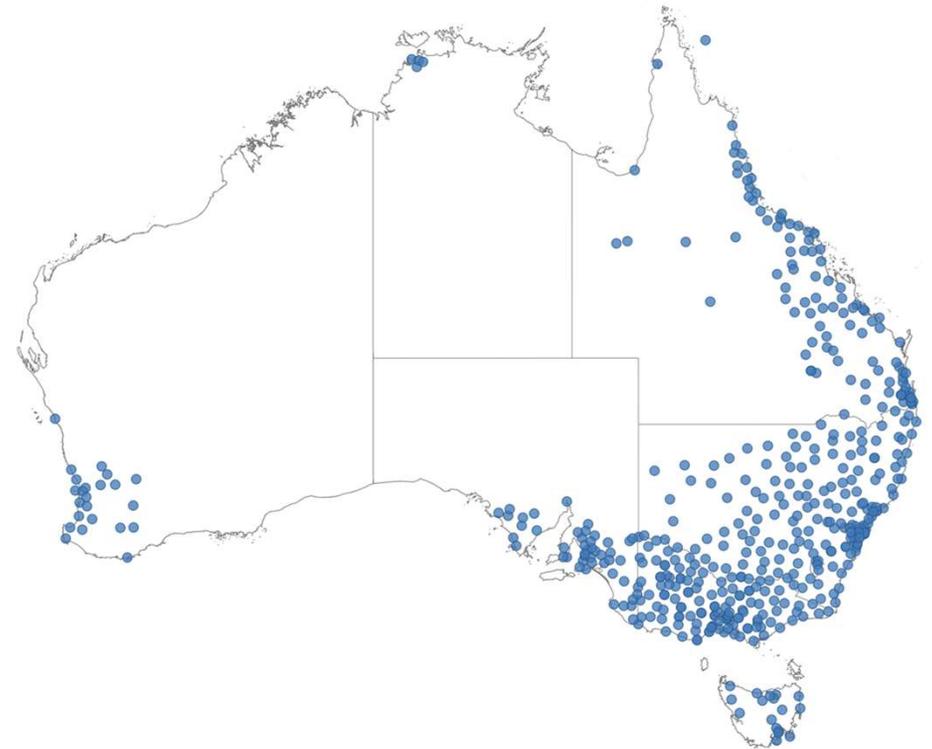
Physical Infrastructure – Third Party Operated

To densify the capability in key areas, data streams from existing stations have been licensed and integration into the network. This has opened access to an additional 500 stations.

Network Operator Partners

Aptella

HxGN SmartNet





National Positioning Infrastructure Capability

NPIC provides a **unified** approach the management of the nation's positioning infrastructure, ensuring that **consistent, fit-for-purpose** positioning data and services are available to government business and academia.



Underpins Australia's geospatial fabric
define and deliver the national datum



Supports research and encourages innovation
free and open data, products, and services



A platform for Australian businesses
strengthening the positioning sector in Australia





Economic Benefits

A 2023 report by ACIL Allen found that Government investment in positioning infrastructure, through NPIC, is estimated to inject an additional A\$545 million into the economy by the middle of 2038.

Agriculture



\$163 million*

Direct benefit this sector from 2019-2038

Construction



\$68 million*

Direct benefit for this sector from 2019-2038

Mining



\$91 million*

Direct benefit for this sector from 2019-2038

Surveying and Geospatial



\$43 million*

Direct benefit for this sector from 2019-2038





Open Services

SouthPAN Open Services

	NTRIP Service	Ginan SSR [^]	SouthPAN L1 [*]	SouthPAN DFMC [*]	SouthPAN PVS [*]
Method	RTK	PPP-RTK	SBAS	SBAS	PPP
Accuracy	< 5 cm	< 10 cm	< 3 m	< 1.5 m	< 50 cm
Initialisation Time	Fast (seconds)	Slow (40 min)	Fast	Fast	Slow (80 min)
Coverage	Local	Regional	Continental	Continental	Continental
Equipment	Specialist	Specialist – Mass Market	Mass Market	Mass Market	Specialist
Delivered	Internet	Internet	Satellite and Internet	Satellite and Internet	Satellite

NPIC Open Services

[^] Experimental SSR GPS code biases (RTCM 1059) and Experimental SSR Combined orbit and clock corrections to GPS broadcast ephemeris (RTCM 1060)

^{*} Initial Operating Capability-99.5





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Delivered	Internet	Internet	Satellite and Internet	Satellite and Internet	Satellite



Value Added Reseller Services		
RTK	NRTK	PPP-RTK
< 5 cm	< 5 cm	< 10 cm
Fast (seconds)	Fast (seconds)	Fast (minutes)
Close to Base Station	Local	Regional
Specialist	Specialist	Specialist – Mass Market
Internet	Internet	Internet





Case Study

Tiny Mobile Robots Case Study



Victorian Department of Transport and Planning (Station Operator)
operate a network of GNSS CORS across Victoria



Geoscience Australia (Network Coordinator)
license data from DTP (plus 10 other operators) for inclusion into NPIC



Aptella (Value Added Reseller)
subscribe to GA's free NTRIP service and integrates this into their offerings



Tiny Mobile Robots (Customer)
subscribe to Aptella's AllDayRTK service





Australian Government
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Positioning
Australia



GNSS Data

Key Benefits of GA's Open Positioning Services



Accurate

m-level to cm-level services



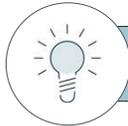
Available

national coverage



Certified

legally traceable access to our national datum (GDA2020)



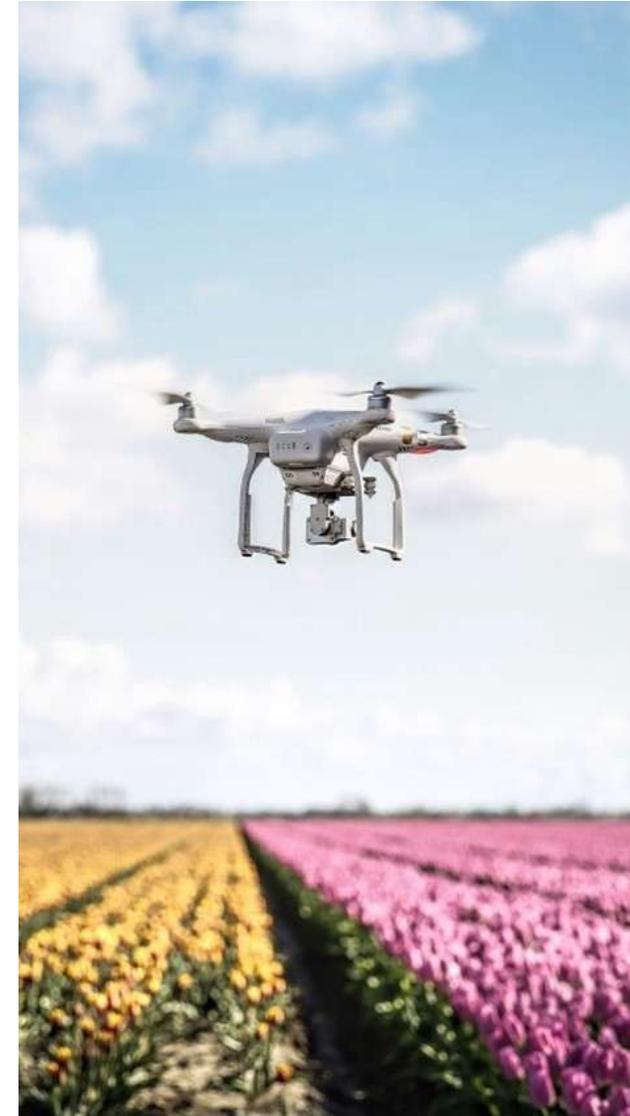
Free

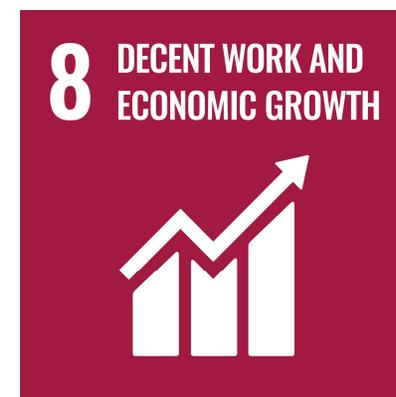
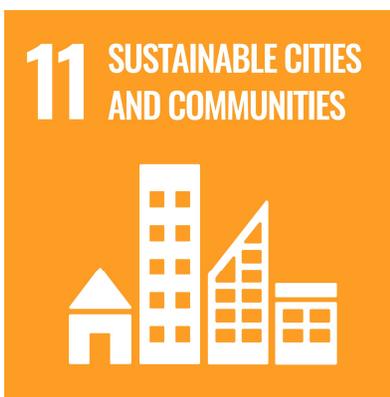
supports research and encourages innovation



Reliable

provides a platform for Australian businesses





SUSTAINABLE DEVELOPMENT GOALS | International Federation of Surveyors supports the Sustainable Development Goals

