



**Locate25**   
THE NATIONAL GEOSPATIAL CONFERENCE



**Geospatial**  
Council of Australia

Collaboration, Innovation and Resilience: Championing a Digital Generation

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# A Unified Approach to Australia's Positioning Infrastructure

**Ryan Ruddick**

Positioning Australia Branch

Geoscience Australia

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**

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Positioning Australia

COLLYN



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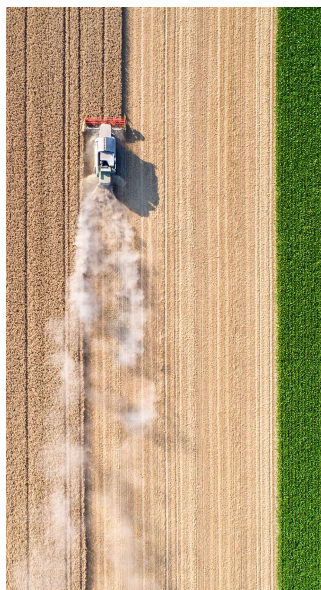




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Positioning  
Australia

## High Accuracy Positioning Applications



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



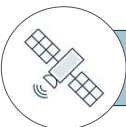


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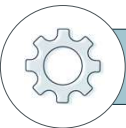
Positioning  
Australia

## Positioning Australia Program

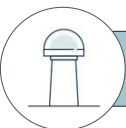
In 2018, the Australian Government made a significant investment to establish and operate a world-class positioning capability focused on supporting regional Australia and Australian businesses.



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.





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## 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



Spatial  
Services



Queensland  
Government

Department of Resources



Government of  
South Australia



NORTHERN  
TERRITORY  
GOVERNMENT

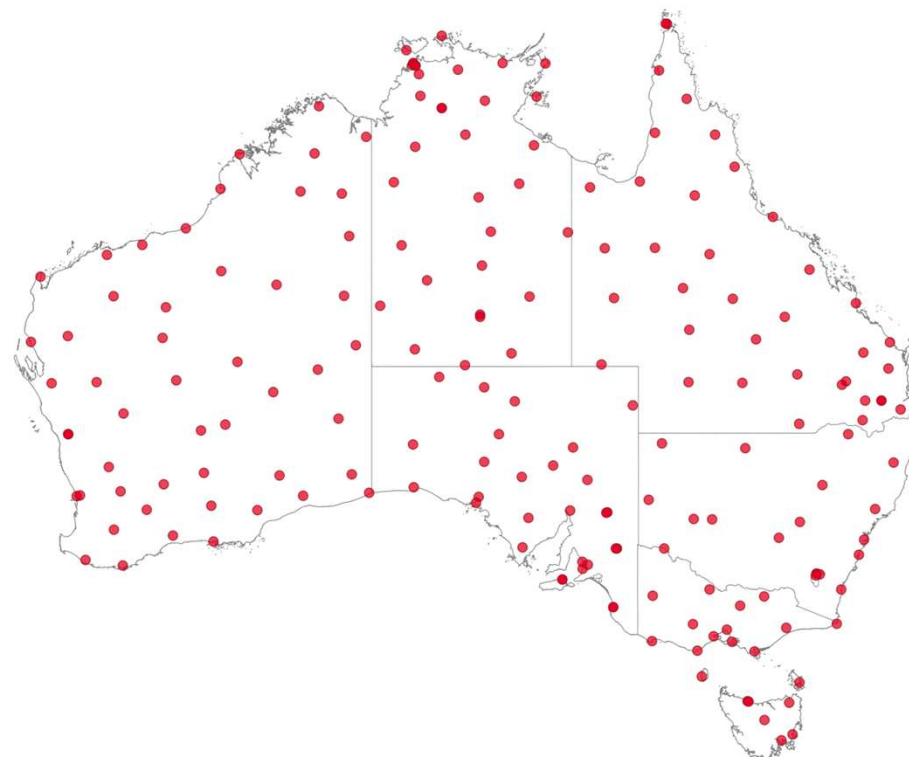


Tasmanian  
Government



Landgate

### Key Construction Partners







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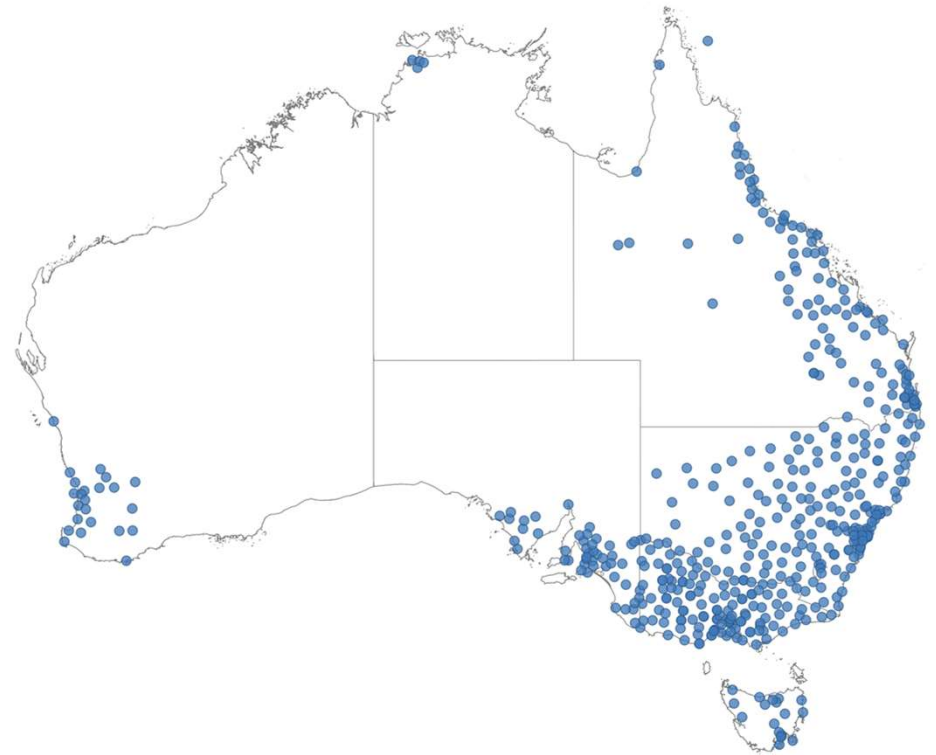
## Physical Infrastructure – Third Party Operated

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



HxGN SmartNet



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## 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.



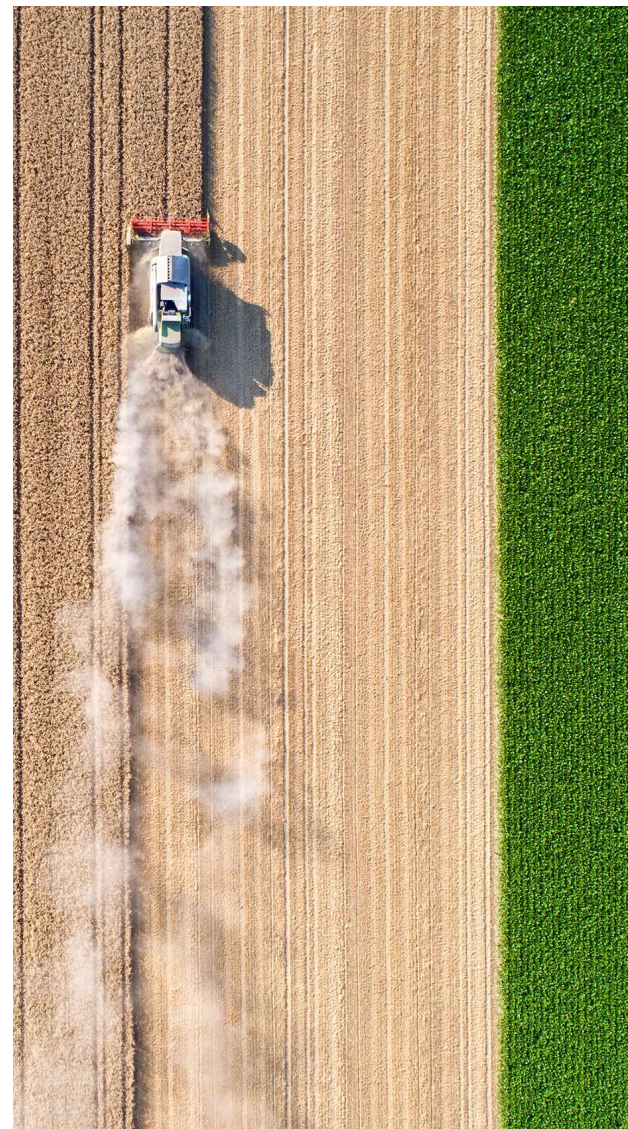
**Underpins Australia's geospatial fabric**  
define and deliver the national datum



**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\***

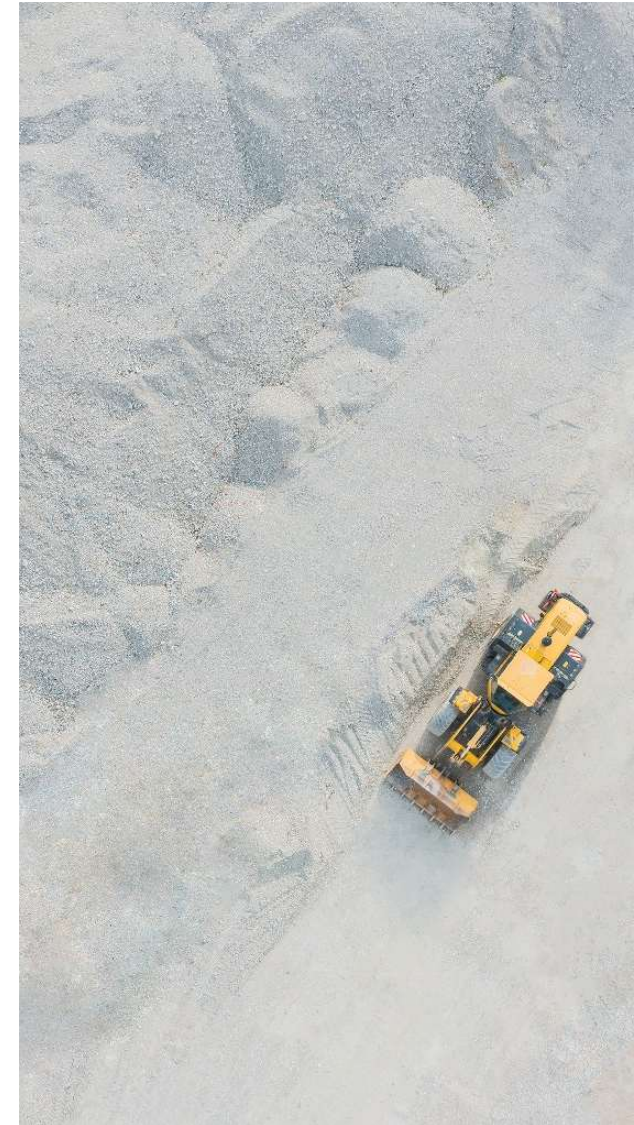
Direct benefit for this sector from 2019-2038

### Surveying and Geospatial



**\$43 million\***

Direct benefit for this sector from 2019-2038







## Open Services

### SouthPAN Open Services

	NTRIP Service	Ginan SSR <sup>^</sup>	SouthPAN L1 <sup>*</sup>	SouthPAN DFMC <sup>*</sup>	SouthPAN PVS <sup>*</sup>
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

<sup>^</sup> Experimental SSR GPS code biases (RTCM 1059) and Experimental SSR Combined orbit and clock corrections to GPS broadcast ephemeris (RTCM 1060)

<sup>\*</sup> Initial Operating Capability-99.5





## Open Services

### SouthPAN Open Services

	NTRIP Service	Ginan SSR*	SouthPAN L1*	SouthPAN DFMG*	SouthPAN PVS*
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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







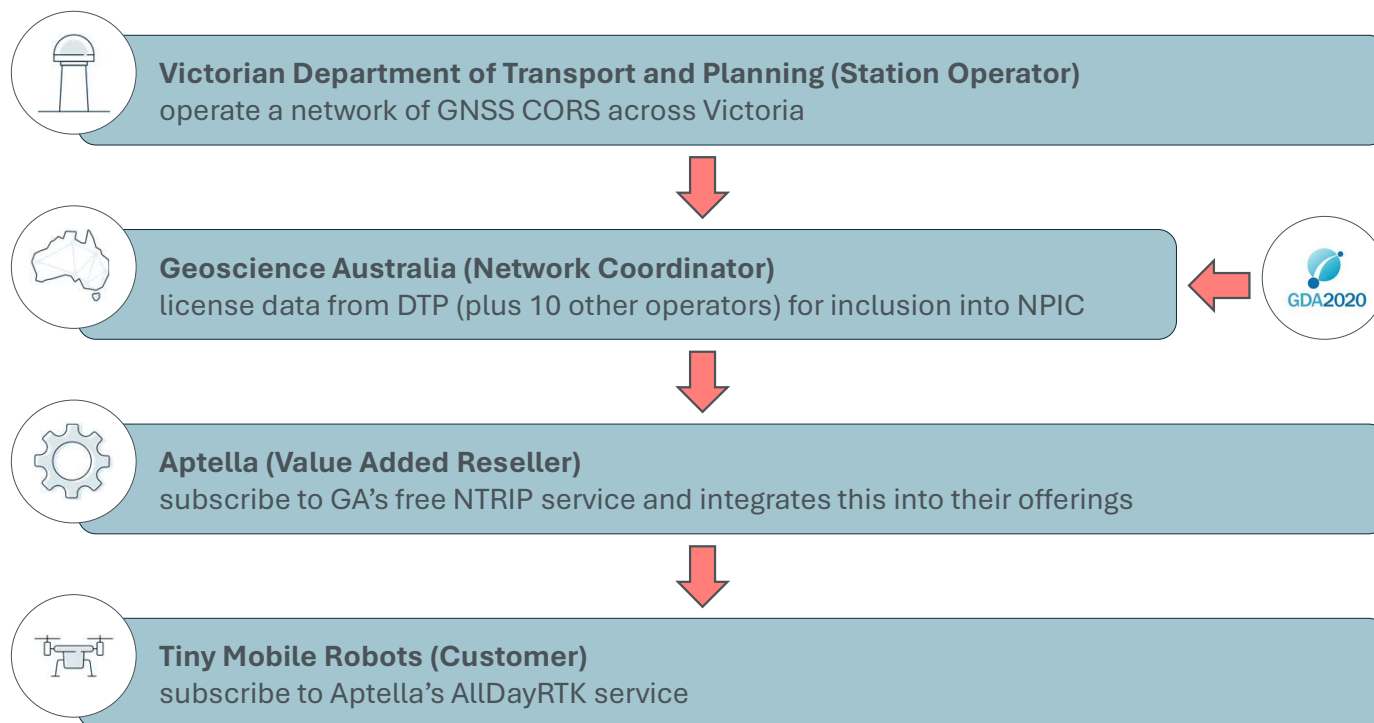
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Case Study

## Tiny Mobile Robots Case Study



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GNSS Data

## Key Benefits of GA's Open Positioning Services



### Accurate

m-level to cm-level services



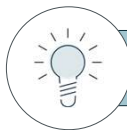
### Available

national coverage



### Certified

legally traceable access to our national datum (GDA2020)



### Free

supports research and encourages innovation

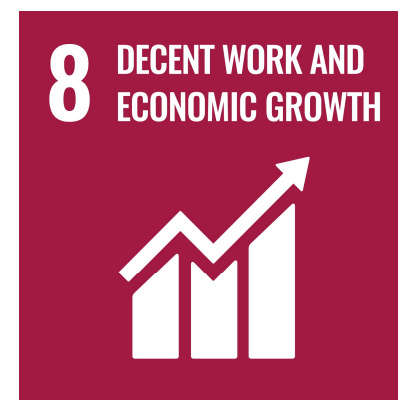


### Reliable

provides a platform for Australian businesses







International Federation of Surveyors supports the Sustainable Development Goals