

# Expanding the Australian Regional GNSS Network

Part of the National Positioning Infrastructure Capability

Ryan Ruddick, Amy Peterson, Brandon Owen and Hanna Slattery | Geoscience Australia, Canberra

## Overview

The National Positioning Infrastructure Capability is part of an Australian Government investment into building a world-class satellite positioning capability. NPIC provides a unified approach to the management of Australia's positioning infrastructure ensuring that consistent, fit-for-purpose precise positioning data and services are available to government, business, and academia.

As part of the investment, funding was allocated to modernise and expand Australia's fundamental geodetic network – the Australian Regional GNSS Network (ARGN). The improvements and benefits of this modernisation is reflected across the 25 stations from the network that Geoscience Australia contribute to the International GNSS Service (IGS) tracking network.

This poster shares some of the decisions made during the expansion to ensure the stations are resilient and the data available.

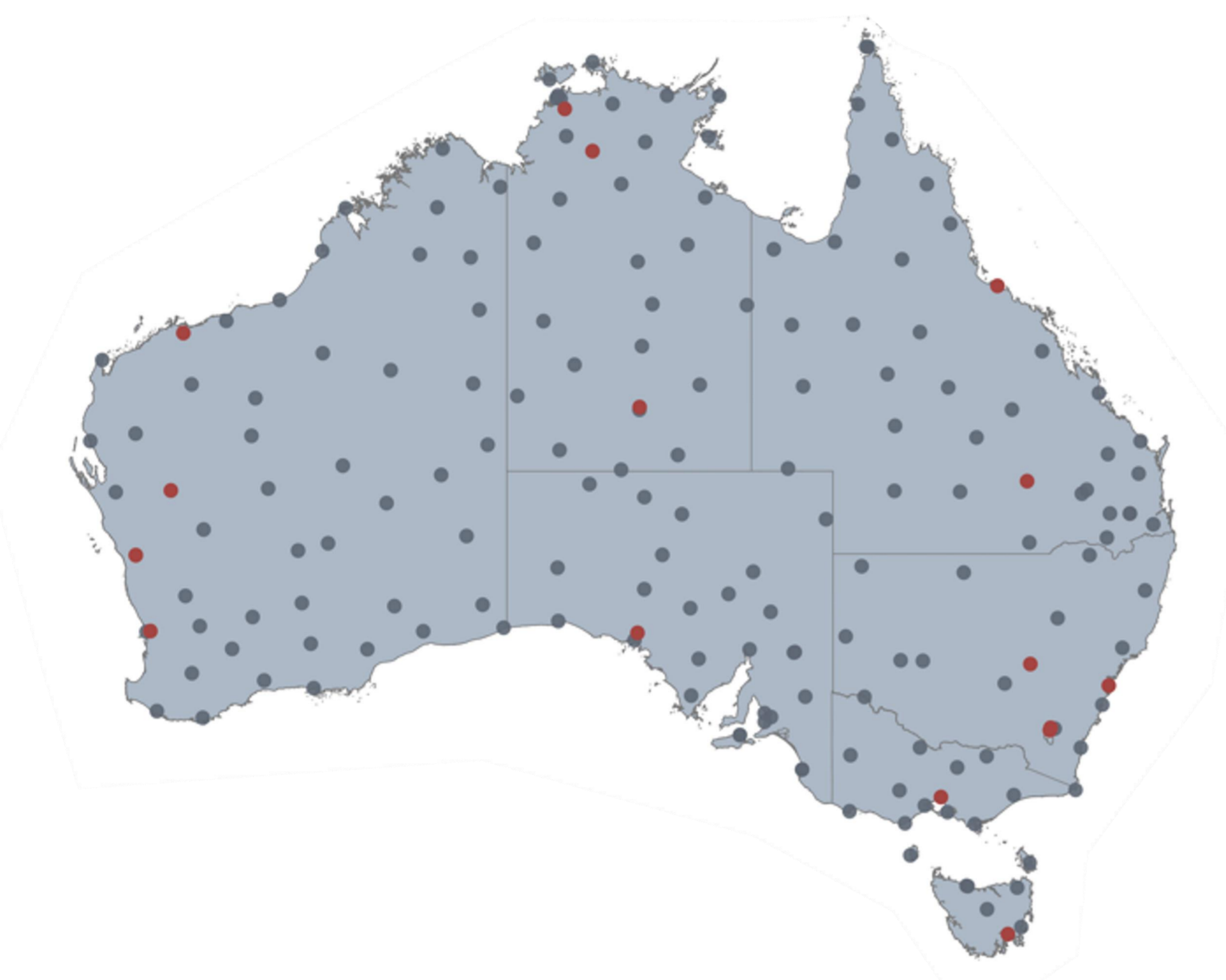


Figure 1: A map of the Australian Regional GNSS Network. The stations shown in red contribute data to the International GNSS Service (IGS) tracking network.

## The Australian Regional GNSS Network



The ARGN is a 200-station network of continuously operating reference stations that spans all of Australia and its external territories including the Australian Antarctic Territory.



The observation data from the ARGN is streamed into our cloud-based data centre where it is verified, validated, archived, and disseminated.

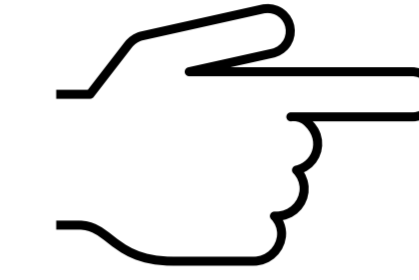


The data from the ARGN is made available for free under a Creative Commons Attribution 4.0 International Licence.



Figure 2: A consistent design has been used across all ARGN stations. This station is at Kanandah Station, Western Australia.

## Explore the ARGN



## Design Considerations

### Secure Land Tenure

To ensure longevity of the stations we are diligent about establishing long-term, legally binding agreements and maintaining positive working relationships with all landowners and custodians.



Figure 3: Engaging with custodians at Tjukayirla, Western Australia.

### Geodetic Quality

The stations define Australia's geospatial fabric and contribute to the regional and international reference frames, as such, they need to be of geodetic quality. Each station consists of a concrete pillar that has been anchored to bedrock. The monuments have been designed and certified for long-term stability by civil engineers.

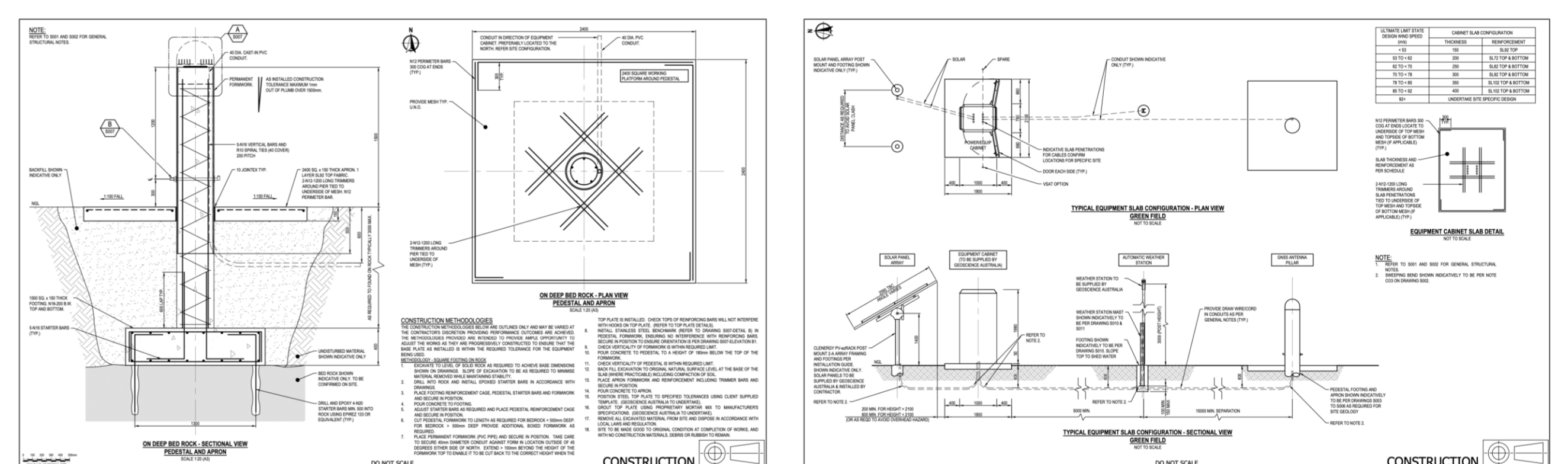


Figure 4: Our certified design plans for the concrete monuments can be shared with the community.

### Consistent Equipment

A standard equipment design has been rolled out across all stations. This improves our ability to identify and respond to issues. By including equipment redundancy in the design, such as using two different receivers at each station we enhance reliability and mitigate against systematic failures.

### Multi-GNSS

As Australia is in a so-called GNSS "hotspot" each station has been configured to track all available signals and satellites from the four global constellations along with the L-band signals from the two regional constellations.

### Secure by Design

Measures have been implemented to ensure the physical and digital infrastructure aligns with the Australian Information Security Manual.

### IGS Ready

While 25 ARGN stations already contribute to the IGS tracking network (those shown in red in Figure 1), all stations have been built and are operated in alignment with the newly released IGS Guidelines for Continuously Operating Reference Stations.

