

# Geoscience Australia Analysis Center 2013 Annual Report

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**Abstract** This report gives an overview of the activities of the Geoscience Australia IVS Analysis Center during 2013.

## 1 General Information

The Geoscience Australia (GA) IVS Analysis Center is located in Canberra within the National Geospatial Reference System Section, Mineral and Natural Hazard Division (MNHD).

## 2 Activities during the Past Year

Several celestial reference frame (CRF) solutions have been prepared using the OCCAM 6.2 software. The latest solution was uploaded in September 2013. VLBI data consisting of 4,353 daily sessions from 25-Nov-1979 to 03-September-2013 have been used to compute several global solutions with different sets of reference radio sources. This includes 5,927,370 observational delays from 2,950 radio sources having three or more observations.

Station coordinates were also estimated using No-Net-Rotation (NNR) and No-Net-Translation (NNT) constraints. The long-term time series of the station coordinates have been used to estimate the corresponding velocities for each station. The tectonic motion for the Gilcreek VLBI site after the Denali

earthquake was modeled using an exponential function typical of post-seismic deformation. The tectonic motion of the Tigoconc (2010) and Tsukub32 (2011) VLBI sites after recent strong earthquakes is currently under study.

The adjustment was made by least squares collocation, which considers the clock offsets, wet troposphere delays, and tropospheric gradients as stochastic parameters with a priori covariance functions. The gradient covariance functions were estimated from GPS hourly values.

Our first CRF solution, aus2013a.crf, was not imposed by the NNR constraints. The second CRF solution, aus2013b.crf, was imposed by NNR constraints. This second solution is consistent with the CRF solutions submitted by other Analysis Centers.

In 2013, all three new AuScope 12-meter radio telescopes were actively working in different IVS geodetic and astrometric programs. Two other Australian radio telescopes – Hobart26, operated by the University of Tasmania (UTAS), and Parkes, operated by the Australia Telescope National Facility (ATNF) — participated in the geodetic VLBI programs occasionally.

A program for optical identification and spectroscopy of the reference radio sources continued in collaboration with the Australian Telescope National Facility, University of Sydney and Nordic Optical Telescope. A paper that includes redshifts of 126 reference radio sources has been published.

New observing runs at Gemini North, Gemini South (service mode) and New Telescope Technology (ESO) (visitor mode) were ongoing in 2013.

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### **3 Staff Changes**

Dr. Laura Stanford was actively involved in all the programs during the year and left this job in October 2013.

### **Acknowledgements**

This report was published with the permission of the CEO, Geoscience Australia.