

# Geoscience Australia Analysis Center

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## Abstract

This report gives an overview about the activities of the Geoscience Australia IVS Analysis Center during 2008.

## 1. General Information

The Geoscience Australia (GA) IVS Analysis Center is located in Canberra. The Geodesy group operates as a part of the Geospatial and Earth Monitoring Division (GEMD).

## 2. Component Description

Currently the GA IVS Analysis Center contributes nutation offsets, EOP, and EOP rates on a regular basis for IVS-R1 and IVS-R4 networks and their predecessors (IRIS-A and NEOS-A). The EOP time series are available for 1983 to 2008. The CRF catalogues using a global set of VLBI data since 1979 are regularly submitted.

## 3. Staff

- Dr. Oleg Titov - project manager

## 4. Current Status and Activities

Several CRF solutions have been prepared using the OCCAM 6.2 software. VLBI data comprising 3,700 daily sessions from 25-Nov-1979 to 04-Sep-2008 have been used to compute several global solutions with different sets of reference radio sources. This includes 4,279,473 observational delays from 2,066 radio sources observed by 60 VLBI stations. The dipole and quadrupole systematic effects in apparent proper motion of the reference radio sources (magnitude about 20 microarcsec/year) were indicated [1].

Station coordinates were also estimated using NNR and NNT constraints. The long-term time series of the station coordinates have been established to estimate the corresponding velocities for each station. Due to a limited amount of observations the velocities have been estimated for 55 stations only. The velocities of five stations—DSS65A, MARKUS, METSAHOV, VLBA85 3, and BADARY—were not estimated. The tectonic motion for the Gilcreek VLBI site after the Denali earthquake was modelled using an exponential function [2].

The adjustment has been done by least squares collocation [3], which considers the clock offsets, wet troposphere delays, and troposphere gradients as stochastic parameters with a priori covariance functions. The gradient covariance functions were estimated from GPS hourly values [4].

## 5. Geodetic Activity of the Australian Radiotelescopes

During 2008 two Australian radiotelescopes—Hobart and Parkes, operated by the University of Tasmania (UTAS) and Australia Telescope National Facility (ATNF), respectively—were involved in geodetic VLBI observations. GA's Geodesy Group supported the observations in different ways including assistance with campaign scheduling.

The Parkes 64-meter telescope participated in six geodetic VLBI sessions in 2008 (CRF-52, T2055, APSG-22, CRF-54, APSG-23, and OHIG-60). All of them were recorded with Mark 5B. Five sessions are planned for 2009 for further improvement of the ITRF and the ICRF in the Southern Hemisphere. This program is undertaken in cooperation with ATNF and UTAS.



Figure 1. Local visitors touring the Parkes radiotelescope site during the OHIG60 geodetic VLBI session. The 12-meter 'Patriot' dish installed at Parkes for technical tests is visible in the background.

## 6. New Geodetic VLBI Network

Geoscience Australia supported the installation work of the new Australian geodetic VLBI network during 2008. The first telescope in Hobart is expected to be installed in April/May of 2009 and to start operations by the end of 2009. Two other telescopes (Yarragadee, Western Australia and Katherine, Northern Territory) will be built in 2009–2010. The radio astronomy group at UTAS has responsibility for the network deployment. In addition, the 12-meter New

Zealand radiotelescope near Auckland was installed [5].

## References

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- [3] Titov, O., Estimation of subdiurnal tidal terms in UT1-UTC from VLBI data analysis, In: IERS Technical Notes 28, B. Kolaczek, H. Schuh, and D. Gambis (eds.), 11–14, 2000.
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