

Geoscience Australia Analysis Center 2017–2018 Annual Report

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Abstract This report gives an overview of the activities of the Geoscience Australia IVS Analysis Center during 2017–2018.

1 General Information

The Geoscience Australia (GA) IVS Analysis Center is located in Canberra within the National Geodesy Section, National Positioning Infrastructure Branch, Positioning and Community Safety Division (PCSD).

2 Activities during the Years 2017–2018

Several celestial reference frame (CRF) solutions have been prepared using the OCCAM 6.3 software. The latest solution (aus2018a.crf) was released in October 2018. VLBI data comprising more than 5,000 daily sessions from January 1980 to August 2018 have been used to compute this solution. This includes 9,433,411 observational delays from 4,267 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 has 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 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.

A dedicated VLBI experiment was organized in collaboration with many institutes to estimate the post-Newtonian relativistic parameter γ from a single 24-hour geodetic VLBI session. Seven radio telescopes participated in this experiment (AUA020) on 1 May 2017 (Hobart26, Svetloe, Zelenchukskaya, Badary, HartRAO, Seshan25, and Sejong). The parameter γ was estimated with an accuracy of 9×10^{-5} that is known to be the best accuracy achieved with the geodetic VLBI technique [1].

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References

1. O. Titov et al., “Testing of general relativity with geodetic VLBI”, *Astronomy and Astrophysics*, 618, A8 2018.

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