

# Geoscience Australia Analysis Center

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## Abstract

This report gives an overview about activity of the Geoscience Australia IVS Analysis Center during the 2003 year.

## 1. General Information

The Geoscience Australia IVS Analysis Center is located in Canberra. In 2003 the Center physically moved to new location in Symonston building. At the new structure the Space Geodesy Analysis Center became a part of Minerals and Geohazard Division.

## 2. Component Description

Currently the GA IVS Analysis Center contributes five EOPs for IVS-R1 and IVS-R4 networks. The EOP time series from 1983 to 2003 are available. Also the CRF catalogues using a global set of VLBI data from 1980 to 2003 are regularly submitted.

## 3. Staff

- Dr. Ramesh Govind - Director of the Space Geodesy Analysis Center
- Dr. Oleg Titov - project officer
- Dr. Clement Ogaja - project officer

## 4. Current Status and Activities

Global homogeneous solution has been done using the new facilities of OCCAM. VLBI data comprising 2985 daily sessions from 12-Apr-1980 till 13-Oct-2003 have been used to compute the global solution AUS2003b. This includes 2,707,712 observational delays from 645 radiosources observed by 58 VLBI stations. Weighted root-mean-square of the solution is about 0.645 cm (about 21 picosec).

Using the NNR approach all radiosource coordinates were estimated as global parameters without separation into stable and unstable ones. 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 52 stations only.

New version of the OCCAM (v6.0) software is being prepared in collaboration with scientists from Vienna (Technical University of Vienna), Munich (DGFI) and Saint-Petersburg (IAA). It will include updated system of reductions, three adjustment methods, latest advanced mapping functions, etc.

Also the GA Analysis Center continues the regular submission of EOPs to the IVS/IERS and

works on the development of long-term time series for the EOP, station coordinates and comparison of techniques (VLBI, SLR, GPS) for EOP and ITRF adjustment.

Long-term comparison of results from co-located VLBI, GPS and SLR stations contributing to the IVS, IGS, ILRS have been carried out to assess the consistency between the techniques. Seasonal variations of baseline lengths as well as individual site radial components were considered over long time periods. Spectral analysis of the baseline time series revealed the existence of both annual and semiannual terms. The estimates of the signal amplitudes and phases as well as relative rates were computed for 19 independent co-located baselines and cross-validated (Fig.1).

A subsequent estimation was done to determine the seasonal effects at the individual sites. For instance, the annual terms indicated that the northern hemisphere sites rise in the first part of the year and lower in the second part (Fig.2). Similarly, it was shown that sites in the southern hemisphere are lowered in the first part of the year (Fig.3).

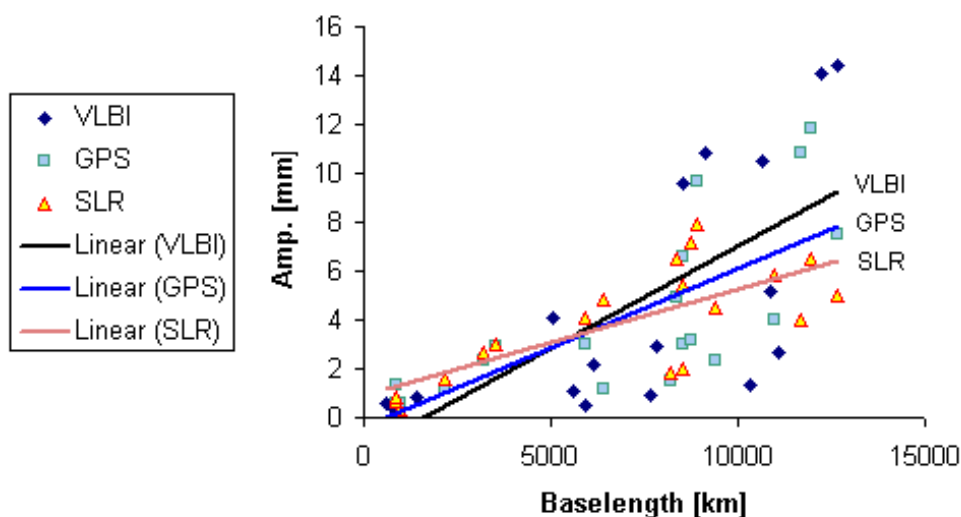


Figure 1. Amplitude vs baseline length of annual signature for 19 baselines from co-located sites.

## 5. Future Plans

- comparison of the individual ICRF solutions available through the IVS website
- combined estimation of the EOPs using VLBI, SLR and GPS data
- cooperation with the Australian National University (ANU), Australian National Telescope Facility (ANTF) and University of Tasmania on development of VLBI for the southern hemisphere

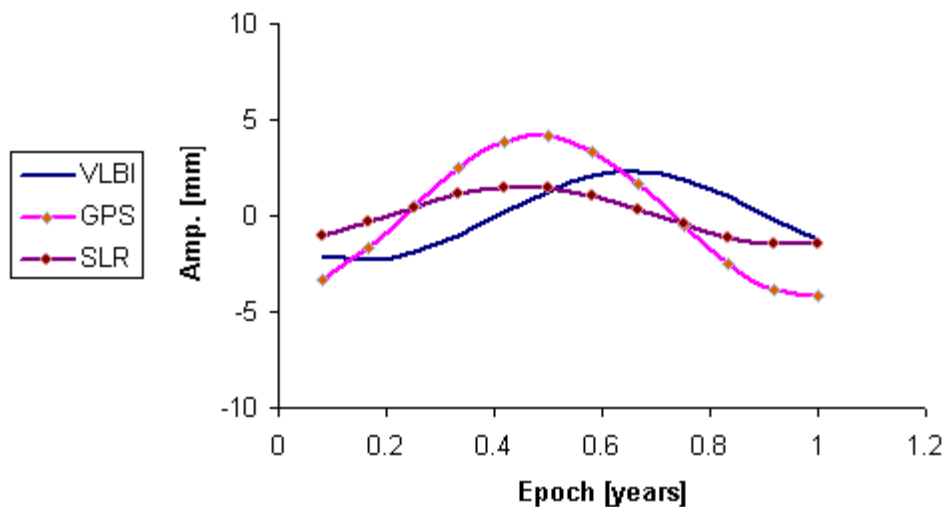


Figure 2. Annual signatures from co-located sites at Matera.

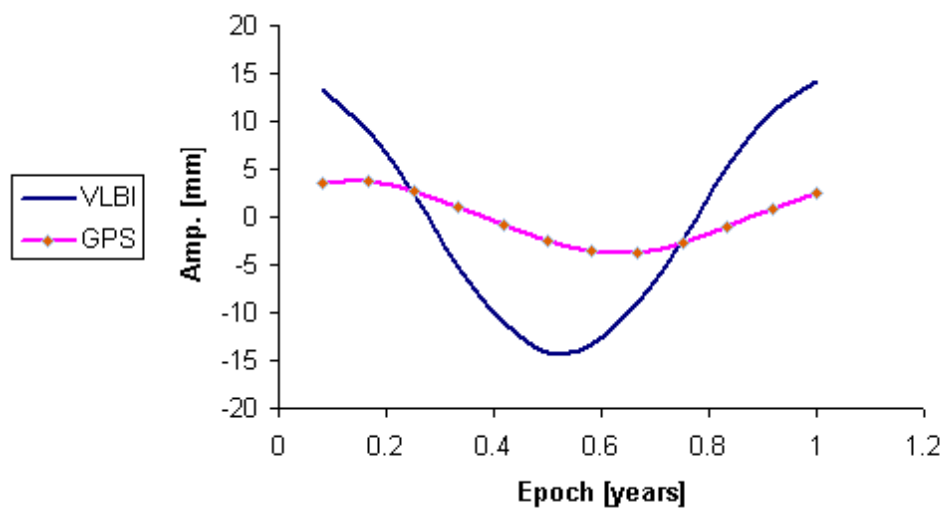


Figure 3. Annual signatures from co-located sites at Hobart.