IAA VLBI Analysis Center Report 2012

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Abstract

This report presents an overview of IAA VLBI Analysis Center activities during 2012 and the plans for the coming year.

1. General Information

The IAA IVS Analysis Center (IAA AC) is located at the Institute of Applied Astronomy of the Russian Academy of Sciences in St. Petersburg, Russia. The IAA AC contributes to IVS products, such as daily SINEX files, TRF, CRF, rapid and long-term series of EOP, baseline lengths, and tropospheric parameters. EOP, UT1, and station positions were estimated from domestic observation programs Ru-E and Ru-U. The IAA AC generates NGS files.

2. Component Description

The IAA AC performs data processing of all kinds of VLBI observation sessions. For VLBI data analysis we use the QUASAR and the OCCAM/GROSS software packages. All reductions are performed in agreement with IERS Conventions (2010). Both packages use NGS files as input data.

The IAA AC submits to the IVS Data Center all kinds of products: daily SINEX files for EOP and EOP-rates and station position estimates, TRF, CRF, baseline length, and tropospheric parameters.

The QUASAR and the OCCAM/GROSS software packages are supported and developed.

IVS NGS files are generated in automatic mode on a regular basis.

3. Staff

– Vadim Gubanov, Prof.: development of the QUASAR software and development of the methods of stochastic parameter estimation.

– Sergey Kurdubov, Dr.: scientific researcher: development of the QUASAR software, global solutions, and DSNX file calculation.

– Elena Skurikhina, Dr.: team coordinator, VLBI data processing, and OCCAM/GROSS software development.

4. Current Status and Activities

- **Software Development for VLBI Processing**

  The QUASAR software is capable of calculating all types of IVS products. A new release of the QUASAR software was developed in 2012 by S. Kurdubov and has the ability to estimate a generous amount of new parameters (tidal waves, for example).

- **Routine Analysis**

  During 2012 the IAA AC continued to submit daily SINEX files for the IVS-R1 and IVS-R4 sessions as rapid solution (iaa2010a.snx) and SINEX files based on all 24-hour experiments for the quarterly solution.

  A new global solution was calculated.

  The routine data processing was performed with the OCCAM/GROSS software using a Kalman Filter. The IAA AC operationally processed the "24h" and Intensive VLBI sessions and submitted the results to the IERS and IVS on a regular basis. Processing of the Intensive sessions is fully automated. The EOP series iaa2007a.eops and iaa2005a.eopi, baseline lengths iaa2007a.bl (until November 2012), and troposphere parameters iaa2007a.trl were continued. Long-time series of station coordinates, baseline lengths, and tropospheric parameters (ZTD, gradients) were computed with the station position catalog ITRF2005.

- **EOP Parameter Calculation from Domestic QUASAR Network Observations**

  Regular determinations of Earth orientation parameters with the QUASAR VLBI Network Svetloe-Zelenchukskaya-Badary and single baseline one-hour observations for UT1 with e-VLBI transfer were performed weekly. On July 1st, daily Ru-U sessions began. Correlation is performed at the IAA correlator ARC. For 2012 the mean RMS EOP deviations from the IERS 08 C04 series in the Ru-E program were 0.72 mas for X-Pole position, 0.97 mas for Y-Pole position, 36 μs for UT1-UTC, and 0.29 mas for Celestial Pole position for 36 Ru-E sessions. The RMS deviation of the Universal Time values from the IERS C04 series for 187 sessions of the Ru-U program was 65 μs. We used station positions from the QUASAR global solution in our calculations.

5. Future Plans

We plan to:

- Continue to submit all types of IVS product contributions.

- Continue investigations of VLBI estimation of EOP, station coordinates, and troposphere parameters, and comparison with satellite techniques.

- Further improve algorithms and software for processing VLBI observations.

- Contribute to ICRF3 Working group study.