

# Analysis Center of Saint Petersburg University

Dmitriy Trofimov, Veniamin Vityazev

**Abstract** This report briefly summarizes the activities of the Analysis Center of Saint Petersburg University during 2015 and 2016. The current status as well as our future plans are described.

## 1 General Information

The Analysis Center of Saint Petersburg University (SPU AC) was established at the Sobolev Astronomical Institute of the SPb University in 1998. The main activity of the SPU AC for the International VLBI Service before 2007 consisted of routine processing of 24-hour and one-hour observational sessions for obtaining Earth Orientation Parameters (EOP) and rapid UT1-UTC values, respectively. In 2008, we began submitting the results of 24-hour session processing.

## 2 Component Description

Currently, we support two series of Earth Orientation Parameters: spu00004.eops and spu2015a.eops.

All parameters were adjusted using the Kalman filter technique. For all stations (except the reference station), the wet delay, clock offsets, clock rates, and troposphere gradients were estimated. Troposphere wet delay and clock offsets were modeled as a stochastic process such as a random walk. The clock rates and the

troposphere gradients were considered to be the constant parameters.

The main details of the solutions of the EOP time series spu00004.eops and spu2015a.eops are summarized below:

- data span: 1989.01–2016.12
- CRF: fixed to ICRF-Ext.2
- TRF: VTRF2005 was used as an a priori TRF
- estimated parameters:
  1. EOP:  $x, y, UT1-UTC, d\psi, d\epsilon$ ;
  2. Troposphere: troposphere gradients were estimated as constant parameters, and wet troposphere delays were modeled as a random walk process;
  3. Station clocks were treated as follows: offset as a random walk process, rate as a constant.
- nutation model: IAU 1980 (spu00004.eops), IAU 2000 (spu2015a.eops)
- mapping function: VMF1
- technique: Kalman filter
- software: OCCAM v.6\_2

## 3 Staff

The assistant professor of Saint Petersburg University, Dmitriy Trofimov, was in charge of the routine processing of the VLBI observations. General coordination and support for the activities of the SPU AC at the Astronomical Institute were performed by Professor Veniamin Vityazev.

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Sobolev Astronomical Institute of Saint Petersburg University  
AI SPbU Analysis Center

IVS 2015+2016 Biennial Report

## 4 Current Status and Activities

In 2015–2016, the routine estimation of the five Earth Orientation Parameters was performed. The OCCAM software package (version 6.2) was used for current processing of VLBI data [1]. The time series is named spu00004.eops. It includes data obtained by the IRIS-A, NEOS-A, R1, R4, RDV, and R&D observing programs, and it covers 28 years of observations (from January 2, 1989 until the end of 2016). The total number of VLBI sessions processed at the SPU AC is about 2,230, of which about 160 sessions were processed in 2015–2016.

A new Earth Orientation Parameters series was begun in 2015 and was named spu2015a.eops. The total number of points is about 2,220; in 2015–2016 about 160 points were added.

Our experience and the equipment of the Analysis Center was used for giving lectures and practical work on the basics of radio interferometry to university students. We use our original manual on the training in modern astrometry and, in particular, VLBI [2].

## 5 Future Plans

In 2017, we are going to continue our regular processing of the VLBI sessions as well as giving lectures and practical training for students in a special course on radio astrometry. This course is a part of the systematic curriculum of astronomical education at SPb University.

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## References

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