

# IVS Analysis Center at Main Astronomical Observatory of National Academy of Sciences of Ukraine

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## Abstract

This report summarizes the activities of VLBI Analysis Center at Main Astronomical Observatory of National Academy of Sciences of Ukraine in 2005.

## 1. Introduction

The VLBI Analysis Center was established in 1994 by Main Astronomical Observatory (MAO) of the National Academy of Sciences of Ukraine as a working group of the Department of Space Geodynamics of MAO. In 1998 the group started its IVS membership as an IVS Analysis Center. The AC MAO is located in the Central building of the observatory in Kiev.

## 2. Technical Description

The computer of the Analysis Center is a Pentium-4 1.9 GHz CPU box with 256M RAM and a 160 GB HDD. It is running under Linux/GNU Operating System and is used for software development and VLBI data processing.

Main Astronomical Observatory has a 256 kbps link for Internet connection.

The STEELBREEZE software is written in the C++ programming language and uses Qt widget library. STEELBREEZE makes Least Squares estimation of different geodynamical parameters with the Square Root Information Filter (SRIF) algorithm (see [1]).

The software analyzes VLBI data (time delay) of single and multiple sets of sessions. The time delay is modeled according to the IERS Conventions (2003) [2], plus additional models (tectonic plate motion, nutation models, wet and hydrostatic zenith delays, mapping functions, etc). The software makes estimations of the following parameters: Earth orientation parameters, coordinates and velocities of a selected set of stations, coordinates of a selected set of radio sources, clock function and wet zenith delay.

## 3. Staff

The VLBI Analysis Center at Main Astronomical Observatory consists of two members:

**Prof. Yaroslav Yatskiv:** Head of the Department of Space Geodynamics, performs general coordination and support of activity of the Center.

**Ph.D. Sergei Bolotin:** Senior research scientist of the Department of Space Geodynamics, responsible for the software development and data processing.

## 4. Current Status and Activities in 2005

In 2005 we performed regular VLBI data analysis to determine Earth rotation parameters. This “operational” solution is produced and submitted to IVS on a weekly basis. The IERS Conventions

(2003) [2] models have been applied in the analysis. In the solution coordinates of stations and Earth orientation parameters are estimated.

Also, this year our participation in the IVS Tropospheric Parameters project was continued. Estimated wet and total zenith delays for each station were submitted to IVS. The analysis procedure is similar to the previous one.

In the frame of “*Next ICRF*” project two “global” solutions were obtained, `maotst01` and `maotst02`. They were derived using the same data analysis strategy, but covering different time spans for the observations (1979–2005 and 1990–2005).

Normal equation systems for each session (1979–2005) were evaluated and submitted to IVS for further analysis.

## 5. Plans for 2006

MAO Analysis Center will continue to take part in operational EOP determination as well as updating the solutions of TRF and CRF from VLBI analysis of full dataset of observations.

The development of the software STEELBREEZE will be continued next year also.

## Acknowledgments

The work of our Analysis Center would be impossible without activities of other components of IVS. We are grateful to all contributors of the Service.

## References

- [1] Biermann, G.J., 1977, Factorization Methods for Discrete Sequential Estimation, V128, Mathematics in Science and Engineering Series, Academic Press.
- [2] McCarthy, D.D. (ed.), IERS Conventions (2003), IERS Technical Note 32, Observatoire de Paris, Paris.