

Determination of Precise EOP using Satellite and Lunar Laser Ranging

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Federal State Unitary Enterprise «All-Russian Research Institute of physico-technical and radio-technical measurements » is one of the leading national institutes of metrology in Russia. One of the main divisions of the Institute is the Main Metrology centre of time and frequency state service.

The Main Metrology centre of time and frequency state service was founded based on the Head office of the unified time service and has been actively defining Earth rotation parameters based on co-processing of the entire measurement data since 1955 [2].

The EOP activities at VNIIFTRI can be grouped in four basic topics:

- processing GNSS, SLR , LLR and VLBI observation data for EOP evaluation;
- combination of EOP series for evaluation of reference EOP values (on the EOP raws level and observation level);
- combination of GLONASS/GPS satellites orbit/clock;
- providing GNSS and SLR observations at five metrological sites acting under the auspices of Federal Agency on Technical Regulating of Metrology(ROSSTANDART).

Regular computing of Earth rotation parameters (ERP) according to the measurements data using satellite laser rangers (SLR) started in the Main Metrology centre of time and frequency state service in 1995. In 2010 the processing of SLR measurements had to be suspended due to technical reasons. Nowadays the processing of laser measurements is resumed [1].

Since 2017, FSUE VNIIFTRI has been performing LLR data processing. The modern program of UT1 evaluation based on Lunar Laser Ranging measurements were created in the MATLAB environment. Now only ILRS LLR data are processed, but it's ready for processing the Altay LLR station measurements too. Comparison of the results of determination with the concurrent EOP (IERS) C04, the agreement is as good as 60 μ s for the UT1–UTC.

The report presents the results of the determination of EOP according to SLR and LLR.

References

1. Kaufman M.B., Tsyba E.N. (FSUE «VNIIFTRI») – EOP Evaluation in Main Metrological Center of Russian Time and EOP Service from SLR Data /Metrology of Time and Space. 6th International Symposium (Materials of the Conference) 2012
2. Tsyba E Associate Analysis Center VNIIFTRI (AAC VNIIFTRI) / 19th International Workshop on Laser Ranging "Celebrating 50 Years of SLR: Looking Back and Planning Forward"/ Annapolis, MD, USA, October 27-31 (Materials of the Conference) 2014