Svetloe Radio Astronomical Observatory 2014 IVS Annual Report

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Abstract This report provides information about the Svetloe Radio Astronomical Observatory during 2014. The report also provides an overview of current geodetic VLBI activities and gives an outlook for the next year.

1 General Information

Svetloe Radio Astronomical Observatory (Figure 1) was founded by the Institute of Applied Astronomy (IAA) as the first station of the Russian VLBI network QUASAR. The sponsoring organization of the project is the Russian Academy of Sciences (RAS). Svetloe Radio Astronomical Observatory is located near Svetloe village in the Priozersky district of the Leningrad region *http://www.ipa.nw.ru/PAGE/rusipa.htm*. The basic instrument of the observatory is a 32-m radio telescope equipped with special technical systems for VLBI observations co-located with GPS/GLONASS/Galileo receivers and an SLR system. A Water Vapor Radiometer (WVR) has operated since 2013.

Fig. 1 Svetloe observatory.

Institute of Applied Astronomy of RAS

Network Station Svetloe

IVS 2014 Annual Report

2 Technical Staff

Table 1 Staff related to VLBI operations at Svetloe.

Prof. Ismail Rahimov	observatory chief
Vladimir Tarasov	chief engineer
Tatiana Andreeva	engineer
Alexander Isaenko	engineer
Andrey Mikhailov	FS, pointing system control

3 Component Description

3.1 Technical and Scientific Information

The main instrument at Svetloe observatory is a 32-m radio telescope (RT-32), equipped with L, C, S/X, and K cryogenic receivers with circular polarization, a Mark 5B+ recorder, and a DAS P1002M. Main technical characteristics of the radio telescope are presented in Table 2. Observations can be carried out both in radiometric mode and in radio interferometric mode.

All IAA observatories are equipped with the identical time standards and meteorological stations which are used when carrying out all types of observations. Automatic digital Weather Transmitter "Vaisala" is used to obtain meteorological data in real time. A Water Vapor Radiometer designed at the Institute of Applied Astronomy is currently working at the Svetloe observatory on a regular basis.

Table 2 Technical parameters of the radio telescope.

Year of construction	2000
Mount	AZEL
Azimuth range	$\pm 270^\circ$ (from south)
Elevation range	from -5° to 95°
Maximum azimuth	
- velocity	$0.83\ ^\circ$/s
- tracking velocity	$2.5\ '$/s
- acceleration	$12.0\ '/s^2$
Maximum elevation	
- velocity	$0.5\ ^\circ$/s
- tracking velocity	$0.8\ '$/s
- acceleration	$12.0\ '/s^2$
Pointing accuracy	better than $10''$
Configuration	Cassegrain (with asymmetrical subreflector)
Main reflector diameter	32 m
Subreflector diameter	4 m
Focal length	11.4 m
Main reflector shape	quasi-paraboloid
Subreflector shape	quasi-hyperboloid
Main reflector surface accuracy	$\pm$ 0.5 mm
Frequency range	1.4–22 GHz
Axis offset	3.7 ± 2.0 mm

3.2 Co-location of VLBI, GPS/GLONASS, and SLR System

The Topcon GPS/GLONASS/Galileo receiver with meteo station WXT-510 is in operation (Figure 2).

The SLR system "Sazhen-TM" (Figure 3) at Svetloe observatory observed 3,089 passes of LAGEOS, GLONASS, and other satellites and obtained 3,959 normal points during 2014.

Fig. 2 Topcon GPS/GLONASS/Galileo receiver at the Svetloe observatory.

Fig. 3 "Sazhen-TM" SLR system at Svetloe observatory.

Fig. 4 WVR and RT-32 at Svetloe observatory.

4 Current Status and Activities during 2014

Svetloe actively participates in both international (IVS and EVN) and domestic (Ru) observation programs. During 2014, Svetloe station participated in 29 24-hour IVS sessions — 24 IVS-R4 sessions, three IVS-T2 sessions, and two EUROPE sessions – and in 21 IVS-Intensive sessions.

Svetloe participated in 48 24-hour sessions in the framework of the domestic Ru-E program for determination of all Earth orientation parameters and in 13 one-hour Ru-U sessions for obtaining Universal Time using e-VLBI data transfer.

During 2014 a WVR was installed and successfully worked (Figure 5).

Fig. 5 WVR at Svetloe observatory.

5 Future Plans

Our plans for the coming year are the following:

- To participate in IVS sessions,
- To carry out domestic observational programs for obtaining Universal Time daily and for obtaining Earth orientation parameters weekly with e-VLBI data transfer,
- To carry out SLR observations of geodetic and navigation satellites,
- To participate in EVN and RADIOASTRON observational sessions,
- To continue geodetic monitoring of the RT-32 parameters,
- To continue WVR observations on a regular basis.