Svetloe Radio Astronomical Observatory

Sergey Smolentsev, Dmitriy Ivanov, Zinovy Malkin

Abstract

This report provides information about changes in the Svetloe Radio Astronomy Observatory status in the period after the last IVS report.

1. Introduction

Svetloe Radio Astronomical Observatory was founded by the Institute of Applied Astronomy (IAA) as the first station of Russian VLBI network QUASAR. Sponsoring organization of this project is the Russian Academy of Sciences (RAS). The site is located at the Karelian Neck near Svetloe village in about 100 km towards North from St. Petersburg. The basic instruments of the observatory are 32-m radio telescope RTF-32 and technical systems provided realization of VLBI observations. In addition, a permanent GPS receiver was installed at Svetloe in 1996.

During last two years Svetloe observatory regularly participated in various radio astronomy programs including VLBI and RL VLBI observations of quasars, Sun, planets, asteroids using recording terminal S2-RT.

Svetloe observatory participated in several regional and global geodetic projects and is a EUREF permanent station.

2. Radio telescope and VLBI equipment

The results of measurements of radiotelescope parameters (for LRP) are presented in Table 1.

Table 1. Parameters of the radio telescope RTF-32.

Wave band, cm	SEFD	T_{sys}, K
3.5	430	58
6	180	32
13	300	43

Field System is now fully involved in observation, registration, and investigation process. Corrections for radio telescope deformations are determined and used for pointing.

A new automatic meteo station was installed at Svetloe in 2000. It has been manufactured by the "Taifun" Enterprise, Obninsk, Russia, and provides measurement of temperature, pressure, relative humidity, wind 3D velocity and direction.

Figures 1–4 show a common view of Svetloe observatory, RTF-32 radio antenna and other equipment.

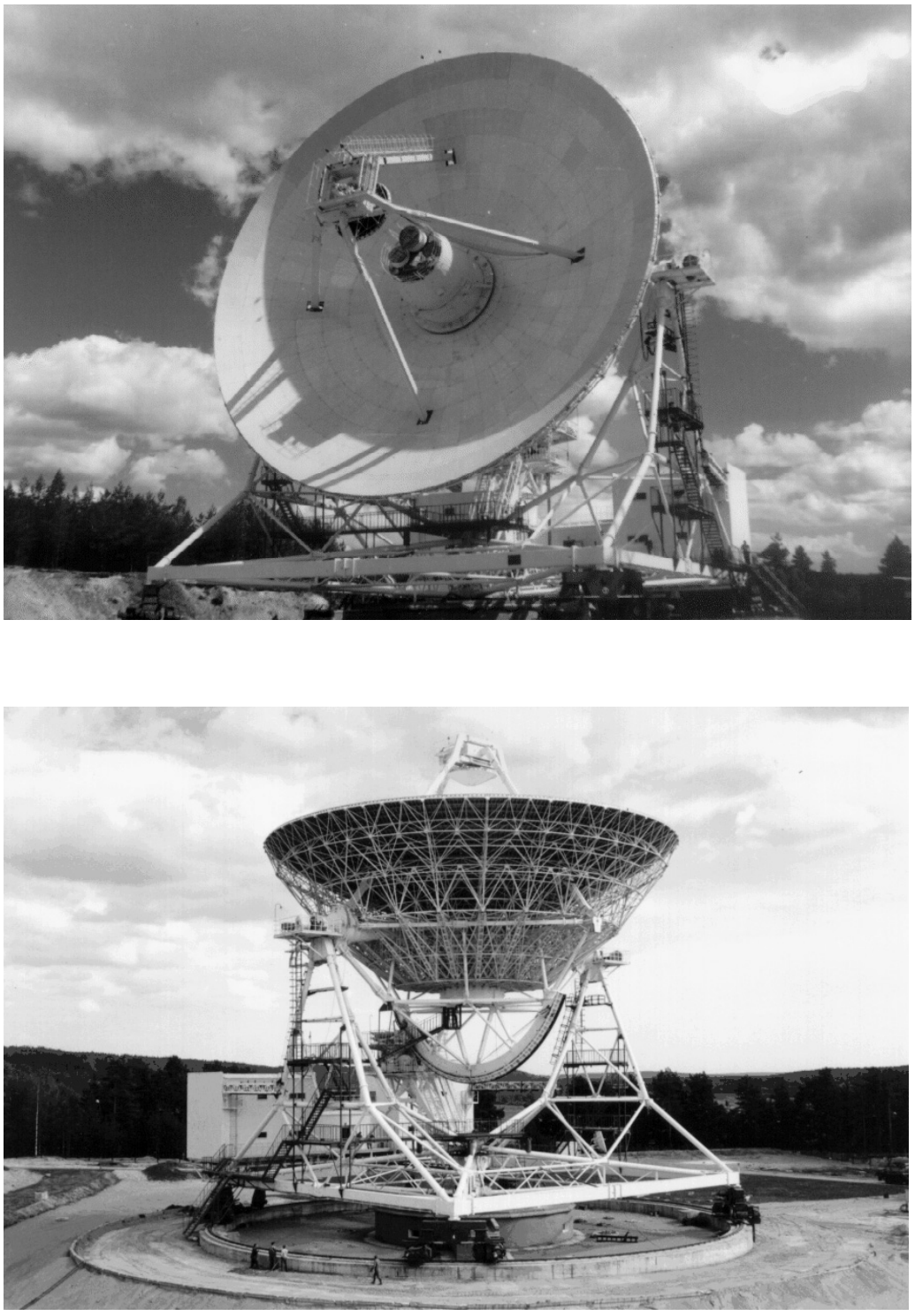

Figure 1. Radio telescope RTF-32.

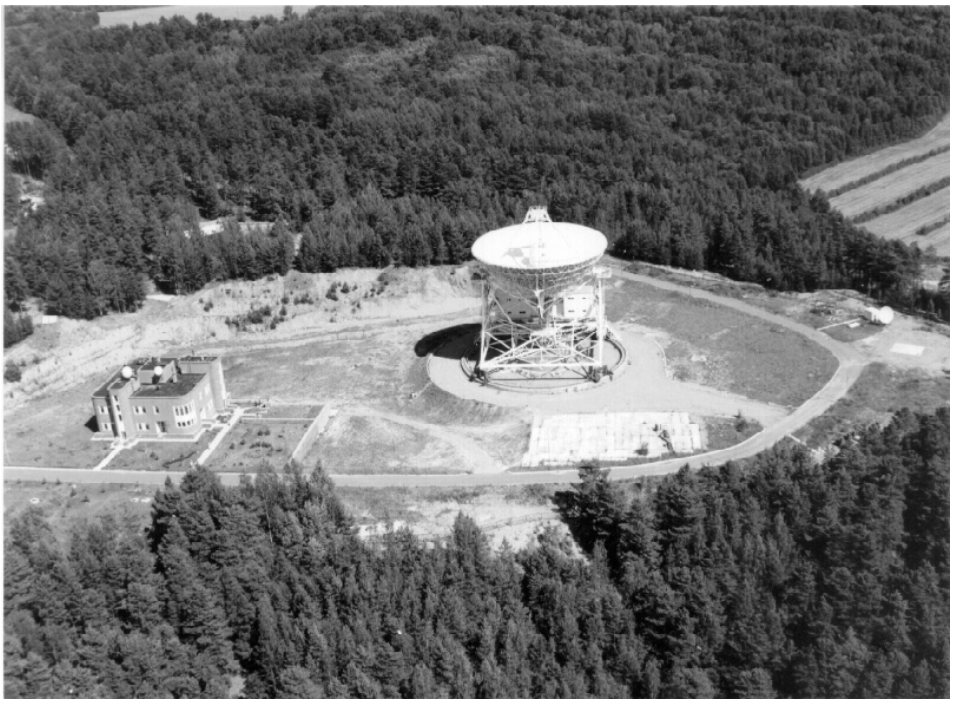

Figure 2. Svetloe station: laboratory building and radiotelescope RTF-32.

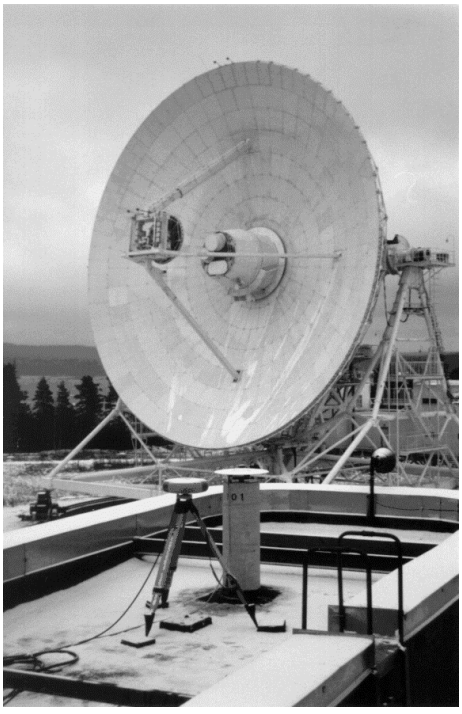

Figure 3. RTF-32 antenna, Trimble GPS and Javad GPS/GLONASS receivers during IGEX campaign.

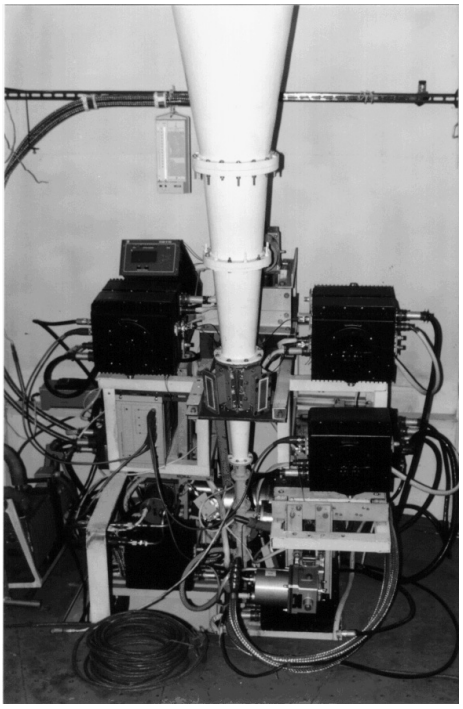

Figure 4. Radio receivers for 3.5 and 13 cm wave bands.

3. Geodetic Survey at Svetloe Observatory

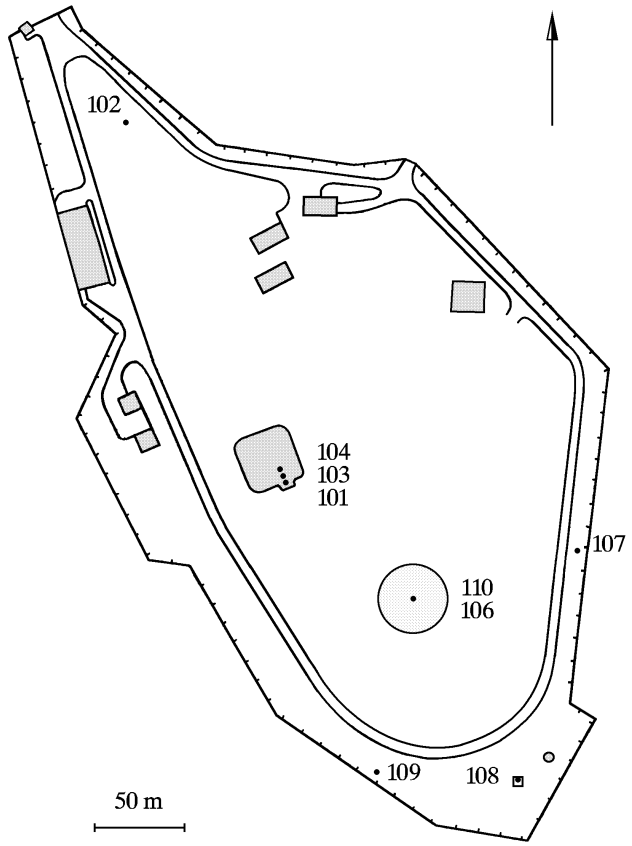

Figure 5. Local geodetic network at Svetloe.

Local geodetic network at the Svetloe observatory includes 9 reference points (see Figure 5): 102, 107, 108, 109 are ground marks (the latter connected with a pad for mobile systems), 101, 103, 104 are located at the roof of two story laboratory building and designed for installation of GPS/GLONASS receivers or conventional geodetic units, 110 is the intersection of radiotelescope RTF-32 axis, and 106 is intermediate mark on its foundation. GPS receiver Trimble 4000SST is permanently installed on the 101 mark (12350M001, SVTL).

Since the last report several new measurements were made at the network and mutual eccentricity between marks were derived from common adjustments of GPS and conventional surveys made in 1993–1999. Accuracy of the local geodetic network is about 2 mm and intersection of radio telescope axis is tied to the network with accuracy about 5 mm.

4. Outlook

We plan for the near future:

- Begin experimental VLBI observations on Svetloe-Zelenchukskaya baseline (IAA observatory Zelenchukskaya located in North Caucasus is the second station of the QUASAR network).
- Install the first two channels of the new DAS developed at the IAA.
- Install a new radio telescope control system.