

Sheshan VLBI Station Report for 2007

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Abstract

This report summarizes the observing activities carried out at the Sheshan station in 2007. The SESHAN25 radio telescope participated in ten 24-hour VLBI sessions organized by the IVS and twenty-seven VLBI experiments organized by the EVN. Apart from its international VLBI activities, the SESHAN25 telescope spent a large amount of time on the Chinese Lunar Project, including the testing before the launch of the Chang'E-1 satellite, and the tracking campaign after the launch. We also report the updates and developments in the facilities at the station.

1. General Information

The Sheshan VLBI station (also named SESHAN25 in the geodetic community) is hosted by the Shanghai Astronomical Observatory (SHAO), CAS. A 25-meter radio telescope, which was built in 1987, is in operation at multiple centimeter wavelengths. The Sheshan VLBI station is a member of the IVS, EVN, and APT. It takes part in astrometric, geodetic, and astrophysical VLBI experiments, along with other VLBI network stations. In October and November 2007, SESHAN25 was involved in the VLBI tracking of the Chinese Chang'E-1 Lunar satellite. A 5-station correlator at SHAO undertook the VLBI data processing of the Chang'E satellite.

2. VLBI Observations in 2007

In 2007, SESHAN25 participated in 10 IVS sessions. The antenna worked normally in 9 of the experiments. SESHAN25 also participated in the EVN sessions in February and June at 1.3, 6, and 18 cm wavelengths. There were no known problems during the EVN observations. In order to participate in the Chinese Chang'E Lunar Project, SESHAN25 stopped international VLBI activities on October 11, 2007. After the launch of Chang'E-1 on October 24, the telescope carried out daily monitoring of the satellite. The Chinese radio telescopes had great success in the VLBI tracking of the Chang'E-1 satellite. The 5-station correlator processed the real-time data transferred from the observing stations through fiber link. The outputs of delay, delay rate, and the angular positions (RA and DEC) were used for measuring and determining the satellite orbit. Since December 2007, SESHAN25 has observed the Chang'E-1 satellite in its lunar orbit two or three days per week.

3. Development and Maintenance of Facilities in 2007

One of the antenna bearings was broken during the observation of IVS-R1288 on August 6. It cost us a couple of weeks to replace the bearing and repair the drive. After that, we spent several days on adjusting the pointing.

In August 2007, we received eight BBCs and one IF distributor from the IVS. The Shanghai VLBI station then recovered the standard geodetic VLBI setup with 14 BBCs and 2 IF distributors.

We had a new Mark 5A system as a backup in 2007. The FS software package has been kept up-to-date; the current FS version 9.9.2 is in use. A new FS computer was purchased for debugging local station programs. We have updated the clock and weather data acquisition programs

and developed a remote monitoring program. The power equipment in the observing dome was reconstructed to guarantee safe and smooth running during VLBI experiments.

A number of e-VLBI test experiments between Shanghai and some European stations were performed in the first half of 2007. The Sheshan station can normally work at a data rate of 256 Mbps. In a demo experiment in Xi'an, China on August 28, Sheshan station achieved a maximum data rate of more than 512 Mbps, and fringes were detected among Chinese, European, and Australian telescopes.

Our five-station hardware correlator currently works at 16 Mbps per station in real-time mode, and 256 Mbps per station for post processing. An e-VLBI system consisting of four Chinese radio telescopes (in Shanghai, Urumqi, Beijing, and Kunming) and a software correlator were developed. The e-VLBI facilities are used in the Chang'E project.

4. The Staff of the Sheshan VLBI Station

Table 1 lists the group members at the Sheshan VLBI Station. The staff is involved in the VLBI program at the station with various responsibilities. Professor Wenren Wei retired in the beginning of 2007, but he will continue working with us in 2008. Bin Li began to serve as the technical friend at Sheshan station in 2007.

Table 1. The staff at the Sheshan VLBI Station.

Name	Background	Position & Duty	Contact
Xiaoyu Hong	astrophysics	Director, Astrophysics	xhong@shao.ac.cn
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Weihua Wang	astrophysics	Associated Professor, Astrophysics	whwang@shao.ac.cn
Tao An	astrophysics	VLBI friend, Astrophysics	antao@shao.ac.cn
Hong Yu	ant control	Associated Professor, Antenna	yuhong@shao.ac.cn
Bin Li	microwave	Technical friend, receiver	bing@shao.ac.cn
Jinqing Wang	electronics	Engineer, Antenna	jqwang@shao.ac.cn
Huihua Li	electronics	Engineer, VLBI terminal	hhlee@shao.ac.cn
Lingling Wang	software	Engineer, VLBI terminal	llwang@shao.ac.cn
Rongbing Zhao	software	Engineer, VLBI terminal	rbzhao@shao.ac.cn
Bo Xia	electronics	Operator	bxia@shao.ac.cn
Wei Gou	electronics	Operator	gouwei@shao.ac.cn

5. Prospects

From January 2008 on, the Sheshan VLBI Station will participate again in IVS and EVN observations. In 2008 SESHAN25 will participate in 16–20 IVS sessions. The telescope will regularly monitor the Chang'E-1 satellite in its lunar orbit for 2–3 days per week in 2008.