

# Sheshan VLBI Station Report for 2006

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## Abstract

This report summarizes the current status, recent activities, updates in equipments, and the personnel at the Sheshan VLBI station, located in sheshan county about 30km away from Shanghai. Observing activities in 2006 included seventeen 24-hour VLBI sessions organized by the IVS and fifteen experiments organized by the EVN, respectively. A new set of S/X receivers with cryogenic amplifiers were installed at the telescope in April 2006. They worked well in VLBI experiments, and the performance is briefly displayed in the main text. Severe deformations in the antenna track were found at the end of July 2006. The observing activities had to stop for repairing the track. The repairing project took four months and was accomplished at the end of the year. After one week's testing, the telescope resumed VLBI experiments.

## 1. General Information

The Sheshan VLBI Station (also named SESHAN25 in Geodetic community) is located at Sheshan, 30 km west of Shanghai. A 25-meter radio telescope, since 1987, has been one of the major astronomical facilities of the Chinese National Astronomical Observatories. The telescope is operated by the Shanghai Astronomical Observatory, CAS. The Sheshan VLBI Station is a member of the IVS, EVN and APT, taking part in astrometric, geodetic and astrophysical VLBI experiments. In recent years, it has also been involved in tracking man-made satellites. A 5-station correlator center is running at the host institute, Shanghai Astronomical Observatory (SHAO).

## 2. Observations in 2006 and Current Status of the Telescope

During the period January to August 2006, SESHAN25 successfully participated in seventeen 24-hour IVS geodetic sessions along with fifteen EVN experiments. As one of the VLBI ground stations tracking the Chinese Chang'E satellite, the telescope was involved in a variety of testing experiments in the first half of the year. We are grateful for the kind help and support from the VLBI experts among the IVS and other groups in all processes of the project. A 5-station data processing center at SHAO started to play a full role in early 2006. Several real-time experiments among the Chinese VLBI Network consisting of four stations at Shanghai, Beijing, Kunming and Urumqi, were carried out successfully. The achieved data rate of the fiber link network was about 16 Mbps. The delay, delay rate, and the angular positions (RA and DEC) could be derived in 10 minutes.

Since August 2006, the telescope had to stop operations due to severe track deformations. Figure 1 (left panel) shows one of the largest deformations. The compression between two sections of the rail was so great in some places that it caused dislocations or resulted in a large separation with a maximum gap of 20mm. The whole track and concrete under the rail was overhauled and replaced. The repairing work lasted four months till the end of the year. The right panel in Figure 1 exhibits a section of the reconstructed rail. After one to two weeks' testing and pointing checks, the telescope restarted operations in January 2007.

A new S/X cryogenic receiver (Figure 2) started working in VLBI experiments since April 2006, replacing the old one whose amplifiers had worked at ambient temperature. Table 1 lists

parameters of the new cryogenic S/X receivers. The SEFDs given in column (5) were measured on 9 Feb 2007 after the track repair; they agree with the values of 800 Jy (S band) and 820 Jy (X band) which were measured before the track repair in August 2006. For the parameters at other bands of the telescope the reader is referred to the 2005 report.

The FS software is kept up-to-date with the latest version. Currently version 9.9.2 is used. Some local station programs were updated to improve the clock and weather data acquisition and to facilitate monitoring. The power equipments in the observing dome were reconstructed to guarantee safe and smooth operation during VLBI experiments.

Table 1. S/X receivers of the SESHAN25 antenna

Band	RF (MHz)	LO(MHz)	Type	SEFD(Jy)	Tsys(K)	Pol.
13 cm	2150–2450	1600	Cryogenic	790	63	right circ. pol.
3.6 cm	8200–9000	9100	Cryogenic	880	57	right circ. pol.



Figure 1. Left: deformation in the rail of the Sheshan 25m telescope (photo taken on 8 August 2006). Right: reconstructed tracks (photo taken on 25 December 2006).

### 3. The Staff of the Sheshan VLBI Station

Table 2 lists the group members of the Sheshan VLBI Station. The staff involved in the VLBI program at the station has various responsibilities. Prof. Wei Wenren retired in December 2006. Zhao Rongbing joined our group at the beginning of the year. He works on software development for antenna control and maintains the VLBI terminal equipment.

### 4. Outlook

The Sheshan VLBI Station will participate in sixteen 24-hour IVS geodetic sessions and a number of EVN experiments. The telescope will be involved in Chinese Chang'E Campaign in the next year.

Table 2. The staff at the Sheshan VLBI Station.

Name	Background	Position & Duty	Contact
Xiaoyu Hong	astrophysics	Director of station, Professor	xhong@shao.ac.cn
Qingyuan Fan	ant. control	Chief Engineer, Professor	qyfan@shao.ac.cn
Wenren Wei	electronics	Professor, VLBI terminal	wwr@shao.ac.cn
Zhuhe Xue	software	Professor, VLBI terminal, FS	zhxue@shao.ac.cn
Quanbao Ling	electronics	Senior Engineer, VLBI terminal	qling@shao.ac.cn
Weihua Wang	astrophysics	Associated Professor	whwang@shao.ac.cn
Tao An	astrophysics	VLBI friend	antao@shao.ac.cn
Bin Li	microwave	Engineer, receiver	bing@shao.ac.cn
Jinqing Wang	electronics	Engineer, VLBI terminal	jqwang@shao.ac.cn
Huihua Li	electronics	Engineer	hhlee@shao.ac.cn
Lingling Wang	software	Engineer, FS	llwang@shao.ac.cn
Bo Xia	electronics	Operator	bxia@shao.ac.cn
Wei Gou	electronics	Operator	gouwei@shao.ac.cn
Hong Yu	ant control	Post doctor, antenna control	yuhong@shao.ac.cn
Rongbing Zhao	software	Engineer, VLBI terminal, FS	rbzhao@shao.ac.cn



Figure 2. The new S/X receivers at the Sheshan station.