

Shanghai Station Report for 2021–2022

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Abstract In this report we summarize the observing activities at the Sheshan station (SESHAN25) and the Tianma station (TIANMA65) in 2021 and 2022. We include the international VLBI observations for astrometry, geodesy, and astrophysics as well as domestic observations for satellite tracking. We also report on updates and new developments of the facilities at the two stations.

1 General Information

The Sheshan station (SESHAN25) is located at Sheshan, 30 km west of Shanghai. It is hosted by the Shanghai Astronomical Observatory (SHAO), at the Chinese Academy of Sciences (CAS). A 25-meter radio telescope is in operation at 3.6/13, 5, 6, and 18 cm wavelengths. The Sheshan VLBI station is a member of the IVS and EVN.

The Tianma station (TIANMA65) is located in the western suburbs of Shanghai, Sheshan town, Songjiang district. It is jointly funded by CAS, the Shanghai Municipality, and the Chinese Lunar Exploration Program. The telescope construction started in the early 2009, and the majority of the mechanical system was completed in October 2012. On December 2, 2013, the Tianma 65-m telescope passed the acceptance evaluation. By design, the Tianma telescope with a diameter of 65 meters, one of the largest steerable radio telescopes in the world, is a multifunction facility, conduct-

ing, astrophysics, geodesy, astrometry, as well as space science. At the end of 2014, TIANMA65 had installed five cryogenic receiver systems (L, C, S/X, and Ku). Two further high-frequency cryogenic receiver systems (Ka, Q) were finished in 2015. A K-band cryogenic receiver system was installed at the end of the 2016. The VLBI terminal of the Tianma 65-m telescope houses a CDAS and DBBC2.

The SESHAN25 and TIANMA65 telescopes take part in international VLBI experiments on astrometric, geodetic, and astrophysical research work. Apart from its international VLBI activities, the telescope spent a large amount of time on the Chinese Lunar Project, including the testing before the launch of the Chang'E test satellite, and the tracking campaign after its launch as well as other single dish observations.

2 Activities during the Past Two Years

In 2021, the SESHAN25 telescope participated in 74

Table 1 Participation of the SHAO stations in IVS sessions in 2021 and 2022.

Session Name	2021(SH)	2022(SH)	2021(T6)	2022 (T6)
AOV	11	4	0	1
APSG	2	1	1	0
IVS-R1	20	8	0	0
IVS-T2P	2	1	0	0
IVS-RDV	6	4	0	0
IVS-R&D	1	0	0	2
IVS-INT1	0	4	0	0
IVS-INT3	32	14	0	0

1. Shanghai Astronomical Observatory, Shanghai, China

IVS sessions (including 32 INT3 Intensive sessions), while TIANMA65 participated in one IVS session. In 2022, SESHAN25 participated in 36 IVS sessions (including 18 INT2/INT3 Intensive sessions), and TIANMA65 participated in three IVS sessions.

3 Current Status

3.1 Antenna Maintenance of SESHAN25

The Shanghai 25-m radio telescope was built in 1986 and it now faces the problems of load-carrying capacity of components weakening and steel corrosion. From September to November 2022, we brush painted and reinforced the structure of this telescope, ensuring the safety and stability of the structure and prolonging its service life.



Fig. 1 Structure reinforcement.



Fig. 2 Replacement of supporting bars.

3.2 Antenna Maintenance of TIANMA65

In 2022, the maintenance of the Tianma radio telescope focused on replacing the gear oil, replacing screw spacers, and checking grease status of adjusting mechanism of subreflector surface, which provides the guarantee for stable operation of telescope.

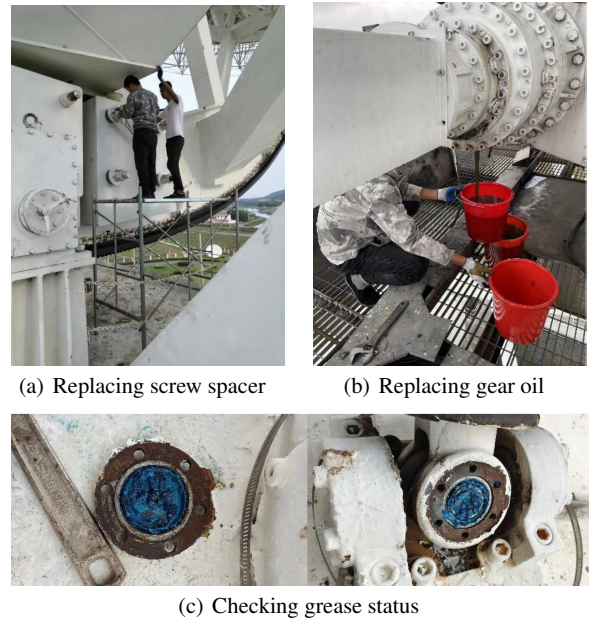


Fig. 3 Antenna maintenance on the Tianma 65-m telescope.

3.3 Other Tasks

The current lunar mission is in the long-term management stage. Observations are performed 1–2 times per week.

4 Staff of the Shanghai VLBI Station

Table 2 lists the group members at the Shanghai VLBI Station. The staff is involved in the VLBI program at the station with various responsibilities.

Table 2 Staff at the Shanghai VLBI station. All e-mail addresses end with @shao.ac.cn.

Name E-mail	Background	Position and Duty
Zhiqiang Shen zshen	Astrophysics	Deputy Director
Qinghui Liu liuqh	Radio Technique	Chief Engineer
Bin Li bing	Microwave	Technical friend, Receiver
Bo Xia bxia	Electronics	VLBI friend, VLBI terminal
Jinqing Wang jqwang	Electronics	Engineer, Antenna
Lingling Wang llwang	Software	Engineer, Timing system
Rongbing Zhao zhaorb	Software	Engineer, Antenna software
Li Fu fuli	Ant. mechanical	Engineer, Antenna
Qian Ye yeqian	Active surface	Engineer, Antenna
Weiyue Zhong wyzhong	Microwave	Engineer, Receiver
Chao Zhang zhangchao	Microwave	Engineer, Receiver
Linfeng Yu lfyu	Electronics	Engineer
Yongbin Jiang jyb	Electronics	Engineer
Wen Gou gw	Electronics	Engineer
Yongchen Jiang yongchen	Electronics	Engineer, Disk shipping
Zhiqiang Xu zqxu	Microwave	Engineer, Receiver
Zhang Zhao zhaozhang	Electronics	Engineer

5 Future Plans

In 2023, we plan to continue antenna maintenance in the first quarter of the year. The telescopes will regularly track the Chang'E-4 and Tianwen-1 satellites in their lunar orbits.