

SRT station report

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This report covers the period between July '24 - August '25

Antenna

SRT was offered in shared-risk mode during INAF semesters 2024B (1st July - 31st December 2024), 2025A (1st January - 30th June 2025), and 2025B (1st July - 31st December) according to the antenna stop planned during this semester (see below).

The commissioning of the radio telescope started in September 2023, after the completion of the civil works in August 2023, and it is still ongoing. According to the official guidelines that were drawn up, concerning commissioning of the new receivers, **Sr is operational with the new receiver at C-band (4.2 GHz - 5.6 GHz), and with the previous receiver at K-band and M-band, respectively.** Unfortunately, no operational return date has yet been scheduled for the P- and L-receivers. By the first end of 2026, we plan to start the scientific validation of the triple-band receiver in VLBI mode, for which we need the DBBC3 (see below). New updates to the schedule will be presented in the next TOG reports.

Starting from August 2025 the antenna is going through a **new upgrade phase performed this time by the Agenzia Spaziale Italiana (ASI, Italian Space Agency)** that will require a planned **full stop of antenna operations for a total of 6 months**. These 6 months will be **split in smaller periods** over the next year. At the moment only the dates of the **first two periods** are known: **4th-8th August 2025 and 1st September-14th November 2025**.

Therefore, Sr cannot participate in the EVN session 03/2025, and in the eVLBI sessions in September, October, and November. Further detailed information will be available in November.

Receivers

C-, M- and K- band receivers are all available, while the **P- and L- receivers cannot be considered operational**. The hardware required to implement continuous calibration (80Hz) is installed at L-, M-, K-, and C-band. **Since the EVN session 01/2025 the continuous calibration is regularly used at C-band, M-band, and K-band.**

We remind that the Sardinia Radio Telescope was awarded of one of the grants announced by the Italian Ministry of Education, Universities and Research (MIUR) aimed to enhance research infrastructures, pursuant to Action II.1 of the National Operative Programme (PON)– Research and Innovation 2014-2020. Thanks to this grant Sr has been equipped with new high-frequency receivers and backends. The new installed receivers are a simultaneous microwave compact triple-band receiving system (**K/Q/W**), a multi-beam cryogenic receiver in **W Band (70 – 116**

GHz), a multi-beam cryogenic receiver in **Q Band (33 – 50 GHz)**, and a **millimeter camera (80 – 116 GHz)**. In addition, a metrology system has been installed to allow high efficiency performances at the highest operating frequencies. In addition a dual pol, single feed, **C band (4.2 GHz - 5.6 GHz)** was **installed** and characterized.

The other receiver under construction is the dual pol, 7 feeds, S band.

During EVN session 02/2025 our M-band receiver did not show any fringes. We discovered an issue with a cable that prevented properly injecting the correct time reference in the system. We have solved the issue.

The **DBBC3** was delivered at Sr at the beginning of October 2021, but during the configuration tests **an assembling issue** with the internal disk was found. In addition, we have planned to **increase the number of boards from 6 to 8**. The items necessary to increase the number of boards arrived at INAF-OAC. The DBBC3 and the two new boards have been sent to the MPIfR in Bonn to solve the issue and to install the two new boards. We expect to **have it back by the end of the year**. Nevertheless, we plan to get it operational as soon as possible after we receive it back. We plan to substitute the old DBBC2, which is starting to show some aging problems, with DBBC3 as soon as possible.

VLBI sessions

Sr took part in all the experiments at **C- and K-band of the EVN sessions 03/2024 and 01/2025**, and at **C-, M-, and K-band of the EVN session 02/2025**. Sr also took part in the **ToO at M-band on the 20th March 2025**.

Sr did participate in the **e-VLBI sessions on 18th-19th September 2024 (C-band), 7th-8th October 2024 (C-band), 12th-13th November 2024 (C-band), 14th-15th January 2025 (C-band), 18th-19th March 2025 (C-band), and 13th-14th May 2025 (C-band)**. It was not available on the 3rd-4th December 2024 (C-band) due to a non-deferrable antenna maintenance, on the 11th-12th February 2025 and on the 8th-9th April 2025 because these sessions were made at L-band (unavailable at SRT).

VLBI terminal and Field System

Firmware and software:

Field System: 10.1.1 at 64 bit

DBBC: DDC (v108), PFB (16)

Fila10G: v4.1_231118

Jive5ab: 3.1.0

Antabfs: antabfs.py

The flexbuff units (one at JIVE and one at SRT, of 360 TB each) are fully operational since session 02/2019. A new flexbuff unit at SRT (512 TB) was installed.

Fiber link

The 10 Gbps fiber link works perfectly.

The GARR Consortium is going to upgrade the SRT uplink from 10Gbps to 100Gbps. The project is financed by the Italian Governance (<https://www.terabit-project.it/>). Still in progress.