

# SRT station report

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This report covers the period between February '23 - November '23

## Antenna

SRT could not be offered during semester 2023A (1st January - 30th June 2023) and semester 2023B (1st July - 31st December 2023) due to the planned work for its upgrade at higher frequency (see <https://sites.google.com/a/inaf.it/pon-srt/home>). The civil works, which implied the suspension of the observations, were completed at the end of August 2023, therefore SRT is offered in shared-risk mode during INAF semester 2024A (1st January - 30th June 2024). The commissioning of the radio telescope started in September 2023. According to the official guidelines that were drawn up, concerning commissioning of the new receivers, **we started to be partially operational only in VLBI mode with the new receiver at C-band (4.2 GHz - 5.6 GHz) during the EVN session 03/2023 (see below for more details) and the e-VLBI run in November (14th-15th)** and will be fully operational at C-band since December 2023. **We also expect to be operational again with some of the previous receivers (M-, and K-band) in the first semester of 2024.** In the first half of 2024, we also plan to start the scientific validation of the triple-band receiver in VLBI mode. New updates to the schedule will be presented in the next TOG reports.

During the e-VLBI in November (14th-15th) we had problems in synchronizing the Fila10G of the DBBC2. The inspection of the DBBC2 made by one of our engineers showed a broken cable connected to the Fila10G. The cable has been substituted and the synchronization of the Fila10G now works as expected.

## Receivers

C-, M- and K- band receivers are all available, while the **P- and L- receivers cannot be considered operational till July 2024.** The hardware required to implement continuous calibration (80Hz) is installed at L-, M-, and K-band, the one at C-band is not implemented yet. We use the continuous calibration regularly at M-band, L-band, and K-band since session 01/2021.

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 was equipped with new high-frequency receivers and backends. The new receivers are a simultaneous microwave compact triple-band

receiving system (**K/Q/W; installed**), a multi-beam cryogenic receiver in **W Band (70 – 116 GHz; installed)**, a multi-beam cryogenic receiver in **Q Band (33 – 50 GHz, installed)**, and a **millimeter camera (80 – 116 GHz; installed)**. 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)** receiver has been recently **installed** and its characterization has started (pointing model and gain curve are now available). The other receiver under construction is the dual pol, 5 feeds, S band.

The DBBC3 was delivered at Sr at the beginning of October 2021. The new flexbuff of 512 TB was delivered at the end of September 2022 and it was installed at SRT.

## VLBI sessions

Sr did not participate in sessions 01/2023 and 02/2023 due to the aforementioned upgrade phase and, as hoped in the previous TOG report (January 2023), **Sr has partially participated in session 03/2023**. Indeed, we performed a **successful NME** test during session 03/2023 (N23C3) with the new **C-band** receiver. During the NME strong fringes were observed for the very first time at both polarizations, although some issues with one board (#3) of the DBBC2 occurred; these will be solved on time for the EVN session 01/2024. **Sr also joined the PI experiments EY038C, GG087B, and EG128B during the EVN session 03/2023**.

**Sr** did not also participate in the e-VLBI sessions up to October 2023 due to the aforementioned upgrade phase, but it **joined the e-VLBI run on 14th-15th November 2023 (C-band)** and it **can join the e-VLBI run on 5th-6th December 2023** if the observations are performed at C-band.

## VLBI terminal and Field System

Firmware and softwares:

Field System: 10.1.1 at 64 bit

DBBC: DDC (v108), PFB (16)

Fila10G: v4.1\_231118

Jive5ab: 3.1.0

Antabfs: antabfs.py

## 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/>). We will have more news in a few months.