

Noto Station Status Report

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Abstract General information about the Noto VLBI Station, the 32-m antenna status, and the VLBI observations are provided. Status of the hardware and the upgrades performed are briefly described.

1 General Information

The 32-m parabolic antenna is located near Noto in Sicily. The telescope is a facility of the INAF Istituto di Radioastronomia, and has been active since 1989 in VLBI observations. In the past the antenna was also involved in many different projects of radioscience and Space VLBI. Currently the telescope has commitments for both EVN and IVS networks, with some VLBI projects in the Italian network and some single-dish experiments being carried out.

2 Current Status and Activities

- **Antenna.** The 32-m antenna is equipped with an active surface, allowing to correct gravitational deformations of the primary mirror. The actuator network, along with moving the panels, was partially refurbished during 2020. During the past few months, damages of the mechanical structure of the antenna were found. The issues were related to two steel beams supporting the counterweights and one actuator of the subreflector servo system. The

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problems occurred at different epochs but clearly have a common origin, which are the stress and strain concentration were beyond the limits of the low cycle fatigue of the structure. The steel beams of the backup structure were replaced at the end of July 2020. Repair of the sub-reflector movement mechanism is still pending as the replacement of the deteriorated parts was severely delayed by the COVID-19 pandemic emergency. The replacement is scheduled for March 2021; until then, the telescope can only operate primary focus receivers.

- **Receivers.** The new L-, S-, and X-band receiver, positioned in the primary focus, was installed in June 2019 and is currently in use. Secondary focus receivers are currently not used due to the reported sub-reflector problem, which does not allow to switch the focus. After the aforementioned sub-reflector movement repair, CLow-, CHigh-, and K-band receivers will be available. A Q-band receiver has no functioning LNAs, affecting one of the circular polarizations. No repair is planned; so the receiver will be operated with the only working polarization.
- **VLBI backend.** The DBBC firmware version is currently DDC V107. The Flexbuff system of Noto has a capacity of 360 TB.

3 Geodetic VLBI Observations

Despite the long maintenance periods in the years 2019 and 2020, Noto participated in 24 (11 and 13) routine geodetic sessions: ten IVS-R1, six IVS-R4, four IVS-T2, two IVS-CRF, and two EUROPE experiments.



Fig. 1 A recent image of the Noto antenna.

4 Future Plans

A complete refurbishment of the helium pipes to the vertex room and the cooling system of the telescope have been funded by INAF. Presently, the timeline of the task is not defined but our goal is to complete it by the end of 2021.

INAF has succeeded in a funding call (PON) issued by the Ministry of Research. As part of the PON (National Operational Program), Noto will be equipped with a simultaneous three-band receiver (18–26 GHz, 34–50 GHz, and 80–116 GHz). The receiver will out-

put wide bandwidth IFs (K-Band: 8 GHz; Q-Band: 16 GHz; and W-Band: 16 + 16 GHz), which will be converted to tunable 2-GHz bands. The receiver will be built by KASI and is planned to be available in 2022. Also the PON fundings will permit to buy a DBBC version 3. The call for tender has already been issued by INAF.

A new IF distributor is being developed to be installed in the control room. The device will automate and facilitate receiver setup, allowing for better and more reliable setup before experiments.