

Noto Station Report

From Noto staff (INAF-Institute of Radioastronomy)
To EVN-TOG

Reference period: December 2023 - June 2024

10/06/2024

1) Antenna and station

The reparation of the damaged servo drivers, as reported in the previous report, is now completed. The supplier delivered the items at the end of November. Unfortunately we are still facing issues with the main servo system, particularly the Antenna Control Unit(ACU) stops to communicate to the station computer and the servo amplifiers. That leads to the telescope to go idle and a loss of observation time until the ACU is reset. This issue happens randomly. At the moment a cause is not identified yet as our ACU is a custom device, affected by obsolescence and not supported by the original supplier anymore. For this reason we are accelerating on the activities (project and design) to provide a new servo system for the telescope. According to our plan we could be able to deliver, install and run the new system in 2025.

The major maintenance described in the previous report is completed and the telescope is operative (only primary focus available) again. The intervention started in July 2023 and ended mid November. Only the activity regarding the air cooling system is not yet concluded (components and material procurement delays) but it is expected to be finalised at the end of May.

For the sake on completion the areas involved by the maintenance were:

- a) Optical fibre cabled laying for both digital and analog signal transmission, getting rid of all coaxial cables;
- b) Main servo system drivers cabins and Antenna Control Unit (ACU) moved to a dedicated shelter installed on the telescope;
- c) A new power distribution system, serving all the telescope areas;
- d) A new air cooling system, serving the azimuth shelters, the Vertex cabin and the cryogenic compressors;
- e) New cables wraps for both azimuth and elevation;
- f) New LAN switches, signal and time reference distributors, optical RF transmitters made available;
- g) New cryogenic lines serving the Vertex cabin for secondary focus receivers. A new cryogenic compressor will be installed as well;
- h) Vertex cabin completely cleaned and refurbished;

2) Receivers

Presently only the primary focus receiver is available (L-S-X-band).

C- and M- band receivers have both electronic problems in the RF chains compromising one of the polarisations.

We decided not to operate both those frontends until a proper reparation is done. A procurement order to replace the C-band electronic components (included cryogenic LNAs) have been already issued. We expect to complete the reparation and install again the C-band receiver within September 2024. The schedule for the M-band is still uncertain.

Also the K-band receiver has been decommissioned, it will be replaced by the new tri-band (K,Q and W) receiver.

We plan to install it and then start the commissioning as soon as the refurbishment of the Vertex Room is completed as well as the new air cooling system is installed (see previous paragraph). April/May 2024 is probably a good guess.

For this preliminary stage only a 400MHz, frequency tunable, full circular polarization, band could be exploitable. Only the K-band will be available as well.

3) VLBI terminal

FS Version: 10.1.0
DBBC fw version: DDC V108, PFB V16
FiLa10G fw version: 4.1
Flexbuff sw version: 2.8.1
Flexbuff1 disk space: 360 TB
FlexBuff2 disk space: 512 TB

3) VLBI sessions

Session 3-2023: Noto did not participating due to the reported major maintenance
Session 1-2024: Noto produced fringes during NMEs

1) Antenna and station

Just before the beginning of the 2023, session 2, we had a severe problem with one of the elevation servo amplifiers. Investigating the issue and providing a fix took more than two weeks so Noto could not observe for the larger part of the Session. The damaged servo drivers were sent to the supplier workshop for a complete reparation and are now available.

From the beginning of July we started a major maintenance aimed at refurbish the telescope infrastructure. Particularly the areas of interventions are:

- a) Optical fibre cabled laying for both digital and analog signal transmission, getting rid of all coaxial cables;
- b) Main servo system drivers cabins and Antenna Control Unit (ACU) moved to a dedicated shelter installed on the telescope;
- c) A new power distribution system, serving all the telescope areas;
- d) A new air cooling system, serving the azimuth shelters, the Vertex cabin and the cryogenic compressors;
- e) New cables wraps for both azimuth and elevation;
- f) New LAN switches, signal and time reference distributors, optical RF transmitters made available;
- g) New cryogenic lines serving the Vertex cabin for secondary focus receivers. A new cryogenic compressor will be installed as well;
- h) Vertex cabin completely cleaned and refurbished;

The interventions were planned to complete by the end of October. Unfortunately, delays in the delivery of some components and materials forced us to postpone some activities. The telescope is partially operational from mid November, only primary focus frequency will be available (L, S, X). Starting from mid of January 2024 we plan another two weeks of idle time to conclude the maintenance and the installation of the new air cooling system.

2) VLBI terminal

FS Version: 10.1.0
DBBC fw version: DDC V108, PFB V16
FiLa10G fw version: 4.1
Flexbuff sw version: 2.8.1
Flexbuff1 disk space: 360 TB
FlexBuff2 disk space: 512 TB

3) Receivers

The K-band will be replaced by the new tri-band (K,Q and W) receiver.
The receiver was delivered in August 2022, our plan is to install and then start the commissioning as soon as the refurbishment of

the Vertex Room is completed as well as the new air cooling system is installed. February 2024 is probably the safest guess.

For this preliminary stage only a 400MHz, frequency tuneable, full circular polarisation, band could be exploitable. Only the K-band will be available as well.

C- and M- band receivers have both electronic problems in the RF chains, the issues compromise one of the polarisations. We decided not to operate both those frontends until a proper reparation is complete. A procurement order to replace the C-band electronic components (included cryogenic LNAs) have been already issued. We expect to complete the reparation and install again the C-band receiver within may 2024. The schedule for the M-band is still uncertain.

3) VLBI sessions

Session 1-2023: Parts of user experiments (C-band) lost, due to station software problems. First FTP test failed, the problem was identified and fixed for the rest of the NME

Session 2-2023: Problems with servo amplifiers did not allow us to observe. We managed to join only the X-band part.

Session 3-2023: Noto did not participating due to the reported major maintenance