

# Noto Station Status Report

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**Abstract** The Noto VLBI station was fully operational in 2013. Important progress was achieved in the technological and instrumentation area. A great effort was made to develop and realize VGOS (formerly VLBI2010) compatible front- and back-end systems. The fast connection at 10 Gbps was installed.

## 1 Antenna and Receivers

The mechanical parts for the frequency agility installation in the antenna are ready and will be transferred to the Noto site at the beginning of 2014. The installation is planned to be after the first EVN session in 2014, when the company specialized for this type of operations will be available to visit Noto. The new VGOS broadband DBBR receiver operating in the range of 1-16 GHz is progressing. The feed and cryogenic sections were completed. The choice of possible front-end LNAs is under evaluation. This receiver was developed to operate on a typical 12-meter VGOS antenna and will be adapted to the Noto 32-m radio telescope, making use of a tertiary mirror operating in the vertex room. The receiver after appropriate amplification of the entire broadband is operating entirely in the digital domain. It indeed is part of the DBBC3 system, even though it can be operated also in an independent environment. The two receivers operating in the range of 80-100 GHz for the secondary focus and purchased from IRAM will not be installed for now in the antenna

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because of a lack of funds. Indeed a dedicated tertiary mirror for properly focusing the beam is necessary as the replacement of the existing secondary mirror. Waiting for the proper financing one such receiver will be adapted for measuring the atmospheric transparency, with the help of a small antenna and a pointing structure, providing that a dedicated local oscillator can be realized with the existing resources.

## 2 H-maser

The new maser was installed in October, while the old EFOS-5 was modified to be kept active in parallel with the new one. Additional equipment is going to be installed in order to have a continuous comparison between the two atomic clocks.

## 3 e-VLBI

The connection at 10 Gbps was activated in October 2013. Nowadays in the station e-VLBI observations at 1 Gbps are routine operations.

## 4 DBBC

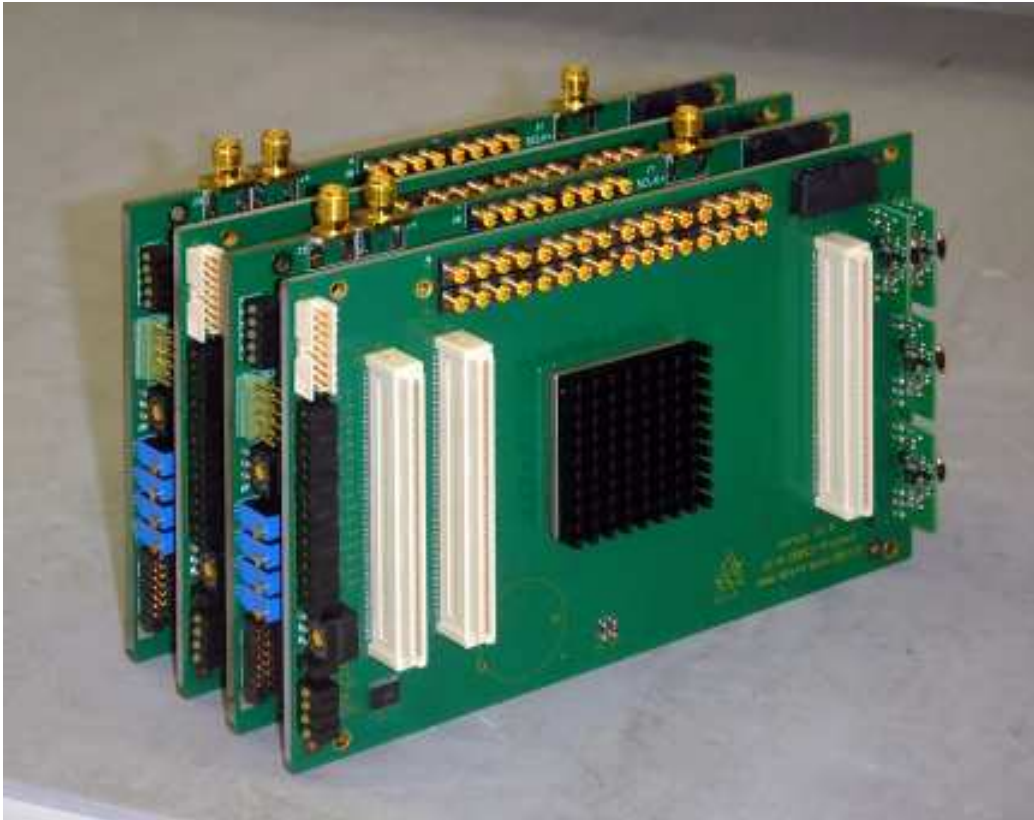
The DBBC2 system is now active as the main VLBI backend even if the system is still not fully complete for VLBI2010. A full implementation is expected in the next months. Since autumn all the observations, including the EVN session, have been observed with

this terminal. The Ethernet interface FILA10G is now available, so having the 10 G connection available, 4 and 8 Gbps e-VLBI experiments are today possible with Noto.

The DBBC3 project, a collaboration of IRA (Italy) - MPI (Germany) - (OSO) Sweden, is progressing as expected in the scheduled time. The main parts that have been realized are: the sampler ADB3, operating at 4 GHz bandwidth, and the CORE3 board, able to process pieces of the same bandwidth in DDC and PFB mode. The FILA40G unit has been assembled. Its functionality is to receive multiple 10G connections coming from the output of the CORE3 boards and handling the data Ethernet packets for different functionalities. One of them is the recording capability at 32 Gbps. A first DBBC3 unit will be tested in Noto during 2014 with the DBBR receiver. Figure 1 and Figure 2 show a stack of ADB3 and CORE3, and a FILA40G, respectively.

## 5 Observations

During 2013, 12 geodetic experiments have been observed: CRF73, EUR121, EUR122, CRF74, EUR123, EUR124, CRF75, T2091, EUR125, T2092, EUR126, and T2094.



**Fig. 1** Stack of DBBC3 boards for dual polarization.



**Fig. 2** FILA40G.