

Noto Station Status Report

G. Tuccari

Abstract

This brief report summarizes the main activities of the Observatory of Noto in 2008.

1. Antenna, Receivers and Microwave Technology

At present, the main issue concerning the antenna's functionality is still the azimuth rail, but it is uncertain whether INAF will support the repair expenses.

A new antenna driving software has been realised. It is able to support all the functionalities available with the TIW ACU, and it provides more precise control. The new software also has a Web interface.

The 43 GHz receiver was working with only one polarization, and the replacement of a front-end amplifier was done in the NRAO laboratories. The amplifiers were mounted in September, and EVN observations were successful.

The 86 GHz receiver is still an issue. Functionality measurements in the laboratory showed a pretty high system temperature, so the receiver was moved to MPI in Bonn to be repaired. The front-end mixer was replaced, and a thermal control was added to the local oscillator. A new testing campaign is expected in the first months of 2009.

The SXL receiver (X wide band and double polarization), built some years ago but never adopted in the antenna, will be modified to take into consideration the extra weight that made antenna operations difficult and unsafe. The receiver will be greatly simplified, and the ADC+FILA10G of the DBBC system will be inserted in the primary focus in order to transfer the signals through optical fibres to the control room.

2. Acquisition Terminal

A complete DBBC system is under construction for Noto. This process has been accelerated because of the numerous problems encountered with the analog base-band converters. These caused several failures in previous VLBI geo experiments. A Mark 5C/B+ unit is going to be ordered for operation with the DBBC system. Initially both systems will operate in parallel; then after a complete debugging of the new terminal, the old one will be dismissed.

3. DBBC Status Report

The hardware and firmware of the new Core2 board is ready and has been tested. Further observational tests are still needed and will start in January 2009. The Core2 uses Virtex 5 LX220 FPGAs but can also be populated with the bigger 330 model. The initially planned DBBCs will have up to 32 MHz BW. DBBCs with larger BW are available for the Core1 and could be adapted to the Core2 modules. The firmware in its present version can provide 4 DBBCs (U+L) on one FPGA, so four Core2 boards are able to produce the functionality of 16 BBCs. The filter shapes have been improved. The tuning precision is increased via a floating point LO. A fixed filter-bank firmware with real output is available, too, but still requires testing. The control software has to

be upgraded from the Core1 to the Core2. Wettzell is working on the integration in the FS. The operating system will soon be converted from Windows XP to Linux, as soon as all the software can be rewritten for that new environment.

The first two DBBC.2 systems have been sent and installed in Wettzell in November. A third system in Wettzell will be upgraded from version 1 to version 2. Additional DBBC.2 prototype backends are ready to be tested and delivered to Effelsberg, Yebes, and New Zealand. Two more systems already delivered to Arcetri and Irbene need to be upgraded to version 2 to be compliant with the standard observing requirements, as they have only a few Core1 boards.

The hardware side of FILA10G, the interface between the DBBC (or any VSI device) and 10 G network, has been completed. A team composed of IRA/MPI/SHAO personnel is jointly developing the firmware. The board will be an interface for the Mark 5C or a direct connection to the network at 1-2-4-10-20 Gbps. It can be used as a standalone element between VSI and the network. The VDIF protocol will be adopted as the data format.



Figure 1. DBBC internal view

The backend will be produced by a spin-off company named HAT-Lab which will start operation probably in the end of January, as numerous bureaucratic procedures have been necessary that took much longer than expected.

A new building in Noto has been completed. New laboratories are available, and so a part of the building will host the spin-off company in charge of the construction of the DBBC systems.

4. Geodetic Observations in 2008

During 2008, the Noto station participated in 12 geodetic experiments: CRF49, EURO91, T2053, T2054, CRF51, EURO92, EURO93, EURO94, T2056, CRF53, EURO95, and EURO96.

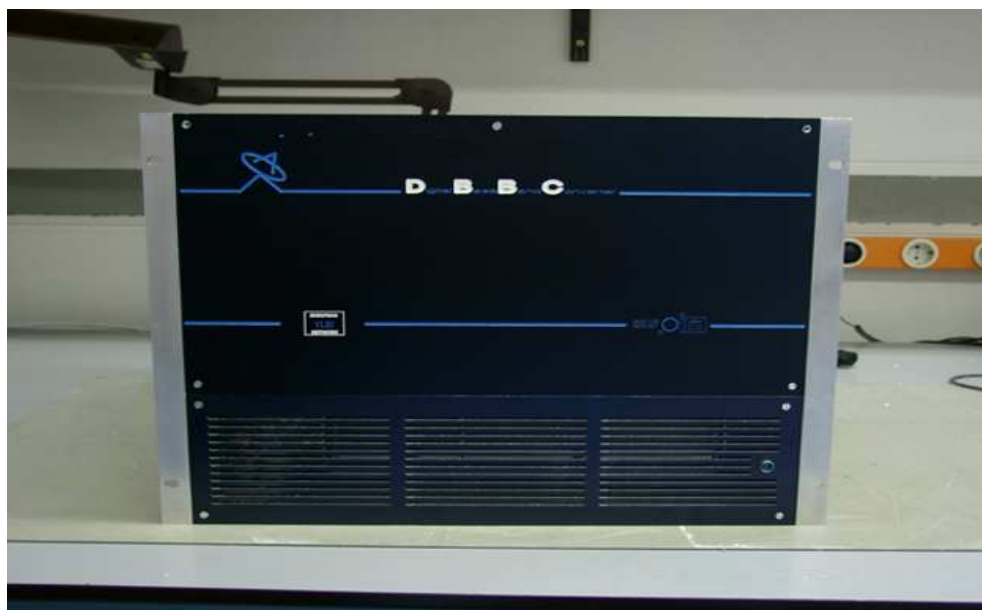


Figure 2. DBBC front view



Figure 3. DBBC rear view