

Noto Station Status Report

*G. Tuccari, G. Nicotra, S. Buttaccio, P. Cassaro, C. Contavalle, P. Leto, L. Nicotra,
C. Nocita, L. Papaleo, M. Paterno, F. Schilliro*

Abstract

Noto station was confronted with several important problems in 2005, obliging the antenna to remain non-operative for more than six months. A report is given about the encountered hardware failures and a description of the plan for taking the station back to optimal operative behavior.

1. Antenna Drive System Problems

The observative activity was suddenly interrupted in June 2005 during the EVN session, due to a severe failure, that involved several parts in the azimuth axis of the antenna driving system. In particular two Lenze amplifiers and a motor encoder were damaged. Some non-standard spare parts were necessary for the first part of the repair process, including the azimuth motor, whose realization took several months.

At the end of December the repair process was completed with the help of the Vertex company, that furnished the entire driving system in 2002. It was discovered that, due to a firmware bug, the broken parts were not detected as defective by the Antenna Control Unit, producing a failing status of the antenna system.

The long inactivity produced the cancellation of nine geodetic observations, two EVN sessions and numerous single dish programs.

In the first part of January 2006 a program of antenna calibration is under way in order to re-establish the proper pointing and amplitude calibration status. Moreover the mechanical inactivity produced some blocking in the azimuth cable wrap, so that the entire January will even be used to test the mechanical performance.

2. Activity Plan

A program is going to be started with a structured organization of the Noto station personnel. This includes the ordinary maintenance, as well as particular operations like the introduction of the wide band receiver, the renewing of the antenna driving software, the implementation of software dedicated to single dish measurements.

The renewal of the antenna driving software is planned in order to take advantage of the different driving modes available for different antenna functionality. So it will be possible to easily implement different scanning functions and dedicated tracking methodologies for the higher frequency observing bands.

As soon as funds will be available the remaking of the grout and azimuth rail will be realized. Better performance are expected in terms of tracking and pointing precision.

3. Receivers and Microwave Technology

The new SX receiver will be installed in a three step process in order to minimize the effects on the observing time. The control part will be in operation first, then the parts involving the vertex

room and finally, as soon as all the other parts will be tested and in operation, the actual receiver will be placed in the primary focus. The date of installation is not yet decided.

The 86 GHz receiver in Noto is not yet operative for VLBI and a relative long period of pointing and calibration time is expected. During 2006 time slots are planned for such activity, taking into consideration that due to the closeness of the Noto antenna to the sea, the weather plays a very critical part.

4. Acquisition Terminal and Digital Technology

The Mark 5A recorder is today the standard recording system in Noto. A large number of disk packs has been acquired in 2005, and several more units are planned to be bought in 2006.

The NRTV, a narrow band recording system, is used for RadarVLBI observations, connecting through the standard Internet network more stations with Noto, including Bear Lakes, Simeiz, Evpatoria, Urumqi. The maximum recording bit rate for this system is going to be widely increased with the introduction of a new terminal, called rDBBC, that includes together with the down-conversion functionalities, recording and e-VLBI capabilities.

The DBBC development group, established with EVN support for the realization of a digital base band converter system, was fully operative and a complete prototype has been produced. At the end of 2005 a 64 channel prototype is ready to be used for testing in the radiotelescopes, and the realization of a second system started.

Good performance in conversion and tuning have been measured up to 2.5 GHz with selected AD converters. With an appropriate Nyquist zone pre-selection, L and S band can be directly down-converted and recorded.



Figure 1. DBBC

5. Geodetic Experiments in Noto during 2005

During 2005 the Noto radiotelescope participated in the following geodetic experiments: CRF31 (JAN 26), T2037 (FEB 2), EURO75 (MAR 23), while other nine experiments have not been observed due to the antenna failure.