Noto Station Activity

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Abstract

The most important achievements at the Noto station are presented and a general status is described about developments and future plans. In particular the progress related to the DBBC development, a digital base band converter system, is reported in some detail.

1. Station Activity and Upgrade

In 2004 the Noto antenna was widely used in numerous observation programs, including VLBI with EVN session, IVS session, Radar session, and single dish activity in spectroscopy and total power. The antenna activity is planned, including maintenance programs, with the help of a "time commission".

1.1. Receivers and Microwave Technology

The cooled multi-feed SXL receiver is now complete and ready to be mounted in the antenna receivers' environment. The introduction of this system requires an antenna stop because of the different installations it involves. Indeed it is composed of three sections: one in primary focus, one in secondary focus, and one in the control room. The sky frequency is transferred from the primary focus to the vertex room using low loss cables. Frequency conversion is performed in the secondary focus room. All the other receivers' IFs are routed through the same system to the control room, using fiber optic connections. So the system introduction affects also the other receiver bands, and a period of time of not less than one week is required for installation. Due to the introduction of a "full time" observing program, it was not possible until the beginning of 2005 to introduce such receiver and it was preferred not to observe the wide band geodetic experiment. During 2005 the receiver set will be done, but at present it is not possible to fix a date because it is related to the general antenna planning.

The 86 GHz receiver in Noto is still not operative for VLBI because of the necessity of a relative long period of pointing and calibration time. During 2005 more time slots are planned, but due to the closeness of the Noto antenna to the sea, the weather plays a very critical part.

The new VHF-UHF receiver, covering the range 250-600 MHz, and 600-1000 MHz was successfully used in EVN observations.

1.2. Acquisition Terminal and Digital Technology

The Mark 5A recorder is now the standard recording system in Noto and the tape recorder fell into disuse. A large number of disk packs has been acquired in 2004, and several more units are planned to be bought in 2005. 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 DBBC project for the realization of a digital base band converter system was fully operative and two prototypes were produced. In a parallel similar project, the "mDBBC", a collaboration

between Noto and Shanghai radiotelescopes for the Chinese Lunar Program, fringes have been obtained with the digital system during 2004. At the end of 2004 a 16 channel prototype was under construction, planned to be ready in the summer of 2005, and to be used for testing the methodology as well as to serve as a basis for a possible mass production.

Several configurations have been developed including 0.5, 1, 2, 4 MHz bwd, to be improved, but is working; 0.25, 8, 16 MHz is near to completion; 0.125, 0.0625, 0.03125, 32 MHz is ready in simulation; tunable base band with 1 Hz resolution is ready today; tuning range in Nyquist blocks of 64 MHz is ready; tuning range in Nyquist blocks of 128 MHz is close to completion; tuning range in Nyquist blocks of 256, 512 MHz ready in simulation.

Good performance in conversion and tuning have been measured from 0 up to 2.5 GHz with selected AD converters (much more than expected). Today with an appropriate Nyquist zone pre-selection, L and S band can be directly down-converted and recorded with modified MK4 formatter (Noto and EVN spare).

Figure 1. DBBC Prototype

2. Geodetic Experiments in Noto during 2003

During 2004 the Noto radiotelescope participated in the following geodetic experiments: T2025 (JAN 13), CRF25 (JAN 26), T2027 (MAR 9), CRF26 (MAR 30), EURO71 (APR 6), T2028 (APR 13), T2029 (MAY 11), CRF29 (JUL 5), EURO72 (JUL 13), EURO73 (SEP 6), T2034 (OCT 5).