

The Medicina Station Status Report

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Abstract

General information about the Medicina Radio Astronomy Station, the 32 m antenna status and the staff in charge for VLBI observations, are provided. In 2004 the data from geodetic VLBI observations were mainly acquired using the MK5A recording system with good results. The station participation in geodetic VLBI observations increased this year compared to previous years.

1. The Medicina 32 m Antenna. General Information

The Medicina 32 m antenna is located at the Medicina Radio Astronomy Station. The station is run by the Istituto di Radioastronomia and is located about 33 km East of Bologna. The Consiglio Nazionale delle Ricerche was the funding agency of the Istituto di Radioastronomia till the end of 2004. From January 1st, 2005 the funding agency will be the Istituto Nazionale di Astrofisica (INAF).

The antenna, inaugurated in 1983, since 1985 takes regularly part in IVS observations. A permanent GPS is installed in the vicinity. The antenna is also one part of the European VLBI Network.



Figure 1. View of the Medicina 32 m dish taken during geodetic VLBI observations. Note that the subreflector is shifted to allow the use of the S/X receiver located in the primary focus of the radio telescope.

2. Antenna Description

The Medicina antenna has a Cassagrain optics, consisting of a primary mirror of 32 m in diameter, and a secondary mirror, called subreflector, of convex shape and about 3 m in diameter. The subreflector, mounted on a quadrupode, is placed opposite the primary mirror, and focuses the radio waves at its centre, where the receiver system is located. For some observing frequencies, a simplified optical system is enough. The subreflector is therefore shifted from its normal position, and the receiving system is placed at the primary focus. The antenna can operate in the range between 327 MHz and 22 GHz.

The receivers are cooled with cryogenic techniques to improve the system sensitivity. The antenna is flexible in changing the operative receiver: only few minutes are needed to change the observing frequency. A picture of the antenna, which was taken recently, is shown in Figure 1.

3. The Staff

Many scientists and technicians are taking care of the observations. However, there is a restricted number of people that is dedicated to maintain and improve the reliability of the antenna during the observations: Alessandro Orfei is the Chief Engineer, expert in micro-wave receivers; Giuseppe Maccaferri is the Technician in charge of the telescope's backend; Andrea Orlati is the Software Engineer who takes care of the observing schedules and regularly implements SKED&DRUDG and the Field System.

4. Current Status and Activities

At the beginning of 2004 the Field System version 9.7.1 was installed. The next release (9.7.2) was installed in December, after the European VLBI Network session 3/2004 in November.

The Mark 5A recording system works fine. Many observations were recorded both for astronomy (during the EVN Sessions) and geodesy with good results. A complete set of 5 modules with 8x120GB hard disks and 21 modules with 8x250GB have been made available for VLBI recording. 41840 Gb are allocated for astronomy and 8988 Gb for geodetic VLBI.

4.1. Front-end and Back-end Upgrading

The prototyping of new cryogenic Low Noise Amplifiers is in progress. At present, 18–26 GHz hybrid GaAs LNAs and InP MMIC chips are available. The latter have to be bonded and embedded in connected enclosures. The designs of 28–40 GHz, 33–50 GHz and W band (around 90 GHz) LNAs are in progress by using the monolithic solution with InP technology. The expected delivery of the chips is foreseen in spring 2006. A 4.3–5.8 GHz hybrid LNA is under construction as well.

The upgrade of the polarimetric system has been completed and a software package for making raster scan observations is being tested.

4.2. Optic Fiber Link

The Institute of Radioastronomy, the Emilia-Romagna Regional Government and GARR (Italian Academic and Research Network) have signed an agreement under which the Regional Government will provide a fiber optic link at 1 Gb/s between the Medicina Station and the GARR

backbone in Bologna. The connection is planned for spring 2005.

5. Geodetic VLBI Observations

During 2004, the Medicina 32 m dish has taken part in 27 geodetic VLBI observations, namely 4 IVS-T, 5 RDV, 14 R and 4 EUROPE projects. Some of the above projects were observed by Medicina as substitute for the Matera antenna, which was stopped by failure in the azimuth rail. This was agreed upon request by the IVS Coordinating Center.