

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 of the VLBI observations is provided. In 2012, the data from geodetic VLBI observations were acquired using the Mark 5A recording system with good results. Updates of the hardware were performed and are briefly described.

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 approximately 33 km east of Bologna. The Consiglio Nazionale delle Ricerche was the funding agency of the Istituto di Radioastronomia until the end of 2004. Since January 1, 2005, the funding agency has been the Istituto Nazionale di Astrofisica (INAF).

The antenna, which was inaugurated in 1983, has regularly taken part in IVS observations since 1985 and is an element of the European VLBI network. A permanent GPS station (MEDI), which is a part of the IGS network, is installed in the vicinity. Another GPS system (MSEL) is installed near the VLBI telescope and is part of the EUREF network.

2. Antenna Description

The Medicina antenna has Cassegrain optics, consisting of a primary mirror that is 32 m in diameter and a secondary mirror, called the subreflector, of convex shape and approximately 3 m in diameter. The subreflector, mounted on a quadrupod, is placed opposite the primary mirror and focuses the radio waves at its center, 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. This is the case for the S-X observations. 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's operative receiver is easily changed; only a few minutes are needed to change the observing frequency. A recent picture of the antenna is shown in Figure 1.

3. The Staff

Many scientists and technicians take care of the observations. However, a limited number are dedicated to maintaining and improving the reliability of the antenna during the observations: Alessandro Orfei is the Chief Engineer, expert in microwave receivers, and Andrea Orlati, Software Engineer, takes care of the observing schedules and regularly implements SKED, DRUDG, and the Field System. In 2012, Giuseppe Maccaferri took a half-time contract. Marco Bartolini and Simona Righini have been temporary included in the staff, helping Andrea Orlati for the VLBI preparation and observation.



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.

4. Current Status and Activities

The Mark 5C board and the DBBC have been delivered. At the time of this report they are on the way to be integrated in the observing system.

A new Helium pipeline and new cryogenic compressors have been installed on the antenna.

The new H-maser has been successfully tested at the factory. It will be delivered before the end of February.

The driving system of the subreflector is going to be re-engineered; installation, tests, and commissioning are expected to occur during autumn 2013.

The upgrade of the fiber optic link to 10 Gb/s is complete. A full bandwidth (without data drop) e-VLBI observation has been carried out. IVS data correlated in Bonn are regularly transferred off-line through optical fiber.

5. Geodetic VLBI Observations

In 2012, Medicina took part in 22 24-hour routine geodetic sessions (namely two IVS-T2, 17 IVS-R4, one R&D, and two EUROPE experiments).