

# 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 VLBI observations are provided. In 2007 the data from geodetic VLBI observations were acquired using the Mark 5A recording system with good results. Updates of the hardware have been 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 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. Since January 1st, 2005 the funding agency is the Istituto Nazionale di Astrofisica (INAF).

The antenna, 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, which is part of the IGS network, is installed in the vicinity. Another GPS system is installed near the VLBI telescope (MSEL) and is part of the EUREF network.

## 2. Antenna Description

The Medicina antenna has Cassegrain 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: this is the case of 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 is flexible in changing the operative receiver: 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 are taking care of the observations. However, there is a limited 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.



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

During 2007 the Field System version 9.9.0 was running routinely. The Mark 5A recording system worked fine; it was upgraded to support 1 Gbit activity via installation of the suggested operating system (Sarge). At the end of the year, we acquired the new MarkB system. All observations are made onto hard disk. New disk frames with a storage capacity of 20 TB will be available for geodetic observations. The 18-26 GHz multifeed system is in the final stage of measurement. First antenna tests are foreseen for the beginning of 2008. The central feed will be the new K band receiver for VLBI: great improvements with respect to the current receiver are expected. The development of the new observing system and control software of the 32 m antenna proceeds. Two PhD students have joined the team. INAF plans to fund the replacement of the elevation wheel. Problems are still present in the ground unit, specifically in the lock of VC 13 and at the cryogenic circuit of the S/X receiver. Final resolution of these problems will be attempted in 2008.

### 4.1. Optic Fiber Link

Medicina participated routinely in e-VLBI tests and e-VLBI experiments.

## 5. Geodetic VLBI Observations

During 2007, the Medicina 32 m dish took part in 25 geodetic VLBI sessions, namely 2 IVS-T2, 13 IVS-R4, 2 IVS-R1, 4 EUROPE, and 4 R&D experiments.