Italy CNR Analysis Center Report

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Abstract

This report summarises the work of the Italian CNR VLBI Analysis Center. It will give the fundamental information about the structure of the center, its locations, and its activity.

1. Introduction

The Italy CNR VLBI Analysis Center is the joint effort of two Institutes of Consiglio Nazionale delle Ricerche (CNR) to improve the quality of the geodetic VLBI results, in particular in the European area. The two institutes are:

a) the Istituto di Radioastronomia (Institute of Radio Astronomy, IRA) located in Bologna, where the main research activity is carried out, both in radioastronomy and geodesy;

b) the Istituto di Tecnologia Informatica Spaziale (Institute of Informatica and Technology for Space, ITIS), located in Matera at the Center of Spatial Geodesy (of the Italian Space Agency), where VLBI antenna, laser ranging telescope, permanent GPS receiver and PRARE antenna are located. Also a different analysis center is located here. All these structures are properties of the Italian Space Agency and run by Telespazio.

However the two institutes mentioned above will become quite shortly a single institute, the "Istituto di Radioastronomia", with a section located in Matera. The new CNR's institute will carry on the same commitment to IVS as the previous two intitutes.

The IRA have started to analyze VLBI geodetic database from 1989, using CALC/SOLVE package at the HP1000 at the Medicina station. In the following years that software was installed on an HP360 workstation and later on on an HP715/50 workstation. We have analyzed here mostly databases with some European baselines, generally at least three. Most of the databases have been reprocessed here in Bologna (using CALC and SOLVE). We are now using CALC9.1 and the November 2000 version of f-solve, for data analysis. We will soon move to the updated version of f-solve (February 2001).

From 1997 also ITIS have installed the CALC/SOLVE software and after some tests we have specialized the Bologna section to analyze single databases, in order to produce the final database. The global solutions have been computed in Matera at the ITIS. In Matera we are also using f-solve but with a previous version with respect to the one installed in Bologna.

2. Data Analysis and Results

In Bologna the main computer is HP715/80; the computer name is boira6.ira.bo.cnr.it. On it we are now analysing single experiments (interactive solve); the global solutions are run mostly on Matera computer.

We are continuing to work on the possibility of using tropospheric zenith path delay from GPS in order to improve the repeatability of the VLBI geodetic results. We have inserted the wet zenith path delay in the VLBI database as if this information was derived using a water vapour radiometer. The tropospheric data have been collected at the Berna site of the IGS. However the IGS data, with an hour interval, are the total tropospheric delay. For that we have subtracted

the dry delay, from the VLBI data, in order to produce the "wet" zenith delay. These data have been inserted into the VLBI database using an updated version of DBCAL. In this new version the Niell mapping function was implemented and also some other errors present in the program have been corrected.

In Matera the main computer is an HP282 computer with internet name hp-j.itis.mt.cnr.it. Also here we have installed f-solve (the center name is ITISCNR) and we are using it mostly for global solutions in order to compute the positions and velocities of European stations.

The use of GPS tropospheric zenith path delay have produced some interesting results. On the European database of 1998, the use of the new way of analysing VLBI data seems to produce a better repeatability on the European baseline length (Rioja at al. 2000).

3. References

M. J. Rioja, P. Tomasi, P. Sarti, M.A. Torres Integrating GPS zenith path-delay measurements into the VLBI analysis of geodetic observations with the European Network. - Proceedings of the 14th Working Meeting on European VLBI for Geodesy and Astrometry. P. Tomasi et al. editors, IRACNR 2000.