Italy CNR Analysis Center Report

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Abstract

This report summarizes 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 Institute of Radio Astronomy (IRA) located in Bologna, where the main research activity is carried out, both in radioastronomy and geodesy;

b) the 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.

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 have been installed on an HP360 workstation and later on on a HP715/50 workstation. From that time the software have been regularly updated following the indications of the VLBI group working at the Goddard Flight Space Center at Washington. We have analyzed here mostly database with some European baselines, generally at least three. The originals databases have been imported from the Geodetic Institute of the Bonn University or from GSFC - Washington, generally via ftp, and in one case via tapes. Most of the database have been reprocessed here in Bologna (using CALC and then SOLVE). During 1998 the European experiments have been released by the Bonn group at the final stage of processing. In these case the database have been used without any more editing.

From 1997 also ITIS have installed the CALC/SOLVE software and after some tests we have specialized the Bologna section to analyze single database, in order to produce the final database. The global solutions have been computed in Matera at the ITIS.

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.

During 1998 we have also started 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 that data into the database using the water vapor radiometer route. The tropospheric data have been collected to 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 update version of DBCAL. In this new version the Niell mapping function was implemented and also some others errors present in the program have been corrected.

We have installed f-solve (L. Petrov) on boira6 (the center name in this case is IRACNR) and we are using this software on a regular basis.

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 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 the 1998, the use of the new way of analysing VLBI data, seems to produce a better repeatability on the European baseline length (Rioja and Tomasi, 1999).

3. References

M. Rioja and P. Tomasi Integrating GPS zenith path-delay measurements into the analysis of geodetic VLBI observations from European Network. - Proceedings of the 13th Working Meeting on European VLBI for Geodesy and Astrometry. W. Schluter and Hase editors, BKG 1999.