Italy CNR Analysis Center Report

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Abstract

This report summarizes the work of the Italy CNR VLBI Analysis Center. It will give fundamental information about the structure of the center, its locations, and its activities.

1. Introduction

The Italy CNR VLBI data center is the joint effort of:

a) the Istituto di Radioastronomia (Institute of Radio Astronomy IRA) of the Consiglio Nazionale delle Ricerche (CNR) located in Bologna, where the research activity is carried out, both in radio astronomy and geodesy, and the two VLBI antennas in Medicina (near Bologna) and Noto (in Sicily) are managed;

b) and in its section located in Matera at the Center of Spatial Geodesy (of the Italian Space Agency), where its main research activity in geodesy is carried out, and a VLBI antenna, a laser ranging telescope, a permanent GPS receiver and a PRARE antenna are located.

The IRA has started to analyze VLBI geodetic databases from 1989, using a CALC/SOLVE package on the HP1000 at the Medicina station. In the following years that software was installed on an HP360 workstation and later 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 in Bologna (using CALC and SOLVE). We are now using CALC9.1 and f-solve for data analysis. However, we are also storing all the databases with the Ny-Ålesund antenna data. During 2002 and 2003, we have stored in Matera all the 2000-2003 databases available on the IVS data centers. All the databases have been processed and saved with the best selection of the parameters for the final arc solutions. At present, the main analysis activity and storage is concentrated in Matera, where we store and analyze single databases, using CALC/SOLVE software. We are using F-solve regularly updated.

2. Data Analysis and Results

The main computer in Bologna is HP 785/B2600 workstation and its internet address is boira3.ira.cnr.it. At present we have installed and tested on this machine the Mark-5 VLBI Analysis Software Calc/Solve under Fortran90 compiler. In Matera the main computer is an HP282 workstation with internet name hp-j.itis.mt.cnr.it. Here, we have installed f-solve (with a center name of ITISCNR) and we are using it for the analysis of single experiments and also for global solutions in order to compute the positions and velocities of European stations.

Until June 2003, we continued to participate in the IVS Pilot Project -Tropospheric Parameters, dedicated to test and evaluate future provision of additional operational products by IVS. Regular submissions of tropospheric parameters (wet and total zenith delays, horizontal gradients) of all IVS-R1 and IVS-R4 24hr VLBI sessions were solicited. Starting with July 2003 the combined tropospheric estimates are regular IVS products within the TROP Project and our Analysis Center continued the submission of the estimated tropospheric parameters on a regular basis. In order

to fulfill the request of the project, we modified the CALC/SOLVE software, so that it is able to produce the Sinex files containing the tropospheric parameters in the suitable format.

Moreover, we imported and analyzed all the other 2000-2003 databases available on the IVS data centers, in order to compute the tropospheric parameters. We are carrying out a comparison between the VLBI tropospheric estimates and the GPS-derived troposphere for the co-located sites.

We are continuing to work using external tropospheric zenith path delays in order to improve the repeatability of the VLBI geodetic results. We are inserting the wet zenith path delays in the VLBI databases as if this information had been derived using a water vapor radiometer. These data have been inserted into the VLBI databases using an updated version of DBCAL. We are testing the results on the IVS-R1 and IVS-R4 databases.