

# Matera CGS VLBI Analysis Center

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## Abstract

This paper summarizes the present status of the VLBI data analysis activities at the Space Geodesy Center (CGS) of Matera and the contributions that the CGS intends to provide as an IVS Data Analysis Center. The center born in 1983 as an SLR station grew in the years including in its facilities a VLBI and a fixed GPS station. It is operated by Telespazio on behalf of the Italian Space Agency (ASI) and is providing not just high quality data but also data analysis support.

## 1. Introduction

The Matera VLBI station became operational at the Space Geodesy Center (CGS) of the Italian Space Agency (ASI) in May 1990. Since then it is active in the framework of the most important international programs [3]. VLBI data analysis activities are performed at CGS for a better understanding of the tectonic motions with specific regards to the European area. The CGS, operated by Telespazio on behalf of ASI, provides full scientific and operational support using the three main space geodetic techniques: VLBI, SLR and GPS. The CGS intends to participate in the IVS as an Analysis Center for:

- Terrestrial Reference Frame analysis products
- Comparison of TRF analysis products and production of a single TRF
- Comparison of results from different space geodetic techniques.

For the VLBI analysis we use the CALC/f-SOLVE software on an HP725 workstation.

## 2. TRF Analysis Products

Analysis of the EUROPE campaign is performed at the CGS since 1992 and its results are regularly presented at the working meetings on European VLBI for Geodesy and Astrometry [2]. Our products from this analysis are station coordinates and velocities. Generally we perform, using CALC/f-SOLVE, a “standard” two-step analysis procedure; the first is an “arc solution” which provides the time series of the parameters under investigation, the second solution is a “global solution” where parameters are estimated using all sessions. For this analysis we will provide a solution every year using all data acquired within this campaign.

Also global geodetic VLBI solutions have been carried out and for this kind of analysis we intend to provide solutions, without any particular time schedule, using as many data as possible to determine TRF, CRF and EOP.

## 3. Comparison of TRF

For the combination of individual TRF products we intend to use the following procedure:

- We assume that the individual TRF are provided in SINEX format.

- Constraints introduced in the solution will be removed for each TRF.
- Application of minimal internal constraints adjustment will be performed on each TRF.
- Combination of all TRFs will be done evaluating a 14 parameters transformation (scale factor, translations, rotations and their time derivatives) using the IERS ITRF as reference frame. This step will produce a unique TRF.

Initially we can provide the combined TRF for the end of 1999. After that date combination will be performed every six months.

Comparison of the TRFs will be performed estimating a 14-parameter transformation between the single TRF and a ITRF that can be the IERS one or that produced by IVS. Feedback to the Analysis Center will be provided in terms of differences between the single TRF and the ITRF.

#### 4. Comparison of Results from Different Space Geodetic Techniques

The space geodetic data analysis activities in the fields of GPS, SLR and VLBI usually carried out at the CGS make the comparison and combination of the results one of our natural objectives. The kind of compared geodetic parameters depend on the particular solution (global, regional).

Results from the analysis of the EUROPE campaign have been extensively compared to those from our SLR and GPS solutions for co-located sites [2]. Results from a worldwide VLBI solution have been compared to SLR global solutions and to ITRF to verify the consistency of different reference systems [1], in terms of rototraslations/scale parameters, of empirical Eulerian poles, where possible, and in terms of Fourier coefficients for the EOPs.

Comparison of results concern:

- Comparison of baseline time series, after removal of the eccentricity vectors among the techniques.
- Evaluation of the 14-parameter transformation between the TRF determined by each technique and the ITRF.
- Determination of the Eulerian poles for each technique and comparison with those coming out from the ITRF.

#### 5. Staff at CGS contributing to the IVS Analysis Center

- Dr. Giuseppe Bianco, Responsible for CGS, ASI (primary scientific/technical contact)
- Dr. Francesco Vespe, Responsible for CGS geodesy activities, ASI (administrative contact)
- Dr. Cecilia Sciarretta, Responsible for scientific activities, Telespazio
- Dr. Roberto Lanotte, Geodynamics scientist, Telespazio.

#### References

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