

IV.3 ITRF Section of the Central Bureau

This report summarizes the activities of the former Terrestrial Reference Frame Section of the IERS Central Bureau.

The main activities of the ITRF Section during the year 2000 are:

- Maintenance of the IERS network
- Data analysis and Software enhancement
- ITRF2000 project

Maintenance of the IERS network

This activity includes update of the IERS network data base in terms of new sites and stations, assignment of DOMES numbers, local ties, availability of IERS network information and ITRF products on the web and ftp server, as well as assisting the ITRF users for a proper use of ITRF products.

Data analysis and Software enhancement

With interaction of IERS Analysis Centers (AC), individual solutions from the different techniques are frequently evaluated and tested, in order to improve the individual analysis as well as ITRF combination. Thus both the individual AC's as well as the ITRF Section regularly test new analysis strategies. This cooperation between the IERS AC's and the ITRF Section is vital for quality control and improvement of IERS products. To achieve this goal, the software package Combination and Analysis of Terrestrial Reference Frames (CATREF), developed by the ITRF Section, is regularly updated and enhanced in order to perform proper analysis of the different solutions performed by the IERS AC's.

ITRF2000

A great part of the year 2000 was devoted to the preparation of the ITRF2000 solution. Interaction between the ITRF Section and the individual IERS AC's was regularly maintained in order to provide specific individual solutions for this Standard solution. The ITRF2000 is intended to be a Standard and densified solution for a wide application community (geodesy, cartography, navigation, etc.).

Before the generation of this solution, a specific Workshop was organized by the ITRF section gathering all the contributing IERS AC's. During this Workshop, the individual AC's presented their analysis and description of their solutions. Preliminary analyses of these solutions performed by the ITRF Section were discussed. The Working Group on ITRF Datum issued specific recommendations for the final ITRF2000 combination in terms of datum definition (see <<http://lareg.ensg.ign.fr/ITRF/ITRF2000/ITRF2000.RECOM>>).

The ITRF2000 solution is the most dense and accurate frame ever developed, containing about 800 stations located on about 500 sites. It has been achieved by simultaneous combination of positions and velocities using full variance/covariance matrices of the

individual solutions provided by the IERS Analysis Centers. It includes core stations observed by VLBI, LLR, SLR, GPS and DORIS (usually used in previous ITRF versions) as well as regional GPS networks for its densification (Alaska, Antarctica, Asia, Europe, North and South Americas and Pacific). Figure 1 shows the distribution of the primary sites of ITRF2000 highlighting the collocated techniques.

The ITRF2000 is intended to have an accurate datum definition, achieved as follows:

- The origin and its rate are defined by a weighted average of most consistent SLR solutions.
- The scale and its rate are defined by a weighted average of VLBI and most consistent SLR solutions. Unlike the ITRF97 scale, expressed in the Geocentric Coordinate Time-frame, that of the ITRF2000 is expressed in Terrestrial Time-frame. The effect of this change on the scale factor is 0.70 ppb (10^{-9}).
- The orientation is aligned to that of ITRF97 at 1997.0 epoch and its rate to be such that there is no-net-rotation rate with respect to NNR-NUVEL-1A. Note that the orientation as well as its rate are defined upon a selection of ITRF sites with high geodetic quality.

The ITRF2000 long-term stability, evaluated over 10 years, is estimated to be better than 4 mm in origin and better than 0.5 ppb in scale, equivalent to a shift in station heights of approximately 3 mm over the Earth's surface.

All the ITRF2000 related files are available via Internet at:
<<http://lareg.ensg.ign.fr/ITRF/ITRF2000>>

*Zuheir Altamimi, Claude Boucher,
Patrick Sillard, Martine Feissel*

Figure 1. ITRF2000 Primary Network

