VI. Solutions not included in ITRF97

VI.1. Description of the solutions

VI.1.1. Summary of the VLBI solutions

VI.1.1.1. SSC(GAOUA) 98 R 01

S. Bolotin Main Astronomical Observatory of the National Academy of Sciences of Ukraine,
Dept. of Space Geodynamics,
Golosiiv, Kiev-22, 252650, Ukraine
e-mail: bolotin@mao.kiev.ua

The GAOUA 98 R 01 solution is based on the VLBI data acquired on various networks during 8 years since 02 January 90 till 30 December 97. The solution consist of RSC (198 radio sources), SSC (45 stations), SSV (28 stations) and EOP. The radio sources coordinates have been constrained by requiring the sum of right ascension of 27 sources equals the corresponding sum from the solution RSC(WGRF)95R01. The same no-translation constraint have been applied to fix the origin (coordinates of 18 stations linked to the ITRF94) and the rotation (velocities of 15 stations linked to NNR-NUVEL1A) of the terrestrial reference frame. The orientation between celestial and terrestrial reference frames is defined by the EOP(IERS)97C04 values for the date 29 January 1997.

VI.1.2. Summary of the LLR solutions

VI.1.2.1. SSC(FSG) 98 M 01

J. Mueller, B. Reichhoff, M. Schneider
Institute for Astronomical and Physical Geodesy (IAPG),
Technical University Munich, 80290 Munich, Germany
The solution is based on the LLR data acquired since the beginning of the observations (1970) until April 1998. The cartesian station coordinates (X0, Y0, Z0) of five sites are estimated using the NNR-Nuvel1 fixed plate motion model. Differences between the three McDonald sites are constrained to local surveys. The model for calculating the station coordinates moreover comprises of tidal displacements due to solid earth and polar tides, ocean loading, variations of latitude in agreement with IERS Conventions (1996). Diurnal and semidiurnal tidal variations in UT1 and relativistic contraction in the geocentric frame have been regarded as well. Corrections to precession and some nutation terms are applied or estimated. Input Earth rotation values up to February 1997 are taken from a solution of R. Gross (JPL). This solution is called COMB96 and is aligned with the IERS system. Input Earth rotation values from March 1997 until April 1998 are taken from IERS Bulletin B. Daily corrections for UT0 and VOL are determined after the global fit. The ephemeris of the major solar system bodies are computed with the FSG ephemeris programm, the lunar librations were integrated simultaneously. The initial values for the integration are essentially taken from the ephemeris DE200.

VI.1.2.2. SSC(JPL) 98 M 02

James G. Williams, Dale H. Boggs
Jet Propulsion Laboratory, California Institute of Technology
Pasadena, California, 91109-8099
Lunar Laser Ranging (LLR) data between April 1970 and February 1998 have been analyzed to produce station locations and station motions. There are 12216 ranges from McDonald Observatory (Fort Davis, three sites), Grasse (OCA/CERGA), and Haleakala (Maui) Observatory to four retroreflectors on the moon.

These data have been analyzed in a global solution to estimate station locations, horizontal motions, 18.6-year nutation and other parameters. Solutions were made using the

ephemeris DE330. The station location solution is designated SSC(JPL) 98 M 02. DE330 is nominally on the IERS celestial reference frame.

VI.1.2.3. SSC(UTXMO) 98 M 01

J. Gyorgyey Ries, R. L. Ricklefs, P. J. Shelus, J. R. Wiant McDonald Observatory / Department of Astronomy The University of Texas at Austin Austin, Texas 78712 (USA) Contact: moon@astro.as.utexas.edu

The University of Texas McDonald Observatory (UTXMO) has submitted in March EOP results for the 1997 IERS Annual report. This report is the corresponding station coordinate solution. In this analysis we used the total set of lunar laser ranging data available. These data were acquired between September, 1969 and June 26, 1998. A total of 12836 normal points were used in this solution. The following stations have data: McDonald Observatory 2.7m telescope the McDonald Laser Ranging Station (saddle site) near Ft Davis, Texas, the Haleakala Observatory on Maui, (all three ceased operations); and two active stations, the Observatoire de Cote d'Azur station in Grasse, France, the McDonald Laser Ranging Station on Mt. Fowlkes near Ft Davis, Texas. The Earth-Moon barycenter orbit is fixed to the MIT ITR-78 ephemeris to tie the longitude of the celestial reference frame. The orientation of the terrestrial reference frame was fixed to the CSR EOP(CSR) 95 L 01 EOP series at 11 Jan 1985. The station coordinates were estimated simultaneously with with long span corrections to the apriori EOP series, Embary mass, reflector coordinates and lunar gravitation parameters.

VI.1.3. Summary of the SLR solutions

VI.1.3.1. SSC(BKG) 98 L 01

W. R. Dick, M. Mareyen, M. Meinig, K. Oppitz, B. Richter
Bundesamt fuer Kartographie und Geodaesie, Aussenstelle Potsdam, Michendorfer Chaussee 23, D-14473 Potsdam, Germany

The solutions EOP(BKG) 98 L 01 and SSC(BKG) 98 L 01 were derived from the analysis of Lageos-1 SLR data with UTOPIA and KIN software. Observation data from January 1988 to January 1998 was used. The computation of EOPs and station positions was performed for intervals of one year in a 2-step approach: First, the orbital parameters were derived with ITRF94 site coordinates and velocities and the EOP(IERS)97 C 04 as a-priori values, and next, corrections to the EOPs and the coordinates were computed using the improved orbital parameters. At the second step, the orientation was defined by fixing three coordinate components of the stations 7105 and 7210 at their ITRF94 values.
These annual solutions, transformed to epoch 1993.0, were used to estimate mean positions for 86 stations and linear velocities for 65 stations. For this, the fixing of the stations 7105 and 7210 was removed by a special algorithm obtaining fiducial-free coordinate sets, still orientated to ITRF94. The mean coordinates of 13 fiducial stations (7080, 7090, 7105, 7109, 7110, 7210, 7831, 7835, 7837, 7838, 7839, 7840, 7939) from the 10 annual solutions were then used to define the orientation (no-rotation constraints at epoch 1993.0 and with time). 7 parameters for the orientation of each annual set of fiduals together with the mean coordinates of all stations and corrections to the a-priori velocities of stations having observed at least at two epochs were solved for.

VI.2. Analysis of the solutions

The solutions submitted in 1998 and not included in ITRF97 combination were a posteriori compared to the ITRF97, using diagonal variances only. Tables T10 and T11 of the appendix give respectively the transformation parameters and global residuals with respect to ITRF97.

The causes of rejection of these solutions from the ITRF97 combination are mainly due to:

- structure and format SINEX problems for some solutions
- some other solutions did not estimate velocities.