Consistent realization of ITRS and ICRS

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The International Earth Rotation and Reference Systems Service (IERS) is in charge of the computation of the International Terrestrial Reference Frame (ITRF) and the International Celestial Reference Frame (ICRF).

The ITRF is computed by combining the data of the four geodetic techniques VLBI, SLR, GNSS and DORIS in order to exploit the individual potentials provided by these four techniques w.r.t. the determination of the geophysical parameters (origin, scale, network geometry and EOP).

The realization of the ICRS is based on VLBI. It is the only one of the techniques observing extragalactic radio sources. Thus, the unique characteristic of VLBI is, that it fully links the ITRF and the ICRF. Both reference frames are computed separately today. Therefore, ICRF, and ITRF and the respective EOP series are not fully consistent.

This paper deals with the common adjustment of ITRS and ICRS realizations. It presents a computational approach, which allows for minimizing the network deformation by applying only minimum conditions. It presents the results of a consistent TRF-CRF realization, which is based on homogeneously processed VLBI, GNSS and SLR input data. The paper demonstrates the advantages of such an approach in terms of consistency and stability of the frames and the EOP.