



## **How to constrain the origin, orientation and scale of a daily/weekly TRF without perturbing the loading signal?**

Xavier Collilieux (1), Zuheir Altamimi (1), Tonie van Dam (2), and Jim Ray (3)

(1) IGN, LAREG, Marne La Vallée, France (xavier.collilieux@ign.fr, +33 1 64 15 32 53), (2) University of Luxembourg, Luxembourg, Luxembourg (tonie.vandam@uni.lu), (3) NOAA National Geodetic Survey, Silver Spring, USA (jim.ray@noaa.gov)

To properly compare time series of station positions from different space geodetic techniques, namely GPS, VLBI, SLR and DORIS, it is essential to express them with respect to the same terrestrial reference frame. In theory, this can be done by defining an arbitrary orientation of the frame for all techniques as well as the origin for VLBI. However, in practice, it is preferable to remove intrinsic origin and scale information since there are systematic differences between the various techniques. This is usually realized by estimating linearized similarity transformation parameters between the quasi-instantaneous frames and a secular frame such as the International Terrestrial Reference Frame (ITRF). It is well known that non-linear station motions, not-accounted for in the ITRF secular reference frame, partly alias into these parameters.

We discuss in this paper some procedures that may allow reducing these aliasing effects. This includes the use of well distributed sub-networks when possible, the addition of constraints on the scale parameters, the use of loading corrections and the down weighting of the height component. The suggested procedures will be studied by analyzing GPS position time series as well as simulated data sets based on available stochastic and loading models.