



DETERMINATION AND ANALYSIS OF STATIONS COORDINATES BASED ON STARLETTE AND LAGEOS-1 &-2 SATELLITES LASER RANGING DATA

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The present work deals with the calculation of International Laser Ranging Service (ILRS) network not only based on observations of both LAGEOS satellites (at altitude of 6000 km) but also on those of Low Earth Orbit (LEO) satellites, such as Starlette (at altitude of 800 km). The challenge is to achieve good quality on stations coordinates by inter-satellite combination of High and Low satellites data.

The methodology adopted, in this paper, comprises three main steps:

- a. The orbit restitution of different tracked satellites is performed by the GINS (Geodesy by Simultaneous Numerical Integration) software (GRGS, France), based on purely dynamical approach.
- b. The estimation of stations coordinates updates and of Earth orientation parameters is performed using the MATLO (MATHematics for Localization and Orbitography) software (IGN, France), which can also determine orbit correction via simply kinematical assumptions. This estimation provides weekly time series of stations positions, in which their analysis permits to make in evidence the geophysical phenomena effects on the station vertical coordinate (Up component).
- c. The analysis of results with frequency analysis by FAMOUS software (OCA, France) and noise study (type and level of noise estimation) by Allan variance method.

The data concern the laser measurements of different satellites according to different combinations: LAGEOS-1 (LA-1), LAGEOS-1&LAGEOS-2 (LA-1&-2) and LAGEOS-1&Starlette (LA-1&STAR), for a relatively long period of 14 years (between October 1993 and February 2007). Finally, the results about the performed methodology are presented and discussed.

Key words: Orbit restitution, Inter-satellite combination, SLR technique, Frequency analysis, Noise study