Geophysical Research Abstracts
Vol. 21, EGU2019-11737, 2019
EGU General Assembly 2019

Time Transfer by Laser Link (T2L2), role and impacts for space geodesy

Alexandre Belli (1), Pierre Exertier (2), Frank Lemoine (1), and Nikita Zelensky (3)
(1) NASA GSFC, Greenbelt, USA , (2) OMP, GET, Toulouse, France, (3) SGT, Greenbelt, USA

The Time Transfer by Laser Link (T2L2) experiment on-board the Jason-2 satellite (launched the 20 June 2008, at 1335 km of altitude) aimed to synchronize remote clocks in the ground with a sub-nanosecond accuracy. Except for short interruptions, the experiment worked perfectly for almost 10 years. T2L2 consists of an electronic device for timing, linked to the Doppler Orbitography Radiopositioning Integrated by Satellite (DORIS) Ultra Stable Oscillator (USO), which delivers the frequency reference to the whole satellite, and an optical device that detected the laser pulses coming from the laser stations of the International Laser Ranging Service (ILRS).

T2L2 offered a time colocation with three geodetic techniques on-board the Jason-2 satellite (Satellite Laser Ranging (SLR), DORIS and Global Positioning System (GPS)), and with the ground, clocks located in laser ranging stations.
In this paper, we will summarize the main results of the T2L2 experiment and highlight the benefits for geoscience, which are:
· The complete synchronization of the Laser Ranging Network at a sub-nanosecond level, and the determination of Time Bias in SLR station
· The development of a deterministic frequency model for the Ultra-Stable-Oscillator on-board Jason-2
· Impact of the model for Jason-2 Precise Orbit Determination and geodetic DORIS network coordinates improvement.