Geophysical Research Abstracts
Vol. 19, EGU2017-13485, 2017
EGU General Assembly 2017

Orbit determination of the Sentinel satellites - preparations for GPS L2C-tracking

Heike Peter (1), Jaime Fernández (2), Carlos Fernández (2), and Pierre Féménias (3)

(1) PosiTim UG, Swisttal, Germany (heike.peter@positim.com), (2) GMV AD., Tres Cantos, Spain, (3) ESA/ESRIN, Frascati, Italy

The Copernicus POD (Precise Orbit Determination) Service is part of the Copernicus Processing Data Ground Segment (PDGS) of the Sentinel-1, -2 and -3 missions. A GMV-led consortium is operating the Copernicus POD Service being in charge of generating precise orbital products and auxiliary data files for their use as part of the processing chains of the respective Sentinel PDGS.
Since April 2014 four Sentinel satellites have been launched (1A, 2A, 3A, and 1B). Sentinel-2B is expected to be launched in March 2017. Thus the CPOD Service will be operating five satellites simultaneously in spring 2017.
The satellites of the Sentinel-1, -2, and -3 missions are all equipped with dual frequency high precision GPS receivers delivering the main observables for POD. Sentinel-3 satellites are additionally equipped with a laser retro reflector for Satellite Laser Ranging and a receiver for DORIS tracking. This allows an additional external validation of the Sentinel-3 orbit accuracy. The three missions require orbital products with various latencies from 30 minutes up to 20-30 days. The accuracy requirements are also different and partly very challenging, targeting 5 cm in 3D for Sentinel-1 and 2-3 cm in radial direction for Sentinel-3. The main quality control of the CPOD orbits is done by validating them with independent orbit solutions provided by the Copernicus POD Quality Working Group. The cross-comparison of orbit solutions from different institutions is essential to monitor and to improve the orbit accuracy.
The GPS receivers on the B-satellites have the capability to track L2C signal. The option is, however, not yet activated, because if enabled the old L2 signal can no longer be tracked by the receiver. The measurements of many old GPS IIA and IIR satellites would have to be discarded because of the missing second frequency. To be prepared for the future, tests and simulations are foreseen to learn about the impact of the new observable on the POD results.
This paper presents the Copernicus POD Service in terms of operations and orbital accuracy achieved by the different orbit products of the different missions. The long-term evolution and progress of the service is presented and the impact and challenges following a future switch to L2C tracking are analysed.