Geophysical Research Abstracts
Vol. 21, EGU2019-8946, 2019
EGU General Assembly 2019

Copernicus POD Service: Reprocessing of the Copernicus Sentinel-1,-2,-3 orbits

Jaime Fernandez Sanchez, Emilio José Calero, Heike Peter , and Pierre Féménias
GMV Aerospace and Defence S.A.U., Flight Dynamics and Operations, Tres Cantos, Spain (jfernandez@gmv.com)

The Copernicus POD (Precise Orbit Determination) Service delivers as part of the PDGS of the Copernicus Sentinel-1, -2, and -3 missions orbital products and auxiliary data files for their use in the corresponding PDGS processing chains. The most precise results are the NTC (Non-Time Critical) orbit products delivered for the Copernicus Sentinel-1 and -3 missions. These orbits are part of the final SAR (Synthetic Aperture Radar) products in the case of Sentinel-1 and are serving as backup (for the CNES orbits) for the generation of the final altimeter products in the case of Sentinel-3. Consistent time series of the orbit products are a requirement for highest-level final products of the different satellite missions.

The Copernicus POD Service is compelled to deliver consistent orbit time series to the extent possible. However, due to external developments such as the updates of the ITRF (International Terrestrial Reference Frame) the time series get inconsistent. In addition, necessary model improvements and updates or correction of wrongly used instrument reference points lead to inconsistencies. A rigorous reprocessing is the usual way to provide consistent orbit time series after major switches necessary in the operational processing.

The Copernicus POD Service plans to perform an offline reprocessing to have consistent time series available for all Copernicus Sentinel-1, -2, and -3 satellites. This includes all model updates (including integer ambiguity resolution) and improvements made in the processing system since the launch of Sentinel-1A (April 2014). Updates (S-3) and correction of wrongly used antenna reference points (S-1) are also included as well as a full reprocessing of the GPS orbits and clocks in the ITRF14/IGS14 reference frame. The reprocessed GPS orbits and clocks have an arc length of 36 h instead of the usual 24 h, because all Copernicus Sentinel orbit products cover more than 24 h. Thus the common discontinuity of the GPS orbit and clock products at the day boundaries is avoided.

The results of this offline reprocessing are presented including a summary of all updates and improvements made in the processing. The improvements of the resulting Sentinel orbit time series are discussed and analysed. The final goal is to have the reprocessed orbits included in the official Copernicus Sentinel processing procedures at the individual PDGS of the missions.