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Jason-CS is an operational oceanography programme of two satellites that will ensure continuity to the Jason series of operational missions. The main payload of the Jason-CS satellite is the Poseidon-4 radar altimeter that has evolved from the altimeters on-board the Jason satellites (Poseidon-2 of Jason-1, Poseidon-3A of Jason-2 and Poseidon-3B of Jason-3). Poseidon-4 also inherits the Synthetic Aperture Radar (SAR) Altimeter mode of CryoSat-2 SIRAL and Sentinel-3 SRAL now proven to reduce errors in elevation and SWH retrieval over ocean. Furthermore, Poseidon-4 will be the first radar altimeter embarked on a satellite that includes improved digital and radio frequency hardware and, in particular, open burst Ku-band pulse transmission (an operation currently termed the interleaved mode), that performs a near continuous transmission of Ku-band pulses, that will allow SAR and pulse limited data to be gathered simultaneously. As with the Jason series and Sentinel-3, the Poseidon-4 transmits C- band pulses in order to retrieve a correction for ionospheric path delay.
The mission is being developed by a multi Agency partnership consisting of ESA, EUMETSAT, NOAA, CNES and NASA-JPL. ESA is responsible for the Jason-CS Space Segment development along with Astrium GmbH as a prime contractor. isardSAT is developing the Ground Prototype Processor for the Poseidon-4 under Astrium. This prototype processes all the chains starting from the Instrument Source Packets, and up to the Level 1b (calibrated pulse- width limited or multi-looked SAR data). The prototype has been verified using simulated data generated by the Jason-CS mission performance simulator and also using in-orbit CryoSat data adapted in format to Jason-CS. These data have been provided by ESA.
This paper will present the Ground Processor Prototype developed for Jason-CS, and the results of its verification, focusing on the new features of the processing chain compared to previous altimeters. Typical examples concern: the assessment of performance improvement thanks to the interleaved mode; the un-correction of the Range Migration Correction (RMC) performed on-board in order to reduce the data rate; the weighting applied to the Doppler beams before the multi-looking to correct the different echo shapes as a function of the incidence angle; or the reconstruction of the waveform scaling factor in order to be able to compute the surface backscatter.
OSTS session
Instrument Processing