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ALTIUS: mission development status and performance

ALTIUS is ESA's upcoming Earth atmospheric limb mission. The primary objective of the mission is to provide near-real-time and consolidated stratospheric ozone profiles. Secondary objectives include stratospheric aerosols, H2O, NO2, NO3, temperature, OClO, BrO, and mesospheric ozone. The mission is in its implementation phase, with both the space and ground segments having reached the critical design review (CDR). The launch is foreseen on a Vega-C rocket in 2027.

The mission has some unique features intended to better tackle the common problems faced by previous UV-VIS-NIR limb sounders. First, it is a single payload mission on an agile platform, giving therefore many options for the observation scenarios. The baseline mission plan combines 100 limb-scatter observations on the day side, 2 solar occultations, and 5 stellar/planetary/lunar occultations in the night side (typical numbers). Second, the instrument is a three-channels spectral imager with tunable capability from 250nm to 1020nm. It comes with excellent vertical sampling (<1km at the tangent point), and allows straighforward in-flight pointing calibration, usually a key driver of the error budget of limb instruments.

The development of the scientific algorithms is ongoing, and a number of processing chains are already implemented in the payload data ground segment (PDGS). Extensive phases of verification of the mission performance have recently been completed. They are based on the best available knowledge of the instrument and spacecraft performance via the use of a simulator of the space segment. Currently, the stratospheric O3 product from the three observation modes, and aerosol extinction and NO2 in occultation modes have been studied. Aside from the pure simulations, the algorithms are also tested on existing limb sounder L1 products, such as OMPS-LP, SAGE-III, and GOMOS. An overview of the current status will be provided.

Topic

Upcoming Earth observation limb and occultation instruments

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