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ALTIUS, a future small mission for O_3 and other atmospheric trace species concentration profiles retrieval

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The ALTIUS (Atmospheric Limb Tracker for the Investigation of the Upcoming Stratosphere) mission aims at the retrieval of atmospheric trace species concentration profiles with a good vertical resolution and a global coverage. It will be flown on a PROBA-type platform on a Sun-synchronous orbit with a 10:00 AM typical local time. The instrument exploits the concept of hyperspectral imaging of different light sources: limb-scattered radiance, Sun, Moon, stars, planets. These sources are observed sequentially, depending on their availability and good positioning. This multi-mode observation capability enables measurements in both bright and dark side of the orbit, extending the coverage to virtually all latitudes and different illumination conditions (including polar night).

The instrument concept relies on three independent spectral channels: UV, VIS and NIR. The imaging technique alleviates the need for scanning systems as the field of view will capture the atmosphere from cloud top to the lower thermosphere at once. It also makes the pointing calibration more easy and robust, an important feature knowing that tangent altitude misregistration is one of the major sources of bias in the retrieved products. In each channel, the wavelength selection for each image will be performed by a tunable filter: an AOTF (Acousto-Optical Tunable Filter) for the VIS and NIR, and a FPI (Fabry-Perot Interferometer) in the UV.

ALTIUS has recently completed a phase B1 under ESA supervision. The next milestone will be the preliminary design review (PDR) that will take place within a few months from now. Launch is expected for 2020 with a 3-5 years design lifetime.

We will present the scientific objectives of the mission, and the current status of the payload and platform concepts. An overview of the main in-flight calibration strategies will be given, and the expected performance of the O_3 level-2 product for the different modes of observation will be shown.