The UVSQ- SAT mission dedicated to the observation of the Earth and the Sun

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Résumé

The Earth energy imbalance is an essential climate variable and is a metric to quantify climate change. This value can be computed from the difference between the incoming solar radiation and the outgoing reflected and infrared radiation at the top of the atmosphere. The UVSQ-SAT satellite, launched in January 2021, measures those different flux thanks to miniaturized sensors on-board a 1U Cubesat (11.10 cm × 11.10 cm × 11.35 cm). Attitude determination of the satellite is crucial to correct the measured flux from the angle of the sensors to the considered source. Methods were developed to determine the UVSQ-SAT attitude based on the available sensors on-board and models. Deterministic algorithms were implemented based on Kalman filters to correct the signals from noise and apply real time calibration. Moreover, a neural network was validated on-ground and is currently in development in orbit to ensure a better accuracy for attitude determination. Thereby, UVSQ-SAT observations and computations allow to draw terrestrial radiation maps.

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