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UVSQ-SAT Attitude Determination to Map the Earth's Radiation Budget

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The energy balance of the earth is an essential climate variable. At the top of the atmosphere, this variable may be measured by calculating the difference between incoming solar flux and outgoing reflected and infrared flux. This is the goal of the UVSQ-SAT mission, which validates miniaturized technology onboard a CubeSat with 1U specifications (11.10 cm × 11.10 cm × 11.35 cm). This satellite was launched into orbit by Space X's Falcon 9 rocket in January 2021 and is fully operational.
Indeed, knowing this orientation allows you to separate the various fluxes and adjust them from the angle to the considered source (Earth, Sun). Different approaches were used to derive the satellite's attitude based on Sun and Nadir pointing as well as data from the inertial measurement unit (IMU). Based on the available sensors, determinists methods and neural networks were constructed to ensure more precise knowledge of attitude determination in all configurations (daylight and eclipse). In order to determine the satellite's orientation, a multilayer perceptron was trained. The varied fluxes were derived from the sensor inputs at each time based on the attitude received.

Field

Not in the above

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