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PRETTY – A CUBESAT MISSION FOR PASSIVE REFLECTOMETRY AND DOSIMETRY

Abstract

Earth observation is one of the essential Space applications. Observation of the climate change and prediction of its further evolution requires advanced technology for measuring all aspects influencing the climate, like changes in the Earth's ice and water heights.

The PRETTY (Passive REflectomeTry and DosimeTry) CubeSat mission is intended to measure these influences on the climate, hosting two scientific payloads for passive reflectometry and dosimetry.

The first payload is a passive reflectometry system focusing on grazing elevation angles, which uses direct and reflected GPS signals for Earth observation, in particular observing the height variations of ice and sea surfaces. The ground trace for reflection measurements is about 15kmx15km, which improves our understanding of the total ocean energy transport and its role in the Earth's climate change.

The second payload is for monitoring the cosmic radiation on-board of the PRETTY spacecraft. The radiation environment is then correlated with the status of the electronic systems of the satellite bus and the payload systems, appraising the impact of cosmic radiation on CubeSat customer-off-the-shelf (COTS) components. The dosimeter system aims the determination of the total ionising dose (TID) due to cosmic radiation based on radiation-sensitive field-effect transistors (RADFETs) and a floating gate dosimeter (FGDOS) with an accuracy of up to 20mrad.

The launch of the PRETTY spacecraft is foreseen in early 2022.