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MINIATURE RADIATION SPECTROMETER HARDPIX

Abstract

HardPix is a miniature radiation monitor based on the Timepix3 sensor and developed for space application by the Institute of Experimental and Applied Physics, Czech Technical University in Prague (IEAP CTU). Its low volume (10.1 U), mass (150 g), power consumption (2 W) and cost make it ideal even for small cubesats and networks of space weather monitoring nanosatellites. Thanks to the built-in onboard processing it can provide particle identification, energy spectra, flux and dose rates using minimum data transfer rates allowing for continuous operation. It is building upon the space heritage of SATRAM, IEAP CTU's radiation monitor onboard ESA Proba-V satellite celebrating 10+ years of ongoing operation in space since 2013, as well as upon REM units onboard ISS. The first HardPix was launched onboard D-Orbit ION satellite in June 2023, two more units will be part of ESA's European Radiation Sensors Array (ERSA) onboard Lunar Gateway, with several more missions already in preparation including another mission to ISS.