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The ECP-Lite Space Radiation Sensor is a space-worthy device that can be hosted on satellite platforms to provide in situ sensing of the space weather environment. Collecting space weather information on-board the host satellite provides situational awareness of the radiation environment and hazards such as surface charging or single event effects (SEEs) that operators or algorithms can use to adjust the operating parameters of other instruments (e.g., switching to “safe mode”). The data also can be leveraged to explain anomalies in telemetry or unusual spacecraft behavior. Collected data can be used on board the spacecraft, at a dedicated ground station, or shared with a central database maintained by a Government agency to contribute to improved knowledge of the natural/ambient radiation environment in orbit regimes of operational relevance to satellite operators. This could be a “one stop shop” for space weather analysis data to complement observations from the Space Weather Prediction Center operated by the National Oceanic and Atmospheric Administration (NOAA).

The device contains 6 micro-sized radiation detectors, 2 photodiodes, an electrostatic discharge recorder, surface charging plate, and 1 surface dosimeter which measures plasma currents in a 2.5 kg, 1667 cc package. Each dosimeter will measure the total-ionization-dose (TID) behind a specified shield thickness. Shield thicknesses are chosen to create electron and proton integral energy channels that are used to derive a dose-depth curve data product for long-term assessment of total ionizing dose and near-instantaneous dose rates (and equivalent integral proton and electron flux) at various depths for shorter-term hazard assessments.

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