

Compact Sensor Package Provides Adaptable Solution to Space Weather Awareness

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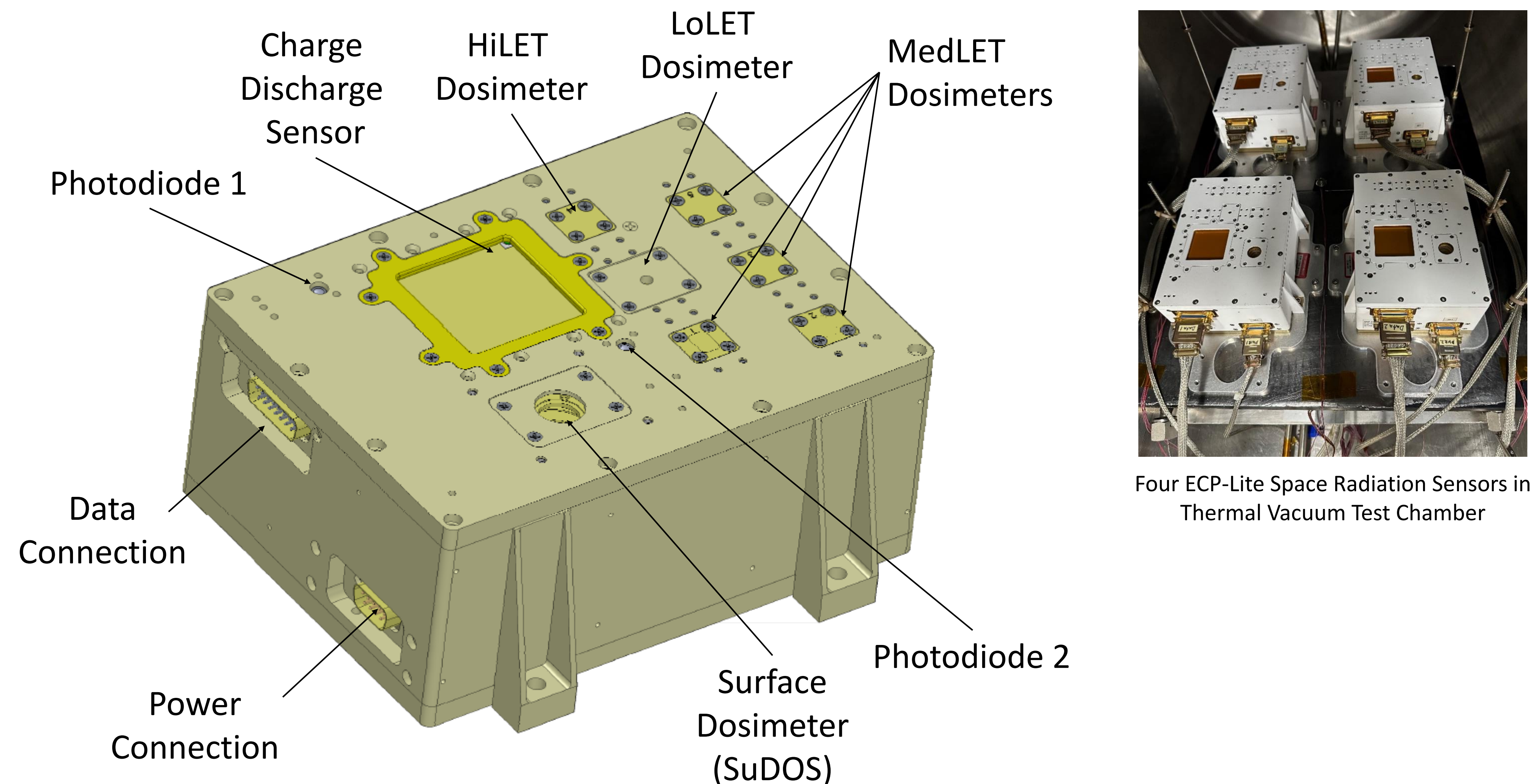
Background

- ▶ Energetic Charged Particle (ECP-Lite) Space Radiation Sensor is a space-qualified device that can be hosted on satellite platforms to provide *in situ* sensing of the space weather environment
- ▶ Measures ionizing radiation dose rates to silicon in addition to plasma currents, and external illumination
- ▶ Data can be used in multiple ways
 - Informs automatic “safe mode” algorithms of spacecraft
 - Helps operators understand system anomalies
 - Contributes to space weather database to improve knowledge of natural/ambient radiation environment

Features / Specifications

- ▶ 6 micro-sized radiation detectors (dosimeters)
- ▶ 2 photodiodes
- ▶ 1 charge discharge sensor
- ▶ 1 surface dosimeter
- ▶ Construction materials meet Class 2 mission requirements of NASA EEE-INST-002
- ▶ Standard 15-pin RS-422 (ANSI/TIA/EIA-422-B) data interface
- ▶ Overall Size: 6.9 x 6.1 x 2.9 inches (17.5 x 15.5 x 7.4 cm)
- ▶ Mass: 5.5 lbm (2.5 kg)
- ▶ Housing Volume: 102 inches³ (1667 cm³)

Instrument Configuration



Benefits

- ▶ Characterization of orbital environments
- ▶ Provides ability to analyze and determine effects of space weather events and environments
- ▶ Constellation monitoring / anomaly diagnosis support
- ▶ Standardized hardware and software interfaces
- ▶ “Bolt-on” design integrates easily with host spacecraft
- ▶ Small footprint, low mass, low power (< 4.0 Watts)

Abbreviated References

1. U.S. Air Force Space Situational Awareness Policy for Energetic Charged Particle (ECP) Monitoring Capability (SecAF Memo Dated 17 March 2015).
2. <https://aerospace.org/article/ecp-lite-understand-space-weather-impacts-spacecraft>, Dec 27, 2021.
3. https://www.tbe.com/en-us/suppliers/SiteAssets/0628_Teledyne%20Space%20Radiation%20_2023.pdf, June 2023.
4. <https://www.teledynedefenseelectronics.com/e2vhrel/Documents/Teledyne%20Micro%20Dosimeter%20Presentation%20-%202016th%20April%202021.pdf>

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