

SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Radiation Fields, Effects and Risks in Human Space Missions (5)

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DEEP-SPACE RADIATION ENVIRONMENT ASSESSMENT WITH A NOVEL SPACECRAFT AND A  
NEWER PAYLOAD

**Abstract**

Shinen2 is in an elliptical orbit around the Sun, traversing between Venus and Mars orbits since December 2014 that was launched by JAXA as part of Hayabusa2 spacecraft of Japan. Shinen2 spacecraft, designed and built by the Kyushu Institute of Technology (KIT-Japan), is a hexagonal shaped, 15-kg, 47 x 49x 49-cm structure built with light-weight and durable Carbon Fiber Reinforced Polymer (CFRP) with dual batteries charged by solar panels on each side of the structure and redundant UHF transmission systems at 437 MHz. Shinen2's only payload is a radiation detector, designed and built by Prairie View A&M University in collaboration with NASA Johnson Space Center (NASA-JSC). This payload uses two CMOS (Complementary Metal Oxide Semiconductor) sensors and custom designed radiation-hardened FPGA (field-programmable gate array) along with other radiation hardened electronics to sustain the deep-space radiation environment with capability to estimate energy and measure the particle flux of radiation environment in deep-space. Initial data and progress with data after one orbit around the sun nearing Venus orbit will be discussed along with current plans for the second orbit around the sun nearing Mars orbit.