SRAG Measurements performed during the Orion EFT-1 Mission

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on behalf of the SRAG EFT-1 Team

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The Exploration Flight Test 1 (EFT-1) was the first flight of the Orion Multi-Purpose Crew Vehicle (MPCV). The flight was launched on December 5, 2014, by a Delta IV Heavy rocket and lasted 4.5 hours. The EFT-1 trajectory involved one low altitude orbit and one high altitude orbit with an apogee of almost 6000 km. As a result of this particular flight profile, the Orion MPCV passed through intense regions of trapped protons and electron belts.

In support of the radiation measurements aboard the EFT-1, the Space Radiation Analysis Group (SRAG) provided a Battery-operated Independent Radiation Detector (BIRD) based on Timepix radiation monitoring technology similar to that employed by the ISS Radiation Environmental Monitors (REM). In addition, SRAG provided a suite of optically and thermally stimulated luminescence detectors, with 2 Radiation Area Monitor (RAM) units collocated with the BIRD instrument for comparison purposes, and 6 RAM units distributed at different shielding configurations within the Orion MPCV.

A summary of the EFT-1 Radiation Area Monitors (RAM) mission dose results obtained from measurements performed in the Space Radiation Dosimetry Laboratory at the NASA Johnson Space Center will be presented. Each RAM included LiF:Mg,Ti (TLD-100), ^{6}LiF:Mg,Ti (TLD-600), ^{7}LiF:Mg,Ti (TLD-700), Al_2O_3:C (Luxel^{TM}), and CaF_2:Tm (TLD-300). The RAM mission dose values will be compared with the BIRD instrument total mission dose.

In addition, a similar comparison will be shown for the ISS environment by comparing the ISS RAM data with data from the six Timepix-based REM units deployed on ISS as part of the NASA REM Technology Demonstration.