

Abstract Submitted
for the MAS14 Meeting of
The American Physical Society

Development of the Spacecraft Environmental Anomalies Expert System (SEAES) at NASA DHANESH KRISHNARAO, American University & NASA Goddard Space Flight Center, YIHUA ZHENG, MARLO MADDOX, NASA Goddard Space Flight Center, TYLER SCHIEWE, Linfield College & NASA Goddard Space Flight Center — We develop and implement a post-anomaly analysis and monitoring tool for NASA satellite operators to understand causes for specific spacecraft anomalies and specify thresholds for future watches and warnings. A hazard quotient showing the ratio of instantaneous to mission averaged likelihood of an anomaly is available for four space weather hazards at geosynchronous orbit (GEO): surface charging, internal charging, single-event effects (SEE) from solar energetic particle events (SEP), and total dose to solar arrays. We use the algorithms and rules developed by O'Brien (2009) as a guideline and make modifications to improve accuracy and account for more recent satellite data. In conjunction with the Community Coordinated Modeling Center (CCMC) at NASA Goddard Space Flight Center (GSFC), we will provide hazard quotients in the Space Environment Automated Alerts & Anomaly Analysis Assistant (SEA⁵), a comprehensive analysis and dissemination system currently under development. In the future, we plan to expand the system to other orbits such as those in Low Earth Orbit (LEO), Middle Earth Orbit (MEO), High Earth Orbit (HEO) and those in the interplanetary space.

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Date submitted: 25 Aug 2014

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