

Project Details

ROSES ID: NRA-01-OSS-01

Selection Year: 2002

Program Element: Independent Investigation: Geospace LWS

Project Title:

Variability in the Low Earth Orbit Plasma Environment

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Summary:

The goal of the study is to improve scientific knowledge of plasma environment variability in low Earth orbit (LEO) over a solar cycle and develop models of the variability that enable cost-effective design of spacecraft and subsystems. The models will aid the spacecraft designer in minimizing damage and effects of the space plasma environment on their systems by providing ready access to statistical estimates of variations in plasma number density and temperatures from mean values. This information is required for use in spacecraft charging calculations and other plasma effects on spacecraft for quantitative estimates of space environment impact. The proposed work will analyze the LEO plasma environment using historical data sets of plasma number density and temperature available from a variety of sensors onboard spacecraft to produce environment definitions that can be used in spacecraft charging, sputtering, and other plasma analysis. A range of altitudes from 200 km to 2000 km is the primary goal, including the range of altitudes from 750 km through 900 km often used for polar orbit missions and the 350 km to 450 km range of altitudes planned for International Space Station (ISS) operations throughout the ISS mission lifetime. The overall program management and coordination of this proposal will be performed by NASA's Space Environments and Effects (SEE) Program. This Program is customer-driven and product-oriented and is considered a "One-Stop-Shop" for providing environment specification models and effects tools by providing synergy and a seamless transition between modeling the environment and the effects due to the space environments. The SEE Program will manage the environment specification modeling effort of this proposal and coordinate the distribution of its product each year through the SEE website and to the Living With A Star Targeted Research and Technology Program.

Publication References:

Summary: "

Reference: LEO Plasma Environment Variability - Kauffman, Billy MSFC

Summary: no summary

Reference: McNamara, H.; Jones, J.; Kauffman, B.; Suggs, R.; Cooke, W.; Smith, S.; (2004), Meteoroid Engineering Model (MEM): A Meteoroid Model For The Inner Solar System, Earth, Moon, and Planets, Volume 95, Issue 1-4, pp. 123-139, doi: 10.1007/s11038-005-9044-8