

Space Environmental Effects Testing Capability at the Marshall Space Flight Center

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Understanding the effects of the space environment on materials and systems is fundamental and essential for mission success. If not properly understood and designed for, the effects of the environment can lead to degradation of materials, reduction of functional lifetime, and system failure. In response to this need, the Marshall Space Flight Center has developed world class Space Environmental Effects (SEE) expertise and test facilities to simulate the space environment. Capabilities include multiple unique test systems comprising the most complete SEE testing capability available. These test capabilities include charged particle radiation (electrons, protons, ions), ultraviolet radiation (UV), vacuum ultraviolet radiation (VUV), atomic oxygen, plasma effects, space craft charging, lunar surface and planetary effects, vacuum effects, and hypervelocity impacts as well as the combination of these capabilities. In addition to the uniqueness of the individual test capabilities, MSFC is the only NASA facility where the effects of the different space environments can be tested in one location. Combined with additional analytical capabilities for pre- and post-test evaluation, MSFC is a one-stop shop for materials testing and analysis.

The SEE testing and analysis are performed by a team of award winning experts nationally recognized for their contributions in the study of the effects of the space environment on materials and systems. With this broad expertise in space environmental effects and the variety of test systems and equipment available, MSFC is able to customize tests with a demonstrated ability to rapidly adapt and reconfigure systems to meet customers' needs. Extensive flight experiment experience bolsters this simulation and analysis capability with a comprehensive understanding of space environmental effects.