

The Influence of Free Space Environment in the Mission Life Cycle: Material Selection

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Abstract

The natural space environment has a great influence on the ability of space systems to perform according to mission design specification. Understanding the natural space environment and its influence on space system performance is critical to the concept formulation, design, development, and operation of space systems. Compatibility with the natural space environment is a primary factor in determining the functional lifetime of the space system. Space systems being designed and developed today are growing in complexity. In many instances, the increased complexity also increases its sensitivity to space environmental effects. Sensitivities to the natural space environment can be tempered through appropriate design measures, material selection, ground processing, mitigation strategies, and/or the acceptance of known risks. The design engineer must understand the effects of the natural space environment on the space system and its components. This paper will discuss the influence of the natural space environment in the mission life cycle with a specific focus on the role of material selection.