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SPACE ENVIRONMENT EFFECTS ON ORBITAL SPACE SYSTEMS

> ABSTRACT

In order to utilize space for scientific and commercial purposes it is necessary to understand the Low Earth Orbit (LEO) space environment where most of the activities are now, and will, be carried out.

LEO environment includes severe hazards such as Atomic Oxygen (AO), Ultraviolet (UV) Radiation, Ionizing Radiation, High Vacuum, Plasma, Micrometeoroids And Debris, Severe Temperature Cycles and, for some systems, the Re-Entry Environment. It is important to note that these environmental characteristics do affect the materials and structures at the same time, with a remarkable synergistic effect. Analyze and comprehend the operative environment becomes a key point to extend operative life of satellites and structures and to withstand aggressive conditions as re-entry phase is. In fact Re-entry mission evolution requires to develop reusable integrated systems, which in turns should be based on advanced materials able to deal with the harsh space environmental conditions. In particular, long duration missions are putting and will put aerospace vehicle structures to the test of onerous exposition, as said, to critical orbital phenomena which may seriously downgrade the materials performance and compromise a critical phase as the re-entry is.

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