

IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)  
Space Environmental Effects and Spacecraft Protection (6)

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## MMOD AND RADIATION SHIELDING SOLUTIONS FOR SPACE INFLATABLE MODULES

**Abstract**

As well known, space environment poses great threats to safety and sustainability of space missions. One of the most concerning factors is the presence of micro meteoroids, space debris and radiation. Micro

meteoroids and debris are a common aspect in Low Earth Orbit, they can travel at very high speeds making a collision with an orbiting spacecraft potentially catastrophic. On the other hand, ionizing radiations are an omnipresent danger for both astronauts and spacecrafts that require effective countermeasures to avoid premature degradation of the system and life-threatening effects on humans. Therefore, to protect astronauts and spacecrafts against deadly amounts of radiation and potential impacts, shielding is a crucial technology to be implemented. This can be achieved using laminate structures composed of high impact resistant materials, such as Kevlar and other advanced composites, and high atomic number elements which effectively absorb and block ionizing radiations. The proposed solution is applied in the design of an inflatable module developed by a group of international students from the SEEDS Master Programme, to bring advantages in terms of size and weight of the protective layers, with consequent reduction of launch cost.