

**Space Exploration, challenges and opportunities for humans and materials**

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Since the beginning of the space era it has been evident that space exploration is tough, not only because of the challenges of space launches, but also due to the harsh environment in space, and on planets. Vacuum, extreme temperatures, modified gravity, ionizing radiation, plasma, meteoroids, debris and dust are “normal” characteristics of the earth orbit and planetary environments. Not only these features pose significant survival issues for human, animal and plant life, but also for the systems, equipment and materials required to operate under the burden of these extreme environmental conditions.

This presentation, after illustrating "where we are" and "where we'll be" in the next few years, will exemplify such challenges and countermeasures, but also describe some opportunities offered by such unique environment to study and develop new materials and processes.