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EXPLOITATION OF SPACE MINERAL RESOURCES: ENERGETIC PARTICLE RADIATION ISSUES

Abstract

Since 2013, many leaders of international commercial ventures have announced their aspirations to initiate robotic and human missions to the Asteroids. Investigations are presently ongoing into the law and policy related to the exploitation of Space Mineral Resources (SMR) at these bodies and much consideration has already been devoted to ensuring commercial success in this activity. Success will depend, inter alia, on ensuring that a spacecraft on such a mission will not fail, during its design lifetime, due to the impingement on it in space of energetic particle radiation. Further, in the case of a crewed mission, measures require to be taken during both the design and operational phases to limit the health risks incurred by personnel due to energetic particle radiation exposure to levels based on legal, ethical and financial considerations. The present paper presents the risks potentially incurred in course of a representative SMR mission by both equipment and humans due to Galactic Cosmic Radiation and, hard spectrum, Solar Energetic Particle (SEP) radiation. An outline of some of the mitigating strategies developed in response to the problems posed in space by energetic particle radiation is also presented.