

IAF HUMAN SPACEFLIGHT SYMPOSIUM (B3)
Advanced Systems, Technologies, and Innovations for Human Spaceflight (7)

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ENABLING TECHNOLOGIES FOR MORE EFFICIENT AND SAFE EXTRAVEHICULAR
ACTIVITIES ON ROCKY PLANETARY SURFACES

Abstract

During Extravehicular Activities, astronauts are asked to explore and perform different tasks once exposed to the harsh environment of Moon and Mars rocky surfaces. So far space suits and tools were designed just to provide the minimum required to survive, such as basic life support systems, and to perform simple tasks like terrain sampling. In order to become an interplanetary species and go through the steps agreed on the Global Exploration Roadmap (GER), in future missions, astronaut will need to perform more complicated tasks and need to be equipped with comprehensive and advanced space suit and tools in order to face any possible circumstance and enable to have more flexible mission planning. Little has been done up to date in order to enhance human capabilities when visiting other celestial bodies despite having already some good solutions in tech already. In this paper we discuss some of the technologies that might help future astronauts in performing EVAs in an easier, safer and more efficient way other than suggesting new equipment and technologies to be carried on in future missions and to be implemented into spacesuits in order to perform tasks such as Moon speleology . In particular, navigation problems such as bad light inclination and shadows through terrain traversal have been considered, solved with a laser grid flashlights, and the implementation of augmented reality visors relying on real time data analysis for safe navigations.