SPACE LIFE SCIENCES SYMPOSIUM (A1)
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Author: Ms. Vinita Marwaha Madill
VEGA Space GmbH, United Kingdom

# DEVELOPMENT OF EVA SUIT DESIGN AND OPERATIONAL PROCEDURES FOR LUNAR EXPLORATION

**Abstract**

Extravehicular Activity (EVA) is an essential component to allow for future human lunar exploration to succeed. Key design and development considerations for future lunar EVA needs will be investigated. Extravehicular mobility units (EMUs), spacesuits, with increased capabilities and flexibility in their use will be required, containing the ability to withstand the lunar environment.

Issues investigated in relation to EVA suit design include lunar dust. This in particular would pose a hazard to a human rated mission to the Moon and will be examined. A solution must be found for the abrasion of Apollo astronauts' spacesuits whilst taking part in lunar EVA. This abrasion affected both pressure retention and impaired visibility. Additional exposure to fine-grained particles of lunar dust has been indicated to be the cause of numerous health problems for the astronauts. These factors must be taken into account during the design process of an EVA suit for use on the lunar surface along with dust mitigation technologies.

A robust training scheme forms the basis for a successful mission. The first step towards developing the needed infrastructure for exploration extravehicular activity (EVA) training is to define and understand the EVA operations that will be required to achieve lunar exploration. A review of Apollo and International Space Station (ISS) lessons learned, concerning EVA operations and training is conducted. Analyses from this review are modified in the context of future exploration missions, including the International Space Exploration Committee Group (ISECG) reference architectures. Recommendations for EVA suit design and training operational procedures are suggested, based on the aforementioned review and tailored modifications towards human exploration. Initial theories to develop these designs and recommendations will be presented based on my conclusions and successive independent analysis.