

SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 3 (2C)

Author: Ms. Sandra Podhajsky
OHB System AG-Bremen, Germany, sandra.podhajsky@ohb-system.de

Mrs. Antonella Sgambati
OHB System AG-Bremen, Germany, antonella.sgambati@ohb-system.de

Dr. Klaus Slenzka
OHB System AG-Bremen, Germany, klaus.slenzka@ohb.de

ENGINEERING APPROACH OF AN AUTOMATED, BIOLOGICAL LUNAR PAYLOAD

Abstract

The strong adhesive and abrasive properties of lunar dust to nearly all materials and its ability to even get within space suits of astronauts is a concern for future human missions to the Moon. Therefore, the long term effect of lunar dust on biological systems and humans needs to be further investigated. In an automated, biological lunar payload volume and mass is very restrictive on scientific research, however, fundamental questions about e.g. its effect on plant growth for regenerative life support systems or its toxicity on the human system through studying wound healing in human cells can be properly investigated. The payload design is suggested to be in a modular way to support adaptability of the payload to different mission scenarios, flight opportunity and experiments. It is based on a common service-platform with power and control unit, sensors, sample collector and gas interfaces. The small sampling unit will gather dust and distribute it to the different biological samples in the different modules. In parallel radiation dose measurements shall be undertaken to support reference studies with lunar soil simulant on ground with the necessary information on other environmental influences, to filter out other side effects that are not lunar-dust based. The basic design of such a modular payload is described, its flexibility to adapt to different lunar lander designs, the potential in answering different scientific questions, as well as the expandability to other fields is presented in the paper.