Paper ID: 45722
oral
student

21st IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM (A5)
Interactive Presentations - 21st IAA SYMPOSIUM ON HUMAN EXPLORATION OF THE SOLAR SYSTEM (IP)

Author: Mr. Marius Schwinning
Institute of Space Systems, University of Stuttgart, Germany, schwinning@irs.uni-stuttgart.de

Mr. Jonathan Skalden
Institute of Space Systems, University of Stuttgart, Germany, skalden@irs.uni-stuttgart.de
Prof. Reinhold Ewald
Institute of Space Systems, University of Stuttgart, Germany, ewald@irs.uni-stuttgart.de

CONCEPTUAL DESIGN OF A PERMANENT LUNAR SURFACE BASE

Abstract

Almost half a century after the last Apollo mission, global endeavor turns towards the Moon again. Several missions in preparation by space agencies and private companies currently target a variety of Lunar science and exploration purposes. In addition to that, a project led by the International Space Station partners conceptualizes a waypoint architecture having become known as Deep Space Gateway or Lunar Orbital Platform Gateway, in a near rectilinear halo orbit in the vicinity of the second Earth Moon Libration Point. These plans are in line with the Global Exploration Roadmap released by the International Space Exploration Coordination Group ISECG. With these ongoing activities in mind, the Stuttgart Space Station Design Workshop (SSDW) 2018, hosted by the Institute of Space Systems (IRS) at the University of Stuttgart, investigated possible designs for a Lunar surface base as follow-on milestones. In 2015 and 2016, the SSDW focused on mission concepts for a space station in cis-lunar space. In 2018, two interdisciplinary teams composed of international students and young professionals, supported by experts from industries and universities, tackle the challenge of performing a phase 0 design of a permanently manned habitat in the South Pole area of the Moon. The mission designs include mission analysis, subsystem design and programmatic aspects, derived from various trade-off studies performed in the one-week competitive work environment of the SSDW. The paper compares and discusses the outcome of the workshop, identifying key drivers for future lunar surface exploration just in time for the emerging global visionary projects