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Author: Ms. Csilla Orgel
Freie Universitaet Berlin, Germany

TRAVERSES FOR THE ISECG-GER DESIGN REFERENCE MISSION FOR HUMANS ON THE LUNAR SURFACE

Abstract

This study explores the Design Reference Mission (DRM) architecture developed by Hufenbach et al. (2015) as a prelude to the release of the 2018 Global Exploration Roadmap (GER) developed by the International Space Exploration Coordination Group (ISECG). The focus of this study is the exploration of the south polar region of the Moon, a region that has not been visited by any human missions, yet exhibits a multitude of scientifically important locations – the investigation of which will address long standing questions in lunar research. This DRM architecture involves five landing sites (Malapert Massif, South Pole/Shackleton Crater, Schrödinger Basin, Antoniadi Crater, and the South Pole-Aitken Basin center)to be visited in sequential years by crew, beginning in 2028. Two Lunar Electric Rovers (LER) are proposed to be tele-robotically operated between sites to rendez-vous with crew at the time of the next landing. With engineering parameters in mind we explore the feasibility of tele-robotic operation of these LERs between lunar landing sites, and identify potential high interest sampling locations en-route. Additionally, traverses for crew and sample collection sites are identified for each landing site. Both inter- and intra landing site exploration is designed to address a suite of National Research Council (NRC, 2007) scientific concepts.