15th SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Hitchhiking to the Moon (8)

Author: Dr. Rogan Shimmin
International Space University (ISU), United States, rogan.s.shimmin@nasa.gov

Dr. Benjamin Cazzolato
University of Adelaide, Australia, benjamin.cazzolato@adelaide.edu.au
Dr. Vincent Wheatley
University of Queensland, Australia, v.wheatley@uq.edu.au
Dr. Rene Laufer
Baylor University, United States, rene_laufer@baylor.edu
Prof. Hans-Peter Roeser
University of Stuttgart, Germany, roeser@irs.uni-stuttgart.de

APPLICATIONS OF NON-LINEAR PROGRAMMING FOR LUNAR MISSION BW-1 TRAJECTORY
OPTIMISATION TO FURTHER MISSIONS

Abstract

A new method for trajectory optimisation was developed for the all-electric satellite *Lunar Mission BW-1*, proposed by the Institute for Space Systems (IRS) at the University of Stuttgart, due to the long duration of the mission and the many severe non-linearities on the thrust profile resulting from the very-low-thrust propulsion system. This paper presents trajectories for alternative missions that could be undertaken by universities similarly constrained by cost and resources. Such alternative missions include lower complexity lunar missions of larger mass, and corresponding greater thrust; and smaller missions, such as typical nanosats developed by universities. Furthermore, other potential targets of small hitchhiking missions are considered such as the Kordylewski clouds and Near-Earth Objects.