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Space Resources, the Enabler of the Earth-Moon Ecosphere (5)

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ARIZONA STATE UNIVERSITY DESIGN OF PROSPECTING SATELLITE SEGMENT

Abstract

Senior level engineering students are designing, building and testing a major segment of the Zodiac Planetary Services, LLC, (ZPS) Satellite. This tether based orbital platform (around the Moon for this study) will collect surface samples for analyses to help identify locations of minerals and water by using a series of penetrators released from a lower winch station for collection. This mission is to investigate the permanently shadowed regions of the Moon, with drastic cryogenic temperatures, without being "stuck" on the surface. This specific design challenge for these students is to eject the penetrators from a canister as it approaches the surface of the Moon while rotating around a main satellite in low lunar orbit (100 km altitude, 84.5 o inclination). ZPS has funded the Arizona State University's Engineering Program to design, fabricate and test a penetrator. There are many key issues and risks that have been addressed and resolved as a consequence of these tests. This paper discusses the project, the design and the results of the testing.