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Moon Exploration – Part 3 (2C)

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NAVIGATION OF A LUNAR SPACECRAFT AS A SECONDARY PAYLOAD: SPACEIL'S GOOGLE
LUNAR X-PRIZE MISSION

Abstract

SpaceIL plans to be the first non-governmental spacecraft to soft land on the Moon. As a non-profit organization competing in the Google Lunar X-Prize, there is a strong incentive to reduce costs while still maintaining a high probability of mission success. The decision to launch as a secondary payload dramatically reduces the cost of space access for lunar missions. This however adds unprecedented challenges to the mission as a whole, and specifically to the trajectory design and navigation systems. In this research we present the methodology, tools, and novel approaches that the mission analysis team at SpaceIL has been developing to target any landing site on the Moon. The SpaceIL Flight Dynamics system ensures navigation performances to several times better than the transfer trajectory requirements, and better than 500m RMS when orbiting the Moon.