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SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 3 (2C)

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TOWARDS SYSTEM ANALYSIS OF ADVANCED MANNED LUNAR EXPLORATION PROGRAM OPTIONS

Abstract

Manned space flight programs are characterized by a great variety of possible development directions, extended periods of implementation, a wide range of purpose and objectives, an extremely high degree of complexity and heavy expenses required for their implementation. It requires a balanced, rational and integrative approach enabling to achieve scientific, engineering, political and other purposes in an optimal way, with reasonable resource usage that wouldn't have negative social and economic consequences. Manned lunar program provides for development of infrastructure (stations, bases) and for regular space vehicle flights. Many operations of the same kind are supposed: first for developing infrastructure in orbit and on the Moon surface; and then for delivering crews and cargo in both directions ("Moon – Earth" and "Earth – Moon") on a regular basis. The paper describes criteria of quantitative estimation of lunar mission program implementation options based on the analysis of mass properties, reliability characteristic, cost performance and other performance data of advanced space infrastructure elements. As a result of the analysis performed the most efficient options of programs for performing lunar exploration tasks of different time fences and options of lunar exploration Roadmap for different funding levels are offered.