

SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 2 (2B)

Author: Dr. George Karabadzhak
Central Research Institute for Machine Building (FGUP TSNIIMASH), Russian Federation

CAPABILITIES OF RUSSIAN LUNAR ROBOTIC MISSIONS TO SUPPORT FUTURE MANNED
SPACEFLIGHTS TO THE MOON

Abstract

Russian Federal Space Program for 2016-2025 years includes four projects dedicated to lunar robotic exploration. These projects will implement a number of researches and technology demonstration experiments which could provide useful data for future manned exploration missions. Understanding the overall lunar environment, regolith properties, lunar dust aggressiveness, survivability condition, communication capabilities etc. is considered by lunar human exploration community as valuable, highly demanded part of the strategic knowledge to be achieved prior to planning of future manned space missions to the Moon and cis-lunar space. The lunar lander (Luna-25, 27 and 28) and orbiter (Luna-26,27) payloads offer quite specific capabilities to advance this understanding. Also, operational experience gained from various systems of the robotic spacecraft (communication, navigation, hazard avoidance, avionics performance etc.) will help mature critical technologies of future manned space vehicles and habitats, indeed. Russian lunar robotic missions are currently at different development stages. Nearer projects are almost firmly integrated and doesn't assume any modification of the platform design, subsystems and payloads architecture. Nevertheless adjustments of the mission programs towards provision of the data demanded by future human spaceflights are still possible. Farther projects are more flexible, so that specific payloads and experiments supporting future human spaceflight technologies and strategic knowledge acquisition may be considered. Utilization of Russian lunar robotic missions capabilities to support future manned space flights to the Moon surface and cis-lunar vicinity are analyzed in this paper. Mission program adjustments and payload composition proposals, specific to each mission, are suggested. Results of the study are offered to Roscosmos State Corporation for further consideration and practical implementation.