

IAF SPACE EXPLORATION SYMPOSIUM (A3)
Moon Exploration – Part 1 (2A)

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KOREAN LUNAR EXPLORATION PROGRAM STATUS UPDATE

Abstract

According to the 3rd National Space Development Promotion Plan released in early 2018, KARI is developing the KPLO (Korea Pathfinder Lunar Orbiter) collaborating with NASA to demonstrate our technological potential, to pursue economically and strategically valuable resources including minerals and polar volatiles, and to understand the origin and evolution of where we live as well as the Solar system. Five scientific instruments including ShadowCam led by NASA and Arizona state university. ShadowCam is specially being developed to seek for lunar polar volatiles especially in the permanently shadowed regions. ShadowCam will address Strategic Knowledge Gaps, or lack of information required to reduce risk, increase effectiveness, and improve the designs of future human and robotic missions. In parallel, KARI has worked on the conceptual study for lunar lander and rover as well as core technologies including image-based navigation for lander and rover, delay-tolerant network, and rover operational optimization ensure a safe and accurate landing on the moon surface. Additionally, nanosatellites is under study for paradigm shift in the moon exploration to provide a real-time communication relay between the Earth and the lander and rover on the moon surface like MarCO launched with InSight Mars lander mission. In this paper, research and development activities for KPLO and pre-phase A study for lunar lander and associated core technologies are introduced and the strategic knowledge gaps (SKGs) for Korean lunar robotic mission are analyzed by comparing scientific and technological achievements with previous and ongoing lunar missions. In line with NASA's space exploration campaign announced in 2018, Korean government is considering to participate the Gateway program led by NASA. Possible collaborative items are described in terms of technical feasibility, affordability and maturity in negotiation process with international partners and so on. In the near future Korea is definitely expected to make significant contributions to the international communities by pursuing lunar exploration with such diversities.