

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

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## STATUS ON JAPANESE LUNAR POLAR EXPLORATION (LUPEX) PROJECT

**Abstract**

Japanese Lunar Polar Exploration (LUPEX) is the JAXA's first landing project to the polar region on the Moon for exploring water resources and demonstrating mobility by a rover on the Moon. One objective of the project is to obtain data on the quantity and quality of lunar water to clarify whether it can be used for future sustainable activities. Another one is to obtain data to understand the principle of the water distribution and concentration to estimate the quantity and quality of water across the Moon. LUPEX is the joint exploration for JAXA and Indian Space Research Organisation (ISRO). JAXA is mainly responsible for developing a rover system, and ISRO for developing a lander system. The rover and the lander will be integrated and launched by the H-3 rocket at the JAXA's Tanegashima Space Center in Japan. Directly measurement of water by conducting in-situ measurements will achieve the objectives, so the rover has a drilling system to excavate the regolith as well as a sampling system to pick the regolith sample from a designated depth. Several mission instruments to detect water resources will also be loaded on the rover. A representative of them developed by JAXA is the REsource Investigation Water Analyzer (REIWA) that is the integrated instrument of four major sensors; Lunar Thermogravimetric Analyzer (LTGA), TRIPLE-reflection reflectRON (TRITON), Aquatic Detector using Optical Resonance (ADORE), and ISRO's Sample Analysis Package. This is the unique instrument to quantify water and to identify the chemical species related to water resources utilization. JAXA has been conducting a feasibility study on the mission with ISRO, and ISRO-JAXA conducted Joint Mission Definition Review (JMDR) in December 2018. Recently, ISRO-JAXA have almost finished the Phase-A studies. JAXA has completed System Definition Review (SDR) in December 2021 after the selection of the company that develops the rover system, and has also completed the phase transition review (one of the JAXA management reviews) in February 2021. Once the LUPEX project is officially established, the Phase-B activities will start. In this paper, we introduce an overview of the LUPEX project and share the status of the project and development activities of the rover as well as the mission instruments that JAXA develops in the basic design phase. Programmatic and Technical challenges and issues will also be reported.