

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

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

**Abstract**

Lunar Polar Exploration (LUPEX) mission is a joint exploration for Japan Aerospace Exploration Agency (JAXA) and Indian Space Research Organisation (ISRO) in the south polar region on the Moon for exploring water resources and demonstrating mobility by a rover.

LUPEX mainly aims to obtain data for the quantity and quality of lunar water to clarify whether it can be used for future sustainable activities and for understanding the principle of the water distribution and concentration to estimate the quantity and quality of water across the Moon.

LUPEX spacecraft consists of a rover system developed by JAXA and a lander system developed by ISRO. The integrated spacecraft will be launched by the H3 rocket at the Tanegashima Space Center in Japan.

Because of in-situ Direct measurement of water is a key to achieve our mission objectives, seven kinds of instrument are on the rover; 1) Resource Investigation Water Analyzer (REIWA) that consists of four main sensors; Lunar Thermogravimetric Analyzer (LTGA), Triple-reflection reflectron (TRITON), Aquatic Detector using Optical Resonance (ADORE), and Raman Spectrometer, 2) Advanced Lunar Imaging Spectrometer (ALIS), 3) Ground Penetrating Rader (GPR), 4) Mid-infrared Imaging Spectrometer (MIR), 5) Neutron Spectrometer (NS), 6) Exospheric mass Spectrometer for LUPEX (EMS-L), and 7) Permittivity and Thermophysical Investigation for Moon's Aquatic Scout (PRATHIMA). The rover also has a drilling system to excavate the regolith as well as a sampling system to pick the regolith sample from a designated depth up to 1.5 meters.

JAXA has completed the phase transition review (JAXA's management reviews) for LUPEX and LUPEX project team of JAXA was officially established in March 2022. Development of the rover and the ground system has been under the basic design phase and keep testing in the subsystem level by using some bread board models. REIWA and ALIS finished their PDRs to fix the basic design of them in January 2023. They stepped up to the detailed design phase and has started to manufacture their engineering models. We will begin their engineering test from May this year.

In this paper, we will report the project status of LUPEX, especially on the basic design of the rover system and on development of REIWA and ALIS in the detailed design phase.