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

Author: Dr. Gordon Osinski
University of Western Ontario (UWO), Canada

Mr. Perry Edmundson
Canadensys Aerospace Corporation, Canada
Dr. Ed Cloutis
Univeristy of Winnipeg, Canada
Ms. Myriam Lemelin
University of Sherbrooke, Canada
Dr. Caroline-Emmanuelle Morisset
Canadian Space Agency, Canada
Mr. Martin Picard
Canadian Space Agency, Canada
Mr. Tom Lamarche
Canadian Space Agency, Canada
Mr. Benjamin Greenhagen
The John Hopkins University Applied Physics Laboratory, United States
Dr. Martin Smith
Bubble Technology Industries, Canada
Mrs. Tanya Harrison
Earth and Planetary Institute of Canada, Canada
Mr. John Hackett
Canadensys Aerospace Corporation, Canada
Mr. Joshua Newman
Canadensys Aerospace Corporation, Canada
Mr. Joshua Cahill
The John Hopkins University Applied Physics Laboratory, United States
Dr. Anthony Colaprete
NASA Ames Research Center, United States
Mr. Alister Cunje
Western University, Canada
Prof. Michael Daly
York University, Canada
Dr. Roberta Flemming
Western University, Canada
Dr. Craig Hardgrove
Arizona State University, United States
Prof. Christopher Herd
University of Alberta, Canada
Dr. Scott MacEwan
Bubble Technology Industries, Canada
Dr. Catherine Neish

Canada
Mrs. Louisa Preston
University College London (UCL), United Kingdom
Mr. Matthew Siegler
Planetary Science Institute, United States
Dr. Adam Sirek
Leap Biosystems, Canada
Dr. Livio Tornabene
University of Western Ontario (UWO), Canada
Dr. Dave Williams
Leap Biosystems, Canada

THE CANADIAN LUNAR ROVER: A ROVER MISSION TO THE SOUTH POLE OF THE MOON

Abstract

The Canadian Lunar Rover is the first ever Canadian-led planetary exploration endeavour. Funded by the Canadian Space Agency's Lunar Exploration Accelerator Program, Canadensys Aerospace Corporation was selected in November 2022 as the prime contractor for this mission, which aims to land a 35 kg Canadian rover in the south polar region of the Moon no earlier than 2026. The rover will carry 5 Canadian and 1 U.S. scientific payloads and it will fly as part of NASA's Commercial Lunar Payload Services program. The goal is that the rover will be able to operate inside of permanently shadowed regions for up to one hour and survive multiple lunar nights. There are 3 high-level mission objectives for the Canadian Lunar Rover: (1) Demonstrate and characterize Canadian technology on the surface of the Moon; (2) Perform meaningful science; and (3) Increase the Canadian Space Sector's readiness for future lunar missions. Along with the technology-demonstration focus of this mission, there are 3 overarching science objectives: (1) Lunar polar geology and mineral resources; (2) Lunar polar shadow, cold-traps, and volatiles; (3) Environmental monitoring for engineering to ensure the health of future astronaut. Science Instruments: Six main science instruments will be carried by the rover. Stereo cameras. There are two identical forward-looking imagers, tilted downward, located at the top of the rover and separated by 30 cm forming a stereo pair. Multispectral Imager (MSI). This instrument uses LEDs with a wavelength of 365 to 950 nm. The MSI points diagonally downward from horizontal and can image objects ranging from horizontal surfaces to vertical surfaces. Lyman-Alpha Imager (LAI): This instrument will be able to identify the presence of water ice. It will measure lunar surface reflectance at 121.6 nm. Lunar Hydrogen Autonomous Neutron Spectrometer (LHANS). This is a combined neutron and gamma-ray instrument with the overall goal of detecting hydrogen as a proxy for water ice in the south polar region of the Moon. Radiation Micro-Dosimeter. The goal of this instrument is to provide data on the radiation environment through time for the lunar south pole. LAFORGE. The Lunar Advanced Filter Observing Radiometer for Geologic Exploration (LAFORGE) instrument is being provided by the Johns Hopkins Applied Physics Laboratory through a partnership with NASA. LAFORGE will provide high-resolution thermal imaging with an ability to obtain highly accurate temperature measurements across the full range of thermal environments present on the Moon.