

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

Author: Dr. Nadeem Ghafoor
Canadensys Aerospace Corporation, Canada

Mr. Paul Fulford
MDA, Canada

Mr. Howard Jones
MDA, Canada

Mr. Ryan McCoubrey
MDA, Canada

Dr. Gordon Osinski
The Institute for Earth and Space Exploration, Canada

Mr. Hermann Rufenacht
MDA, Canada

Mr. Claude Gagnon
Bombardier Recreational Products, Inc, Canada

2014 TECHNOLOGY DEVELOPMENTS IN PREPARATION FOR A LUNAR POLAR RESOURCE
PROSPECTING MISSION**Abstract**

In contrast to global lunar aspirations at the turn of the century which envisioned a rapid buildup of international surface infrastructure for sustained or even permanent human lunar presence, the decade ahead will feature a more understated but arguably more pragmatic approach to lunar exploration, particularly in light of worldwide economic constraints. Over the next decade complementary robotic missions from various international partners will now contribute to a more gradual build-up of scientific, technology and mission operations experience that enables a more cost-effective approach to lunar exploration going forward while accessing more remote and challenging areas of the lunar surface than ever before.

In 2014 no fewer than 8 space agencies have declared lunar mission plans spanning a dozen missions over the next 15 years. Canada is among these nations, with lunar exploration having been a persistent theme within the national exploration program since 2006. Since then the Canadian Space Agency (CSA) has led a sustained program of exploration development activities in advance of participation in the global lunar endeavour, spanning mission formulation, instrument prototyping, robotic and spacecraft subsystem development and analogue field research.

With the worldwide increased interest in the lunar poles following observations of potentially valuable trapped volatiles at the lunar surface, CSA's preparatory activities have similarly honed in on systems and missions capable of addressing the scientific exploration of the lunar poles. MDA, in collaboration with a large team of companies and universities across Canada, has supported these CSA activities since 2008, from rovers and robotics for Constellation-era outpost development through landers and robotics for the International Lunar Network, to most recently prototyping and flight mission formulation in advance of a potential NASA's Resource Prospector Mission (RPM) in the 2018 to 2020 timeframe.

This paper provides an update on 2013-2014 development activities within MDA and its team members in particular as they pertain to polar missions such as RPM. The paper summarizes the MDA-led RPM rover concept assessment commissioned by CSA in 2013 and subsequent 2014 technology development

activities funded by CSA with MDA including lunar dust mitigation technologies to protect mechanical, electrical and optical components of an RPM-class rover and an RPM-focused DTE lunar communications system prototype. The paper concludes with a discussion of analogue science research and robotic field testing activities conducted in 2014 of particular interest to RPM and similar future missions to the lunar poles.