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

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RISING TO THE CHALLENGE OF NEW LUNAR EXPLORATION

Abstract

The past 2-3 years have seen the global exploration landscape evolve dramatically, particularly in the area of lunar exploration. The first few months of 2018 alone witnessed an increased commitment from the US government to lunar activity, a new ISECG Roadmap with a greater emphasis on cislunar space and infrastructure development. A number of missions continue to be launched from Asia to the lunar surface, while several commercial teams continue to make progress towards affordable commercial delivery options and communications services in and around the Moon by 2020. Momentum appears to well and truly have returned for lunar exploration, just in time for the 50th Anniversary of Apollo, with a diverse fleet of missions and players, and a healthy mix of small, secondary missions accompanying larger human robotic missions.

At the same time, the new phase brings new challenges ranging from the technical to the programmatic. Technically the next generation of missions target more remote destinations, more challenging environments, longer durations and / or more ambitious in situ capabilities. Programmatically however this must all be achieved within the tight resource constraints of modern space today – smaller vehicles, lower costs, a more fluid geopolitical landscape and a strong expectation of immediate socioeconomic return. Success no longer relies solely on technology advancements tailored to the target environment and careful, clever system design to eke out maximum performance from subsystem combinations pushed to

their limit. A more flexible approach is required that can account for evolving geopolitical and economic circumstances, balance both national interests and commercial sustainability, and provide compelling options for broadened collaboration and participation with non-traditional stakeholders – including emerging space nations, the public and even consumer sectors.

This paper provides an update on recent developments underway in Canada, in particular at Canadensys and partners, aimed at meeting these various challenges and improving the viability of both government and private endeavours in new lunar exploration . A number of example activities are discussed from ruggedized low-cost space systems, including low-temperature electronics, mechanisms, thermal and sensors developed in collaboration with the CSA, to examination of next-generation missions across a range of different scales, and payload investigations that span science, education and engagement in support of a more inclusive next phase of international, commercial and private lunar exploration.