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AUSTRALIA'S MOON TO MARS INITIATIVE- TECHNICAL OUTCOMES AND LESSONS LEARNED

Abstract

The Australian Space Agency has established the Moon to Mars initiative which includes lunar rover grant program to support the development of foundational surface mobility services aligned with NASA's Moon to Mars architecture. This initiative funds and guides grantees from conceptual design to preliminary design, incorporating mission assurance principles to ensure the grant projects meet the demands of M2M objectives. The program supports early-stage technology maturation, focusing on key capabilities such as mobility, power, communications, and autonomous navigation which align strongly with Australia's critical tech priority areas such as Robotics, AI, quantum and Net Zero. Grantees were selected based on technical feasibility, innovation, and alignment with M2M program objectives . A structured review framework was implemented, including independent Standing Review Boards, ensuring that designs met mission objectives and lunar environmental constraints. Mission assurance was integrated from the outset, addressing system reliability, redundancy, and risk mitigation. This included industry standard practices to ensure mission assurance. The program also fostered collaboration between government, industry, and academia, accelerating technology readiness levels (TRLs) through iterative design cycles, simulation-based assessments, and prototype testing in lunar analog environments. Lessons learned will inform future lunar and martian initiatives and contribute to sustainable human and robotic operations on moon, mars and beyond. This paper outlines the grant program's structure, progress, and mission assurance strategies, demonstrating how early integration of these elements enhances the reliability and capability of lunar surface assets in support of future M2M exploration and spin off benefits to sectors such as agriculture and mining.