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BUCCANEER MAIN MISSION – LESSONS LEARNED FROM DESIGN AND QUALIFICATION

Abstract

Buccaneer Main Mission (BMM) is the second CubeSat for Australia's Defence Science and Technology Group (DSTG), the successor to the Buccaneer Risk Mitigation Mission (BRMM) CubeSat launched in November 2017. The 6-Unit CubeSat consists of payloads developed by DSTG and the bus developed by Australian satellite company, Inovor Technologies. The key objectives of BMM are: 1) To research calibration of the Jindalee Operational Radar Network (JORN) and ionospheric propagation via a space-based High Frequency (HF) receiver and deployable antenna; 2) to demonstrate space-to-ground, high-speed optical communications via optical transmitter and optical receiver payloads; 3) to use deployable optics to image both the Earth and the satellite itself via the "Manoeuvrable Antenna and Terrestrial Imaging System" (MANTIS) payload; 4) to achieve orbit-wide communications via the Iridium constellation; and 5) to further develop Australian expertise in small satellite development and operations. BMM is scheduled to launch in Q4 2023, and will be operated by DSTG staff through the small satellite ground segment at DSTG Edinburgh, South Australia. Both Engineering and Flight Models have undergone extensive Assembly, Integration and Test (AIT) campaigns, including environmental testing at the National Space Test Facility (NSTF) in Canberra, Australia. These campaigns have provided DSTG and Inovor Technologies personnel with valuable knowledge and experience in qualifying a satellite for launch and testing its operational limits. BMM will provide the first flight in space for the fully-functional HF and MANTIS payloads, and potentially the Inovor Technologies Apogee bus, marking significant milestones for Australia's civil and defence space sectors which have both recently established ambitious goals to augment their respective involvement in space.