

V253a Integration and Verification of the ADCS for the VERTECS CubeSat Mission

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VERTECS is a 6U CubeSat mission developed through joint collaboration between Kyushu Institute of Technology (Kyutech) and external collaborators across Japan, supported by JAXA's Small Satellite Rush (JAXA-SMASH) Program. Its goal is to investigate cosmic star formation history by measuring the extragalactic background light (EBL), a diffuse light thought to originate from first-generation stars or intra-halo light. A 3U optical telescope with a $3k \times 3k$ CMOS sensor captures photometric data in four spectral bands (400–800 nm). Scheduled for a 2025 launch, VERTECS will operate in a sun-synchronous orbit at 576 km altitude. This paper presents the integration and testing of the Attitude Determination and Control System (ADCS) for VERTECS. The ADCS unit interfaces with the satellite BUS via an adapter board, facilitating command and telemetry exchange. Numerical simulations validated its performance across mission phases, ensuring a pointing stability of 10 arcseconds (1sigma) over 1-minute exposures. An ADCS testing facility is being developed at Kyutech for hardware-in-the-loop (HIL) simulations, and confirmation of magnetic and sun sensor and actuator polarization in a simulated orbital environment. These tests will verify ADCS readiness for VERTECS in-orbit operations.