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SINGLE-GIMBAL CONTROL MOMENT GYRO WITH SPHERICAL MOTOR TECHNOLOGY FOR
ATTITUDE DETERMINATION AND CONTROL SYSTEM**Abstract**

This paper introduces a single-gimbal control moment gyro driven by the spherical motor technology for satellite attitude determination and control system (ADCS) applications. Unlike the traditional ADCS utilized three reaction wheels to achieve attitude control, a robust, compact, and power-saving reaction sphere has been developed to minimize satellites' ADCS since 2016. The reaction sphere has two degrees of freedom on the mechanical structure, which can provide angular momentum and torque in two axes with its magnetic topology design and control methodology, bringing the satellite's ADCS the same performance as the traditional system but with less weight, volume, and power consumption. In this paper, the performance of Tensor Tech's reaction sphere based integrated ADCS has been investigated through an ADCS calibration and experiment platform, including an air bearing platform, 3-axis Helmholtz cage, and solar simulator.