

Deploying the NASA Meter Class Autonomous Telescope (MCAT) on Ascension Island

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NASA has successfully constructed the 1.3m Meter Class Autonomous Telescope (MCAT) facility on Ascension Island in the South Atlantic Ocean. MCAT is an optical telescope designed specifically to collect ground-based data for the statistical characterization of orbital debris ranging from Low Earth Orbit (LEO) through Middle Earth Orbits (MEO) and beyond to Geo Transfer and Geosynchronous Orbits (GTO/GEO). The location of Ascension Island has two distinct advantages. First, the near-equatorial location fills a significant longitudinal gap in the Ground-based Electro-Optical Deep Space Surveillance (GEODSS) network of telescopes, and second, it allows access to objects in Low Inclination Low-Earth Orbits (LILO).

The MCAT facility will be controlled by a sophisticated software suite that operates the dome and telescope, assesses sky and weather conditions, conducts all necessary calibrations, defines an observing strategy (as dictated by weather, sky conditions and the observing plan for the night), and carries out the observations. It then reduces the collected data via four primary observing modes ranging from tracking previously cataloged objects to conducting general surveys for detecting uncorrelated debris. Nightly observing plans, as well as the resulting text file of reduced data, will be transferred to and from Ascension, respectively, via a satellite connection. Post-processing occurs at NASA Johnson Space Center.

Construction began in September, 2014 with dome and telescope installation occurring in April through early June, 2015. First light was achieved in June, 2015. Acceptance testing, full commissioning, and calibration of this soon-to-be fully autonomous system commenced in summer 2015. The initial characterization of the system from these tests is presented herein.