Miniature Sensor Technology Integration Satellite: A Team's Success
by:

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Abstract. The third satellite in the Air Force's Miniature Sensor Technology Integration program, MSTI-3, launched May 16, 1996. The primary mission is to characterize atmospheric background clutter by collecting images in the midwave infrared (MWIR) and the shortwave infrared (SWIR). This data will improve current predictive infrared radiance models and the current understanding of atmospheric background clutter as a function of solar geometry, spectral bandpass, season, geographic region, and orthography. This knowledge is critical to evaluating and improving space surveillance systems into the next century.

MSTI-3 is operated out of the MSTI Payload Operations Center (MPOC) in Alexandria, Virginia. The operations architecture incorporates mission planners, command generation members, image processing members, data managers, and spacecraft analysts all in one location. This proximity creates a flexible and efficient working environment invaluable in diagnosing and correcting on-orbit anomalies and in providing quick turnaround of special event experiments. The MSTI team successfully completed on-orbit calibrations during the first month, necessitated by unfinished ground tests and a demanding launch schedule. In addition, the MSTI team has planned, commanded, and executed images of forest fires, hurricanes, volcanoes, and other phenomena requested by the science working group (SWG), as well as the nominal operation scenario.

MSTI-3 has collected over 850,000 calibration and data images to date. This paper discusses the MSTI spacecraft and payload, the mission requirements, launch and operations, and the results. Also included is a discussion of the on-orbit characterization, spacecraft anomalies, and additional tasking that makes operating the satellite such a challenge.