

NASAS THEMIS MISSION: MULTIPOINT OBSERVATIONS OF SUBSTORMS, THE FORESHOCK, AND THE MAGNETOPAUSE

**D.G. Sibeck¹, V. Angelopoulos², M. Kuznetsova¹, K.-H.
Glaßmeier³, and J.P. McFadden⁴**

¹*NASA/GSFC*, ²*IGPP/UCLA*, ³*Technical University, Braunschweig*,
⁴*SSL/UCB*

From launch on February 17 through the repositioning to final orbits that began in September 2007, the five-spacecraft of the THEMIS mission operated nominally in nearly identical 14.6 RE apogee near-equatorial orbits. On March 23, while aligned from east to west in the duskside magnetotail, the spacecraft observed two substorm sequences in fast survey mode. Timing the motion of these signatures served as an early proof of concept for the main phase of the mission: particle injection and dipolarization signatures propagated duskward from one probe to another, as did auroral intensifications seen by the dedicated array of ground-based observatories. During the summer of 2007, the spacecraft were on the dayside, where the three inner spacecraft (C, D, E) were separated by 100-500 km and the two outer probes (B, A) by 5,000 - 10,000 km. Here the THEMIS probes repeatedly encountered the magnetopause and bow shock, dissecting flux transfer events (FTEs), determining the instantaneous width of the low-latitude boundary layer, and simultaneously observing hot flow anomalies upstream and downstream from the bow shock at the moment of their inception. From January to March 2008, the spacecraft were in the Earth's magnetotail with apogees of 31.0, 19.5, 11.8 (2) and 10.0 RE corresponding to periods of 4, 2, and 1 days. Radial alignments once each four days offered an opportunity to pinpoint when and where substorms begin. This talk reviews THEMIS discoveries to date, with an emphasis on model-data comparisons of FTE characteristics