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THE ROLE OF SPACE SYSTEMS BEFORE, DURING, AND AFTER THE APRIL 2011  
SOUTHEASTERN UNITED STATES MULTIPLE TORNADO OUTBREAK

**Abstract**

Space systems played a major role in the unprecedented April 2011 multiple tornado outbreak in the southeastern United States. The massive storm system caused \$11 billion USD in damage and killed 322 people. On 27 April 2011, 292 tornadoes touched down; which remains the highest number of tornadoes ever recorded in a 24-hour period. The most significant damage occurred in State of Alabama where devastating storms destroyed local infrastructure and caused a widespread and prolonged electrical power outage. The blackout affected more than 1.2 million people throughout Northern Alabama. Communications failures dramatically reduced the ability of emergency responders to begin relief and recovery efforts. Public order, health, and safety were threatened by limited access to clean water and reduced hospital operations. Local law enforcement agencies were forced to enact public curfews. The power failure endangered information technology security, affected the functioning of a major military installation, and closed many businesses, compounding economic loss. Space systems assets played a significant role in monitoring, warning, measurement, and recovery throughout this severe weather event and resulting blackout. This paper will review the use of satellite imagery and real-time forecast modeling to help citizens prepare for the storms. Local and federal agencies used satellite imagery and communications to support disaster mitigation, financial damage assessment, and relief and recovery efforts throughout the massive power outage. In the aftermath of this human and financial disaster, the affected communities are examining their resiliency and sustainability in the face of extreme conditions and the role that space systems play in disaster mitigation. This case study will recommend improvements to space systems that support the human condition under stress before, during, and after future severe weather disasters.