186. SPACE ENVIRONMENT MODELING/PREDICTION

PROJECT AT-A-GLANCE

- **AST RDAB POC:** Coleman, Kelvin
- **AST RESEARCH AREA:** 1.1 STM - Integration & Operations
- **PRINCIPAL INVESTIGATOR:** Forbes, Jeff (SU), Fuller-Rowell, Tim (CU)
- **EXECUTION ENTITY:** Stanford, CU
- **PERIOD OF PERFORMANCE:** Jan 3, 2011 - Jan 6, 2012
- **STATUS:** Ongoing

PROJECT DESCRIPTION

PURPOSE: An integrated air and space traffic management system requires seamless and real-time access to density predictions for on-orbit collision avoidance and atmospheric reentry; future knowledge of deleterious particles including energetics, meteoroids, and debris; and near-surface weather prediction.

OBJECTIVES: We will develop (i) a weather prediction model extending from Earth's surface to the edge of space and (ii) a micrometeoroid detection and risk assessment system that, together, predict the environmental conditions needed for safe orbital, entry, descent and landing operations.

GOALS: ● Define the process to develop a weather prediction model extending from Earth's surface to the edge of space (~600 km altitude).

● Define the Process to develop a micrometeoroid detection and risk assessment system that, together, predict the environmental conditions needed for safe orbital, entry, descent and landing operations.

STATEMENT OF WORK

1. Develop a "whole atmosphere model" (WAM) that includes assimilation of real-time data throughout the atmosphere (0-600 km), and that will seamlessly provide neutral and ionosphere densities and wind forecasts throughout the orbital (200-400 km), entry (~80-200 km), and descent and landing (0-80 km) operational regimes.

2. Provide the first characterization of meteoroid parameters, including density, in order to provide satellite risk assessment.