NSF MRI Acquisition: Mobile Integrated Platform for Atmospheric Research (Mobile Skycast™) at Appalachian State University: PI: Thaxton, C.S.

Researchers at the Appalachian Atmospheric Interdisciplinary Research facilities (AppalAIR) at Appalachian State University (APP) and their collaborators request funds to acquire a Mobile Skycast trailer system, manufactured by Radiometrics, Inc, Boulder, CO, USA. Instrument Location: AppalAIR Facility / Department of Physics and Astronomy, Appalachian State University. Code: MRI-24

The Mobile Skycast system from Radiometrics, Inc. (Boulder, CO, USA) includes an MP-3000 radiometer (front); XBS-BL-73e wind profiles (rear); and engineering shed (center). It will allow multiple investigators to obtain spatially distributed vertical profile data necessary to support research projects related to: model development and validation, air quality, solar radiation budgeting, satellite validation, aerosols, microphysical and cloud processes, snowfall, etc.

Example Research Activities to be Enabled:

- **Support of WRF/MPAS model development and validation;**
  *PIs: Thaxton (APP/PHY), deWekker (UVA), Barros (Duke)*

- **Coupling of meteorology, air quality, and solar radiation budget;**
  *PIs: Sherman (APP/PHY), Swarthout (APP/CHE)*

- **Characterization of dynamical and microphysical processes for orographic snowfall;**
  *PIs: Perry (APP/GHY), Thaxton (APP/PHY), Miller (UNCA), Yuter (NCSU)*

The Mobile Skycast trailer system will provide necessary and sufficient real-time data that will allow investigators (APP, Duke, UVA, NCSU, UNCA, NOAA identified to date) to gather data over multiple sites that are within driving distance, effectively replacing the need for a network of fixed data acquisition sites. The only commercially available mobile platform of its kind, the Skycast system includes a MP-3000 radiometer which measures brightness temperature in the vapor and oxygen bands; cloud base temperature and height; and temperature, vapor, humidity, and liquid profiles (up to 10km); as well as surface meteorology and GPS data. The Skycast also includes a XBS-BL-73e wind profiler which measures wind speed and direction profiles to 2-4km. The trailer comes with a climate controlled engineering shed, all mounting hardware, calibration packages, and spare parts. The included RAOB software synthesizes output from all instruments into a suite of integrated diagnostics for operational fore- and now-casts and model validation. The Skycast system would be critical in developing competitive, cross-disciplinary research proposals that address some of the most pressing questions in atmospheric science. Additionally, it will provide: hands-on research opportunities and a rich dataset for undergraduate and graduate student research; a platform for recruiting under-represented students in STEM; a K-12 and community college mobile atmospheric science outreach platform for the region.