



## **University of Colorado at Boulder Center for Environmental Technology**

### **P-3 Program Goals for CLASIC**

The Department of Energy's Cloud and Land Surface Interaction Campaign (CLASIC) is being conducted to study land surface interaction mechanisms leading to the production of cumulus convection and the impact of these mechanisms on the land surface and atmospheric energy budget. Primary among the various mechanisms leading to cumulus convection is latent heat transfer into the convective boundary layer through evaporation and transpiration. The CLASIC experiment will utilize the Department of Energy's ARM instrument facilities and USDA and Oklahoma Mesonet surface sites in central Oklahoma.

A coordinated experiment, the Cumulus Humilis Aerosol Processing Study (CHAPS), will be run in conjunction with CLASIC. CHAPS is focused on studying the impact of aerosols on cumulus formation. Both CLASIC and CHAPS are to take place from June 9 (first potential fly day) through June 30 (last fly day) and will involve a total of nine aircraft, including the NASA P-3.

The University of Colorado's Polarimetric Scanning Radiometer (PSR/CXI) will operate aboard the NASA WFF P-3 at 25,000 feet altitude to provide soil moisture maps over a wide area of Oklahoma during CLASIC. Approximately seven sorties will be flown to provide soil moisture maps during critical post-frontal and dry-down periods along with observations of soil moisture both before and after the winter wheat harvest. The soil moisture maps will also serve to provide validation data for the NASA Aqua satellite, which will pass over the CLASIC survey area three times during the mission. Instrument requirements and goals for the deployment are as follows:

#### **High Level Requirements**

- Demonstrate the utility of airborne soil moisture imaging for studying the impact of surface heat and moisture fluxes on convection.
- Develop soil moisture maps using the PSR/CXI instrument over a ~250 x 180 km grid located in central Oklahoma throughout the month of June.

- Operate the PSR on the NASA P-3 in coordination with other CLASIC aircraft, including the NASA ER-2.

### **Minimum Success Criteria**

- Fly the PSR over the CLASIC grid during at least 4 CLASIC survey sorties, and ideally seven sorties.
- Obtain C- and X-band brightness maps and derived soil moisture maps for these sorties.
- Map soil moisture over the CLASIC grid during at least one NASA Aqua overpass.

### **Comprehensive Success Criteria**

- Provide soil moisture data obtained during several sorties to the ARM and NASA Aqua archives for scientific interpretation along with other ARM CLASIC and CHAPS data

### **About the Center for Environmental Technology**

The Center for Environmental Technology (CET) was established in 2006 in the College of Engineering and Applied Science at the University of Colorado at Boulder. The Center was established in cooperation with the National Oceanic and Atmospheric Administration to support the development of advanced environmental sensors for use by governments, industry and academia. CET provides expertise for the development of new in situ and remote sensing concepts and systems through cross-linkages with faculty across the CU campus and collaborators within the CU Cooperative Institute for Research in Environmental Science and the NOAA Earth System Research Laboratory. CET is directed by Professor Al Gasiewski, former chief of the NOAA Environmental Technology Laboratory Microwave Systems Development Division. <http://cet.colorado.edu>

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