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Final Report on NPS/CIRPAS support of DOE Classic Experiment

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CIRPAS

Center for Interdisciplinary Remotely-Piloted Aircraft Studies

Final Report on CIRPAS operations in the CLASIC experiment, 2007.

The Department of Energy conducted the Cloud-Land Surface Interaction Campaign (CLASIC) in Poncha City Oklahoma, in June 2007. The purpose of the experiment was to study the influence of different surface conditions on properties of small cumulus clouds. The Oklahoma site provided climatologically arid surface in the western part of the state, and lush green conditions in the eastern part. The summer of 2007, however, was exceptionally wet, with flooded fields and rivers flowing over their banks. This had seriously adverse effect on the experiment.

CIRPAS participated in this with its instrumented Twin Otter aircraft, flight crew and scientist. The CIRPAS instruments measured temperature, dewpoint temperature, pressure, winds, aerosol particle concentrations, aerosol size distribution, cloud droplet concentration, cloud droplet size spectra, total scatter coefficients and absorption coefficients at three different wavelengths. Additionally, CIRPAS provided measurements of aircraft location, velocity and attitude. CIRPAS reduced all the data to engineering units, quality assured the data, and submitted a coherent data set to the project's archive.

The Twin Otter flew 15 sorties from the airport in Poncha City, and characterized meteorological, aerosol and cloud conditions as well as the temperature of the underlying surface in a wide variety of conditions. Conditions ranged from deep convection and thunderstorms, to totally clear sky and stable atmosphere. Some flights were coordinated with other aircraft, such as the DOE's G-1, which was in Poncha City simultaneously doing the CHAPS mission, the NASA King Air, which used lidar to characterize underlying aerosol and clouds, and a helicopter from Duke University, which was characterizing turbulence. Other flights were coordinated with satellite overpasses, ground-based observation sites.

The field campaign took place during the month of June, 2007, and all CIRPAS data had been delivered by October that same year.