An Instrumented Aircraft Facility to Provide Vertical Profiles of Wind, Temperature, Turbulence, Sensible Heat, Aerosol and Trace-Gas Concentrations and Fluxes t Urban Boundary Layer for PUMA Consortia Model Validation

Objectives

This project will provide facilities in the form of a low cost, highly instrumented aircraft designed for probing the turbulent and aerosol-cloud microphysical structure of the atmospheric boundary layer (ABL). Priority use will be given to the PUMA (Pollution of the Urban Midlands) consortia during the field trials planned for June 1999 and January / February 2000. The main objectives are:

- to provide high resolution 3-D wind turbulence, temperature and trace-gas variances of the urban ABL
- to provide measurements of the vertical and horizontal profile of aerosol concentration and volumetric size distribution over the Birmingham conurbation
- to provide a database of aircraft urban ABL case studies, which will be available to the PUMA and ASURE modelling communities via the appropriate NERC database committee
- to provide, where current UMIST instrumentation and facilities allow, the aircraft as a measurement platform for specific URGENT user measurement requests
- to measure the vertical entrainment and venting rates of trace-gas and aerosol between the urban ABL and the lower troposphere
- to measure the net aerosol / condensation nucleus flux downwind over an urban environment
- to construct and install a low cost aerosol collection sampling system to provide complementary aerosol chemical composition data to the PUMA measurement campaigns and to the PUMA modelling efforts.

Location

West Midlands

Approach

A flight programme of ten flight days / case studies is designated solely to the PUMA consortia. Five additional flights are being made available for either (a) instrument testing required by PUMA, which may require the removal of the base-line instruments due to space and weight limitations, or (b) specific flights to accommodate other URGENT requirements.

Start Date/Duration

Apri1999 Three years

Lead Organisations

University of Manchester Institute of Science and Technology

Deliverables

Flights within the allotted PUMA schedule are flexible and can be tailored to specific requests by PUMA modelling groups, depending on weather limitations and air-traffic control restrictions. Liaison with PUMA groups providing combined weather prediction and pollution model predictions will allow flights to be made under conditions most suitable for model validation.

Users

PUMA consortia
Other URGENT requirements

Further Details

Further information is available from the following contacts:

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