

Environment

Environmental issues have been linked continually with aviation development, primarily in relation to the noise and local pollution impacts of aircraft. More recently however, climate change has moved rapidly up the political agenda, and as a result, drawn attention to some of the more long-term environmental impacts of the aviation sector, particularly in relation to the various exhaust emissions.

A number of Schools covering a variety of disciplines are making significant contributions to understanding aviation's impact on the environment, not only from a scientific and engineering perspective, but also through socio-economic and policy analysis. Areas of research interest include:

- Simulating engine performance
- Landing and take-off emission and noise cycles
- Turbulent flows
- Combustion
- Aviation policy studies
- The construction of demand for aviation
- Socio-economic aviation studies
- Alternative low-carbon fuel sources
- Aerosol formation processes and aerosol cloud interactions

- Aviation climate change issues pushed to the top of the political agenda by Tyndall Manchester
- Research sheds light on the impact of aircraft exhausts on physical properties of contrails

Research areas

By its nature, environmental research brings together disciplines to synthesise knowledge and understanding to address the key issues of the day. Climate change has swiftly become a dominant driver in many areas of aerospace and aviation research. In Manchester, studies are being undertaken to better understand turbulent flow in relation to both wing-tips and engines hence addressing the issue of fuel burn. Experimentation into the combustion of alternative

low-carbon fuels for industrial gas turbines is complimented by studies within atmospheric science to better understand the impact of aircraft exhausts on the production and radiative properties of contrails and cirrus clouds. Finally, aviation policy studies within the Tyndall Centre can take advantage of the technical expertise available to better understand the impact of aviation on the climate in relation to the UK and EU's energy policies.

Research facilities

- A suite of instruments as part of the NERC Universities Facility for Atmospheric Measurement (UFAM), covering the areas of aerosol, cloud microphysics, and UV radiation
- Cessna light aircraft, instrumented for atmospheric research; this is unique among UK university groups
- A wide range of state-of-the-art instrumentation, some of which was developed within the group, allowing detailed measurements of aerosol chemical and physical properties, cloud microphysical properties, atmospheric turbulence, trace gas concentrations and radiative transfer
- BAE 146 UK Community aircraft equipped to measure a comprehensive range of trace gases, aerosol and cloud properties
- Hilltop field stations at Great Dun Fell in Cumbria, and Holme Moss in the Southern Pennines. Both these sites are ideal for studying cloud processes
- Remote sensing field site at Capel Dewi in mid-Wales which has an array of radar and lidar instruments for measuring profiles of atmospheric winds, structure, composition and clouds
- High quality laboratory facilities, including cloud chambers, cold rooms, a rooftop lab and an aerosol lab
- Mobile laboratories for use during field measurements
- High performance computers for numerical modelling studies
- Heavy involvement with the new 'Facility for Airbourne Measurements'(FAAM)

Relevant postgraduate study

MSc in Pollution and Environment Control

The programme is designed to meet the growing need, internationally, for scientists who are able to understand and solve environmental problems. Since most environmental problems are interdisciplinary in nature, the MSc Pollution and Environment Control is founded upon a variety of environmental science, engineering and social science disciplines.

Master of Enterprise in Environmental Innovation

The environmental science and technology sector ranges from the fast-moving competitive marketplace for energy efficiency and effective solutions to air, water and land pollution, to the variably paced greening of every other facet of human activity in the region. This programme represents an innovative approach to meeting these rapidly evolving needs in the context of environmental science and technology, through a partnership between the University of Manchester Environment Centre (UMEC) and the Manchester Science and Enterprise Centre (MSEC).

Academic staff



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