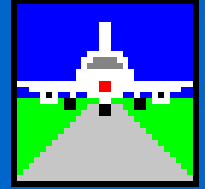


ADMS-Airport

Atmospheric Dispersion Modelling System for airports in rural or complex urban environments



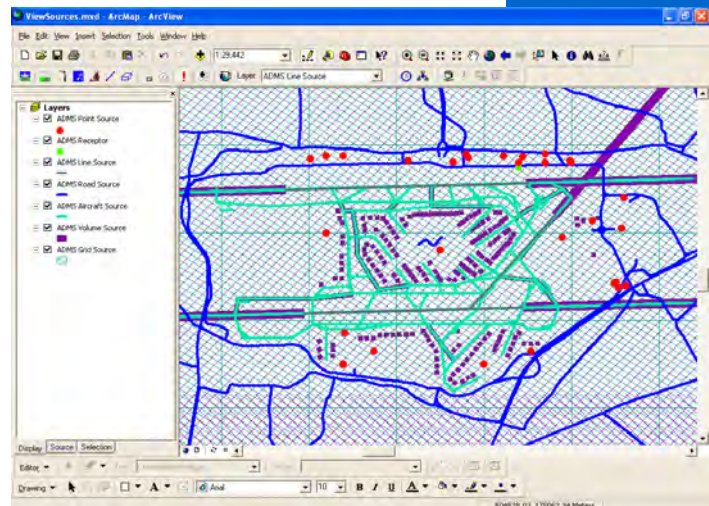
ADMS-Airport...

- Is an extension of the ADMS-Urban model, designed to model concentrations of pollutants in the neighbourhood of an airport
- Models the aircraft exhausts as moving jets capturing the near field dispersion
- Uses a chemistry model to calculate NO₂ concentrations
- Has a link to ArcGIS



Sources Modelled

ADMS-Airport models the full range of sources that may be important in calculating air quality in the neighbourhood of an airport: aircraft emissions, Ground support equipment (GSE), Auxiliary Power Units (APU), road traffic, rail, industrial, commercial and domestic heating and other aggregated emissions.



Visualisation of airport sources in ArcGIS

CERC
Environmental
Software

Technical Specification

Aircraft sources

ADMS-Airport makes use of the ADMS jet model to model the impact of aircraft exhausts. The jet model calculates an integral solution to the equations of conservation of mass, momentum, heat and species, capturing the effect of the movement of the jet engine source in reducing the effective buoyancy of the exhaust.

This is particularly important in capturing the near field dispersion from the high momentum, buoyant take-off ground roll sources.

Time varying emissions

To model in detail the airport's flight schedule users can construct up to 500 annual hourly profiles (each with 8760 factors, one for each hour of the year). These detailed schedules can also be used for detailed modelling of non-airport sources, such as the effect of school terms and public holidays on road traffic.

For less detailed modelling ADMS-Airport allows up to 50 diurnal and 50 monthly profiles plus wind direction dependence for any source.

Emissions

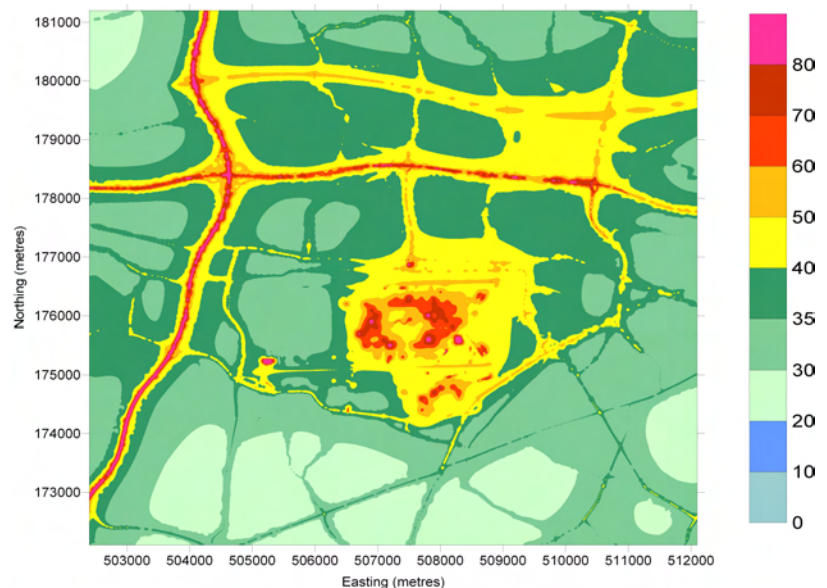
ADMS-Airport can import data from CERC's EMIT emissions model. EMIT contains emissions factors for airport sources as well as the latest emission factors for road traffic, other transport sources, industrial processes and fuel use. EMIT can be used to compile greenhouse gas inventories as well as inventories for local air quality.

Use of ADMS-Airport

ADMS-Airport has been used to model London's Heathrow airport and is also one of the participating models in the ICAO CAEP model exercises (International Civil Aviation Organisation, Committee on Aviation Environmental Protection)
www.icao.int/icao/en/env/Caep.htm

EMIT: Emissions Inventory Toolkit

EMIT is an emissions calculator that can export emissions data directly to ADMS-Airport. For calculating emissions from airports EMIT contains the ICAO version 15 aircraft emission factors, for all Landing and Take-off (LTO) modes (taxiing, take-off roll, climb, approach, landing). It also contains emission factor datasets for Ground Support Equipment (GSE) and Auxiliary Power Units (APU).



2002 base case, modelled total NO₂ concentrations in µg/m³ around Heathrow, taken from "Adding Capacity at Heathrow Airport – Air Quality Studies for Heathrow" (2007).

Modelling Heathrow

ADMS-Airport was part of the Department for Transport's (DfT) Project for the Sustainable Development of Heathrow Model Inter-comparison in which it was compared with four other models. Following the recommendations of PSDH it has subsequently been used on behalf of DfT to model the 2002 base case and future scenarios at London's Heathrow airport.

Modelling Heathrow airport the full power of the model is used, the detailed modelling of the aircraft and other airport sources, as well modelling of road traffic and other city sources.

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