



Reducing the environmental impact of air travel

This project aims to find innovative ways to reduce the impact of noise and fuel emissions from aircraft at and around airports through improved air traffic management systems, procedures and technologies.

Key benefits

- reducing the environmental impact of aviation at and around airports
- finding new ways to restrict noise and fuel emissions from air traffic
- finding solutions to problems that affect all major airports worldwide

UK air traffic is predicted to increase by 45% by 2015. Without technological and operational improvements, this growth is likely to have a major environmental impact at airports and the areas around them. If not addressed, factors such as noise and engine emissions will make growth unsustainable and will restrict the development of airports. This could have a significant impact on the UK's economic prosperity.

This EFAS (Environmentally Friendly Airport ATM Systems) project aims to research these issues and find advanced solutions. A range of additional benefits will also come from the partnership approach being taken to move EFAS forward.

This will include the greater innovation as well as better collaboration between industry and the academic world.

The project is led by Thales ATM. Other organisations involved in the consortium are: National Air Traffic Services (NATS), ATMASuk, BAE SYSTEMS (Operations) Ltd, Flight Refuelling Ltd, Qinetiq Ltd, Raytheon, SELEX-SI, Helios, the Manchester Metropolitan University (Centre for Air Transport and the Environment) and Loughborough University (Systems Engineering Innovation Centre). Cranfield University (Department of Air Transport) has also been supporting the programme.

Together, the group possess a huge range of skills and resources, including air navigation, aircraft systems, aircraft and airport surveillance systems, air traffic management systems, modelling and research. EFAS was launched in March 2006 and should run until early 2008 for the first stage. It is a two-year programme, costing £1,480,234, with £737,720 of this provided by the Technology Programme.

Objectives

The project intends to identify potential technologies and systems that will reduce the environmental impact of the expected growth in air traffic. The focus will be on solutions that can be realised through improvements in air traffic management (ATM).

EFAS will look at ways to reduce noise and key engine emissions (NO_x, CO₂) in civilian aircraft, particularly in the approach and departure airspace around the airport as well as on the runway and taxiway. The focus will be on larger airports where the environmental challenge is more acute. The project envisages a step change in technology.



The project team will research and evaluate the effectiveness of potential solutions, using simulation tools. Areas of interest will then be evaluated further using large-scale validation.

Programme manager Thierry Narnio says: "There are big constraints biting already for the likes of Heathrow, Manchester and all the big airports around the world mostly because of noise and fuel emissions. If these issues are not addressed, this will severely limit the growth of these airports."

He says improving the design of aircraft themselves, through the engines, equipment and airframes, can deliver significant savings in noise and emissions.

"But if you look at the way air traffic is growing, if you treat 2006 as a baseline, then by 2030 there will be a big increase in pollution. The improvements to aircraft can reduce this increase by around 40%. But clearly, that leaves a 60% gap.

"There is no big bang solution to this problem. But we hope that the improvements in air traffic management could deliver savings in noise and emissions of between 5-10%. This will be a significant contribution to the whole issue of sustainable aviation."

Solutions

The project will not be looking at aircraft or engine design, but rather the processes and procedures used in and around airports. For example, this could include changing the navigation of aircraft to reduce noise impact. It could also include ways to reduce the amount of time aircraft spend taxiing on runways.

One way of reducing noise and fuel consumption which is already being put into use is continuous descent approach (CDA). This involves bringing aircraft down using a continuous glide rather than staggered steps.



When aircraft descend using these steps, they have to be re-stabilised at every stage, producing more noise and using additional fuel. The continuous glide is preferable – but this is difficult to achieve at present without compromising safety and security and because

airports are so busy. The project will study advanced CDA techniques.

EFAS will provide a list of potential ATM technical solutions for reducing environmental impact while also ensuring efficient and safe operations. A preliminary assessment will lead to the selection of the most favourable technical solutions which will then be tested using prototypes and demonstrations.

Results

Mr Narnio says the project has already taken significant steps forward. "We have developed the synthetic environment tool needed for the simulation," he says. "This is at the core of the project.

"We have also identified the baseline scenarios for the project which tell us what the situation is today and what it is likely to be in 2030, in terms of the growth of air traffic, aircraft procedures and the equipment in the aircraft."

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