

Executive Summary

Green Flight Workshop

Results of a Workshop

held at FOI Stockholm-Kista, Sweden, on November 20 - 21, 2006



ATM / Airport / Airlines

ATM goals for environment are related to a better efficiency, i.e. horizontal efficiency, vertical efficiency and minimisation of air & ground holdings. Horizontal efficiency means to increase capacity, to reduce complexity and to shorten average route lengths. Advanced Continuous Descent Approaches in a high traffic situation are an important operational measure to reduce environmental impact.

The following results, research needs and challenges were identified:

- Reduce direct and en route inefficiencies
- To de-couple transport performance and environmental impact
- Impact of airport on the local air quality
- Better Airport collaborative environmental management
- Environmental constraints and associated delays
- Impact assessment of interdependencies
- ATM strategic objectives
- ACDAs in high density traffic situation

Aviation Environmental Policy

From the aviation environmental policy point of view economic instruments as means to reduce aviation emissions need to be assessed in detail and common methodologies need to be found. A European modelling toolset on interdependencies as support for policy makers needs to be developed.

The following results, research needs and challenges were identified:

- Inclusion of aviation in the European Emission Trading Scheme
- Common methodology for Emission charges at airports
- Develop basic, responsive and aircraft type modelling systems and impacts and monetisation add-ons
- Make proposals for short, medium and longer term projects for future Euromodelling work

Industry

In order to achieve the very challenging ACARE environmental goals novel and innovative engine architectures are being investigated (e.g. open rotors, intercooled turbofan etc.). Significant effort has been spent in large European or national research programs (e.g. UK Environmentally Friendly Engine program). The European Joint Technology Initiative “clean sky” is a very large European program setup to meet the ACARE environmental goals, through 6 dedicated technology platforms covering mainly the vehicle aspect of air transport.

Atmospheric science

Mitigation options to reduce aviation climate impact and avoiding ice super saturated regions need to be investigated in more detail. The idea behind mitigation options is to minimise the aviation climate impact by optimizing flight routes and flight altitudes. The exact impact of cirrus clouds on radiative forcing needs to be better understood. Advanced linearised global chemistry models are important to calculate climate change metrics.

The following results, research needs and challenges were identified:

- Apply route optimisation for minimal fuel consumption
- Fly higher, fly lower, fly (early) during day, fly around ice super saturated regions
- Reduce soot emissions
- Provide information for better weather / contrail / cirrus / ice super saturated regions (ISS) prediction
- Evaluate climate impact of mitigation options
- Evaluate and reduce uncertainties
- What is the exact impact of contrails-cirrus on additional radiative forcing?
- How many contrail-cirrus clouds are produced by aviation (coverage?)
- Does an additional constraint like “avoiding ice super-saturated regions” lead to a break down of the ATM system?
- What additional CO₂ emissions are produced while detouring ISS regions?
- What are the additional costs due to detouring ISS regions?