Contribution of Airlines for the Reduction of Industry Nuisances and Gases

Project CARING is the only Clean Sky project that involves airlines.
Its objectives are twofold:

- Understand how current and future environmental regulations affect airline's economics and how they adapt their operations

- Analyze thousands of flight trajectories to their variability, and define 'typical' trajectories

Hence, CARING provides critical inputs to Cleansky/System for Green Operation, to support the analysis of trajectories, of their environmental impact (noise and emissions) and reduce it with innovations in flight trajectories management.

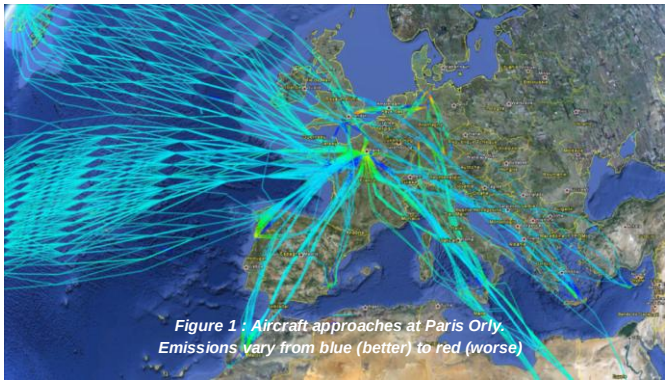

Figure 1 : Aircraft approaches at Paris Orly. Emissions vary from blue (better) to red (worse)

CARING is analyzing thousands of real commercial flights operated by 6 partner airlines on 11 different types of aircraft.

For each of these flights, and for all phases (taxi, take-off, climb, cruise and descent), CARING processes the data extracted from the aircraft Flight Data Recorder (the black-boxes): hundreds of parameters, second by second.

Through innovative algorithms, CARING interprets these data to explain how pilots' technique, choices of trajectories and aircraft settings (engines thrust, wing configuration…) affect emissions and noise, in a real commercial environment.

By exploiting the results of CARING, specifically best practices proven by the analysis of trajectories, partner airlines are already implementing changes in their operations that will yield a direct reduction of emissions of 2-3% with equivalent fuel savings.

In the future, leveraging CARING's research, the new Flight Management Computers that automatically pilot the aircraft will multiply these figures by automatically choosing optimal trajectories that limit the environmental impact.

Project facts:

- Leader: OpenAirlines
- Partners: Airlinair, ENAC, Envisa, FNAM, Icon, SustainAvia, Transavia, TUI (CorsairFly, Thomson Airways, TUIFly)
- Subcontractor: Swiss Intl.
- For the products: FMS for regional, single-aisle and widebody aircraft. Flight operations software for commercial airlines.
- Budget: 1 Mio EUR
- Duration: 24 months

Goals & objectives:

- Build a model of airline economics that includes the environment
- Provide operational facts to enable development of technologies and functions reducing the environmental impact (noise and emissions) of aircraft trajectories

Technology challenges:

- Model the impact of environmental constraints on airline economics in a competitive environment
- Develop statistical models that process hundreds of parameters, second by second on thousands of flights and that explain how multiple external factors influence actual aircraft consumption, emissions and noise

Milestones:

- Project kick-off: Jan 2010
- Environmental constraint analysis and airline strategies : Oct 2010
- Trajectory analysis : March 2011
- Economic model: Dec 2011

Next steps: Development of a new FMS functions that delivers green trajectories: 2014 (based on CARING's input)

More information: www.caring.aero

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