

PROJECT

## **SOURDINE II**

# **Study of Optimisation Procedures for Decreasing the Impact of Noise around Airports II**

**Funding:** European (5th RTD Framework Programme)

**Duration:** Nov 2001 - Sep 2006

**Status:** Complete with results



### **Background & policy context:**

With the continuing growth of air traffic as well as the ever increasing level of urbanisation around most airports in Western Europe, the impact of aircraft noise and emissions on the quality of life for the surrounding communities has become a serious issue to be dealt with. Many European airports already face the conflicting problems of increasing their airport capacity to meet the amount of traffic, and the increasing pressure from the general public to reduce environmental impact, particularly noise and emissions, of the increased traffic volume. Many efforts are already being undertaken to reduce the source noise itself by the introduction of more silent aircraft and engines. On the other hand, a further solution to noise reduction around an airport is the definition of new approach and departures procedures. By modifying or optimising the operations and traffic flow of aircraft around the airport, it should be possible to achieve noise reduction.

### **Objectives:**

- Development of new advanced and innovative environmental friendly approach and departure procedures. The results from the Sourdine I project will be used as an initial input.
- Provide an accepted implementation plan by all involved stakeholders to be able to migrate from the current situation to advanced environmentally friendly approach and departure procedures. This avoids the need to develop specific local solutions to a European problem.
- Development of enabling technology to achieve the successful introduction of the selected departure and approach procedures, such as ATC controller tools, automated aircraft-ATC interaction and cockpit monitoring tools
- Achievements will consist of quantified results for each procedure in terms of safety, capacity and environmental benefits, as well as associated costs or benefits. Objective evaluation of these issues will be performed by comparing controller and pilot workloads during baseline scenarios, i.e. current day, with future procedures. Metrics to be used will be in line with standardised European metrics and stakeholders' metrics.

### **Methodology:**

The project started with the generation of an overview of current practices and future technology related to the environmental friendly approach and departure procedures. Based on those results and after feedback from the expert panel a first set of potential procedures was developed. Those procedures were assessed using single event simulations (SES) with Airbus aircraft performance and noise calculation tools. Aircraft included in the study are the short/medium-range twinjet A320-200 and the long-range, four-engines A340-300. The performance studies involved computation of operational trajectories based on the procedure descriptions. These studies enable a first selection of the initial procedures based on aircraft performance limitations and provide trajectories that reflect performance characteristics and limitations of the aircraft. The trajectories are used as input for single event noise prediction carried out with Airbus Noise Level Calculation Program (NLCP). This assessment led to the selection process where 5 approach and 3 departure procedures were selected to be further assessed in detail during the project. In the following phase the procedures were assessed on different aspects, including safety, capacity, noise, emissions, user acceptance and cost benefit. The safety assessments for the various procedures have been executed.

### **Parent Programmes:**

**Institute type:** Public institution

**Institute name:** European Commission, Directorate-General for Energy and Transport (DG TREN)

**Funding type:** Public (EU)

## **Partners:**

France:

AIRBUS FRANCE SAS

International:

European Organisation for the safety of Air Navigation (EUROCONTROL)

Italy:

Sistemi Innovativi per il Controllo del Traffico Aereo (SICTA)

Spain:

Aeropuertos Españoles y Navegación Aérea (AENA); Ingeniería de Sistemas para la Defensa de España S.A. (ISDEFE); Ingeniería y Economía del Transporte (INECO);

The Netherlands:

National Aerospace Laboratory (NLR)

National Aerospace Laboratory

**Organisation:** (NLR)

**Address:** Anthony Fokkerweg 2

**Zipcode:** 1059 CM

**City:** Amsterdam

**Contact country:** Netherlands

**Telephone:** (+31) 20 511 31 94

**Fax Number:** (+31) 20 511 32 10

## **Key Results:**

The noise assessment results show that all Sourdine II procedures provide significant noise reduction as compared with current day practice. With single event simulations, it has been demonstrated that the SOURDINE II reference approach procedure shows benefits more than 5dBA in a very large range of the procedure.

## **Technical Implications**

From all approach procedures Sourdine II arrival procedure III, featuring an increased final glide path angle, provides the largest noise benefit compared to the reference procedure.

- The optimized departure procedures featuring optimized thrust management provide noise reduction in the targeted zones compared to current PANS-OPS procedures, either close-in or at distant positions.
- The distribution of the fleet mix will influence the shape of the noise contours considerably (i.e. unbalanced use of runways).
- Noise assessment conclusions are the same (i.e. slight differences depending on fleet-mix flow) for all scenarios.
- Major noise benefits are mainly determined by higher altitudes for approaches while for departures on the thrust settings.

## **Policy implications**

It is recommended to perform flight trials in a low-density situation (e.g. at night) to get detailed feedback on aircraft performance as well as pilot and controller acceptability from hands-on experience. Results from these flight trials can support additional assessments like performed in this project to reach the ultimate goal: continuous descent approaches during peak-hour operations at major European airports while maintaining or even improving capacity and safety.

Documents:

 [Sourdine II Final Report.pdf \(Final report\)](#)

**STRIA Roadmaps:** Vehicle design and manufacturing, Network and traffic management systems

**Transport mode:** Air transport

**Transport sectors:** Passenger transport, Freight transport

**Transport policies:** Environmental/Emissions aspects

**Geo-spatial type:** Infrastructure Node