CONSAVE 2050

Constrained Scenarios on Aviation and Emissions

**Funding:** European (5th RTD Framework Programme)
**Duration:** Sep 2002 - Aug 2004
**Status:** Complete with results

**Background & policy context:**
Following a proposal of a German Aviation Scenario Circle AERONET has performed two workshops on 'Long-term Scenarios of Aviation and its Emissions' at - DLR, Cologne, 17–18 October 2000, - the Airport Palma de Mallorca, 19-21 March 2001. After these workshops, a team from DLR; NLR; QinetiQ, DLH, MVA, IIASA and Airbus was formed which developed a proposal for an EU - Accompanying Measure Project CONSAVE 2050. This proposal was approved by the Commission and a two year project was started in September 2002.

**Objectives:**
The major objective of the CONSAVE 2050 programme is to contribute to ensuring sustainable growth of air transportation with regard to environmental issues.

The output of the scenario quantification exercise will go a step beyond (and improve) existing scenarios on aviation and emissions (IPCC/SRES), helping to develop a common European understanding on constrained aviation scenarios and emissions. In addition, the project will generate valuable input for FP6 research programmes in terms of a defined range of boundary conditions for air transport development, and will help to support and enhance the competitiveness of European aviation industry.

The project work consists of developing quantified scenarios on aviation and emissions with focus on the Year 2050, with a look on the short (Year 2025) and long (Year 2100) term development relevant for aviation industry planning and climate models respectively. It will include constrained conditions and the newest 'background' data on external fields to transport and air transport, which are setting the frame for the long term development in aviation.

**Methodology:**
The key factors and qualitative background scenarios were developed. The substantive technical project work started with the examination, review and choice of the key scenario descriptors that were later to be quantified in the scenarios on aviation and its emissions.

To assess the draft set of key scenario descriptors, a questionnaire was sent to experts representing a broad range of the aviation community (including AERONET-members). Responses were evaluated and used to improve and extend the list of key factors which was then reviewed by the CONSAVE Advisory Committee founded by DLH.

Based on the outcome of these activities, a final catalogue of key factors was developed for subsequent quantification. To ensure that the outcome of the project would match the needs and views of stakeholders within aviation, a range of contacts has been made with aviation experts, including the completion of a questionnaire and a review by the Advisory Committee.
Quantification of the set of four Background Scenarios was successfully performed for key parameters using results for those IPCC/SRES scenarios which are similar to the background scenarios developed within WP 1.

For the final quantification with the AERO-model, a differentiation of the GDP values used for the Unlimited Skies scenario and the Regulatory Push and Pull scenario was developed, with the figures for the latter decreased by ca. 3 percent, an amount consistent with the reduction in the aviation system. A concept for the planned European Review of the preliminary study results was developed and presented at the Mid-Term Meeting. Close contacts to some of the related external projects were assured by the fact that one or more contractors are team members of those projects. With ACARE/ASTERA especially, a continuous exchange of information and reciprocal consideration/use of results was agreed on.

The project work is supported by management and coordination activities led by DLR. One important task was to organise the internal assessment of preliminary results of the various work packages by the consortium. An Advisory Committee of stakeholders/customers was founded as part of WP 5 by DLH. Three meetings were held including the final assessment of the Draft Final Report, to ensure that the requirements of users are taken into account.

To allow the smooth and effective running of the project work, it was impor

**Parent Programmes:**
FP5-GROWTH KA4 (AERONAUTICS) - New Perspectives in Aeronautics

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**Partners:**
- German Aerospace Centre (DLR) (DE)
- Stichting Nationaal Luchten Ruimtevaarlaboratorium (NLR) (NL)
- QinetiQ (UK)
- International Institute for Applied System Analysis (IIASA) (AT)
- GIE Airbus Industrie (EU)
- Lufthansa (DE)
- MVA (UK)

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**Key Results:**

From the work performed and the results achieved, various conclusions can be drawn: The design of a representative set of robust constrained scenarios on aviation and its emissions for 2020, 2050 with an outlook to 2100 has been completed. The scenarios are fully developed, quantified, tested and broadly reviewed, and based on newest information for the ‘Background Scenarios’ for those fields which set the framework for the long-term development in aviation. This work is an important step beyond existing scenario work, delivering a foundation for the short-, medium-, and long-term planning, enabling more efficient consideration of possible futures and consideration of the implications for technology development and other possible responses. Rather then looking for mixed ‘realistic’ futures developing along ‘most-likely’ paths, the concept of CONSAVE to design a set of ‘pure’, even extreme, scenarios, allows the definition of robust boundaries for the range of possible growth of aviation and its emissions until 2050.

This approach provides essential information for the policy and regulation community, the aviation
industry, and for researchers including climatologists, and is a valuable input for further RTD activities within FP7. By implementing intensive contacts and interactions especially with ACARE/ASTERA, AERONET, EUROCONTROL and AERO2K, the project has been able to successfully contribute to the development of a common European understanding of critical aspects of the long-term development of aviation and its related emissions.

The work of the Accompanying Measure Project CONSAVE has been used as prerequisite for the development of the second version of the ACARE Strategic Research Agenda (SRA II), for the development of the new forecast for 2020 of EUROCONTROL, as input information for many discussions on the level of AERONET II, and for comparison within the AERO2K project. Whereas the broad European activity ACARE is referring to the year 2020 as a time horizon, the CONSAVE study with its major time horizon year 2050 can be regarded as a complementary additional project, as some key developments for the future in aviation will become strongly relevant only beyond 2020.

Additionally, ASTERA has developed for ACARE a set of scenarios which has nearly identical basic features compared to those designed (and quantified) by CONSAVE; with one meaningful exception: ASTERA did not include a scenario comparable to the CONSAVE scenario Down to Earth, for the good reasons that o

**Policy implications**

A wide range of open questions were to be addressed by CONSAVE. Nonetheless, during the performance of the project it became clear that various complementary additional aspects would benefit from study in the near future: These could not be dealt within CONSAVE, as they were outside the given frame for project-funding and project-time.

Based on what could be already achieved by CONSAVE, a group of proposals for future work emerged which should follow the project to further enhance the value of the study:

- To perform a EU-supported and -funded pilot study on the definition of the detailed requirements for the instalment of an effective European Monitoring System on Aviation Development (EMSAD), including the development of agreed objectives, tasks, specific tools, network of information sources and of principles for the organisational structure. (The willingness to co-operate within such a project and for some financial support after the pilot study and to participate in a Steering Committee has already been declared by various stakeholders)
- To develop – based on the now modified version – an AERO-model specially adjusted for application as a tool for the typical tasks of a monitoring system.
- To develop more detailed scenarios studying additional alternative long-term developments in the field of energy / fuel technology / aircraft emissions (e.g. addressing air quality aspects around airport) for example for EU projects such as ECATS.
- To visualise the scenario storylines, by producing video-movies to further enhance the understanding and acceptance of the main messages of the outcomes from CONSAVE 2050.
- To study potential (aviation related) wild card events, including, for example, possible (sector specific) effects, defining adequate reactions aiming to minimize the negative impacts, and of possible precautionary measures (such as the organisation of an early warning system, as part of the monitoring system).
- To further clarify critical aspects (financing infrastructure, environmental impacts, timing) of a possible introduction of the hydrogen technology for aviation.
- To study more details on special aspects, on alternative scenarios, on combination of scenarios, etc. of interest for the different stakeholders of the aviation community from their specific point of view and strategy design requirements.

It could be highly eff

**Related Projects:**
- AERONET
- Trade Off
- AERO2k
- ACARE/ASTERA

**Documents:**
- CONSAVE Executive Summary (Final report)

**STRIA Roadmaps:** Other specified

**Transport mode:** Air transport

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

**Geo-spatial type:** Other