Aviation Safety Improvement using Cost Benefit Analysis

**Funding:** European (6th RTD Framework Programme)

**Duration:** Jan 2005 - Jan 2007

**Status:** Complete with results

**Total project cost:** €1,770,094

**EU contribution:** €944,740

**Call for proposal:** FP6-2003-AERO-1

**CORDIS RCN:** 74830

**Background & policy context:**

Despite the important efforts on safety data sharing at an international level (for example, the Global Aviation Information Network GAIN, ECCAIRS, etc), aviation stakeholders proceed, at best, with a limited access to this data because of the lack of adequate tools. The small number of tools available seems to focus on data collection rather than data use. Moreover, these tools may be of little practical use, especially in the hectic, budget-tight world of aviation where managers do not seek the time to learn how to exploit these methods fully.

**Objectives:**

The objective of this project was to improve aviation safety through the development of a novel safety approach. This approach allowed aviation stakeholders (from EASA, to civil aviation authorities, airlines, airports, air traffic control, and manufacturers) to:

- understand and manage the effective risk reduction when adopting a safety measure;
- prioritise their safety investments when multiple options are potentially feasible;
- increase safety as much as possible within the limiting budgets available;
- justify investments in safety from a cost perspective.

The main objectives of this Specific Target Research Project were to:

1. identify the practices and processes that aviation stakeholders follow to assess the viability and desirability of safety measures, and the role that cost benefit analysis has in those practices and processes;
2. single out the limits of the current practices and processes encountered by the whole spectrum of aviation stakeholders, and identify their needs for a novel approach;
3. compare these needs against existing approaches incorporating cost-benefit analysis, but which have never been applied to real cases;
4. derive a set of functional requirements for the development of a methodological approach and a tool enabling all aviation stakeholders to apply effective risk reduction when adopting a safety measure by means of cost-benefit analysis;
5. develop a methodological approach that will allow the treatment of safety and cost aspects in such a way to support decisions on whether to introduce safety measures;
6. develop a methodological approach that will allow making priorities for investments in safety based on the most beneficial outcome;
7. develop a decision support tool, that will facilitate the use of such a methodology;
8. provide the necessary information on risks and costs for applying the methodology to real cases;
9. verify the applicability of this safety approach, to contribute to its optimization and to appraise the feasibility of broad take up by the industry;
10. capitalise the results issued from the application of this approach into a data set, which will gradually expand while the method is being used and make these data accessible to all interested parties;
11. disseminate the findings of the approach to the industry; and
Methodology:

The safety approach consisted of a methodology enabling aviation stakeholders to assess the effects of their technical, managerial and political decisions at safety level, together with the associated costs and benefits. The approach will support decisions such as whether or not to introduce a safety measure, by making priorities for investments in safety, based on the most beneficial outcome. The methodology was implemented in a decision support system (DSS), providing a step-by-step procedure that will support the user throughout the different phases for assessing the cost effectiveness of safety measures. The DSS will incorporate a data pool for the estimation of risk reduction and costs related to the implementation of specific safety measures.

Cost-benefit analysis of safety measures is a relatively new concept in the aviation community and decisions on safety related matters are taken without knowing precisely what their final effect will be. This project provided the means for taking decision at different levels (i.e. policy, procedures, and operational level) in order to understand the consequences on safety from both viewpoints: policy makers and regulators on one side and industry on the other. While for policy makers and regulators the objective is safety with affordability as a requirement, for the industry the objective is affordability with safety as a requirement.

The project was structured into seven Work Packages (WPs) to achieve the project objectives:

- WP0: Technical & Administrative Coordination
- WP1: State-of-the-Art and User Needs
- WP2: Functional Requirements
- WP3: Methodology Development
- WP4: DSS Tool Development
- WP5: Application to Case Studies
- WP6: Results Dissemination

During the project, two series of workshops were organised, focusing on real case studies, on subjects proposed by users of ASICBA. The objective of having workshops is twofold, namely to support the development of the safety approach in the first instance, and to then validate the approach.

Parent Programmes:

FP6-AERO-1.3 - Improving aircraft safety and security

Institute type: Public institution
Institute name: European Commission
Funding type: Public (EU)

Lead Organisation:

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<th>Institution</th>
<th>Address</th>
<th>Website</th>
<th>EU Contribution</th>
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<tbody>
<tr>
<td>D'appolonia</td>
<td>Via San Nazaro 19 16145 GENOA Italy</td>
<td><a href="http://www.dappolonia.it">http://www.dappolonia.it</a></td>
<td>€0</td>
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Partner Organisations:

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<tr>
<td>Ecorys Nederland B.v.</td>
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Airclaims Limited

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Organisation Website:
http://www.meridiana.it

EU Contribution: €0
Key Results:

The results achieved by the project are expected to have a short, a medium and a long-term impact. Two different short-term impacts were identified.

The first occurred during the project duration and is related to the dissemination of the novel safety approach within the users of this consortium. In addition, it has improved stakeholder participation and inclusion through dialogue, workshops, reporting and transparent processes. Furthermore, it increased international cooperation, especially in the field of aviation safety research.

The second type of short-term impact is represented through the validation of the approach allowing cost benefit analysis (CBA) of safety measures. In addition, the case studies subjects to which the approach was provided valuable results for the users. While the objective of conducting the case studies is ‘testing’ the novel safety approach, in fact the case studies address ‘real world’ problems, brought up by ‘real world’ users. The case studies have been carefully selected to fit in national and international research activities, such that these research activities could equally benefit from the case study results, and vice versa.

A medium-term impact of the project is believed to be the fulfilment of an urgent but not very well formalised need of aviation stakeholders to manage their internal safety budgets in a cost-effective way.

DSS is a valuable tool that can support aviation stakeholders in their decision-making process for budget allocation. Moreover, the project defined required research activities and research targets on a European level.

Cost-benefit analysis of safety measures is a relatively new concept, and the practical application of the method to real world test cases brought up important issues. Most importantly in this respect is also the development of a common data set that is accessible to all potential users of the method. Whereas the availability of such a common data set would provide a tremendous advantage to the European aviation industry, its development and exploitation required a careful approach, as demonstrated with the development and implementation of the ECCAIRS (European Co-ordination Centre for Aviation Incident Reporting Systems) database.

This research project primarily focused on the development of a framework for supporting all aviation stakeholders in the elaboration of their own safety management systems.

Documents:
- Final Publishable Report (Final report)
- Final Report Summary - ASICBA (Aviation Safety Improvement using Cost Benefit Analysis)

STRIA Roadmaps: Other specified
Transport mode: Air transport
Transport sectors: Passenger transport, Freight transport
Transport policies: Societal/Economic issues,
Geo-spatial type: Other