

# PROJECT FINAL REPORT

## Publishable Summary

**Grant Agreement number:** 205768

**Project acronym:** AGAPE

**Project title:** ACARE Goals Progress Evaluation

**Funding Scheme:** Support Action

**Period covered:** from 1/07/2008 to 30/06/2010

**Name of the scientific representative of the project's co-ordinator<sup>1</sup>, Title and Organisation:**

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## Context

ACARE (the Advisory Council for Aeronautics Research in Europe) is the European Technology Platform for aeronautics and air transport and its purpose is to provide guidance for the future of the European aeronautics research aiming at two general objectives: to meet society's needs for an efficient air transport system and to achieve global leadership for Europe in civil aviation. These 2 overarching objectives are the cornerstones of the "Vision 2020" document produced back in 2001 by a Group of Personalities chaired by former Commissioner Busquin.

Vision 2020 sets very ambitious Goals addressing the breadth of the Air Transport challenges for a sustainable future: Environment, Safety, Air Transport Efficiency, Security and Quality & Affordability. In addition the Group of Personalities strongly recommended developing a long-term commitment by all stakeholders to work in close partnership and stressed the need for the creation of ACARE.

As part of its mission of supporting the fulfilment of the Vision 2020 Goals (also known as the ACARE Goals), ACARE has so far published two editions of its Strategic Research Agenda (SRA) which address the research needs of Europe in the field of air transport systems up to 2020. The first SRA was published in October 2002 and the second in October 2004.

In this first SRA (SRA-1), it was acknowledged that the plan set out was ambitious and very challenging. Almost 10 years later and with 10 years to go before 2020, the Air Transport community considered it to be of prime relevance to take stock of the progress. Therefore it was decided that a proposal be submitted to an EC FP7 Call on 'Evaluation of the impact of FP5 and FP6 projects in the field of Transport'. The positive evaluation of this initiative led to the funding of the AGAPE project. AGAPE stands for "ACARE GoAls Progress Evaluation" and the project ran for 2 years from 1<sup>st</sup> July 2008 to 30<sup>th</sup> June 2010.

Setting out the context of the AGAPE project, it is worth noting that sixteen goals were elaborated in the SRA-1 on the basis of the Vision 2020 in relation with the 5 so-called "Challenge Areas" which are:

- **Quality and Affordability**

The challenge of delivering products and services to airlines, passengers, freight and other customers whilst increasing quality, economy and performance for sustained international competitive success.

- **The Environment**

The challenge of meeting continually rising demand whilst demonstrating a sensitivity to society's needs by reducing the environmental impact of operating, maintaining, manufacturing and disposing aircraft and associated systems.

- **Safety**

The challenge of sustaining the confidence of both the passenger and society that commercial flying will not only remain extremely safe, notwithstanding greatly increased traffic, but will reduce the frequency of accidents.

- **The Efficiency of the Air Transport System**

The economic needs of Europe's citizens, international competitiveness and the convenience of passenger and freight customers' demand that rising traffic shall not exacerbate the downsides of congestion, delay and lost opportunities. The challenge is therefore that the efficiency of the whole system taken together must be substantially increased. This will require radical new concepts to be introduced.

- **Security**

Recent events have underlined the reality that protected and uninterrupted air services are a foundation for all the economic and social benefits of the air transport system. The challenge is to devise measures that will improve security, on a global basis, within a highly diverse and complex system and against a strong backdrop of increasing traffic.

Goals have been clearly identified for each of the above Challenges, respectively:

<p><b>Environment</b></p> <ol style="list-style-type: none"> <li>1. 50% CO<sub>2</sub> reduction</li> <li>2. 80%NO<sub>x</sub> reduction</li> <li>3. Reduction of noise emission by half</li> <li>4. No impacted people outside airport boundaries</li> <li>5. Green manufacturing, maintenance and disposal</li> </ol> <p><b>Safety</b></p> <ol style="list-style-type: none"> <li>6. 80% reduction of accident</li> <li>7. Minimise human error</li> </ol>	<p><b>ATS Efficiency</b></p> <ol style="list-style-type: none"> <li>8. 3-fold increase in traffic</li> <li>9. 99% flights within 15 min</li> <li>10. Time in airport &lt; 15 min (SR) or 30 min (LR)</li> <li>11. Seamless ATM system</li> </ol> <p><b>Security</b></p> <ol style="list-style-type: none"> <li>12. Zero successful hijack</li> </ol> <p><b>Quality &amp; Affordability</b></p> <ol style="list-style-type: none"> <li>13. Fall in travel charges</li> <li>14. Halved time to market and competitive supply chain</li> <li>15. Increase passenger choice</li> <li>16. Improve Air Freight Services</li> </ol>
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## Objectives

The overarching objective of the AGAPE project was to implement a methodology to evaluate the progress being achieved in 2008/09 by European R&T activity towards the Vision 2020 Goals as defined in 2000 for the 2020 horizon. In other words the AGAPE project objective was to verify whether the current and planned R&T activities were meeting an ambition which is in line with the Strategic Research Agenda.

The results of the AGAPE project were aimed to be of use to the ACARE Community to reflect on the progress and provide recommendations for the next steps.

In order for ACARE to do so, a number of sub-objectives were set to the AGAPE project:

- generate an authoritative and consensual report to the benefit of the ACARE stakeholders including the European Commission
- involve the wide range of ACARE stakeholders across Europe: manufacturing industry companies from all sectors, research establishments, universities, regulating agencies such as Eurocontrol and EASA, airlines, airports etc
- review the interdependencies between Goals as well as the influencing factors to progress

## Methodology/ Work performed

The guiding principle of the methodology was to generate for each Goal the following overview:

- What are the results achieved from 2000 to today?
- What are the results foreseen from on-going initiatives?
- What are the corresponding gaps? Gaps to be understood as the resulting deltas between [full goal completion] and [achieved + foreseen results]

To this end more than 150 experts were mobilised from the ACARE Stakeholder Community, taking part to dedicated *Goal Groups* in charge of one or more Goals progress evaluation. The objects of the analysis were primarily the research projects which have been undertaken in the period from 2000 (when the Vision 2020 was defined) to the current date. The experts reviewed material from research projects having been launched in Europe as part of:

- the European Commission Framework Programmes (in particular 5 and 6)

- the national programmes of the member states
- the privately funded projects at company level.

Experts also reviewed the objectives of the projects planned for the future. Consensus has been built, based on this wide range of expertise, on actual as well as predicted performance against each goal using shared expertise and supported by modelling tools where appropriate and available.

This methodology was applied under the guidance of a Steering Group and with the support of *Goal Group Leaders*.

Two reviews were conducted: a first stage review and a detailed review to refine the results and dwell into the interdependencies between Goals and influencing factors (incl. non-technological factors) to delivering progress. A Data Synthesis exercise was performed with all the experts and across the *Goal Groups* to integrate the outcomes into a single report containing the results of the evaluation work by the 150 experts. This report was handed over to ACARE.

## Results

Overall, the analysis carried out has shown that significant progress is being made towards all of the Goals set out in Vision 2020 and the subsequent SRA as a result of the R&T projects launched in Framework, National and privately funded programmes since 2000. All of these programmes have been greatly instrumental in achieving these results. There is a strong potential from the ongoing activities to deliver progress in the coming years.

Delivering progress is subject to the progressive materialisation of the technology performance up the Technology Readiness Level (TRL) scale. This technology maturation entails increased technical complexity and validation costs. This process is notably supported by large programmes such as SESAR and Clean Sky. Delivering progress is also subject to technologies actually introduced in operation.

Whilst the AGAPE analysis has shown that significant progress has been achieved and is underway for all of the Goals, it also outlined that more efforts are required for the Goals to be fully reached at a uniform pace.

With respect to the Strategic Research Agenda, AGAPE has demonstrated that the process set by ACARE with respect to the SRA has proved efficient for the period 2000 – 2010 in advancing the progress towards the Vision 2020 Goals. A vigorous programme of research has been established and it has covered almost 100% of the topics recommended in the SRA. Few additional research topics outside the SRA have been identified as being required. In essence the SRA itself has proved robust in its overview of the research streams to be pursued since 2000. Furthermore the SRA has been and continue to be very powerful agents in enabling the harmonisation and integration between European projects and those conducted in the national programmes of the member states. The ACARE framework, the overarching Vision and the SRA that support it have provided the right focus and coherence to allow these programmes to be conducted in an efficient and complementary manner.

The AGAPE analysis has shown clearly that the interactions between goals are extraordinarily manifold and complex therefore highlighting the inherent challenges in progressing all of the goals in parallel due to the implicit trade-offs of these interactions.

Furthermore, the transition from technology availability to technology uptake in product or system is influenced by many factors and amongst factors of a non-technological nature such as market expectations, new products or improvements being developed. Other factors of an exogenous nature also have influence on the completion of the Goals and some of them are clearly outside of the perimeter that the Air Transport sector can manage. It is clear

that delivering technology improvements is a necessary condition to deliver progress but is not sufficient. In most cases, these exogenous factors can exert a positive influence if properly addressed and a negative influence if not given the correct attention at the right level, which is often the European level.

Throughout the evaluation exercise, AGAPE has noted that the changes of circumstances surrounding the Air Transport since 2000 at political and economic levels as well as at the technological level have rendered the delivery of progress even more challenging than a decade ago.

## Conclusions

The AGAPE project is unique. It is the first time such an assessment was attempted across a complex system of systems such as the Air Transport System at the highest levels of integration and across such a broad range of contributing projects. It has been a massive exercise of bringing together experts from all technical domains and member states and gathering information from R&T projects in European, national and privately funded programmes.

Much has been learned in so doing, in particular the need for better approaches to quantification in some areas, and also the need for improved access to project results and knowledge management. Importantly AGAPE has highlighted the necessity to put in place the means of providing traceability of project data and the mechanisms and means for regular reviews of progress towards targets for the future.

With the experience of the AGAPE project, it seems possible that the methodology be applied to other modes of Transport as long as the following criteria are met:

- There is a Strategic Research Agenda with a detailed structure covering the Goals, Contributors and Solutions paving the way to the achievements of the objectives
- The results of the research projects for the period considered are available for consultation by the experts
- Experts are mandated to perform the evaluation

Despite the great complexity encountered, the AGAPE project was successful in reaching its overarching objective of evaluating the progress being achieved in 2008/09 by European R&T activity towards the Vision 2020 Goals as defined in 2000 for the 2020 horizon. The AGAPE analysis has shown that significant progress has been achieved and is underway for all of the Goals. It also outlined that more efforts are required for the Goals to be fully achieved by 2020.

With respect to the Strategic Research Agenda, AGAPE has demonstrated that the process set by ACARE with respect to the SRA has proved efficient for the period 2000 – 2010 in advancing the progress towards the Vision 2020 objectives: meet society's needs for an efficient air transport system and achieve global leadership for Europe in civil aviation.

In view of the results of the AGAPE project, the ACARE Community (including the European Commission) has now elements at its disposal for providing recommendations for the next steps.

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