



Methodology for framework programmes' impact assessment in Transport

FINAL REPORT - April 2010

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IMPACT ASSESSMENT AERONAUTICS

More than 400 projects funded over 8 years
375 stakeholders consulted through workshops, survey, interviews

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1. Executive Summary

The MEFISTO project had three main objectives: to develop a process for conducting impact assessments of Framework Programmes, to demonstrate this process in the aeronautical sector, and to propose how it could be used more widely across the transport sector.

As an **impact assessment** MEFISTO was intended to provide a tool for influencing future policy at the mid point of FP7 and before the preparation of FP8 by assessing the extent to which policy objectives were achieved. The policy objectives for FP 5 and FP6 derived from a number of specific and general policy decisions within the European Union, with the Lisbon Agenda leading the way. For aeronautics some of these policy objectives were technological; to increase competitiveness, serve social needs including the protection of the environment, and contribute to the vision of a sustainable, competitive, safe, secure and user friendly air transport system. It was also a policy aim to establish a European Research Area that by encouraging co-operation and integration of research across Europe to work towards the Lisbon objectives for Europe to become a leading knowledge based world economy.

The **methodology** prepared and used by MEFISTO is explained in this report. It provided for taking the views of more than **350** people experienced at various levels across many branches of aerospace work in the research field. It provided a data set of responses to **94** key questions that together allow the impact of policies to be assessed. **53** interviews of selected executives in aviation and representatives of governments and the European Commission allowed personal experience to be explored and provided in relation to the benefits of the Framework Programmes in

different circumstances. More than **800** separate comments were collected from these interviews and analysed against **20** key issues for the output impacts and input conditions.

In the aeronautical sector Framework Programmes 5 & 6 were highly successful and profoundly significant successors to previous Framework initiatives. During a period of increasing challenge to the aviation sector they brought about fundamental changes to the way the sector worked, increased competitiveness at all levels, encouraged leading edge work on environmental problems to be carried out, allowed innovative work on aircraft structures and in other areas, and initiated a substantial research integration of the sector. At the same time they assisted the enlargement of the European Union providing mechanisms for the engagement of enterprises from the New Member States. Across the Union they provided actions that supported smaller enterprises in their attempts to take a wider and more ambitious view. Co-operative working between enterprises increased further and was functional with larger companies and on larger projects as well as with SMEs.

In all these key areas the Framework Programmes were a signal success. But the impact of the Framework Programmes was felt in many other ways; by the growing success and importance of a coherent sector research strategy that had been created following a pioneering initiative by European Commissioner Busquin, by the progressive introduction of a common understanding of how research in the sector was, and could increasingly be, integrated with complementary actions by the member States and enterprises. The two Framework Programmes spanned a period of great change in the sector, they contributed to these changes by enhancing the approaches, processes and opportunities that fundamentally encouraged Member States and their enterprises to work in a different way - effectively establishing a change in the European Operating System as it was practiced in aeronautics.

The third element of the MEFISTO task was to consider how the impact assessment process could be transferred to and applied in other transport sectors. Each transport sector has unique challenges, has policies to meet particular needs as well as more general ones, has its own structure of industrial enterprises and regulations that are appropriate only in its own domain. It is essential, therefore, that any plan to transfer a process from one sector to another should find a balance between consistency and recognition of the special needs of each sector. The report comments on how this was approached and why we believe that the process recommended will be useful in a variety of situations.

This report makes 12 recommendations.

First, and most important, is our recommendation that the many beneficial and important impacts of FP 5 & 6 should be followed by a continuation of the Framework initiative.

The remaining recommendations are directed at individual aspects of the Framework Programmes where the European Commission may have an opportunity further to enhance the impact of future FPs and make them more effective, efficient or convenient in the particular circumstances.

2. Introduction

The MEFISTO project was carried out during the period July 2008 until February 2010. The background to the project is that the European Commission (EC) wants to develop approaches that will provide impact assessments in a variety of sectors so that these can be used to monitor and influence their policy actions.

In particular the Commission wants to receive impact assessments on FP5 and 6 in time for the FP7 Interim Evaluation and the preparation for FP8. In this respect impact assessments sit alongside but are distinguished from Evaluations which generally look at the project results. There are many excellent evaluation studies available. Impact Assessments look at the impact of the Commission's policy intentions although there are very few such reports available as models.

To be useful an Impact Assessment has to work within clear boundaries. Some of the changes encouraged by the research work within the FPs had effects outside the field of aeronautics but MEFISTO has limited its impact studies to those found within the aeronautics and aviation sector of transport.

Timing is also an issue for carrying out an Impact Assessment; the impacts of a Framework Programme will be felt over an extended period with different impacts being evident at different times. An assessment over a single period is, therefore, necessarily a snapshot and the more useful picture of developments over time may not always be captured. Isolating the long term impacts for a programme is also disturbed by the interaction over the period of numerous other influences. In the aeronautics sector, for example, we could see that whilst the FPs were a major influence the effect of national policies, industrial activity, and changes in the market had each brought some change of its own event though

these were augmenting rather than in different directions. Distinguishing between these changes and isolating the impact of the FPs was unlikely to yield a precise result.

The MEFISTO team took into account that a parallel evaluation was taking place on the aeronautics projects of FP 5 & 6 under project AGAPE that was assessing the progress

*The European court of Auditors (2007) has made some remarks that highlight the difficulty of impact assessments:
...The auditors concluded that evaluating RTD programmes, and in particular assessing their long-term results, is inherently difficult...
but... the fact remains that little or nothing is known about the achievement of programme.*

in technological developments against the technology goals agreed upon in Europe through ACARE SRA's. There were other monitoring, evaluation and study projects elsewhere across the transport sector.

The team wanted to remain aware of the progress of these projects and to share experiences with them but also to retain an independence of thought and action from them.

As the project developed it became clear that MEFISTO would accumulate a large amount of data, views and other information that might be very useful to the Commission and would need to be recorded for future reference. The team decided to produce a shorter report (this report) that concentrates on the important issues but omits most of the supporting justification for the views expressed. For those readers who wish to explore the rich detail of our survey and interviews we recommend a study of the long report.

Finally in this introduction MEFISTO must **acknowledge the invaluable assistance of many people working in the aeronautics community who spent time and effort on helping with this project at workshops, survey completion and in interviews.** The project was helped unselfishly by all and benefited from their experience. Without their help it would have been impossible to produce this report.

The MEFISTO project was funded by the European Commission under contract number FP7-TPT-2007.6 and aimed to meet three objectives set by them:

- To develop a methodology for impact assessment under Framework Programmes 5 & 6.
- To exercise and refine this methodology by carrying out an impact assessment in the Aeronautics Sector.
- To propose a generic methodological approach to impact assessment in the wider Transport Sector.

The MEFISTO project was carried out during the period from July 2008 until February 2010.

The MEFISTO Team was composed of the following members:

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The assistance of
Mr Anthony Joyce – [EUROCONTROL](#)
is also acknowledged.



3. EU Policy Aims

From a survey of the relevant policies five were identified as having the greatest significance to the impact of the Framework Programmes in aeronautics; these were:

- The Lisbon agenda.
- The transport policy
- Support to SME's
- International relations
- The ERA

The last decade of the 20th Century happened to be a time of great change in the aeronautics area. This included the first "Open Skies" agreement, airline global alliances and low-cost carriers. The Cold War ended and the resource devoted to military aeronautics was beginning to decline substantially. The aircraft industry in Europe was in a state of change from a fragmented series of nationally based companies into a globally competitive manufacturing system with Airbus at its apex. Behind these changes smaller companies and research communities were also changing and combining.

Meanwhile the global stage was dominated by the USA. It sold more aircraft, spent more on research and development and influenced every kind of international aviation agreement. During the 1980's R&D spending on civil aircraft had risen substantially in the USA as part of an explicit investment to protect their commercial dominance in the evolving global situation.

The response of the EU was to give greater funding to the key research areas through successive Framework Programmes. The scale of the aeronautics research activity of the Commission grew following the success of the pilot scale of FP2 at € 35

million and increased to € 71 million in FP3 and then to € 245 million in FP4. Framework Programme 5 emerged in 1999. In preparation for the 5th FP it was concluded that if the dominance of the USA was to be met by Europe a more integrated, better focused and stronger approach for research in the sector would be necessary. Too much of the research funding had been directed at upstream research and a better balanced programme with more attention paid to more ends-directed research was proposed.

An Aeronautical Task Force in which the industry and the Commission participated recommended a restructuring of the European RTD programme with a focus on a limited number of strategic topics for the development of critical technology related to:

- Reducing aircraft development cost and time to market
- Improving aircraft efficiency
- Improving environmental friendliness of aircraft
- Improving operational capability and safety of aircraft

In FP 5 the aeronautics sector was given its own programme as part of the Growth programme.

Framework programme 5 had two distinct objectives:

- technology objectives related to increased competitiveness
- serving social needs (e.g. the protection of the Environment)

It was the intention that FP5 (1999-2002 with an aeronautics research budget of € 700 million) would be executed through an interlocking system of "thematic" (the critical technologies) and "horizontal" priorities (the competitiveness and social needs objectives).

The Aeronautics Research in FP6 was part of the "Aeronautics and Space" thematic priority and was intended to give equal focus to public interest and industrial competitiveness. The Commission was assisted by an Aeronautics Advisory Group that checked the consistency of the Work Programme document with the guidelines and objectives from the ACARE Strategic Research Agenda.

This SRA was based on the European vision regarding the future of aeronautics as published in the Vision 2020 report by the Group of Personalities (GoP) which was initiated by EU Commissioner Busquin in 2000. The GoP's advice corresponded with the two lines above (1) meeting societal needs with respect to demand for air transport, travel rates, travel comfort, safety, security and environmental impact and (2) ensuring European leadership in the global civil aviation market by cost-effective production, operational attractiveness and efficient product performances. FP6 ran from 2002 – 2006 and called for the establishment of a European Research Area (ERA) to improve the cooperation between researchers in Europe, between research institutions, to coordinate national and regional research programmes and to develop strong links with partners around the world to benefit from worldwide progress of knowledge but also to take a leading role in solving global issues. ERA was created as a consequence of the Lisbon European Summit of 2000 where Europe set the goal to become "the world's most competitive and dynamic knowledge-based economy". Another important starting point was the White paper on Transport: "European Transport Policy for 2010: time to decide".

Calls from FP6 ran from 2002 until 2006 and the available budget was € 840 million. The aeronautical research under FP6 has taken place within four broad areas:

- Strengthening competitiveness of the manufacturing industry
- Improving the environmental impacts with regard to emissions and noise
- Improving aircraft safety and security
- Increasing the operational capacity of the air transport system

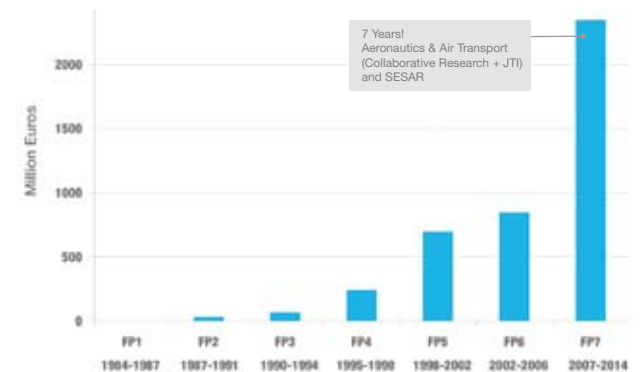
New instruments were introduced under FP6 based on the concepts of the ERA and aimed at more effectively structuring and integrating European Research. For Aeronautics new instruments were the Integrated Project (IP) and Network of Excellence (NoE). Traditional FP instruments like Specific Targeted Research Project (STReP), Coordination Action (CA) and Specific Support Action (SSA) were retained.



Comparison of Policy Aims between FP5 and FP6

Although there is much in common between the two successive Framework Programmes e.g. competitiveness in aircraft manufacturing, aircraft efficiency, air transport capacity and safety, and the collateral effects (e.g. emissions and noise), the environment accents have shifted to the more societal aspects at the expense of core aircraft technology. This inclination to consider the social impact of technology more actively was a clear change. Continuity between FP5 and FP6 was also somewhat affected by the new instruments brought in to cope with the fragmented research in the growing number of Member States, the wish to improve the under-utilized infrastructure, and the wish to involve more SMEs in the manufacturing chain and in the research activities. A smoother sense of continuity might have been achieved by more closely considering this aspect in the preparation of the work programme.

Evaluation FP Aeronautics budget per Framework Programmes



4 Developing the Methodology

It would be useful to start any Impact Assessment with clearly defined, unique, quantified and applied European policy objectives and then go on to measure the degree to which they had been achieved. This was not generally possible.

The main reason why this simple process of measurement was inappropriate was that the impacts of the FPs have been made over time, acted in parallel with many other influences, and contributed in many cases to long-term technical aims. Policies had been defined over a long period, were sometimes necessarily not expressed as quantified goals, were formed by different bodies and written separately and not as a coherent set to be uniformly felt by all. This is normal in a large policy making structure but inevitably it produced a level of variability of emphasis. The two FPs we examined had similar, overlapping but not identical aims.

MEFISTO recognised that the European Commission had sought to create the impacts for the FPs through its research programme as that research led to greater competitiveness, collaboration, and integration. In this sense the FPs were important enablers of the policies as well as direct implements of research progress.

This diversity of policy objectives naturally needed to be taken into account. For example in transport research the FPs are instruments to support the development of European transport evolution policies whilst on European cohesion the FPs are also an important instrument. On mobility of researchers the Commission used the successful Marie Curie program. MEFISTO needed to consider the policy objectives of air transport and aeronautics and then examine how far these had been achieved.

It was also necessary to recall that FP5 and FP6 were not the start of the Framework approach. There was a body of experience that needed to be recognised. MEFISTO examined the history of FPs before FP 5 and 6. The team also read a number of reports about these two FPs and looked at how the utility of these reports had varied.

MEFISTO identified 20 key policy issues to be analyzed. The process of distilling the policy aims down to questions to be examined is summarised below and in much more detail in the longer project report. The 20 Key Policy Issues were arranged into four groups under the headings of the Driving Impacts, the Structural Impacts, The Leveraging Impacts, and Input Impacts.

Driving Impacts were the direct impacts of the research work advancing technologies and increasing capability of the enterprises concerned through participation in projects.

Structural Impacts were the effects of the FPs influencing the way in which enterprises collaborated and how their relationships developed through participation in the FPs.

Leveraging Impacts were those effects of the FPs adding value by making the whole value of the research community more effective than could be attributed to the projects alone.

The Input Impacts were those effects that stemmed from the actions and structures provided by the Commission.

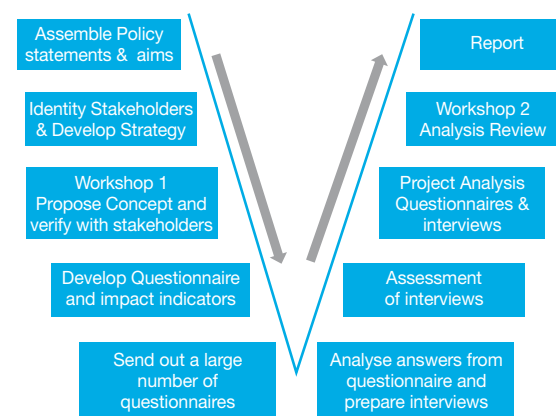
MEFISTO drew up the outline strategy for finding out about impacts and this revealed a number of issues that would need to be resolved. For example, there were few appropriate metrics for impact. As noted earlier the impact of the FPs is often augmented by other influences, some of the desired impacts were not susceptible to metrics anyway and often

Precursor Framework programmes

impacts are progressive. The overall approach was, therefore, to rely on what a wide selection of those who had working experience at different levels had to say about working under FP5 and FP6. MEFISTO prepared draft material for discussion, including draft questions, and convened a workshop of a selected and representative group of stakeholders to consult about the approach. This workshop was extremely lively and useful and enabled the planning to be improved.

The Project Methodology

The project methodology adopted for MEFISTO used a conventional systems approach of a «V» diagram that shows how the process development activities on the left side are matched with corresponding outcomes in the process use on the right side. This enables the objectives of the study to be dismantled into constituent parts and re-assembled to ensure that the objectives are met in a systematic manner.



Having extracted the main policy drivers a large matrix of sub-issues was created that the team would ideally wish to know about.

Creating the matrix

Under every important policy issue the team drew up a series of questions and placed them into the categories of Driving, Structuring, Leveraging or Input Impacts. This large matrix produced a set of 214 background topics that seemed potentially of interest to MEFISTO. This number of topics of concern was too many to be useful in a questionnaire as it was expected that the majority of people might spend only about 15 minutes completing the survey questions (although some would be prepared to spend longer).

The workshop helped us to improve the focus and grouping of possible questions. **The final list was 94 questions relevant to MEFISTO. The questions were grouped and colour coded so that, whilst all questions were visible respondents were guided to a more efficient use of their time and expertise.**

Deploying the survey

MEFISTO selected the commercial organisation Survey Monkey to provide an established platform for the survey and built-in results analysis tools. This choice worked very well in managing the survey.

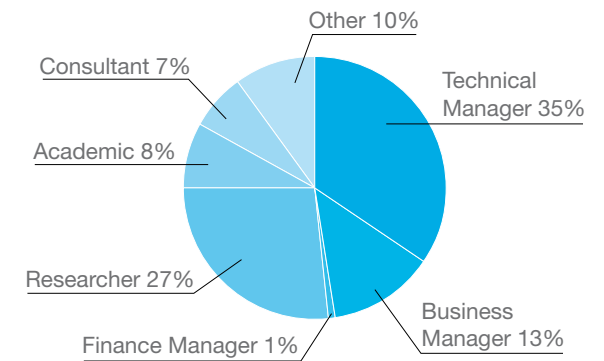
MEFISTO had originally intended to invite individual people to respond to the survey by means of a personal and direct e-mail invitation. This plan proved impractical. It was much harder than expected to generate lists of the people that needed to be approached and MEFISTO evolved the plan to be a **mixture of direct invitation and roll-out from those invited to other colleagues, that enabled the invitation to get out to a large number of people and led to the final input of nearly 300 returned survey results** of which nearly 50% were from industrial sources. This met our own previously set targets.

7. the FP5 provided the mechanisms to reach the following technical objectives:

	strongly disagree	disagree	inclined to disagree	inclined to agree	agree	strongly agree	don't know	Rating Average	Response Count
Reducing production costs by 35% and development time by 15 to 30%	1.7% (3)	5.0% (9)	15.1% (27)	25.1% (45)	13.4% (24)	2.2% (4)	37.4% (67)	3.80	179
Reducing fuel consumption by 20%, improvement in reliability and direct operating cost	3.4% (6)	6.2% (11)	9.6% (17)	24.2% (43)	23.0% (41)	2.2% (4)	31.5% (56)	3.93	178
Reduction of noise, climate impact as well as improvement of passenger environment	1.1% (2)	2.2% (4)	5.0% (9)	21.2% (38)	33.5% (60)	7.3% (13)	29.6% (53)	4.50	179
Reduction of NOx by 80% and CO2 by 20%; decreasing external noise & cabin noise by 10 dB	1.7% (3)	6.1% (11)	11.7% (21)	20.7% (37)	15.1% (27)	7.8% (14)	36.9% (66)	4.03	179
Improvement of the operational capability of a/c and of safety, with									

A sample for the survey Analysis

The Survey Respondents



The policy aims extracted by MEFISTO for use as the 20 Key Issues were:

Driving Impacts

- (1) Improvement of the competitive position.
- (2) Improvement of Mobility
- (3) Improvement of the environment
- (4) Improvement of Safety and Security
- (5) Stimulating new knowledge
- (6) Bridging the gap between research and application

Structural Impacts

- (7) Mobilising European research
- (8) Stimulating additional funding
- (9) Coordination with MS programmes
- (10) Involving NMS in aeronautics
- (11) Involving SMEs in the supply chain

Leveraging Impacts

- (12) Improving relations between research and SMEs
- (13) Stimulating Excellence
- (14) Benefiting education
- (15) Can Europe do without EU funding?

Input Impacts

- (16) The efficiency of EU actions
- (17) Efficiency of the evaluation process
- (18) Efficiency of project work
- (19) Costs involved in European collaboration
- (20) Efficiency of EU international collaboration

These 20 Key Issues represented the aims of the EU that MEFISTO needed to explore through its consultations. Results are discussed in chapter 6.



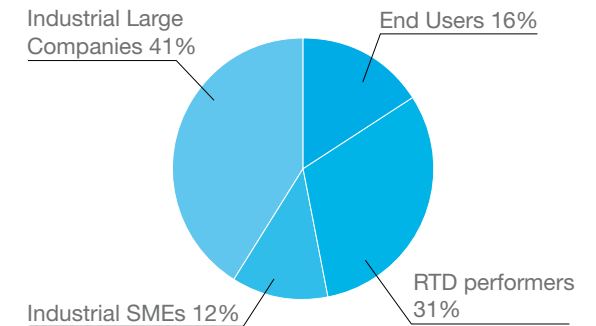
In parallel with the survey MEFISTO carried out 53 interviews with people from a variety of experience of the FPs.

Although each interview was different, the set of 20 “Key Issue” questions that further encapsulated the original matrix and combined some questions together was used as a guide. The 20 issues gave focus for the interviews and also provided a very useful tool for looking at the issues from a different perspective. Interviews were a mixture of face-to-face and telephone interviews. Most people who were asked to be interviewed agreed and were pleased to have their views recorded in this project.

Performing the interviews

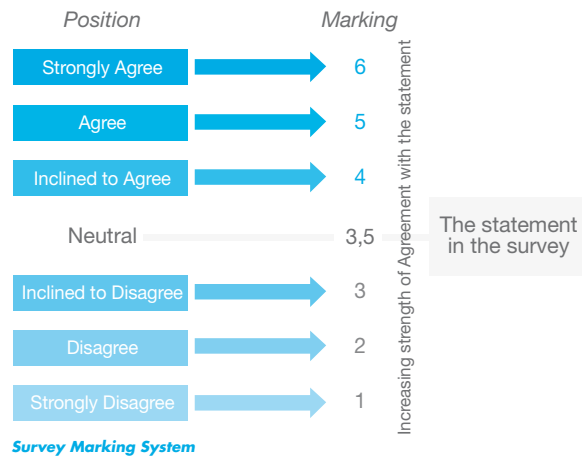
The results from the survey were mostly of a similar pattern, not only from question to question but between classes of respondent. Most answers, when averaged, were in the zone “inclined to agree” (with the statements made). A minority of answers were at extreme positions of strongly agreeing or disagreeing. Deep analysis of the answers was somewhat inhibited by this even tone but some distinctions were extracted. Among the distinctions were comparisons of less experienced with more experienced staff, men with women, research-based with industrial employees. The contributions made by stakeholders, survey respondents and interviewees resulted in gathering a rich set of data with many views being expressed by several people. The interviews especially helped us to uncover what lay behind both the disagreements and the agreements.

Interviewee Profile



The survey response was processed numerically and produced numerous graphical representations that give insights into the views of the whole cohort of respondents and of particular groups within them.

Responses to several statements were often combined to give a richer picture of particular key issue. The analysis therefore gives good indications of the average view of experienced individuals, and sub-groups, against relevant statements and areas. The interviews and comments, however, add another perspective to our understanding since they single out particular aspects of an area that worked well or poorly which we could not extract from the survey. The interviews alone would not have been satisfactory because, inherently, the comments are specific to each individual and their experience. It was nevertheless possible to record that significant numbers of comments focused on particular aspects and this indicated a level of consensus between experts.



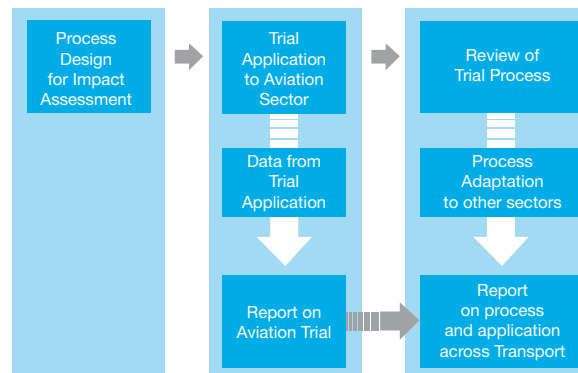
The survey response and the interviews gave different perspectives on the same topics. The survey asked for an overall perception on each issue. The interview format allowed the interviewees to select particular aspects to elaborate within their general comments on a given topic.

These elaborations were useful additional information, especially where a number of interviewees selected similar aspects for mention and in helping the interpretation of survey response averages.

From data to information

Drawing conclusions from the data required that the information gathered should be reflected in the conclusions although in a summarised form. Summarising the information gathered and its composition into useful and informative statements has, naturally, been the responsibility of the MEFISTO team.

The interview results were also part of the data gathered and these are summarised at appropriate points in this document. In a number of places quotations from the interviews are included to give some flavour of the responses.



Basic MEFISTO Process Plan

This report contains a number of graphics that illustrate different aspects of the impacts examined.

This section is a short guide to their interpretation. One of the most frequent graphics is the “spider diagram” and its features are identified in this picture. It allowed MEFISTO to generate an average value for the Key Issue based on individual averages obtained for the correlated questions.

The Report also shows an overall assessment of the impact on each key issue and this system of marks is also used in the table of impacts against the policy aims on Page 52. In this system the marking is:

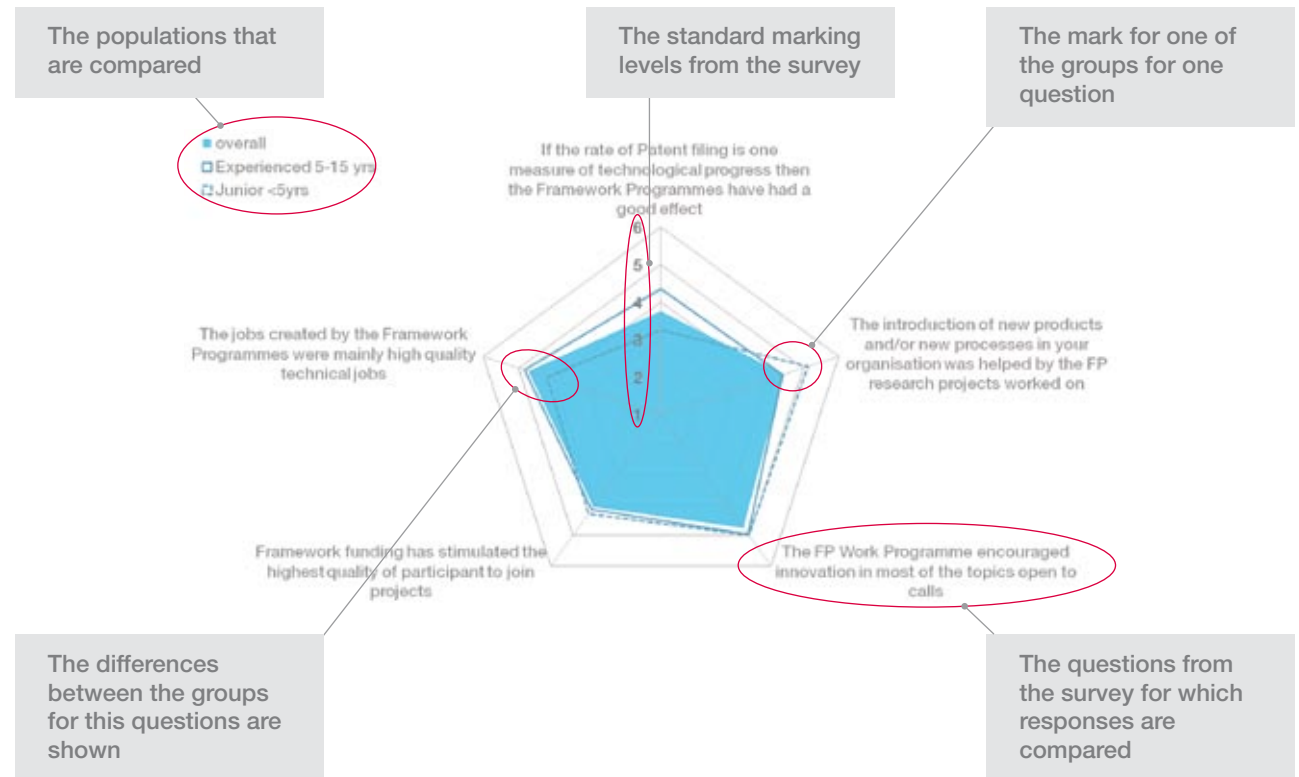
Notation

- ■ ■ ■ A very positive impact
- ■ ■ ■ A good impact
- ■ ■ ■ The system worked effectively but with some issues recorded

On a number of pages quotations are included. These are verbatim extracts from comments made to MEFISTO in interviews (or on the web in response to the survey) are included only to indicate the breadth of experience reported by the interviewees.

“ Quotations, verbatim extracts from comments. Industrial Interview ”

A Typical Spider Diagram



On some key issues no spider diagram is provided. This occurs where only 1 or 2 questions from the survey have direct relevance to the issue and the provision of a graphic to illustrate these is inappropriate. A complete statistical analysis of the survey is made in the appropriate deliverable of the project.

5. Deploying the Methodology across Transport

One of the objectives of MEFISTO is to evaluate and propose a generic methodological approach to impact assessment in the Transport Sector.

Although the MEFISTO team has not conducted a practical test in transferring the MEFISTO methodology to other transport sector domains, confidence in the applicability of the method can be gained by using a set of general criteria. These criteria relate to:

- the manner and timing of the visibility of the impact in a sector.
- the objectives (political and technological) for the Framework Programme and for the sector under review.
- the specificity of the effects measured.
- the applicability of the ten steps within the methodology developed.

These criteria have been discussed with national and European experts from Surface Transport. In total we consulted about 10 experts to get their feedbacks. A further input to judge the MEFISTO methodology was derived from methodologies developed and used in other impact studies. Both activities gave a first indication of the value and applicability of the MEFISTO methodology in other transport modes.

The MEFISTO understanding is that the specific characteristics of a particular Surface Transport will have most effect during the execution phase of the impact analysis rather than on the basic methodology. Furthermore Impact assessment is seen as a very valuable asset and the MEFISTO approach is a structured and sound way to get a view on the impact of research. However it was pointed out that in Non-Air Transport sectors there is more diversification.

In general it will not be possible to perform one overarching impact assessment for Surface Transport and sub-sectors will need to be considered separately.

The conclusion is that the MEFISTO Methodology can be used to assess the impacts within other domains of transport with some modest modifications. The most effective and efficient way to do so is to adopt and modify where necessary the approach taken by MEFISTO especially the definition of the stakeholders group and the selection of a representative group of workshop participants to check the approach require attention. Secondly; the scope of the work area should be focused since the transport sectors are in themselves very diversified. We advise against reinventing a new and different methodology for each sub-sector and we have prepared a Transfer Report for application in other domains.



6.0 The Impact Assessment

The most obvious impact of the FPs was to allow research to be done that could not have been afforded or performed as effectively otherwise. This was a substantial programme and it gave a significant impetus to research across the industrial sector.

In time, sometimes quite a long time, this research enabled product development and new products to enter service years later. The attached graphics illustrate how important and fundamental have been the driving effects that have, in large part, been created by the FPs. The evidence we explored showed clear recognition of the role played by the Commission's FP in achieving the advances that have been made. It was not the only factor but was an important one.

In summary the MEFISTO assessment stresses a single key issue: **to regard the FP projects as a pathway and not a destination**. The pathway provides a prepared road that can enable participants to reach any number of destinations. The vision, commitment, and effort displayed by some participants is remarkable and they have often achieved remarkable outcomes. Using the projects in this wider context requires considerable effort and needs a clear vision of how the participating team wants to develop itself. It requires a genuine respect for the knowledge of others and a willingness to acquire new skills and knowledge. Many topics in the successive Framework programs were developed from low Technology Readiness Levels (TRL) up to validation and ultimately demonstration in FP7 (Clean Sky). As a consequence, many Framework projects are interrelated and sequential.

The illustration opposite can be used to understand this gradual maturing of technologies and how wider research achievements often depend on clusters of projects.

The blue boxes represent Framework program technology projects (See the Cordis website of the Commission for more details). The connections between them represent a sequential relationship. These technology projects- now called Level 1 projects- represent the building blocks for technology development in a particular area.

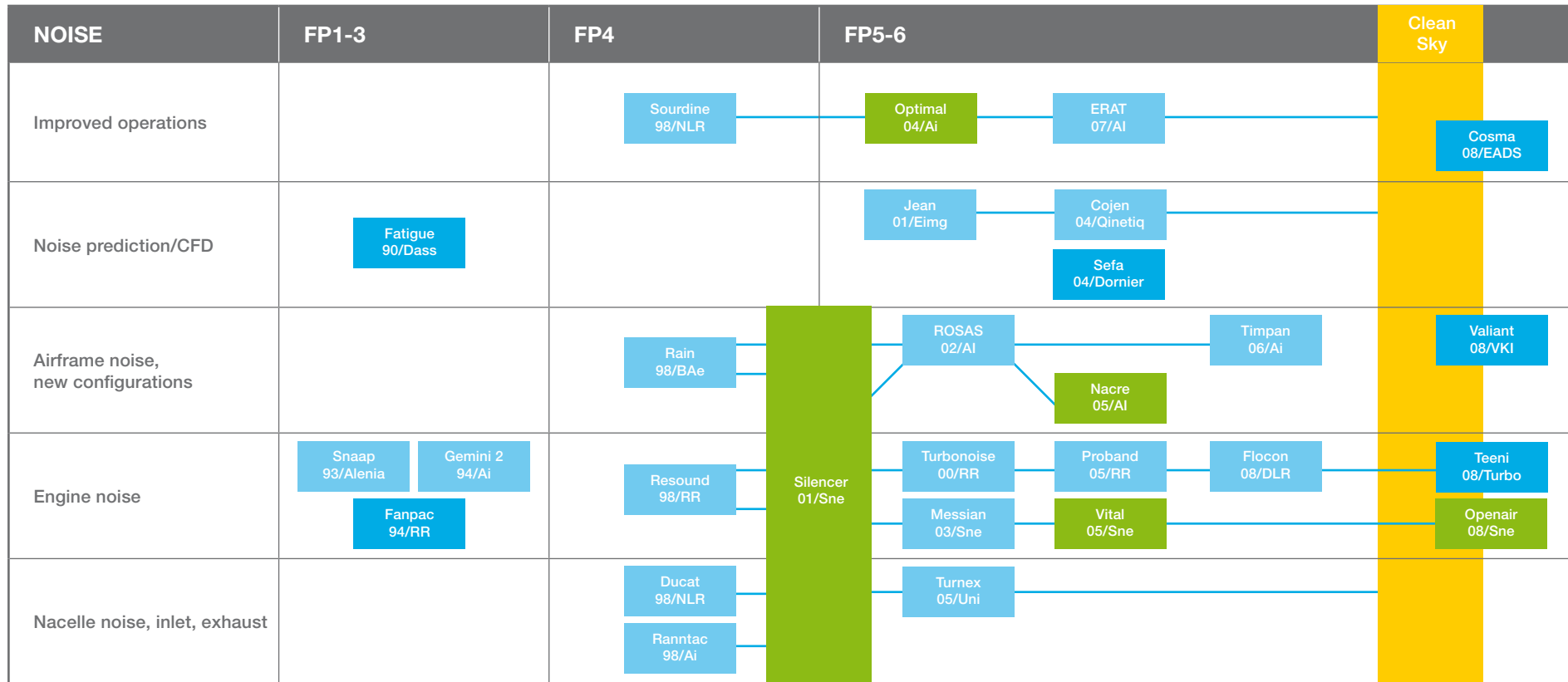
The green boxes represent projects that integrate and validate the results of Level 1 projects and national research, now called Level 2 projects (FP7).

The yellow bar represents the demonstration efforts in the level 3 project Clean Sky.

The illustration on page 17 (opposite) can be used to understand this gradual maturing of technologies. It illustrates the relationship in aircraft noise research. The success of a new aircraft or engine programme depends on the selection of the best technologies available at the time of the launch of a new programme where technology is not the only factor. There are also business, financial, marketing strategies and industrial aspects which also contribute to the competitive advantage of a programme. Technology development is normally a continuous process and several technology programmes are needed to develop the right maturity level for a low risk application into a new programme. Unfortunately, there exists no clear metric, which allows the quantification of the impact of a single technology or a set of technologies on a programme.



Technological trajectory of FP projects in Environment*



* Boxes show Project Acronym, Starting Year, Coordinator

6.1 Improvement in the Competitive Position



The FPs have clearly and strongly increased the competitive position of participants. They have done this by their influence on the direct effects of research on companies' ability to develop emerging and new in-service products.

This influence has been effective in both the medium and long-term perspective by the development of critical technologies and in the shorter-term by the integration and validation of technologies. The benefit was naturally expressed differently for different sectors and individual companies as some of the quotations show.

The analysis of the questionnaire and interviews shows the consistently positive overall feedback about these improvements in the competitive position of firms. Benefits were mentioned both by large firms and SMEs. The latter said that participation with EU funding was both beneficial in the individual projects and in enabling further benefits as participants engaged in the opportunities that European collaboration offers. Of particular benefit to SMEs were those projects which allowed these participants a closer product orientation and a more flexible research focus.

Other influences also encouraged the European development of advanced product technologies but these national and private funded efforts were very largely complementary and augmenting relations of the FPs and the beneficial impact of the FPs is widely recognised. The Framework programs allowed more risky research to be undertaken that helped to improve competitiveness thanks to the innovative nature of these products. The graphs and tables on page 17, and annexes show several examples of successful FP projects, which have helped in one way or another to contribute to the competitive advantage for the next generation of new products. The additional resources from SMEs, the supply chain, Research centres and Universities that could be engaged was also recognised.

But perhaps the most vivid support that the FPs have given to European competitiveness is shown in the series of illustrations of the number of advanced products that have been underpinned by the earlier research carried out during FP 5 & 6. (see annexes)

CONCLUSION FPs effectively and strongly increased the competitiveness of the European industry by complementing national and private research; FP's supported the more risky research and led to quicker availability of new technologies in the market with a primary focus on large aircraft.

SUGGESTION focus on RTD roadmaps for clustered RTD activities related to technology development in Europe; Create opportunities for technology demonstration (Clean Sky*).

* Clean Sky has the potential to cover the last part of the research chain in providing opportunities to demonstrate that integrated new technologies actually work.



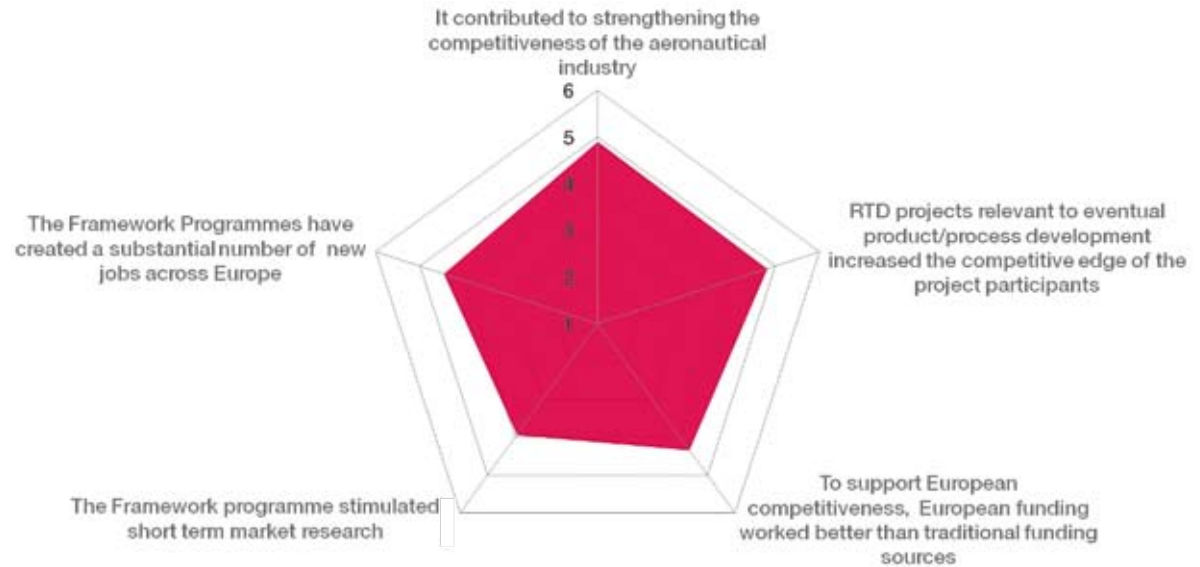
“ The EU Framework program helps to speed up developments. The EU program also allows my company to perform more long term, risky research, whilst in house research has sometimes a shorter time horizon and is more near market. Industrial comment ”

“ For example the A350 has taken advantage when suddenly the wing and fuselage had to be changed from AL alloys to CFRP, that the EC project TANGO and ALCAS had already delivered a lot of basic results to reduce the risk. Industrial comment ”

“ Cooperation in EU projects between large airframe and engine manufacturers has helped to look at total system and system integration. Airliner comment ”



KI 1. Improved competitiveness (4,48 Average)



“ The developed technologies have the potential to support many of the technical objectives of the FPs. But if these technologies will become part of new products remains to be seen? It is now up to the industry to make best use of it.

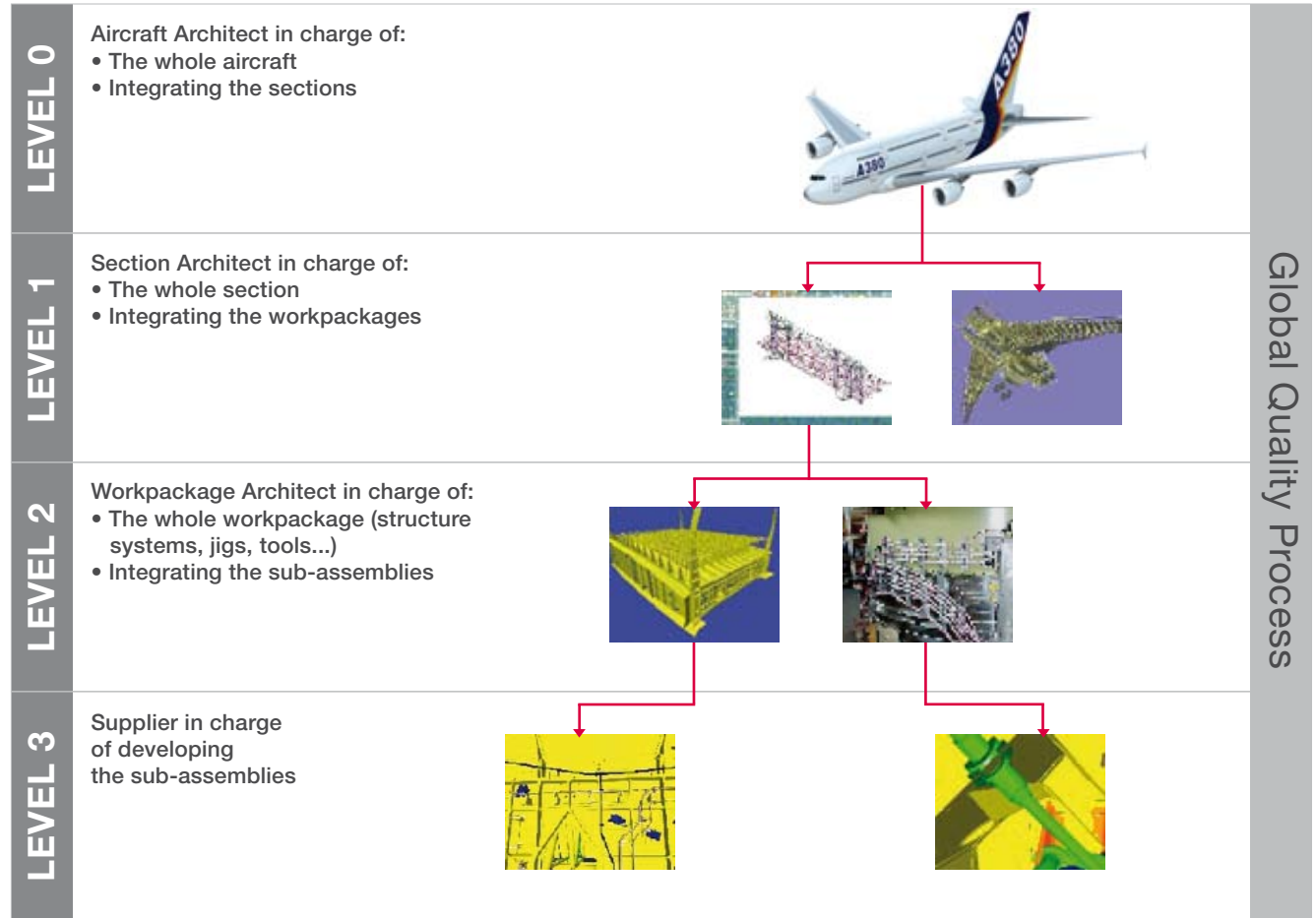
Research center comment ”

Some examples on how EU projects have had an impact on real life

Optimization of design processes

Based on the FP4 concurrent engineering project ENHANCE, the Airbus led FP 6 project VIVACE enables the re-engineering and optimization of the entire aircraft design process by modelling and simulation in an advanced concurrent engineering environment. This resulted in substantial cost and time savings in the aircraft and engine development process.

VIVACE developed user cases related to real aircraft and engine development processes. VIVACE created the collaborative design environment of the European extended enterprise that has been made available to the European supply chains. The results of the project are currently being implemented in the European industry, the supply chains and multidisciplinary design teams.



Global Quality Process

Common Product organisation

A composite fuselage

Increased efficiency of aircraft can be achieved by reduced drag, more efficient engines and lower weight. Composite materials provide opportunities to save weight. Until recently, composite materials were used only for secondary structures. Thanks to the EU projects TANGO and ALCAS, Airbus became confident that composite materials can be used for primary structures as well leading to substantial weight savings and thus fuel and emission savings. The integrated projects TANGO and ALCAS validated and integrated knowledge about composite materials and structures gained in several smaller EU and national projects. The results of these projects made Airbus confident enough to design the fuselage of the new A-350 in composite material structures.



Fuselage frame sections in CFRP composite material (FP5 TANGO project)

New engine configurations

Research on aero engines during the framework programs was focused on reducing the environmental impact of engines, on efficiency and durability issues of aero engines, manufacturing techniques and new materials as well as new engine configurations. Technologies for promising new designs like geared turbofans and counter rotating open rotor engines were developed. These new engines may be applied in the next generation of airliners.

Over time these technologies matured thanks to successive Framework projects. This provided the industry with sufficient confidence to test these advanced engine configurations in the Clean Sky demonstration project in FP 7.



Wingpanel showing the kink for FP6 ALCAS

Aerodynamics

Aircraft fly because the airflow underneath the wing has a lower speed than the airflow over the top of the wing and thus the pressure of airflow under the wing is higher than the pressure of the air flowing over the wing. This creates lift. As a consequence the airflow speed over the wing increases. At some point the airflow reaches supersonic speed which creates a shock wave that increases drag. In the ideal world the airflow should stay laminar, called natural laminar flow. However this is difficult to achieve in practice due to the different functionalities that need to be added to aircraft wings and much attention was given in the Framework programs to technical solutions to reduce and delay the effects of the shock waves. Several projects were funded to study technologies for boundary layer suction (hybrid laminar flow) and active flow control. These studies demonstrated that active flow control is feasible. The studies convinced the industry that new flow control devices are possible to delay the effects of the shock wave and paved the way to investigations within FP7 Clean Sky project towards an integrated flow and load control.

6.2 Improvement in Mobility

RATING:


Substantial progress was made in the research field mainly in the area of ATM - “mobility” in this context relates to air transport operations in general.

As airports and airlines were not very actively involved in FP5 and FP6, mobility addresses mainly ATM related research. During FP6 many significant ATM related projects were supported whilst in parallel significant ATM RTD resources were allocated to the definition phase of SESAR. These were in many cases precursor projects for SESAR and enabled the operational concept development of SESAR to be based on proven technologies. Notable examples of FP6 research consolidation and validation projects are EPISODE 3 and CAATS II. Research for air transport was focused on seamless flows both in the air and on the ground. New procedures were tested, new technological possibilities were developed and tested thanks to satellite Communication, Navigation and Surveillance technology. New low noise approach procedures, such as CDA approaches, were also developed and tested. Safety in the air and on the ground was enhanced whilst Security in the seamless air transport system was addressed as well. In all areas emphasis was placed on enhanced human-machine interface issues. Efficient ground movements were designed and the effect of wake vortices on airport capacities was studied. All of this research contributed to much good ATM research progress in the implementation of new systems. These will enable the increases in capacity required to meet 2020 targets and will make optimal use of already congested airports. Whilst major research projects like AFAS and MA-AFAS were launched during FP5, practical progress achieved in the field of air transport operation (mobility) was not always immediately visible to MEFISTO respondents. Respondents were aware that much good research was conducted in the

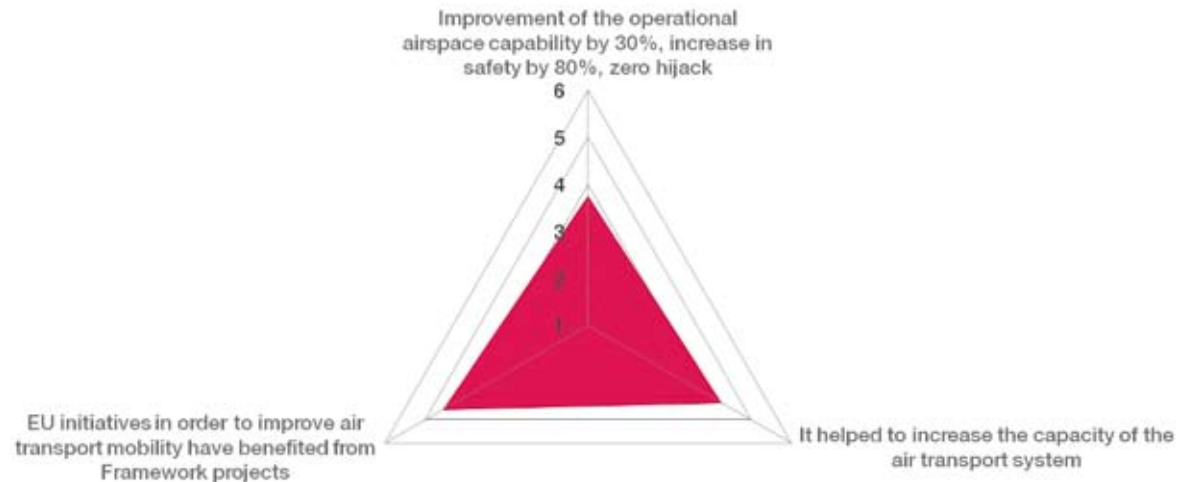
FP’s that will impact this area, particularly in ATM and Airport Operations. They knew that the path to implementation in the Air Transport System is dependent upon a complex set of factors and that progress will only become more visible as SESAR is deployed. Respondents were aware of the advent of the Single European Sky, its associated European ATM Master plan and the decision to place all FP7 ATM Research under the headline project SESAR.

CONCLUSION During the FP’s many significant ATM related projects were supported whilst significant resources were allocated to SESAR.

SUGGESTION Devote attention to long term ATM developments; Link safety research to future regulation.

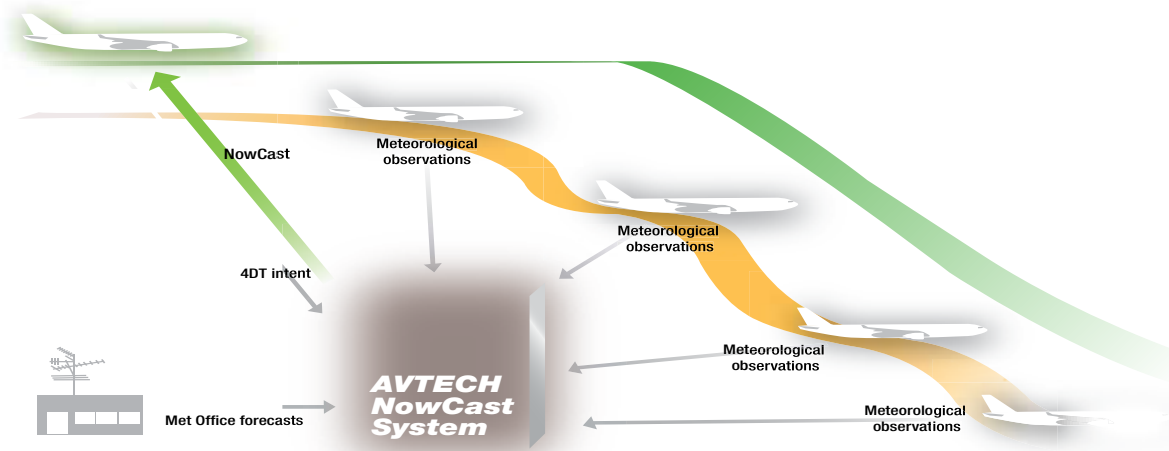
“ Much good ATM research work was done in the FP’s. However, the gap between research and application was often not bridged. There should be a mechanism to manage the created knowledge to ensure that it feeds an operational need. RTD Manager Interview ”

KI 2. Increased mobility (4,2 Average)



Optimal descent

Thanks to EU projects like AFAS, FLYSAFE and NUP+, a Swedish SME named AVTECH, was able to develop a fully automated update system for aircraft Flight Management Systems by providing real time information about prevailing wind conditions along the planned trajectory for descent. The FMS can now accurately optimize the descent path and trajectory of aircraft, resulting in up to 38% reduction of fuel consumption in the descent phase. Thanks to uploading of the FMS, a very accurate prediction can be made for runway touch down enabling better planning of runway use and airport capacity. AVTECH produced the Aventus NowCast System (TM) which has been successfully sold to different customers in the world.



The AVTECH Aventus NowCast System™ enables greatly improved 4DT (airborne-generated Four Dimensional Trajectories) calculation, environmental and economic optimization.

Improved regulations

Safety is of paramount importance in aviation. Rules exist to which manufacturers and operators have to comply. One set of rules deal with performance requirements for take off from flooded runways and runways contaminated with standing water, slush, snow and ice. The EU project CONTAMRUNWAY led by Dassault in 1999 demonstrated that the rules for smaller aircraft, derived from large airliners, were inadequate as the behaviour of these aircraft proved to be quite different. Several tests were made during the project to understand the parameters influencing the aircraft behaviour and to recommend changes in JAR-regulations. These changes were applied in the relevant JAR-OPS.



“ AirTN helped in aligning. For aeronautics research was already very well structured in Europe: aircraft, helicopters, engines research relied mainly on national programmes on subcomponent level. Government representative ”

6.3 Improving the Environment

RATING:



In the 5th and 6th Framework Programme the reduction of the environmental impact of air transport was concentrated on developing technologies for the reduction of emissions and noise.

One of the four key priorities in FP5 was the "reduction of impacts related to noise and climate. Objectives are reduction of emissions of NO_x by 80% and CO₂ by 20%, and decreasing external noise by 10 dB ". NO_x and CO₂ targets were seen as long term targets.

There are three main areas of concern in the environmental links with aviation: understanding the connections between aviation emissions and climate change (the science), the measurement of aviation emissions using a consistent and reliable methodology (measurement) and work associated with delivering emissions reduction. All three areas have been advanced by FP 5 & 6 although not exclusively within the aeronautics thematic program. The science and measurement activities have been advanced by a number of projects under other thematic priorities including QUANTIFY, AERONOX, AEROCONTRAIL, POLINAT, CARIBIC, STREAM, EULINOX, MOZAIC, TRADEOFF and INCA (FP5).

MEFISTO has looked particularly at the work for emissions reduction. In aeronautics some technical improvements e.g. fuel burn reduction lead directly to equivalent environmental improvements (CO₂ reduction). Given the life cycles of this industry, it may take a decade or more before solutions, developed in the laboratory, can and will be integrated into commercial engines and aircraft. Individual elements of research need to be combined into the systems of which they form a part and it is extremely difficult, therefore, to give a short overall quantitative summary of progress although this is being addressed in the AGAPE project. The significant measurable impact of the extensive research done in FP5 and FP6 will be coming forward as new generations of engines and aircraft are introduced.

Excellent work has been initiated in the area of noise, where industry and research centres have developed several good solutions for possible applications into future products. The survey results confirm the effort and progress made on environmental R&D activities of the Commission with projects like SILENCER.

In FP7 the Clean Sky project will further demonstrate the benefits of technologies developed in FP5 and 6 and in Clean Sky the improvements will become much more visible. The table shows the improvements that will be demonstrated by 2014 compared to the technology baseline of 2000. The environmental research done in FP5 and 6 will enable better products with fewer emissions to be developed and will directly assist the airline industry to reach their long term goals in reducing the effects of aviation on the atmosphere. However Environmental research is also dependant on clear statements from basic research done by the Atmospheric Chemistry research Community. As long as there is no

consolidated view about the effects of flying on global warming due to CO₂, NO_x, contrails and other gases in high altitudes, it will be difficult to address, for example, measures for new optimum flight altitudes. In FP5 and 6 relative little attention was given to the better understanding of the effects of aviation on the atmosphere and it will remain important to integrate the studies being done on the science and measurement of emissions and climate change with the work being done on impact reduction.

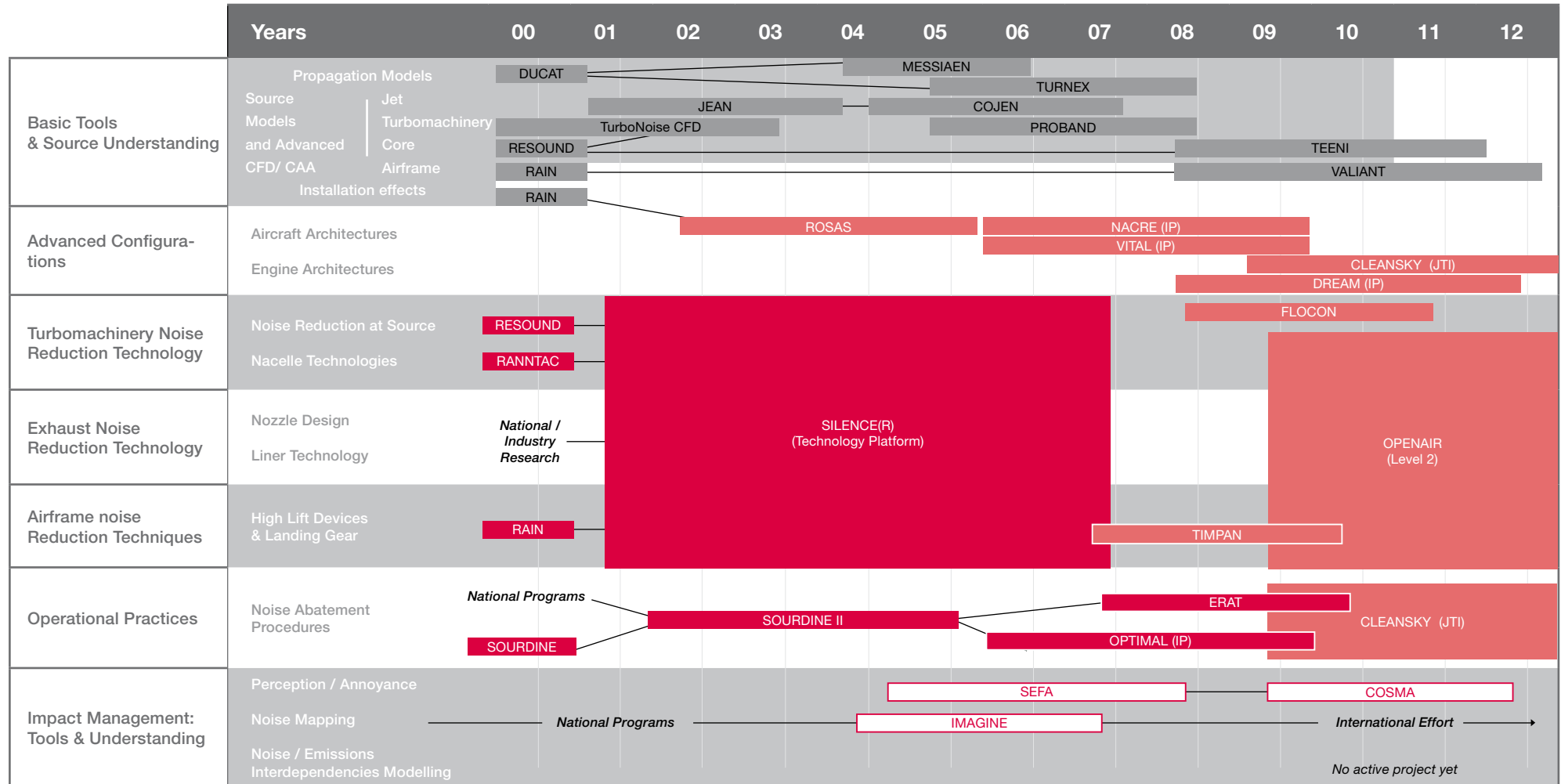
CONCLUSION FP's focused on technologies for emission and noise reduction; the full effect of this research will be demonstrated in Clean Sky; research on atmospheric chemistry did not yet result in a united and consolidated view on the contribution of manmade emissions to climate change or the mechanisms that apply in the aviation field.

SUGGESTION Devote more attention to longer term radical solutions for environmental friendliness and to understanding the effects of aviation emissions on climate change.

Clean Sky objectives

Programme	Smart Fixed Wing Aircraft	Green Regional	Green Rotorcraft	Sustainable & Green Engines	Systems for Green Operations	Eco Design
Activities	Active Wing New Aircraft Configurations	Advanced Aerodynamics (Low Drag & Noise) Low Weight Structures	New Powerplants Innovative Blades & Rotors New Aircraft Configurations	Advanced LP & HP System Technology (compressor, turbine) New Engine Concepts (i.e. Open Rotor)	Mission & Trajectory Management Aircraft Energy Management	Whole Life Cycle Environmental Impact Analysis
Targets	CO ₂ ~12 to 20% Noise ~10dB	CO ₂ ~10 to 20% Noise ~10dB	CO ₂ ~26 to 40% NO _x ~53 to 65% Noise ~10dB	CO ₂ ~15 to 20% NO _x ~60% Noise ~18dB	CO ₂ ~10 to 15% Noise ~9dB	CO ₂ ~10%
Products	Widebody 2020 CO ₂ -30% NO _x -60% Noise -20dB	Narrowbody 2015 CO ₂ -20% NO _x -60% Noise -15dB	Regional 2020 CO ₂ -40% NO _x -60% Noise -20dB	Corporate 2020 CO ₂ -30% NO _x -30% Noise -10dB	Rotorcraft 2020 CO ₂ -30% NO _x -60% Noise -10dB	

EU Aircraft Noise Projects Roadmap : X-NOISE (courtesy SNECMA)



X-NOISE

In order to coordinate joint research planning in the area of aircraft noise (both related to engine noise, aircraft noise and flight procedures) a coordinating action was started in 1998 under the name of X-NOISE. This activity has been continued over the years and new elements have been added to the X-NOISE platform like integration of noise research activities in Europe. Thanks to the roadmapping activities, European and national research was coordinated on a voluntary basis. This ensured subsidiarity of European actions and created cohesion in noise reduction efforts as well as optimal use of scarce resources.



Aircraft noise reduction

In 2001 a large technology validation project to reduce external noise, SILENCER, was funded by the Commission. SILENCER addressed several technologies like low-noise engine component design, low noise nacelles negatively scarfed intakes, low noise nozzle design, active systems and low noise airframes. SILENCER also studied low noise liner designs for the nacelle intakes. This resulted in a different design of acoustic liners. Rolls Royce developed the idea into zero splice intake liners. The zero splice liner has a continuous surface and lacks distinct joins that exist on conventional liners, which are constructed from 2 or 3 pieces. The zero splice intake enabled a reduction of 3 EPN decibels for forward fan noise. Jointly with Airbus a complex, one-piece composite liner was developed and introduced on the Airbus A-380. This makes the A-380 a very silent aircraft and the technology will also be used on the new A-350 aircraft.

“ Even if results do not show up immediately, FP impact on environment research is essential. Private and even national research would have been very poor without the FPs driving effect.

Industrial Interview ”

6.4 Improving Safety & Security

RATING :
■ ■ ■

Safety is a well embedded cultural aim of the industry and is of a very high standard and importance with progressive safety improvements continuing to be made.

Safety issues including human factors in flight operations and maintenance were successfully addressed with technologies for Health and Usage Monitoring developed on a European scale. Certification was addressed but there is a need for European Airworthiness bodies to do further research on safety issues in order to advance and adapt certification requirements to new technology standards. Additional work is envisaged in FP7 and the EASA research programme. There will also be a sustained need for energetic work in international regulatory bodies to keep pressing for advances in regulation if these goals are to be met in the time-frame set out.

Security has not been explicitly addressed in the aeronautics programme. Some airborne related security issues were studied in the Aeronautics RTD programme, but most of the security related RTD was performed in the specific EU RTD program called "Preparatory Action for Security Research" during FP6¹.

CONCLUSION Research for aviation safety made good progress with emphasis on human factors; on board security issues were addressed; the link to regulation should be strengthened.

SUGGESTION Safety and security research should be based on a common RTD roadmap with good international links.

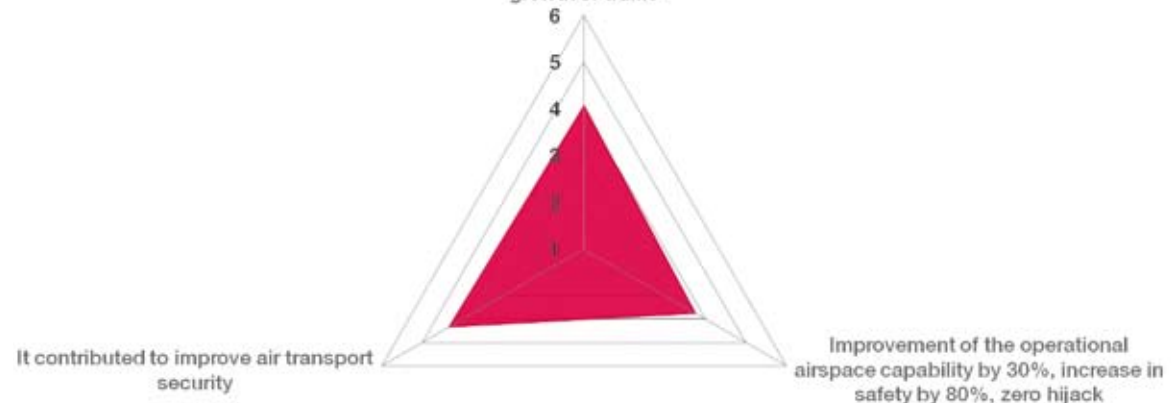
¹ FP7 addresses safety & security more explicitly: A full theme of FP7-Cooperation is devoted to Security, and a full activity area in FP7 Aeronautics theme is devoted to Security and, for instance, research related to Safety certification (EASA) is included in FP7 3rd call

“ The joint Aviation Authority struggled to generate interest and funding for safety R&D. The FPs created at the least a bit of pressure for performing R&D in this area. End User Interview ”



KI 4. Improvement of safety and security (4,1 Average)

Improvement of the operational capability of a/c and of safety, with targets of increasing airspace capacity, reducing a/c maintenance costs by 25% and decreasing accident rates by at least the same factor as the growth of traffic



Technological trajectory of FP projects in Security and Safety

RESEARCH AREA	FP1-3	FP4	FP5-6	FP7		
Certification		Eurice 96/Cira	Musca 05/EADS			
Safety	Aerosafe NLR	Jartel 97/NLR ASTER 99/NLR Dynasafe 98/SME Desire 98/NLR	Helisafe 00/Autoflug Asicba 04/SME ESACS 01/Ale	ISAAC 04/Ale Seat 06/Uni HELISAFE TA 04/ Autoflug	Missa 08/Ai	
Security			SAFEE 04/Sagem	Sofia 06/isdefe CASAM 06/Sagem	ATOM 09/SESM	Bermosa 09/tecnioni ISAP 09/Sagem

6.5 Stimulating New Knowledge

RATING :



Knowledge has different meanings according to the type and size of organization involved.

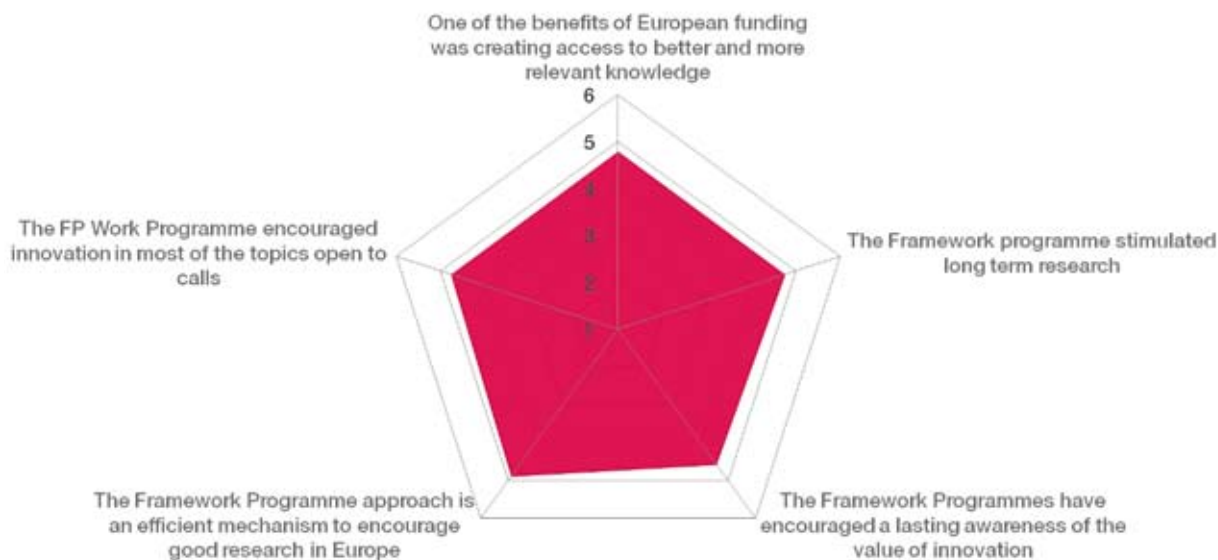
The detailed know-how accumulated in FP projects allows large enterprises to focus their R&D better as they progress to the next product. FP projects allow faster progress of the technology development process especially in more risky or uncertain projects. EU projects like NACRE with a more long-term focus have produced some excellent results in the more uncertain and innovative work and have also led to the filing of many patents. SMEs are very IPR sensitive and try to have background patents filed and their knowledge base cleared before joining EC projects. Research Centres benefit from the opportunity to do work for which they would have no other sources of funding – especially in sharing costly testing. In conclusion MEFISTO found the FP not only improved general access to the European knowledge base, but also stimulated the generation of new knowledge.

CONCLUSION FP's helped new knowledge creation and further knowledge development thanks to clusters of projects; FP's also provided good access to knowledge in Europe.

SUGGESTION Create a mechanism to foster upstream innovative research in the domain of aeronautics and air transport.

“ Yes, my Company has filed for patents during FP5/FP6. Manufacturing industry ”

KI 5. Stimulating new knowledge (4,75 Average)



“ Cooperative research inhibits submitting patents due to problems with foreground and background knowledge and the claim for being the original “inventor” without having published the results before submitting the patent request.

industrial comment ”

6.6 Bridging the gap between Research & Application

RATING:



Several TRL levels are usually needed between “research” and “application” and this often requires several EU projects to work in some sort of cluster relationship to create an impetus towards application.

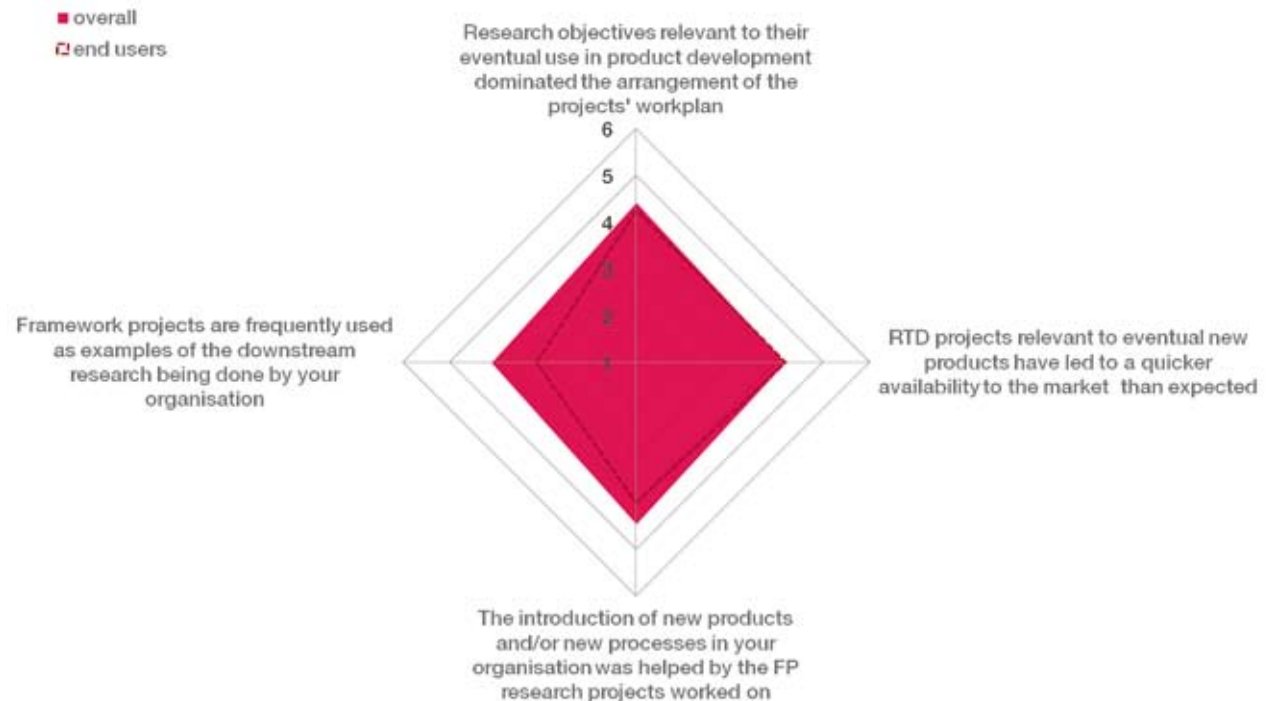
However, limited resources and attempting to perform the work in a series of distinct EU projects may sometimes prejudice an effective clustered approach. In most cases visibility of a clear technology road-map setting out the cluster design from the outset may encourage greater efficiency. Perceptions from the downstream end of this process seem less sharply aware of the value of earlier stage research, possibly because the contribution of any single element is less evident even when there is an acknowledgement of the overall importance of research. Respondents from industry indicate that industry has roadmaps which they follow in prioritising their research activities but they are apparently reluctant to reveal them publicly for competitive reasons.

Overall the response illustrates the importance of strategic research road-maps for achieving complex or important goals. These road-maps should indicate the range of objectives (for there will be several) and consider the importance of the span of mechanisms available to achieve them. The formation of these road maps may take place at different “levels”, that is to say they may be more or less detailed and at the detailed end of the scale it is clear that they could contain commercially confidential information. However, it might be possible for ACARE to encourage the preparation of some high level road maps that do not contain confidential information but which are, nevertheless, very useful documents for helping participants to understand how their project fits into the wider picture. **These road-maps should come initially from the industry although this might be assisted by ACARE.**

CONCLUSION The FP’s helped to expedite the valorisation of research results; this will be especially stimulated by the new Clean Sky demonstration project.

SUGGESTION Include large scale demonstration to the FP’s. Encourage the use and visibility of technology road-maps.

Key Indicator 6. Bridging the gap between research and application (4,3 Average)



6.7 Mobilising European Research

RATING :



Respondents are convinced that the Commission actions especially those related to setting up the Group of Personalities in 2000 under chairmanship of Commissioner Busquin helped to unite and mobilize European research.

The Group of Personalities (GoP) recommended establishing an European Technology Platform (ETP) called ACARE that produced two Strategic Research Agendas (SRA) for air transport and aeronautics research in Europe as well as an addendum to these. These SRAs became vehicles to align national and European research. **They became not only guidelines for FP6 but also for national and private aeronautics research in Europe.**

The Commission also supported setting up an ERA net in air transport research. AirTN provided a vehicle for Member States to discuss their national research support programmes and AirTN resulted in new bilateral research cooperation initiatives.

By initiating the Single European Sky, the Commission also paved the way for the SESAR programme to implement a new European ATM system.

Participation in Framework Program projects was seen by participants as a good investment for them. FP5 and FP6 enabled the access to the rich R&T capabilities of Europe and initiated an important and fruitful networking and alignment of research plans. The collaboration in research was primarily and positively impacted by the Commission actions but these were also significantly assisted by market forces working in parallel according to several interviewees. The Networks of Excellence (NoE) did not achieve the desired effect and would have required a stronger market pull to do so. The Commission had policies intended to integrate research and move industry and academia away from fragmented duplication and towards collaboration and greater efficiency.

Respondents reported that very little reduction of duplication has been achieved on the ground. This occurred partly because the Commission policy of integrating research and avoiding duplication was not reflected in the criteria used for evaluating research proposals. An ACARE aim was to encourage the wider use of major infrastructures across the EU. The "Access" scheme for participants to use large facilities was initially very successful. However, the programme was not continued in FP6 and some respondents from research were disappointed about this change in policy.

CONCLUSION The Commission initiatives of the GoP, supporting ACARE and SESAR as well as AirTN have all stimulated the alignment of research efforts and helped to unite and mobilize European research.

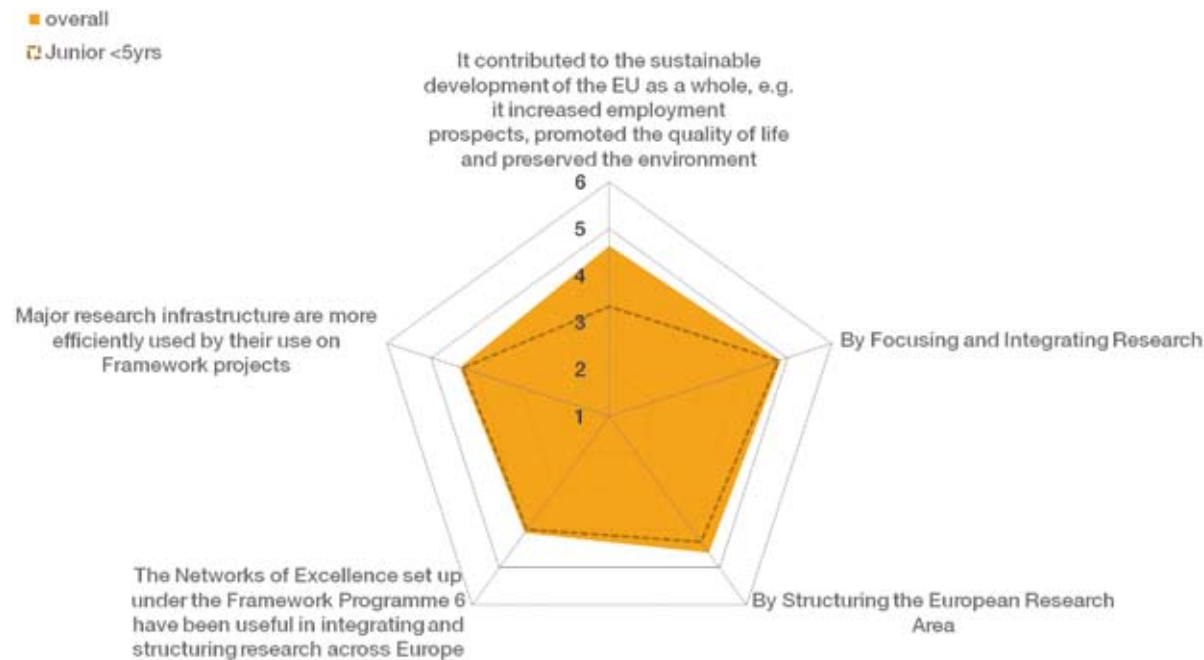
SUGGESTION The Commission should continue to stimulate the sector by initiating a new Group of wise people to sketch an update for the future for air transport.

“FP give a possibility to develop new contacts and discover capabilities outside the normal supply chain. Especially the IP/ level 2 projects make it possible to discover new partners in research due to the large numbers of participants. Manager Test facility”

“The whole effort of pioneering the work of the GoP, ACARE, the SRAs etc was ground breaking and led to a significant alignment where there was little alignment previously. This was a bigger and more important effort than is often remembered today. It brought a very good result. RTD practitioner”

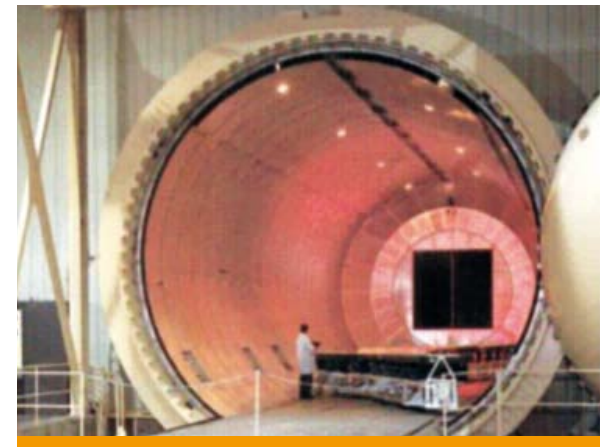


KI 7. Mobilizing european research (4,51 Average)



Harmonizing research

As a consequence of the large number of national initiatives in aircraft design and manufacturing of airplanes across Europe in the past, many national research entities were established that were developing competing technologies. With the restructuring of the industry, more cooperation and integration of research efforts would be logical but continued national interests discouraged integration and specialisation. EU projects like TELFONA, aimed at calculating and testing natural laminar flow phenomena helped to integrate CFD capabilities of DLR and ONERA in Germany and France. TELFONA was testing the effects of NLF in the unique European transonic wind tunnel ETW for which supporting Computational Fluid Dynamics (CFD) calculations were required. The two institutes decided to join their efforts in this domain leading to better use of scarce resources and enabling complementary work to be performed at lower cost.



“ It was a primary objective of the programme for «Putting Europe Together» and FP 5&6 represented a consolidation of the earlier work in previous FPs. Collaboration and connection was much more heavily stressed in FP 5&6 and was a strong feature of them. Alignment was not so strongly stressed and has mostly been in FP7 but it is difficult and there is more to do still in this area. Commission officer ”

6.8 Stimulating Additional Funding

RATING : 

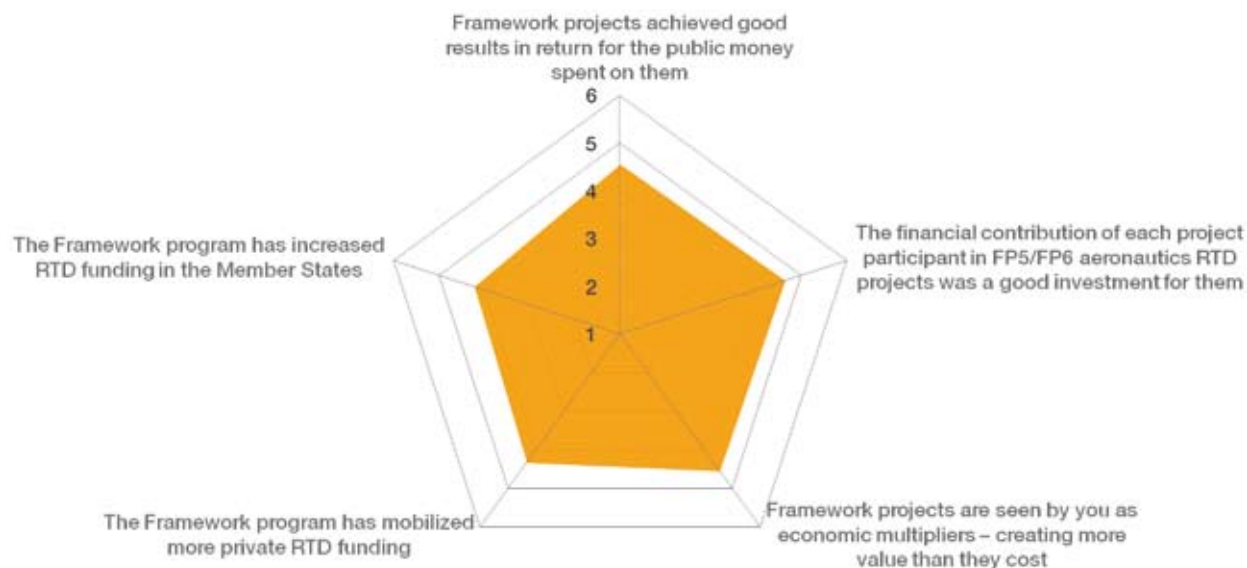
Participation in Framework Programme projects was a good investment according to the respondents to the survey, who also thought that more private funding became available.

This was not seen as simply a substitution of funds from in house research programmes to European programmes but genuinely additional funding. National funding was even increased in most European countries during FP6. A number of European countries created their own Strategic Research Agendas modelled after the ACARE SRA. These national agendas e.g. in Germany, the UK, Italy, France and Spain helped to increase national budgets further. Although there was a general expression in the interviews that national public funding had increased in parallel with the level of EU funding **it was not clear whether these mutually supportive actions were connected or not.**

CONCLUSION The Commission's FP's have created additional research funding in the private sector. Following alignment with the unified European goals for air transport initiated by the Commission national funding for aeronautics research increased in most countries.

SUGGESTION The Commission should continue to stimulate the sector by initiating a new Group of wise people to sketch an update for the future for air transport.

KI 8. Stimulating additional funding (4,47 Average)



“ The 50% mechanism automatically “stimulates” additional private funding. The stimulation of national funding is not so automatic and typically was not so obvious for a French company research. UK probably better integrated national and EU funding. Manager large industry ”

“ It is usually difficult to convince Governments to spend money. Here the EU funding is often helpful in triggering research activities. Once a topic went through the EC proposal evaluation machinery and got started, national support is easier to find. Manager End user ”

6.9 Co-ordination with Member States Programmes

RATING :

Respondents recognised that the use of the ACARE Strategic Research Agenda had provided a common base for the Member States. The evidence gathered by MEFISTO did not, however, point towards this having created a significantly higher level of co-operation between Member States' programs.

It appears that in areas that might have been considered to be of broad and mutual concern – environment, safety, and security – the MS programmes continued to develop their own way forward.

AirTN, however, provided a valuable inventory of national aeronautics research support mechanisms in the Member States. It also gave some insight into the national research set up and support in other continents e.g. the US, Canada, Brazil, China, India etc. As a result of the AirTN activities there were already joint calls for proposals between the German and Austrian national research programs. This could ultimately lead to further co-operation in Member State research activities as well as bilateral or multilateral research projects that are no longer funded by the European Commission. Besides which AirTN networks would give the Commission a good insight of the content of national research efforts and strengthen the subsidiarity principle of EU actions. Although it may be argued that this kind of collaboration should not be dependent on stimulation from the EU, the fact remains that AirTN resulted in actions by the governments that had been largely lacking in the past. The inventory made by the AirTN project provides better information on national programmes than had been obtained through various kinds of consultancy contracts aimed at the same types of inventories. **MEFISTO concluded that the AirTN activities should continue to foster joint activities in aeronautics Member State research efforts.**

There is fierce competition in the supply chain within Europe. This underlines the points made elsewhere – that real progress in bringing projects and their participants toward an integrated and more holistic community requires that there is an agreed, and commercially sustained end point or target; that there is a broadly acceptable road-map that explains to all the participants how the major pieces will fit together, and that projects submitted for evaluation will be assessed with knowledge of this road-map. There is an open question, however, whether all R&T work needs to follow a strict plan. **Duplication can also have a competitive aspect, which can be very beneficial, as was shown during the first 30 years of Airbus.**

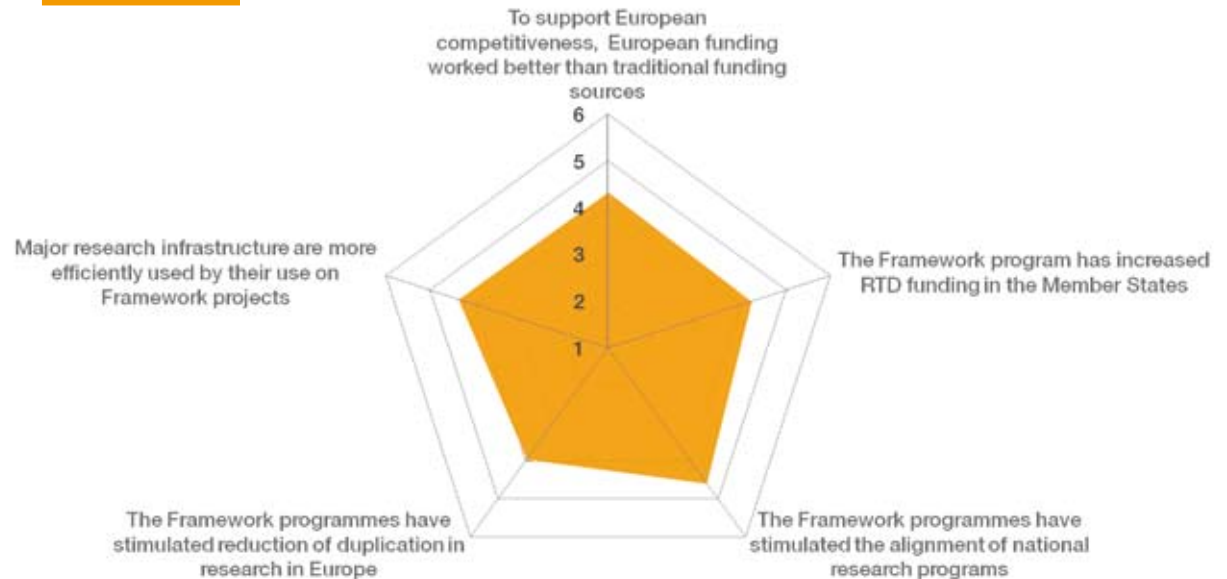
CONCLUSION Networking has been successfully stimulated by the Commission; integration of capabilities (research and facilities) through NoE's and the infrastructure program has had less effect as the Commission cannot provide market incentives for lasting integration; The FPs did not result directly in much coordination of research funded by MS.

SUGGESTION The Commission policy should continue to support AirTN.

“ *The EU funding is too low compared to national and industrial investment to force coordination upon the stakeholders.* ”
RTD performer

KI 9. Coordination with MS programmes

(4,3 Average)



6.10 Involving the New Member States in Aeronautics

RATING :



During the period of the FPs the European Union expanded substantially and it was a rational consequence to encourage the participation of the New Member States in the mechanisms of the Union.

It is useful to recall the magnitude of the change expected from NMS enterprises. They had come from a centrally controlled environment. They had worked with a completely different set of partner enterprises; they had no experience with an industrial supply chain set up; they had not been accustomed to competing for funds. Changing to a competitive, free-market economy that required knowledge of entirely new processes and methods required a huge process of assimilation. The FPs were one of the vehicles for this assimilation encouragement. The NMS were helped in their assimilation into the European research community by their participation in numerous FP projects and through Workshops, Support Actions and ACARE's studies & profiles, as the map of developing relationships within FPs shows in the evolution from FP5 to FP6.

The success was limited by the time it takes to change direction, to learn new approaches and conventions, and to increase the knowledge of the people and of projects in particular fields.

The NMS participants were not sought out because they were new members of the EU but for the special knowledge and skills that they could contribute. The collaborations achieved by the NMS were seen by some respondents to be somewhat fewer and less profound than had been expected. However, the complexities of European business relationships, of the FP system and the need to improve language skills were a major learning experience in some areas. Progress is being made but it will take time to bring these economies fully up to the level of experience of the Western European nations. Respondents from NMS were very positive about the chance they had

to get acquainted to Western European ways of working. Respondents from the Western partners consistently stated that it took at least 1 or 2 participations in FP projects to make useful contribution possible.

It will not be helpful to favour NMS participation in future project evaluations – especially now that many enterprises are becoming accustomed to EC procedures.

MEFISTO recommends that NMS participation should now be judged on the same terms as for other nations.

CONCLUSION NMS have become acquainted with the Western European industries thanks to the FP's; Strong ties were developed: the Commission also supported studies to enable the revitalisation of the Eastern European aeronautics industry.

SUGGESTION NMS are on the right path, do not need further special treatment and need to be judged by their contributions to European research.

“ FP has allowed us to discover them (the NMS). A natural bias of industrial is to try to preserve the Return on Investment: as such the “ obligation” of collaboration of EC is a good thing ! It push us a little. Industrial Interview ”



Network created in the Aeronautics Community under FP5



Network created in the Aeronautics Community under FP6

Examples of success stories from NMS

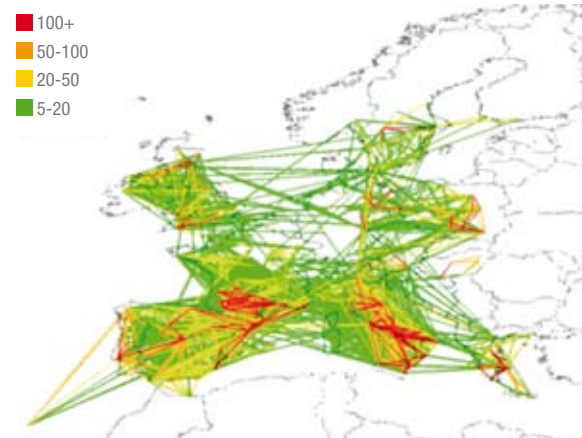
CESAR has pioneered international research co-operation in the general aviation sector in Europe. The project brought different entities to one table larger OEMs, SMEs, research establishments and universities. Many new long-term relations and co-operations were established working jointly on the project. CESAR has made its most important achievements in aerodynamics design & analysis, propulsion and aircraft systems.

EPATS looked at new potential markets for personal aviation up to 2020, the potential impact of new ways of transport on the European ATM, airport infrastructures, as well as the environmental, safety and security issues involved in addressing the specification and the R&D Roadmap. Both CESAR and EPATS projects showed that NMS are ready to play a role that goes beyond participation in European R&T with large OEMs with their well developed supply base. NMS are eager to look for the niches of the future aeronautical industrial and research scene.

These two good examples paved the way for other follow up projects in future FPs and were in line with GA strategy, using suitable tools and technology to support new business models and their needs for the System™ which has been successfully sold to different customers in the world.



Number of flights a day



RATING : ■ ■ ■

6.11 Involving SMEs in the Supply Chain

Although no fundamental change in the supply chain has happened due directly to EU projects several SMEs managed to improve their involvement in the aeronautical supply chain and the influence of the FPs was beneficial in this as well as other respects.

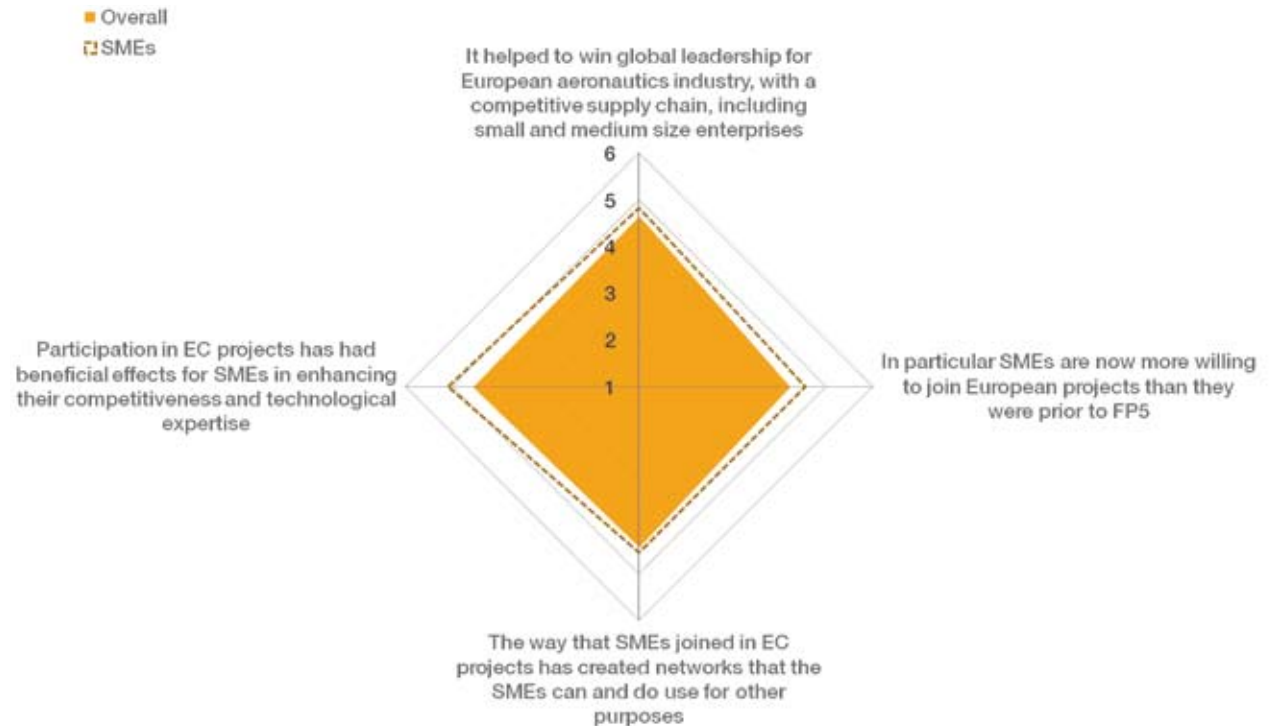
Those SME's that manage to gain a position in the supply chain, thanks to participation in EU projects, only obtain that position through devoting much extra effort to the collaboration. These SMEs must demonstrate that they are very motivated and willing to spend much more time and effort on the collaboration than that required by the project description alone (See also page 16). It also seems a great opportunity for potential customers to get to know the capacities of potential suppliers. One interviewee reports that they found a new supplier from Poland through the collaboration in EU RTD projects; indicating that EU funded projects were able to involve SMEs who could generally contribute well – they were not merely token SMEs. If the technology project fits well into the company strategy it gives SMEs valuable knowledge which helps them to win other contracts. SMEs have a much better standing following experience with EU RTD projects.

A significant number of instruments and support actions existed to help SMEs. These included CRAFT, SCRATCH, AeroSME, and ECARE and these individual actions worked well. In practice, however, many SMEs appeared not to know about the whole set of the actions available to them and some suggested that it would be helpful to have a single place where advice and information could be obtained.

CONCLUSION An increasing number of SME's improved their position in the supply chain thanks to participation in the FP's; SME's were encouraged to participate through several instruments and actions; some SME's made the transition from low to high technology companies thanks to the FP's.

SUGGESTION Streamline the SME support and introduce a single front office at the Commission.

KI 11. Involving SMEs in supply chains (4,5 Average)



6.12 Improving relations between Research and SMEs



The overall impact of FP5 and FP6 on this key issue is reported positively, especially by SME respondents and in the survey. About 20 useful comments from the survey and interviews gave additional colour to this view, with half of them positive.

The aim to improve the relationship or engagement between SMEs and the research community, was by its nature, mainly of benefit to those SMEs already characterised as high technology and who could extend this by forging new and long-lasting relationships with others: they are the SMEs that already perform research. Those negative comments received were often concerned with the complexity of the system as seen from the position of an SME and these opinions about the difficulties that were experienced by SMEs in engaging in relationships with the research communities cannot be ignored. They indicate the way towards improvements that would be coherent with the continuous EC efforts (as for instance SCRATCH initiative) in supporting this community, in particular in the upstream phases of proposal preparation:

- 1. Innovation is by nature a risky and longer-term challenge for a small company and probably does not fit very well with the strategy and time-scale of many SMEs. This might explain some of the observed reluctance of SMEs to include innovative activities in their programmes and partly their limited participation in FPs.
- 2. The constraints of the funding instruments available, and the broader consultation process for elaborating framework programmes might prevent some breakthrough technological initiatives that could emerge from this community.
- 3. Finally it seems that the potential extent of this impact is to some degree overshadowed by the complexity of procedures or instruments, as addressed on page 41.

CONCLUSION As a result of FP projects, SME's were in contact with the research infrastructure and benefited from its capabilities.

SUGGESTION Adjust the policies to different types of SME's by, for example, introducing research vouchers to ease access to knowledge and facilities (cf p41).

“ The FPs have an amplifying effect. SMEs need to offer good skills to be invited. By participating, they advance their skills further thus continuously advancing their competitiveness (amplifying effect). RTD comment ”

“ SMEs would perform far less research without European programs, which significantly reduces risks ever difficult to run for SMEs. Industrial Comment ”

“ Yes, if the proposal is successful ! ...But it's also difficult for SMEs to set up these projects: we ourselves could do it thanks to SCRATCH initiative. But it is even worse now, very heavy procedures, with a level of expectations really high (you shall have beyond 12,5 to have a chance to be selected !). SME Comment ”

“ EU instruments are difficult to understand. As soon as you begin to understand the different mechanisms, new instruments are introduced in the next Framework program. Instruments like support for large-scale facilities, international collaboration and Marie Curie are totally unclear to small organisations despite all the workshops provided by the National Points of Contact. Industrial Comment ”

6.13 Stimulating Excellence in Research

RATING :



FP5 and 6 succeeded in stimulating competition and often allowed somewhat more risky research to be taken forward than might otherwise have been possible.

Analysis has also shown that some risky research directions have been stopped. This should not be seen as a negative outcome of the FP. Research has by definition an uncertain outcome and exploring research routes that prove to be unsuccessful is beneficial to progress in general.

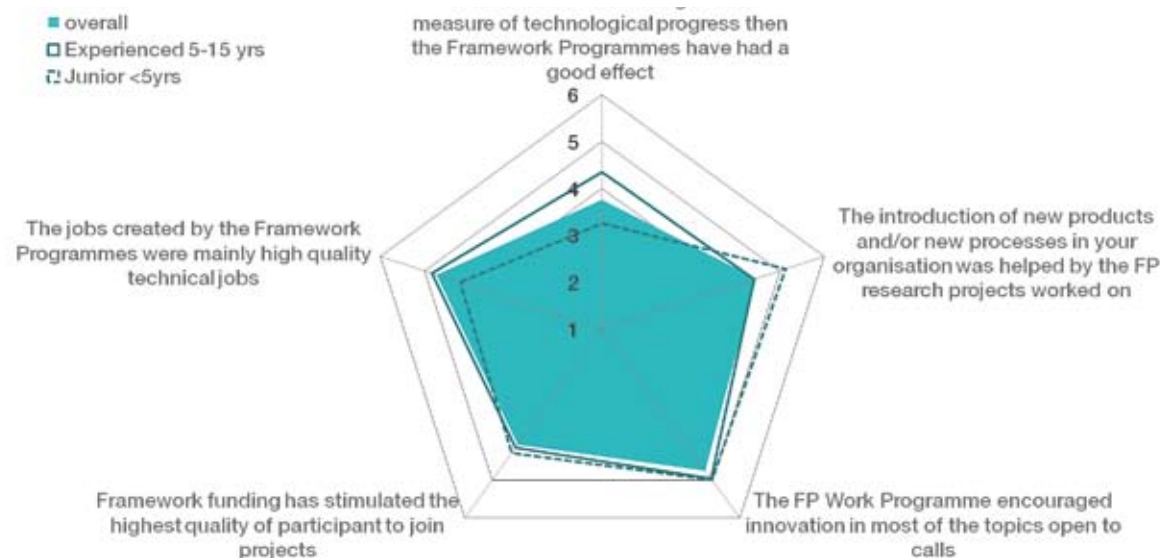
The FP successes were naturally associated with specific projects. The responses indicated that in pursuing the aim of encouraging excellence good outcomes have been achieved. Some suggested that allowing the pursuit of more "open" lines of enquiry along the lines, perhaps, of the "FET (Future Emerging Technologies) Open Scheme" used in ICT, might encourage innovation more directly and generate a more rapid result, for example in the rate of patent filing as well as in the quality of the consortia formed. Such freedoms would need to be carefully considered as the FP's are closely aligned with the ACARE goals for 2020. **Such a scheme would certainly allow some flexibility for long term work to be introduced and, given the relatively small numbers of projects likely to apply for it, might be an acceptable change ¹.**

CONCLUSION FP's stimulated excellent research being done and the competition in research in Europe - which is inherent to FP's - assured a high quality of the research funded.

SUGGESTION Consider providing some freedom of choice over basic research topics to the respondents.

¹ There is in FP7 a "pioneering" part of the work-programme that is addressing these comments.

KI 13. Stimulating excellence (4,36 Average)



6.14 Benefiting Education and Training

RATING :



Respondents indicated that EU research projects provided excellent opportunities for their staff to work in an international environment.

This provided the best possible training ground for young staff. As an indicator about 60% of the comments received on this issue were from industry respondents. The importance of the knowledge triangle in the form of interaction between education, research and innovation has been emphasised by EU leaders in recent years. The two historic products of universities are the creation of new knowledge and well-educated individuals. But each feeds the other. The FPs have been successful in providing opportunities for PhD students to work alongside industrial companies or research institutes in a practical work setting. There was also feedback from University professors, who had found initially that access to facilities was being made easier and this benefited their students and allowed the educational value of visits to be increased. In addition it was reported, that the ECTS system (European Credit Transfer System), also developed by a specific EC support action, helped a lot in this respect.

EU research projects provided opportunities for working together in international teams where the team building skills of the students were enormously developed. There are also other EC initiatives to support the mobility of researchers, but the chance to be involved in actual research work under the leadership of industry is a specific motivational factor for students. Some PhD students took opportunities to extend their horizons and some companies used projects to talent spot promising people.

Education also benefited from the new technologies developed in EU projects.

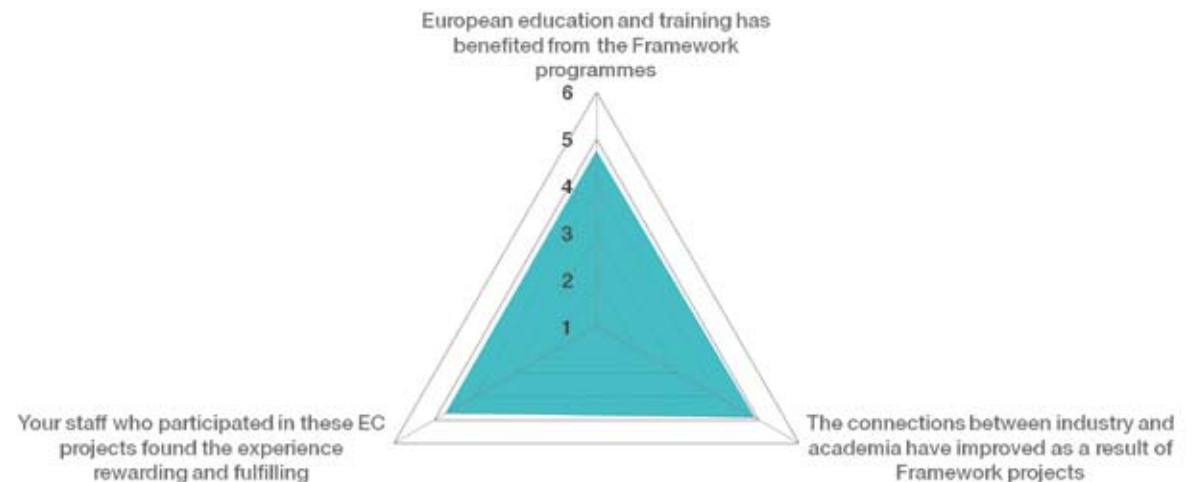
The EU facilitated ACARE in identifying the future needs of the industry with respect to curricula, emphasising not only the technical skills but also the soft skills needed in the future.

CONCLUSION FP's provided an excellent opportunity to train young staff in international team work; opportunities to link education to European research work were used; ACARE facilitated the identification of future skills required.

SUGGESTION Attach more importance to participation of students in RTD work; link supporting actions in training and mobility better to the specific research programs.

“ Support to PhD and post-graduate students was not part of the Framework Programme and although there were some spin-off effects these have been on the side and nearly nothing was achieved. End User ”

KI 14. Benefits to education (4,8 Average)



6.15 Can Europe do without EU Research Funding ?

RATING :



The actions of the Commission in the FPs have strengthened Europe and created substantial and important impacts in many spheres of interest to the aeronautical world.

It has been an enduring theme of all FPs that collaboration between participants across the nations of the Union should be encouraged. This has been achieved and many effective relationships have been formed and exploited in a large number of projects. These benefits have gone on to produce sustained advantages outside the specific projects where they were initiated.

MEFISTO asked whether "Europe could do without the funding provided by the Commission". The Framework approach is presently the mechanism for delivering funding and this alone generally works very well. But there are many additional aspects of importance about the Commission approach and MEFISTO found that **the unique character of the Commission actions extended to such matters as providing a common legal and financial framework, providing a common architecture of calls and timing, positively assisting harmonisation and integration across Europe as more nations and more participants join in the same set of projects.** So from the standpoint of projects and from the wider ideological perspective there was much support for the concept and practice of European market intervention.

The support that has been given to advancing technology maturity and the broad coherence that has been established between the aeronautics Work Programme of the FPs and the strategic goals of ACARE was welcomed. Similar important actions were taken by the Commission in creating AirTN and the forming of the SESAR project bringing all ATM research together to provide the technological element of the Single European Sky. These large scale alignments are evidently important to people working on the research, it gives them

a more dependable structure within which to work. The response on this topic was very encouraging – the European dimension of funding brings many benefits perceived by respondents.

For SMEs a simplified process for sub-contracting to research centres using a voucher system to gain access to knowledge and facilities would be of significant benefit.

Some measures have, of course, already been implemented to stimulate SME participation in the FPs (specific calls, support for proposals, SCRATCH etc). Too much weight appeared to be given to the number of SMEs that had become engaged with the FPs as though this figure somehow equated to impact. MEFISTO feels that different indicators should be developed (e.g. technology levels achieved, scale of technical departments, percentage expenditure on RTD).

The FPs present opportunities for SMEs and Academia to take part in projects alongside larger companies. The advantage of this is that small companies better understand the policies



New Acoustic Phased Array Measurement Technique in DNW-LLF Wind Tunnel used in AWIATOR Technology Platform under FP5. (courtesy NLR)

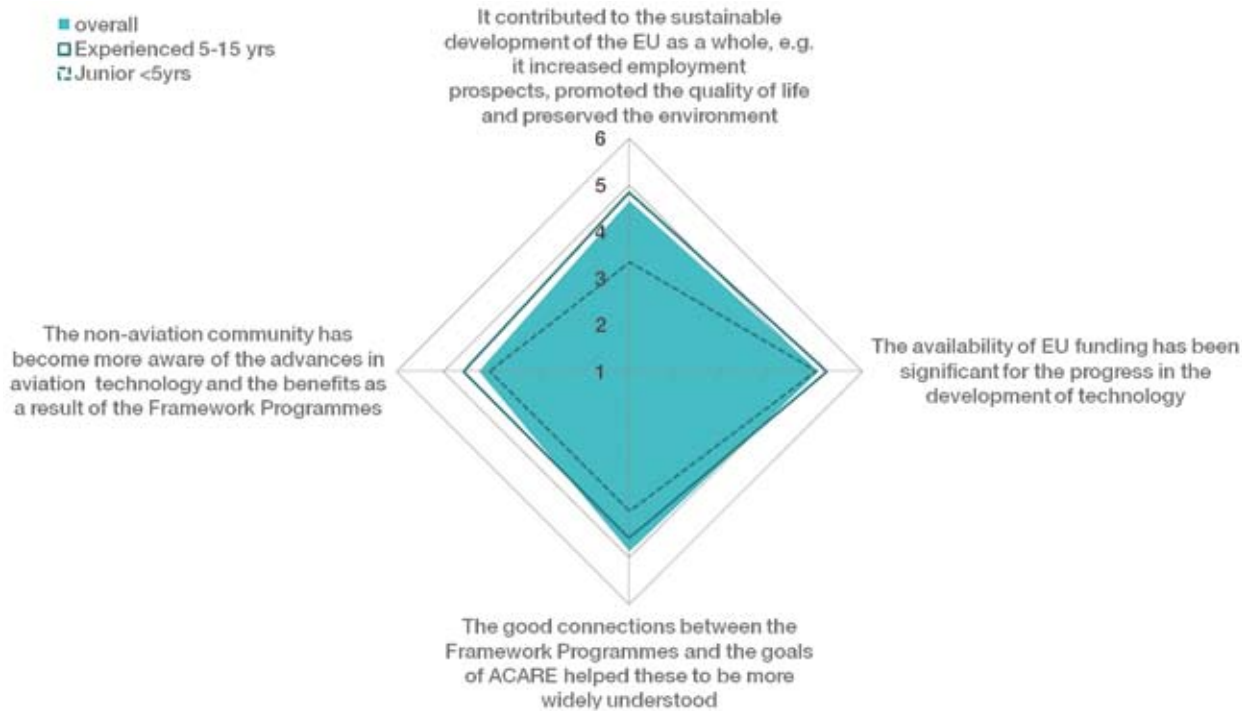
and organisation of larger companies and larger companies can learn about novel solutions coming from small companies that are normally not part of their supply chain.

CONCLUSION The impact analysis has shown that the Commission support to air transport and aeronautics is indispensable.

“ We could not have done without the funding of the FPs. National funding has been increased significantly in Germany and France. The «Operating System» of Europe has changed irreversibly. However, to be clear, we need BOTH: FPs and national programmes. ” RTD Practitioner

“ Funding is absolutely necessary! It is an important pillar for R&T and necessary for the technological progress. EU program have helped for longterm vision. Longterm research is only possible in EU projects, not on national basis! ” Industrial Comment

KI 15. Can Europe do without funding? (4,7 Average)



“ Without EU funding there would be no strong incentives to work on themes important for society such as environment. When speaking of environment in ICAO, FP programmes results provide Europe with sound arguments for the negotiations and give it a clear advantage compared to that financed by NASA. Industrial Comment ”

RATING :

6.16 The Effectiveness of EU Actions as viewed by Participants

The compilation of the Work Programme and the presentation of the calls received considerable praise for a complex operation well executed.

There were few indications of any significant problems. The scale of the achievement is measured by the very large number of projects successfully placed and executed as well as the number of individual participants attracted to the Framework Programme. So there is no doubt that on a broad view the FPs were effective in their relationships with participants.

The concept of «Effectiveness» in this section of the report describes the totality of the actions of the Commission as perceived by the participants, an approximate assessment of the user friendliness of the FPs. Whilst this assessment did not attempt to measure the internal efficiency of the Commission or its overall cost-effectiveness it was intended to give a feel for how the Commission actions appeared to participants. There were a large number of favourable comments about the actions of the Commission and its staff and the overall achievement of the FPs and their impacts have been widely recognised. However, a substantial number of interviewees had critical comments to make from their personal experience, although this was not reflected in the survey (see graphs on this page). It seems clear, therefore, that whilst the overall experience was good some individuals had poor experiences on specific topics in their personal dealings with the Commission. Those who talked about these experiences especially cited an apparent lack of urgency in dealing with contract negotiations. Proposers, especially SMEs, have reported serious problems in late and delayed payments and in contract resolution. With their limited resources and slender operating margins they explained that this quickly becomes critical to any SME. In the worst reported cases the effect was to have a significantly negative impact

on the proposers about the whole of the FP. Experience with the administrative system of the Commission was reported to have deterred some companies from further participation in FPs. Against the overall good performance of the FPs these comments may be of limited importance and they do not seek to present a balanced view but only personal experiences.

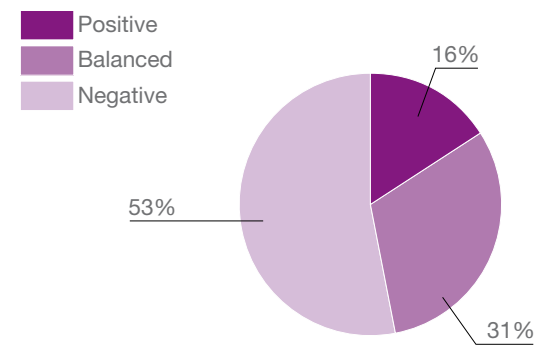
In the aviation industry, virtually all companies are used to dealing with their own governments but the Commission was alleged (by interviewees especially) to be more difficult than their usual experience. Participation in the FPs is not the same as a normal trade contract but even so MEFISTO's conclusion from this sample is that some criticism should be noted. The Commission is perceived, whether justly or unjustly, as too fragmented, rigid and concerned with process, and is in danger of costing the European taxpayer more in delay and administrative burdens than it sometimes saves by these measures. Comments by several respondents expressed these sentiments, or elements of them, in different ways but with enough consistency to persuade MEFISTO that a significant point was being made.

Finance and contracts departments are impartial, as respondents accepted, but it was put to MEFISTO that they also owe a duty to those who seek to make the Framework Programmes effective and who invest their own funds, as well as being efficient within the narrow terms of Commission process control.

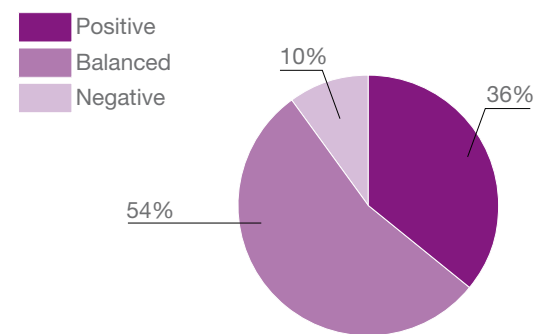
Taken in perspective the overwhelming response of those we contacted was very positive. It would be impossible to conceive such a large programme that did not have some problems to overcome. It is also incumbent upon participants to prepare for their participation thoroughly and not to assume that a contract with the FP is just the same

Responses to the statement "The European Commission delivered the Framework Programmes through the use of efficient internal processes at the interface with participants".

Responses by commentary (64 comments)



Survey Question Responses (140 responses)



as one with a routine customer. There are, however, areas that the Commission should review in the light of the MEFISTO comments received.

MEFISTO recommends that a structured set of layered controls should be considered that allows smaller and financially less significant decisions to be made quickly with only those with the largest implications being subjected to the full set of controls that the Commission can exercise.

CONCLUSION The FP worked well; but in the execution of some areas the Commission appears too fragmented, rigid and concerned with processes rather than content; Financial and legal departments owe a duty to participants to make the FP's as effective and efficient as possible.

SUGGESTION Streamline the procedures of the Commission focusing on results: Make a single person responsible and accountable for overall monitoring individual projects; speed up the financial and legal processes.

“ *The formation of the Work Programme has shown steady improvement over the years. The EC have used the connections to ACARE very effectively.*

RTD Interview ”

“ *There have been some good results from FP projects and these good results mean that the system has worked pretty well.* End User Interview ”

“ *The inability of EC to execute contractual agreements overshadows all achievements and [these failures] cannot be allowed to be repeated.* Web Survey Comment ”



6.17 The Efficiency of the Evaluation Process

RATING :



The performance of the Commission in evaluations was praised and this has clearly been a strong and successful area of administration.

The Commission has conducted the evaluations to the satisfaction of the community that they serve. Participants were satisfied on the whole that good proposals were approved by an impartial process and those that failed deserved to. We were made aware of the need to maintain a balance in the evaluation system and that changes in one area could have unexpected consequences elsewhere. Nevertheless the connection between EU policy and evaluation might be reviewed to advantage. Cases were reported of an apparent disconnection between policy and evaluation. The aim for more efficient use of European research resources was clear. **However, policy was not sufficiently linked to the evaluation process in all cases to form a coherent system in which the projects approved also assisted the implementation of policy aims. An example of this was cited in respect of large research facilities**

A disconnection of sorts between policy and evaluation also applied in a more fundamental way in some situations. The list of projects actually conducted within the FPs was mainly in the hands of the proposing participants and the evaluators, not directly with the Commission or Member States. The great majority of proposals fitted well into the policy and technical objectives (including supporting clusters within road-maps) but some did not. To obtain a greater compliance with a more desirable pattern of proposals the Commission could be more directive, and perhaps become a kind of custodian of aeronautics industrial policy. This would sit uncomfortably with the open competitive nature of the FPs but would give, overall, a greater effectiveness to the work.

We recommend that this be further studied by the Commission.

CONCLUSION The evaluation process is appropriate and impartial.

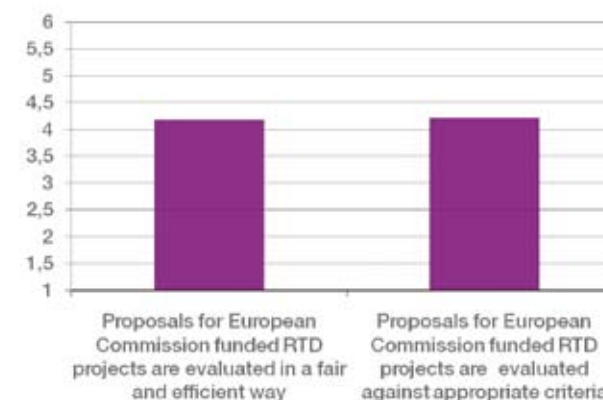
SUGGESTION The FP project evaluation criteria should reflect all EU policy priorities

“Evaluations are quite satisfactory. No unfair Evaluations were encountered in the aeronautics program. Industrial Interview”

“Given the boundary conditions of time and neutrality and accepting that no evaluation can be perfect the system of evaluation is all in all about as good as we are likely to get. Seeking to improve one area can easily disturb the balance in other areas. It has been one of the Commission's strongest areas.

End User Interview”

KI 17. Efficiency of evaluation process (4,2 Average)



“Technology evaluation has become quite professional. RTD Interview”

6. 18 The Efficiency of Project Work

RATING :


The support of individual Commission project staff is widely commented on and appreciated. The very large number and diversity of projects that are successful, and are reported as bringing benefits to the participants, and more generally to the policy objectives, is evidence that the system works very effectively overall.

In the eyes of the Commission the role of Project staff in their branches is to monitor the progress of the contract. But it is certainly within their competence to assist the projects materially in navigating the processes of the Commission and producing the best result for the Union that is possible. Many project staff do this as a matter of course. But it can require a greater knowledge, of and engagement with, the challenges that the project faces and a willingness to contribute to their solution. **It would also on average require more time and attention from the project staff of the Commission.** Senior Independent experts are a valuable resource used by the Commission staff but we suggest that the Commission should review how they should be best used across the project spectrum.

One area where people believe that there could be great advantage would be if more project officers could act for the entire Commission as a single point of Commission contact as in a «front office». Some respondents found that the Commission appeared fragmented in its attitudes and practices and this perception appears to MEFISTO to be damaging to a consistency of good relationships. Implementing such a move would be far from easy and there are substantial implications for the Commission. The Commission departments have not had an easy time in this period. Two factors ring true: first many experienced people (in aeronautics) have retired or were moved and their experience is very hard to replace. Secondly, that numbers

of projects advanced rapidly in this period and the number of staff advanced only slowly. So whether the Commission will be able to move forward towards this «front office» role further than they have at an individual level is uncertain.

MEFISTO recommends that the Commission consider this aspect of the relationship of projects to the Commission services.

It is clear, however, that despite these comments the work of the project staff is successful and appreciated by a wide majority of participants.

CONCLUSION The project work is generally efficient and appreciated.

SUGGESTION The staff at the Commission could be more involved in a content oriented rather than a process oriented way.



“ This is very much dependant on the associated Scientific Officers. There have been in FP5 and FP6 very experienced and motivated Sc. Officers at the EC. They have also taken a direct involvement in the technical side, not only acted as a neutral administrator. Industrial Interview ”

“ The Scientific Officers from EC are very competent in pushing for milestones.

RTD Interview ”

6.19 Costs involved in European collaboration

RATING :



It is clear from the oversubscription of proposals in each aeronautics call that the benefits of collaboration are perceived as considerably greater than any additional costs.

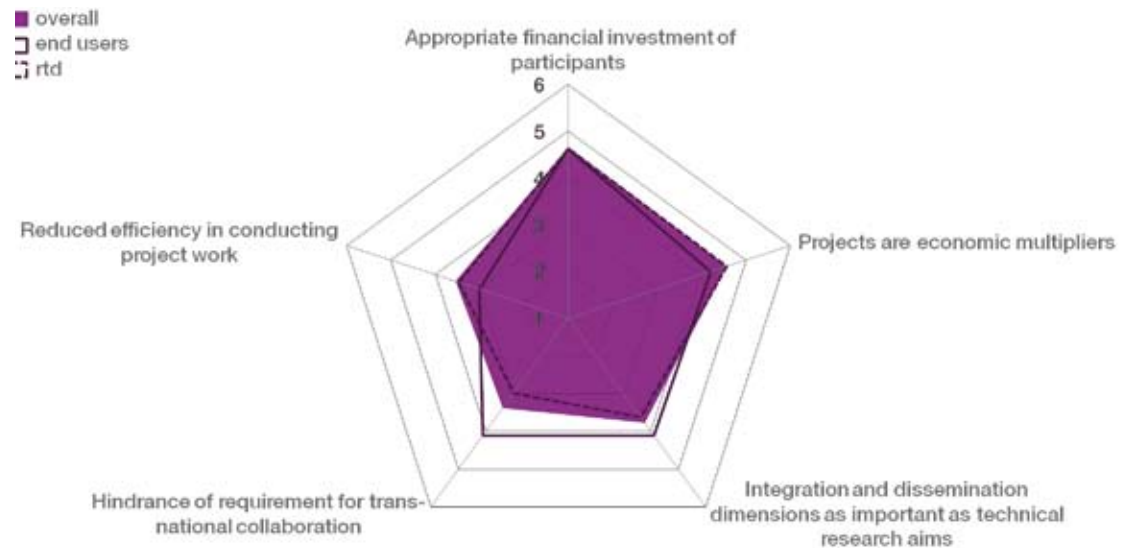
Respondents also told MEFISTO that these benefits can extend well beyond the life and scope of any single project and can have profoundly beneficial effects and create new opportunities for the companies concerned. Collaboration within the FPs was also said by our respondents to have enabled projects to be undertaken that would otherwise not have been possible. For a number of SMEs collaboration has enabled a much wider horizon of opportunities to open up where some, by focused effort, have turned these into significant commercial benefits.

Of course, any collaboration has an extra cost associated with the administration of a greater number and disposition of the collaborating parties. **But this is for each participant to judge and evidently a very large number find that the cost benefit equation is favourable - especially where they take a longer and wider view and look for benefits outside the individual project.**

CONCLUSION Compared to the benefits the cost of participation is favourable, keeping in mind that international collaboration always involves higher cost than national collaboration.

SUGGESTION the Commission should find ways to reduce the oversubscription of calls for proposals.

KI 19. Cost involved in European Collaboration (3,98 Average)



“ Collaboration requires always more money than doing work on your own. The real question is if you can gain the same knowledge if you work alone? Usually not! So if you pay more than what you get in benefits you are in the wrong project. Industrial Interview ”

6.20 Efficiency of EU international collaboration

RATING : ■ ■ ■

The Framework Programmes represent a very large investment in research in world terms and the EU view is that this should be one of their instruments for relationships between the EU and other nations. This arena of collaboration prompted many views from respondents.

At the EU level there are cogent reasons for encouraging general collaboration with the major economic powers in the world. This high-level policy position was understood and supported. But when this policy was translated down to collaboration in research to be encouraged in aeronautics with other major nations it created confusion and mixed responses. MEFISTO gained the clear understanding that collaboration with firms and institutes in e.g. Russia, China, India can be very important and effective and is often promoted by European firms themselves. There appears from respondents to be no reluctance to examine ways that these can be developed and used. **Confusion arose because successful collaborations, especially between different cultures, need, in the opinion of our contacts, to be driven by shared values and a sense of benefit between the parties, by shared and complementary goals, and by a matched level of commitment.** Our respondents gained the impression that the EU was trying to encourage more potential participants to support a series of initiatives that would somehow increase the number of collaborative endeavours. This led sometimes to people not being clear about aims and feeling concerned that the intellectual traffic might be one way – spending European knowledge for no perceptible commercial gain to its originators. Some also feared that the money spent on these initiatives would result in reductions in the EU FPs. Only a few comments were received about specific impacts of these collaborative measures but these were able to report favourably on them and some

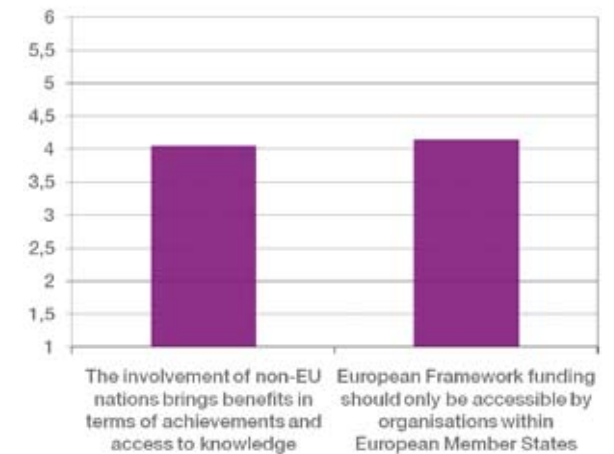
individual companies had clearly found great benefit from their collaborative experience and in obtaining access to different technologies.

There is, at the same time, clear need for the EU to collaborate with other countries on many matters of safety, regulation, standards and the mass of specific public areas where international alignments and joint progress are required to benefit the global society and to make a global industry work well. This was also stressed by ACARE. It is very important that the EU joins and supports these discussions from both the public and the private sectors and takes an appropriate role in driving the work forward. MEFISTO recommends that the EU re-considers its policy on extra-EU collaboration making a sharp distinction between matters where the aviation community of Europe has a need to be supported on global policy issues and those where support to cooperation in competitive issues is requested based on proposals from the private sector.

CONCLUSION Although it is logical that the EU wants to develop good relationships with e.g. Russia and China from a geo-political point of view, a strong rationale for joint aeronautics research is not evident and is confusing.

SUGGESTION A clear policy for cooperation in research with third countries needs to be developed: the Commission should actively promote joint research for global public issues but rely on the private sector to determine the priorities for private research.

KI 20. Efficiency of EU International Collaboration (4,1 Average)



“ *Extra-European collaboration is a political aim dressed up to have an appearance of something to do with the FPs.* Industrial Interview ”

“ *No direct experience in this domain. But it is not seen as an instrument, which could bring any benefit to us.* Industrial Interview ”

“ *For a very competitive sector as helicopters it is a good opportunity to get to know the other partners (competitors!) who one would usually not meet. The cooperation provides a good overview on the technology.* Industrial Interview ”



7 Findings

This section is a summary of our overall findings, the conclusions we drew from them and our recommendations for the future. The supporting and detailed material of our long report should be consulted for more background. The points made below emerge from the reports and views expressed to us.

The ability of the aeronautics community to carry out small and large scale projects that otherwise would not have been possible is very significant. Excellent results have flowed from the work of the EU through the FPs.

Respondents clearly believe that the impact has been profound, wide ranging and encompassing in taking the view of one that “The “Operating System” of Europe has changed irreversibly.”

It is very clear that in some respects the FPs have had major and beneficial impacts on research in the aeronautics sector. Without any doubt a great deal of research has been assisted by EC funding. **Inter-EU networking and collaboration has advanced strongly. New products are being introduced with important new technologies directly traceable to research originating in these FPs.** A huge range of individual projects has been proposed, evaluated and placed as contracts. The European research scene in this sector was greatly changed during the life of the FPs – we cannot always say with certainty which impact was attributable to which influence but we can confidently say that the FPs have been a major and important part of some fundamental changes.

The process of coming to our view has been fully set out in our longer report for the record and that report contains much detail that may be useful to those who wish to follow us.

General

- The Commission actions and the FPs had fundamental impacts on the character of the European Research scene and have changed the way in which research is done across this sector. This has been reported as specially beneficial to large companies and to those SMEs taking a longer view of participation. (Ref p.18)
- The unifying effect of the Commission actions and its FPs in establishing common systems of working was welcomed as bringing profoundly beneficial effects. (Ref p.41)
- The FPs have demonstrated good alignment with the aims of the aviation sector according to our respondents.



Driving Impacts

- A large majority of SMEs rated their participation as beneficial. (Ref p.18)
- Much good work, evidenced by the projects, was reported in the area of improving the environment. The outcome has not yet been fully felt by the public. (Ref p.24)
- Few identifiable and specific measures towards greater safety and security were reported. The embedded safety culture of the industry drives progress but a more integrated connection between research and international regulation development might bring quicker results. (Ref p.27)
- Larger and higher risk projects have been possible as a consequence of FP funding. (Ref p.18)
- The measures to stimulate the creation and dissemination of new knowledge were especially useful in innovative projects. (Ref p.29)
- The gathering together of all ATM research under SESAR to provide the technological element of the Single European Sky has been a radical step forward in integrating ATM improvement delivery.

Structural Impacts

- European research is more integrated as a result of the FPs.
- The FPs have enhanced the use of collaborative programmes substantially. Many medium and large companies now see that collaborative working is both possible and beneficial and will continue to exploit the relationships formed as a consequence of the FPs in their wider work outside the FPs. (Ref p.31)
- Only a small proportion of SMEs participating in the FPs have been able to make a significant transition to a higher technology character. (Ref p.37)
- The New Member States have been assisted to join FP projects and to become part of the European Research Area and their ability to do so continues to rise. (Ref p.34)
- The evidence pointed towards the FPs having had no direct impact on cooperation between MS programs although the AirTN activities appear to be provoking some joint programs. In areas that might have seemed good joint areas of interest (environment, safety, security) MS were reported as maintaining largely independent programs. (Ref p.33)

Leverage Impacts

- The aim to improve relationships between SMEs and the research communities benefited mainly those SMEs with previous research spending seeking to extend their capability. (Ref p.38)
- The FPs stimulated excellence and some respondents thought this might be increased by allowing some higher risk projects a greater degree of freedom through adaptation along the lines of the ICT "FET Open Scheme". (Ref p.39)
- The respondents addressing the benefits if involving students in international projects from industry were very enthusiastic about it. There was no strong evidence indicating any major impact on educational curricula as an incidental effect of the FPs. (Ref p.40)
- There was a strong and positive response to the question of whether Europe needed EU funding mechanisms that indicated consistent support for them. Their importance was said to go well beyond the projects themselves and to extend to common systems that had a powerful unifying effect across Europe. (Ref p.41)
- Accumulating numbers of SMEs engaged with the FPs was thought not to be the best measure of the effects on SMEs. Alternative metrics might be devised that assess increasing technological or research activity of participants. (Ref p.41)

Input Impacts

- The European Commission is seen by the majority of respondents as performing well overall in executing a large, complex and multi-faceted programme. Projects are considered to offer good prospects for participants to gain in a variety of ways which speaks well for the shape and implementation of the work programme. (Ref p.43)
- The overall performance of the Project Staff and the Project work of the Commission was good. (Ref p.46)
- The European Commission is perceived at times (at least by those who sought to express their views) to be too administratively inflexible, fragmented, bureaucratic and slow. Particularly singled out were delays to payment and the resolution of contractual issues. (Ref p.43)
- The formation of the work programme and the conduct of evaluations was strongly supported. (Ref p.42)
- We encountered a perception that the Commission may be too occupied with the processes of the FPs and perhaps not as much with the content of the work and its success. If this is the Commission's experience we believe that the output from projects is unlikely to be optimal. (Ref p.43)
- The efforts of the Commission to encourage greater collaboration with non-EU nations have not been widely understood or effective. (Ref p.48)

8 Recommendations

The points listed above are findings that emerge from the evidence given to us. The conclusions and recommendations below are deductions from the evidence joined with our own experience and analysis.

1. The most important of our recommendations is that given the many important and positive impacts of FPs 5 & 6 the Framework process should continue beyond FP7.
2. We recommend that the Commission should direct its actions to further develop RTD capabilities and performance in Europe giving close attention to the incentives that work in the business market.
3. We recommend that the Commission should differentiate between actions for the public and general good (e.g. mobility, the environment, safety, security etc) and those that address industrially competitive issues in their approach to collaboration both within the EU and between the EU and other nations.
4. The Commission is urged to ask industry for road maps of technology development in appropriate cases and should take these into account when planning future programmes.
5. The Commission should consider whether and how it might introduce a «front office» concept, as a single point of enquiry, for the information and assistance of proposers in understanding all the relevant measures that are made available by the Commission.
6. We recommend that the Commission should consider and implement an oversight process that provides a single Commission point of contact for all matters for each project running (i.e. technical, legal, contractual, financial).
7. We recommend that the administrative processes of the Framework Programmes should be reviewed with an intention to make them simpler, swifter of resolution, and more appropriate to the importance of any issues that arise.
8. We recommend that the Commission should develop better ways of reflecting policy issues in evaluation criteria both in terms of consistency between them and in recognising the policy effects of selecting projects that do not allow coherence within clusters of work.
9. We recommend that consultation with the breadth of stakeholders in the sector should continue to be consulted so that the Commission may remain closely aware of the issues faced by the sector and plans for the future.
10. We recommend that the EU policy on collaboration with nations outside the EU should be clarified insofar as it is relevant to the aviation sector.
11. Measures directed at helping SMEs to participate in the FPs and to access technology more easily should be reviewed taking into account the types of company, the issues faced by them and the relevance of the instruments available to them.
12. NMS have made good progress and should henceforth be judged on their merits alongside all other MS.



Summary table of impacts against Commission policy aims

POLICY	TOPIC	COMMENTS	ASSESSMENT
Lisbon agenda	Key Issue 1 Competitiveness	Conclusion: FP's effectively and strongly increased the competitiveness of the European industry by complementing national and private research; FP's supported the more risky research and led to quicker availability of new technologies in the market with a primary focus on large aircraft. Suggestion: focus on RTD roadmaps for clustered RTD activities related to technology development in Europe; Create opportunities for technology demonstration (Clean Sky *).	■ ■ ■
	Key Issue 3 Sustainability	Conclusion : FP's focused on technologies for emission and noise reduction; the full effect of this research will be demonstrated in Clean Sky; research on atmospheric chemistry has not yet resulted in a united and consolidated view on the contribution of manmade emissions to climate change or the mechanisms that apply in the aviation field. Suggestion: Devote more attention to longer term radical solutions for environmental friendliness. Devote attention to understanding the effects of aviation emissions on climate change.	■ ■ ■
	Key Issue 7 Mobilizing European research	Conclusion: The Commission initiatives such as the GoP, supporting ACARE and SESAR as well as AirTN have stimulated the alignment of research efforts and helped to unite and mobilize European research. Suggestion: The Commission should continue to stimulate the sector by initiating a new Group of wise people to sketch the new future for air transport.	■ ■ ■
	Key Issue 5 New knowledge creation	Conclusion: FP's helped new knowledge creation and further knowledge development thanks to clusters of projects; FP's also provided good access to knowledge in Europe. Suggestion: Create a mechanism to foster upstream innovative research in the domain of aeronautics and air transport.	■ ■ ■
	Key Issue 13 Stimulating excellence in research	Conclusion: FP's stimulated excellent research being done and the competition in research in Europe - which is inherent to FP's - assured a high quality of the research funded. Suggestion: Consider providing some freedom of choice over basic research topics to the respondents	■ ■ ■
	Key Issue 6 Bridging the gap between research and application	Conclusion: The FP's helped to expedite the valorisation of research results; this will be especially stimulated by the new Clean Sky demonstration project. Suggestion: Include large scale demonstration to the FP's.	■ ■ ■
	Key Issue 8 Stimulating additional funding	Conclusion: The Commission's FP's have created additional research funding in the private sector. Following alignment with the unified European goals for air transport initiated by the Commission national funding for aeronautics research increased in most countries. Suggestion: The Commission should continue to stimulate the sector by initiating a new Group of wise people to sketch a future for air transport.	■ ■ ■
	Key Issue 11 Involving SME's in the supply chain	Conclusion: An increasing number of SME's improved their position in the supply chain thanks to participation in the FP's; SME's were encouraged to participate through several instruments and actions; some SME's made the transition from low to high technology companies thanks to the FP's. Suggestion: Streamline the SME support and introduce a single front office at the Commission.	■ ■ ■
	Key Issue 12 Improving the relationship between SME's and the research providers	Conclusion: As a result of FP projects, SME's were in contact with the research infrastructure and benefited from its capabilities. Suggestion: Adjust the policies to different types of SME's by for example introducing research vouchers for access to knowledge and facilities.	■ ■ ■
New Member States	Key Issue 14 Benefitting training and education on a European scale	Conclusions: FP's provided an excellent opportunity to train young staff in international team work.; opportunities to link education to European research work were used; ACARE facilitated the identification of future skills required. Suggestion: attach more importance to participation of students in RTD work; link supporting actions in training and mobility better to the specific research programs.	■ ■ ■
	Key Issue 10 Increase the involvement of NMS	Conclusion: NMS have become acquainted with the Western European industries thanks to the FP's; Strong ties were developed: the Commission also supported studies to enable the revitalisation of the Eastern European aeronautics industry. Suggestion: NMS are on the right path, do not need further special treatment and need to be judged by their contributions to European research.	■ ■ ■

POLICY	TOPIC	COMMENTS	ASSESSMENT
Transport policy	Key Issue 2 Enhance transport mobility**	Conclusion: During the FP's many significant ATM related projects were supported whilst significant resources were allocated to SESAR. Suggestion: Devote attention to long term ATM developments; Link safety research to future regulation.	■ ■ ■
	Key Issue 4 Increase safety and security in air transport,	Conclusion: Research for aviation safety made good progress with emphasis on human factors; on board security issues were addressed; the link to regulation should be strengthened. Suggestion: Safety and security research should be based on a common RTD roadmap with good international links.	■ ■ ■
ERA policy	Key Issue 9 Integrate the research capabilities in Europe and coordinate research in the EU member States	Conclusion : Networking has been successfully stimulated by the Commission; integration of capabilities (research and facilities) through NoE's and the infrastructure program has had less effect as the Commission cannot provide market incentives for lasting integration ; The FPs did not result in much coordination of research funded by MS. Suggestion: The Commission policy should continue to support AirTN.	■ ■ ■
Input parameters related to Commission	Key Issue 16 The efficiency of Commission actions	Conclusion: The FP worked; but in the execution of some areas the Commission appears too fragmented, rigid and concerned with processes rather than content; Financial and legal departments owe a duty to make the FP's as effective and efficient as possible. Suggestion: Streamline the procedures of the Commission focusing on results: Make a single person responsible and accountable for overall monitoring individual projects; speed up the financial and legal processes.	■ ■ ■
	Key Issue 17 The efficiency of the evaluation process	Conclusion: The evaluation process is appropriate and impartial. Suggestion: The FP project evaluation criteria should reflect all EU policy priorities.	■ ■ ■
	Key Issue 18 The efficiency of the project work	Conclusion: The project work is generally efficient and appreciated. Suggestion: The staff at the Commission could be more involved in a content oriented rather than a process oriented way.	■ ■ ■
	Key Issue 19 Cost involved in European collaboration	Conclusion: Compared to the benefits the cost of participation is favorable, keeping in mind that international collaboration always involves higher cost than national collaboration. Suggestion: the Commission should find ways to reduce the oversubscription of calls for proposals.	■ ■ ■
International relations	Key Issue 20 Stimulate international cooperation in RTD	Conclusion: Although it is logical that the EU wants to develop good relationships with e.g. Russia and China from a geo-political point of view, a strong rationale for joint aeronautics research is not evident and is confusing. Suggestion: A clear policy for cooperation in research with third countries needs to be developed: the Commission should actively promote joint research for global public issues but rely on the private sector to determine the priorities in private research.	■ ■ ■
	Key Issue 15 Can Europe do without EU research funding?	Conclusion: The impact analysis has shown that the Commission support to air transport and aeronautics is indispensable.	■ ■ ■

* Clean Sky has the potential to cover the last part of the research chain in providing opportunities to demonstrate that integrated new technologies actually work.

** It is assumed that with the start of SESAR a more focused approach on ATM in Europe will be feasible.

Annex

The following illustration identify EU sponsored EU projects that contributed to technology development in Europe. The listing is not to be meant to be exhaustive. The illustrations do not cover all areas of research addressed in the framework programs. Both contributing technology projects and the larger integration and validation projects are shown. The full details of these projects can be found on the Commission Cordis website, and the «Project Synopsis» edited (ISBN 92-894-2078-2, ISBN 978-92-79-07678-7, ISBN 92-79-00643-6).

ATM projects in FP5/6

ATM Concept

- FARADEx FP4
- MAICA FP4
- CATS
- CAATS
- SUPERHIGHWAY
- C-ATM IP
- G2G

TRAINING

- ECOTTRIS FP4
- ESSAI

SESAR concept Validation

- ASIVAL FP4
- CASCADE FP4
- TORCH FP4
- MAEVA
- EPISODE 3

GNSS

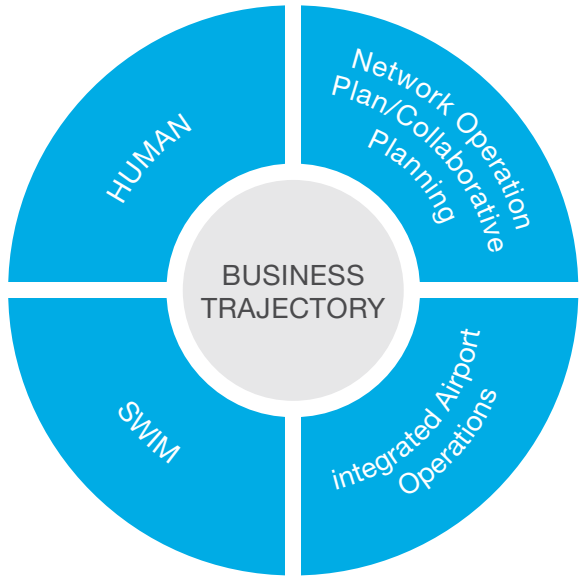
- MAGNET FP4
- SHINE
- GIFT

Datalink

- EOLIA FP4
- NEAP FP4
- DADI FP4
- FARAWAY

Weather info

- 4MIDABLE FP4
- FLYSAFE IP
- SWIM SUIT



CNS

- AATMS FP4
- ANASTASIA IP
- ERASMUS
- MINERVA
- NEWSKY
- APASIA

E-Networking

- CAVA FP4
- PRO ATN FP4
- CAATS
- ASAS-TN

FP5/6 Aircraft Noise reduction contributions

Noise Prediction Modeling

- DUCAT
- RESOUND
- TURBOMOISE CFD
- TURNEX
- JEAN
- COJEN
- MESSIAN
- PROBAND
- SILENCER IP

Turbo machinery noise reduction

- RESOUND
- RANNTAC
- SILENCER IP
- TURBONOISE
- MESSIAN
- PROBAND
- VITAL IP
- FLOCON

Airframe noise reduction (landing gear and high lift devices)

- RAIN
- ROSAS
- SILENCER IP
- ROSAS
- NACRE IP
- TIMPAN

Inlet, Exhaust, Nacelle noise reduction

- DUCAT
- RANNTAC
- SILENCER IP
- TURNEX
- RAMSES



Improved airport operations contributions by FP5/6

ASMGCS

- AIRPORT G FP4
- DEFAMM FP4
- SAMS FP4
- DAVINCI FP4
- BETA IP
- EMMA IP

Airport Modeling

- OPTAS FP4
- OPAL
- SPADE
- SPADE 2 IP

Optimal (CDA) approach

- SOURDINE FP4
- AWARD FP4
- OPTIMAL IP
- SINBAD
- ERAT

Noise mapping

- IMAGINE
- SEF



Collaborative Decision Making (CDM)

- LEONARDO

FP5/6 Contributions to aircraft emissions research

Atmospheric Measurements In previous FP

- AERONOX
- AEROTEST
- SREAM
- CARIBOC
- AEROCONTRAIL

Emission prediction

- CYPRESS
- NEPAIR
- PARTEMIS
- SIA TEAM

Exhaust and particle measurements In previous FP

- AEROTRACE
- AEROPROFILE
- AEROJET
- MOZAIC
- POLINAT
- MENELAS

Emission Database

- AERO 2K



FP5/6 Some technology projects related to aircraft structures, materials and production & repair technologies



Supply chain Management

- ENHANCE IP
- VIVACE IP

Resin Transfer Moulding

- FALCOM

Advanced composit structures

- ALCAS IP
- MAAXIMUS IP

Machining

- AGEFORM
- ECOSHAPE
- COMPACT

Bonding

- MOJO
- BOJCAS
- BASSA
- ABITAS

Cabin comfort

- ECAB IP
- FACE IP

Damage tolerance

- CRAHVI
- IDA

Welding

- WAFS
- WEL-AIR
- DINAMIT

Aerodynamic efficiency

- REMFI
- EUROLIFT
- AWIATOR
- FLIRET
- TAURUS
- POLINAT
- 3AS

NDI/ MRO/ REPAIR

- SMIST
- IARCAS
- HILAS IP
- TATEM IP
- ADAMS

FP5/6 Projects in support of next generation aircraft technologies

Smart structures

- LISA

Landing gear

- DRESS

Lightning Protection

- FULMAN
- ILDAS

Active flow control

- AEROMEMS
- AVERT



Advanced Configurations

- M-DAW
- NACRE IP

All electric aircraft

- EPICA
- EECS
- POA IP
- MOET IP
- NEFS

NLF/HLF technology

- HYLDA
- HYLTEC
- ALTTA
- TELFONA
- EUROLIFT

FP5/6 contributions to future aircraft configurations

Hydrogen fuel aircraft

- CRYOPLANE



Supersonic and hypersonic Aircraft

- EUROSUP
- EPISTLE
- SOBER
- SUPERTRAC
- HISAC IP
- LAPCAT
- ATLLAS
- FALCON



Blended wing bodies

- NEFA
- MOB
- NACRE
- ROSAS
- VELA



Small passenger aircraft technologies

- CESAR IP



FP5/6 Some projects in support of General Aviation (GA) aircraft technologies



Internal noise reduction

- ENABLE

Airframe noise Reduction

- ERAIN

External noise Reduction

- JEAN

Aircraft Design

- ECARP
- AVTAC
- EUROLIFT
- CESAR IP

Metallic Structures

- ADPRIMAS

RTM Process

- APRICOS

AGE formable panels

- AGEFORM

Ultra sound NDT

- INDUCE

FP 5/6 contributions to new rotorcraft

FRIENDCOPTER IP

Flight physics Toolbox

- EROS
- ROSAA

Interior Noise

- RHINO
- FACE

Engine integration

- HORTIA

Aerodynamic Integration

- HELIFLOW
- HELINOVI

Rotor aerodynamics

- HELISHAPE

Fuselage drag Reduction

- HELIFUSE

Rotor noise Reduction

- HELISHAPE
- HELINOVI

Handling qualities

- HELIFLOW
- RESPECT
- OPTIMAL

Gearbox

- FACET
- ASETT



*Eurocopter EC175
Maiden flight in 2009*



*AgustaWestland GRAND
Maiden flight in 2005*

FP5/6 contributions to future advanced rotorcraft

NICE TRIP IP

Noise

- ADYN

Handling

- AC-TILT

Aeromechanics

- RHILP

Drive system

- TRISYD

Aerodynamics

- TILTAERO

Rotor system

- DART



FP5/6 projects in support of technology development for avionics and Human factors

Integrated modular avionics

- FANSTIC
- IMAGES
- NEVADA
- GASCA
- NEWSCREEN
- MCUBE
- PAMELA
- VICTORIA IP
- FLYSAFE IP
- NATACHA

Human factors

- JARTEL
- VINTHEC
- IMCAD
- SAFE SOUND
- FLYSAFE IP
- HILAS IP

Advanced avionics

- ISAWARE
- FLYSAFE IP
- ADELINÉ
- PEGASE

EMI

- CATE
- EM-HAZE

Lidar development

- NOSCA
- I-WAKE
- FLAME
- FIDELIO
- MFLAME
- NESLE



FP5/6 projects in support of aero engine and propulsion

MORE ELECTRIC AIRCRAFT

- POA IP
- MOET IP

ENGINE CORE TECHNOLOGIES

- EEFAE IP
- NEWAC IP

LP Technologies

- CLEAN IP
- VITAL IP

HP spool components, Intercooler, Recuperator, IRA

- NEWAC IP

Low noise

- SILENCER IP

Manufacturing

- MMFS
- MANHIRO
- AGNETA
- DOLSIG
- DUTIFRISK
- TITALIUM
- HORTIA

Validation at engine level for DDTF (Antle), GTF and IRA (Clean)

- EEFAE IP

Health Monitoring

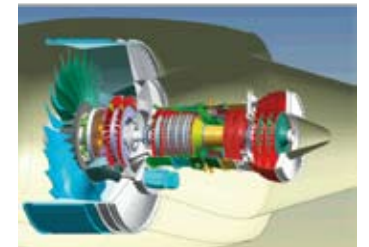
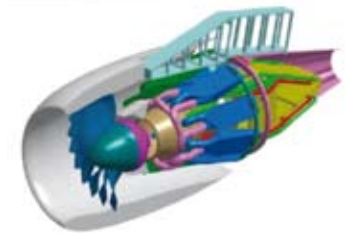
- TATEM IP

Installation Issues

- NACRE IP

Fuel

- SMART FUEL



Abbreviations and Glossary

Acronym	Meaning
ACARE	Advisory Council for Aeronautics Research in Europe
AeroSME / Aeroportal	Support Action towards SME (FP5/ FP6/FP7)
AFAS	Aircraft in the future air traffic management system
AGAPE	ACARE GoAls Progress Evaluation
AirTN	Air transport network
ALCAS	Advanced Low Cost Aircraft Structures
ASTERA	Support action to ACARE
ATM	Air Traffic Management
CAATS III	Cooperative Approach to Air Traffic Services
CDA	Continuous Descent Approach
CESAR	Cost-Effective Small Aircraft
Clean Sky	Joint technology initiative for aeronautics
CONTAMRUNWAY	Contaminated Runways
CRAFT	Cooperative Research projects for and by SMEs (FP5)
EC	European Commission
ECARE	European Communities Aeronautics REsearch
ENHANCE	Enhanced Aeronautical Concurrent Engineering
EPATS	European Personal Aircraft Transportation System
EPISODE 3	
ERA	European Research Area
ETP	European Technology Platform
EU	European Union
EUROMART (IMG)	European Cooperative measures for Aeronautical Research and Technology
FET (Open)	Future Emerging Technologies (Open topic)
FLYSAFE	Airborne Integrated Systems for Safety Improvement, Flight Hazard Protection and All Weather Operations
FP	Framework Programme
FP5	Fifth framework programme
FP6	Sixth framework programme
FP7	Seventh framework programme
GA	General Aviation
GARTEUR	Group for aeronautical research in Europe
HEI	Higher Education Institute
HLTC	High Level Target Concept
IMG	Industry Management Group
IP	Integrated Project
IPR	Intellectual Property Rights
JTI	Joint Technology Initiative
MA-AFAS	More Autonomous Aircraft in the Future Air Traffic Management System
MS	Member state
NMS	New Member State(s)
NUP+	Neon Upgrade Programme
OEM	Original Equipment Manufacturer
RTD or R&T	Research and Technology Development
SCRATCH	Support Action towards SME, associated to Aerosme
SESAR	Single European Sky ATM research
SILENCER	Significantly lower community exposure to aircraft noise.
SME	Small and Medium Enterprise(s)
SRA	Strategic Research Agenda
TANGO	Technology application to the near term business goals and objectives of the aerospace industry
TN	Thematic Network
TRL	Technology readiness level
VIVACE	Value Improvement through a Virtual Aeronautical Collaborative Enterprise

Term	Usage and limitations
Driving Impacts	Impact of Key issues related to sustainable development (new technologies, increased competitiveness, environment...) as specific targets of the Fps.
Impact(s)	Only to describe the policy effects of the FPs - the impacts being studied in MEFISTO against the FP5 and FP6 aeronautics and air transport workprogrammes and background policies
Input parameters	Implementation conditions set by the Commission in planning, evaluation, execution of FP projects
Interviewees	People we interviewed
(key) Issue(s)	The 20 Key issues are the most obvious - and other major dimensions of the aims and results of the FPs. Note not Key policy aims , Key intentions or other variations
Leverage Impacts	Impact of Key issues intended to increase the value and impact of the FPs to a total greater than the individual effects. This might apply in areas such as education, stimulating excellence, the engagement of SMEs etc
Matrix	The table of topics from which the Questions were derived.
Mobility	Air transport operations
Policy, policies	The policies of the EU that had been formulated at Lisbon etc and provided the policy setting for the FPs
Questions	Use only to describe the questions of the survey
Reference Group	Stakeholders having participated to Workshop 1 and workshop 2
Respondents	People who filled in the survey
Step	Methodology sequence (10 steps distinguished in MEFISTO)
Structuring Impacts	Impact of Key issues related to encouraging greater collaboration between, and engagement of, Member States, especially New Member States, and SMEs
Topics	Areas identified as possibly contributive to the impacts
Workprogramme	Guidance document published by EC per thematic areas in each Framework programmes, and for each call for proposal



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