EUROPEAN COMMISSION

DIRECTORATE-GENERAL
JOINT RESEARCH CENTRE

Report of the STTP Stakeholder Workshop on Air Transport and Aeronautics

Participants:

Stakeholders: François Quentin (ACARE), Uwe Hessler (ASD), Guenter Martis (CANSO), Hans Roefs (EREA), David Young (Eurocontrol), Philippe Novelli (SWAFEA), Jozsef Rohacs (EASN), Peter Hotham (SESAR JU)

Chairs: D. Schroecker (DG MOVE), T. Jurimae (DG RTD), S. Gouvras (DG INFSO)

Rapporteur: P. Dilara (JRC)

Venue: Brussels, 2 March 2011

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1. SCOPE OF THE WORKSHOP

The European Commission is currently developing a Strategic Transport Technologies Plan (STTP). The adoption of the STTP is foreseen for mid-2011 and it will play a main role in the definition of the Commission's future transport research and innovation priorities. The aim of the STTP is to match the most appropriate policy instruments to the needs of different technologies at different stages of the development and deployment cycle. It will address the entire innovation chain, from basic research to market uptake. The STTP will facilitate coordination of European and national public and private efforts and help achieve greater leverage through flagship EU instruments.

The STTP will include roadmaps for a set of leading edge technological solutions, including the supporting organisational, financial and governance frameworks, which are necessary for a future competitive and clean European transport system. The availability of appropriate research coordination structures has been identified as a potential critical issue for the transition to such a transport system.

The involvement of the stakeholder community is crucial to reach a shared European vision on the role of transport technologies as a follow-up to the White Paper and to produce a credible and widely supported STTP. At the same time, the process of preparing the STTP will help to identity the measures needed from the different stakeholders to attain their goals, and will exploit synergies across them.

2. SETTING THE CONTEXT

A presentation on the STTP provided the stakeholders with insights on: rationale, objectives, structure, preparatory phase and indicative planning as well as expectations from stakeholders' hearings. It was emphasised that the term 'technology area' within the STTP is a comprehensive set of methods, practices and technologies with a shared focus of application.

Discussion during the workshop has been structured in accordance with a previously circulated questionnaire in: (1) Transport Vision and Activities: current status, development perspectives and expected impacts in first block; (2) competitive solutions; (3) Achieving the Vision, essentially focussing on: barriers, shortcomings, funding and organisational requirements; (4) Specific Questions on intelligent transport systems across modes.

The discussion therefore centred on how technology areas are expected to help the European Commission achieve its transport policy and transport research policy objectives, on the one hand, and how the European Commission can optimise resource use by investing in properly selected and prioritised technology areas via properly designed governance and funding schemes.

Stakeholders' advice is one of the inputs to the scientific process leading to the STTP Communication, as work is now focussed on identifying key technology areas in the Air transport and Aeronautics domain. Other input was requested by mid-March. It was made clear that an internet consultation will open soon for 8 weeks and stakeholders are also welcome to give their opinions either through the internet consultation or by sending emails to move-sttp@ec.europa.eu. The Commission will take into consideration any input received in time.

3. SUMMARY OF MAIN DISCUSSION POINTS

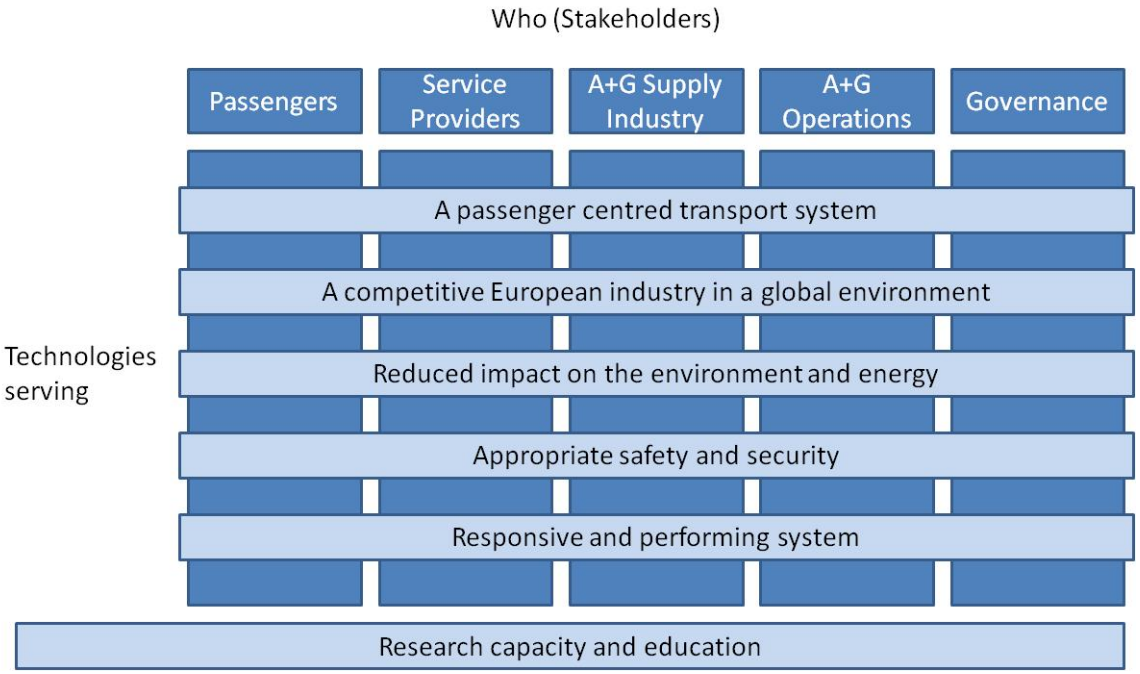
3.1. Transport Vision and Activities

Growth of air transport globally is envisaged to stay over 4% per year over the coming decades. At the same time, the EU and ICAO are setting very ambitious targets for GHG reductions. The air transport and aeronautics sector in Europe is currently working towards two main goals: meeting Society's needs and winning global leadership. The vision developed is for a safe, reliable, affordable and quiet future air transport system with a zero emission balance with well-informed customers and linked with other transport modes, in order to provide seamless transport to the European citizen. New entrants in the global market along with traditional competitors will require that Europe steps up its investments and coordination in order to capture part of the growing market and remain competitive.

This sector has put a lot of effort during the last decade to create a vision and strategic research agendas through the ACARE (the Advisory Council for Aeronautics Research in

Europe, http://www.acare4europe.com/). ACARE has established in common agreement with private and public stakeholders a revised Strategic Research Agenda and a Vision beyond 2020 (Towards 2050) which details the foreseen evolution of the sector. Lately some large research structures were also put in place, like the SESAR Joint Undertaking and the Clean Sky Joint Technology Initiative. These initiatives aim to make air traffic management in Europe more efficient, safer, cheaper and more environmentally friendly and develop breakthrough technologies to reduce environmental impact of aviation.

Many technological developments need to take place in the coming years to achieve such an ambitious vision. These technologies fall under the scheme seen below. Since any technology shift in aviation has very long lead times from R&D to large-scale implementation, the aviation industry has already been working on the upcoming technological changes for some time. These changes can be broadly grouped under **aircraft design and ATM improvements**. Another major technology shift is expected to take place after 2030 and will depend greatly on the success of the currently planned changes.



Aircraft Design Improvements:

Under this heading one can group the following:

- Development of new airframe and engine technologies (using lighter materials, better aerodynamics, noise suppression and more fuel efficient engines)

- Use of alternative fuels (feedstock availability, alternative pathways, life-cycle assessment)

- Rethinking the aircraft configuration (enhancement of production technologies, eliminating vortices and new architecture, like vertical and short-take-off-and-landing (VSTOL), high speed propellers, including contra rotating systems, or Blended Wing Body (BWB))

- ICT systems for supporting seamless, safe and secure transport (rail integration into airport concepts, seamless ticketing, better security checks, better use of infrastructure to eliminate congestion)

Air Traffic Management Improvements:

Through SESAR, new technologies will be developed which will allow for more automation in the system. In the future the following technologies will become reality:

- The command and control systems will progressively become more automated and integrated but loosely coupled (open architecture systems, safe, efficient and high performance 4-D trajectory operations)

- The vehicle will become a node in a global network, sharing information, issuing and receiving instructions, with little or even no human intervention (unmanned vehicles)

3.2. Achieving the Vision

The full innovation cycle from fundamental research, technology development and demonstration, to system demonstration need to be covered and funded appropriately. In its Vision 2020, ACARE estimated the necessary investments “possibly in excess of 100 billion Euros over twenty years”. These investments need to come from the private and public sector. Throughout the discussions it was clear that industry is willing to support the development of technologies with lower risk, while the role of the public sector should be to support research and development of higher risk technologies. This is crucial in order to support the competitiveness of the European aeronautics industry, against foreign competitors (for instance USA, where the military is supporting research in the field). At the same time, high investments in aeronautics leads to spill-over technology development for other industrial fields such as safety and security applications, optical, new materials and structures, ICT, laser, construction, robotics, etc..

Aviation development relies on a stable funding system for long term technological developments. The stakeholders pointed out that the current research structures (like SESAR, or Clean Sky) and advisory groups (ACARE) are serving very well the sector and should continue to be supported in the coming years, taking care to cover some of the areas which are currently not addressed (e.g. communication systems are not covered in ACARE). Assuring the participation of all stakeholders is important and special efforts should be made to involve also airlines and service providers. The need to better exploit opportunities or technologies developed in other sectors was also raised.

Although the sector seems to be well coordinated, some stakeholders pointed out that this is not necessarily so below the surface, and more coordination is therefore needed. Furthermore, there is a problem with national co-funding of Joint Technology Initiatives, for those countries where there is no aeronautics research programme in place. On the other hand, while PPPs (Public Private Partnerships) are important, funding instruments tailored to SMEs, research institutes and universities should also be ensured, as should university education in the fields relevant to aviation.

Some critical issues which were raised by the stakeholders in regards to the development and deployment of main technologies are found below:

Aviation is expected to depend on liquid fuels for the foreseeable future. However, in order for the aviation to reach its environmental goals, especially within the continuous growth scenario, alternative fuels must be introduced. Currently there seems to be a wait-and-see approach from the aviation industry on alternative fuels, where they expect the proper legislative framework to be set-up and the fuel industry to find appropriate solutions. Instead some stakeholders have pointed out that if the aviation industry continues to take the approach that they are only the users of the fuels, they will never secure enough quantities of affordable fuel. Since there is no profitable business case, only regulation can help in this field. On the research front, there is an urgent need to develop new pathways (like algae), to support standardisation and to develop commonly accepted methodologies for the life-cycle-assessment of alternative fuels.

As recently shown natural events or security issues can now cause interruptions of the transport system, with thousands of people stranded in airports. The transport system of the future should use ICT applications to assure alternative routes, reschedule services, and in general minimise problems by securing the uninterrupted transport of people and freight in case of unforeseen events. Basic research on mathematics, complexity and system of systems could also assist the aviation, which is a very complex system, also in emergency cases.

4. CONCLUSIONS AND NEXT STEPS

The aeronautics sector in Europe is working for a safe, reliable, affordable and quiet future air transport system with a zero emission balance with well-informed customers and linked with other transport modes, in order to provide seamless transport to the European citizen, while maintaining its competitiveness.

Research in aeronautics needs to be supported in a long-term stable framework, since there are very long lead times from R&D to large-scale implementation in this sector. The research support and infrastructures put in place up to now seem to be in the right path, although a significant level of funding should be secured also in the future, if European aviation industry wants to keep or even improve its position in the global market. Some effort still needs to be put in assuring the participation of all players, as well as addressing all issues (alternative fuels, communication technologies, etc).

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APPENDIX 1

Stakeholder hearing
Air transport and Aeronautics

Wednesday, 02 March 2011, 09.30 – 13.00
Meeting Room SDME 2F

- AGENDA -

Chairpersons: *D. Schroeker,* DG MOVE
J. Jurimae, DG RTD
S. Gouvras, DG INFSO

09.30 – 09.40	Welcome and introduction of the participants (*All*)
09.40 – 10.00	Objectives of the STTP, purpose of the hearings (*M. Rommerts,* DG MOVE)
10.30 – 11.30	General questions (Part 1 of questionnaire) (*All*)
11.30 – 12.30	'Air transport and aeronautics' specific questions (Part 2 of questionnaire) (*All*)
12.30 – 12.50	Open floor for further stakeholder interventions (*All*)
12.50 – 13.00	Summary (*Chairpersons*)

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APPENDIX 2

Air transport and Aeronautics Questionnaire

INTRODUCTION

These questions are designed to facilitate the stakeholder hearings. We would appreciate, if you could send us your answers to the questions 1 week before the next meeting. Please answer them in the way you consider most appropriate to convey your key messages. It would be helpful, if you could identify to which mode/technology area your answer relates to. To help answering the questions some suggestions are given regarding what could be explained under each question.

1. GENERAL QUESTIONS

1.1. Transport Vision and Activities

1.1.1. Current state of play within transport?

Indicate: market readiness/penetration of the different technologies within the activity area for each mode or cross-modal issues; on-going or planned public, public-private or private initiatives relevant for the STTP; type and scale of initiatives at which level -International/EU/MS/Regions

1.1.2. Likely evolution of transport?

Indicate*:* major trends in the transport sector (technology and actors); evolution of transport needs (volume and quality); likelihood of structural changes as a result of new business models, globalisation, competition, ageing population; influence of the market structure on future market potential; possible effects of legislation etc

1.1.3. Key technology penetration targets (2020, 2030, and 2050)? What are the main assumptions underlying these estimates? What are the main barriers to overcome to achieve them?

Indicate*:* main constraints and showstoppers, risks, needs for technological breakthroughs, resource/feedstock availability, consequences for the current infrastructure, etc

1.1.4. If these targets are met, what will be the contribution to EU policy goals in the field of transport?

Indicate*:* Contribution to (1) achieving low-carbon transport (reducing CO2 emissions and dependency on imported oil), (2) achieving seamless mobility in a Single European Transport Area (establishment of a seamless European TEN-T network that is intelligent, efficient, and green, single European 'transport ticket' for passengers and freight), (3) competitiveness and innovation (e.g. future market sizes for a given technology, European share of new market, additional jobs,

export revenues), (4) other policy goals (such as reduction of congestions, local/urban pollution, noise reduction, damage to cultural heritage, etc.)

1.1.5. Contribution to the overall ('well to wheel') energy efficiency?

Indicate: Effects on energy efficiency in electricity and fuels supply, as well as in use; evolution over time and depending on market penetration, etc

1.1.6. Are there any interactions with other community policies and initiatives?

Indicate*:* Potential contribution of the technology to other EU policies; need for measures and initiatives in other policy areas to support the market penetration of the technologies

1.1.7. Which are the main competing or synergetic technologies within the activity area? (in relation to the indicated market penetration targets)

1.2. Achieving the Vision

1.2.1. Is your vision achievable under a 'business as usual' scenario?

Indicate*:* Current support programmes and policy measures and their expected impact

1.2.2. Are there barriers to innovation? Is there a need for change in the innovation system?

Indicate*:* For the mode in question any weaknesses in the current system

1.2.3. Does the considered mode/sector already benefit from or plan to set-up initiatives to bridge the gap between the current state of technology and a cost-effective market entry? What would be the critical mass (e.g. investment) needed for such initiatives? What new approaches could be considered to accelerate innovation?

Indicate*:* i.e. how could the STTP help the sector; which actions of it would be most effective; what impact could be expected with respect to 'business as usual (i.e. No STTP)?

1.2.4. What actions need to be carried out at European level? What actions would be better implemented at national and or regional level? Is there a need, or a potential benefit, to integrate or to better coordinate action carried out at different levels?

1.2.5. International Dimension - Is there a potential for international cooperation? What type of cooperation?

Indicate*:* Major initiatives in other countries; assessment of specific opportunities for international cooperation

2. SECTOR/ISSUE SPECIFIC QUESTIONS: AERONAUTICS AND AIR TRANSPORT

2.1. A Passenger Centered Smart and Adaptive Mobility serving EU citizens

2.1.1. What are the main obstacles that prevent a passenger friendly and seamless air travel from door to door that is customised to the needs of the different types of passengers? How to better connect the European air transport system with other modes and with the transport system in other regions of the world? How to improve resilience after crisis events?

Indicate: *which technologies should be developed to allow a seamless air travel, which key stakeholders should be brought together?*

2.1.2. For which type of missions air transport is particularly well suited for passengers and freight transport (including on an environmental point of view)? In which cases air transport can potentially serve well European integration?

Indicate: *the barriers that prevent air transport to be deployed for missions where it is better suited than other modes and technologies to be developed to allow its deployment?*

2.2. A Competitive and Innovative European Aviation sector?

2.2.1. Which actions need to be carried out at European level for this sector to support European competitiveness in a globalised sector?

Indicate*: who are the key stakeholders, what are the best instruments to support competitiveness and the main areas where the European effort should focus?*

2.2.2. Innovation: see 2.2.2

2.3. A Sustainable Environmentally Friendly Air Transport system

2.3.1. Given the yearly air traffic increased observed in the past years in Europe, the technology advances that reduce the environmental impact of aviation, will this sector be able to meet objectives such as those fixed by ETS and EU2020 in a sustainable way? What about noise?

Indicate: *what are the technologies/fuels capable of answering these challenges? Are there regulatory / economic barriers for their implementation?*

2.3.2. What problems can we expect in terms of energy supply and availability of resources for the manufacturing of vehicle and the construction and maintenance of infrastructures?

Indicate: *what are the potential solutions to achieve sustainability?*

2.4. Integrated Safety and Security at Air Transport System Level

2.4.1. Is the level of safety of air transport high enough? Is key safety information handled and shared in an efficient way? Is Europe enough involved in safety standards and regulations? Is the way safety is handled in the different components of the air transport system continuous and coherent?

Indicate: *Indicate potential tools, instruments, technologies, actions to solve issues?*

2.4.2. Is the way security is handled in the different components of the air transport system continuous, coherent, cost and time efficient?

Indicate: *Indicate potential tools, instruments, technologies, actions and collaborations to solve issues?*

APPENDIX 3

List of Respondents

- ACARE (Advisory Council for Aeronautics Research in Europe)
- ASD (AeroSpace and Defence Industries Association of Europe)
- ECA (European Cockpit Association)
- EREA (European Research Establishments in Aeronautics)
- SESAR Joint Undertaking