

CHALLENGES FOR MORE EFFECTIVE, ENVIRONMENTALLY FRIENDLY AIR TRANSPORT

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ABSTRACT

Introduction

Few leaps forward in Science and Technology have touched more lives than the invention of the aeroplane at the beginning of the last century. Safe and reliable air travel is now essential to the lives of millions of people for business and pleasure as well as to cultural and political exchange at the national and global level.

Air Transport System has also become an indispensable part of Europe's Economic infrastructure with a very large turnover in the aeronautics sector exceeding by far many other important sectors.

The commercial aeronautics sector is well aware that it has to find an acceptable balance between the constant fierce competitive pressures upon it and the public expectations for cheaper fares but reduced environmental impact - including community noise around airports and global warming.

To achieve such a balance in the future imposes important challenges and requires an established strategy for competitive excellence dedicated to meeting society's needs.

The Vision 2020 Challenges

To develop this top level strategy a 'Group of Personalities' was established by the European Commissioner for Research with the purpose "To produce, in the context of implementing the European Research Area, a vision for Aeronautics in the year 2020".

The vision had to encompass the air transport system and not just the manufacture of aircraft and equipment. The Group of Personalities identified the following Vision for 2020:

- **Quality and Affordability:** In 2020 at all prices an airline ticket buys - Choice, Convenience, Comfort, Cost
- **Safety:** In 2020 the skies are safer than ever before because safety has remained the top priority of the aircraft manufacturers and operators
- **Environment:** In 2020, although Hydrocarbon based fuel is still the main source of energy the range and volume of damaging emissions has been substantially reduced
- **European Air Transport System:** In 2020 there are three times more aircraft movements than today
- **The Worlds number 1:** In 2020 European Aeronautics companies are celebrated brands winning more than 50% shares of world markets for aircraft, engines and equipment.

From the technology point of view, it has to be stated that those goals cannot be achieved just by continuous improvement of existing concepts. This all needs essential steps and completely new approaches in aircraft technology.

The realisation of this 2020 vision requires significant technology breakthroughs in the area of aerodynamics as well as those of other disciplines such as propulsion, materials and structures. Initial estimates suggest that about 40% of

the overall reduction in fuel burn should come from improved aircraft design, with major contributions from Aerodynamics/Flight Physics. Another 40% should be delivered by innovative propulsion and 20% should be covered by air traffic management.

Improved aerodynamic designs and the introduction of new aerodynamic technologies will be required if the 2020 vision goals are to be realised as the discipline not only plays a key role in defining the performance of the aircraft but also contributes to product cost and operability.

Substantial R&T exploration and development will have to be conducted in order to provide the technologies that allow fulfilling the 2020 vision goals. This does not only include aerodynamic work but more and more multi-disciplinary interactions and crossdisciplinary interdependencies have to be considered.