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Ian Poll – Conclusions PC Workshop

1. The essential question of "what is aviation is doing to the environment?" is not fully answered.
2. Before engineering solutions can be produced the community must know what the political requirements for aviation are and the precise environmental targets e.g. is climate change more important than local air quality? What metrics should be used to define environmental impact?
3. When addressing any issue relating to environmental impact it is necessary to adopt a total (global) system view (science, engineering, economics, social and political).
4. In aviation, the majority of the waste occurs in inefficient operations. Technology on the aircraft does not address this central problem.

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Roland Vercammen– Conclusions PC Workshop

1. **EU Vision 2020 provides ambitious targets**
2. **50% reduction in CO2 per passenger km**
   50% reduction in perceived noise per flight
   80% reduction in NOx
3. **Small up to large (EU) programs contribute to obtain these targets:**

NLR and partners “Break the trend”

“Make the difference” and “Shift Paradigms”

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Joachim Szodruch – Conclusions PC Workshop

A. Atmospheric Research

1. The climate impact of contrail cirrus is larger than estimated so far
Contrail cirrus can be reduced by flying higher or lower, depending on the predicted weather situation.
This causes a small CO2-Radiative Forcing-increase and a larger contrail RF-reduction.

2. The NOx impact is less important than thought when formulating ACARE objectives in 2000

3. The CO2 impact remains very important for centuries
Limiting global warming to less than 2°C requires quick actions on all warming contributions, including contrails and soot

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Joachim Szodruch – Conclusions PC Workshop

B Recommendations for operations and design:

1. **Air transport growth and CO2 emissions must be decoupled**
2. **Next generation aircraft should have a 50% fuel reduction compared to today's products**
3. **Future ATM routing should minimize climate impact from CO2 and contrails**
4. **A reduction of soot emissions helps to reduce the climate impact of contrail cirrus.**

5. Fuels without fossil C-emissions are needed :
Near-term: Fossil non-petroleum resources
Mid-term: Next generation Biofuels
Long-term: Low/Zero carbon fuels (cryogenic)

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Artur Mirzoyan, Philippe de Saint Martin – Conclusions PC Workshop

1. Supersonic Business Jets (SSBJ) can be a adopted to environmental requirements by Multidisciplinary Design Optimization !

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Karl Heinz Haag – Conclusions PC Workshop

1. Climate change is a global issue. Lufthansa is teaming up with other Airlines in IATA to develop a solution for the global industry
2. 4 Pillars Strategy: Technologies and Alternative Fuels, Infrastructure, Operations, Market Based Measures
3. Concepts “Carbon Neutral Growth” and “Global Sectorial Approach” are developed
4. Potential technologies for improvement identified will not be sufficient
5. Alternative Fuels very promising
6. Market based concepts as an intermediate measure must be applied globally
7. ICAO will introduce proposals to the Copenhagen Climate summit

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Carl Burleson – Conclusions PC Workshop

1. **U.S. aviation has an exceptional record in reducing its GHG emissions footprint.**

2. **Despite past progress, more complex environmental challenges to aviation growth ahead**

3. **Climate change and energy issues could prove the most significant challenge to aviation growth**

4. **Tackling environment and energy challenges at the heart of the U.S. Next Generation Air Transportation System (NextGen) Plan.**

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Carl Burleson – Conclusions PC Workshop

5. **The U.S. is pursuing:**
   - **Continued Local Mitigation**
   - **Better Scientific Understanding**
   - **Enhanced Tools and Models**
   - **Accelerating ATM Operational Changes**
   - **Fostering New Aircraft Technology**
   - **Developing Sustainable Alternative Fuels**
   - **Exploring Use of Various Policy Options**

6. **A number of international and domestic decisions over the next few years will influence the future of global aviation system.**

7. **International collaboration and partnership is essential for success in meeting the challenges ahead.**

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