



ASSEMBLY — 40TH SESSION

EXECUTIVE COMMITTEE

**Agenda Item 15: Environmental Protection – General provisions, Aircraft Noise and Local Air Quality– Policy and Standardization**

**DEVELOPMENT OF SUPERSONIC AEROPLANES SUBJECT TO PUBLIC ACCEPTABILITY  
BASED ON SUBSONIC STANDARDS**

(Presented by Finland on behalf of the European Union and its Member States<sup>1</sup>, the other Member States of the European Civil Aviation Conference<sup>2</sup>)

**EXECUTIVE SUMMARY**

While acknowledging the importance of technological innovation, the authors of this paper consider that it is very important to ensure that civil supersonic aeroplanes development does not undermine the considerable efforts made over many years to reduce aviation's environmental impact, and does not have adverse or disproportionate effects on safety, capacity and operations.

**Action:** The Assembly is invited to:

- a) Reaffirm that limiting or reducing the number of people affected by aircraft noise is a permanent and joint responsibility of all stakeholders in the aviation sector;
- b) Reaffirm that any supersonic aeroplane project needs to aim to comply with the most recent noise standards for subsonic aeroplanes to avoid a step backwards from efforts achieved so far to reduce aeroplanes' noise at source;
- c) Reaffirm that a CO<sub>2</sub> standard is to be developed based on the standard for subsonic aeroplanes and that the existing Annex 16, Volume II, Chapter 3 addressing emissions is to be updated;
- d) Instruct the Council, in the light of the available information and availing itself of the appropriate machinery, to review the Annexes and other relevant documents, so as to ensure that they take account of the problems which the operation of supersonic aeroplanes may create for the public;
- e) Reaffirm the importance it attaches to ensuring that no unacceptable situation for the public is created by operations from supersonic civil aeroplanes at both supersonic and subsonic speeds;
- f) Reaffirm that the integration of supersonic civil aeroplanes at airports and into the ATM system should not cause adverse impacts on operations, safety and the environment; and
- g) Instruct the Council, with the contribution of the ANC and CAEP, to assess the performance impacts (safety, operational and environmental) of the integration of supersonic operations into the air navigation system, at and around airports, and, propose any mitigation actions, where appropriate.

<i>Strategic Objectives:</i>	This working paper relates to the following Strategic Objectives of Environmental Protection.
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<sup>1</sup>Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

<sup>2</sup>Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia, Iceland, Republic of Moldova, Monaco, Montenegro, North Macedonia, Norway, San Marino, Serbia, Switzerland, Turkey and Ukraine.

<i>Financial implications:</i>	The activities referred to in this paper will be undertaken subject to the resources available in the Regular Programme Budget and/or from extra budgetary contributions.
<i>References:</i>	Chicago Convention and its Annex 16 A39-1

## 1. INTRODUCTION

1.1 Limiting or reducing the number of people affected by aircraft noise is a permanent and joint responsibility of all stakeholders in the aviation sector. Addressing the noise problem remains one of the most challenging tasks. Noise exposure around airports is the dominant subject of complaints and, in recent years, it has constrained traffic growth at many airports. Significant constraints will continue to be imposed on future growth in air traffic, including the rejection of any increase in airport capacity, if progress cannot be demonstrated in reducing significantly aircraft noise at source.

1.2 There are also growing concerns about the impact of aviation on local air quality, the associated human health and welfare impacts and climate change. In Europe, CO<sub>2</sub> and NO<sub>x</sub> emissions are predicted to increase by at least 21% and 16% respectively by 2040. Other harmful pollutants are particulate matter (PM), ground level ozone (O<sub>3</sub>). With regard to climate change, there is an increasing need for aviation to contribute to efforts to limit global warming to which it contributes both through its CO<sub>2</sub> emissions and other climate forcers.

1.3 In Europe, the aviation research effort is driven by the “Flightpath 2050” vision. Technological innovation is a key factor in aviation and Europe’s ambition is to develop technologies and procedures to achieve a 75% reduction in CO<sub>2</sub> emissions per passenger kilometre to support the ATAG target<sup>3</sup> and a 90% reduction in NO<sub>x</sub> emissions. The perceived aircraft noise is also to be reduced by 65%. These are objectives relative to the capabilities of typical new aircraft in 2000.

1.4 Monitoring technology improvements over time, ICAO has been developing more and more stringent noise standards limiting aircraft noise at source. Public acceptance of newly designed aircraft is linked to their compliance with the latest existing noise standards.

1.5 Likewise, for local air quality and climate change, which are primarily public health and environmental concerns respectively, aircraft certification standards are fundamental to the significant progress that the sector has made in controlling these emissions. Only by continuing to do so can growth in the sector be acceptable to the public.

1.6 Considering the overall contemplated traffic growth and in order to be able to accommodate it, it is of paramount importance that the integration of supersonic civil aeroplanes into the air navigation system including airports must not cause adverse impacts on the overall performance targets for operations.

1.7 Thus, if the aviation sector wishes to continue to be allowed to grow, it is fundamental to ensure that aircraft noise and emissions standards safeguard that the current levels of environmental protection do not deteriorate, and to guarantee that the integration of supersonic aeroplanes in the air navigation does not cause adverse impact.

## 2. A COHERENT REGULATORY FRAMEWORK FOR SUPERSONIC AEROPLANES

2.1 While acknowledging the importance of innovation the possibility for civil aeroplanes to fly at supersonic speeds would represent a technological advance, the authors of this paper considers that it is

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<sup>3</sup>The ATAG target is to reduce, by 2050, the net aviation carbon emissions by half of what they were in 2005

very important to ensure that this development does not undermine the considerable efforts made over many years to reduce aviation's environmental impact in the field of noise and emissions.

2.2 The authors acknowledge that an important difference between subsonic and supersonic aeroplanes is that, while subsonic airplanes mainly cause a noise nuisance near airports, supersonic aeroplanes produce sonic booms along their flightpaths as long as they maintain a supersonic speed, not only when they reach a supersonic speed.

2.3 However, while noting the important technical differences between subsonic and supersonic aeroplanes, the authors believe that the two classes of aircraft are fundamentally similar and will compete for the same passengers, airspace and access to airports using the same aviation system. There is therefore a need to ensure that the significant progress made over many decades in the environmental performance of the global subsonic fleet is not jeopardised by allowing significantly more lenient environmental standards for the future supersonic fleet.

2.4 In particular, regarding aircraft noise around airports, given that supersonic aeroplanes are aimed at both replacing subsonic aeroplanes and generating new traffic demand, if they were noisier than their subsonic counterparts, it would lead to a step backwards from the results achieved so far to reduce aeroplanes' noise at source. Such a situation would no doubt lead to negative reactions from the public and potentially harm societies' opinion of aviation in general. Therefore, any supersonic aeroplane project needs to comply with the most recent noise standards with respect to subsonic operations.

2.5 As regards the emissions produced when the aeroplane flies at subsonic speed, and following the example of subsonic aeroplanes, supersonic aeroplanes should be subject to ICAO standards. A CO<sub>2</sub> standard is to be developed based on the standard for subsonic aeroplanes and the existing Annex 16, Volume II, Chapter 3 addressing emissions is to be updated. The impact of emissions produced at supersonic speed is also to be considered.

2.6 Finally, the authors consider that a coherent regulatory framework is required from ICAO. This means that a package of regulations is required to facilitate the introduction of supersonic aeroplanes, including noise, emissions, safety and operations.

### **3. ENVIRONMENTAL IMPACT ASSESSMENT TO ENSURE NO "UNACCEPTABLE SITUATION FOR THE PUBLIC"**

3.1 Recognizing that the type certification of a supersonic aeroplane could occur in the 2020-2025 timeframe, resolution A39-1<sup>4</sup> reaffirms the importance the Assembly attaches to ensuring that no unacceptable situation for the public is created by sonic boom from supersonic aircraft in commercial service. The Assembly also instructs the Council to review the Annexes and other relevant documents, so as to ensure that they take due account of the problems which the operation of supersonic aircraft may create for the public<sup>5</sup>.

3.2 Regarding problems that supersonic aeroplanes may create for the public, the environmental impact of operations at both supersonic and subsonic speeds should be considered, since there are potential unacceptable situations for the public in both flight regimes. CAEP is undertaking an exploratory study to provide a better understanding of airport noise impacts resulting from the introduction of supersonic aircraft.

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<sup>4</sup>Appendix G, paragraph 1: "Reaffirms the importance it attaches to ensuring that no unacceptable situation for the public is created by sonic boom from supersonic aircraft in commercial service;"

<sup>5</sup>Appendix G, paragraph 2: "Instructs the Council, in the light of the available information and availing itself of the appropriate machinery, to review the Annexes and other relevant documents, so as to ensure that they take due account of the problems which the operation of supersonic aircraft may create for the public and, in particular, as regards sonic boom, to take action to achieve international agreement on measurement of the sonic boom, the definition in quantitative or qualitative terms of the expression "unacceptable situations for the public" and the establishment of the corresponding limits"

3.3 Furthermore, the assessment of the environmental impact of supersonic aeroplanes when operating at supersonic speed should not be limited to sonic booms. Emissions and other effects on the climate have to be addressed as well.

#### 4. **INTEGRATION OF SUPERSONIC CIVIL AEROPLANES**

4.1 In the middle of the next decade a significant number of supersonic aeroplane operations might be introduced into and out of congested airspace, and potentially at congested airports. The CAEP/12 work programme comprises an exploratory study that includes a fleet and operations estimation and a noise impact assessment for a selection of airports based on the noise performance information of supersonic project aeroplanes currently available. It will also provide information regarding the climate impacts of such aircraft.

4.2 Integration of supersonic civil aeroplanes must not cause adverse impacts on the current level of capacity, safety and environmental protection. There is therefore also a need for decision-makers to understand how supersonic aeroplanes will operate, how their operations could affect those of subsonic aeroplanes in the same airspace and what the resulting environmental impact<sup>6</sup>.

4.3 The Assembly should instruct the Council, in the light of the available information and availing itself of the appropriate machinery, to review the Annexes and other relevant documents, so as to ensure that they take account of the problems which the operations of supersonic aeroplanes may create for the public. To that end ANC and CAEP should also assess the performance impacts of supersonic civil aeroplane operations. As such, impacts on the Air Traffic Management system, including at and around airports, in terms of possible adverse effects on the current levels of safety, capacity and environmental protection should be assessed, and mitigation actions should be proposed, where appropriate.

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<sup>6</sup> Mitigating the environmental impact of new entrants to the airspace (from drones to supersonic flights), was considered a key issue at the European Higher Airspace Operations Symposium on 2nd April.