



ASSEMBLY — 35TH SESSION

EXECUTIVE COMMITTEE

Agenda Item 15: Environmental protection

CIVIL AVIATION AND THE ENVIRONMENT

SUMMARY

The Council is presenting three papers to the Assembly on environmental protection. This paper reports on progress made by ICAO on aircraft noise and engine emissions, based on the report of the sixth meeting of the Committee on Aviation Environmental Protection (CAEP/6) and other developments.

Action by the Assembly is in paragraph 10.

REFERENCES

A35-WP/76	Doc 9750, <i>Global Air Navigation Plan for CNS/ATM Systems</i>
A35-WP/77	Doc 9790, <i>Assembly Resolutions in Force</i> (as of 5 October 2001)
Annex 6	Doc 9829, <i>Guidance on the Balanced Approach to Aircraft Noise Management</i>
Annex 14	Doc 9836, <i>Report of the Sixth Meeting of the Committee on Aviation Environmental Protection</i>
Annex 16, Volumes I and II	
Doc 9184, <i>Airport Planning Manual, Part 2</i>	
Doc 9501, <i>Environmental Technical Manual on the use of Procedures in the Noise Certification of Aircraft</i>	

1. INTRODUCTION

1.1 The Council is presenting three papers to the Assembly on environmental protection. This paper provides a progress report on the Organization's activities in the field of environmental protection, including those of the Committee on Aviation Environmental Protection and ICAO's relationship with other United Nations (UN) bodies. The two other environment-related papers cover market-based measures (A35-WP/76) and a proposed revision to Assembly Resolution A33-7: *Consolidated statement of continuing ICAO policies and practices related to environmental protection* (A35-WP/77).

1.2 The Organization's environment-related activities continue to be undertaken by the Council largely through CAEP, which assists the Council in formulating new policies and developing new Standards on aircraft noise and aircraft engine emissions. CAEP's terms of reference are to undertake specific studies, as approved by the Council, related to control of aircraft noise and gaseous emissions from aircraft engines.

1.3 CAEP is currently composed of 21 Members¹ and 12 Observers². The 32nd Session of the Assembly in 1998 requested that States from regions that are not represented or are under-represented in CAEP participate in the Committee's work, and progress has been made in achieving better geographical representation.

1.4 The committee has held one meeting (CAEP/6 in February 2004) since the 33rd Session of the Assembly (*Report of the Sixth Meeting of the Committee on Aviation Environmental Protection* (Doc 9836) refers). CAEP has continued to pursue its work programme between formal meetings through working groups, focal points and annual meetings of its Steering Group to coordinate activities.

2. AIRCRAFT NOISE

2.1 Amendments to ICAO documents

2.1.1 On 26 May 2004, the Council considered amendments to Annex 16 — *Environmental Protection*, Volume I — *Aircraft Noise*, Annex 6 — *Operation of Aircraft*, Part III and Annex 14 — *Aerodromes*, Volume I which arose from the recommendations of CAEP/6. The most significant aspects of the amendments are new provisions relating to documents attesting noise certification, provisions for re-certification, and references to the balanced approach to noise management.

2.1.2 The *Environmental Technical Manual on the use of Procedures in the Noise Certification of Aircraft* (Doc 9501) was updated and a new edition is soon expected in English, French, Russian and Spanish.

2.2 Noise Certification Documentation

2.2.1 Over time, many different systems for the issuance of noise certification documents have evolved. In view of the wide variety of administrative systems already in use for noise certification documentation, three alternative standardized options were proposed by CAEP/6. Provisions on this subject will be included in Annex 16.

¹ *Argentina*, Australia, Brazil, Canada, Egypt, France, Germany, *India*, Italy, Japan, Netherlands, Poland, Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, Tunisia, United Kingdom and United States. States in italics have become Members since the last Assembly session in 2001.

² Greece, Norway, Arab Civil Aviation Commission (ACAC), Airports Council International (ACI), European Commission (EC), International Air Transport Association (IATA), International Business Aviation Council (IBAC), International Co-ordinating Council of Aerospace Industries Associations (ICCAIA), International Federation of Air Line Pilots Associations (IFALPA), International Coalition for Sustainable Aviation (ICSA), United Nations Framework Convention on Climate Change (UNFCCC) and World Meteorological Organization (WMO).

2.3 **Monitoring noise technology research**

2.3.1 A one-day Technology Workshop was held in December 2001 during a CAEP Steering Group Meeting, which reviewed the current research activities, stated the long-term objectives, and substantiated the issues involved in industrial application of research findings. A detailed review of the main technical and non-technical factors involved in the generic technology development process has been carried out and provided the basis for future technology monitoring activities, which is an important step in consideration of the need to further improve the current aircraft noise standards.

2.4 **Recertification**

2.4.1 Further guidance material to apply in case of noise re-certification was developed to address possible applications for aircraft originally certified to Chapter 2, or originally certified to Chapter 5.

2.4.2 A noise certification workshop is being planned at ICAO Headquarters (date to be confirmed) with a view to disseminating information on noise provisions for certification and re-certification approved in recent years and to allow for the highest level of harmonization possible among the authorities dealing with the certification of aircraft.

2.5 **The balanced approach to noise management**

2.5.1 The objective of the balanced approach is to reduce the impact on aircraft noise through a programme which takes into account the balance of four elements comprising: (1) the reduction of noise at source; (2) land-use planning and management; (3) noise abatement operational procedures; and (4) operating restrictions on aircraft use (see paragraph 2.8.1). The goal is to achieve maximum environmental benefit as cost-effectively as possible, and the process of implementing such a programme and the balance between the elements would be the responsibility of Contracting States. The 33rd Session of the Assembly (A33-7, Appendix C) reinforced this concept and requested the Council to assess continuously the evolution of the impact of aircraft noise and to develop the necessary ICAO guidance material to assist States in implementing the concept of the approach to noise management.

2.5.2 CAEP/6 developed the requisite guidance material and it is now available as *Guidance on the Balanced Approach to Aircraft Noise Management* (Doc 9829). It contains information on all the elements of the balanced approach and development of cost-benefit analysis for the implementation of the balanced approach to noise management. The guidelines are not intended to be prescriptive; rather, they are intended to illustrate good practices in the conduct of economic analyses that may be used by States or airports to achieve the goals of Assembly Resolution A33-7. Doc 9829 describes evaluation techniques, analytical methods, and mathematical decision rules that can be used to evaluate the likely costs and benefits associated with the various noise-related measures under consideration. It describes how to identify, estimate and aggregate the incremental costs and benefits. Guidance is also provided to assist in the identification of the most cost-effective, environmentally beneficial measure. It presents examples on how to draw conclusions about the expected economic impact and the resulting benefits to stakeholders from alternative options or scenarios. Further work on the guidance is now being undertaken as part of CAEP's future work, particularly on case studies and encroachment analysis.

2.5.3 Regarding the evolution of the impact of aircraft noise, a revised noise trend using MAGENTA (Model for Assessing the Global Exposure to the Noise of Transport Aircraft) had been developed by CAEP based on its 2002 forecast. Overall, the results show a significant improvement in the situation with reduction in the size of the population affected by noise of up to 30 per cent in the short term (2006) when

compared to the forecast presented at CAEP/5 (January 2001). This shift in the noise exposure is seen on a global basis and is due to the accelerated retirement of older aircraft and the reduction in forecast operations for large transport jets. In the near term the reduction is largely due to lower forecast levels of operations and the accelerated retirement of aircraft such as the B727.

2.5.4 It was noted that the global noise exposure levels were not forecast to reach the CAEP/5 levels throughout the forecast period (up to 2020). The analysis for North America shows that after reaching a minimum level in 2002, noise effects are expected to stabilize by 2006 and to increase steadily thereafter. The rate of reduction in noise expected to be achieved in European Civil Aviation Conference (ECAC) States in the near term is smaller than that expected in North America. This might be explained by the relatively younger fleet serving European airports and the consequent fewer old generation aircraft retirements. By contrast, results show a slight increase in noise levels for the Asia/Pacific Region as compared to CAEP/5 predicted levels. This is due to higher predicted growth rates for routes to, from and within the region (except for the transpacific routes) and to a change in the fleet mix. For the other regions, results show not only a reduction in noise levels as compared to CAEP/5 but also a steadily declining pattern in noise exposure over the forecast horizon.

2.6 Operational Measures

2.6.1 CAEP has developed guidance material providing general data on the assessment of noise benefits accrued from the implementation of optimized noise abatement procedures that will be published as an ICAO circular.

2.7 Land-Use Planning and Management

2.7.1 A new edition of the *Airport Planning Manual, Part 2 — Land Use and Environmental Control* (Doc 9184) has been published. The document provides recommended land-use planning guidelines, and environmental protection practices applicable at airports, as well as examples of land-use planning techniques from various States.

2.7.2 Workshops are being planned to disseminate information on the concept of the balanced approach and land-use planning and management, having as basic documentation Doc 9829 and Doc 9184, Part 2.

2.8 Operating Restrictions

2.8.1 The 33rd Session of the Assembly endorsed the concept of the balanced approach and developed recommendations for the use of operating restrictions, which were included in Resolution A33-7, Appendix E. The new balanced approach guidance has further developed information on operating restrictions.

2.8.2 In April 1999, the European Union (EU) Council had adopted a regulation³ on this subject which entered into force on 4 May 2000. This regulation had become the subject of an application for settlement of a dispute filed by the United States with ICAO against the fifteen EU member States on 14 March 2000 under the Chicago Convention's provisions for the settlement of disputes (Article 84 and following). On 5 December 2003, the Council recorded the solution subsequently agreed between the parties involved in this dispute.

³ Council Regulation (EC) No 925/1999 of 29 April 1999 on the registration and operation within the Community of certain types of civil subsonic jet aeroplanes which have been modified and re-certificated as meeting the standards of Volume I, Part II, Chapter 3 of Annex 16 to the *Convention on International Civil Aviation*, third edition (July 1993).

3. AIRCRAFT ENGINE EMISSIONS

3.1 Relations with other United Nations bodies concerning global effects of emissions

3.1.1 Since the 33rd Session of the Assembly, liaison has continued with other United Nations (UN) bodies, with a view to obtaining a better understanding of the environmental impact of aircraft engine emissions at a global level and to exploring policy options to limit or reduce emissions.

3.1.2 Liaison with UN policy-making bodies was primarily focussed on the UN Framework Convention on Climate Change (UNFCCC). Regular reports have been made to the UNFCCC process regarding the work in progress within ICAO on limiting or reducing greenhouse gases from aviation. At the request of the UNFCCC's Subsidiary Body for Scientific and Technological Advice (SBSTA), ICAO has been cooperating in an exercise aimed at improving both the quality of data on aviation emissions reported by Parties to the UNFCCC and the methodology on which this reporting is based. In this connection, ICAO has hosted two meetings of experts on emissions data and modelling, in conjunction with the UNFCCC Secretariat, and is exploring aviation emissions models that could be used to assist SBSTA. For its part, the UNFCCC Secretariat has observer status within the CAEP process, thus facilitating exchanges of ideas on such issues as emissions trading. Meanwhile, the complex question of whether international aviation emissions should be allocated to national greenhouse gas inventories, and if so how, remains unresolved within the UNFCCC process. Liaison also continued with other UN policy-making bodies on emission-related matters, including the United Nations Environment Programme, the Montreal Protocol process and the UN Economic Commission for Europe (concerning the Convention on Long-range Transboundary Air Pollution).

3.2 Reduction of emissions

3.2.1 CAEP/6 recommended more stringent NO_x Standards in Annex 16, Volume II — *Aircraft Engine Emissions*, for consideration by the Council. The new NO_x Standard, which would be 12 per cent below the current stringency levels, was approved unanimously by the committee as part of a two-step approach that includes consideration of more stringent Standards for aircraft engine emissions, especially NO_x, in light of a technology review process and the CAEP principles of technical feasibility, economic reasonableness, environmental benefit and interdependencies aiming to complete the process for review in 2010.

3.2.2 The committee continues to work on assessing the available scientific information on the impact of aircraft engine emissions, both globally and at ground level, and on emissions reduction technology. CAEP/6 recommended the continuation of work on a possible emissions methodology for considering cruise and climb phases of flight, in addition to the current landing and take-off cycle (LTO) phase. A circular on the use of LTO certification data for assessment of operational impacts has been developed and will be published in due course.

3.2.3 CAEP developed a definition and a process to be followed on the establishment of mid- and long-term goals for NO_x reduction to help CAEP in its future standard-setting activities and to assist engine manufacturers in their planning.

3.2.4 Two workshops were held to promote the use of operational opportunities to reduce emissions, based on information in ICAO Circular 303 — *Operational Opportunities to Minimize Fuel Use and Reduce Emissions*, as requested by the Assembly (Resolution A33-7, Appendix H). These workshops were well

attended by participants from governments, airports, airlines, manufacturers, air traffic services (ATS) providers and environmental research establishments. Similar workshops are being planned for 2004 and 2005.

3.2.5 Further development of models will be necessary for the assessment of CNS/ATM environmental benefits. CAEP is currently analyzing these models and the environmental-related information contained in the *Global Air Navigation Plan for CNS/ATM* (Doc 9750) will be updated accordingly.

4. **MARKET-BASED MEASURES TO LIMIT OR REDUCE EMISSIONS**

4.1 The Organization's activities related to market-based measures to limit or reduce emissions, voluntary measures, emissions trading and emission-related levies, are described in detail in A35-WP/76.

5. **CONSOLIDATED STATEMENT OF ICAO CONTINUING POLICIES AND PRACTICES RELATED TO ENVIRONMENTAL PROTECTION**

5.1 Proposals for amendment of the Consolidated Statement (Assembly Resolution A33-7) are contained in A35-WP/77.

6. **ORGANIZATIONAL STRUCTURE TO DEAL WITH ENVIRONMENTAL ACTIVITIES**

6.1 Following a Council request to further explore means to streamline the working methods of CAEP, a small task force was established to review the committee's working methods and structure, with a view to improving them. The results of this study have now been presented to Council in light of Council's consideration of the *Report of the Sixth Meeting of the Committee on Aviation Environmental Protection* (Doc 9836). Based on the recommendations of the study, CAEP agreed that ICAO should adopt environmental goals. These are being considered as part of the proposals to update Assembly Resolution A33-7 (paragraph 5 refers).

6.2 On 15 January 2004, an Environmental Unit was created in the Air Transport Bureau. Funding for the Environmental Programme for the next triennium, 2005 to 2007 is included in the Draft Programme Budget. In addition, States are being invited to nominate professional staff on an extra-budgetary basis to assist the Secretariat.

6.3 The comprehensive work programme leading to CAEP/7 will be dependent on the willingness of States to commit resources for the accomplishment of the work.

7. **ICAO ENVIRONMENTAL PUBLICATIONS**

7.1 CAEP has produced valuable studies and developed substantial guidance material in the field of aircraft noise and aircraft engine emissions. To expedite the distribution to States of all the information produced, these publications will be made available by electronic means and in non-simultaneous language versions.

8. CONCLUSION

8.1 In the noise field, following the Assembly's endorsement in 2001 of the concept of the balanced approach to noise management, ICAO has issued detailed guidance on the balanced approach, as well as new provisions for re-certification and certification of aircraft and new studies on benefits of implementing operational measures for noise reduction. Workshops to promote the new guidance material are being planned.

8.2 In the emissions field, a new NO_x Standard that is 12 per cent below current levels has been proposed as the first of a two-step approach, based on the expectation that manufacturers and the research community (public and private) would make every effort to develop technology that provides significantly lower NO_x levels before CAEP/8 in 2010. Efforts continue on the development of mid- and long-term goals for aircraft emissions reduction and on the need for further developing tools to determine interdependency between emissions and noise. Guidance material has been published on operational measures to minimize fuel use and reduce emissions so as to enable airports, airlines and other stakeholders that have successfully reduced emissions to share their techniques with others. This "best practices" document is being promoted through a series of regional workshops.

8.3 The growing presence of UN bodies in the CAEP process and the increasing cooperation with the UNFCCC underscores the leadership role and responsibilities of ICAO in the field of aviation and the protection of the environment. The Organization is also taking the necessary administrative steps to provide better support to States in this important area. Since the last Assembly, ICAO's role as a forum for mediation of aviation issues was reinforced by the settlement under Article 84 of the dispute between the United States and fifteen European States, which concluded satisfactorily on 5 December 2003.

9. FINANCIAL IMPACT

9.1 The proposals contained in this working paper have no direct budgetary implications for the immediate future.

10. ACTION BY THE ASSEMBLY

10.1 The Assembly is invited to note this report and take it into account when considering the proposals for amendment of Resolution A33-7 contained in A35-WP/77.