



**Statement from the
International Civil Aviation Organization (ICAO)
to the Twentieth Session of the UNFCCC Subsidiary Body for Scientific and
Technological Advice (SBSTA)**

(Bonn, 16 to 25 June 2004)

The International Civil Aviation Organization appreciates this opportunity to address the Subsidiary Body for Scientific and Technological Advice at its Twentieth Session.

The aim of this statement is to report to SBSTA on recent developments in ICAO. As requested by SBSTA/19, this includes the results of the sixth meeting of the Committee on Aviation Environmental Protection (CAEP/6) held from 2 to 12 February 2004¹. It also includes some brief remarks concerning ICAO's cooperation with your secretariat on methodological issues, a subject which is addressed in Information Paper 5.

CAEP/6

CAEP is a technical committee of the ICAO Council that undertakes most of the Organization's work on aviation environmental protection. Its sixth meeting was attended by approximately 200 participants. CAEP members and observers from 21 States and 11 international organizations were present, including your Secretariat.

Underlying concerns in the meeting included: the need for aviation to respond to its environmental responsibilities versus the recent downturn in the airline industry; how to further improve the availability of scientific information; and the balance of specific environmental local/regional needs with global needs.

The meeting adopted a series of recommendations on aircraft engine emissions which have since been approved by the Council of ICAO. They reflect the three principal approaches that ICAO is pursuing to limit or reduce emissions, namely taking action at source, reducing fuel burn through operational measures, and market-based measures.

Reduction of emissions at source

In the early 1980s, ICAO adopted Standards for the control of aircraft engine emissions through an engine certification scheme. These Standards are contained in Annex 16 of the Chicago Convention, in Volume II — *Aircraft Engine Emissions*. They were originally designed to address concerns regarding local air quality rather than global concerns, by establishing limits for emissions of pollutants that affect air quality, and are based on an aircraft's landing and take-off (LTO) cycle. While based on the LTO cycle, these Standards have also helped to reduce emissions at altitude. In this regard, the ICAO Standards for oxides of nitrogen (NO_x) are of particular importance, in view of the role of NO_x in climate change.

In 1993, the Council of ICAO reduced the permitted NO_x levels by 20 per cent for newly certificated engines, with a production cut-off on 31 December 1999. In 1999, the Council further reduced the permitted NO_x levels by an average of 16 per cent for engines newly certificated from 31 December 2003.

CAEP/6 recommended that the permitted NO_x levels adopted in 1999 be further reduced by 12% applicable in 2008. Following the usual ICAO practice for Annex 16 amendments, this proposal is now being sent to States for comment prior to final action by the Council.

The proposed 12% reduction is part of a two-step approach that includes consideration of more stringent Standards for aircraft engine emissions, especially NO_x, at a later date. This two-step approach includes a technology review process and takes into account the four CAEP principles of technical feasibility, environmental benefits, economic reasonableness and possible trade-offs (for example, emissions versus noise).

CAEP/6 also recommended the continuation of work on a possible emissions methodology for the cruise and climb phases of flight, in addition to the current landing and take-off cycle (LTO) phase. Guidance on the use of LTO certification data for assessment of operational impacts has been developed and will be published in due course.

In order to help CAEP in its future standard-setting activities and to assist engine manufacturers in their planning, a process has also been developed to establish mid- and long-term goals for NO_x reduction.

ICAO's work on emissions, particularly the work focussed on reduction at source, is very dependent on our understanding of the impact of aircraft engine emissions. It is now 5 years since the Intergovernmental Panel on Climate Change (IPCC) published its Special Report on *Aviation and the Global Atmosphere*, identifying what is known and where the uncertainties lie. While new research information has since become available, questions arise concerning its interpretation. Consequently, it is important for ICAO that the IPCC's Fourth Assessment Report due in 2007 include an update of the main scientific findings of the 1999 Special Report.

Reducing fuel burn through improved operational measures

Aircraft operations often involve indirect routings, delays, and other factors that may contribute to increased fuel burn and associated emissions.

ICAO guidance material² has therefore been made available for States so as to enable airports, airlines and other stakeholders that have successfully reduced emissions to share their techniques with others. Two workshops have already been held to promote these initiatives, based on this ICAO guidance. CAEP/6 recommended that further workshops be held and these are currently being planned for 2004 and 2005.

There is also scope for reducing aircraft emissions by operational means through the implementation of new satellite-based Communications, Navigation, Surveillance and Air Traffic Management (CNS/ATM) systems, which are expected to provide more direct routings and reduce delays. An initial assessment by the IPCC³ identified a potential emissions reduction of 6 to 12% from the implementation of such systems. Since then, more sophisticated tools to estimate these reductions have become available and a parametric model to estimate reductions has been included in ICAO's *Global Air Navigation Plan for CNS/ATM* (Doc 9750).

Other models and tools are currently under development⁴ and are being considered by CAEP, such as SAGE - System for assessing Aviation 's Global Emissions - developed by the United States Federal Aviation Administration (FAA) Office of Environment and Energy (AEE), and AERO2K - Global Aircraft Emissions Data for Climate Impacts Evaluation - developed by Qinetiq under a consortium funded by the European Community.

Against this background, CAEP/6 called for the further development of models to estimate the emissions produced by aviation and the reductions associated with the implementation of CNS/ATM.

Analysing the use of market-based measures

Three market-based measures have been under consideration by CAEP, namely voluntary measures, emission-related levies and emissions trading. Each of these measures is at a different stage of consideration by the Organization, for example in the extent to which ICAO guidance already exists. In 2001, the 33rd Session of the ICAO Assembly requested the Council “to continue to develop guidance for States on the application of market-based measures aimed at reducing or limiting the environmental impact of aircraft engine emissions, particularly with respect to mitigating the impact of aviation on climate change and “to evaluate the costs and benefits of the various measures with the goal of addressing aircraft engine emissions in the most cost-effective manner”⁵.

Information relevant to all market-based measures

While aircraft engine emissions have a potential impact both at a local level and globally, CAEP's work on market-based measures has focussed on the global impact. It has been assumed that the market-based measures would target carbon dioxide (CO₂) emissions, while leaving open the possibility of later extending this work to other greenhouse gas emissions from aviation.

As required by the Assembly, CAEP has attempted to take into account potential implications for developing as well as developed countries. In this connection, developing countries have pointed to the fact that one of the principles enshrined in the UNFCCC is that industrialised countries are required to take the lead in addressing emissions. This has given rise to questions as to whether developing countries should be given special treatment in some way in the design of market-based measures for aviation, for example by exempting the airlines of these countries and/or routes to and from these countries. This matter remains largely unresolved at present.

Voluntary agreements

In 2001, the 33rd ICAO Assembly noted that in the short term voluntary measures - a mechanism under which industry and governments agree to a target and/or a set of actions to reduce emissions - could serve as a first step towards future actions. It encouraged short term action by States and other parties involved, in particular through voluntary measures, and called for the development of guidelines, including a voluntary template agreement, to facilitate such short-term action.

CAEP has since developed a Template Agreement - Memorandum of Understanding that States and other parties concerned could use, along with associated guidance on voluntary measures to limit or reduce CO₂ emissions.

The Council has subsequently approved a CAEP/6 recommendation that this material be posted on the general ICAO web site for dissemination to States and interested organizations. ICAO's guidance on operational opportunities to reduce emissions (Circ 303, referred to earlier) also contains information that can support the development of such agreements. As part of its future work, CAEP will promote the use and monitor the implementation of voluntary agreements.

Emissions Trading

On emissions trading, in 2001 the ICAO Assembly endorsed the development of an open system for international aviation emissions and the development of the necessary guidelines including the structural and legal basis for international aviation's participation in such a regime.

In view of the complexity of emissions trading, a firm of consultants has been commissioned to explore the feasibility of designing a greenhouse gas emissions trading system covering the international aviation sector. The objective of the study is to identify and analyse several potential options for an emissions trading scheme and their implications. An initial draft of the study was considered by CAEP/6, and since then, the consultants have been working on revising the report in light of comments received. The consultancy report, once it is completed, is expected to provide a valuable resource of information on the concept of emissions trading in aviation to assist the development of guidance for States and the aviation community on this subject.

Based on the information available in February 2004, CAEP/6 considered three possible avenues for implementing an open emissions trading system. It recommended – and the Council has since approved – that further work should focus on two approaches. Under one approach, ICAO would support the development of a voluntary trading system that interested States and international organizations might propose. Under the other approach, ICAO would provide guidance for use by States, as appropriate, to incorporate emissions from international aviation into States' emissions trading schemes consistent with the UNFCCC process.

The next CAEP Steering Group meeting (November 2004) is expected to review the report from the consultant and decide on the most appropriate working structure to support the continuation of the work.

Emissions-related levies

On emission-related levies, a policy statement of an interim nature adopted by the Council in 1996 strongly recommends that any such levies be in the form of charges rather than taxes, and that the funds collected should be applied in the first instance to mitigating the environmental impact of aircraft engine emissions. Such charges should be based on the costs of mitigation to the extent that costs can be properly identified and directly attributed to air transport. In 2001, the Assembly recognized the continuing validity of this policy, urged States to refrain from unilateral action to introduce emission-related levies inconsistent with the policy, and called for further studies and the development of further ICAO guidance on the subject.

In response to this Assembly request, CAEP worked on a draft framework of further guidance to address issues that could arise if some States were to implement a charge related to CO₂ emissions. However, CAEP/6 was unable to arrive at a consensus on this subject because of a number of outstanding issues. CAEP/6 concluded that while scope remained for further study of points raised, it was questionable if CAEP could resolve these problems without additional

guidance from the Council due to different views on essential aspects. CAEP/6 recommended that information on the progress made on the study of this complex issue, the views and options presented be brought to the attention of the Council and that it be requested to provide further instructions to CAEP, as appropriate.

The Council has since considered this matter. It was noted that when the current Council guidance was adopted in 1996, some States considered emissions-related charges desirable and would consider introducing them, while other States had no intention of doing so. These different positions were recognised in the 1996 guidance. Today, this dichotomy remains although in the intervening period a better understanding of the subject has been achieved. There have also been developments affecting some States' positions. In particular, some industrialised countries have entered into new commitments concerning greenhouse gases.

There are a number of outstanding issues that would need to be resolved if further progress is to be made. The Council recognises that resolving these issues is likely to be a difficult task and is currently considering what action it should take.

Methodological issues regarding aviation emissions

ICAO has been pleased to cooperate with your secretariat 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, in April ICAO hosted a second meeting of experts on emissions data and modelling, and is exploring three aviation emission tools made available to ICAO, namely AERO MS, AERO2K and SAGE that could be used to assist SBSTA. Full details are included in your secretariat's Information Paper 5.

Since the expert meeting in April, CAEP has formed an *ad hoc* group in response to a request to assist the IPCC Technical Support Unit in the latest revision of the IPCC guidelines for national greenhouse gas inventories. The request relates to emissions factors and other parameters relevant to aircraft emissions.

The *ad hoc* group has concluded that significant revisions could be made to bring the IPCC guidelines up to date with aircraft fleet developments and understanding of aircraft emissions, but that substantial resources would be required to conduct the necessary data analysis and that a comparative study would have to be undertaken to ensure the quality of data to be supplied. The study would involve comparisons of output from the SAGE, AERO2K, and NASA/Boeing models.

This work has been initiated by developing a listing of representative aircraft along with matching aircraft types and engines. Results of the work on updating the emissions factors are expected to be provided to the IPCC Energy Authors meeting in September.

The *ad hoc* group is also considering the possibility of including new methodologies, but has concluded that this would require further consultation with the IPCC Technical Support Unit.

Concluding remarks

Following the Committee on Aviation Environmental Protection meeting in February 2004, the Council of ICAO has reviewed the progress that has been made in the various activities that have been undertaken to limit or reduce the emissions of greenhouse gases from international civil aviation and will report to the next Assembly Session in September/October 2004. As this work progresses, ICAO will continue to keep the UNFCCC process informed on a regular basis.

Once again, we would urge States to ensure that there is proper coordination at national level so that their positions on aircraft engine emissions within the UNFCCC process and within ICAO are consistent.

— END —

1. For more information on ICAO's activities, see the ICAO Statement made available to the high level segment of COP/9.
2. *Operational Opportunities to Minimize Fuel Use and Reduce Emissions* (Circular 303)
3. Special Report on *Aviation and the Global Atmosphere*, 1999
4. A side event "Emissions from aviation", organized by ICAO, will be held on 17 June to provide information on the comparison by ICAO of the UNFCCC aviation bunker fuels inventory data with modelled data obtained from three emission tools made available to ICAO - AERO MS, AERO2K and SAGE.
5. Assembly Resolution A33-7, Appendix I, *Market-based measures regarding aircraft engine emissions*.