



**Statement from the  
International Civil Aviation Organization (ICAO)  
to the Ninth Session of the Conference of the Parties  
to the UN Framework Convention on Climate Change (UNFCCC)**

(Milan, 1 -12 December 2003)

The International Civil Aviation Organization appreciates this opportunity to address the High-level Segment of the ninth session of the Conference of the Parties.

The aim of this statement is to highlight some of the characteristics of international civil aviation in a climate change context, and to describe how ICAO is seeking to limit or reduce greenhouse gas emissions from international civil aviation.

### **Aircraft engine emissions**

Aircraft engines produce emissions that are similar to other emissions resulting from fossil fuel combustion. However, aircraft emissions are unusual in that a significant proportion is emitted at altitude.

The *Special Report on Aviation and the Global Atmosphere* (1999), which was prepared at ICAO's request by the Intergovernmental Panel on Climate Change (IPCC), assessed the global impact of aircraft engine emissions. Among the key findings of this report are the following:

- Aircraft emit gases and particles which alter the atmospheric concentration of greenhouse gases, trigger the formation of condensation trails and may increase cirrus cloudiness, all of which contribute to climate change.
- Aircraft are estimated to contribute about 3.5 per cent of the total radiative forcing (a measure of change in climate) by all human activities and this percentage, which excludes the effects of possible changes in cirrus clouds, is projected to grow.

The emissions from aircraft of relevance for climate change include carbon dioxide (CO<sub>2</sub>), water vapour, nitrogen oxides (NO<sub>x</sub>), sulphur oxides and soot, although CO<sub>2</sub> is the only one covered by the targets established in the Kyoto Protocol. The IPCC special report recognized that the effects of some types of aircraft emissions are well understood, revealed that the effects of others are not, and identified a number of key areas of scientific uncertainty that limit the ability to project aviation impacts on climate. It is important that States promote scientific research aimed at addressing these uncertainties.

Future concerns about aviation's role in climate change are largely due to the projected continued growth in this sector. Growth rates for emissions are less than those for traffic growth, because fuel efficiency continues to improve (today's world fleet is about 70% more efficient per passenger kilometre than in the 1960s, and there was a 17% improvement between 1990 and 2000)<sup>1</sup>. While fuel efficiency improvement is expected to continue, there are no easy technical "fixes" for aviation and total emissions will continue to increase. For example, the IPCC special report in 1999 projected traffic growth in the sector of 5 per cent per year between 1990 and 2015 with CO<sub>2</sub> emissions growing at 3 per cent annually over the same period. However, in recent years the air transport industry has experienced declines and stagnation. ICAO is now forecasting that world traffic will rebound in 2004 and subsequently continue to expand in following years, barring any unforeseen events of significance. In the longer term up to the year 2020, global scheduled passenger traffic is anticipated to grow at an average annual rate of about 4 per cent, which is lower than earlier projections.

## **Treatment of domestic and international aviation under the UNFCCC process**

Under the UNFCCC process, emissions from domestic flights and those from international aviation are treated differently.

Firstly, when quantifying emissions, the emissions from domestic flights are treated as part of the national inventory of the country within which the flights occur. For international flights, the problem has been how to allocate the emissions to national inventories. Consequently, international aviation emissions are required to be estimated by the country where the fuel is sold, but are not to be included in that country's total emissions.

Secondly, there is different treatment in the Kyoto Protocol in that emissions from domestic flights are included in the agreed-on targets for Annex I Parties (although these Parties are free to determine to what extent they require domestic aviation to help achieve these targets), while the targets do not apply to emissions from international aviation. Instead, Article 2, paragraph 2 of the Kyoto Protocol states that the responsibility for limiting or reducing emissions from international aviation shall fall to the Annex I Parties, *working through ICAO*.

As Parties consider what action may be appropriate for aviation in pursuance of the commitments which they have made under the UNFCCC process, it is important that they bear in mind that domestic and international aviation are closely related. Actions aimed at domestic aviation may affect their international aviation, and vice-versa.

As ICAO commented in a statement to the Conference of the Parties (COP) in 1998, the Organization's mandate under the Convention on International Civil Aviation does not extend to domestic aviation. However, ICAO's Standards and Recommended Practices and Procedures in many circumstances have a de facto application domestically.

## **ICAO's activities to limit or reduce greenhouse gases**

The adoption of the Kyoto Protocol in 1997 was immediately communicated to the Council of ICAO and the need for an appropriate response by ICAO was enshrined in resolutions adopted by the 32nd and 33rd Sessions of the ICAO Assembly in 1998 and 2001 respectively.

*Assembly Resolution A33-7: Consolidated statement of continuing ICAO policies and practices related to environmental protection*, adopted by the 33rd Session of the ICAO Assembly in September/October 2001, requests the Council of ICAO to continue to study policy options to limit or reduce the environmental impact of aircraft engine emissions and to develop concrete proposals and provide advice as soon as possible to the Conference of the Parties. It also calls for special emphasis to be placed on the use of technical solutions while continuing consideration of market-based measures, and for taking into account potential implications for developing as well as developed countries.

Against this background, the ICAO Council's Committee on Aviation Environmental Protection (CAEP) is undertaking an ambitious work programme on aircraft engine emissions, including the further development of technology and related world-wide standards; reducing fuel burn through improved operational measures; and analysing the use of market-based measures. Each is summarized separately below. The results will be considered at CAEP/6, which will take place in February 2004.

This work on aircraft engine emissions is guided by the following principles:

- Measures to address emissions should take into account environmental benefit, technological feasibility and economic reasonableness.
- Measures to address emissions should also take into account any potential implications for safety, which must not be compromised, and for aircraft noise. Measures aimed at one type of emission (for example, CO<sub>2</sub>) or one emission-related problem (for example, climate change) should take into account any potential implications for other types of emission or for other emission-related problems.
- Measures to address emissions should be developed on a harmonised world-wide basis, wherever possible.

### **Further development of technology and related world-wide standards**

In the early 1980s, ICAO adopted Standards for the control of aircraft engine emissions through an engine certification scheme. These Standards, which were originally designed to address concerns regarding local air quality rather than global concerns, establish limits for emissions of pollutants that affect air quality, including NO<sub>x</sub>, 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 1993, the Council of ICAO reduced the permitted NO<sub>x</sub> 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<sub>x</sub> levels by an average of 16 per cent for engines newly certificated from 31 December 2003.

ICAO's present activities include:

- monitoring advances in technology that might help achieve further reductions in emissions through improved engine or airframe design, in consultation with aircraft and engine manufacturers, and government sponsors of related research and development;
- exploring the establishment of long-term technology goals to reduce aircraft engine emissions;
- considering whether the ICAO NO<sub>x</sub> Standards adopted in 1999 could be made more stringent; and
- exploring the further development of ICAO Standards to specifically address emissions of global concern.

### **Reducing fuel burn through improved operational measures**

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

ICAO guidance material has therefore been prepared for States on operational opportunities to minimise 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 guidance is being promulgated through a series of regional workshops.

ICAO is also promoting awareness of the beneficial impact on aircraft emissions from 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. For example, analytical work involving the European Organization for the Safety of Air Navigation (EUROCONTROL) and the United States Federal Aviation Administration has estimated overall fuel savings and associated reductions of CO<sub>2</sub> of the order of 5 per cent in both the United States and European regions, based on planned CNS/ATM enhancements through 2015. This analytical work is now being expanded to other regions of the world.

### **Analysing the use of market-based measures**

Whereas past ICAO efforts in the environmental field have generally focussed on the adoption of technology-based standards, the ICAO Assembly<sup>2</sup> has recognized the need to broaden the range of approaches, explore the potential role of market-based measures and develop appropriate guidance for States. These measures are designed to achieve environmental goals at a lower cost and in a more flexible manner than traditional regulatory approaches. They include voluntary measures, emission-related levies and emissions trading, all of which at this stage would target CO<sub>2</sub> emissions.

The 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. A draft template agreement has since been developed and will be reviewed by CAEP/6.

On emission-related levies, a policy statement<sup>3</sup> 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. Some progress has since been made in developing further guidance, although there are very different views among States on the appropriateness of emission-related levies to address climate change. The results will be reviewed by CAEP/6.

On emissions trading, the Assembly endorsed the development of an open system for international aviation emissions (one in which there is trading of CO<sub>2</sub> equivalent allowance units between the aviation sector and other sectors). This includes:

- development of guidelines for open emissions trading including the structural and legal basis for international aviation's participation in such a regime; and
- further development of key elements of such a system including reporting, monitoring, compliance and definition of an appropriate target for the international aviation sector.

In view of the complexity of emissions trading, a firm of consultants has since 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. The conclusions of the study will be considered by CAEP/6.

In this work on market-based measures, it is also necessary to address a number of cross-cutting issues including:

- the effects of implementation of these measures on developing countries;
- the implications if different approaches are taken by States or regions; and
- the effects of international and domestic aviation emissions being treated differently.

### **Methodological assistance to SBSTA**

In addition to its policy-related work on aircraft engine emissions, ICAO is also responding to a request from the Subsidiary Body for Scientific and Technological Advice (SBSTA) concerning emissions inventories. Since the information on aviation emissions that Parties are reporting to the UNFCCC Secretariat is inadequate in certain respects, ICAO has been invited to provide assistance. In February 2003, in cooperation with the UNFCCC Secretariat, we held an expert level meeting to explore these problems. A number of ways of assisting were identified, including the provision of estimates of aviation emissions at national level, which the UNFCCC Secretariat could use for comparison purposes. We will be continuing to work closely with the UNFCCC Secretariat on this subject.

### **Concluding remarks**

Following the Committee on Aviation Environmental Protection (CAEP) meeting in February 2004, the Council of ICAO will review 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. Meanwhile, 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.

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1. Source: International Air Transport Association. <http://www.iata.org/soi/environment/fuelefficiency.htm>
2. [Assembly Resolution A33-7](#), Appendix I.
3. [ICAO Council Resolution](#) adopted on 9 December 1996.