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

(Bonn, 31 May - 11 June 1999)

ICAO is pleased to be able to report to SBSTA on the substantial activities underway to respond to the role identified for it under Article 2.2 of the Kyoto Protocol. This provision requires Annex I Parties to pursue limitation or reduction of emissions of greenhouse gases from aviation bunker fuels, **working through ICAO**. We can assure you, that ICAO is fully committed to responding to this challenge in an effective and timely manner.

Today's report will focus on the specific actions that have been taken by ICAO in the relatively short period since the Kyoto Protocol was adopted. The highest body within ICAO, the ICAO Assembly, adopted a resolution at its most recent session in September/October of 1998, calling for its subsidiary bodies to "study policy options to limit or reduce the greenhouse gas emissions from civil aviation" and to report back to the next ordinary session of the Assembly in September/October 2001[1]. With this clear mandate, the expert group within ICAO that focuses on environment (the Committee on Aviation Environmental Protection, CAEP) has initiated actions aimed at providing the technical and policy basis for decisions on limiting or reducing greenhouse gases that could be taken by the Council of ICAO or at the next Assembly meeting.

The work in progress on this subject is very dependent on having a clear understanding of the potential impacts of aircraft engine emissions on climate and stratospheric ozone depletion. This is why ICAO requested the IPCC in 1996 to prepare a *Special Report on Aviation and the Global Atmosphere*. Their recently completed report will help to shape ICAO's efforts to limit or reduce greenhouse gas emissions. We wish to express our gratitude to the IPCC and the many experts from government, industry and academia who contributed to the report. It provides a thorough assessment of current understanding of critical atmospheric, technological, and policy issues with emphasis on both what is known and what remains uncertain. Meanwhile, CAEP will continue to foster development of a scientific basis for the assessment of the potential impacts of engine emissions, with resolution of scientific uncertainty as a key objective.

CAEP ACTIVITIES RELATED TO LIMITING OR REDUCING GREENHOUSE GASES

The main thrust of ICAO's efforts to develop a programme aimed at limiting or reducing greenhouse gas emissions is being undertaken by CAEP and its working groups. This work falls into three categories, namely technology and standards, operational measures, and market-based options. Each is summarized below.

Technology and standards

ICAO has been considering to what extent technology can help, through improved engine or airframe design, to achieve reductions in greenhouse gas emissions.

The present ICAO Standards for emissions certification of aircraft engines (contained in Volume II of Annex 16 to the Convention on International Civil Aviation) were originally designed to respond to concerns regarding air quality in the vicinity of airports. As a consequence, they establish limits for emissions of oxides of nitrogen (NO_X), carbon monoxide, unburned hydrocarbons and smoke for a reference Landing and Take-off (LTO) cycle below 915 metres altitude. These limits are expressed in terms of mass of emissions per unit of engine thrust.

While these Standards are expressed in terms of an aircraft's LTO cycle, they also help to limit emissions at altitude. Of particular relevance in this context is the Standard for NO_x, which is a precursor for ozone. At ground level, ozone takes part in the smog chemistry, whilst at altitude it is a greenhouse gas. The Standard for NO_x was first adopted in 1981, then made more stringent in 1993, when the Council of ICAO reduced the permitted levels by 20% for newly certificated engines, with a production cut-off on 31 December 1999. More recently, in April 1998, CAEP recommended a further tightening of about 16% on average for engines newly certificated from 31 December 2003 and, following consultation with States, this was adopted by the Council of ICAO in February of this year. This represents an important development on an issue that had proved difficult in the past.

CAEP is now carrying out assessments of technological advances with a view to further developing the ICAO Standards to specifically address emissions of greenhouse gases. In particular, it is studying alternate emissions methodologies that will encompass all phases of flight (climb and cruise emissions, as well as LTO cycle). In addition to considering the types of emissions already covered by ICAO Standards, the new methodologies will take into account fuel efficiency and productivity of the whole aircraft, which would have a direct bearing on CO_2 emissions. CAEP will also follow developments in the characterization and measurement of other emissions such as particulates that could be relevant to contrail production and additional cirrus cloud formation. This is a very complex task requiring close cooperation with industry and scientific experts, and recommendations for new methodologies are not expected to be completed until 2001. Definition of relevant standards, if appropriate, would follow.

Operational measures

ICAO is considering to what extent operational measures might help to reduce the amount of emissions of greenhouse gases produced, for example through more direct routings, or to reduce their impact.

In April 1998, CAEP established a new working group with two primary tasks. The first is to identify the best operating practices to achieve near-term reductions in aircraft emissions of greenhouse gases together with potential actions to facilitate their broader application. The second task is to evaluate the potential impact of satellite-based Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) systems enhancements and recommended actions to facilitate implementation on a regional and global basis.

The working group has focused its efforts in three key areas:

- the quantification of the emissions benefits of CNS/ATM, starting with the development of a quantification methodology;
- increased liaison with ICAO's planning and implementation regional groups to help maximize emissions benefits of regional CNS/ATM implementation plans; and
- identification and development of operational best practices on the ground and in the air to reduce fuel burn.

In addition, at the request of the Council of ICAO, the Secretary General recently drew the attention of States to the environmental benefits that would accrue from early implementation of satellite-based CNS/ATM systems, in terms of reducing fuel consumption and avoiding unnecessary emissions.

Market-based options

ICAO is also considering the use of market-based options as a potentially attractive means of limiting greenhouse gas emissions at the lowest possible cost.

In April 1998, CAEP established another new working group to "identify and evaluate the potential role of market-based options, including emission charges, fuel taxes, carbon offsets, and emissions trading regimes." The focus of this group's work would be to evaluate the possible role that market-based options could play in responding to Article 2.2 of the Kyoto Protocol.

CAEP has traditionally adopted technology-based standards for controlling emissions. Market-based options offer a potentially cost effective approach to achieving environmental objectives. However, their use raises a number of important economic, legal and administrative issues that must be fully evaluated.

The working group has received briefings on:

- existing programmes related to various market-based options, notably regarding emissions trading ;
- the past work by CAEP on emission levies (charges or taxes) and on similar recent analyses conducted by the European Commission and others; and
- flexible mechanisms in the Kyoto Protocol.

In the light of these briefings, the working group has identified and begun to define a range of specific market-based options including: fuel and en-route levies; emissions trading; and voluntary regimes.

It has also begun to develop an evaluation framework which will allow for a transparent comparison of the strengths and weaknesses of these options.

In view of the importance attached to this work by the ICAO Assembly[2], the goal of the working group is to complete its technical evaluation by late 2000, prior to a policy review by CAEP.

Costs and benefits

On the basis of the work being carried out on these three separate aspects (technology and standards, operational measures and market-based options), policy options are expected to emerge. It will then be necessary to assess the costs and benefits of such policy options, if possible on a common basis. This work will be undertaken by CAEP's Forecasting and Economic Analysis Support Group.

Timescale

The present CAEP work-plan in the emissions field is aimed towards the next full meeting of the Committee (CAEP/5) which is expected to take place in the final quarter of 2000 or the first quarter of 2001. Thereafter, CAEP's recommendations will be reviewed by the Council of ICAO, which meets on a regular basis, and some aspects such as market-based options are also expected to be discussed at the 33rd Session of the ICAO Assembly in late 2001.

It is intended to consolidate these various activities into an ICAO Action Plan on emissions that would provide a road map of tasks and objectives over the next few years. ICAO intends to have it ready later this year before the COP meets.

RELATED ISSUES

There are a number of related issues on which we would like to comment.

Definition of aviation bunker fuels

In our Statement to COP/4 in Buenos Aires, we drew attention to a question that had arisen in the aviation community as to whether Article 2.2 of the Kyoto Protocol is intended to cover emissions from international aviation only, or from both international and domestic aviation. Much depended on how one defines "aviation bunker fuels", a term which is not commonly used in the aviation community.

In the documentation for this week's meeting (FCCC/SBSTA/1999/INF.4, para 10), we note the Secretariat's observation that the terms "international bunkers" and "bunker fuels" in the context of greenhouse gas inventories are generally used to denote the international share of fuel sold to ships and aircraft.

This provides some welcome clarification. If Article 2.2 is read in the same light, it is consistent with ICAO's mandate under the Convention on International Civil Aviation, which does not extend to domestic aviation. At the same time, ICAO's Standards, Recommended Practices and Procedures in many circumstances do have a *de facto* application domestically, in recognition of the need for a consistent policy approach to international and domestic aviation.

The allocation issue

The ICAO Assembly has expressed an interest in how ICAO might assist in furthering discussion on the issue of allocating international aviation emissions. This issue is being examined within CAEP in the context of analysing the potential role of emissions trading as a means of limiting or reducing greenhouse gas emissions from civil aviation.

In this connection, we noted with interest the statement in the Secretariat's document that "It would be up to the Parties to determine whether, and if so when, the inclusion of international bunker fuels into national totals would affect "assigned amounts" as defined in Article 3 of the Kyoto Protocol" (FCCC/SBSTA/1999/INF.4, footnote 1 to para 9), .

Emissions reporting

Finally, ICAO has considerable expertise in the area of data collection in the field of aviation. The Secretariat's document (FCCC/SBSTA/1999/INF.4) focuses on the difficulties that States have experienced in accurately reporting emissions from the aviation sector. We would like to extend an invitation to work more closely with the appropriate organizations (IPCC, SBSTA or the UNFCCC Secretariat) in developing and implementing a plan to improve inventory reporting of greenhouse gases from the aviation sector.

SUMMARY

This short summary is intended to give a comprehensive review of the significant and wide-ranging efforts being made to address the reduction of emissions from aviation. The IPCC report, requested by ICAO, gives a thorough assessment of the relevant issues including the status of research and knowledge about the various impacts of aviation on the atmosphere. ICAO itself is leading investigations into the possible further actions, including new technology, new or revised standards, operational measures and market-based options to achieve the desired results, while taking into account the unique features of civil aviation.

Endnotes

1. Appendix F to Resolution A32-8, *Consolidated statement of continuing ICAO policies and practices related to environmental protection*. Accessible on the ICAO website (www.icao.int).

2. Appendix H of Resolution A32-8, *Consolidated statement of continuing ICAO policies and practices related to environmental protection*. Accessible on the ICAO website (www.icao.int).