



WORKING PAPER

ASSEMBLY — 36TH SESSION

EXECUTIVE COMMITTEE

Agenda Item 17: Environmental protection

ICAO POLICY ON AVIATION EMISSIONS

(Presented by the Council of ICAO)

EXECUTIVE SUMMARY

This paper reports on the Council's work with regard to the Organization's aviation emissions policy, including the application of market-based and other policy measures to limit or reduce the impact of aircraft engine emissions on the environment, both at the global level (climate change) and the local level (local air quality). It also proposes modified text for Appendices A, H and I of Assembly Resolution A35-5.

Action: The Assembly is invited to:

- a) note the developments in the area of market-based measures since the last Assembly;
- b) review the draft text in the Appendix and agree that it replace the present Appendices A, H and I of Assembly Resolution A35-5; and
- c) endorse the Organization's work with regard to measures to limit or reduce the environmental impact of aircraft engine emissions, including the application of market-based or other policy measures.

<i>Strategic Objectives:</i>	This working paper relates to Strategic Objective C (<i>Environmental Protection – Minimize the adverse effect of global civil aviation on the environment</i>).
<i>Financial implications:</i>	This Assembly Resolution identifies additional tasks to be undertaken by the Organization to address aviation emissions which would require additional resources.
<i>References:</i>	A36-WP/34, <i>Developments in ICAO related to civil aviation and the environment</i> A36-WP/35, <i>Consolidated statement of continuing ICAO policies and practices related to environmental protection (Appendices B through G)</i> Doc 9848, <i>Assembly Resolutions in Force (as of 8 October 2004)</i> Doc 9082, <i>ICAO's Policies on Charges for Airports and Air Navigation Services</i> Doc 8632, <i>ICAO's Policies on Taxation in the Field of International Air Transport</i>

1. INTRODUCTION

1.1 The work of the Organization on aviation emissions is undertaken using three approaches, i.e. technology and standards, operational measures and market-based measures. The work accomplished with respect to the first two is reported in A36-WP/34, *Developments in ICAO related to civil aviation and the environment*. This paper covers the developments in the field of market-based and other policy measures. It summarizes the progress made since the 35th Session of the Assembly with respect to the measures studied; it also considers the current developments and outlines how the Council proposes to carry the work forward in the 2008-2010 triennium.

1.2 What distinguishes this paper from the other one mentioned above is that market-based measures are policy tools using economic mechanisms to achieve policy objectives.

Background – the basis for ICAO’s emissions mitigation efforts

1.3 Since the inception of the Council’s Committee on Aviation Environmental Protection (CAEP) in 1983, ICAO has undertaken and continues to develop ways of reducing the effects of local and global emissions from aviation. These efforts are accomplished through mechanisms that are technologically feasible, environmentally beneficial, and economically reasonable. The primary impetus behind the drive to reduce emissions from aviation is to limit or reduce air pollution locally and climate change globally.

1.4 On the local level, the key environmental concern regarding aviation emissions pertains to air pollution formed by such gases as nitrogen oxides (NO_x), hydrocarbons (HC) and carbon monoxide (CO), as well as particulate matter (PM). These gaseous emissions which are closely linked with the burning of fossil fuels can have a considerable impact on human health, primarily in the form of respiratory problems.

1.5 On a global level, a similar case can be made for greenhouse gases (namely, carbon dioxide (CO₂) which is also closely linked to fuel burn). The findings of the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (4AR) assert a clear urgency for action on climate change. The Report states that: “Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level”. Human activities, such as fossil fuel burning and land use change, have greatly contributed to these effects.

1.6 ICAO continues to address these concerns through its work in CAEP which endeavours to limit or reduce emissions from aviation through technological, operational, and market-based measures. This paper emphasizes the use of market-based measures.

1.7 In 2004, the 35th Session of the Assembly gave direction to the Organization’s work on aircraft engine emissions. *Inter alia*, it requested the Council “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 of the UNFCCC, placing special emphasis on the use of technical solutions while continuing its consideration of market-based measures, and taking into account potential implications for developing as well as developed countries” (Assembly Resolution A35-5, Appendix H, Clause 2 b)).

1.8 Each of the three market-based measures studied by ICAO, namely voluntary measures, emission-related charges and emissions trading, is at a different stage of consideration by the Organization, depending on, for example, the extent to which ICAO guidance already exists. On this subject, the Assembly made a number of more detailed requests to the Council in Assembly Resolution A35-5, Appendix I, *Market-based measures regarding aircraft engine emissions*. The Assembly requested the Council “to continue to develop guidance for Contracting 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...” (App. I, Clause 1), and encouraged “Contracting States and the Council, taking into account the interests of all parties concerned, including potential impacts on the developing world, to evaluate the costs and benefits of the various measures, including existing measures, with the goal of addressing aircraft engine emissions in the most cost-effective manner...” (App. I, Clause 2).

2. ACHIEVEMENTS SINCE THE LAST ASSEMBLY (A35)

2.1 Throughout the whole triennium, discussions on environmental issues in general, and the use of market-based measures in particular, assumed a very high profile at ICAO, notably through numerous discussions at the Council level. This is consistent with the leadership role of ICAO in addressing aviation’s contribution to environmental protection, and the need to reconcile differences in views and approaches among Contracting States on how best to use the various measures available.

2.2 Work on environmental issues has largely been undertaken through CAEP. This Committee held its Seventh Meeting (CAEP/7) in February 2007 and its recommendations were subsequently approved by the Council with comments during its 180th Session in March 2007.

2.3 It is noteworthy that within the period since the 35th Session of the ICAO Assembly (September 2004), the Kyoto Protocol came into force on 16 February 2005 and, as of December 2006, 169 States have ratified the agreement.

Voluntary Measures

2.4 During its 35th Session in 2004, the Assembly had encouraged States and other parties involved to limit or reduce international aviation emissions through voluntary measures and had requested the Council to facilitate actions by making available guidelines that ICAO had developed for such measures, including a template voluntary agreement (A35-5, Appendix I, Clause 2 a)).

Emission-related charges

2.5 In 2004, the Assembly, recognizing that the existing ICAO policy guidance (mainly contained in the Council Resolution of December 1996 on environmental taxes and charges) was not sufficient to implement greenhouse gas (GHG) emissions charges internationally, had requested the Council to carry out further studies and develop further guidance on the subject (A35-5, Appendix I, Clause 2b) 3)). The Assembly had also urged Contracting States to refrain from unilateral implementation of GHG charges prior to the next regular session of the Assembly in 2007 (A35-5, Appendix I, Clause 2b) 4)). Finally, the Assembly had requested the Council to study the effectiveness of, and to develop further guidance on emissions levies related to local air quality (LAQ) (A35-5, Appendix I, Clause 2 b) 5)).

2.6 Although work on the use of emissions-related charges had been initially addressed in accordance with these directions, various difficulties, including those of a legal and policy nature, were

encountered during the course of the CAEP/7 cycle. This led to the establishment of a Council Special Group on Legal Aspects of Emissions Charges. Based on the results of the work of this Special Group, the CAEP Steering Group had decided to address the issue of charges in two different ways: one related to LAQ emissions charges, and the other to GHG emissions charges. Noting that there was a greater potential for developing guidance on LAQ emissions charges than for GHG emissions charges, the CAEP Steering Group had agreed that CAEP should concentrate its efforts and resources in areas where progress was more likely to be achieved, i.e. developing guidance on LAQ emissions charges and emissions trading. As a consequence of this decision, which was subsequently endorsed by the Council, CAEP's work on emissions charges only addressed the charges that might be imposed on those emissions that affect local air quality at or around airports. Under market-based measures, climate change issues have, at this stage, only been covered through guidance provided on emissions trading (see paragraphs 2.10 to 2.15 below).

2.7 The guidance developed by CAEP for those States considering implementing LAQ charges as one of the measures to address emissions affecting local air quality contains five chapters: a) existing ICAO policies on charges; b) process for implementing local emissions charges; c) local air quality assessment; d) design of a local emissions charge scheme; and e) administration aspects.

2.8 At its 180th Session, the Council adopted a policy text on emissions charges related to local air quality, for incorporation in *ICAO's Policies on Charges for Airports and Air Navigation Services* (Doc 9082). It also agreed that the accompanying guidance material entitled *Guidance on Emissions Charges Related to Local Air Quality* (Doc 9884) be published as a saleable document.

2.9 The Council also noted the conclusions reached by CAEP on the analysis conducted on the cost-effectiveness of LAQ charges, according to which the impact on NO_x emissions, which is directly attributable to LAQ charges, is marginal. In light of the limitations of the analysis conducted, definite inference on the cost-effectiveness of LAQ charges cannot be drawn.

Emissions Trading

2.10 After having endorsed, in 2001, the development of an open emissions trading system for international aviation, the Assembly had requested in 2004 that the Council focus its work on two approaches¹ and develop guidelines on the open emissions trading system (A35-5, Appendix I, Clause 2 c)).

2.11 The draft guidance material prepared by CAEP for integrating international aviation into States' emissions trading systems focuses on aviation-specific issues, identifies options and provides reference.

2.12 One issue that had been particularly difficult to address during the elaboration of the guidance was that of geographic scope. The central point of disagreement was whether Contracting States could integrate international aviation emissions from aircraft operators of other Contracting States into their emissions trading schemes without the consent of those States. After several discussions on this issue, the Council recommended that CAEP adopt the same principle used in other key elements of this guidance, i.e. by including the different options of geographic scope, describing their advantages and

¹ Under one approach, ICAO would support the development of a voluntary emissions trading system that interested Contracting States and international organizations might propose. Under the other approach, ICAO would provide guidance for use by Contracting States, as appropriate, to incorporate emissions from international aviation into Contracting States' emissions trading schemes consistent with the UNFCCC process.

disadvantages, and starting to address the integration of foreign aircraft operators on a mutually-agreed basis, while continuing to analyze further options.

2.13 During its 180th Session, the Council adopted the guidance on the use of emissions trading for aviation and agreed that this document be published as draft guidance on the ICAO public website with a foreword from the President of the Council acknowledging that a majority of States represented on the ICAO Council indicated that any approach for the inclusion of international civil aviation in emissions trading schemes should respect the sovereignty of Contracting States and be on the basis of mutual agreement. A minority of Council Members, referring to the principle of non-discrimination, requested that ICAO continue to analyse other options. In addition, some States reiterated the need to take into account the principle of common but differentiated responsibilities when implementing an aviation emissions trading scheme.

2.14 With respect to existing voluntary emissions trading schemes, the report elaborated by CAEP described the general nature of various types of such schemes, presented a number of practical experiences currently implemented throughout the world, and discussed the possible future development of such schemes involving aviation. The Council agreed that this report should be made available through the ICAO public website. Of particular importance for ICAO's future work are carbon offset schemes through which consumers are able to offset the emissions from their flights via the facility offered by a carbon offset provider.

2.15 Complementary to the above, the Council agreed on the establishment of a web-based resource to collect relevant information on emissions trading experiences. The objective would be to provide background information on emissions trading schemes in order to complement the relevant ICAO guidance, and help to facilitate broader understanding of emissions trading within the aviation community.

3. CURRENT DEVELOPMENTS

3.1 The ICAO Colloquium on Aviation Emissions was held in May 2007. It provided a forum to seek and share information on the work on emissions with a view to facilitating environment-related discussions and high-level decision-making at the 36th Session of the Assembly. It also provided, *inter alia*, substantial information related to market-based instruments. A website containing the Colloquium's presentations can be accessed at <http://www.icao.int/EnvClq/CLQ07/Documentation.htm>.

3.2 Numerous initiatives for offsetting emissions from aviation are being proposed by various stakeholders (NGOs, airlines, etc.). These initiatives are not harmonized and might not produce an accurate assessment of emissions produced by aircraft, which is necessary to identify the precise amount of carbon to offset. ICAO Secretariat, with the support of CAEP is therefore developing harmonized guidance for a methodology to estimate aviation CO₂ emissions that can be used as a reference for carbon offset projects. This methodology is also being considered for use within the United Nations as part of its UN carbon neutral initiative efforts.

3.3 Noting that the use of the Clean Development Mechanism (CDM) for international civil aviation related projects is not currently provided for by the Kyoto Protocol, ICAO is presently holding consultations with the UNFCCC in order to consider how such valuable mechanism could be adapted to aviation-related projects.

3.4 Regarding the United Nations Initiative on Climate Change, the UN Secretary General has consistently stated that climate change is a major global challenge and that the UN is taking a leadership role in supporting efforts by the international community to address the problem by bringing world leaders together and by ensuring that all parts of the UN system contribute to the solution. ICAO is exploring the appropriate measures to support this effort and will cooperate in the UN initiative accordingly.

4. **DRAFT TEXT TO REPLACE ASSEMBLY RESOLUTION A35-5, APPENDICES A, H AND I**

4.1 Most of the Appendices of the revised resolution (i.e. Appendices B to G of A35-5 – *Consolidated statement of continuing ICAO policies and practices related to environmental protection*) are dealt with in A36-WP/35.

4.2 The Appendix to this paper presents for the Assembly's consideration the revision of Appendices A, H and I, which have been substantially re-structured and modified in the following way:

- a) Appendix A has been expanded to host some considerations of a general nature that were previously included in the former Appendix H;
- b) Appendix H now focuses on the impact of aviation on local air quality; and
- c) Appendix I deals exclusively with the impact of aviation on global climate.

4.3 The revised Appendices H and I now feature a holistic approach which considers all types of measures to tackle a specific problem, from a technical, operational and economic perspective (including market-based measures). These Appendices constitute the ICAO policy with respect to aviation emissions.

4.4 While every attempt has been made to reconcile differences of views, there remain on some issues different options that are presented between square brackets. The Assembly is invited to consider these options with a view to reach a consensus.

5. **FUTURE WORK**

5.1 The future work required for ICAO to make further progress in the area of aviation emissions is reflected in various Appendices of the *Consolidated statement of continuing ICAO policies and practices related to environmental protection*. In general, it addresses the need to:

- a) assess the impact of aviation emissions and develop the appropriate guidance and tools for that purpose;
- b) collect, monitor and disseminate data on the contribution of aviation emissions to local air quality and climate change;
- c) develop appropriate indicators, parameters and goals;

- d) develop appropriate policies, guidance and measures to minimize aviation emissions under:
 - 1) technology (SARPs and goals);
 - 2) new operational procedures, including air traffic planning and management; and
 - 3) economic instruments including open emissions trading, voluntary measures, local air quality charges, carbon-offsets, CDMs, etc.;
- e) evaluate the impact of adopting the different policy options and measure them on the grounds of technical feasibility, environmental benefit and economic efficiency; and
- f) actively cooperate with scientific and UN bodies, notably the IPCC and the UNFCCC, involved in work in this area relevant to ICAO.

6. FINANCIAL IMPACT

6.1 The additional tasks that the Secretariat is requested to undertake have not been included in the Regular Budget of the Organization, therefore, additional resources would be needed.

APPENDIX

RESTRUCTURED APPENDICES A, H AND I

DRAFT RESOLUTION FOR ADOPTION BY THE 36TH SESSION OF THE ASSEMBLY

Resolution 17/1: Consolidated statement of continuing ICAO policies and practices related to environmental protection

Whereas in Resolution A35-5 the Assembly resolved to continue to adopt at each ordinary Session a consolidated statement of continuing ICAO policies and practices related to environmental protection;

Whereas Resolution A35-5 consists of an introductory text and a number of Appendices concerning specific but interrelated subjects; and

Considering the need to reflect developments that have taken place since the 35th Session of the Assembly in the field of aircraft noise and engine emissions, including new ICAO guidance material on market-based measures to limit or reduce emissions from aviation;

The Assembly:

1. *Resolves* that the Appendices attached to this Resolution and listed below constitute the consolidated statement of continuing ICAO policies and practices related to environmental protection, as these policies exist at the close of the 36th Session of the Assembly:

Appendix A — General

Appendix B — Development of Standards, Recommended Practices and Procedures and/or guidance material relating to the quality of the environment

Appendix C — Policies and programmes based on a “balanced approach” to aircraft noise management

Appendix D — Phase-out of subsonic jet aircraft which exceed the noise levels in Volume I of Annex 16

Appendix E — Local noise-related operating restrictions at airports

Appendix F — Land-use planning and management

Appendix G — Supersonic aircraft — The problem of sonic boom

Appendix H — Aviation impact on local air quality

Appendix I — Aviation impact on global climate

2. Requests the Council to submit at each ordinary session of the Assembly for review a

consolidated statement of continuing ICAO policies and practices related to environmental protection;
and

3. Declares that this resolution supersedes Resolution A35-5.

APPENDIX A

General

Whereas the preamble to the *Convention on International Civil Aviation* states that “the future development of international civil aviation can greatly help to create and preserve friendship and understanding among the nations and peoples of the world . . .” and Article 44 of that Convention states that ICAO should “develop the principles and techniques of international air navigation and . . . foster the planning and development of international air transport so as to . . . meet the needs of the peoples of the world for safe, regular, efficient and economical air transport”;

Whereas many of the adverse environmental effects of civil aviation activity can be ameliorated by the application of comprehensive measures embracing technological improvements, more efficient air traffic management and operational procedures and the appropriate use of airport planning, land-use planning and management and market based measures;

Whereas all ICAO Contracting States agreed to continue to pursue all aviation matters related to the environment and also maintain the initiative in developing policy guidance on these matters, and not leave such initiatives to other organizations;

Whereas other international organizations are emphasising the importance of environmental policies affecting air transport;

Whereas the sustainable growth of aviation is important for future economic growth and development, trade and commerce, cultural exchange and understanding among peoples and nations; therefore prompt action must be taken to ensure that it is compatible with the quality of the environment and develops in ways that alleviate adverse impacts.

Whereas reliable and best available information on the environmental effects of aviation is essential for the development of policy by ICAO and its Contracting States;

Whereas as far as there are recognized interdependencies of the environmental effects from aviation, such as noise and emissions, they need to be considered when defining source control and operational mitigation policies;

Whereas airspace management and design can play a role in addressing the impacts of aviation greenhouse gas emissions on the global climate, and that the related economic and institutional issues need to be addressed by States, either individually or collectively on a regional basis;

Whereas cooperation with other international organizations is important to progress the understanding of aviation's impacts on the environment and in order to develop the appropriate policies to address these impacts;

Recognizing the importance of research and development in fuel efficiency and alternative fuels for aviation that will enable international air transport operations with a lower environmental impact;

The Assembly:

1. *Declares* that ICAO, as the lead United Nations Agency in matters involving international civil aviation, is conscious of and will continue to address the adverse environmental impacts that may be related to civil aviation activity and acknowledges its responsibility and that of its Contracting States to

achieve maximum compatibility between the safe and orderly development of civil aviation and the quality of the environment. In carrying out its responsibilities, ICAO and its Contracting States will strive to:

- a) limit or reduce the number of people affected by significant aircraft noise;
- b) limit or reduce the impact of aviation emissions on local air quality; and
- c) limit or reduce the impact of aviation greenhouse gas emissions on the global climate;

2. *Emphasizes* the importance of ICAO continuing to demonstrate its leadership role on all international civil aviation matters related to the environment and *requests* the Council to maintain the initiative in developing policy guidance on these matters, which recognises the seriousness of the challenges which the sector faces;

3. *Requests* the Council to regularly assess the present and future impact of aircraft noise and aircraft engine emissions and to continue to develop tools for this purpose;

4. *Requests* the Council to maintain and update knowledge of the interdependencies and trade-offs related to measures to mitigate the impact of aviation on the environment so as to optimise decision making;

5. *Requests* the Council to establish a set of aviation environmental indicators which States could use to evaluate the performance of aviation operations and the effectiveness of standards, policies and measures to mitigate aviation's impacts on the environment;

6. Requests the Council to disseminate information on the present and future impact of aircraft noise and aircraft engine emissions and on ICAO policy and guidance material in the environmental field, in an appropriate manner, such as through regular reporting and workshops;

7. *Invites* States to continue their active support for ICAO's environment-related activities;

8. *Invites* States and international organizations to provide the necessary scientific information to enable ICAO to substantiate its work in this field;

9. *Encourages* the Council to continue to cooperate closely with international organizations and other UN bodies on the understanding of aviation impacts on the environment and on the establishment of policies to address such impacts;

[10. *Urges* States to refrain from unilateral environmental measures that would adversely affect the orderly and sustainable development of international civil aviation.]

[10. *Urges* States to take into account the global measures pursued through ICAO in considering their own action and urges that States take into account the orderly development of international civil aviation.]

[10. *Urges* States to immediately take the necessary measures to protect the environment from growing CO₂ emissions from aviation.]

[11. Encourages Contracting States to positively consider the adherence to market-based measures in accomplishment of their responsibilities or as voluntary measures.]

APPENDIX H

Aviation impact on local air quality

Whereas there are growing concerns about the impact of aviation on the atmosphere with respect to local air quality and the associated human health and welfare impacts;

Whereas many pollutants affecting local and regional air quality from aircraft engines have declined dramatically over the last few decades;

Whereas the impacts of aviation emissions of NO_x (nitrogen oxides), PM (particulate matter), and other gaseous emissions need to be further assessed and understood;

Whereas the majority of international aircraft operations and fuel burn occur at altitudes above that which would impact local air quality;

Whereas the impacts of aviation emissions on local and regional air quality is part of the total emissions in the affected area and should be considered in the broader context of all sources that contribute to the air quality concerns;

Whereas the actual local air quality and health impacts of aviation emissions depend on a series of factors among which the contribution to the total concentrations and the number of people exposed in the area being considered;

Whereas ICAO has established technical standards and fostered the development of operational procedures that have reduced significantly local air quality pollution from aircraft;

Whereas Article 15 of the *Convention on International Civil Aviation* contains provisions regarding airport and similar charges, including the principle of non-discrimination, and ICAO has developed policy guidance for Contracting States regarding charges (*ICAO's Policies on Charges for Airports and Air Navigation Services*, Doc 9082) including specific guidance on noise-related charges and emissions-related charges for local air quality;

Whereas the ICAO Council had adopted on 9 December 1996 a policy statement of an interim nature on emission-related charges and taxes in the form of a resolution wherein the Council 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;

Whereas such charges should be based on the costs of mitigating the environmental impact of aircraft engine emissions to the extent that such costs can be properly identified and directly attributed to air transport;

Whereas the ICAO Council has adopted policy and guidance material related to the use of emission-related charges to address the impact of aircraft engine emissions at or around airports; and

Noting that the Council has agreed that it would be useful to develop a report that would consider the application of all measures relating to local air quality emissions, using technological, operational and market-based approaches and that ICAO is currently working on this issue;

The Assembly:

1. *Requests* the Council to monitor and develop its knowledge of, in cooperation with other relevant international bodies such as WHO, the effects of aviation emissions of particulate matter, nitrogen oxides and other gases on human welfare and health, and to disseminate information in this regard;

2. *Requests* the Council to continue its work to develop technologically feasible, environmentally beneficial and economically reasonable standards to further reduce the impact of local air pollution from aircraft;

3. *Requests* the Council continue its work to develop long-term technology and operational goals with respect to aviation environmental issues, including nitrogen oxides from aircraft;

4. *Requests* the Council continue to foster operational and air traffic improvements that reduce the impact of local air pollution from aircraft;

5. *Encourages* action by Contracting States, and other parties involved, to limit or reduce international aviation emissions affecting local air quality through voluntary measures and to keep ICAO informed;

6. *Welcomes* the development and promotion of guidance material on issues related to the assessment of airport-related air quality and requests the Council to actively pursue this activity, aiming for the completion of the Airport Air Quality guidance in 2010;

7. *Requests* the Council to work with States and stakeholders in promoting and sharing best practices applied at airports in reducing the adverse effects of aviation emissions on local air quality;

8. *Welcomes* the development of the guidance on emission charges related to local air quality and *requests* the Council to keep up-to-date such guidance and *urges* Contracting States to share information on the implementation of such charges; and

9. *Urges* Contracting States to ensure the highest practical level of consistency and take due account of ICAO policies and guidance on emissions charges related to local air quality.

APPENDIX I

Aviation impact on global climate

Scientific understanding

Whereas a comprehensive assessment of aviation's impact on the atmosphere is contained in the special report on *Aviation and the Global Atmosphere*, which was prepared at ICAO's request by the Intergovernmental Panel on Climate Change (IPCC) in collaboration with the Scientific Assessment Panel to the Montreal Protocol on Substances that Deplete the Ozone Layer, published in 1999;

Whereas the IPCC special report recognized that the effects of some types of aircraft emissions are well understood, it 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 and ozone;

Whereas ICAO has requested that the IPCC include an update of the main findings of the special report in its Fourth Assessment Report, published in 2007, [which reported *inter alia* that:

- Due to developing scientific knowledge and more recent data, estimates of the climate effects of contrails have been lowered and aircraft in 2005 are now estimated to contribute about 3.0 percent of the total of the anthropogenic radiative forcing by all human activities;
- Total aviation CO₂ emissions is approximately 2 percent of Global Greenhouse Gases (GHG) emissions;
- The amount of CO₂ emissions from aviation are projected to grow around 3 to 4 percent per year; and
- Medium-term mitigation for CO₂ emissions from the aviation sector potentially can come from improved fuel efficiency. However, such improvements are expected to only partially offset the growth of aviation emissions;]

Cooperation with UN and other bodies

Whereas the ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC) is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system;

[*Whereas* the UNFCCC underlines the principle of common but differentiated responsibilities and respective capabilities in addressing greenhouse gas emissions;]

Whereas the Kyoto Protocol, which was adopted by the Conference of the Parties to the UNFCCC in December 1997 and entered into force on 16 February 2005, calls for developed countries (Annex I parties) to pursue limitation or reduction of greenhouse gases from "aviation bunker fuels" (international aviation) working through ICAO (Article 2.2), while domestic aviation emissions are included in their national targets, and noting the potential advantages of harmonizing treatment of the two categories of emissions and that some States are proposing action to reduce aviation emissions, all of which indicates an urgent need for greater [progress] [international coordination and cooperation] in this respect;

Whereas the Kyoto Protocol provides for different flexible instruments (such as the Clean Development Mechanism – CDM) which would benefit projects involving developing States;

Whereas the first commitment period of the Kyoto Protocol expires in 2012 and discussions on the follow up of this instrument are being undertaken and ICAO will need to continue to address its responsibility and demonstrate leadership to limit or reduce GHG emissions from international civil aviation;

Whereas it has become clear that all stakeholders expect ICAO [to continue] to demonstrate leadership in mitigating the negative effects of GHG emissions by aviation, and to develop visions and [clear goals] to integrate these and the environmental objectives into ICAO's Business Plan and other ICAO programmes;

[*Noting* that the G8 meetings in Gleneagles and Heiligendamm acknowledged the progress made so far and concluded that resolute and concerted international action is urgently needed to reduce global GHG emissions and increase energy security, and that tackling climate change is a shared responsibility of all, and can and must be undertaken in a way that supports growth in developing, emerging and industrialized economies while avoiding economic distortions;]

Recognizing, the relevance of climate change and economic development in the context of the UN Millennium Development Goals (MDGs) and the role of aviation in helping achieve these goals;

[*Recognizing* the need to set targets with respect to limiting or reducing the growth of aviation emissions in order to ensure sustainable growth;]

Noting it is important to address aircraft emissions without losing sight of their proper context in assessing overall GHG emissions from aviation, the transportation sector, and general economic activity; and

Noting that different regions of the world are experiencing wide differences in absolute levels of aviation emissions and aviation emissions growth rates both internationally and domestically;

Actions to mitigate aviation's effect on global climate

Whereas the ICAO Council has developed policy options to limit or reduce the environmental impact of aircraft engine emissions from civil aviation and work is in progress on technology and standards, on operational measures to reduce fuel consumption and hence emissions and on market-based measures;

Whereas improved technology and operations have led to significantly less polluting aircraft and fuel efficiency has improved roughly 70% in the last 40 years;

Recognizing that ICAO Standards and goals for NO_x, although intended to address local air quality, will also help reduce the impact of aviation on climate;

Recognizing that important emissions reductions can be achieved through improvements in Air Traffic Management (ATM);

Noting that increasing fuel prices in the past few years have provided significant incentives for the aviation sector to reduce fuel consumption which in turn will reduce the level of greenhouse gas emissions;

Recognizing that ICAO's leadership in the Global Air Navigation Plan can foster emissions reductions through improvements in Air Traffic Management (ATM), the application of satellite navigation, and the design of more efficient routes;

Recognizing that the current airspace fragmentation has resulted from historic geopolitical arrangements, and that new ATM operating concepts require State commitment to address legal, security, economic and other institutional barriers to environmentally efficient use of airspace;

Welcoming the steps taken by ICAO to promote the use of operational measures, including the publication of *Operational Opportunities to Minimize Fuel Use and Reduce Emissions* (Cir 303), and the holding of three workshops on this subject;

Whereas Principle 16 of the Rio Declaration on Environment and Development (1992) states that "National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment";

Whereas in recent years there has been increasing recognition by many governments of the need for each economic sector to pay the full cost of the environmental damage it causes;

Whereas market-based measures are policy tools that are designed to achieve environmental goals at a lower cost and in a more flexible manner than traditional regulatory measures;

Noting that a template agreement and associated guidance have been prepared by CAEP for the use of voluntary measures by Contracting States and interested parties in the short-term, and that ICAO is promoting the dissemination of practical experiences on its public website;

Recognizing that Contracting States are responsible for making decisions regarding the goals and most appropriate measures to address aviation's greenhouse gas emissions [for aircraft operators] [for which they issue air operator certificates];

Recognizing that complementary national, regional and global endeavours [developed on the basis of collaboration] will enhance our capacity to address aviation emissions effectively;

Whereas ICAO policies make a conceptual distinction between a charge and a tax, in that "a charge is a levy that is designed and applied specifically to recover the costs of providing facilities and services for civil aviation, and a tax is a levy that is designed to raise national or local government revenues which are generally not applied to civil aviation in their entirety or on a cost-specific basis";

Whereas ICAO has developed policy guidance to Contracting States on taxation (*ICAO's Policies on Taxation in the Field of International Air Transport*, Doc 8632), which recommends *inter alia* the reciprocal exemption from all taxes levied on fuel taken on board by aircraft in connection with international air services, a policy implemented in practice through bilateral air services agreements, and also calls on Contracting States to the fullest practicable extent to reduce or eliminate taxes related to the sale or use of international air transport;

Noting that the ICAO policy on exemption of aviation fuel from taxation has been called into question in some Contracting States which impose taxes on other transport modes and other sources of greenhouse gases;

Whereas the ICAO Council had adopted on 9 December 1996 a policy statement of an interim nature on emission-related charges and taxes in the form of a resolution wherein the Council 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;

Whereas such charges should be based on the costs of mitigating the environmental impact of aircraft engine emissions to the extent that such costs can be properly identified and directly attributed to air transport;

Noting that there remains a number of issues of a legal and policy nature regarding the implementation of GHG charges that have not been resolved;

Noting that the interim guidance material for integrating international aviation into States' emissions trading schemes has been developed by ICAO;

[*Recognizing* that the majority of the Council endorses the application of emissions trading for international aviation only on the basis of mutual agreement between States,] [and that other Council Members consider that establishing an open emissions trading system in accordance with the principle of non-discrimination would require consistent application to all flights;]

Whereas Contracting States have legal obligations, existing agreements, current laws and established policies;

Whereas the establishment of carbon offset schemes has helped to raise public awareness of climate change, and may contribute to emissions reductions in the short term; and

Whereas the holding of the ICAO Colloquium on Aviation Emissions in 2007 and other ICAO initiatives have provided information on the scientific issues and on the work and action undertaken by ICAO and its Contracting States and provided a forum to facilitate discussion on possible future solutions to address aviation emissions on a global basis;

The Assembly:

1. *Requests* the Council to:

- a) ensure that ICAO [continue to demonstrate] leadership on environmental issues relating to international civil aviation, including GHG emissions, thereby being able to provide input in the discussions [of a future long term cooperative action under the UNFCCC;]
- b) continue to take initiatives to promote information on scientific understanding of aviation's impact and action undertaken to address aviation emissions and to continue to provide the forum to facilitate discussions on [new global] solutions to address aviation emissions;
- c) 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 of the UNFCCC, encompassing technical solutions and market-based measures, and taking into account potential implications of such measures for developing as well as developed countries; and
- d) continue to cooperate closely with the IPCC and other organizations involved in the

assessment of aviation's contribution to environmental impacts in the atmosphere, and with organizations involved in policy-making in this field, notably with the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) and its Subsidiary Body for Scientific and Technological Advice (SBSTA);

2. *Urges* States to:

- a) promote scientific research aimed at continuing to address the uncertainties identified in the IPCC special report on Aviation and the Global Atmosphere and in the recently released Fourth Assessment report; and
- b) ensure that future international assessments of climate change undertaken by IPCC and other relevant United Nations bodies include updated information on aircraft-induced effects on the atmosphere;

3. *Encourages* the Council, to promote improved understanding of the potential use of, and the related emissions impacts of, alternative aviation fuels;

4. *Encourages* the Council and States to keep up to date and cooperate with the development of predictive analytical models for the assessment of aviation impacts;

[5. *Requests* the Council, working with Contracting States, to develop a comprehensive package of environmentally beneficial, economically reasonable, technologically feasible (CAEP) measures for States to limit or reduce aviation GHG emissions and their contributions to climate change;]

[6. *Requests* the Council to continue to develop and keep up-to-date the guidance for Contracting States on the application of measures aimed at reducing or limiting the environmental impact of aircraft engine emissions and to conduct further studies, with respect to mitigating the impact of aviation and climate change;]

7. *Encourages* Contracting States and the Council, taking into account the interests of all parties concerned, including potential impacts on the developing world, to evaluate or continue evaluating the costs and benefits of the various measures, including existing measures, with the goal of addressing aircraft engine emissions in the most cost-effective manner;

8. *Requests* the Council to provide the necessary guidance and direction to ICAO's Regional Offices to assist States with studies, evaluations and development of procedures, in collaboration with other States in the region, to limit or reduce GHG emissions on a global basis and work together collaboratively to optimize the environmental benefits that can be achieved through their various programmes;

9. *Urges* Contracting States to continue to apply measures [to aircraft operators] [for which they issue air operator certificates] to mitigate the effects of international aviation greenhouse gas emissions from aviation by applying technological, operational and market-based measures [working through ICAO]; and

10. *Urges* Contracting States, taking into account the nature of their aviation industry, to cooperate within ICAO, working collaboratively to develop a comprehensive package of technological, operational and market-based measures to mitigate the impacts of international aviation greenhouse gas emissions [from their own aviation industry based on the principles of technological feasibility, environmental benefits, and economic reasonableness];

11. *Requests* the Council to develop an ICAO emissions initiative describing the ICAO objectives to limit or reduce the impact of aircraft emissions, foster collaboration among its Contracting States, and to monitor and report on progress made in this area. In particular, the Council should:

- a) explore relevant parameters and develop medium and long term technology goals for aircraft fuel burn and report back by the next Assembly;
- b) continue to develop the necessary tools to assess the benefits associated with ATM improvements, and to promote the use of the operational measures outlined in ICAO guidance (Cir 303) written in 2003 as a means of limiting or reducing the environmental impact of aircraft engine emissions;
- c) implement an emphasis on increasing fuel efficiency in the ICAO's Global Air Navigation Plan;
- d) foster, as appropriate, regional, inter-regional and global initiatives with Contracting States to enhance air traffic efficiencies to reduce fuel consumption;
- e) encourage Contracting States to improve air traffic efficiency, which leads to emissions savings and to report on progress in this area;
- f) request Contracting States to submit an inventory of actions they are taking to reduce aviation emissions in their respective countries; and
- g) promote the use of new procedures and technologies that has a potential to provide environmental benefits on the operation of aircraft;

12. *Requests* the Council to encourage States and stakeholders in promoting and sharing best practices applied at airports in reducing the adverse effects of GHG emissions of civil aviation;

13. *Requests* the Council to encourage States and stakeholders in developing models of flow control and air traffic management that optimize environmental benefits;

14. *Requests* the Council to establish a process by which ICAO can work cooperatively with stakeholders to achieve environmental improvements through research, technology and operations;

[15. *Requests* the Council to establish performance indicators that can be used to measure the impacts of specific programs in reducing the adverse effect of GHG emissions and to establish a process to collect information about State and regional actions to limit or reduce GHG emissions and evaluate their impacts]; and

16. *Requests* States to:

- a) encourage the necessary research and development to provide more environmentally efficient engine and aircraft designs;
- b) accelerate the development and implementation of fuel efficient routings and procedures to reduce aviation emissions;
- c) accelerate efforts to achieve environmental benefits through the application of satellite-

based technologies that improve the efficiency of air navigation and to work with ICAO to bring these benefits to all regions and States;

- d) promote effective coordination between their authorities involved in aviation in designing more environmentally beneficial air routes and improved operational procedures for international civil aviation;
- e) reduce legal, security, economic and other institutional barriers to enable implementation of the new ATM operating concepts for the environmentally efficient use of airspace; and
- f) cooperate in the development of a regional measurement and monitoring capability in order to allow for the assessment of the environmental benefits accrued from the measures above;

17. *Encourages* Contracting States and the Council to adopt measures consistent with the framework outlined below:

a) Voluntary measures

- 1) *Encourages* action by Contracting States, and other parties involved, to limit or reduce international aviation emissions, and to keep ICAO informed; and
- 2) *Requests* the Council to instruct the Secretary General to keep up-to-date guidelines that ICAO has developed for such measures, including a template voluntary agreement, and to make available such experience to all parties concerned;

b) Emission-related levies

- 1) *Affirms* the continuing validity of Council's Resolution of 9 December 1996 regarding emission-related levies;
- 2) *Recognizes* that existing ICAO guidance is not sufficient at present to implement greenhouse gas emissions charges internationally, although implementation of such charges by [mutual agreement of] States members of a regional economic integration organization [on operators of those States] is not precluded; and
- 3) [*Urges* Contracting States to refrain from unilateral implementation of greenhouse gas emissions charges;]

c) Emissions trading

- 1) [*Urges* Contracting States, if deemed appropriate, to implement an emissions trading system on other Contracting State's aircraft operators only on the basis of mutual agreement between those States;]

[*Urges* Contracting States, if deemed appropriate, to implement an emissions trading system, having due regard to implications for all parties concerned;]

- 2) *Requests* States to report on new developments, results and experiences in this area; and

- 3) *Requests* the Council to:
- a) keep up-to-date for use by Contracting States, as appropriate, the guidance developed by ICAO for incorporating emissions from international aviation into Contracting States' emissions trading schemes consistent with the UNFCCC process; and
 - [b) conduct further studies, as appropriate, on various aspects of the implementation of emissions trading systems and evaluate the cost effectiveness of any systems put in place, taking into account the effect on aviation and its growth in developing economies;]
 - [b) conduct an economic analysis of the financial impact of including international aviation in existing trading schemes and undertake literature review of cost-benefit analysis of existing trading systems with a special emphasis on how it has been applied to other sectors in order to draw some pertinent lessons learned for the aviation sector;]
 - [c) conduct further studies, as appropriate, on various aspects of the implementation of emissions trading systems, taking into account the principle of common but differentiated responsibilities and respective capabilities;]
- d) Carbon offsets
- 1) *Requests* the Council to examine the potential for carbon offset mechanisms as a further means of mitigating the effect of aviation emissions on local air quality and climate change; and
 - 2) *Requests* the Council to collect and disseminate information on the results of carbon-offset programmes implemented by States and other Organizations regarding aviation emissions.
- [e) Clean Development Mechanism (CDM)
- 1) *Requests* the Council to consult the UNFCCC in order to explore ways to use flexible instruments such as the CDM for international aviation.]

— END —