GIACC/2-SD/2
9/9/08

GROUP ON INTERNATIONAL AVIATION AND CLIMATE CHANGE (GIACC)

SECOND MEETING

(MONTRÉAL, 14 TO 16 JULY 2008)

SUMMARY OF DISCUSSIONS — DAY 2

Agenda Item 3: Planning of actions and policy elements to be developed by the Group

Results of the answers provided by GIACC Members in respect of the consolidated template — Identification of topics where consensus exists and of topics where further discussion is needed

Discussion of Category B: Goals and targets (Template questions 2, 3, 4, 7 and 12-1)

Template question 2: What short-, medium- and long-term goals should the GIACC suggest, taking into account that any ICAO proposals should respect the different circumstances of various countries' aviation markets, be considered acceptable and credible by third parties and improve public opinion? Should it focus on international aviation on a global basis? What are the options?

1. The Group resumed its consideration of this question. The Chairperson underscored that the GIACC should base its discussion on Assembly Resolution A36-22, Appendix K, Resolving Clause 2 a) 3), which called for the "identification of possible global aspirational goals in the form of fuel efficiency for international aviation and possible options for their implementation", as well as on the common themes which had been agreed to in its First Meeting and were set forth in IP/1.

2. Mr. K. Takiguchi (Japan) then presented WP/4 (Some basic components for the reduction mechanism of CO_2 emissions from international aviation), which contained three proposals, two of which related to aspirational goals. The first proposal was that each ICAO Member State should assume the responsibility of taking measures for tackling greenhouse gas (GHG) emissions from international services operated by air carriers of the respective Member State (based upon the air carriers' nationality). Each Member State should implement the comprehensive measures prescribed in the ICAO Programme of Action on International Aviation and Climate Change to the extent possible and develop individual action programmes to achieve the Global Aspirational Target (GAT).

3. While aware that the issue of monitoring progress would be discussed by the Group under template questions 17, 18 and 20, Japan further proposed that ICAO should establish its statistics on fuel consumption, call for each Member State to report annually on individual action programmes and fuel consumption data and monitor and disclose the progress of each Member State concerning their measures and fuel efficiency.

4. Drawing attention to Figure 4 of WP/4, Mr. Takiguchi noted that, although the fuel consumption and efficiency estimates prepared by Japan were based on the airlines of each State, there was

some similarity between them and the estimates contained in the table on page A-3 of IP/2 on fuel consumption for the top ten countries by category of service, which were based on the State of departure. He underscored that fuel consumption should be determined using the metric of Litres/Revenue-ton-kilometre (l/RTK). Referring to Figure 5 of WP/4, Mr. Takiguchi emphasized that there was not much difference in the estimated fuel efficiencies as measured in l/RTK for the top thirty fuel consumption States, whether they were developed countries or not. Noting, however, that the data was not updated, he indicated that the Committee on Aviation Environmental Protection (CAEP) should review it. Mr. Takiguchi noted that his State's second proposal relating to aspirational goals was that, following the possible technical deliberation by the CAEP, the numerical value for the Global Aspirational Target (GAT) in terms of "the amount of fuel consumed per RTK (pax/cargo) could be formulated as "xx per cent fuel efficiency improvement by the year 20xx. He indicated that in considering the global aspirational goal on fuel efficiency the Group should consider whether or not it was necessary to apply the principle of common but differentiated responsibilities, given the said similarity in the estimated fuel efficiencies.

5. The Chief of the Environmental Unit (C/ENV), who also served as the Secretary of the CAEP, then briefed the Group on some of the issues that were being considered in the Committee relating to goals. In noting that the development of technological and operational goals for fuel burn had been included in the Committee's work programme for the next CAEP cycle, she indicated that medium-term (ten years) and long-term (twenty years) goals for CO_2 were to be developed by 2009. The CAEP Steering Group would be discussing how to incorporate those goals into its modelling for trends during its upcoming meeting in Seattle from 22 to 26 September 2008. In noting that a group of independent experts would be assessing those technological and operational goals, C/ENV underscored that the results of its initial assessment would give the GIACC a sense of what was considered to be reasonable goals for CO_2 for ten and twenty years. That, in turn, would assist the Group in considering global aspirational goals in the form of fuel efficiency. She indicated that if the GIACC required more specific information from the CAEP, then it should be requested during the said Steering Group meeting.

6. The Chairperson observed that there was an opportunity for the work of the said group of independent experts to feed into the work of the relevant GIACC working group so that the definition of a specific aspirational goal for fuel efficiency would be made in the context of the CAEP's technological and operational goals for CO_2.

7. The Secretary of the GIACC recalled that IATA, as part of its four-pillar strategy, had committed to its own goal of a 25 per cent efficiency improvement for the time period 2005-2020: In 2020, their in-service fleet average fuel efficiency as measured in RTK/litre would have improved by 25 per cent over the 2005 baseline. He noted that the members of the Air Transport Action Group (ATAG) would be meeting during the week of 14 to 18 July 2008 to discuss a carbon neutral goal further to the Industry Declaration on Climate Change which had been adopted at the Aviation & Environment Summit 2008 (Geneva, 22-23 April 2008). It hoped to define by the end of 2008 a carbon neutral goal that would be a broad industry commitment. The GIACC would be informed of that goal once it was agreed. The Secretary of the GIACC also noted that IATA had established its own aspirational goal: that in fifty years, the aviation industry would produce a zero emissions aircraft.

8. The Chairperson observed, from the Group's initial consideration of template question 2 and from the information regarding IATA's goals, that there was an emerging framework of a short-term global aspiration goal on fuel efficiency for either the period 2008-2012 or, in view of IATA's goals, the period 2008-2020; a medium-term aspirational goal on carbon neutral growth for the period 2008-2020; and a long-term aspirational goal on carbon footprint reduction for the period 2008-2050 that would recognize the post-2012 UNFCCC mechanism. Noting that there was substantial coincidence between the CAEP's and IATA's goals, she indicated that it would be for the GIACC to provide guidance on the most appropriate framework. The Chairperson emphasized that IATA's goals should not necessarily be the Group's goals as

the former represented airlines, whereas the latter represented States. She underscored, in this regard, that the GIACC could set more ambitious goals than IATA had set for itself.

9. In the course of the discussion, Members voiced support for the three-phased framework suggested by the Chairperson. It was reiterated that the establishment of a global aspirational goal on fuel efficiency should be the Group's first priority in light of Assembly Resolution A36-22, Appendix K. Consideration should, however, be given to other goals, such as carbon neutral growth. It was emphasized that, while it was beneficial for ICAO, as the regulator and policy-maker for international civil aviation, to be aware of the aviation industry's goals, the Organization was not obliged to adopt them. The view was expressed that it was paramount for ICAO to set more ambitious goals than the aviation industry, taking into account their attainability. With regard to a short-term approach to fuel efficiency, it was stressed that consideration should be given not only to available technical and operational measures and the modernization of ATM, but also to issues involving airport design and operational control at airports, such as long taxiways, rules for control of APUs on the ground and methods for delivering power to aircraft. The view was expressed that the metric for fuel efficiency proposed by Japan in WP/4 did not sufficiently integrate the factor of improvements in air navigation services, such as the modernization of ATM, and that it was therefore necessary to adopt a more global approach. The Chairperson indicated that it would be for the relevant working group to identify the specific measures which could be implemented to achieve the global aspirational goal of fuel efficiency.

10. It was pointed out that 2020 could be viewed as a short-term framework if the GIACC not only established that framework but also set up a mechanism to monitor performance against it. As was the case in CAEP, the challenge would be to obtain sufficient data to identify where there was room for improvement and to manage the achievement of the global aspirational goal of fuel efficiency.

11. With regard to the carbon neutrality goal, it was noted that the aviation industry had already demonstrated a degree of commitment thereto. That could be perceived as "business as usual" for the aviation industry, however, given the commercial incentive for airlines to improve fuel efficiency. For ICAO to adopt such a goal would demonstrate a degree of commitment regarding the outcomes. There was considerable work to be done to determine the mechanisms for its achievement. Consideration would have to be given to whether, in addition to operational measures, there was scope for economic measures. With regard to a longer term goal, it was emphasized that any mechanisms developed to achieve the carbon neutrality goal could also be used to drive a decrease in the net carbon footprint. It was pointed out that in considering such a long-term goal, the relevant working group should not limit itself to what was technically feasible. A reduction in international civil aviation's carbon footprint was a politically-desirable goal, and if the aviation industry could not achieve it through technological or operational measures, then it could do so through compensating methods.

12. The question was raised whether the said medium- and long-term global aspirational goals should be mandatory, with it being indicated that, if they were not, then they should be treated in a different manner from the short-term goal when it came to implementation. Another view was expressed that the medium- and long-term targets for emissions reductions should only apply to Annex I Parties in order to be consistent with international obligations under the UNFCCC and the Kyoto Protocol. The Chairperson emphasized, in this regard, that the common themes agreed to by GIACC/1 and contained in IP/1 governed the issue of applicability, in particular, the principle of common but differentiated responsibilities. It was agreed to return to the issue of applicability at a later stage, when the global aspirational goals and measures for their implementation had been determined.

13. In summarizing the discussion, the Chairperson indicated that the fuel consumption data presented in WP/4 could be referred to a working group for verification, as requested by Japan. That would lift the data to a more strategic level and the global aspirational goal on fuel efficiency could be dealt with in

that context. That would coincide with the decision reached earlier regarding data improvement and verification.

14. The Chairperson noted that the Group had agreed that the global aspirational goals should be focussed on fuel efficiency in the short-term, should recognize developments in the post-2012 UNFCCC mechanism and should reflect the respective timeframes and capabilities, with a view to achieving: a) in the short-term, an improvement of international in-service fleet fuel efficiency; b) in the medium-term, carbon neutrality of international civil aviation; and c) in the long-term, a reduction in the carbon footprint of international civil aviation. The definition of those goals would be provided by a working group and would be based on a technical assessment of the work by the CAEP and a review of the targets set by IATA. The working group would develop policy proposals for specific dates and percentages based on an understanding of what was feasible, practical and achievable. The Group agreed that the implementation of the three-phased framework was not a consecutive process and that action to achieve each global aspirational goal could begin immediately. The only difference would be the dates by which they were attained and the specific measures implemented to attain them.

15. With regard to the global aspirational goal on fuel efficiency, the Chairperson underscored that while the GIACC noted the importance of the impact of oil prices on the aviation sector, it agreed that it must not depend on that as the mechanism to help achieve fuel efficiency. The Group must develop its own measures to achieve fuel efficiency which ignored oil prices as a factor. It recognized, however, that any additional oil price-induced measures would further enhance the ability to achieve the said goal.

Review of draft conclusions arising from the first day's discussions

16. The Group then reviewed and approved the draft conclusions arising from the first day's discussions circulated during the meeting, subject to the following amendments: with regard to template question 3, that reference would be made to Assembly Resolution A36-22, Appendix K, and aspirational goals in the form of fuel efficiency; that the second sentence would be reworded to reflect that the timeframes had been agreed to subject to the availability of data; that emphasis would be placed in the third sentence on the attainability of the global aspirational goals; and that the action would be amended to refer to the identification and not quantification of goals; with regard to template question 5, that reference would be made to the aspirational goals being in the form of fuel efficiency and that monitoring would be in accordance with international obligations; and with regard to template question 24, that reference would be made to the establishment of three working groups (Goals, Measures and Monitoring) that would report to GIACC/3. It was understood that a separate document would be prepared on the tasks to be referred to the CAEP, such as the examination of the implications of oil price increases on its modelling work.

Template question 4: How should GIACC deal with other aviation emissions that have climate change-forcing characteristics? Should GIACC make specific recommendations to deal with the significant scientific uncertainties?

17. In noting that there was no consensus among respondents, the Chairperson indicated that the majority had indicated that the GIACC should focus on CO_2 emissions. Some had considered that all six greenhouse gases (GHGs) referred to in the Kyoto Protocol should be addressed. Others had indicated that non CO_2 GHGs should be studied further, either by the CAEP or the Intergovernmental Panel on Climate Change (IPCC), and that the Global Warming Potential adopted by the UNFCCC should be taken into account.

18. The Secretary of the CAEP noted that the ICAO Carbon Calculator did not take into account non-CO_2 emissions. There was, however, a multiplier for non-CO_2 effects which varied from carbon offset programme to carbon offset programme. Observing that ICAO's guidance material on emissions trading only considered CO_2 effects, she underscored that that the science regarding non-CO_2 effects was not yet

sufficiently accurate. ICAO had requested guidance from the IPCC on how to proceed with respect to non-CO_2 effects.

19. During the discussion, it was indicated that the GIACC should remain focussed on CO_2 emissions as it was to develop a global aspirational goal on fuel efficiency and there was a direct link between fuel and CO_2 emissions. Continued research into the development of a metric for other GHG emissions should nonetheless be encouraged and ICAO should monitor such non-CO_2 emissions. It was noted, in this context, that under the United States' Climate Change Research Initiative, a metric for non-CO_2 emissions was being developed. One Member, who had initially suggested that the GIACC consider all GHG emissions, now agreed that it should focus on CO_2 emissions. It should not stop there, however: it should push the envelope and obtain guidance from the IPCC regarding non-CO_2 effects. Some multipliers for non-CO_2 effects were substantial and were an important policy consideration.

20. Noting that the view of the Secretary of the CAEP reflected the view of the majority of the respondents, the Chairperson indicated that the Group agreed that it should focus on CO_2 emissions while taking into account that other emissions might also contribute to climate effects. In requesting that the CAEP keep the GIACC informed of developments regarding non-CO2 emissions, she noted that the Group would revisit this issue during its next meeting, after consultations with the IPCC regarding non-CO_2 effects and further work thereon in ICAO.

21. The Group agreed to refer template question 7 (For those elements of GIACC's work which do not feed through to fuel efficiency improvements such as market-based measures, carbon offsets and bio-fuel, how should GIACC deal with them in the goal-setting process?) and template question 12-1 (Should the GIACC framework require adoption of all measures or allow each State to decide how it will meet the goals for its aviation sector?) to the relevant working group for consideration.

Discussion of Category C: Measures (Template questions 9, 11-3, 11-4, 11-5, 11-6, 12-2, 13, 14-1, 14-2, 14-3, 16, 18, 21, 10, 11-1, 11-2 and 11-7)

Template question 9: What are the key elements that would be needed to demonstrate an urgent Programme of Action on climate change?

22. Observing that there was no consensus among the respondents on this question, the Chairperson indicated that the Group should be guided by Appendix K of Assembly Resolution A36-22 for the various elements of its Programme of Action. Recalling the comments made earlier regarding the modernization of ATM and the role of States therein, in addition to the primary intervention of airlines, she indicated that there was a sufficient consensus that the modernization of ATM was a necessary part of the Programme of Action.

23. In the course of the discussion, it was underscored that the Programme of Action should be as comprehensive as possible. In accordance with the conclusion reached by GIACC/1, the measures forming the elements of that Programme of Action should be based on a comprehensive, multi-path approach comprising technological advances, the setting of technological Standards, operational measures, infrastructural measures, including improvements in ATM, market-based measures and voluntary measures. States would select from among the defined menu of measures those measures which they considered to be the most appropriate for the achievement of the global aspirational goals.

24. With regard to ATM, it was stressed that there must be the political will for action to be taken to modernize ATM. It was noted that improvements in ATM had not been easy to achieve in Europe: while that region was as close to a substantially enhanced ATM system as any other region, it had required a considerable effort. There had been institutional, constitutional and technical problems to address, and the ATM system had to be accompanied by SESAR, a technical programme. A modernized ATM system was,

however, an integral part of any CO_2 emissions reduction programme. The Chairperson noted that the modernization of ATM posed different challenges for each State and region.

25. It was underscored that, while as broad an approach as possible should be taken to the identification of measures, the resultant menu of options should be manageable so that it would make a significant contribution to aviation emissions reduction. It was suggested that the Group take the same approach as it had for the establishment of global aspirational goals and identify measures to be implemented in the short-, medium- and long-term, focussing on those which would result in significant gains in the short-term. The Group should recognize the diversity among States and that there would not be a simple solution to the problem of aviation emissions. In many areas, it would be a case of sharing knowledge of best practices, encouraging cooperation and increasing the consistency of good approaches. A suggestion was made that the Group focus on mechanisms to promote such cooperation between air navigation services providers in the short-term. It was emphasized that the GIACC should not anticipate that operational measures alone would be sufficient to counterbalance the expected level of aviation growth and that it should consider a comprehensive range of economic and market-based measures.

26. In agreeing with a comment that the relevant working group develop workable measures without commitment, the Chairperson indicated that it should develop as many options as possible for States to choose from based on their applicability, appropriateness and achievability in their particular circumstances. All measures were meant to assist States in the achievement of the global aspirational goals.

27. Offering a summary of the exchange of views, the Chairperson noted that consensus had been reached that the Programme of Action must be as comprehensive as possible and should be based on a comprehensive, multi-path approach comprising technological advances, the setting of technological Standards, operational measures, infrastructural measures, including improvements in ATM, market-based measures and voluntary measures. Those measures should be linked to the short-, medium- and long-term timeframes established for the global aspirational goals and should be considered on the basis of the availability of technology, the cost and ease of implementation. The measures were not directed solely at industry: there was a role for States, particularly in their provision of air traffic services.

Template question 11-3: Should an element of the Programme of Action include an accelerated fleet renewal by airlines? Early retirement of inefficient aircraft?
Template question 11-4: What is the role of market-based measures such as emissions-trading and/or compensatory measures such as the Clean Development Mechanism in addressing aviation emissions?
Template question 11-5: Will the GIACC consider positive economic incentives directed at aircraft, airlines, manufacturers, infrastructure, etc.?
Template question 11-6: What measures can Member States take to facilitate increased research and development in new technologies, alternative fuels and long-term solutions?

28. The Chairperson noted that there had been consensus among respondents regarding the need for continued research and development in new technologies and alternative fuels and the importance of technological advances, both airside and groundside, of ATM modernization and of the dissemination of best practices.

29. During the discussion, it was emphasized that all of the measures referred to in template questions 11-3 to 11-6 were important and should be considered. It was a question of determining which could yield the greatest effect, which were the most economically acceptable and the easiest to implement, etc.

30. In agreeing that all of the measures should be considered at this stage, the Chairperson noted that there had not been a sufficient technical assessment of them to determine whether or not they would be

appropriate. It would be for the relevant working group to develop evaluation criteria for the measures, such as feasibility, practicality, ease of implementation, time required for implementation, cost. Within that evaluation framework, an indication should be given of the technological and financial support necessary to facilitate the implementation of the measures in developing countries.

31. It was underscored that many of the technology issues, such as the modernization of ATM, would require the participation of States and not only of the aviation industry. The Chairperson noted, in this regard, that the Programme of Action would clearly set forth the responsibilities of States and the aviation industry.

32. To a query regarding the feasibility of establishing a hierarchy of measures based on their relative effectiveness in reducing aviation emissions, the Secretary of the CAEP, observed that a substantial amount of ICAO material was already available to States for addressing GHG emissions from aviation. She cited, as an example, Circular 303 *(Operational Opportunities to Minimize Fuel Use and Reduce Emissions)*. Such material could also serve as the basis for the basket of measures to be developed by the GIACC. The Secretary of the CAEP underscored that a quantitative assessment of the various measures referred to in template question 11 would require a considerable amount of work. A qualitative assessment of the measures, which could indicate for each category (technological, operational, market-based) the timeframe required for implementation, the technical feasibility, ease of implementation and the cost, would take less time and effort.

33. It was pointed out that the GIACC was a policy-oriented group and that its working groups were therefore not technical working groups. If data were required to substantiate some of the GIACC's findings, then the CAEP could provide whatever data was already available; it should not do new calculations. It was emphasized that the basket of measures to reduce aviation emissions should not be in conflict with each State's obligations under other international agreements. Moreover, each State's choice of measures should complement its development so that there would be a "win-win' situation for developed and developing countries.

34. The Chairman indicated that the GIACC accepted the evaluation framework suggested by the Secretary of the CAEP. In recalling that the Group had already accepted as a principle that it would be for States to choose which measures to implement to reduce their aviation emissions, she underscored that the initial evaluation of those measures by the GIACC would provide guidance to States on the practical implementation of particular measures. States would assess their own specific circumstances against GIACC's evaluation and make an informed choice of measures. In noting that the said broad evaluation of measures would be performed by the relevant working group between GIACC/2 and GIACC/3, the Chairperson emphasized that it would not be necessary for the CAEP to develop a new tool for that purpose. In noting that the working group would also consider the implications of the measures in terms of the technological and financial requirements, she observed that that would also give the Group an indication of the feasibility of the particular measures and what action would be needed on the part of ICAO and States to facilitate their implementation.

35. The Chairperson indicated that between GIACC/3 and GIACC/4, the Group could, on the basis of the said initial evaluation, assist States in considering those measures which were feasible under their own particular circumstances. That process would impact directly on the final Programme of Action that was adopted by the GIACC, as once that exercise was completed, there would be a clear indication of what preferences were emerging as a result of the said evaluation framework. That would, in turn, better inform a comprehensive report by the GIACC to the Council indicating the action that the Group would likely recommend in terms of areas of intervention through measures.

Template question 12-2: What mechanism should be established to ensure that States can make their own selection from a menu of measures while avoiding unwanted effects, such as distortion of competition?
Template question 13: What are your views on the short-, medium- and long-term measures which might be adopted within your region related to emissions reduction potential in your region?
Template question 14-1: What are the possible barriers to achieving emissions reductions and what are your views on the possible mechanisms that could assist States in overcoming these barriers and achieving emissions reductions?
Template question 14-2: How should the special situation of developing countries and of the differential nature of their actions in mitigating aircraft GHG emissions be recognized? What are their expectations and how are they different from developed countries? Should GIACC describe a financing mechanism to assist developing countries?
Template question 14-3: What recommendations does your State/region have for fostering innovation and dissemination of technology? How best to deal with technological interdependencies and the roles and responsibilities of industry stakeholders?
Template question 16: How can existing ICAO work inform GIACC? How does ICAO's work on market-based measures (MBMs) add value? What are the aviation-specific issues with MBM? What is the available ICAO data? How reliable is it?
Template question 18: Will GIACC identify mechanisms to extend the availability of voluntary offset schemes to ensure the effectiveness of offset schemes and to increase the levels of take-up by passengers? What is the role of voluntary offset mechanisms?
Template question 21: How can a framework be established for linking measures adopted on a bilateral or regional basis towards a global approach?

36. The Chairman indicated that the above template questions relating to the implementation of measures in different contexts would be discussed by the Group as a cluster prior to being referred to the relevant working group in order to give the latter guidance on implementation aspects and to indicate directional preferences.

37. With reference to template question 12-2, it was underscored that in international aviation, there needed to be an ICAO-driven framework that would prevent unfair practices arising from the application of measures, for instance, in the implementation of emissions trading schemes. It was emphasized that it would be appropriate for the measures to be implemented on the basis of mutual agreement and negotiation. It was noted, in this context, that there was not a level playing field to begin with: for example, the weakness of the currency in which some airlines paid for fuel resulted in their paying more than other airlines which paid in stronger currencies. Concern was expressed by one Member that the avoidance of unfair practices did not take into account the historic responsibilities of States for climate change and the special situation of developing countries which formed the basis of the principle of common but differentiated responsibilities.

38. To a question raised regarding the relationship between the *Convention on International Civil Aviatio*n and the UNFCCC, it was noted that Article 31 (General rule of interpretation), paragraph 3 c), of the 1969 *Vienna Convention on the Law of Treaties* stipulated that "Any relevant rules of international law applicable in the relations between the parties" were to be taken into account, together with the context. Thus the provisions of the UNFCCC had to be taken into consideration in applying the provisions of the *Convention on International Civil Aviation* and *vice-versa* to ensure that there was no contradiction. The Chairperson indicated that that Article gave a clear sense of the general principle of implementing measures by mutual agreement and negotiation, aiming towards a common agreement. It would guide the ability to move forward with implementation of measures.

39. It was underscored that the CAEP's evaluation of the relative effectiveness of the various measures would potentially be a useful instrument to States in choosing measures based on their unique situations and needs.

40. With regard to template questions 13 and 14-3, it was suggested that the GIACC recommend that ICAO consider performing a consolidated qualitative inventory of all of the work being done internationally by States to reduce aviation emissions and producing a report every five years on the state of aviation emissions based on States' actions.

41. With reference to template question 14-1, it was pointed out that the work of the CAEP's Market-based Measures Task Force (MBMTF) would be important in assisting the GIACC in assessing what the challenges associated with the various economic measures were. It was underscored that its advice and guidance on how to reconcile the different bases and measurements used in emissions trading schemes in an international system would be critical. A suggestion was made that a progress report on its work be given during the next GIACC meeting.

42. With regard to the removal of barriers, it was emphasized that the need for developing countries to develop should be respected and that developed countries (Annex I Parties) should take the lead by honouring their commitments to provide technical and financial assistance and to assist them in developing their capacity to further reduce aviation emissions. A suggestion was made that a financial mechanism be established to assist developing countries, one that could be reviewed on a regular basis. It was also suggested that an extensive international campaign for cooperation among the various stakeholders be launched in order to promote technology transfer and innovation. It was emphasized, in this context, that all should work together to achieve the common goal of aviation emissions reductions.

43. With respect to template question 14-2, it was underscored that the principle of common but differentiated responsibilities was a sound basis for addressing aviation emissions reductions. Recalling that the Clean Development Mechanism (CDM) was not available for international aviation as the latter had not been part of the UNFCCC and Kyoto Protocol discussions, it was suggested that the CDM be considered as one of the potential measures for implementing the aspirational goals and that the GIACC consider recommending that the CDM be made available for civil aviation projects in its report to the Council.

44. With reference to template question 14-3, it was underscored that, while all were in favour of fostering innovation, the promotion of new technologies should be done in a manner consistent with States' international obligations, particularly those under the World Trade Organization (WTO).

45. With regard to question 18, it was underscored that currently voluntary carbon offset schemes put in place by certain airlines were not well-regarded, due in part to the low level of participation and lack of confidence in the use of the proceeds. It was recalled, in this context, that Brazil did not recognize such schemes as a mechanism that contributed to climate change mitigation. It was suggested that the Group consider recommending the promulgation by ICAO of principles or standards for voluntary carbon offset schemes that would facilitate their implementation and ensure their consistency and credibility. It was also suggested that the GIACC consider whether there was scope within the ICAO framework to help bring States together or otherwise provide assistance in the implementation of the various measures. It was recalled, in this regard, how ICAO assisted States in rectifying their safety-related deficiencies. It was also noted how regional DGCA meetings were utilized to bring States together to improve air navigation services, such as ATM.

46. In summarizing the discussion, the Chairperson observed that the need to focus on institutional mechanisms to take the implementation of measures forward had been highlighted. Consideration should be given to the role of ICAO in facilitating States' implementation of measures and in the coordination of such assistance through its Regional Offices. While the GIACC could make

recommendations in that regard, it could not prescribe action. It would be for the Organization to decide what it could and could not do and what its limitations were. In its report to the Council, the GIACC could indicate, as part of its recommendations, that the implementation of the measures would not be successful unless ICAO assumed a role in facilitating their implementation.

47. The Chairperson noted that a suggestion had been made that the measures be dealt with in the same manner as the global aspirational goals and that a short-, medium-, and long-term framework be established for their implementation. Suggestions had also been made on how to deal with the challenges faced by developing countries in reducing their aviation emissions.

48. The Secretary of the GIACC agreed with the Chairperson that, as the GIACC was a Committee of the Council, the governing body of ICAO, the most effective course of action would be for it to make an explicit recommendation to the Council if it considered that the envisaged role of ICAO in facilitating the implementation of the measures was currently not fulfilled or not adequately fulfilled. Such a recommendation could be contained in the Group's interim report to the Council if it chose not to wait until the issuance of its final report. It could also be contained in the Secretariat's progress report to the Council. The President of the Council affirmed that ICAO would be able to provide all of the requisite support to promote any initiatives proposed by the GIACC which were approved by the Council, in particular, the facilitation of States' implementation of the said measures.

49. Responding to a point raised, the Chairperson noted that it was envisaged that the Group's work would come to an end in June 2009 and that whatever recommendations it made would, following Council's approval, be left to States to implement. Such implementation would have to reside in a particular institutional context. A framework was necessary for facilitating and monitoring States' implementation and for reporting thereon. Recalling the suggestions made that ICAO facilitate implementation through its Regional Offices and that it establish a five-yearly reporting process and publish reports on the progress made collectively in the international aviation sector in reducing emissions, she indicated that the said framework would have to be within some structure of ICAO. The Chairperson queried what body would assume responsibility for facilitating implementation of the measures after June 2009 if ICAO did not.

50. Replying to another question, the Secretary of the GIACC clarified that the Group's work was policy-oriented and not technically-oriented and that it was not the intention to develop technical Standards regarding, for example, fuel efficiency or CO_2 emissions. It was possible that, as part of the future Standard-setting process, such Standards might be developed by the CAEP for incorporation into Annex 16 *(Environmental Protection)*. It would be incumbent upon States to either comply with such Standards or to file a difference.

51. The Secretary of the CAEP concurred that it would be appropriate for Annex 16 to include any Standards relating to the certification of aircraft engines for CO2 emissions. Referring to the proposal made for a five-yearly report on progress made by States in addressing aviation emissions, she recalled that the Organization had recently issued the *ICAO Environmental Report 2007*. A second report, to be published in 2010, prior to the next Assembly, would focus more on climate change and would include an indication of action taken by States in that regard. With regard to the role of ICAO in facilitating implementation of the measures, the Secretary of the CAEP noted that a potential role for ICAO in monitoring and verifying the accuracy of information on aviation emissions was already addressed in the Organization's recently issued guidance on emissions-trading. That was an important part of any policy for tackling aviation emissions. The Secretary of the CAEP further indicated that the CAEP was currently developing guidelines for the reporting of CO_2 aviation emissions.

52. Having concluded its discussion of template questions 12-2, 13, 14-1, 14-2, 14-3, 16, 18 and 21, the GIACC referred them to the relevant working group for consideration.

Discussion of Category E: Technical —Input data: fuel efficiency (Template questions 1, 6, 19 and 22)

Template question 1: What input data would you consider needed to enable GIACC to develop a fuel efficiency goal?
Template question 6: What type of metric should be the basis of a fuel efficiency goal: global in-service fleet, regional, national, by operator?
Template question 19: What data can you provide about current and projected emissions and the fuel efficiency performances of the carriers operating in your region?
Template question 22: From what areas of CAEP's work could GIACC benefit? What other information should GIACC solicit from States, CAEP, industry, others? What other sources of information are relevant? What are possible legal or practical barriers in providing information?

53. Recalling that the Group had already had some discussion regarding data, the Chairperson indicated that the only outstanding issue was that raised in template question 19. She observed that there was consensus among the respondents that States could provide some level of data on fuel burn. Other responses had indicated that: comprehensive data by flight movement could be provided; that fuel efficiency for commercial fleets should be tracked; that data could be provided at the national and international levels; that emissions could be estimated from tracked data; that a comprehensive tool was currently being developed; and that some developing countries would require support in data collection. The Chairperson noted, with regard to template question 1, that the Group had already discussed what further work the CAEP should undertake in the area of data. The Group should now focus on what action States could take regarding the provision of data. She recalled that Japan had, in WP/4, provided information on its fuel consumption data and on the analysis thereof.

54. It was suggested that a short-term and longer-term approach be taken, with consideration being given, in the short-term, to what information was sufficient (not optimal) to allow the discussion of realistic goal or series of goals, and in the longer-term, to what information was needed to establish greater rigour around the long-term global aspirational goals and to monitor them with a degree of confidence. It was indicated that for the short-term it was not necessary to have detailed data from States and airlines in order to set global aspirational goals and that all the requisite information was now available. Furthermore, the existing ICAO fuel consumption model could be used. For the longer-term, reporting would be an important issue. How the GIACC articulated the global aspirational goals would determine if data were required by State, region, airline, route, etc. It would be necessary to precisely define what data was required and to collect it over time. While it was not certain if commercial sensitivities would enable all relevant data to be collected, a framework could nevertheless be established. As the fuel consumption estimates prepared by Japan (*cf.* WP/4) were not the same as some estimates prepared by other States, it was suggested that another metric would have to be developed for the longer-term.

55. It was also suggested that consideration be given to the role of ICAO in data collection and data credibility and whether it should be the definitive source point for international aviation data. The question was raised whether it would create difficulties within the UNFCCC if ICAO were to assume such a role. In noting that another challenge would be to determine the completeness of ICAO's fuel consumption data, it was indicated that the responses received to the questionnaire attached to State letter ENV 1/1-08/44 dated 27 May 2008 would help in assessing how large the gaps were. It was a question of determining how difficult it would be for all States to move to a common basis for reporting data to ICAO.

56. It was recalled, in this regard, that Canada had historically provided low-level data (tier 1) international aviation data to the UNFCCC, which was very limited in terms of value in differentiating allocations between international and domestic aviation data. It was in the process of improving that data and was now closer to a tier 2 and possibly moving to tier 3. It was also noted that the United States had robust

data as it required, by regulation, the reporting of a substantial amount of data from airlines on a monthly basis.

57. The representative of the UNFCCC, Mr. S. Pesmajoglou, welcomed efforts by ICAO to collect information regarding international aviation emissions. Noting that the UNFCCC received different data sets for international aviation, and that it did not have a complete time series for developing countries, he emphasized that it was important that ICAO be involved in the collection of such data and so provide assistance to the UNFCCC. In recalling that the UNFCCC had similar cooperation with other international organizations, such as the FAO, Mr. Pesmajoglou indicated that the latter verified the nationally reported agricultural data received by the UNFCCC with the data contained in its database.

58. The Secretary of the GIACC underscored that ICAO had a well-established data programme and that it requested all types of aviation-related data from States, including fuel burn data, which was incorporated into a database. Referring to the questionnaire attached to State letter ENV 1/1-08/44 dated 27 May 2008, he noted that it requested specific data for passenger services and all services (passenger, mail and freight) for the timeframe 2002-2007 according to international and total fuel burn. Responses were expected by 30 August 2008 and would be collated and reported on the GIACC. If the response rate were similar to previous response rates, then it would be expected that some 50 out of 190 Member States would respond. Some of those replies would likely not be complete. Observing that one of the problems in the collection of any data was finding a way to stimulate a more complete and effective responses from States, the Secretary of the GIACC indicated that the Secretariat over time established contacts within Governments and organizations responsible for specific types of data and followed-up State letters with personal phone calls and, on occasion, second State letters requesting responses. Even with such follow-up, the response rate would only increase to some 80 to 95 States.

59. To a point raised, the Secretary of the GIACC clarified that ICAO already worked closely with IATA to ensure that it had a full data set. While recognizing that commercial sensitivities sometimes prevented the submission of certain data, he emphasized that there was considerable variability by region. In some regions the annual reports of commercial air carriers contained comprehensive fuel burn data as it was one of their “controllable costs” that they reported on.

60. It was indicated that, if the Group were aiming at the most effective means to deal with international aviation emissions, then it might wish to only consider those States with robust aviation systems. The same level of data collection might not be necessary for all States. The Group should consider whether there should be a minimum threshold for the reporting of data on international aviation emissions.

61. The Chairperson noted that the Group agreed on the short- and longer-term approaches to the collection and analysis of data outlined in paragraph 54, with the existing modelled data and CAEP model being used in the short-term and more precise data and possibly another metric being used for the longer-term. She noted that, for the longer-term, the Group would also consider issues such as accurate reporting and assisting ICAO to improve data collection and review data prepared by industry in order to have a better framework for data collection and thus data analysis.

Discussion of Category C: Measures (Template questions 10, 11-1, 11-2 and 11-7)

Template question 10: Taking into account the information received at GIACC/1, what are your views about the range of potential emissions reductions that might be achieved by these elements? Which do you think offer the greatest scope for improvements?
Template question 11-1: What is the role for improved operational and maintenance practices in reducing aviation emissions? Should recommendations be included in the Programme of Action?
Template question 11-2: What are the actions that can be taken at airports to reduce emissions (night operations, better zoning, more efficient ground movements, CDA, gate power, decentralized parking, etc)?
Template question 11-7: What can be done to stimulate the developments and use of renewables such as biofuels?

62. The Chairperson indicated that the above template questions would be considered as a cluster as they all related to the long-term global aspirational goal of emissions reductions. With reference to template question 10, she noted that there had not been any consensus among the respondents'. A variety of replies had been provided: that the GIACC should not establish a level for emissions; that a comprehensive multi-path approach should be taken; that no regulatory action was needed; that market-based incentives were adequate; that a degree of commitment by States was required; that efficiency gains would not offset aviation growth; the role of market-based measures (MBMs); technology transfer; alternative fuels; best practice sharing; and that this was not the role for ICAO. The Chairperson recalled that during GIACC/1, presentations had been made by representatives of the aviation industry who had stipulated their own quantified goals with regard to emissions reductions. She noted that many aviation industry companies and organizations had signed the Aviation Industry Commitment to Action on Climate Change adopted during the Aviation & Environment Summit 2008 (Geneva, 22-23 April 2008). There was also wide recognition that emissions reduction could be achieved through, *inter alia*, technology enhancements, operational procedures, MBMs and ATC efficiency improvements. The real question to be answered was what potential emissions reductions might be achieved.

63. Referring to template questions 11-1, 11-2 and 11-7, the Chairperson observed that there had been consensus among respondents regarding the role of technological advances airside and groundside, the modernization of ATM and the dissemination of best practices in reducing aviation emissions. A suggestion had been made for an ICAO manual on airport climate change strategies.

64. In the course of the discussion, it was stressed that the *Convention on International Interests in Mobile Equipment* and *Protocol on Matters specific to Aircraft Equipment* (Cape Town, 16 November 2001) had an important role to play in assisting developing countries in replacing their aging, fuel-guzzling aircraft with modern, fuel-efficient aircraft and thus in reducing aviation emissions.

65. It was also underscored that the optimization of operational procedures and maintenance practices represented the most practical approach to attaining the global aspirational goal of emissions reductions in the short-term. The modernization of ATM was another means to achieve emissions reductions in the short-term but would require more work given the interactions among States and regions. It was suggested that the CAEP could provide empirical data that would support these short-term measures. It was emphasized that technology enhancements, as well as the use of alternative fuels, would also enable emissions reductions to be achieved. It was noted that the United States considered that such reductions could be attained without implementing emissions trading systems. It was recalled, in this regard, that the United States had recently announced the creation of a competitive international prize to accelerate the advent of biofuels. This was an example not only of research and development by companies but also of spurring the competitive market and industry to move faster to develop alternative fuels. It was emphasized that States should be encouraged to adopt local policies to support research and development in the area of renewables such as biofuels, as well as other measures, such as local fiscal incentives to develop and use

biofuels. It was also underscored that the international community should, through technical cooperation, assist developing countries in acquiring the advanced technology to produce biofuels. It was necessary to bear in mind the limited quantity of biofuels and that their use in one sector might result in the increased use of traditional fuels in other sectors.

66. The Chairperson observed that one important challenge to be addressed was the impact of stimulating a biofuels market on the current food crisis and food security. States would have to assess which had the highest priority: developing biofuels to reduce emissions or ensuring food security. The food crisis was limiting the potential globally for promoting biofuels and it would be necessary to consider if enough was being invested in research and development of other alternative fuels. The Chairperson thus suggested that the Group address the issue of alternative fuels generally, with biofuels being one of several such fuels to be considered.

67. It was noted, in this context, that South Africa had developed the first synthetic aviation fuel (SASOL), which had recently been certified for use. The research and development done in that country had, in turn, put the United States on the road to some of the work which was currently been undertaken there. The United States had commissioned a study on the full environmental lifecycle of biofuels, a report on which would be published in the Fall. It was emphasized that the United States' programme was committed to biofuels that did not compete with food and that it was currently looking at second and third generation algae-based biofuels. There were thus technology solutions available in the short-term. More data and reports thereon would be available in the next six months to inform GIACC's deliberations.

68. Responding to a query, the Secretary of the GIACC noted that ICAO, through the CAEP, was watching the development of alternative fuels. As information thereon became available, it was considered within the various working groups of the CAEP. ICAO was not, however, promoting alternative fuels and was not involved in any research. In underscoring that there were clearly opportunities to use alternative fuels to reduce aviation emissions, he indicated that some aircraft had flown using various mixes of biofuels. One of the main issues to be addressed was how to produce such fuels at the industry scale and distribute them to the airports around the world where refuelling took place. While such fuels held much promise, they still posed many challenges. ICAO and the CAEP were monitoring, but not driving, the progress being made in that regard. The Chairperson requested that the CAEP make available to the GIACC whatever information it had on the state of alternative fuels in the aviation sector.

69. It was noted that biofuels had been used extensively in Brazil in car transportation for more than thirty years. Only two per cent of its land was used to produce enough ethanol to power half of its car fleet. Biofuels were also used in aviation: in 1984 there had been the first flight of a bio-kerosene powered aircraft in Brazil and in 2004 the latter had certified an ethanol-fueled crop duster. The use of biofuels in Brazil was positive and sustainable and did not affect its food supplies. Brazil was working with the United States and other States to create an international market for biofuels and was willing to transfer technology to interested States. It considered that biofuels were a viable option for Africa, Latin America and the Caribbean. They must, however, be produced in a sustainable manner.

70. It was noted that Europe was promoting research into biofuels under its Clean Sky Programme and that in 2006 more than 80 million euros had been spent on biofuel programmes. It was necessary, however, to ensure that the production and use of biofuels did not adversely affect food security. It was emphasized that, as a leap in technology was required before biofuels could be produced for the aviation sector, the GIACC should not base its Programme of Action on biofuels. While the Group could encourage progress in the research and development of biofuels, it could not present the latter as an existing solution to the problem of aviation emissions

71. It was underscored that the said measures to improve operational procedures and to reduce emissions at airports, as well as the use of biofuels, were important elements to be included in the Group's

Programme of Action. It was emphasized that the latter should also include the provision of financial assistance to developing countries and the transfer of technology in order to facilitate the implementation of the global aspirational goals by those countries.

72. To a comment made that any mandatory measures which were recommended by the GIACC should not be restricted to Annex I Parties, the Chairperson recalled that the Group had agreed to return to the issue of applicability once the global aspirational goals and measures had been determined.

73. In summarizing the exchange of views, the Chairperson indicated that the issue of emissions reductions should be dealt with under the overall umbrella of measures, specifically, under the comprehensive, multi-path approach. The actions to be taken at airports to reduce emissions covered under template question 11-2 would be considered in the context of various efficiency measures, as would the issue of airport design. Recalling the commitments made and initiatives undertaken to reduce emissions, the Chairperson indicated that once the Group had a clear perspective on the long-term global aspirational goal of emissions reduction it could consider how emissions reductions could be further developed.

74. In noting the comments made on the potential usefulness of biofuels, the Chairperson requested the assistance of the Secretariat in assessing the current state of biofuels, what was likely to be achieved over time and what role alternative fuels would play in emissions reduction. In observing that the discussion had also focussed on operational efficiencies, she indicated that they and the other suggested measures to reduce emissions would be referred to the relevant working group for consideration.

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