CONFERENCE ON AVIATION AND ALTERNATIVE FUELS

Rio de Janeiro, Brazil, 16 to 18 November 2009

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS FROM THE FIRST MEETING

1. **AGENDA ITEM 1**

1.1 **Conclusions – Environmental Sustainability and Interdependencies of Sustainable Alternative Fuels for Aviation**

1.1.1 From the documentation and ensuing discussion during the first meeting on environmental sustainability and interdependencies under Agenda Item 1, the Conference concluded the following:

a) The world today uses 3,917 Mt of liquid fuel annually, of which 0.02 Mt is biofuel. Noting the limited number of qualified biofuels for aviation, very little of this biofuel is used by international aviation;

b) International aviation could need a substantial contribution from sustainable alternative fuels for aircraft in order to reduce its overall GHG footprint;

c) Climate change is a global problem requiring a global approach for international aviation and we welcome ICAO's initial activities to facilitate global efforts for implementing sustainable alternative fuels for aircraft;

d) Sustainable alternative fuels for aircraft may provide surface and local air quality benefits in addition to their life cycle GHG emissions benefits;

e) There are interdependencies between the removal of sulphur from conventional aviation fuels and the climate impacts of aircraft emissions;

f) CAAFI and other regional initiatives have proven to be an effective means of sharing information and coordinating efforts to research, develop and deploy alternative fuels for aviation;

g) The ability to compare the life cycle GHG emissions from alternative aviation fuels is an essential element of a global assessment of GHG emissions from international aviation;

h) GHG emissions associated with both direct and indirect land-use change may result from the production of alternative jet fuels. Further research is needed to better understand these interdependencies;

i) There are multiple research efforts ongoing within the U.S., Europe and other States to estimate the life cycle GHG emissions from conventional and alternative jet fuels, as well as from ground transportation fuels;

j) A peer reviewed, consistent approach to estimating life cycle GHG emissions that covers all sectors is needed;

k) The supply chain that involves the life cycle of sugarcane ethanol produced in Brazil, and the inherent characteristics of the product – renewability and low carbon content – could make sugarcane ethanol an environmentally sustainable product for concentration in other regions, which needs to be confirmed with further detailed analysis;

l) The manufacturing industry believes that alternative fuels that are fully compatible with existing aircraft, engine and distribution systems can be utilized as soon as supply is available;

m) The manufacturing industry believes that carbon life cycle of more than 50% reduction, as compared to typical petroleum-based aviation fuel, can be demonstrated for some types of renewable alternative aviation-capable fuels;

n) Large transport aircraft require a very high energy source, and unlike other transport modes, no technology exists to decouple such aircraft from liquid fuels;

o) Considerable work must be done to develop a supply chain able to deliver fuel that is technically capable, economically reasonable, and environmentally beneficial;

p) Timely and appropriate establishment of acceptability criteria is required to ensure that new fuels are environmentally beneficial;

q) The development and use of sustainable renewable alternative fuels for aviation is an important opportunity to reduce aviation emissions;

r) As a result of permanent fleet modernization, fuel burn has been reduced by about 70% over the last 40 years;

s) There are interdependencies associated with environmental improvements when dealing with the design and development of future products;

t) Significant progress has been made in testing aircraft engines with various types of alternative fuels;

u) The work performed by the engine manufacturers shows the viability of using blends of drop-in alternative fuels as a substitute to jet fuel;

v) The manufacturing industry has tested drop-in alternative fuels and the results show no adverse impact on performance of aircraft engines. While having little impact on

gaseous emissions, the drop-in alternative fuels show significant reduction in smoke emissions; and

w) More research is needed to determine the impact of alternative fuels on areas such as materials compatibility, chemical composition, density, and to fully derive correlations between alternative fuel properties and particulate and gaseous emissions.

1.2 Recommendations – Environmental Sustainability and Interdependencies of Sustainable Alternative Fuels for Aviation

1.2.1 From the documentation and ensuing discussion during the first meeting on environmental sustainability and interdependencies under Agenda Item 1, the Conference adopted the following recommendations:

a) States work together expeditiously with the industry to foster the development and implementation of sustainable alternative fuels for aircraft;

b) States actively participate in further work on sustainable alternative fuels for aircraft;

c) ICAO endeavour to facilitate active participation by States in further work on sustainable alternative fuels for aircraft;

d) ICAO update the 15th meeting of the Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC COP15) in December 2009 with the results of CAAF2009 on the development and deployment of aviation and alternative fuels;

e) ICAO be informed by States in advance of the 37th Session of the ICAO Assembly of their initiatives related to sustainable alternative fuels for aircraft. ICAO Secretariat to issue a State Letter to collect this information;

f) States take into account the surface and local air quality benefits associated with the use of sustainable alternative fuels for aircraft when making policy decisions on their use;

g) ICAO further explore the environmental benefits and trade-offs of sustainable alternative fuels with reference to surface and local air quality;

h) Note that the definitions in CAAF/09-WP/9 are used exclusively for the purposes of the Conference on Aviation and Alternative Fuels;

i) Recommend that the definitions for drop-in jet fuel blend and drop-in neat jet fuel be incorporated into ICAO Doc 9713 “ICAO Vocabulary” in the next update of the document;

j) Note the effectiveness of the efforts to date of the Commercial Aviation Alternative Fuels Initiative (CAAFI);

k) Encourage members and observers to participate in the activities and efforts of CAAFI;

l) Recommend the use of life cycle analysis as the appropriate means for comparing the relative GHG emissions from alternative jet fuels to conventional jet fuel;

m) Acknowledge the potential for use of sugarcane as well as other feedstocks for development of sustainable biofuels;

n) [Pending acceptance by the Conference] Acknowledge that Brazil's efforts in the areas of (a) research, (b) technological development, and (c) public policies for evaluation of the use of ethanol in piston engine aircraft may be applicable to other member States;

o) ICAO should encourage the development of policy actions by Member States to accelerate the appropriate development of sustainable renewable alternative fuels for aviation;

p) ICAO should take efforts to ensure the consideration of aviation alternative fuels within relevant international, regional and State efforts to develop sustainability criteria for all alternative fuels;

q) ICAO should take efforts to ensure the consideration of aviation within evolving recommended practices and processes on sustainability criteria to ensure consistency with that for all sustainable fuels;

r) Take note and acknowledge the past record of improvements that the air transport industry achieved over the past decades as explained in CAAF/09-WP/8 and associated IP/08;

s) Note the challenge of interdependencies associated with environmental improvements when dealing with design and development of future products;

t) Recommend that the opportunity of sustainable alternative fuels for aviation be further studied as a new possibility to further reduce emissions from aviation;

u) Recommend funding efforts that support the study and development of sustainable alternative fuels and other measures to reduce GHG emissions in addition to the funding for research and technology programmes to further improve the efficiency of air transport be maintained or improved;

v) Recommend that funding bodies support further research into engine research using alternative drop-in fuels, whilst still maintaining funding levels for technology research; and

w) Promote the production of drop-in alternative fuels for aviation.

2. AGENDA ITEM 2

2.1 Conclusions – Technological Feasibility and Economic Reasonableness of Sustainable Alternative Fuels for Aviation

2.1.1 From the documentation and ensuing discussion during the first meeting on technological feasibility and economic reasonableness under Agenda Item 2, the Conference concluded the following:

a) The development of new sustainable alternative fuels for aircraft production processes could be able to reduce costs of fuels to compete with conventional jet fuel in the mid-term;

b) Sustainable alternative fuels for aircraft can be produced from a wide variety of feedstocks for use in global aviation, suggesting that many regions are candidate production locations;

c) [Pending acceptance by the Conference] recognise that sustainable biofuels for aircraft can be produced through a range of processing routes some of which could be suitable for local scales;

d) The by-products or secondary products from sustainable alternative fuels for aircraft production could be valuable inputs to local economies; and

e) Sustainable alternative fuels for aircraft can be produced from a wide variety of feedstocks and processes, yet, only those that attract sufficient investment will achieve a market presence.

2.2 Recommendations – Technological Feasibility and Economic Reasonableness of Sustainable Alternative Fuels for Aviation

2.2.1 From the documentation and ensuing discussion during the first meeting on technological feasibility and economic reasonableness under Agenda Item 2, the Conference adopted the following recommendations:

a) States inform ICAO of any plans to establish alternative fuel production facilities in the short, medium, and long-term;

b) Those plans be incorporated into the High-Level Roadmap on Aviation and Alternative Fuels;

c) ICAO establish a web site to facilitate the exchange of information between States and International Organizations interested in advancing sustainable alternative fuels for aircraft; and

d) States and International Organizations share best practices and techniques that can apply to the development and scale up of sustainable alternative fuels for aircraft production through ICAO.

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