WORKING PAPER

INTERNATIONAL CIVIL AVIATION ORGANIZATION

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ASSEMBLY – 35TH SESSION

EXECUTIVE COMMITTEE

Agenda Item 15: Environmental protection

RECOMMENDATION FOR LIMITING THE GROWING CONTRIBUTION OF AIRCRAFT ENGINE EMISSIONS TO LOCAL AIR POLLUTION

(Presented by 41 Contracting States[2], Members of the European Civil Aviation Conference)

SUMMARY

This working paper calls attention to the new increase of aircraft engine emissions with the return of traffic growth and to the serious negative effects on the aviation sector world-wide if air quality at and around airports is not effectively addressed.

Action by the Assembly: The Assembly is invited to reflect in its consolidated statement on environmental protection (A35-WP/77) the recommendations set out in paragraph 11.

BACKGROUND

1. Despite the existing ICAO standards, aircraft emissions of nitrogen and carbon oxides, of hydrocarbons and particulate matters, at and near the ground level, are growing again with the return of the traffic growth. The World Health Organization (WHO) clearly describes some of the adverse effects of these pollutants on human health[3]. ECAC Member States believe that more attention should be paid to these guidelines and to the implications of increasing demand for better air quality.

2. ECAC Member States recognize the fundamental work which has been done in ICAO for establishing and updating engine emissions standards and for recommending operational measures to limit pollution. But they consider that additional actions are needed to address this issue and reduce opposition to traffic growth.

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[1] English and French versions provided by ECAC.

[2] Albania, Armenia, Austria*, Azerbaijan, Belgium*, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus*, Czech Republic*, Denmark*, Estonia*, Finland*, France*, Germany*, Greece*, Hungary*, Iceland, Ireland*, Italy*, Latvia*, Lithuania*, Luxembourg*, Malta*, Moldova, Monaco, Netherlands*, Norway, Poland*, Portugal*, Romania, Serbia and Montenegro, Slovakia*, Slovenia*, Spain*, Sweden*, Switzerland, The former Yugoslav Republic of Macedonia, Turkey, Ukraine, United Kingdom*.

* Member States of the European Union are indicated with an asterisk in the above list.

[3] World Health Organisation air quality guidelines (2000).

3. In conurbations aircraft emissions of nitrogen oxides (NOx) inside the (atmospheric) boundary layer which contributes to local air pollution are generally responsible for less than 10 % of urban NOx emissions. But airport activities as a whole are becoming the main source of this pollution after road transport. Emissions of NOx increase the concentrations of nitrogen dioxide, ozone and particulate matter (as aerosols). For some communities close to airport boundaries, airport activities are already the dominant source of nitrogen dioxide. This can impede airport growth and development.

4. The European Environmental Agency (EEA) has reported that in 1999, 15 % of the urban population in Europe was exposed to nitrogen dioxide concentrations above the EU short-term limit value set for the protection of human health. As reported to the ICAO Committee on Aviation Environmental Protection (CAEP), there are similar situations in other regions of the world. Large parts of the population are also exposed to peak and median concentrations of ozone above the thresholds values. It is forecast that in large conurbations thresholds for ozone and nitrogen dioxide will be exceeded after 2010 despite large reductions of emissions from road transport and other sources.

5. The successive increases in the stringency of the ICAO emission standard for limiting NOx emissions (- 20% in 1996, -16% in 2004 and, if CAEP proposal is adopted, -12 % in 2008) are not sufficient to reduce the mass of pollutant emitted per passenger. The standard is related to the engine pressure ratio and this is increasing[1] in order to reduce fuel consumption, which explains why NOx emissions per passenger have not decreased. With the return of air traffic growth the contribution of aviation to NOx emissions is going to increase again both in absolute and in relative terms.

6. Another serious concern regarding local air quality is related to particulate matter. According to the EEA, between 20 and 40 % of the urban population of Europe is exposed to levels of fine particles in excess of limit values set for the protection of human health. The contribution of aviation to this pollution is small but growing again.

POLICY REQUIREMENTS FOR THE FUTURE

7. As recalled by the ICAO circular 303 AN/76 on Operational Opportunities to Minimize Fuel Use and Reduce Emissions, CAEP has been pursuing three complementary approaches to address local aviation emissions, namely technological innovation and certification standards, operational measures - related to airport facilities and equipments, ground transport and aircraft operations - and the possible use of market-based measures. The cost-effectiveness of each approach as well as the risks of distortion of competition should be considered.

8. But in any case it seems necessary to pursue the increase of stringency of the certification standards related to air quality, particularly for NOx, taking into account interrelationships between performances related to each type of emissions (carbon dioxide notably) and to noise. Emissions standards stringency remains the best way to promote technological innovation. The industry must also make every effort to achieve the long-term research goals announced in Europe and North America and to develop and bring into service technology incorporating consequent advances at the earliest possible time.

9. Minimizing aircraft NOx emissions at all altitudes, not only below 3000 feet, is desirable to limit the impact of aviation on regional ozone concentrations and on climate change. This is why the existing certification regime should be complemented in order to encompass all phases of flight, taking into account the performance of the whole aircraft.

[1] The average increase of the engine pressure ratio was greater than 50 % during the last 20 years.

10. The existing certification regime related to smoke emissions was not designed to represent the engine performance concerning emissions of fine particles. Limit values for concentrations of fine particles are now set in many countries on the basis of WHO recommendations for the protection of human health. As recommended by CAEP an appropriate adaptation of the ICAO certification should be studied so as to address this issue.

ACTION BY THE ASSEMBLY

11. ECAC Member States invite the 35th Session of the ICAO Assembly to:

a) reflect in its resolution on environmental protection (A35-WP/77) that new actions are needed to protect air quality as the contributions from aircraft engines to nitrogen dioxide and to ozone pollutions are increasing again with the return of the traffic growth, both in absolute and in relative terms;

b) welcome the proposal by CAEP for a new standard for NOx emissions (-12% in 2008);

c) request the Council to:

   i) ensure that CAEP will review the NOx standard by 2010;

   ii) ensure that CAEP work related to the extension of the existing certification regime for NOx emissions to encompass all phases of flight taking into account the performance of the whole aircraft is completed by CAEP/7;

   iii) study the appropriate characterization of the particulate matter emitted by aircraft engines, as proposed by CAEP, with a view to assessing the existing ICAO standard for smoke emissions in light of the latest recommendations made by WHO, which has identified concentrations of fine particulates as a health hazard.

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