



**GROUP ON INTERNATIONAL AVIATION AND CLIMATE CHANGE (GIACC)**

**FOURTH MEETING**

**Montréal, 25 to 27 May 2009**

**Agenda Item 2: Review of aviation emissions-related activities within ICAO and internationally**

**NEW ICAO DATA COLLECTION ON FUEL CONSUMPTION  
BY COMMERCIAL AIR CARRIERS**

(Presented by the Secretariat)

**1. INTRODUCTION**

1.1 At its third meeting (GIACC/3), the Group on International Aviation and Climate Change agreed that States should report annually to ICAO, data on air traffic and fuel consumption in accordance with Article 67 of the Chicago Convention and that ICAO should provide upon request, technical assistance and cooperation to developing countries for collecting, processing and disseminating data. Accordingly, it was requested that the ICAO Secretariat report at the fourth meeting of the GIACC, on how ICAO's current data collection process could be expanded or improved to support the monitoring of progress toward the achievement of fuel efficiency goals. In addressing this issue, data available from other sources, including the aviation industry as well as the scope of the United Nations Framework Convention on Climate Change (UNFCCC) requirements, should be taken into consideration in order to avoid, as far as possible, any duplication of efforts.

1.2 This paper provides information on and status of the action that has been taken by the ICAO Secretariat to modify the ICAO Statistics Programme, as requested, in order to collect from States data on fuel consumption by commercial air carriers.

**2. ICAO STATISTICS PROGRAMME**

2.1 The need for complete, comprehensive and reliable aviation statistics was recognized at the Chicago Conference in 1944 and Article 67<sup>1</sup> defines the ICAO mandate to collect data from each Contracting State. In parallel, Article 54 mandates the Council to request, collect, examine and publish

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<sup>1</sup> Each Contracting State undertakes that its international airlines shall, in accordance with requirements laid down by the Council, file with the Council traffic reports, cost statistics and financial statements showing among other things all receipts and the sources thereof.

information relating to the operation of international air services, while Article 55 stipulates that the Council may conduct research into all aspects of air transport which are of international importance and communicate the results of its research to the Contracting States.

2.2 In addition to the framework settled by the Chicago Convention, the ICAO Statistics Programme is addressed in Appendix B of Assembly Resolution A36-15, Consolidated Statement of Continuing ICAO Policies in the Air Transport Field. More specifically, the Council is requested to, *inter alia*, examine on a regular basis the statistical data (referring to “statistics on airline operations”) collected by ICAO in order to meet more effectively the needs of the Organization and its Contracting States and to establish the necessary metrics to monitor the performance of the organization in meeting its Strategic Objectives. These objectives include Efficiency and Environment.

2.3 The forthcoming Tenth Session of the Statistics Division, to be held in November 2009, will carry out a comprehensive review of the current Statistics Programme in order to provide recommendations to the Council, taking into account the conclusions of the fourteenth meeting of the Statistics Panel (STAP/14) convened in March 2009. One of the proposals recommended by STAP/14 is the introduction of a new data collection on fuel consumption by commercial air carriers.

### 3. NEED FOR DATA ON FUEL CONSUMPTION

3.1 With respect to fuel, ICAO currently collects financial data on fuel and oil expenditures by airlines through the air transport reporting form EF – *Financial Data – Commercial Air Carrier*, but this form does not provide any information on the volume of fuel consumed.

3.2 Historically, the only ICAO source of information on fuel consumption has been the database created for the purposes of conducting studies on regional differences in international airline operating economics. Fuel consumption is modelled by using both scheduled air carrier operations material as filed with the OAG Aviation Solutions (formerly known as the Official Airline Guide), and a fuel consumption formula developed by the ICAO Secretariat in the nineties for specific aircraft types. However, the modelled result does not reflect the actual fuel consumption of air carrier operations, and does not contain any information on fuel consumption for non-scheduled or general aviation operations.

3.3 Consequently, even if the information available in the database serves well its initial primary purpose, these data are insufficient to measure the full impact of policies aimed at protecting the environment and to evaluate exactly fuel efficiency improvements.

3.4 On the other hand, IATA has been collecting fuel consumption data from their airline members. Considering the rate of reply and the representativeness of the IATA members in terms of the total world revenue tonne kilometres (RTKs), these data are estimated to cover about two thirds of the total global commercial aviation fuel consumption. They are used as inputs to the analysis and formulation of the total IATA fleet fuel efficiency, supplemented by other fuel consumption data sources, e.g. International Energy Agency (IEA).

3.5 However, presently, fuel consumption data by all commercial air carriers are not being collected by any organization or entity at the level of detail needed to support current and anticipated requirements for analyses and decision making.

3.6 In view of the growing importance of aviation environmental protection issues, it appears that ICAO, its Contracting States and other civil aviation stakeholders need time series data on aviation fuel consumption in order to support the broad range of analyses requested. As ICAO plays a leading role

in the aviation environmental protection, it is imperative that the Organization maintain a reliable database on fuel consumption. These data are required to evaluate the effectiveness of the various measures introduced to improve aircraft technology, the efficiency of the different Air Traffic Management (ATM) initiatives being implemented, to monitor environmental policies, and to develop performance indicators to follow up the progress toward the fuel efficiency goals settled.

#### **4. PROPOSAL ON FUEL CONSUMPTION DATA COLLECTION BY COMMERCIAL AIR CARRIERS**

4.1 In February 2008, GIACC/1 requested that ICAO make available data on fuel consumption generated by aircraft operations, through the cooperation of its Contracting States. Accordingly, a survey on fuel consumption was carried out (State letter ENV 1/1-08/44 dated 27 May 2008), in which about 50 States participated. The replies clearly showed that without the corresponding operational data, it is impossible to determine the scope of the underlying operations covered by the fuel consumption reported.

4.2 Based on the lessons learned from this State Letter as well as from the on-going work of the ICAO Secretariat in support of environmental groups such as GIACC, various possibilities were examined as to the content of a new reporting form. Taking into account the needs expressed for GIACC/4 and by other air transport industry stakeholders, it was concluded that the data collected should not be at a high level of aggregation as they would be of limited value for any analysis aiming at assessing the trends of civil aviation impact on the environment. Therefore, fuel consumption data should be submitted by air carrier and by aircraft type for each calendar year, broken down into scheduled and non-scheduled services for both international and domestic operations, and should be reported in metric tons (to be converted into litres, if needed for specific applications) with the corresponding capacity and traffic expressed respectively in available tonne-kilometres and revenue tonne-kilometres.

4.3 This proposed collection pattern will enable the calculation of global fuel consumption for international aviation and the development of fuel efficiency metric recommended by the Committee on Aviation Environmental Protection (CAEP) and adopted by GIACC, i.e. fuel consumed per revenue tonne-kilometre.

#### **5. RECOMMENDATIONS OF THE STATISTICS PANEL (STAP/14) ON THE NEW DATA COLLECTION BY COMMERCIAL AIR CARRIERS**

5.1 STAP/14 examined the ICAO proposal to introduce a new annual data collection on actual fuel consumption by commercial air carriers. According to article 67 of the Chicago Convention, the data on fuel consumption should be collected based on the “carrier principle”, i.e. from commercial carriers (to be submitted by the State in which a carrier has its principle place of business), regardless of which country fuel was delivered to aircraft.

5.2 The Panel noted that in order to better understand the challenges associated with collection of fuel (and hence CO<sub>2</sub> emissions) data for aviation, the ICAO Secretariat convened an informal meeting on fuel data collection, that was attended by representatives of the aviation industry stakeholders. The experts in the meeting provided an environmental analysis perspective regarding the future collection of aviation fuel consumption data. They noted the importance of considering the ability to compare results with those produced by other organizations, to produce results in a consistent manner, and to define precisely the data that are to be provided. Therefore, the collection of fuel consumption data will enhance the ability to conduct environmental analysis and complement other evaluation tools such as modelling based on trajectory data. However, the numerous information presented during this informal

meeting pointed to the fact that a single form of data collection could not easily address the range of possible aviation environmental analyses.

5.3 During the discussion, the Panel noted that the existing models for fuel consumption estimation developed in CAEP are predominantly the ones developed by the Federal Aviation Administration (FAA<sup>2</sup>) and the European Organisation for the Safety of Air Navigation (EUROCONTROL<sup>3</sup>), both of which are built on radar data inputs. For that purpose, FAA and EUROCONTROL have synchronized their radar databases in order to get around 70 per cent coverage, but these still do not capture all the world traffic, especially outside their radar control area.

5.4 The issue of possible duplication of requirements and additional burden placed on Contracting States to report fuel consumption data both to ICAO and the UNFCCC was discussed, with a view to arriving at a harmonization of these two processes. Under the complex UNFCCC principles for collecting emissions data, the challenges encountered by States to collect air transport fuel consumption are real. Indeed, some States, for example United States, are collecting on one hand fuel data from their airlines (cf Department Of Transportation Form 41), and on the other hand, for UNFCCC purposes, another entity (generally the Ministry of Environment) is “estimating” national inventories through diverse assumptions, including inputs coming from the national airlines’ consumption. According to the UNFCCC reporting requirements, Annex I countries should report emissions from international aviation separately in their respective national inventories, while non-Annex I countries should report them to the extent possible and only if disaggregated data (international and domestic) are available.

5.5 In that context, based on the UNFCCC principle of country of departure, fuel sale data which in many cases are the only information available by country of departure, could be obtained. It is noteworthy that Annex 1 countries which are mandated to file these data with the UNFCCC, account for only 62 per cent of overall fuel consumption on international scheduled services. Therefore, if ICAO were to use data reported to the UNFCCC, insufficiency of data reported coverage would be an issue as would the collection process, that is fuel sold and not fuel consumed.

5.6 The Panel noted that since these two data collections were based on different principles (ICAO by air carriers and the UNFCCC by country of departure) and served in certain respect different purposes, it would be difficult to harmonize these two collections. Moreover, it was confirmed that the data reported to UNFCCC do not come from the same sources (generally fuel vendors) as the ones being reported under Article 67 mechanism, where ICAO addresses its data requests to the Civil Aviation Authorities who generally have no authority over fuel vendors.

5.7 Hence, the Panel concluded that the collection of data on fuel consumption by air carriers would be needed to estimate the actual global air transport fuel consumption, and by taking into account the ability of the reporting entities to provide the requested data, the Panel endorsed the change to the ICAO Statistics Programme by recommending the introduction of a new form for reporting fuel consumption by commercial air carriers.

5.8 The Panel reviewed various possible formats of a reporting form for the collection of data on fuel consumption and came to the conclusion that the proposed form (shown in the attached Appendix) put forward by the Secretariat, could be used for the new data collection with the addition of an item regarding aircraft type (passenger versus all-cargo). It is also intended to include an item on the share of alternative fuels in total fuel consumed (by aircraft type).

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<sup>2</sup> Aviation Environmental Design Tool (AEDT) / System for assessing Aviation’s Global Emissions (SAGE)

<sup>3</sup> Advanced Emission Model (AEM)

5.9 The forthcoming Tenth Session of the Statistics Division (STA/10) will consider the STAP/14 proposal regarding the implementation of fuel consumption data collection by commercial air carriers, in order to make a recommendation to the Air Transport Committee and the Council to modify the ICAO Statistics Programme by adding this new data collection.

## 6. CONCLUSIONS

6.1 The proposed new ICAO data collection on fuel consumption by commercial air carriers will enable tracking and monitoring of the achievement of global fuel efficiency goals as established by GIACC.

6.2 Once the new data collection on fuel consumption is approved and implemented, regular assistance will be provided to States regarding the collection and analysis of data, in the form of workshops, on-the-job training and other assistance requirements, to the extent that the existing Secretariat resources permit.

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