International Civil Aviation Organization

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WORKING PAPER

TENTH SESSION OF THE STATISTICS DIVISION

Montréal, 23 to 27 November 2009

Agenda Item 10: Fuel consumption by commercial air carriers

PROPOSAL FOR A NEW DATA COLLECTION OF FUEL CONSUMPTION BY COMMERCIAL AIR CARRIERS

(Presented by the Secretariat)

SUMMARY

ICAO needs to collect fuel consumption data for commercial air carriers to meet the requirements of initiatives in the area of environmental protection as well as to monitor improvements in fuel efficiency due to changes in operational and air navigation procedures. In accordance with the recommendation of the 14th meeting of the Statistics Panel (STAP/14), this paper proposes the introduction of a new collection process on fuel consumption by commercial air carriers and two options of a reporting form through which the data could be collected on an annual basis. These two options include:

a) a form endorsed by STAP/14 which would collect fuel consumption data by air carrier and aircraft type (passenger and all-freight) broken down into scheduled and non-scheduled services for international and domestic operations, plus the corresponding tonne-kilometres performed and tonne-kilometres available; or

b) a form requiring reporting of fuel consumption and corresponding traffic in terms of tonne-kilometres performed and tonne-kilometres available by flight stage for international and domestic services. This option would reduce the burden on States of reporting to ICAO in view of the developments with respect to aviation emissions trading that have been taking place since STAP/14.

Action by the division is in paragraph 6.

1. INTRODUCTION

1.1 This paper discusses the need for a new data collection process on civil aviation fuel consumption in view of the deficiencies of the models/collections in place, and presents a proposal put forward by the Secretariat to the 14th meeting of the Statistics Panel and describes the outcome of its discussion and recommendation with respect to this new data collection. It also proposes that the statistics

Division (STA/10) consider a form based on reporting systems designed for emissions trading systems for the purposes of data collection and decide which of these two forms would be most suitable for the purposes of the process.

2. NEED FOR FUEL CONSUMPTION DATA COLLECTION

2.1 In view of the growing importance of aviation environmental protection issues, 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 aviation and environmental protection, it is imperative for the Organization to maintain a reliable database on fuel consumption. These data are also required to evaluate the effectiveness of various measures introduced to improve aircraft technology, the efficiency of the different Air Traffic Management (ATM) initiatives being implemented and to monitor the effectiveness of environmental policies.

2.2 In addition, in order to measure the achievement of aspirational fuel efficiency goals established in the Programme of Action that was adopted by the Group on International Aviation and Climate Change (GIACC) in May 2009 and endorsed by the High-level Meeting on International Aviation and Climate Change (HLM-ENV) in October 2009, the Council has directed the ICAO Secretariat to develop and implement a mechanism under Article 67 of the Chicago Convention to collect annually from States data on traffic and fuel consumption.

3. EXISTING FUEL CONSUMPTION MODELLING AND REPORTING SCHEMES

3.1 ICAO currently collects data on fuel and oil expenditures by airlines through *Form EF – Financial Data – Commercial Air Carriers*. However, this form does not collect data on the volume of fuel consumed. Besides, the only ICAO source of information on fuel consumption has been the database created for purposes of conducting studies on regional differences in international airline operating economics. This information is modelled on scheduled air carrier operations as filed with the OAG Aviation Solutions (formerly known as the Official Airline Guide) by using fuel consumption formula developed internally in the early 1990s for specific aircraft types. Consequently, these data do not reflect the actual fuel consumption of air carrier operations, as the modelling assumes average operational conditions, which renders this database unable to fully detect changes in fuel consumption that result from improvements in operational efficiency. Furthermore, the database does not contain any information on fuel consumption for non-scheduled or general aviation operations.

3.2 The above notwithstanding, the information available in the database serves well its initial basic purpose, which is to allow estimating fuel costs for international passenger scheduled services (aggregated into route groups or by region of airline registration) and to identify regional differences in that respect. However, these data are insufficient to measure the impact of policies aimed at protecting the environment and to properly calculate fuel consumption changes over time, since they do not reflect actual operations.

3.3 In the framework of the assessment of progress in achieving ICAO's environmental objectives, the ICAO Committee on Aviation Environmental Protection (CAEP) has been producing estimates and projections of fuel consumption, among other parameters. These estimates, which can be provided at the country, region and global levels have been made at using four greenhouse gas models and generated on radar data inputs. For that purpose, FAA and EUROCONTROL have synchronized their radar databases in order to get better coverage. However, coverage is estimated at 70 per cent, as these

databases still do not capture all the world traffic and fuel consumed, especially outside their radar control areas.

3.4 IATA has been collecting fuel consumption data from their airline members. Considering the rate of reply and the share of the IATA members in terms of the total world tonne-kilometres performed, 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.

3.5 Under the complex UNFCCC principles for collecting emissions data, the challenges encountered by States in collecting air transport fuel consumption are real. Indeed, some States, while on the one hand, collect fuel data from their airlines (usually ministries of transport or civil aviation authorities), on the other hand, for the UNFCCC purposes other entities (generally ministries of environment) they "estimate" national inventories through diverse assumptions, including inputs coming from national airlines. Since these data collections were based on different principles (ICAO by air carriers according to Article 67 mechanism and the UNFCCC by country of departure) and served in certain respect different purposes, it would be difficult to harmonize them. Moreover, it is noteworthy that Annex I countries which are obliged to submit these data to the UNFCCC account for an estimated 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 coverage would be an issue as would be the data i.e. fuel sold and not fuel consumed.

3.6 It appears that presently data pertaining to fuel consumption by all commercial air carriers have not been collected by any organization/body at the level of detail needed to support current and anticipated requirements for analyses as well as decision making.

3.7 In view of the need for ICAO to collect fuel consumption data, a proposal was put forward to STAP/14 to consider the introduction of such new collection.

4. RECOMMENDATION STAP/14-15

4.1 As there have been significant drawbacks in modifying existing ICAO reporting forms that might lend themselves to the collection of fuel data, various possibilities were examined by the Secretariat as to the content of a new reporting form to be presented for consideration by STAP/14.

4.2 It has become evident that the data collected should not be at a high level of aggregation, as they would be of limited value for the detailed modelling and analyses required to assess the current and future trends of the impact of civil aviation on the environment. On the other hand, the ability of the reporting entities to provide the data should also be taken into account when introducing a new form. Accordingly, it was proposed for the consideration STAP/14 of that fuel consumption data by air carrier and aircraft type be broken down into scheduled and non-scheduled services for international and domestic operations and be reported annually in metric tons plus the corresponding capacity and traffic expressed in tonne-kilometres available and tonne-kilometres performed.

4.3 This proposed collection pattern would, in addition to other applications, enable the calculation of global fuel consumption for international aviation and the development of fuel efficiency metric recommended by CAEP and adopted by GIACC and further endorsed by the HLM-ENV, i.e. fuel consumed per tonne-kilometre performed.

4.4 Having considered a proposal put forward by the Secretariat, STAP/14 recommended the introduction of a new collection process on fuel consumption by commercial air carriers and endorsed a form proposed by the Secretariat for the purpose of that data collection with an additional inclusion therein of an item regarding specification of aircraft type (passenger versus all-freight).

4.5 Based on discussions in various fora (GIACC, CAEP, HLM-ENV) following STAP/14, it is proposed that an item on the share of alternative fuels in total fuel consumed be included in the form. The form that includes the recommendation of STAP/14 and the said proposal appears in Appendix A.

5. FUEL CONSUMPTION DATA COLLECTION BASED ON FLIGHT STAGE

5.1 Since STAP/14 there have been significant developments taking place with respect to aviation emissions trading, including the incorporation of aviation into the European Union Emissions Trading System (EU ETS).

5.2 Under the EU ETS, emissions (fuel consumption) and traffic will have to be monitored by flight stage by air carriers involved. Bearing in mind that such monitoring systems are or will be widely introduced (estimated 2 700 carriers will fall under the EU ETS), entities reporting to ICAO should take advantage of them, and requirements that States/air carriers establish other systems for reporting fuel consumption and traffic to ICAO should be avoided.

5.3 It should be noted that fuel consumption and traffic data by flight stage might also be helpful to calculate fuel consumption by country of departure which the UNFCC requires to be reported. Thus, the UNFCCC reporting process, and the ICAO process, using data by flight stage, could be harmonized to a certain extent, and at least would enable ICAO to start a cross-checking procedure.

5.4 Accordingly, as an option to reporting using a form endorsed by STAP/14, it is proposed that STA/10 also consider the implementation of the new fuel consumption data collection, based on the flight stage approach, by a means of a form appearing in Appendix B.

6. ACTION BY THE DIVISION

6.1 The division is invited to:

a) adopt the introduction of a new collection process on fuel consumption by commercial air carriers as recommended by STAP/14; and

b) choose among the two options of a reporting form (appearing in Appendices A and B) for that process and approve the choice made.

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FORM ….

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AIR TRANSPORT REPORTING FORM

FUEL CONSUMPTION AND TRAFFIC - COMMERCIAL AIR CARRIERS

Contact person: ____________________

Organization: ____________________

Tel: ____________________

Fax: ____________________

E-mail: ____________________

State: ____________________

Air carrier: ____________________

Year ended: ____________________

Aircraft type Manufacturer and Model		International services						Domestic services						Total services (international and domestic)						Non-revenue flights	% of drop-in biofuels (total services and non-revenue flights)
		Scheduled			Non-scheduled			Scheduled			Non-scheduled			Scheduled			Non-scheduled				
Passenger	Freighter	Fuel consumed (metric tonnes)	Tonne-kilometres performed (thous)	Tonne-kilometres available (thous)	Fuel consumed (metric tonnes)	Tonne-kilometres performed (thous)	Tonne-kilometres available (thous)	Fuel consumed (metric tonnes)	Tonne-kilometres performed (thous)	Tonne-kilometres available (thous)	Fuel consumed (metric tonnes)	Tonne-kilometres performed (thous)	Tonne-kilometres available (thous)	Fuel consumed (metric tonnes)	Tonne-kilometres performed (thous)	Tonne-kilometres available (thous)	Fuel consumed (metric tonnes)	Tonne-kilometres performed (thous)	Tonne-kilometres available (thous)	Fuel consumed (metric tonnes)	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
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FORM xx

INTERNATIONAL CIVIL AVIATION ORGANIZATION
AIR TRANSPORT REPORTING FORM

FUEL CONSUMED AND TRAFFIC - COMMERCIAL AIR CARRIERS

Contact person: _____ State: _____
Organization: _____ Airline: _____
Tel: _____
Fax: _____ Year:
E-mail: _____

INTERNATIONAL SERVICES

Stations		Aircraft type Manufacturer and Model		Scheduled services			Non-scheduled services			% of drop-in biofuels (total services)
From	To	Passenger	Freighter	Fuel consumed (metric tonnes)	Tonne-kilometres performed	Tonne-kilometres avaiable	Fuel consumed (metric tonnes)	Tonne-kilometres performed	Tonne-kilometres avaiable	
1	2	3	4	5	6	7	8	9	10	11

DOMESTIC SERVICES

Aircraft type Manufacturer and Model		Scheduled services			Non-scheduled services			% of drop-in biofuels (total services)
Passenger	Freighter	Fuel consumed (metric tonnes)	Tonne-kilometres performed	Tonne-kilometres available	Fuel consumed (metric tonnes)	Tonne-kilometres performed	Tonne-kilometres available	
1	2	3	4	5	6	7	8	9