



**WORKING PAPER**

**TWELFTH AIR NAVIGATION CONFERENCE**

**Montréal, 19 to 30 November 2012**

**Agenda Item 6: Future Direction**

**6.1: Implementation plans and methodologies**

**QUANTIFYING THE ENVIRONMENTAL EFFECTS  
OF OPERATIONAL CHANGES**

(Presented by the Secretariat)

**SUMMARY**

This paper provides an overview of ICAO activities related to the quantification of environmental benefits associated with operational changes. The 37th Session of the ICAO Assembly invited States to submit action plans outlining their respective policies and actions to reduce international aviation CO<sub>2</sub> emissions to ICAO. In addition, States, through the planning and implementation regional groups (PIRGs) were invited to report on the improvements in fuel consumption being realized through current initiatives. Tools and guidance material have been made available by the Secretariat to support these activities. Of note is the ICAO fuel savings estimation tool (IFSET), which allows States without access to detailed fuel consumption modelling or measurement campaigns to estimate the fuel savings from the implementation of operational measures. States that have not yet submitted this information are encouraged to do so and assistance is available for those States who require it.

The ICAO Committee on Aviation Environmental Protection (CAEP) is currently assessing the potential environmental benefits associated with the implementation of the aviation system block upgrade (ASBU) Block 0 Modules. Support from States in the form of information and data is needed to ensure the success of this assessment.

**1. INTRODUCTION**

1.1 The 37th Session of the ICAO Assembly in October 2010 adopted Resolution A37-18: Consolidated statement of continuing ICAO policies and practices related to environmental protection – general provisions, noise and local air quality, and Resolution A37-19: Consolidated statement of continuing ICAO policies and practices related to environmental protection – climate change. Resolution A37-19 makes international aviation the first sector with a shared global commitment to the environmental goals of increasing fuel efficiency and stabilizing its global CO<sub>2</sub> emissions in the medium-term.

1.2 Operational measures are one of the elements in a basket of measures available to States to address the impact of aviation operations on the environment by offering the potential to reduce fuel consumption and hence, CO<sub>2</sub> emissions. As the Organization begins to measure progress toward the

global aspirational goals for CO<sub>2</sub> emissions established by the Assembly, it is important that information regarding operational changes is quantified, monitored, verified, and communicated in a clear and consistent manner. ICAO has developed guidance material and tools to assist States in quantifying the environmental benefits associated with operational changes.

## **2. STATE ACTION PLANS TO REDUCE CO<sub>2</sub> EMISSIONS**

2.1 Resolution A37-19 invited States to submit voluntary action plans outlining their respective policies and actions to reduce international aviation CO<sub>2</sub> emissions to ICAO. With support from the ICAO Committee on Aviation Environmental Protection (CAEP), guidance material was developed and a series of regional hands-on training workshops were held in 2011 so that States could communicate the basket of measures considered and information on any specific assistance needs in a consistent manner. A website that serves as an electronic template was also developed to assist States with the preparation and submission of their action plans. For preparing the action plans, 81 States nominated focal points (often more than one), with a total of 225 being trained worldwide during the six workshops. These States represent more than 92 per cent of the world's international aviation traffic.

2.2 When selecting a basket of measures to be implemented, States are encouraged to consider that there are recognized interdependencies between the environmental effects from aviation, such as noise and engine emissions, when defining source control and operational mitigation policies.

2.3 As of August 2012, States that represent 62 per cent of international aviation traffic have submitted their plans to ICAO. Of the action plans submitted, 96 per cent included some form of operational improvement in their basket of measures. ICAO is compiling the information received so that future progress to achieving the global aspirational goals can be assessed.

2.4 In October 2012, ICAO held the Assistance for Action – Aviation and Climate Change seminar to provide States and other stakeholders with an opportunity to exchange views and information on the assistance required to develop and implement policies and actions related to international aviation and climate change. The seminar considered synergies, existing measures and mechanisms by which ICAO and other relevant stakeholders can assist States to develop and implement climate policies and actions.

## **3. QUANTIFYING THE BENEFITS OF SELECTED MEASURES**

3.1 The quantification of the environmental effects of aviation system changes can be a challenging and resource-intensive task. In order to provide States with the ability to conduct these assessments, a guidance document titled “Environmental Assessment Guidance for Proposed Air Traffic Management Operational Changes” is being developed by CAEP. A preliminary version of this guidance document has been made available to States through the action plan on emissions reduction website to support the preparation of action plans, while the guidance is being finalized by CAEP.

3.2 Typically, the quantification of fuel savings from operational changes requires either the use of sophisticated models or the implementation of a detailed measurement campaign. Recognizing that many States do not have these capabilities, the ICAO fuel savings estimation tool (IFSET) was developed to assist States in quantifying the changes in fuel consumption that would result from the implementation of operational changes. This tool is not intended to replace the use of detailed measurement or modelling of fuel savings, where those capabilities exist. Rather, it is provided to assist those States without such facilities to consistently estimate the benefits from operational improvements. The tool was reviewed by

CAEP, which recommended making the initial version of IFSET available to States as soon as possible for the purposes of estimating changes in fuel consumption from the implementation of operational measures and obtaining State feedback.

3.3 The use of IFSET or a more sophisticated modelling capability can directly support the development of an action plan as well as to report to ICAO on the improvements in fuel consumption from the implementation of operational measures. States are encouraged to quantify these savings and to include their expected results in the action plans submitted and to report the results already achieved to through their planning and implementation regional group (PIRG).

#### 4. ASBU BLOCK 0 BENEFITS

4.1 The modules contained in the aviation system block upgrades (ASBUs) are expected to deliver a global air traffic management (ATM) system that should contribute to the protection of the environment by considering noise, gaseous emissions and other environmental issues. Of particular interest is the contribution of the different modules to the environment considering the global aspirational goals for CO<sub>2</sub> emissions established by the 37th Session of the ICAO Assembly.

4.2 CAEP, in partnership with the operational community, is in the process of assessing the ASBU Block 0 Modules in order to quantify their environmental benefits. Support from States in the form of information, particularly data that quantifies the fuel savings associated with the changes being implemented, will help to ensure the success of this assessment. The results of this analysis are expected to be included in the inaugural air navigation capacity report in January 2014.

#### 5. OUTREACH

5.1 As the United Nations specialized agency for international civil aviation, it is the Organization's responsibility to communicate the achievements by aviation in reducing their CO<sub>2</sub> emissions. Access to transparent, accurate information is particularly critical in the context of many discussions related to CO<sub>2</sub> emissions and climate change by individuals and organizations who are not experts in the field of aviation. ICAO has developed numerous publications (e.g. environment report), videos on key topics of interest (e.g. alternative fuels), and maintains a website ([www.icao.int/env](http://www.icao.int/env)) with information on aviation and the environment. These resources provide an impartial source of factual information on the topic. States can support these important outreach activities by sharing information about their initiatives and research with ICAO.

#### 6. CONCLUSION

6.1 Operational improvements are an important element in the basket of measures that a State can implement to improve the environmental performance of their aviation system. In order for ICAO to accurately quantify, monitor, communicate, and verify the progress achieved and the anticipated future progress toward the global aspirational goals, it is important that States provide consistent information on their plans and expected results from their aviation system changes.