

FOURTH MEETING OF THE ALLPIRG/ADVISORY GROUP

(Montreal, 6 – 8 February 2001)

Agenda Item 2.2: Interregional coordination and harmonization mechanism – Environmental benefits of CNS/ATM systems

ENVIRONMENTAL BENEFITS ASSOCIATED WITH THE IMPLEMENTATION OF CNS/ATM SYSTEMS IN THE CAR/SAM REGIONS

(Presented by the Secretariat)

SUMMARY

As part of the planning for the gradual implementation of CNS/ATM systems in the CAR/SAM Regions, environmental benefits have been identified resulting mainly from the reduction of flying time (more direct routing) and the capability to permit aircraft operators to fly at their requested flight levels. In line with the work being carried out by the Committee on Aviation Environmental Protection (CAEP), the resulting benefits are expressed as a percentage of improved efficiency and presented in the appendix.

1. INTRODUCTION

1.1 It has been accepted right from the beginning that the implementation of the ICAO communication, navigation, surveillance/air traffic management (CNS/ATM) systems would, in addition to improving flight safety and efficiencies, bring significant environmental benefits. These benefits are obtained mainly because of the reduced fuel burn resulting from diminished flying time and delays, as well as from enabling aircraft operators to fly at their optimum or preferred flight level.

1.2 At the third session of the Conference of the Parties to the United Framework Convention on Climate Change (Kyoto, Japan, December 1997) ICAO was recognized as the forum through which developed countries should pursue the limitation or reduction of greenhouse gas emission (carbon dioxide (CO₂), nitrogen oxides (NO_x), carbon monoxide (CO) and Hydrocarbons (HC)) from aviation bunker fuel.

1.3 As part of Project RLA/98/003, which has been set up by ICAO with the assistance of CAR/SAM States, an evaluation of environmental benefits is being carried out simultaneously with the detail analysis of the eighteen main traffic flows identified by GREPECAS in the CAR/SAM Regions. The following section presents the methodology used in the evaluation of the environmental benefits; the results obtained for the nine traffic flows analysed so far for the first two phases of the project are presented in the appendix hereto.

2. METHODOLOGY FOR THE EVALUATION OF ENVIRONMENTAL BENEFITS

2.1 While the ultimate objective of the planning process is the implementation of CNS/ATM systems, there are immediate benefits that can be achieved through the implementation of RNAV RNP routes. In line with the above, each flow was surveyed for a period of two weeks to establish the volume and type of traffic on the flow, as well as to determine the percentage of flights unable to proceed at their requested flight levels.

2.2 Knowing the present routes being used by aircraft operators between city pairs and the reduction in distance that would result from the introduction of direct routing, it was possible to establish the diminishment in flying time for each one of the flights. For this calculation, a cruising speed of 8 Mach has been used and the fuel burn reduction expressed as a percentage of total fuel consumption for the trip.

2.3 Furthermore, having sampled the number of flights unable to fly at their requested flight level, which also has an affect on the fuel consumption, and using the following conservative assumptions, estimates of the resulting fuel savings were produced. Such assumptions are:

- only 20% of the flights would be conducted at a less than optimum flight level; and
- fuel burn efficiency loss would amount to 8% of the normal fuel burn, considering that, for multiple flight levels, this value could be as much as 13% and as little as 1.49% when flying at the next-to-requested level.

2.4 From the above, we can observe that only the main elements (reduced flying time and preferred flight levels) have been considered in the evaluation of the fuel burn saved, and that the assumptions used are quite conservative. It is likely that additional savings can be achieved through more efficient arrival/departure management and other similar improvements which, unfortunately, could not be included in the evaluation at this time.

3. CONCLUSION

3.1 The gradual evolution towards CNS/ATM systems will bring significant environmental benefits through reduced flying times and the ability to fly at requested flight levels. The efficiency improvements shown in the appendix are expressed as a percentage of total fuel burn reductions for flights between sets of city pairs on the different CAR/SAM traffic flows.

4. ACTION BY ALLPIRG

4.1 The meeting is invited to note the information contained in this paper.

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