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International Civil Aviation Organization
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Transition to the CNS/ATM Systems in the CAR and SAM Regions

**Sixth Meeting/workshop of Air Traffic Management (ATM) Authorities and
Planners for RVSM, RNAV routes and RNP implementation in the CAR and SAM Regions**

(San José, Costa Rica, 29 September-3 October 2003)

Agenda Item 2: Action Plan for RNP Implementation in the CAR/SAM Regions

**a) Review of the Action Plan for RNP 10 Pre-Operational Implementation
in parallel routes UL 780 and UL 302 in the Santiago de Chile-Limasegment**

Cost/Benefit analysis

(Presented by IATA)

Summary

This working paper presents a cost/benefit analysis for the users on the implementation of RNP-10 in the RNAV routes UL780 and UL302 between Lima and Santiago de Chile.

1. Introduction

1.1 The purpose of this working paper is to present to the States a cost/benefit analysis with the application of RNP-10 for the airlines operating in the UL780 from SULNA to MOXES and in UL320 from ATEDA to ILMAR.

1.2 The RNP-10 benefits for the airlines are based on an increase in capacity of the airspace, therefore a better utilization of the flight levels will be derived from a reduction in separation. The airspace on UL780 and UL320 is not saturated, but since both airways are considered as a single airway in terms of longitudinal separation, the application of RNP-10 will allow the use of these airways independently, reducing departing and en-route delays.

2. Discussion

2.1 The IATA Member Airlines have been consulted about the possible benefits and/or inconvenient application of RNP-10 on the referred airspace; all the airlines have manifested their agreement on the implementation of RNP-10.

2.2 In the year 2000, some airlines reported delays leaving Santiago northbound as well as leaving Lima southbound. These delays ranged from 5 to 10 minutes. It is presumed that the southbound traffic north of Lima, destination Santiago, experimented some en-route delays also, but there is no record of it.

2.3 Since the year 2000, traffic on the proposed RNP-10 area has decreased, and at the present time no delays are reported. But considering that in the year 2004 traffic is expected to reach or exceed the 2000 levels, the traffic encountered in the year 2000 has been used to develop this cost/benefit analysis.

3. Equipment

3.1 Thirteen airlines operated 228 weekly scheduled flights in the RNP-10 proposed area; the equipment used on these flights is:

A320, A340, B727, B737-200, B737-700, B747-400F, B767-200, B767-300, B777-200, IL-62.

3.2 Except for the B727-200 and B737-200, all the aircraft have RNAV and RNP-10 capability, and the process to achieve RNP-10 approval is simply to request it from the Civil Aviation Authority.

3.3 It is uncertain as to whether the B727-200 and the B737-200 have RNAV capability, but it is certain that they do not have RNP-10 capability. If this fleet is not RNAV, it should not be operating in UL320 and UL380. Therefore, the B727-200 and B737-200 have not been considered in the savings analysis. These fleets operated 13 weekly flights in year 2000; most probably by implementation date, these fleets will be replaced.

Weekly Traffic in 2000 on Airways UL780 and UL320										
City-pairs		Num.	Acft.	Num.	Acft.	Num.	Acft.	Num.	Acft.	Total
Santiago	Cancun	5	B767							5
Santiago	Chicago	2	B747F							2
Santiago	Dallas	14	B777							14
Santiago	Guayaquil	8	B767	6	B727	3	A320			17
Santiago	Havana	2	B767	3	IL62					5
Santiago	Lima	14	A340	40	B767	14	A320	7	B737	75
Santiago	México	18	B767							18
Santiago	Miami	71	B767	3	B747F					74
Santiago	New York	4	B767							4
Santiago	Panamá	14	B737-700							14
								Total --->		228

4. **Cost/Savings**

4.1 It is estimated that the average delay in flights leaving from Santiago and Lima is three minutes. Southbound en-route delays have not been considered since there are no records of them, although they probably do exist. This fact makes this cost/benefit analysis more conservative.

4.2 Considering the operational average cost per minute of taxi-out delay of \$26.83 we have:

$$215 \text{ flights per week} \times 3 \text{ minutes} \times 52 \text{ weeks} \times 26.83 \text{ USD} = \text{USD } 899.878$$

4.3 Then, we can say that the theoretical savings produced by the implementation of RNP-10 in the UL780 and UL302 would be in the vicinity of 0.9 million USD.

4.4 The costs assumed by the airlines are those related to the CAA RNP-10 approval and to crew training. These costs are almost impossible to evaluate, but certainly are below the operational savings.

4.5 A caveat when reviewing the information provided in this working paper; data employed is highly estimated. The purpose is to demonstrate that implementation is beneficial, and not to provide definitive savings for the operators.

5. **Action Requested:**

5.1 Take note of the information presented.