



Agenda Item 2: SAM airspace optimisation
a) En-route PBN

ATS ROUTE OPTIMISATION PROGRAMME IN THE SOUTH AMERICAN REGION

(Presented by the Secretariat)

SUMMARY	
This working paper presents the status of implementation of Phase 3, Version 02 of the SAM ATS Route Optimisation Programme, with calculations of fuel and CO ₂ savings using the IFSET tool.	
REFERENCES	
<ul style="list-style-type: none">• Reports of the workshops/meetings of the SAM Implementation Group.• Report of the ATSRO/5 meeting, Lima, Peru, 1-5 July 2013.	
ICAO Strategic Objectives:	<i>A - Safety</i> <i>C - Environmental protection and sustainable development of air transport</i>

1. Background

1.1 The SAM/IG/11 meeting took note of the significant progress being made in the Region in route optimisation, and resolved that the ATS/RO meetings should implement the Route Optimisation Programme based on the plans developed by SAM/IG meetings, applying a more ample concept covering the whole airspace.

1.2 Notwithstanding the above, route UM662 was implemented before schedule with a view to optimising the Guayaquil-Madrid route. The Secretariat coordinated with Ecuador, Colombia, and Venezuela.

1.3 Based on the 160 monthly operations carried out along that route (60 B767 operations, 60 A340 operations, and 40 B777 operations), the IFSET tool has calculated an initial annual savings of **730.800 kilograms of fuel** and an annual reduction of **2.307 tonnes of CO₂** from the date of its implementation on 17 October 2013.

2. Discussion

2.1 SAM States have shown interest in reducing fuel consumption and, thus CO₂ emissions into the atmosphere, through the optimisation of the ATS route network.

2.2 During the 2001-2012 period, CO₂ emissions into the atmosphere were reduced by approximately 134,460 tonnes per year. This is a conservative estimate that does not take into account the reduction in CO₂ emissions resulting from RVSM implementation in the SAM Region in 2005.

2.3 At the ATS/RO/5 meeting held in Lima on 1-5 July 2013, the States analysed and updated the set of routes proposed for the optimisation of ATS route network in the SAM Region, Phase 3, Version 02. Likewise, terminal area gateways were taken into consideration and paths were updated.

2.4 When planning this implementation, it was felt advisable to divide route implementation into two stages, as shown in the report of the ATSRO/5 meeting, taking into account that some States were also significantly redesigning their terminal areas. The remaining routes of Version 02 are open to new adjustments while the first stage is being implemented.

2.5 Regarding the first implementation stage, it was felt advisable to set two different dates for two different groups of routes. For the first date, 2 new RNAV routes were selected, and 11 routes were realigned, several segments of which were eliminated to make the routes more direct and save a total of 123 NM in 1,151 monthly operations, mainly B 737, A 320, and B767 aircraft.

2.6 This first stage of Phase 3, Version 02 of the SAM route optimisation will be implemented on 12 December 2013. Using the IFSET tool, it was estimated that **11.760.000 kg** of fuel would be saved and **37.161 tonnes of CO₂** reduced per year, starting on the implementation date. The second date of the first stage was set for June 2014.

2.7 In summary, with the early implementation of route UM662, in addition to the implementation of the first stage of Phase 3, Version 02 of the ATSRO programme, **an annual reduction of 39.468 tonnes of CO₂** is achieved.

Selected period	Reduction of CO ₂ emissions, in tonnes
2001 to 2012	134,460
2013 to 2014	39.468

2.8 The following table shows the optimisations made to date under the ATSRO Programme.

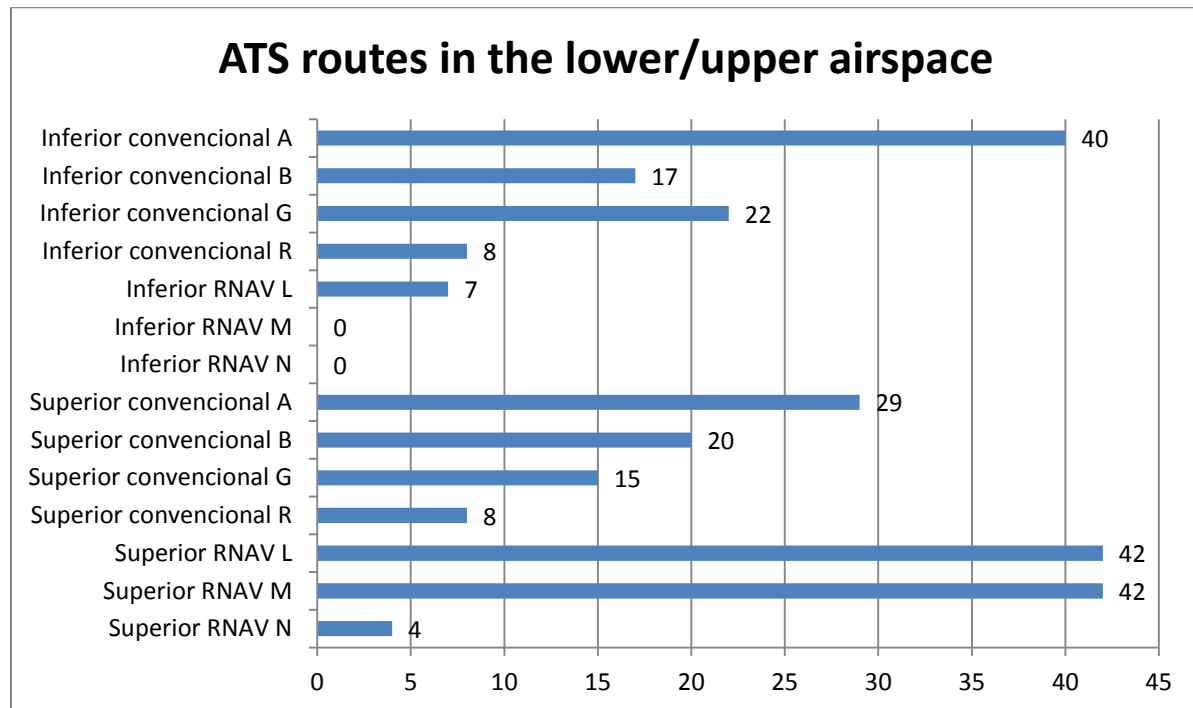
Route optimisation in the South American Region			
Phase/Version	Status	Date	Optimisation
Phase 1 - RNAV-5	Implemented	October 2011	77 new RNAV routes 58 routes optimised 7 routes eliminated
Phase 2 - Version 01	Implemented	March 2011	15 new routes 19 routes optimised 18 routes eliminated

Route optimisation in the South American Region			
Phase/Version	Status	Date	Optimisation
Phase 3 - Version 02	Stage 1	October 2013	1 RNAV route - UM 662
		December 2013	2 new routes 11 routes optimised 4 segments eliminated
		June 2014	6 routes optimised
	Stage 2	November 2014	12 candidate routes under study

2.9 The study conducted by the consultant on regional efficiency indicators for the SAM ATS route network revealed that a total of 254 regional ATS routes have been published, 94 in the lower airspace (37%) and 160 in the upper airspace (73%).

2.10 Regarding the **94 ATS routes** of the lower airspace, 87 correspond to conventional routes (routes A, B, G, and R), accounting for 92%, and 7 to PBN routes (routes L, M, and N), accounting for 8% of the total. Regarding the 160 ATS routes in the upper airspace, 72 (45%) correspond to conventional routes (routes A, B, G, and R) and 88 (55%) to PBN routes (routes L, M, and N).

2.11 The graph below shows the number of conventional ATS and PBN routes in the lower and upper airspace of the SAM Region:



2.12 In summary, out of the 254 routes that make up the regional ATS route network, 159 (62%) correspond to conventional routes, and 95 (38%) to PBN routes.

Total number of ATS routes	PBN routes	ICAO indicator: % PBN routes
254	95	38%

2.13 Another important issue related to route optimisation is the need for States to identify conventional routes that, being aligned and having the appropriate RNAV-5 coverage, may change their designator to RNAV. In this regard, the States are requested to provide information at the next ATSRO meeting on the routes that meet the conditions to change their designator.

2.14 Regarding two-way RNAV-10 routes with a separation of 50 NM over the Pacific, it is necessary to study the possibility of implementing RNP-4 navigation with a separation of 30 NM, and/or assigning one single direction to both routes for the sake of safety. To this end, it would be necessary to know the navigation capability of the fleet operating on these routes.

3. **Suggested action:**

3.1 The Meeting is invited to review the information provided in this working paper and propose the action it may deem appropriate in order to continue with the regional airspace optimisation process.

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