



SAM/IG/5
WP/03
09/04/10

**International Civil Aviation Organization
South American Regional Office**

**FIFTH WORKSHOP/MEETING OF THE SAM IMPLEMENTATION GROUP (SAM/IG/5)
REGIONAL PROJECT RLA/06/901**

Lima, Peru, 10 to 14 May 2010

Agenda Item 2: Optimization of the ATS routes

(Presented by the Secretariat)

Summary

This working paper proposes to the Meeting to proceed with the review of the results of the First SAM Workshop on ATS Routes Network Optimisation (SAM ATSRO/1) as regards the proposals for elimination, realignment and implementation of routes foreseen for version 01 of the SAM routes network and the opportunities of expected improvements with such optimization.

References:

- First SAM Workshop on ATS Routes Network Optimisation (SAM ATSRO/1) – Lima, Peru, 1 to 5 March 2010) Report

ICAO Strategic objectives

A: *Safety*
D: *Efficiency*

1 Background

1.1 The First SAM Workshop on ATS Routes Network Optimisation (SAM ATSRO/1) was held at the ICAO SAM Regional Office facilities in Lima, Peru, from 1 to 5 March 2010. Seven States of the SAM Region attended this meeting, Argentina, Bolivia, Brazil, Panama, Paraguay, Peru and Uruguay, and one International Organization, IATA, making a total of 18 participants.

2 Analysis

2.1 Taking as a basis the planning criteria and analysis/diagnosis of the SAM ATS routes network, the Meeting reviewed the SAM routes network optimization programme. It took note that the programme will be carried out in phases, in order to achieve the corresponding operational benefits as early as possible. The use of versions of the routes network reflects the need for its periodical revision in an integrated manner, so as to always ensure the best possible airspace structure.

2.2 The Meeting also reviewed and introduced some amendments to the action plan associated to the SAM ATS routes network optimization programme, which contemplates tasks in charge of defined responsible officers with established dates of compliance.

Analysis of Version 01 of the SAM ATS routes network

2.3 The Meeting took note and analysed the three implementation phases that were approved by the SAM Implementation Group Meeting: Phase 1, RNAV-5 Implementation, Phase 2, SAM ATS routes network Version 01 Implementation, and Phase 3 - SAM ATS routes network Version 2 Implementation, agreeing that the work carried out has enabled a complete diagnosis of each one of the SAM FIRs. The analysis was based on the following aspects: number of city pairs, number of flights in each ATS route, city pairs served by each ATS Route, number of flights per aircraft type/operator, number of flights per flight level.

2.4 This study also permitted the analysis of domestic and international routes which could, and in some cases should be eliminated as per their use. This action could lead to a reduction in the airspace complexity, keeping in mind that it would enable a re-designing of the airspace structure and to an optimisation of the air traffic en-routing in the SAM FIRs.

2.5 The analysis was made based on the forms developed by Regional Project RLA/06/901, with the main objective to identify the routes that should be eliminated, taking as a basis those which had air traffic lower than 30 flights per month.

2.6 As a result, initially 169 domestic and international routes were evaluated, which could be eliminated, optimized or substituted by other routes with a better trajectory. From that total, 44% will be eliminated, while 56% will be maintained, realigned and optimized as per agreements reached (**Appendices A and B** to this working paper).

2.7 The Meeting also consolidated those routes that should be implemented as of the agreements reached in different regional meetings (bilateral, multilateral and SAM/IG), and new proposals by users and States.

2.8 Keeping in mind the work carried out, the First SAM Workshop on ATS Routes Network Optimisation agreed on Conclusion ATSRO/1-1, which indicates that SAM States and IATA must assess more thoroughly the proposals of ATSRO/1, with a view to present the results of such assessment during the SAM/IG/5 Meeting, so that such information be incorporated into Version 01 of the SAM ATS Routes Network, which is being presented to the meeting through working paper 7 (WP/07).

3 **Analysis**

3.1 The Meeting is invited to:

- a) Review Appendices A and B to this working paper; and
- b) If necessary, make corrections or update information and incorporate it into Version 01 of the SAM ATS Routes Network, which is being presented to the Meeting through working paper 7 (WP/07).

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APPENDIX A

Analysis of the routes with air traffic movement below 30 monthly flights

ATS Route	States involved	Action	Remarks
UB554	Bolivia/Brazil/ Paraguay	Suspend/Eliminate	Only segment FOZ-Cuiaba
UA306	Argentina/Uruguay	Is maintained	Route often used in high season
UA307	Argentina/Chile/ Paraguay	Is maintained	Routes of cargo flights from SGES to SCEL
UA308	Argentina/Brazil / Uruguay	Suspend/Eliminate	Coincident with UN857
UA310	Argentina/Brazil / Uruguay	Maintain (Argentina) Suspend /Eliminate	Route used in high season (Argentina). Eliminate segment between VOR CRR and VOR SCB. Realign UM792 from VOR CGO/Melo to VOR SCB/Melo
UA312	Brazil /Guyana	Suspend/Eliminate	Coincident with UZ28 and new RNAV route
UA314	Argentina/Brazil / Uruguay	Suspend/Eliminate	Coincident with UN741 between Ezeiza and Bage. Flights between SBPA and SAEZ will use new Route SBPA-Rosario.
UA316	Brazil/Bolivia	Suspend/Eliminate	Coincident with UL322. Addition of movements of two Routes (UA316 and UL322) was 31 flights
UA432	Argentina/Uruguay	Suspend/Eliminate	Eliminated through the implementation of a new direct RNAV route between SBPA/SACO;
UA562	Venezuela	Suspend/Eliminate	
UA566	Brazil /Colombia	Is maintained	Attend cargo flights (APW) SBEG/SEQU. Verify if it would be advisable to change name to UA565
UA632	Suriname	Suspend/Eliminate	
UB556	Argentina	Is maintained	Only Route which enables link with New Zealand
UB561	Argentina	Suspend/Eliminate	
UB652	Brazil/Bolivia	Suspend/Eliminate	

ATS Route	States involved	Action	Remarks
UB680	Brazil/Suriname	Maintain/Implement	Maintain in Rochambeau FIR and re-implement in Amazónica/Brasilia FIR. Requested to IATA, will evaluate the need for viability of realignment
UB681	Brazil/Guyana Francesa	Is maintained	Only Route between SBBV and SYGC
UB682	Argentina	Is maintained	
UB687	Argentina	Is maintained	Regular flights
UB695	Brazil/Paraguay	Suspend/Eliminate	Replaced by Route SGAS /SBBR (UM403)
UG680/UB 449	Argentina/ Brazil/Uruguay	Eliminate	Route UG680 (VOR GUA/VOR BGE); Route UB 449 (VOR GUA/VOR MLO) will be eliminated when <i>Porto Alegre/Rosario is implemented (See Appendix B)</i>
UL211	Argentina	Is maintained	Only Route available to intercept the entry/exit point to the AORRA
UL216	Bolivia/Brazil/ Paraguay/Venezuela	Is maintained	Alternate route for the exit of Ciudad del Este towards the Northern sector of the Asunción FIR. Verify if the Route is not being used due to communications problems in the Maiquetía FIR or lack of continuity of the route in the CAR Region
UL309	Brazil/Bolivia/Chile/Venezuela	Suspend/Eliminate	The route does not appear in the Venezuela AIP. However it is in the DOD chart. Verify if the Route is not being used due to communications problems in the Maiquetía FIR or lack of continuity in the route in the CAR Region.
UL322	Brazil/Venezuela	Is maintained	
UL324	Argentina/Brazil/Uruguay	Is maintained	Low movement in the collection, because aircraft are in ascent-descent phase.
UL330	Brazil	Is maintained	Entry-exit route for AORRA
UL335	Brazil	Is maintained	Entry-exit route for AORRA
UL340	Brazil	Is maintained	Entry-exit route for AORRA
UL540	Brazil/Bolivia	Is maintained	240 flights in the Amazónica FIR
UL650	Argentina	Suspend/Eliminate	
UL775	Argentina	Is maintained	

ATS Route	States involved	Action	Remarks
UL793	Argentina/Bolivia/Brazil/Paraguay	Is maintained	Route Coincident with UW65. High air traffic movement collected in Route UW65.
UM409	Brazil/Venezuela	Is maintained	449 flights in the FIR Amazónica. Verify why there are no flights in the Maiquetía FIR
UM417	Brazil	Is maintained	The route must be used by Flights of North America and Central America towards TMA-SP. It is not yet being used due to lack of inclusion in the part of preferential routes from Brazil AIP. Verify why there are no flights in the Maiquetía FIR
UM423	Brazil/Venezuela	Is maintained	122 movements in the Amazónica FIR. Verify why there are no flights in the Maiquetía FIR
UM527	Brazil/Guyana	Is maintained	Impemented further data collection.
UM529	Argentina	Is maintained	LAP regular flights
UM544	Brazil/Paraguay	Suspend/Eliminate	For use Asunción/Campo Grande route
UM654	Argentina/Brazil/ Uruguay	Maintain/Cambiar sentido	Change way from BRU to Ezeiza VOR
UM656	Brazil/Venezuela	Is maintained	Is one by-pass route to avoid over-flights and air traffic concentration in Manaus TMA. It is not being used due to lack of communications coverage in the Maiquetía. ACC
UM662	Venezuela	Suspend/Eliminate	Low movement
UM778	Venezuela	Suspend/Eliminate	Low movement
UM787	Venezuela	Suspend/Eliminate	Low movement
UM789	Argentina/Paraguay	Is maintained	Alternativa para flights in caso de problema con meteorología en the UM799.
UM796	Venezuela	Suspend/Eliminate	Low movement
UN741	Argentina/Brazil/Uruguay	Is maintained	Route Coincident with UA314. High air traffic movement collected in the Route UA314.

ATS Route	States involved	Action	Remarks
UN857	Argentina/Brazil/Uruguay	Is maintained	Route Coincident with UA308. High air traffic movement collected in the Route UA308.
UR550	Argentina/Brazil/Bolivia	Suspend/Eliminate	Low movement
UR554	Argentina/Paraguay	Is maintained	
UR558	Brazil	Suspend/Eliminate	Coincident with UL309
UR559	Brazil; Bolivia/Perú	Suspend/Eliminate	
UR563	Argentina/Brazil	Suspend/Eliminate	Extend UL216 up to Porto Alegre
UT101	Argentina	Suspend/Eliminate	Only one operator uses this route, there is a shorter route, used by Other Airlines.
UT102	Argentina	Suspend/Eliminate	Low movement
UT103	Argentina	Suspend/Eliminate	Low movement
UT105	Argentina	Suspend/Eliminate	Low movement
UT106	Argentina	Suspend/Eliminate	Low movement
UT653	Argentina	Suspend/Eliminate	Change Route UW57 to bi-directional in the segment San Juan / Rio Quarto / San Juan; UW10 bi-directional.
UT656	Argentina	Suspend/Eliminate	Low movement
UT657	Argentina	Suspend/Eliminate	Low movement
UW12	Brazil	Suspend/Eliminate	Coincident with UZ24
UW15	Argentina	Eliminate	Córdoba-Tandil Segment
UW16	Brazil	Suspend/Eliminate	Low movement
UW17	Argentina	Suspend/Eliminate	Low movement
UW17	Brazil	Is maintained	Route used between SBRB /SBEG, daily by Brazilian Airlines. Verify possible problem in data collection.
UW20	Argentina	Is maintained	Route is part of a route between SAZS/SABE
UW22	Brazil	Is maintained	Route will be extended to attend Flights between Rio de Janeiro and Ribeirão Preto.
UW26	Argentina	Is maintained	Is part of route SAZS /SABE

ATS Route	States involved	Action	Remarks
UW28	Brazil	Is maintained	La Route is used for flights between SBCG/SBCY/SBAT
UW29	Argentina	Is maintained	The route has a low air traffic movement because flights are carried out in the lower airspace. The route is maintained due to the high air traffic volume between Mar del Plata/Buenos Aires and considering that a change in the flight-operator may occur that leads to the operation to the upper airspace.
UW34	Venezuela	Suspend/Eliminate	Low movement
UW36	Argentina	Suspend/Eliminate	Low movement
UW38	Argentina	Suspend/Eliminate	Low movement
UW39	Argentina	Suspend/Eliminate	Low movement
UW4	Venezuela	Suspend/Eliminate	Low movement
UW42	Venezuela	Suspend/Eliminate	Low movement
UW42	Brazil	Suspend/Eliminate	Route Directa UZ17
UW46	Argentina	Suspend/Eliminate	Low movement
UW47	Brazil	Is maintained	800 flights in the FIR Curitiba
UW48	Brazil	Is maintained	230 flights in the FIR Curitiba
UW49	Brazil	Is maintained	149 flights in the FIR Curitiba
UW5	Venezuela	Suspend/Eliminate	Low movement
UW5	Brazil	Suspend/Eliminate	Suspend/Eliminate segment Belém-Belo Horizonte. Extend Route UZ3 from CNF to CAX.
UW50	Argentina	Suspend/Eliminate	Low movement
UW51	Brazil	Suspend/Eliminate	In function of the arrival flow in TMA SP
UW52	Brazil	Suspend/Eliminate	Coincident with UZ22
UW63	Argentina	Suspend/Eliminate	Low movement
UW64	Argentina	Is maintained	Is part of the Route SAEZ/SGAS
UW65	Argentina	Suspend/Eliminate	Coincident with UL793
UW68	Argentina	Suspend/Eliminate	Suspend/Eliminate segment VOR SRA / VOR GPI
UW7	Venezuela	Suspend/Eliminate	Low movement

ATS Route	States involved	Action	Remarks
UZ13	Brazil	Is maintained	This route should be used by Flights from KJFK to SBGL, since it is a shorter route, avoid over-flight of TMA BR and flight concentration towards TMA RJ and SP.
UZ15	Brazil	Is maintained	Route used in high season and weekends
UZ23	Brazil	Suspend/Eliminate	Flight attended by Route UL304
UZ28	Brazil	Replace	New RNAV international route, from PCX to TIM.
UZ29	Brazil	Is maintained	Used for restricted deviated airspace
UZ4	Brazil	Is maintained	Currently, there is at least on daily flight of one airline
UZ8	Brazil	Is maintained	Shorter route between SBCY and the TMA SP
UR560	Argentina	Eliminate	Low movement
UT651	Argentina	Eliminate	Low movement
UW17	Argentina	Eliminate	Low movement
UW19	Argentina	Eliminate	Low movement
UW7	Argentina	Eliminate segment Resistencia/Tucumán	Low movement
UW2	Argentina	Is maintained	
UW3	Argentina	Is maintained	
UW6	Argentina	Is maintained	
UW23	Argentina	Is maintained	
UW24	Argentina	Is maintained	
UL322	Bolivia, Argentina and Chile	Is maintained	Over-flight traffic recorded by La Paz FIR between Viru Viru, Salta and Tucumán. Not recorded by Córdoba and Antofagasta/Santiago FIRs. Mendoza FIR only records one flight
UR683	Argentina/Chile	Eliminate	Low movement
UW37	Argentina	Suspend/ Eliminate	Low movement
UW44	Argentina	Is maintained	
UW57	Argentina	Is maintained	Change to bi-directional in the segment VOR San Juan / VOR Rio Cuarto (See App. B)
UW10	Argentina	Is maintained	Change to bi-directional in the segment VOR Rio Cuarto/VOR San

ATS Route	States involved	Action	Remarks
			Antonio de Areco (See App. B).
UW10	Bolivia	Is maintained	Joins cities of Trinidad and Cochabamba. The intentions of the State are to foster air traffic between both cities in the upper airspace.
UA568	Bolivia	Eliminate	Joins Trinidad and La Paz: will be changed to national route
UA573	Bolivia and Perú	Eliminate	
UM530	Bolivia and Brazil	Is maintained	Appears in charts but not in the AIP. Has not been implemented in Brazil, but keeps the intention to implement it. There is no implementation date.
UB652	Bolivia and Chile	Eliminate	With no traffic in Bolivia and Chile
UA558	Bolivia and Argentina	Is maintained	Important traffic in Córdoba FIR.
UL797	Bolivia and Chile	Is maintained	Viru Viru - Iquique
UW3, UW8 and UW7	Bolivia	Eliminated	Are eliminated in Bolivia. Must be deleted from the AIP and its data.
UM424	Chile and Argentina	Is maintained	Without record in FIR Antofagasta/Santiago. FIR Mendoza registers important air traffic.
UW23G	Ecuador	Is maintained	Only Route between Quito - Pastaza
UW9	Ecuador		Only Route Quito - Salinas
UW21G	Ecuador	Is maintained. Change to RNAV	Only Route Quito - Galápagos - Oceanic Route
UW2	Ecuador	Is maintained Change to RNAV	Route Guayaquil- Salinas- Galápagos - Oceanic Route
UG426	Panamá, Perú, Ecuador, Colombia	Change to RNAV; Realign; request to CAR Region	Not enough NAVAID coverage.
UG437	Panamá	Eliminate at the North of Panamá - Consultation with CAR Region.	At the north of Panama overlaps with Route UL780 and there is not sufficient NAVAID coverage.
UR505	Panamá	Eliminate	Must be consulted previously with CAR Region.

ATS Route	States involved	Action	Remarks
UG434, UB510, UG426 and UA319	Panamá, Ecuador, Colombia	Change to RNAV Consult with CAR Region	There is no sufficient NAVAID coverage
UV11, UV16, UV18 and UV20	Panamá	Eliminate	Will be only from the lower airspace
UG431.	Perú and Colombia	Eliminate or realign and Change to RNAV route.	Route UL305 too close. There is no sufficient NAVAID coverage
UG430	Perú and Colombia	Eliminate segment IQT-Pto. Leguizamo-GIR	Duplicity with Routes UA321 and UG431
UB677	Perú and Bolivia	Change to RNAV route segment LIM- EQU-La Paz; Eliminate segment La Paz - Cochabamba-Viru Viru	There is no sufficient NAVAID coverage; change to domestic route
UT222	Perú	Eliminate segment EQU-KOMPA	
UG437	Perú, Ecuador, Colombia, Panamá	Eliminate segment Guayaquil to the north; realign and change to RNAV segment SLS – Guayaquil	Overlaps with UL780 as of GYV to the north. There is no sufficient NAVAID coverage
UG436	Ecuador/Perú	Realign and Change to RNAV	Route mostly oceanic
UM538	Panamá, Colombia and Ecuador	Its elimination is proposed.	Low movement
UA566	Perú and Ecuador	Change to RNAV	There is no sufficient NAVAID coverage
UA565	Perú, Colombia and Ecuador	Change to RNAV	There is no sufficient NAVAID coverage
UB696	Perú and Ecuador	Eliminate	Low movement

ATS Route	States involved	Action	Remarks
UL474:	Panamá	Consult with CAR Region	San José-Santo Domingo and Europe; Flights leave CAR Region to the South and enter the SAM Region (Panamá) and follow to the North-East and enter again to the CAR Region.
UA502	Panamá	Is maintained	Traffic to/from CAR Region. The State has plans to promote aviation in the route.
UG448	Panamá	Is maintained	Together with combined routes, they have an important traffic to Colombia.
UM664	Perú, Bolivia and Chile	Is maintained	Traffic SLLP-ARICA
UL312	Perú and Ecuador	Is maintained	Route Lima – Los Angeles
UR567	Perú and Colombia	Eliminate. Consult with Colombia	Two flights registered in Bogotá FIR and three in the Lima FIR. Data recorded apparently incoherent.
UT652	Argentina	Suspend/Eliminate	Segment ESITO/SOLER

Appendix B

ATS Routes to Implement/Realign in Version 01 of the SAM Routes Network

Version 01 – Implementation/Realignment		
ATS Route	States involved	Remarks
Porto Alegre (SBPA) /Córdoba (SACO)	Argentina/Brazil/Uruguay	Route UA432 (VOR Córdoba and VOR Porto Alegre) is eliminated
Porto Alegre (SBPA) /Rosario (SAAR)	Argentina /Brazil/Uruguay	Routes UG680 (VOR GUA/VOR BGE) and the Route UB 449 (VOR GUA/VOR MLO) are eliminated
TMASP-TMASV	Brazil	Pending on the agreement to enter restricted airspaces
UM 784	Argentina/Bolivia/Brazil/Colombia/ Panamá/Perú/Uruguay	-Panamá/Iquitos/APARE/VOR SIS/VOR MCS/SUMU -Segment KIVEC/APARE (Bolivia) implemented
Santiago/Lima-Miami	Chile, Colombia, Ecuador, Panamá and Peru	Former proposal of IATA for the RNAV route SCEL – KMIA could not be implemented due to different difficulties: forbidden airspaces, insufficient communications and surveillance coverage. In order to optimise current alternatives, the following RNAV route is proposed: - LIM VOR, - BOKAN INT (FIR Guayaquil / FIR Bogotá boundary) - PML VOR (La Palma, FIR Panama) - UCA VOR (Ciego de Avila, FIR La Habana) - URSUS INT
Santiago / Sao Paulo	Argentina, Brazil and Chile	Realignment of existing routes, with a view to increase operations efficiency.
UM530	Brazil	Implementation of route VOR RBC (FIR Amazónica / VOR BRS (FIR Brasilia) – proposal from Brazil. Route already implemented in La Paz FIR
UM662	Colombia, Ecuador and Venezuela	Implementation of Route Guayaquil / Madrid

Version 01 – Implementation/Realignment		
ATS Route	States involved	Remarks
UM661	Brazil	Route published in Montevideo FIR, pending from publication by Brazil
UM532	Brazil	Segment Brasilia/Cuara
Route Montevideo/Asunción	Argentina, Paraguay and Uruguay	Extend route UM402 from VOR VAS up to VOR CRR
UM403	Brazil/Paraguay	Implementation route Asuncion/Brasilia
UM784	Bolivia and Brazil	– Punto de Notificación LIMPO (FIR Amazónica) hasta APARE (FIR La Paz)
VOR Córdoba/NDB Paranaguá/BITAK/VOR Aldeia	Argentina, Brazil	Bidirectional route between VOR Córdoba and Resistencia and Curitiba FIR boundaries. Unidirectional route between Resistencia/Curitiba FIR boundaries and VOR Aldeia. Realignment of UL310 from MASCA to Resistencia/Curitiba boundary
Segment VOR MCS/LUCIA	Argentina	
Segment BIXIM and VOR NEU	Argentina	
Segment KAMUV and VOR SNT	Argentina	
UT652	Argentina	Realignment direct segment ESITO/VOR CBA
UT654	Argentina	Modify unidirectional to bidirectional – Subject to availability of radar information
UW57	Argentina	Modify from unidirectional to bidirectional - Subject to availability of radar information (See Ap. A)
UW10	Argentina	Modify from unidirectional to bidirectional - Subject to availability of radar information (See Ap. A)
UA306	Argentina	Modify from unidirectional to bidirectional - Subject to availability of radar information

Version 01 – Implementation/Realignment		
ATS Route	States involved	Remarks
Segment TBG VOR / VOR TMC/ WPT a 80 NM al NNW de VOR SLS sobre the Route UV1/ SLS VOR	Colombia, Ecuador, Panamá and Peru	Elimination of routes UG 426 and UG 437. Objective: optimise and free airspace at the northern part of Lima, mainly favoring aircraft ascents and descents of aircraft to Lima and to the over-flight flow between Santiago and Miami.
UM654	Argentina/Brazil/Uruguay	Change direction from NDB BRU to VOR EZE (See Ap. A)