



SAM ATSRO/7

**INTERNATIONAL CIVIL AVIATION ORGANIZATION
South American Regional Office**

RLA/06/901 Regional Project

**SEVENTH SAM MEETING ON ATS
ROUTES NETWORK OPTIMISATION**

(SAM ATSRO/7)

FINAL REPORT

Lima, Peru, 12 to 16 October 2015

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

INDEX

i -	Index	i-1
ii -	History of the Meeting	ii-1
	Place and duration of the Meeting	ii-1
	Opening ceremony and other matters	ii-1
	Schedule, organization, working methods, Officers and Secretariat	ii-1
	Working languages	ii-1
	Agenda	ii-1
	Attendance	ii-2
iii -	List of participants	iii-1
	Report on Agenda Item 1	1-1
	Review of the ICAO South American Region ATS Routes Network Optimisation Programme.	
	Report on Agenda Item 2	2-1
	Analysis of Version 03 of the SAM ATS routes network and PBN design of airspace.	
	Report on Agenda Item 3	3-1
	Other business.	

HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The Seventh SAM Meeting on ATS Routes Network Optimisation (SAM ATSRO/7) was held at the premises of the ICAO South American Regional Office in Lima, Peru from 12 to 16 October 2015, under the support of RLA/06/901 Regional Project.

ii-2 OPENING CEREMONY AND OTHER MATTERS

Mr. Franklin Hoyer, Director of the ICAO South American Regional Office, welcomed the participants, highlighting the objectives of the Meeting and clarifying the issues to be discussed during the event. Likewise, he thanked the participants, aeronautical authorities and international organisations for their attendance to this important event and emphasized the significance of the work to be done to complete the implementation of Version 03 of the ATS Route Network. Afterwards he opened the Meeting.

ii-3 SCHEDULE, ORGANIZATION, WORKING METHODS, OFFICERS AND SECRETARIAT

The Meeting agreed to hold its sessions from 08:30 to 15:30 hours, with appropriate breaks. The work was done with the Meeting as a single committee, contemplating the conformation of *ad-hoc* Groups to treat some subjects of the Agenda and to analyze the different route proposals which were consolidated during the PBN workshops.

Mr. Fernando Hermoza Hübner, from the delegation of Peru, was unanimously elected as Chairman of the Meeting and Mr. Tomas Yentzch Irala, delegate from Paraguay was elected as Vice-Chairman. Messrs. Hector Ibarra, from Chile and Carlos Torres, from Argentina, acted as Rapporteurs of the Pacific and Atlantic Groups, respectively.

The Secretariat of the Meeting was coordinated by Messrs. Roberto Arca Jaurena, ANS & SFTY Regional Officer of the South American Regional Office and Jorge Fernandez Demarco, ICAO ATM/SAR Consultant.

ii-4 WORKING LANGUAGES

The working language of the Meeting was Spanish and its relevant documentation was presented in Spanish.

ii-5 AGENDA

Agenda Item 1: Review of the ICAO South American Region ATS Routes Network Optimisation Programme.

Agenda Item 2: Analysis of Version 03 of the SAM ATS routes network and PBN design of airspace.

Agenda Item 3: Other business.

ii-6 **ATTENDANCE**

The Meeting was attended by eleven States of the SAM Region: Argentina, Bolivia, Brazil, Colombia, Chile, Ecuador, Panama, Paraguay, Peru, Uruguay and Venezuela, as well as two International Organizations: IATA and IFALPA, totaling 30 participants. The list of participants is shown in page iii-1.

ii-7 **LIST OF CONCLUSIONS**

No.	Title	Page
ATSRO/7-1	Routes proposed by COPA Airlines	2-4

LIST OF PARTICIPANTS**ARGENTINA**

1. Rafael Alberto Molina
2. Carlos O. Torres
3. Guillermo Ricardo Cocchi
4. Enrique Muñoz
5. Juan Cruz Oregui

BOLIVIA

6. César Augusto Varela Carvajal
7. Luis Benjamín Rojas Santa Cruz

BRAZIL

8. Marcelo Marques Lobo
9. Luiz Antonio dos Santos

COLOMBIA

10. Oscar Hernán Angarita Quiroga
11. Fredy Hernán Celis Ardila
12. Fabián Gaona Leal

CHILE

13. Héctor Ibarra Martínez

ECUADOR

14. Carlos Valencia Guerrero
15. Luis Valencia Taco

PANAMA

16. Ana Teresa Montenegro de De León
17. Julio Javier Fuentes Ceballos

PARAGUAY

18. Tomas Alfredo Yentzch Irala
19. Liza Soledad González Sena

PERU

20. Fernando Hermoza Hübner
21. Tomás Macedo Cisneros
22. César Rebaza

URUGUAY

23. Luis Otheguy
24. Adrián Aguiar

VENEZUELA

25. Francisco Antonio Ortiz

IATA

26. Julio de Souza Pereira
27. José Antonio Zarabia Ramón (AVIANCA)
28. Pedro Miguel Abad Zapata (AVIANCA)
29. Gonzalo Guerrero Beltrán (LATAM)

IFALPA

30. Osvaldo Jodas López Neto

ICAO

- Roberto Arca
Jorge Fernández Demarco

Agenda Item 1: Review of the ICAO South American Region ATS Routes Network Optimisation Programme

1.1 Under this Agenda Item, the Meeting analysed the following working paper:

- WP/02 - *ATSRO Action Plan* (presented by the Secretariat).

ATSRO Action Plan

1.2 The Meeting recalled that SAM/IG/10 analyzed the South American Region ATS Routes Network Optimisation Action Plan and considered it convenient to change its name to Action Plan for the Optimisation of South American airspace, aiming to integrate the planning of *En-Route*, *TMA* and *Approach* phases. During the Second Meeting of the GREPECAS Programmes and Projects Review Committee (PPRC/2) held at the ICAO South American Regional Office in Lima, Peru, from 16 to 18 July 2013, it was considered that the name of PBN Programme should be maintained, but the proposal to include airspace optimisation in the A1 Project, thus extending PBN Project scope, was accepted.

1.3 Based on the aforementioned integrated planning, various activities to support the planning and implementation of SAM PBN have been carried out under the auspices of RLA/06/901 Regional Project, including PBN/1 and 2 workshops during 2014 and PBN/3 and 4 workshops in 2015.

1.4 During ATSRO/6 meeting, Stage 1 of Version 03 of the SAM Region Route Optimisation Programme was presented. Same was evaluated and completed by participating experts in order to prepare the corresponding implementation plan according to users' needs and States' feasibility, taking into consideration aircraft PBN capacity. Version 03, Stage 1 completed its implementation through Proposal for Amendment to the Air Navigation Plan SAM 15/01-ATM.

1.5 Airspace optimisation, including PBN implementation, has high priority within the ATM Work Programme of the South American Regional Office and should also have the appropriate priority for the SAM Region State Administrations.

1.6 In this regard, the Meeting reviewed the ATS Route Network Optimisation Action Plan presented by the Secretariat and noted that according to the progress made to date, such plan should be reviewed more thoroughly and include not only aspects inherent to the optimisation of the route network, but also activities such as the design of standard arrivals and departures in terminal areas to achieve the TMA-route interface, as well as others, which although not directly linked to the routes, could significantly improve airspace management in the Region.

1.7 It was recalled that, according to the Performance-based Implementation Plan (PBIP) for the SAM Region, one of the issues to consider for airspace optimisation was the application of the RNP 2 specification in the continental, remote and oceanic ATS route network.

1.8 Another subject to be assessed by the SAM/IG/16 meeting is the application of a 40 NM longitudinal separation between aircraft at the same flight level in FIR boundaries, gradually reducing longitudinal separation to 20 NM and subsequently to 10 NM, in accordance with the requirements of ICAO Doc 4444.

1.9 In view of the above, the Meeting reviewed the new Action Plan for the optimisation of South American airspace, which, in addition to route network optimisation, also included RNP 2 implementation and the gradual reduction of longitudinal separation at FIR boundaries. The Plan appears in **Appendix A** to this part of the report.

1.10 Whereas the SAM Planning Group (SAM/IG) should review the implementation activities in the Region, the Secretariat was requested to present the Plan to SAM/IG/16 meeting for assessment and approval, including the changes the Group deems appropriate.

APPENDIX A

SOUTH AMERICAN AIRSPACE OPTIMISATION ACTION PLAN (B0-5, B0-10, B0-20, B0-65)

Activity	Start	End	Responsible party	Remarks
SOUTH AMERICAN AIRSPACE OPTIMISATION				
1. TMA				
1.1. First Workshop on PBN Implementation in TMAs	SAM/IG/16	April 2016	Project RLA/06/901	Objective: contribute to, verify, and follow-up on, PBN implementation in TMAs of Argentina (COR, MDZ, BRC, FTE, NQN, IGR, CRD, SLA, TUC, MVD, RGL and USH), Brazil (Brasilia, Belo Horizonte, and changes in Sao Paulo), Chile (Santiago - PAMPA SUR), Ecuador (Guayaquil), Peru (Arequipa, Cuzco, Juliaca and Puerto Maldonado), and Venezuela (Maiquetia).

Activity	Start	End	Responsible party	Remarks
1.2. Second Workshop on PBN Implementation in TMAAs	SAM/IG/16	September 2016	Project RLA/06/901	Objective: contribute to, verify, and follow-up on, PBN implementation in TMAAs of Argentina (Baires), Bolivia (Cochabamba, La Paz, Santa Cruz), Brazil (PBN South), Chile (Santiago - PAMPA SUR), Panama (Panama), Paraguay (Asuncion), and Uruguay (Carrasco and Laguna del Sauce).
1.3. PANS-OPS Workshop	SAM/IG/16	October 2016	Project RLA/06/901 SAM Regional Office States	Objective: Harmonise criteria for PANS-OPS application and SID/STAR/IAC publication, as well as the corresponding Codes Tables.
2. SAM Route Network				
2.1. Version 04 – (TMA – arrival/departure/RNAV5 route segment interface)				
<p>2.1.1. Perform detailed study of the SAM ATS Route Network, with a view to developing Version 04 of the Route Network (TMA - Arrival/Departure/RNAV5 route segment interface), including:</p> <ul style="list-style-type: none"> • Prepare work plan for the participation of contracted/loaned experts and experts from States/International Organisations who would support the preparation of the preliminary draft. 	SAM/IG/16	ATSRO/8 (2016)	SAM/PBN/IG (Project RLA/06/901) States IATA IFALPA ATM RO	<ul style="list-style-type: none"> • 2 experts will be hired/ "loaned" for 3 weeks in order to prepare a Preliminary Draft. Tentative date: TBD • According to progress made in PBN implementation in SAM TMAAs.

Activity	Start	End	Responsible party	Remarks
<ul style="list-style-type: none"> • Determine tools required to conduct the study (aeronautical charts, specific software). • Analyse traffic data to understand traffic flows. • Analyse fleet navigation capacity. • Prepare the preliminary draft of Version 04 of the SAM Route Network, including control sectors, TMA interface, etc., according to the ToRs contained in the Attachment to this Plan. • Assess the feasibility/need to assess the preliminary design using "<i>airspace modelling</i>" tools and fast-time ATC simulation. • Propose the initial draft of the Proposal of Amendment to the CAR/SAM ANP. • Prepare the Plan for the Optimisation of Restricted, Prohibited, Danger, and Reserved Use Zones of the SAM Region. • Calculate fuel/CO₂ savings using IFSET to validate the preliminary design of the SAM airspace structure, covering routes/SIDs/STARs. • Prepare the final document "SAM Route Network, Version 04". • Prepare working paper for the ATSRO/8 meeting. 				
2.1.2. Hold the Eighth Workshop/Meeting for the Optimisation of the SAM ATS Route Network, with the purpose of reviewing Version 04 of the Route Network.	SAM/IG/16	ATSRO/8 (2016)	Project RLA/06/901 ATM RO	Objective: Review preliminary draft of the ATS Route Network, Version 04

Activity	Start	End	Responsible party	Remarks
<p>2.1.3. Continue with the detailed study of the SAM ATS Route Network with a view to developing Version 04 of the Route Network (interface version), including:</p> <ul style="list-style-type: none"> • Prepare work plan for the participation of hired/ loaned experts and experts from the States/ International Organisations who would support the preparation of the preliminary draft. • Determine the tools required to conduct the study (aeronautical charts, specific software). • Analyse traffic data to understand traffic flows. • Analyse fleet navigation capacity. • Prepare the final draft of Version 04 of the SAM Route Network, including ATS routes, control sectors, TMA interface, etc., according to the ToRs contained in the Attachment to this plan. • Assess the feasibility/need to evaluate the preliminary design using "<i>airspace modelling</i>" tools and fast-time ATC simulation. • Propose the initial draft of the Proposal of Amendment to the CAR/SAM ANP. • Prepare the Plan for the Optimisation of Restricted, Prohibited, Danger, and Reserved Use Zones of the SAM Region. • Calculate fuel/CO₂ savings using IFSET to validate the preliminary design of the SAM airspace structure, covering routes/SIDs/STARs. • Prepare the final document "SAM Route Network, Version 04". • Prepare working paper for the ATSRO/8 meeting. 	SAM/IG/19	ATSRO/9 (2017)	SAM/PBN/IG (Project RLA/06/901) IATA IFALPA ATM RO	<ul style="list-style-type: none"> • 2 experts will be hired/ "loaned" for 3 weeks in order to prepare the final draft. Tentative date: TBD • According to progress made in PBN implementation in SAM TMAs.

Activity	Start	End	Responsible party	Remarks
Safety Assessment				
2.1.4. Perform risk analysis on the SAM ATS Route Network, Version 04.	SAM/IG/19	ATSRO/9 (2017)	Project RLA/06/901	Need to hire two experts for 2 weeks to do this job.
2.1.5. Conduct the Ninth Workshop/Meeting for the Optimisation of the SAM ATS Route Network, in order to review Version 04 of the SAM ATS route network.	SAM/IG/19	ATSRO/9 (2017)	Project RLA/06/901 States ATM RO	Objective: Review and approve the final draft of the SAM Route Network, Version 04.
2.2. Version 05 - (RNP2 – Continental and Oceanic airspace)				
<p>2.2.1. Perform detailed study of the SAM ATS Route Network, with a view to developing Version 05 of the Route Network (interface version), including:</p> <ul style="list-style-type: none"> • Prepare work plan for the participation of hired/ loaned experts and experts from the States/ International Organisations who would support the preparation of the preliminary draft. • Define the tools required to conduct the study (aeronautical charts, specific software). • Analyse traffic data to understand traffic flows. • Analyse fleet navigation capacity. • Prepare the preliminary draft of Version 05 of the SAM Route Network, including ATS routes, control sectors, TMA interface, etc., according to the terms of reference contained in the attachment to this plan. • Assess the feasibility/need to evaluate the preliminary design using "<i>airspace modelling</i>" tools and fast-time ATC simulation. • Propose the initial draft of a Proposal of Amendment to the CAR/SAM ANP. 	SAM/IG/20	ATSRO10 (2018)	SAM/PBN/IG (Project RLA/06/901) IATA IFALPA ATM RO	2 experts will be hired for 3 weeks. Tentative date: TBD

Activity	Start	End	Responsible party	Remarks
<ul style="list-style-type: none"> • Prepare the Plan for the Optimisation of Restricted, Prohibited, Danger, and Reserved Use Zones of the SAM Region. • Calculate fuel/CO₂ savings using IFSET to validate the preliminary design of the SAM airspace structure, covering routes/SIDs/STARs. • Prepare the document "SAM Route Network, Version 05". • Prepare working paper for the ATSRO/10 meeting. 				
2.2.2. Hold the Tenth Workshop/Meeting for the Optimisation of the SAM ATS Route Network, to review Version 05 of the Route Network	SAM/IG/20	ATSRO/10 (2018)	Project RLA/06/901	Objective: Review the preliminary draft of the SAM Route Network, Version 05.
<p>2.2.3. Continue with the detailed study of the SAM ATS Route Network with a view to developing Version 05 of the Route Network (interface version), including:</p> <ul style="list-style-type: none"> • Determine the tools required to conduct the study (aeronautical charts, specific software). • Analyse traffic data to understand traffic flows. • Prepare the final draft of Version 05 of the SAM Route Network, including ATS routes, control sectors, TMA interface, etc., according to the terms of reference contained in the attachment to this Plan. • Assess the feasibility/need to evaluate the preliminary design using "<i>airspace modelling</i>" tools and fast-time ATC simulation. • Propose the initial draft of the Proposal of Amendment of the CAR/SAM ANP. • Prepare the Plan for the Optimisation of Restricted, 	SAM/IG/21	ATSRO/11 (2019)	SAM/PBN/IG (Project RLA/06/901) ATM RO	2 experts will be hired for 3 weeks. Tentative date: TBD

Activity	Start	End	Responsible party	Remarks
Prohibited, Danger, and Reserved Use Zones in the SAM Region. <ul style="list-style-type: none"> • Develop a methodology for calculating fuel/CO₂ savings using IFSET to validate the preliminary design of the SAM airspace structure, covering routes/SIDs/STARs. • Prepare the final document "SAM Route Network, Version 05". • Prepare working paper for the ATSRO/11 meeting. 				
Safety Assessment				
2.2.4. Perform risk analysis of the SAM ATS Route Network, Version 05.	SAM/IG/21	ATSRO/11 (2019)	Project RLA/06/901 States	Two experts need to be hired for 2 weeks to do this job.
2.2.5. Conduct the Eleventh Workshop/Meeting for the Optimisation of the SAM ATS Route Network, in order to review Version 05 of the SAM ATS route network.	SAM/IG/21	ATSRO/11 (2019)	Project RLA/06/901 States	Objective: Review and approve the final draft of the SAM Route Network, Version 05.

Activity	Start	End	Responsible party	Remarks
3. Longitudinal Separation				
3.1. 40 NM Separation <ul style="list-style-type: none"> • Verify ATC communications available. • Provide Air Traffic Controllers with the following information (briefing): <ul style="list-style-type: none"> - new separation minima, - the corresponding phraseology, and - changes to the Letters of Agreement. • Amend existing Letters of Operational Agreement, replacing the current 80 NM separation by 40 NM separation. 	SAM/IG/15	2017	States	20 NM conventional separation with the application of GNSS, as shown in par. 5.4.2.3.3.1 of Doc 4444
3.2. 20 NM separation <ul style="list-style-type: none"> • Verify available ATC communications. • Provide Air Traffic Controllers with the following information (briefing): <ul style="list-style-type: none"> - new separation minima, - the corresponding phraseology, and - changes to the Letters of Agreement. • Amend the existing Letters of Operational Agreement, replacing the current 40 NM separation by 20 NM separation. 	SAM/IG/17	2018	States	

Activity	Start	End	Responsible party	Remarks
<p>3.3. 10 NM separation</p> <ul style="list-style-type: none">• Verify the communications and surveillance available at the ATC• Provide Air Traffic Controllers with the following information (briefing):<ul style="list-style-type: none">- new separation minima,- the corresponding phraseology, and- changes to the Letters of Agreement.• Modify the existing Letters of Operational Agreement, replacing the current 20 NM separation by 10 NM separation.	SAM/IG/20	2019	States	

ATTACHMENT TO THE AIRSPACE OPTIMISATION PLAN

Terms of Reference for the Preliminary Draft of the ATS Route Network, Version 04 (see 2.1.1)

- Analyse the routes discussed at the Route Interface Workshop, which depend on the validation of PBN designs for the main SAM TMAs;
- Points of entry and exit of the main SAM TMAs;
- ATS routes that should be eliminated, according to use;
- (Vertical) volume of exclusionary airspace for the application of RNAV-5;
- "Conventional" ATS routes that should be eliminated or replaced by RNAV routes, according to the volume of exclusionary RNAV-5 airspace;
- RNAV routes that should be realigned, according to the points of entry and exit of the main SAM TMAs;
- Interface between SAM Route Network and the CAR Route Network;
- Use of the Guidance Material for the Application of the Flexible Use of Airspace Concept.

Terms of Reference for the Preliminary Draft of the ATS Route Network, Version 04 (see 2.1.3)

- Assess the routes analysed at the Route Interface Workshop, which depend on the validation of PBN designs of the main SAM TMAs;
- Points of entry and exit of the main SAM TMAs;
- ATS routes that should be eliminated, according to use;
- Volume of exclusionary airspace for the application of RNAV-5;
- "Conventional" ATS routes that should be eliminated or replaced by RNAV routes, according to the volume of exclusionary RNAV-5 airspace;
- RNAV routes that should be realigned, according to the points of entry and exit of the main SAM TMAs;
- Interface between the SAM Route Network and the CAR Route Network;
- Use of Guidance Material for the Application of the Flexible Use of Airspace Concept.

Terms of Reference for the Preliminary Draft of the ATS Route Network, Version 05 (Application of RNP 2. See 2.2.1.)

- Points of entry and exit of the main TMAs of the SAM Region;
- ATS routes that should be eliminated, according to use;
- Volume of exclusionary volume for the application of RNP2;
- RNAV-5 ATS routes that should be eliminated or replaced by RNP2 routes, according to the volume of exclusionary RNP2 airspace;
- RNAV routes that should be realigned, according to the points of entry and exit of the main SAM TMAs;
- Interface between the SAM Route Network and the CAR Route Network;
- Use the Guidance Material for the Application of the Flexible Use of Airspace Concept.

Terms of Reference for the Preliminary Draft of the ATS Route Network, Version 05 (Application of RNP 2. See 2.2.3.)

- Points of entry and exit of the main TMAs of the SAM Region;
- ATS routes that should be eliminated, according to use;
- Volume of exclusionary airspace for the application of RNP2;
- RNAV5 ATS routes that should be eliminated or replaced by RNP2 routes, according to the volume of exclusionary RNP2 airspace;
- RNAV routes that should be realigned, according to the points of entry and exit of the main SAM TMAs;
- Interface between the SAM Route Network and the CAR Route Network;
- Use the Guidance Material for the Application of the Flexible Use of Airspace Concept.

Agenda Item 2: Analysis of Version 03 of the SAM ATS routes network and PBN design of airspace

2.1 Under this Agenda Item, the Meeting analysed the following working papers:

- WP/03 - *Stage 2 of Version 03 of the SAM Region Route Optimisation Programme* (presented by the Secretariat) (**Spanish only**);
- WP/04 - *First Workshop on the Interface between TMAs and Version 03 of the South American ATS Route network* (presented by the Secretariat) (**Spanish only**);
- IP/03 - *Implementation of Version 03 of the SAM Route network - Stage I* (presented by Argentina) (**Spanish only**); and
- IP/04 - *Optimisation of airspace in the Argentinean Republic, TANGO Project* (presented by Argentina) (**Spanish only**).

Progress in the ATS route network optimisation programme of the South American Region

2.2 In the framework of the South American Region ATS routes network optimisation programme (ATSRO), the Meeting recalled that under the auspices of RLA/06/901 Regional Project, a preliminary report for Version 03 of the SAM Region Route Optimisation Programme was prepared by the group of experts hired for that purpose.

2.3 Furthermore, the Meeting noted that the Action Plan for the optimisation of the South American airspace, with a view to integrating the planning of phases *En-route*, *TMA* and *Approach*, became part of the PBN Project, corresponding to GREPECAS A1 Project, thus extending the project's scope.

2.4 The Meeting recalled that, considering the need to integrate the new designs of terminal areas based on PBN with the PBN routes ATSRO/6 meeting had decided to carry out this implementation in the South American Region, in two stages.

Routes of Stage 1, Version 03 of ATSRO Programme



2.5 Regarding Stage 1, Version 03 of the ATSRO Programme, the Regional Office started a process of Proposal for Amendment to the CAR/SAM ANP - Volume I - Basic (Serial N° SAM 15/01 - ATM) for the deletion, realignment and establishment of new RNAV-5 routes. These routes are part of Stage 1, Version 03 of the SAM ATS Routes Network Optimisation Programme. All of them are part of the Regional Air Navigation Plan ATS routes network. The implementation of the new routes and changes made to aforementioned trajectories, allowed a reduction in distance and flight time, with the consequent fuel saving, operational costs and environment protection.

2.6 The amendment covered following routes:

- 13 ATS routes were added: L405, UL405, UL531, UL653, UL416, UM658, UL670, UM783, UM527, UN674, N674, B432 and UM543.
- 10 ATS routes were realigned: A307, UA307, B556, UL540, UM529, UM789, UL417, L300, UL650 and UL780.
- 7 ATS routes were deleted: UB556, UB652, UB682, UL775, UG551, UR554, and UR683.

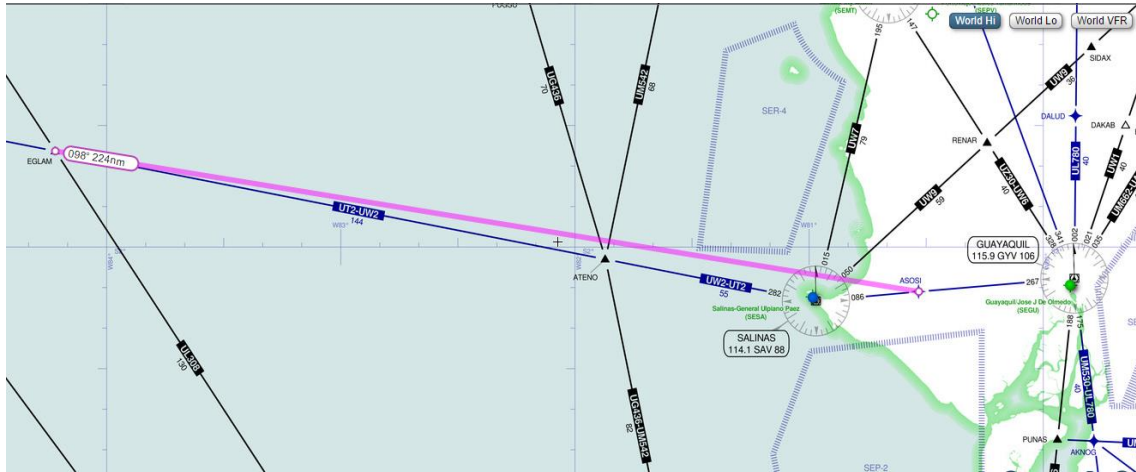
2.7 Regarding the aforementioned, the Meeting was informed by Argentina that they had assessed the routes proposed in Stage 1 and as a result, in addition to the optimisation of domestic routes, significant benefits in distance savings equivalent to 190 NM were achieved.

2.8 The Meeting noted and thanked the information provided by Argentina. Annual savings achieved amounted to 3.850.800 Kg fuel and CO₂ reduction corresponded to **12.168,5 TN**, as shown in following table:

Airway	Type of Aircraft	Quantity of flights by month	Fuel savings (Kg)	CO ₂ reduction (Kg CO ₂)
UM543	A320	30	-5.800,00	-18.328
UT667	B737	320	-10.000,00	-31.600
UN775	B737	30	-279.600,00	-883.536
	A330	49		
	B763	2		
	B767	80		
	B787/800	26		
	B747	30		
	B777/200	90		
UL417	A320	30	-6.200,00	-19.592
	A330	49		
	A340	12		
UT670	B737	143	-2.700,00	-8.532
	A320	121		
UT669	B737	157	-7.700,00	-24.332
	A320	89		
UT668	A320	17	-1.000,00	-3.160
UN674	A320	15	-7.900,00	-24.964
	B737	124		
	TOTAL MONTHLY		320.900 Kg	1.014.044Kg
	TOTAL ANNUALLY		3.850.800Kg	12.168.5 TN

2.9 The Meeting also noted the information provided to the Secretariat by Ecuador, indicating a reduction in CO₂ of **227.52 TN**, corresponding to fuel savings of 72.000 Kg in the new route Galapagos-Guayaquil, as shown in following charts:

REPORT OF SAVINGS IN FUEL AND CO₂ IN THE RNAV ROUTE GALAPAGOS-GUAYAQUIL



STEP 1 - OPERATIONS DEFINITION
© ICAO 2011

Scenario Name: **RUTA RNAV SEGS SEGU**

Aircraft	Base Flights	New Flights	Continuing Old Flights	Remaining Trip (nm)
Single Aisle Jet	12	12	0	1160

STEP 2 - OLD PROCEDURE DEFINITION
© ICAO 2011

Scenario Name: **RUTA RNAV SEGS SEGU**

Action	From Alt(ft)	To Alt(ft)	Distance(nm)	Time(sec)
Descend	32000	4000	2251	

Scenario Name **RUTA RNAV SEGS SEGU**

Action	From Alt(ft)	To Alt(ft)	Distance(nm)	Time(sec)
Descend	32000	4000	2242	

Estimated Fuel Savings Report

© ICAO 2011

Scenario	Old Fuel Consumption (Kg)	New Fuel Consumption (Kg)	Savings (Kg)	Savings (%)
RNAV SEGS	43400	43200	-200	-0,5

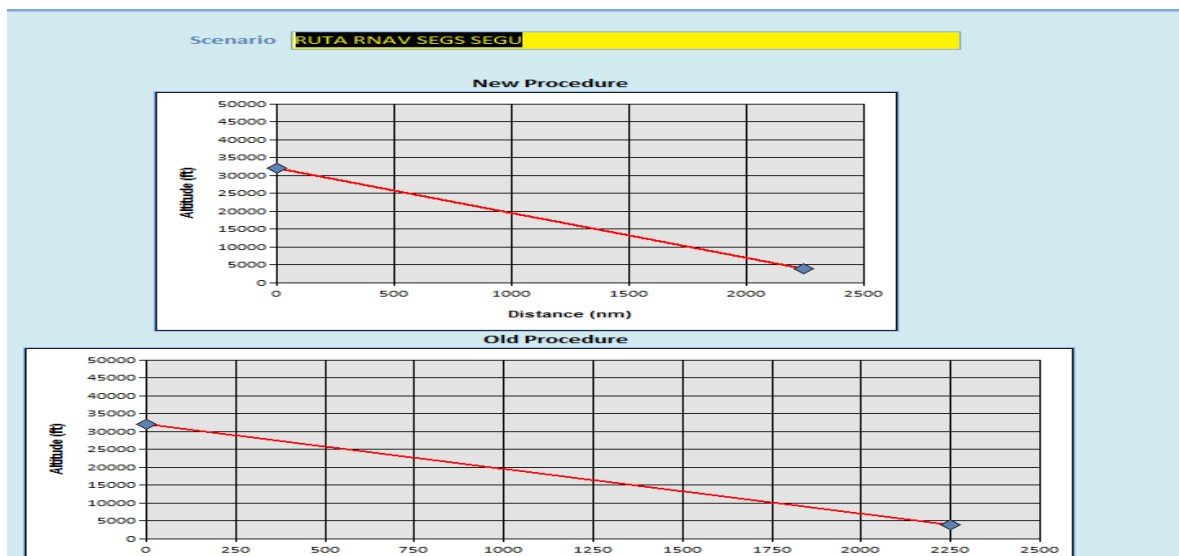
miércoles, 14 de octubre de 2015 Page 1 of 1

Estimated Detailed Fuel Savings Report

© ICAO 2011

Scenario	Old Climb Fuel (Kg)	New Climb Fuel (Kg)	Climb Savings (Kg)	Old Descend Fuel (Kg)	New Descend Fuel (Kg)	Descend Savings (Kg)	Old LevelFuel (Kg)	New Level Fuel (Kg)	Level Savings (Kg)	Old Taxi Fuel (Kg)	New Taxi Fuel (Kg)	Taxi Savings (Kg)
RUTA RNAV	0	0	0	43400	43200	-200	0	0	0	0	0	0

miércoles, 14 de octubre de 2015 Page 1 of 1



ANNUAL FUEL SAVINGS	72.000 KG
ANNUAL CO ₂ SAVINGS	227.52 TN

2.10 The Secretariat recalled that savings presented during PBN/4 workshop should be considered, were Brazil reported a flow analysis from and to Belo Horizonte terminal, with daily fuel savings of 1.787 Kg, totaling 652.255 Kg annually, equivalent to **2.061 TN** annual reduction in CO₂ emissions.

2.11 The Secretariat noted the CO₂ savings reported during this meeting towards the fulfilment of the goal established by the Bogota Declaration, totaling **14.457 TN**. In such sense, the Secretariat asked States not having yet done so, to report the savings achieved during 2015, in order to close the goal of this year.

Routes of Stage 2, Version 03 of ATSRO Programme

2.12 In order to continue with the process of routes optimisation, the Meeting assessed the implementation of Stage 2, Version 03 of the SAM route network, as well as a group of 16 new RNAV routes to replace conventional routes. Moreover, within this Stage, 11 routes to be realigned and/or new routes which would allow reductions of more than 5 NM were assessed. Finally, it also assessed a group of 10 routes with reductions of less than 5 NM.

2.13 The study was conducted by two working groups, divided according to the two predominant traffic flows: the Atlantic Group, composed by experts of Argentina, Brazil, Bolivia, Paraguay and Uruguay, and the Pacific Group, integrated by Bolivia, Chile, Colombia, Ecuador, Panama, Peru and Venezuela. Each group presented their achievements, supported by experts of IATA, IFALPA and the Secretariat.

2.14 The presence of experts from Colombia and Venezuela was very beneficial, as the Meeting had the opportunity to analyse the optimisation of routes which by the absence of those States in previous meetings, had not been possible to examine. In such sense, the Meeting welcomed the effort made by those States to complete the regional work of optimizing routes.

2.15 **Appendix A** includes the Master with refined routes able to be optimised after the feasibility scrutiny carried out by experts of States (<http://www.icao.int/SAM/Pages/MeetingsDocumentation.aspx?m=2015-ATSRO7>). Likewise, as a complementary part to this Appendix, explanatory notes to the analysis of the Atlantic Group are included as **Attachment 1** and the explanatory notes to the analysis of the Pacific Group are contained in **Attachment 2**.

First Workshop on the Interface between TMAs and Version 03 of the South American ATS Route Network

2.16 The Meeting analysed the final report to the First Workshop on the Interface between TMAs and Version 03 of the South American ATS Route Network, which can be obtained under following link: <http://www.icao.int/SAM/Pages/MeetingsDocumentation.aspx?m=2015-PRIMERTMA>.

2.17 The Meeting was of the opinion that these results could be divided into three main parts:

- 1) Routes depending on the validation of PBN designs of the main South American TMAs;
- 2) Routes proposed by KLM;
- 3) Routes proposed by COPA.

2.18 With reference to the routes depending on the validation of PBN designs of the main South American TMAs, the Meeting concluded that these routes should be part of Version 04 of the South American ATS Route Network, which main objective will be the optimisation of the interface between SAM route network and redesigned South American TMAs.

2.19 While discussing the routes proposed by KLM, which are concentrated in the airspace of Colombia, the Meeting was informed that the Colombian Administration had met with KLM and IATA on 27 August 2015 and that all required actions to meet the requirements of said airline were ongoing.

2.20 Ecuador informed that in response to the request by KLM at the First Workshop on Interface, UT21 had been extended to VOR LAV (Ecuadorian East), with the purpose of creating a link between UM662 and UT21 for the arrival/departure transition to Quito. In the intersection of both routes, notification point DOVKO had been created as requested.

2.21 The aforementioned was published on 11 June 2015, by SUP 013/2015, which entered into force on 23 July 2015.

2.22 The Meeting recalled that the 13 routes proposed by COPA during the Interface/1 workshop, contained details required to allow its analysis by concerned States, including notification points and CO₂ savings that could be reached by each route, totaling 2.597 Ton/CO₂ per year. Taking into account these significant savings on CO₂, the Meeting adopted following conclusion:

Conclusion ATSRO/7-1: Routes proposed by COPA Airlines

That:

SAM States whose airspace are considered with routes proposed by COPA Airlines contained in the final report to the First Workshop on the Interface between TMAs and Version 03 of the South American ATS Route Network, present the results of its analysis to the SAM/IG/17 meeting.

Version 04 for the Routes Optimisation

2.23 The Meeting agreed that part of the routes analysed during the Interface Workshop depending on the validation of PBN designs of the main South American TMAs, should be evaluated in Version 04, which will consider an integrated optimisation with the airspace optimisation in terminal areas with PBN application. In such sense, it recommended that this task should be considered in the terms of reference of the consultants who will develop the corresponding study.

2.24 The Meeting understood that the complexity of this task should be carried out with the support of consultants and experts of States and International Organizations, according to the Action Plan established under Agenda Item 1 of this report. The detail of these routes is shown under **Appendix B** (*Final report, First Workshop on the Interface between TMAs and Version 03 of the South American ATS Route Network*) to this part of the report.

Optimisation of airspace in the Republic of Argentina - TANGO Project

2.25 Argentina presented information on the progress of PBN implementation Plan in the Republic of Argentina for the short, medium and long term, taking into account the Bogota Declaration established in the Thirteenth Meeting of Civil Aviation Authorities of the SAM Region.

2.26 The Meeting noted the TANGO Project for the implementation of PNB airspace concept in the BAIRES TMA, which is being carried out jointly by the Administración Nacional de Aviación Civil (ANAC), the Dirección General de Control de Tránsito Aéreo (DGSTA), as well as other participants representing operational sectors, users and airlines.

2.27 With regard to the Eastern Sector, bordering the Oriental Republic of Uruguay, the Meeting noted that a bilateral meeting had been conducted between Argentina and Uruguay on 9 and 10 September 2015 at the Carrasco airport (Uruguay). During this meeting, the Eastern Sector of the TANGO Project was thoroughly treated and analysed by both States, considering the current flows and its improvements, the change of situational awareness to ATC operational environment as well as the gradual migration to PBN concepts. Appendices A, B and C to information paper ATSRO/7-IP/04 (<http://www.icao.int/SAM/Pages/MeetingsDocumentation.aspx?m=2015-ATSRO7>), complement this data.

APPENDIX A

**SOUTH AMERICAN ATS ROUTE
NETWORK OPTIMISATION

PROPOSED ROUTES,
PENDING FOR IMPLEMENTATION

DETAILED STUDY**

<http://www.icao.int/SAM/Pages/MeetingsDocumentation.aspx?m=2015-ATSRO7>

Attachment 1**SUMMARY OF THE ATLANTIC GROUP****States of the Atlantic Group: Argentina, Brazil, Bolivia, Paraguay and Uruguay**

- Route 4: Delete UA305 from EZEIZA up to Curbelo (LDS).
Extend UM424 from EZEIZA to CURBELO (LDS). From CURBELO up to Porto Alegre, current route bidirectional.
Effective date: 21JUL2016.
- Route 7: To be assessed within SUL Project. Brazil.
Move to Version 04.
- Route 12: Delete UA320 from VOR VAS up to VOR LIMA. Create an RNAV route from VAS ESELA SUCRE VOR PAZ VOR JUL.
Effective date: 21JUL2016.
- Route 34: URUGUAY proposes to delete route UB555 in its whole (from CRR up to PAR) and to create a regional bidirectional RNAV from CRR-DUR-PAR or from DUR, as far as involved States deem it necessary.
ARGENTINA ACCEPTS THE PROPOSAL.
IATA DOES NOT ACCEPT THE PROPOSAL IN THE SECTION DUR-PAR
NOTE - NO CONSENSUS WAS REACHED.
- Route 63: Delete UR550
Create RNAV between CORDOBA (CBA) and RIO BRANCO (RCO) maintaining trajectory.
Effective date: 21JUL2016.
- Route 64: Delete UR551. Brazil
Effective date: 21JUL2016.
- Route 69: Delete UW10 BRASILIA (BSI), RECIFE (REC).
Delete UR551 RECIFE (REC) up to BUGAT.
Create regional bidirectional RNAV from BRASILIA (BSI) up to BUGAT maintaining points and trajectory of UW10 and UR551. Brazil
Effective date: 21JUL2016.
- Route 70: Delete whole UW13 from Belo Horizonte (BHZ) up to Fortaleza (FLZ).
Create domestic unidirectional RNAV route from Belo Horizonte (BHZ) up to Fortaleza (FLZ), maintaining the same trajectory.
Effective date: 21JUL2016.
- Route 71: Delete whole UW17 from Rio Branco (RBC) up to Manaus (MNS).
Create bidirectional domestic RNAV route from Rio Branco (RBC) up to Manaus (MNS), maintaining the same trajectory.
Effective date: 21JUL2016.

- Route 72: To be assessed within SUL Project. Brazil.
Move to Version 04.
- Route 73: To be assessed within SUL Project. Brazil.
Move to Version 04.
- Route 74: Delete whole route UW23 from Natal (NTL) up to MOSSORO (MSS). There is no traffic.
Effective date: 21JUL2016.
- Route 75: To be assessed within SUL Project. Brazil.
Move to Version 04.
- Route 76: Delete whole route from Campo Grande (GRD) up to Alto Floresta (ATF);
Create domestic bidirectional RNAV from Campo Grande (GRD) up to Cuiabá (CIA).
Effective date: 21JUL2016.
- Route 77: Delete whole route UW29 from Goiania (GOI) up to Campo Grande (GRD).
Extend regional bidirectional RNAV route UM544 from Campo Grande (GRD) up to Goiania (GOI).
Effective date: 21JUL2016.
- Route 78: Delete whole route UW3 from Porto Velho (PVH), up to Manaus (MNS);
Create domestic bidirectional RNAV route from Rio Branco (BRC), Porto Velho (PVH) up to Manaus (MNS), maintaining the same trajectory.
Effective date: 21JUL2016.
- Route 79: Delete whole route UW33 from Manaus (MNS) up to Recife (REC);
Create domestic bidirectional RNAV route from Manaus (MNS) up to Recife (REC), maintaining the same trajectory.
Effective date: 21JUL2016.
- Route 80: Delete UW47.
Create RNAV between Paranagua (PNG) and Rede (RDE). Brazil.
Effective date: 21JUL2016.
- Route 81: Delete whole route from Foz do Iguacu (FOZ) up to Piracununga (PIR);
It is suggested to Brazil to create a domestic bidirectional RNAV route from Foz do Iguacu (FOZ) up to Piracununga (PIR), maintaining the same trajectory.
Effective date: 21JUL2016.
- Route 82: To be assessed within SUL Project. Brazil.
Move to Version 04.
- Route 83: Delete whole route from Congonhas (CGO) up to Foz do Iguacu (FOZ);
It is suggested to Brazil to create a domestic unidirectional RNAV route from Congonhas (CGO) up to Foz do Iguacu (FOZ).
Effective date: 21JUL2016.
- Route 84: NOT ACCEPTED. Brazil.

- Route 85: Realign bidirectional UL540 from VIRU-VIRU GEDUX PALEP MASPU up to EGIMI
Effective date: 21JUL2016.
- Route 86: To be assessed within SUL Project. Brazil.
Move to Version 04.
- Route 87: To be assessed within SUL Project. Brazil.
Move to Version 04.
- Route 88: To be assessed within SUL Project. Brazil.
Move to Version 04.
- Route 89: To be assessed within SUL Project. Brazil.
Move to Version 04.
- Route 94: Published in AMDT 30 APRIL 2015 Argentina
- Route 104: Published in AMDT 30 APRIL 2015 Argentina
- Route 106: Analyse proposal RNAV route between KUKEN MONTE CASEROS. To be assessed
within TANGO Project and TMA MONTEVIDEO design project. Uruguay-Argentina.
Move to Version 04.
- Route 113: Published in AMDT 30 APRIL 2015 Argentina
- Route 114: Extend UM789 from ASUNCION LUCIA NNNNN (FIR border) EDMAR.
LOAs between PARAGUAY-ARGENTINA-BRAZIL will be updated in SAM/IG/17.
Argentina renames LUCIA because of duplicity.
Coordination of transfer and point of control between Paraguay and Argentina will be
analysed.
Effective date: 13OCT2016.
- Route 115: Proposal is not accepted. Paraguay. See report on multilateral meeting.
- Route 201: Create unidirectional RNAV route between EZE 5lnc (FIR border) ANDAN. Argentina
Uruguay.
Effective date: 21JUL2016.

=====

Attachment 2**SUMMARY OF THE PACIFIC GROUP****States of the Pacific Group: Panama, Colombia, Ecuador, Peru, Bolivia and Chile**

- Route 2: Delete UA301 from VIR up to MLY.
Create RNAV between Rio Branco and Manley, by the same points and trajectories as UA301, to maintain flows in FIR Bogota and Barranquilla.
Section between Rio Branco and Viru-Viru to be analysed in route 13 (UA321).
Coordinate with CAR.
Effective date: 21JUL2016.
- Route 10: Delete UA317 between Mitú and Villavicencio.
Colombia will create a domestic route
Effective date: 21JUL2016.
- Route 11: Delete whole route UA319 between Taboga (TBG) and OROSA.
Create regional, bidirectional RNAV, between Taboga (TBG) and OROSA, maintaining UA319 trajectory.
Coordinate with CAR creation of RNAV between OROSA and BETIR.
Effective date: 13OCT2016
- Route 13: Delete whole route UA321 from Asunción (VAS) up to San Andrés (SPP).
Create regional, bidirectional RNAV, from Asunción (VAS) up to San Andrés (SPP) maintaining points of UA321, with the exception that in FIR Bogota it is considered direct section between PLG and BUSMO.
Effective date: 21JUL2016.
- Route 14: Delete UA323 between Taboga (TBG) and Manaus (MNS).
Create RNAV between Taboga (TBG) and Rio Negro (RNG) maintaining points of UA323.
Extend UL423 from Ambalema (ABL) up to Villavicencio (VVC) and Manaus (MNS).
Effective date: 13OCT2016.
- Route 18: Create RNAV from BIVAN up to Pointe-a-Pitre (PPR).
UA550 is maintained.
Colombia deletes UQ104.
Coordinate with CAR.
Effective date: 13OCT2016
- Route 20: Delete UA552 from San Andrés (SSP) up to Piarco (POS).
Create RNAV from San Andrés (SPP) up to Piarco (POS).
Venezuela will create a conventional domestic route from Margarita (MTA) up to Mauroa (MAU).
Date: 13OCT2016

- Route 25: Delete UR559 Iquitos (IQT) - La Paz (PAZ).
Delete UA558 La Paz (PAZ) - Multa.
Extend UM776 from IQT up to Jujuy.
Create domestic RNAV Jujuy - Multa (Argentina).
Date: 21JUL2016
- Route 28: Delete UA567
Create RNAV from UMxxx between BUVIS and Punta Caucedo (CDO).
Note - Colombia will create a conventional domestic route between BUVIS and Cúcuta.
Effective date: 13OCT2016.
- Route 30: Delete UA574 between Taboga (TBG) and DATOR
Create RNAV UMxxx between TBG and Curaçao (PJC)
Coordinate Curaçao.
Effective date: 13OCT2016.
- Route 32: Delete UB510 from TBG up to OTU.
Create RNAV from TBG, KUBEK, Barrancabermeja (EJA).
Panama will coordinate with Kingston section TBG - SIA
Effective date: 21JUL2016.
- Route 33: Delete UB554 from Rio Branco (RCO) up to Cuiabá (CUI)
Create RNAV maintaining points UB554.
Effective date: 21JUL2016.
- Route 42: Delete UB696 from Guayaquil (GYV) up to Piura (URA).
Extend UM659 from GYV, MOXOM, URA.
Ecuador will amend MOXON by MOXOM.
Effective date: 21JUL2016.
- Route 44: Delete UG427
Realign and extend UM414 from OPRUS dct Puerto Cabello (PBL).
Effective date: 21JUL2016.
- Route 45: Delete UG430.
Extend UL341 up to PLG.
Colombia will delete UQ105, UW23.
Peru maintains UT228.
Effective date: 13OCT2016.
- Route 46: Delete UG431
Create RNAV from CUC, ALCOT
Colombia will create a domestic conventional route between BUVIS, EJA, CUC
Effective date: 13OCT2016.
- Route 48: Delete whole route UG434 from Taboga (TBG) up to Manley (MLY);
Extend regional bidirectional RNAV route UM674 from Taboga (TBG), KASOR up to
Manley (MLY).
Panama will coordinate with Kingston. SAM Office will make proposal.
Effective date: 13OCT2016

- Route 49: Delete UG436.
Extend UL203 from LIXAS, ATENO, ARNEL.
Note - sections MIBAR, ATIPU, ATENO, ARNEL will be modified for UM54; see route 62.
Effective date: 21JUL2016
- Route 50: Delete route UG437 from Taboga (TBG) up to Ciego de Ávila (UCA). Panama will coordinate with Kingston.
CAR Region will assess connection between PIGBO and Ciego de Ávila (UCA).
Effective date: 13OCT2016
- Route 51: Delete UG438.
Colombia will create conventional domestic route between CLO and CTG.
Effective date: 13OCT2016.
- Route 52: Delete UG439.
Extend UM328 from PAPIN up to QIT
Effective date: 21JUL2016
- Route 53: Delete whole route UG442 from Manley (MLY) up to Punta San Juan (VSJ);
Create regional bidirectional RNAV route from Manley (MLY), Aruba (ABA), Punta San Juan (VSJ), maintaining the same trajectory.
PENDING. Waiting for CAR coordination.
Move to Version 04.
- Route 55: Delete UG444.
Create RNAV UMxxx between OBN, LIM FIR, KAROB, IROTI, LOBUL, PLG.
Create conventional domestic route between EJA and ELB.
SAM Office will coordinate with CAR.
Effective date: 13OCT2016.
- Route 56: Delete UG445.
Create bidirectional RNAV between SPP and CTG maintaining points of UG445.
Effective date: 21JUL2016.
- Route 57: Delete UG446.
Create RNAV maintaining points of UG446.
Venezuela accepts proposal.
Coordinate with CAR.
Move to Version 04.
- Route 58: Delete whole route UG447 from San Andrés (SPP) up to Bogotá (BOG). Create regional, unidirectional RNAV route from VASIL, ARORO, PAKOP, San Andrés (SPP). It is suggested to Colombia and Panama to assess advantages of RNAV-5 corridors.
NOTE.- Colombia and Panama will jointly work on this proposal.
Move to Version 04.

- Route 62: Delete whole regional RNAV route UM538 from Taboga (TBG) up to ITATA.
Peru deletes domestic route UT309.
Extend / realign bidirectional UM542:

BY THE NORTH: from MIBAR up to Sangster (SIA).
BY THE SOUTH: from ARNEL up to ILMAR maintaining points of UT309.

Effective date: 13OCT2016.
- Route 66: Delete UR640.
Extend UM409 from Maracaibo (MAR) up to Manley (MLY).
SAM Office will coordinate with CAR.
Effective date: 13OCT2016.
- Route 97: Realign UL300; Proposal is divided into two actions:
TO THE NORTH OF IQT: unidirectional south - north RNAV route between Iquitos (IQT) and Girardot (GIR) will be created.

Note.- UL300 between Bogota (BOG) and Iquitos (IQT) will be maintained for exit flow to the South.

Effective date: 21JUL2016.

Note – TO THE SOUTH OF IQT: See Route 153
- Route 150: Proposal in ATS RO 7.
Realign UM665 section from Guayaquil GYV dct AKNOG.
Effective date: 21JUL2016.
- Route 151: Delete M778/UM778 from Elorza (EZA) up to Sao Gabriel (SGC).
Effective date: 04FEB2016.
- Route 152: Extend UL318 from ESV up to QIT.
Coordinate with CAR
Effective date: 04FEB2016
- Route 153: Realign UL300 to the south of IQT VOR.
Technically Peru and Chile agree concerning section from IRULI up to Iquitos (IQT), but coordination should be made with Chancelleries of each State.
Move to Version 04.
- Route 154: Panama, Colombia agree to delete UL474.
As a previous condition, Colombia will implement routes requested by KLM as soon as possible.
Move to Version 04.

=====

APPENDIX B

**FIRST WORKSHOP ON THE INTERFACE BETWEEN TMA_s
AND VERSION 03 OF THE SOUTH AMERICAN ATS ROUTE
NETWORK**

FINAL REPORT



INTERNATIONAL CIVIL AVIATION ORGANIZATION

South American Regional Office

Regional Project RLA/06/901

**FIRST WORKSHOP ON THE INTERFACE
BETWEEN TMAs AND VERSION 03 OF THE
SOUTH AMERICAN ATS ROUTE NETWORK**

FINAL REPORT

Lima, Peru, 16 to 20 March 2015

1. INTRODUCTION

1.1. The First Workshop on the Interface between TMAs and Version 03 of the South American Route Network was held on 16-20 March 2015 at the ICAO South American Regional Office.

1.2. The objectives of the workshop were:

Main: Develop Stage 2 of Version 03 of the SAM Route Network, based on the validated PBN design of airspaces selected by SAM States.

Other objectives: Fine-tune the routes of Stage 1 of Version 03 of the SAM Route Network; propose the implementation of other routes.

1.3. The workshop worked in two groups, which analysed the main flows through which States handle international traffic in the Region. Group 1 basically analysed the “Atlantic” Region, while Group 2 mainly analysed the “Pacific” Region.

Composition of Group 1:

NAME	STATE	POSITION/FUNCTION
Sandra Naumovitch	Argentina	Expert
Alexander Bastos	Brazil	Expert/Coordinator
Marcelo Lobo	Brazil	Expert/XLSX templates
Luis Rojas	Bolivia	Expert
César Varela	Bolivia	Expert
Robin Dacak	Paraguay	Expert/PPT presentation
Tomás Yentzch	Paraguay	Expert/Rapporteur
Adriana San-German	Uruguay	Expert
Miguel Miraballes	Uruguay	Expert
José Tristão	Advisor	Expert

Composition of Group 2:

NAME	STATE	POSITION/FUNCTION
Tomas Macedo	Peru	Expert
Luis Perales	Peru	Expert
Christian Ramos	Ecuador	Expert
Marcelo Valencia	Ecuador	Expert
Arturo Griffiths	Bolivia	Expert
Ana T. Montenegro	Panama	Expert
Héctor Ibarra	Chile	Expert/Rapporteur
Marco Abarca	Chile	Expert

ICAO OFFICERS		
Julio Pereira	ICAO	ATM/SAR Officer
Roberto Arca	ICAO	ATM/SAR/AIM Officer

2. PART I

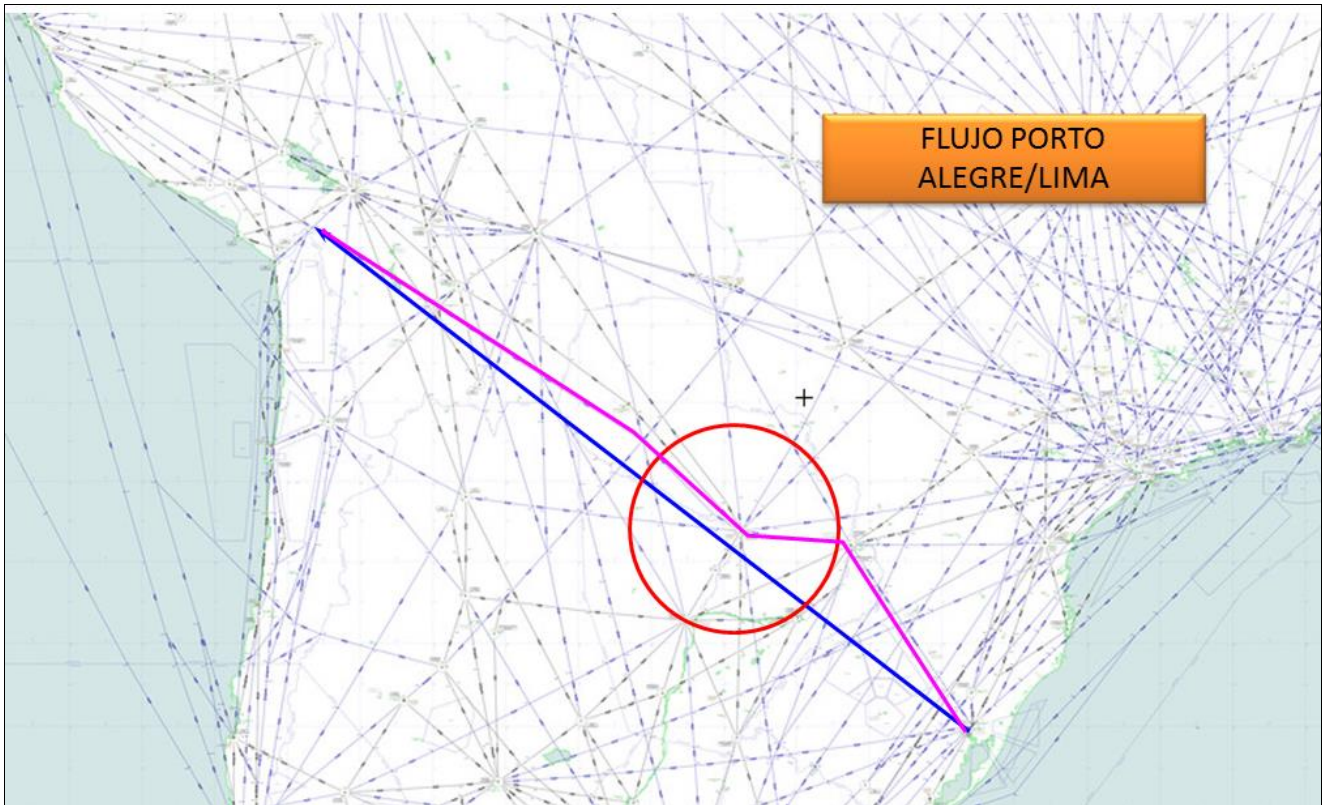
2.1. The information contained in this part of the report corresponds to the main objective, and involved the analysis of some proposals concerning Stage 2 of Version 03 of the SAM ATS Route Network, based on the validated or proposed PBN design for en-route and terminal airspaces of the States.

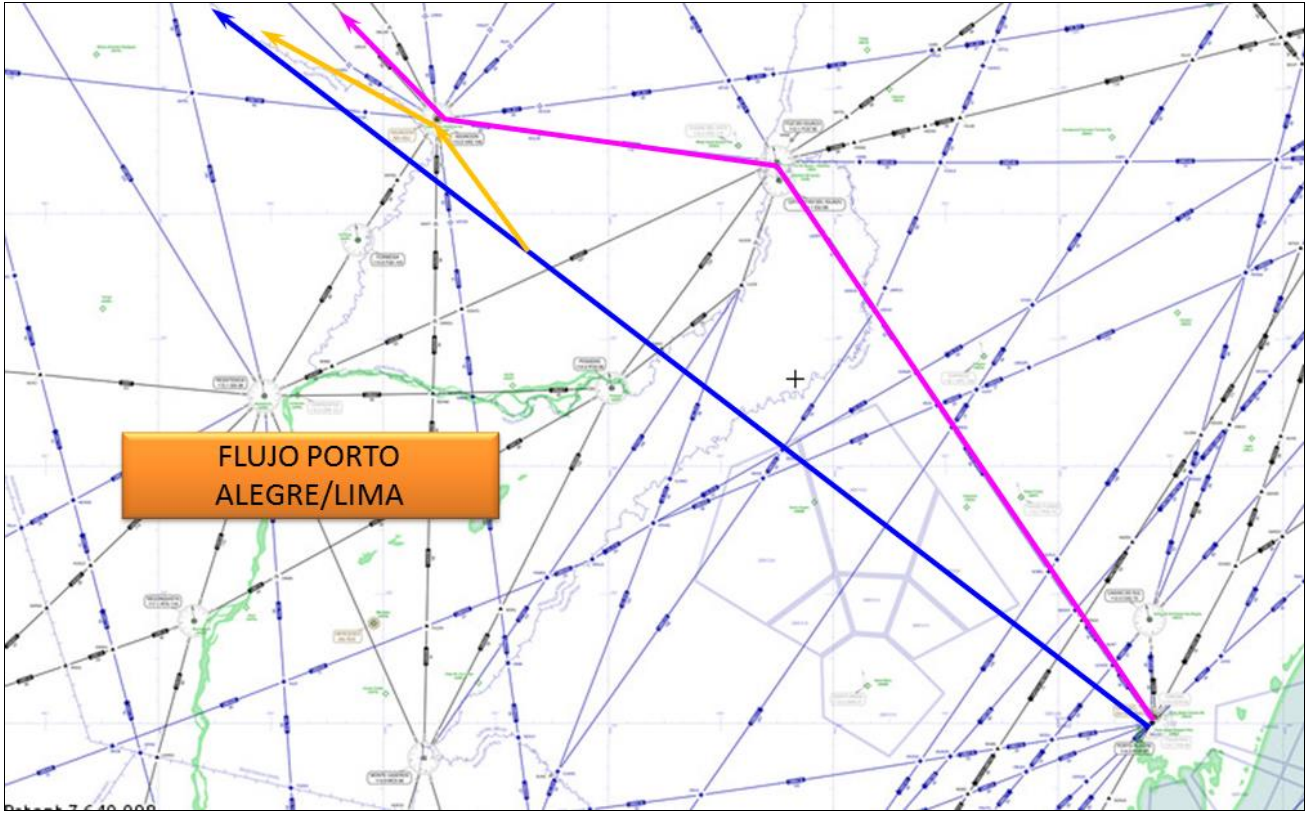
2.2. In this regard, an analysis was made of representative flows between the CAR and SAM Regions that were of interest to the States and some airlines, which submitted proposals based on efficient paths in terms of fuel savings and CO₂ emissions.

2.3. The suggested improvement options are numbered from 01 onwards, identifying the affected FIRs and describing the suggested proposals, as well as the tasks or actions to be performed for the conduction of the relevant study.

Suggested proposal – 01				
RNAV ROUTE PORTO ALEGRE/LIMA				
<ul style="list-style-type: none"> NOTE: It is important to consider the need to apply the Flexible Use of Airspace concept together with RNAV, CCO, and CDO, applying them in airspace restructuring. Within this context, the proposed RNAV route Porto Alegre/Lima will go from the POR VOR to the ARSUN position in the crossing of airways UM664 and UM548 in the La Paz FIR, and from there on, the existing UM548 is used. This same airway will serve the city of Asuncion with two STARs positioned for the Lima/Porto Alegre flow and <i>vice versa</i>. This path design will avoid penetration of segregated airspaces in the Santiago and Asunción FIRs. 				
FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Curitiba, Resistencia, Asuncion, La Paz, Lima	RNAV route Porto Alegre/Lima Proposal “A”	Current segment SBPA/ SBFI/ SGAS/ SPIM 1802,4 NM	UL216/ UM548	<ul style="list-style-type: none"> Proposal by the State (NE) Route data Statistical data Analysis of the proposal CNS analysis Savings SMS analysis LOAs Publications CTA training ...
		Proposed segment SBPA/ SGAS/ SPIM 1756.2 NM Up to the ASIA VOR 46.2 NM saved	U.../UM548	
	New RNAV route Porto Alegre/ Lima Proposal “B”	Current segment SBPA/ SBFI/ SGAS/ SPIM 1802.4 NM	UL216/ UR563/ UM548	
		Proposed segment SBPA/SPIM	U....	

		1750.5 NM Up to ASIA VOR Via ARSUN 52.3 NM saved	This path had been previously proposed, but no implementation decision had been made. In light of progress with implementation in the region, and with a view to obtaining the biggest and best advantages for users, a new study on proposals A and B is recommended.	<ul style="list-style-type: none">• Savings• SMS analysis• LOAs• Publications• CTA training• ...
--	--	---	---	---



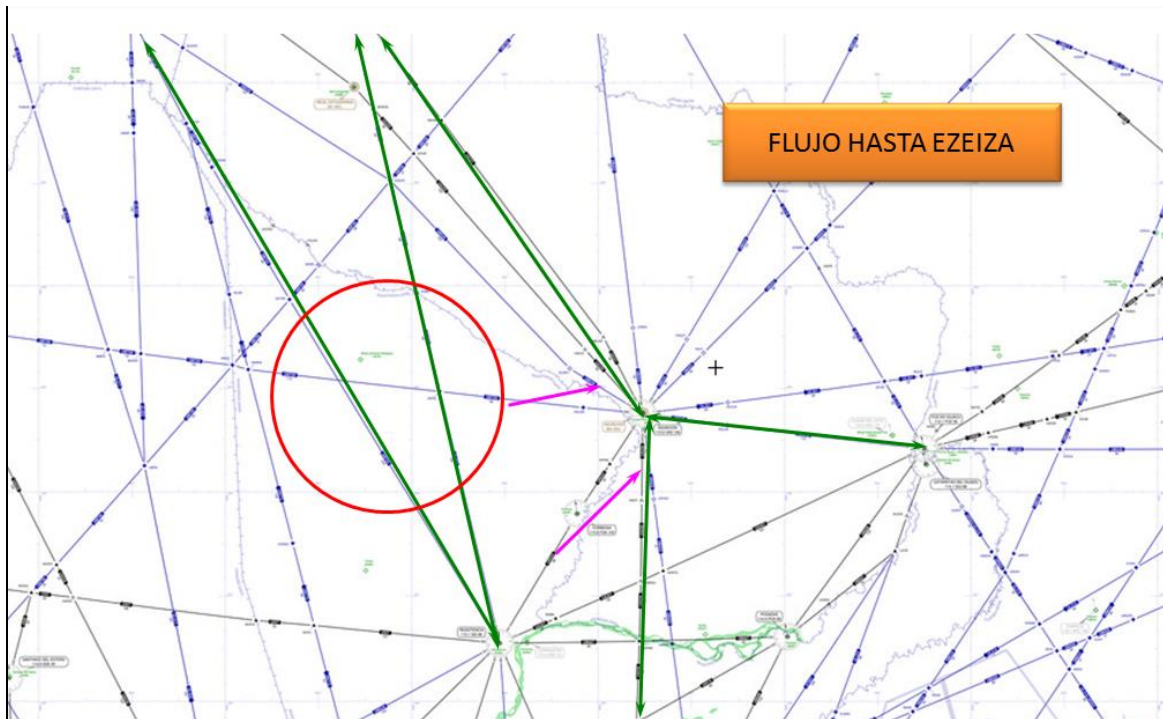


Suggested proposal – 02

IMPLEMENT SIDs/STARs

- These paths will connect arrival and departure routes in the western sector of the Asuncion TMA.
- The Letter of Operational Agreement with Resistencia must be reviewed to facilitate coordination and transfer of control and responsibility of flights that use these routes.
- Routes UL793 and UM799, which are used by the north/south flow with Asuncion as alternate in case Buenos Aires is closed, can also be added.
- This principle may be applied for channelling flows from the La Paz FIR to the Buenos Aires terminal.

FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Asuncion/ Resistencia	SID/STAR	SGAS/ UM789 SGAS/UR554 UL793 UM799	SIDs and STARs	<ul style="list-style-type: none"> • Proposal by the State (NE) • Data on SIDs and STARs • Analysis of the proposal • Savings • SMS analysis • LOAs • Publications • ...



Suggested proposal – 03

IMPLEMENT SIDs/STARs

- These actions will improve the efficiency and safety of operations to the three existing controlled aerodromes in the terminal area and to the other visual aerodromes serving general aviation and military aircraft.
- It will also permit a more efficient use of airspace and PBN improvements contemplated for the sector, optimizing arrival and departure paths.
- It should be noted that instrument arrival paths to runway 23 of Guaraní and runway 14 of Foz are overlapping; this can be easily solved with a STAR/SID properly designed to serve both runways.
- Consider the possibility of incorporating position COSTA of A311 into UM548, requested by BR.

FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Resistencia, Curitiba, Asuncion	Implementation of SID/STAR at the FOZ TMA	Departures and arrivals at the airports of Foz, Guarani, Yguazu	SID/STAR SARP, SBFI, SGES	<ul style="list-style-type: none"> • The Administration of Brazil will start arrangements for a meeting between the representatives of Argentina, Brazil, and Paraguay to analyse and review the proposed SIDs and STARs to be implemented. • The States must submit proposals, statistical data on IFR and VFR flights and projections. • Submit proposal of amendment to the existing LOA.

Suggested proposal – 04				
ENTRY AND EXIT POINTS AT THE EZEIZA AND CARRASCO TERMINALS				
<ul style="list-style-type: none"> • Optimization is advancing gradually, analysing PAPIX/ KUKEN paths that impact Uruguayan airspace. This requires consensus concerning optimum levels, and identification of decision and holding points. 				
FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Ezeiza, Montevideo	Define entry and exit points at the Ezeiza and Carrasco terminals	Models of the Tango Project of Argentina	Baires TMA SID / STAR	<ul style="list-style-type: none"> • Incorporate the SIDs/STARs of the Tango Project of Argentina into the airspace structure. • Submit the relevant proposal to the affected State. • Review and update LOA. • Make the relevant publications. • Training of the staff involved. • ...
SID: LANDA-BIVAM-ATOVO-EZ913-ASADA-GBE- EZ965- DORVO-				
STAR: PAGON-SAN ANTONIO-TORUL-VALOS-GENERAL BELGRANO-TENIL-ESLAN-PAPIX-KUKEN-				

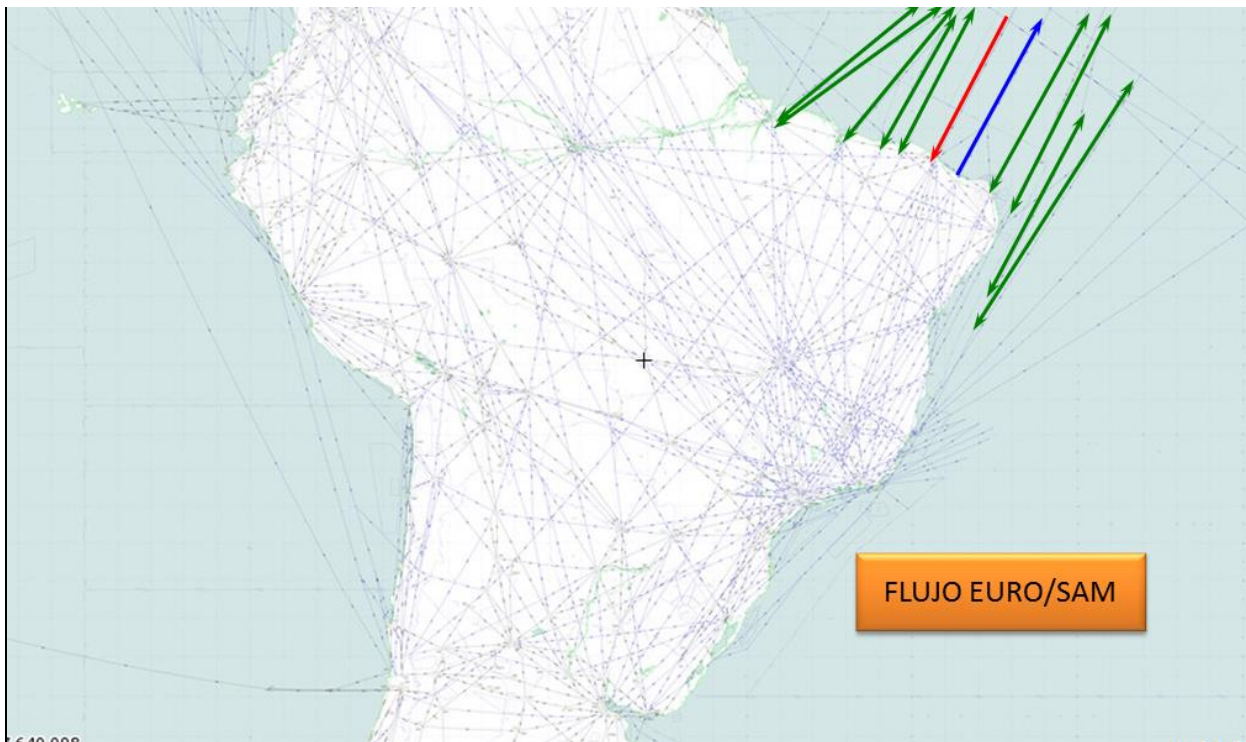
Suggested proposal – 05				
HOLDING POINTS AT THE MONTEVIDEO FIR				
<ul style="list-style-type: none"> • Holding points need to be defined at the Montevideo FIR, which will serve the STARs of the airports in the Baires terminal. • A consensus should be reached regarding optimum levels, identifying decision and holding points. 				
FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Ezeiza, Montevideo	Establish holding points at the Montevideo FIR, for the Ezeiza STARs.	Models of the Tango Project	Baires TMA STAR	<ul style="list-style-type: none"> • Incorporate the STARs of the Tango Project of Argentina into the airspace structure. • Submit the relevant proposal to the affected State. • Review and update LOA. • Make the relevant publications. • Training of the staff involved. • ...

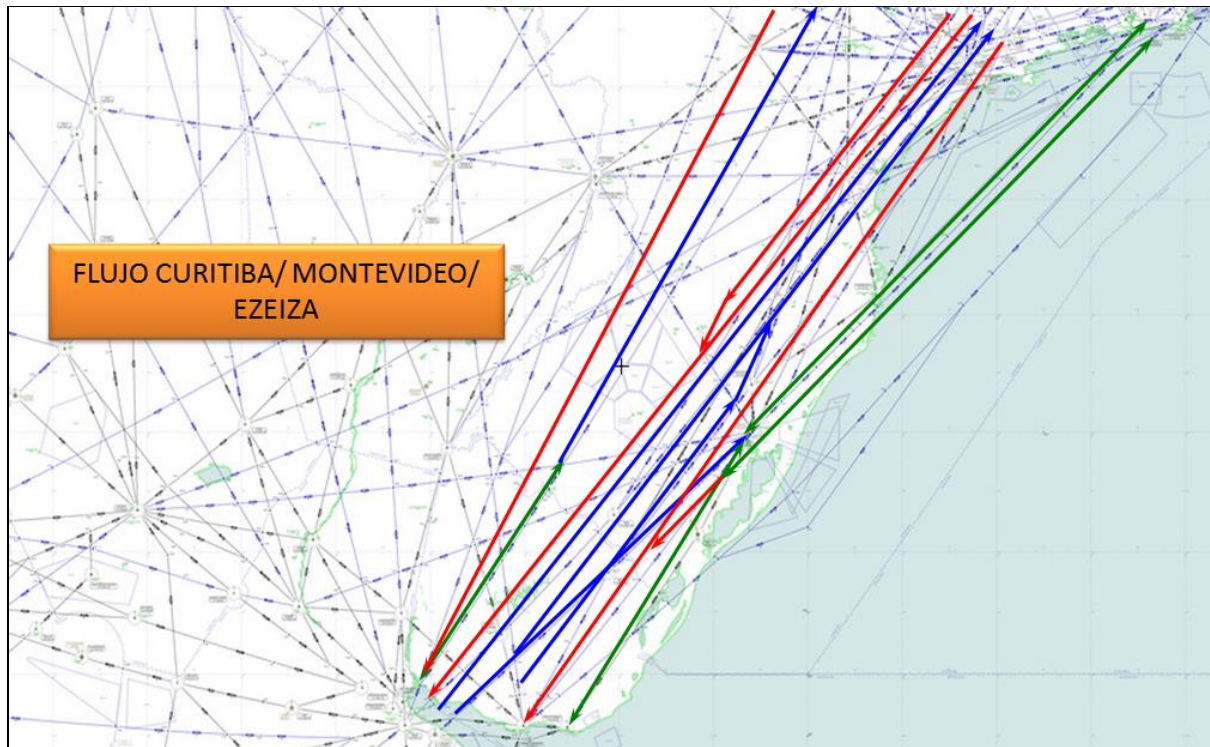
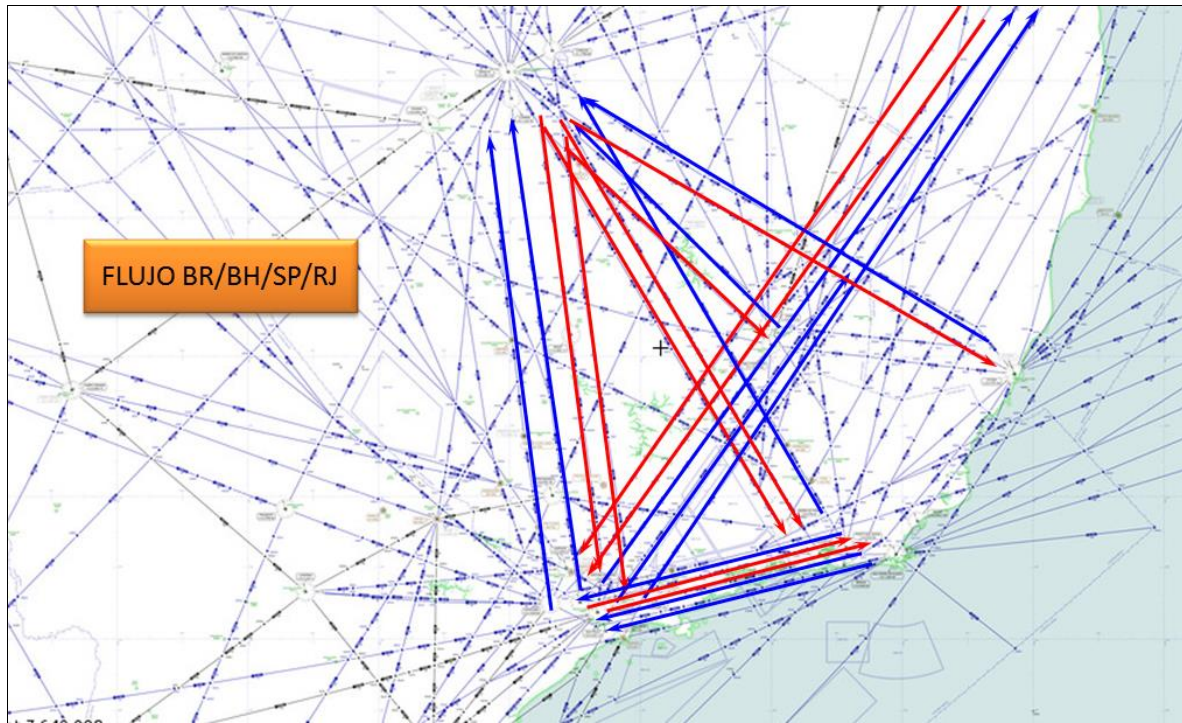
Suggested proposal – 06**CALCULATION TOOL**

- When assessing the proposals and recommended paths, it is important to have the appropriate resources and tools to obtain data as close as possible to reality. In this sense, the effective contribution of users/operators who have shared their resources with the working groups should be highlighted.
- COPA has contributed with the analysis of the proposals submitted to its consideration, and has provided the system for calculating and projecting flights in the paths concerned. The results provide information on the most direct paths, comparing the existing and the planned route, which is of vital importance for determining flight efficiency based on route length, fuel savings and CO₂ emissions.

Suggested proposal - 07				
NEW RNAV ROUTE				
<ul style="list-style-type: none"> Brazil proposes the creation of a new RNAV route network connecting the Curitiba, Montevideo, and Ezeiza FIRs. <p>Note 1: This principle can be used for channelling flows among the Curitiba, Buenos Aires, and Montevideo FIRs.</p> <p>Note 2: The request seeks to enhance safety.</p> <p>Note 3: The creation of the new route network involves applying the concept of parallel routes, maintaining the existing flows in routes UZ30, UZ21, UZ23, UZ14 and UZ36, up to the boundary between the Montevideo and the Ezeiza FIRs.</p> <p>Nota 4: Define the flow between Rio de Janeiro and the Montevideo and Buenos Aires airports.</p>				
FIR	PROPOSAL	PATH	DIRECTION OF THE AWY	ACTIVITIES
Curitiba, Montevideo, Ezeiza.	Realign UM661	VOR ADA/ S2350.06W4327.23/S 3012.17W5053.53/S32 21.36W5337.40	Aldeia/S3012.17W505 3.53 (two-way); S3012.17W5053.53/S 3221.36W5337.40 (one-way)	
	Extend route UM424	VOR LDS/S3012.17W5053. 53	VOR LDS/S3012.17W5053. 53 (two-way)	Eliminate UA305 from LDS to POR; the route will be extended from EZE to LDS, in accordance with Proposal N°4 of the master table.
	Change the direction of route UN857	MELO/POR	MELO/POR (one- way)	
	Realign route UM540	VOR SCP/OPROR/SCC	VOR SCP/OPROR/SCC (one-way)	Eliminate UM548 from RONUT to ANISE; UW21 from FLN to SAT; UZ36 from ANISE to SCP; UW47 from CTB to RDE

	Realign route UM788	VUKAS/NADAR/S27 25.13W4953.60	VUKAS/NADAR/S27 25.13W4953.60 (one-way)	
	Realign route UM792	ANDAN/S2725.13W4 953.60/BCO	ANDAN/S2725.13W4 953.60/BCO (one-way)	Eliminate UW24 from CGO to CTB
	New RNAV route	S3434.57W5750.50/S 3328.07W5624.69/UT GER	S3434.57W5750.50/S 3328.07W5624.69/UT GER (one-way)	
	New RNAV route	ILMUR/NOBEL/PAPI X	ILMUR/NOBEL/PAPI X (one-way)	
	Realign route UM654	SIDUL/UMGOR/MSS	SIDUL/UMGOR/MSS (one-way)	
	Realign route UN741	PUREU/LIVAD/MALBA/SIDUL/GAMOT/KUKEN	PUREU/SIDUL (one-way); SIDUL/KUKEN (two-way)	Obs: Proposal N°86 and N°87 of the master table
Curitiba	Realign/extend route UZ30	ITBAG/KEBOG/PERNA/NOBEL	ITBAG/KEBOG/PERNA/NOBEL (one-way)	

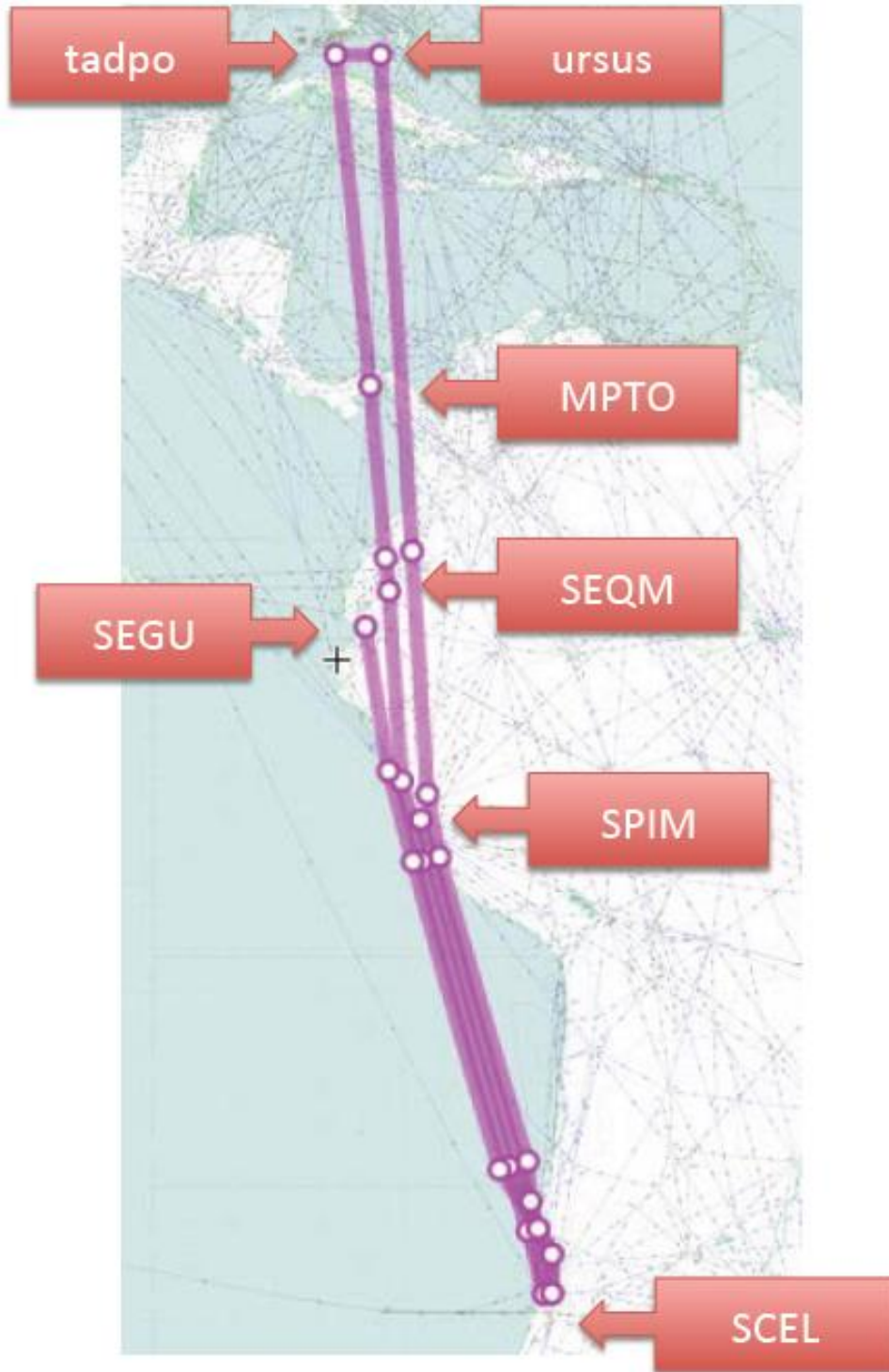




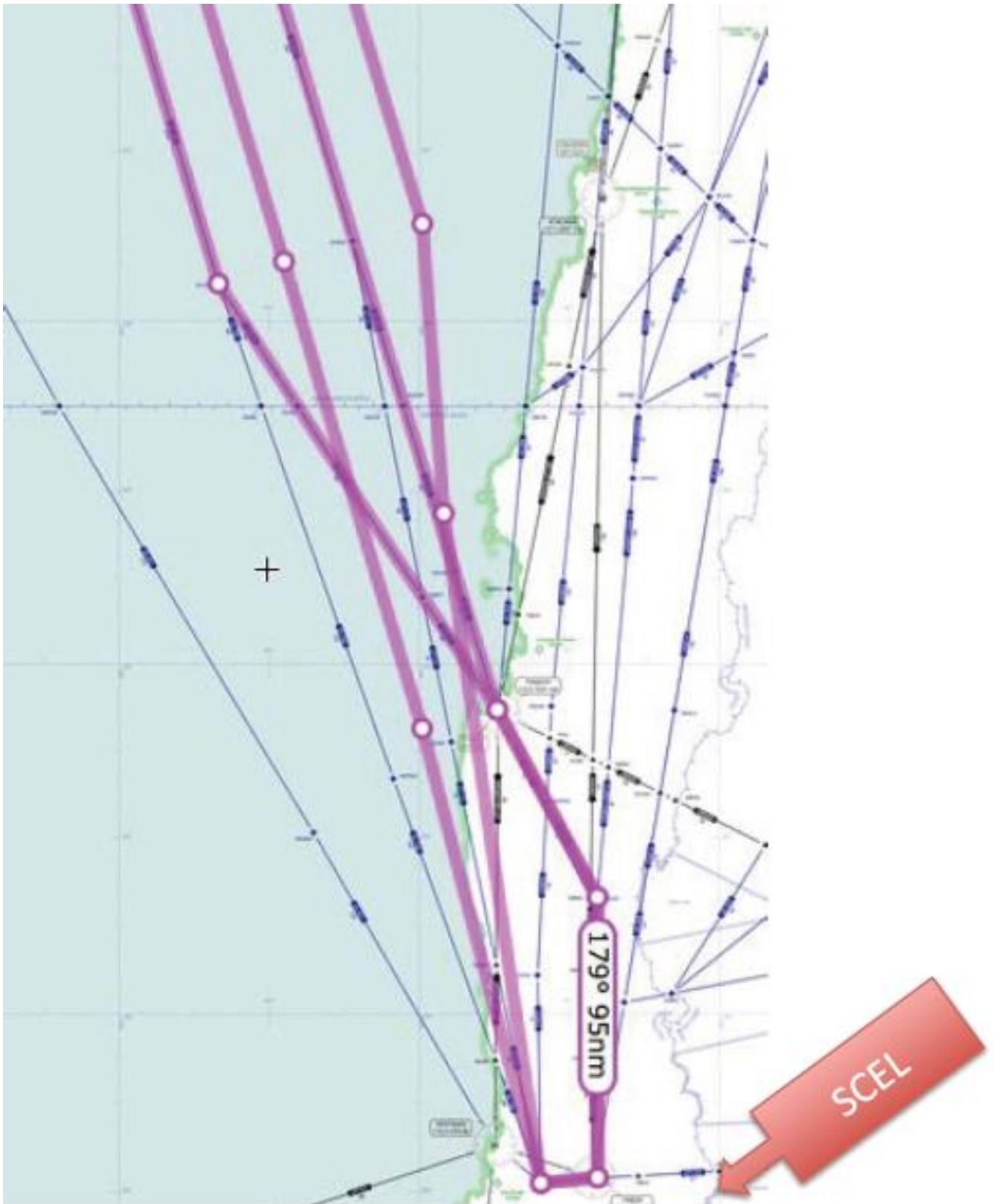
2.4. **Results of the analysis by Group 2**

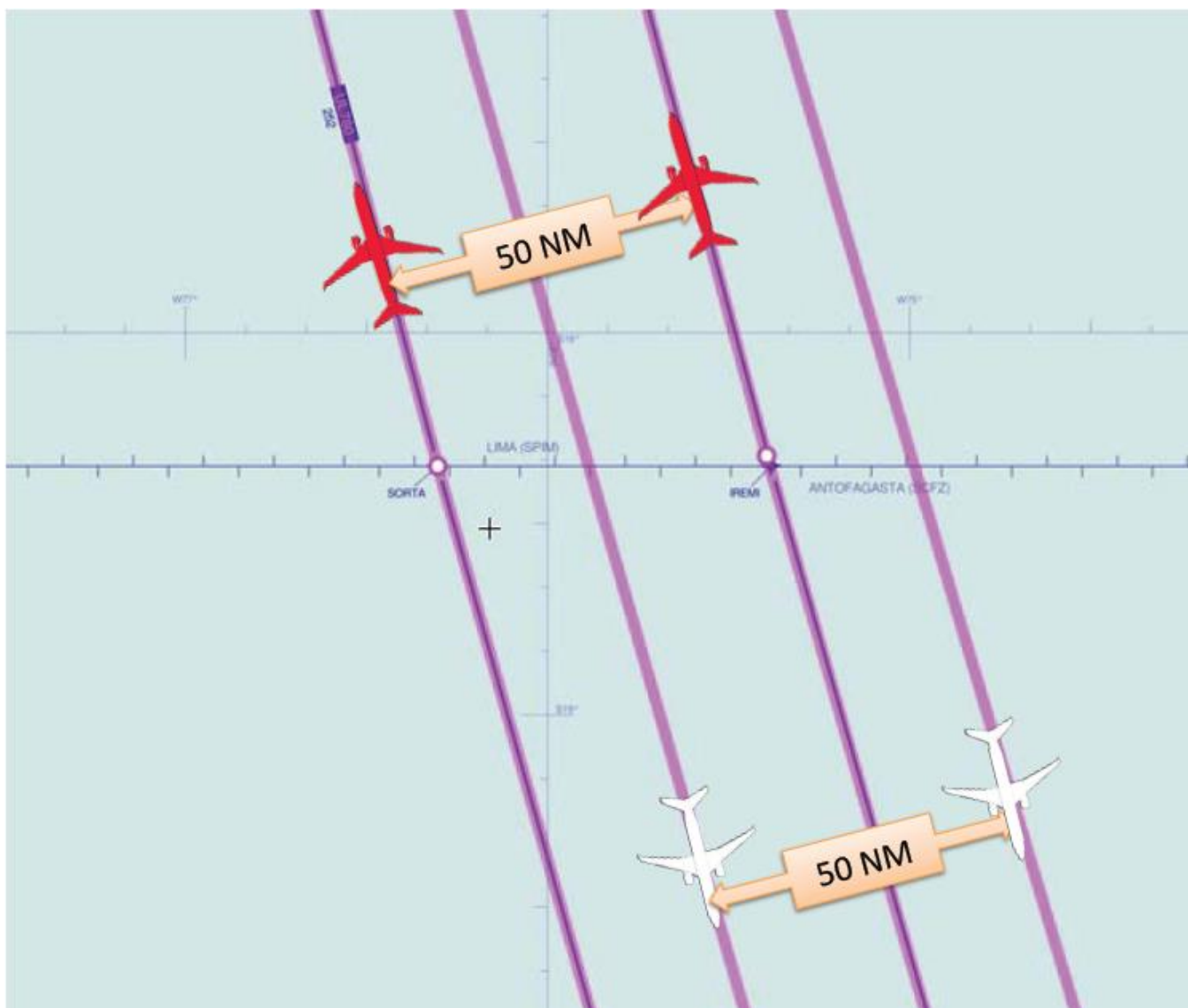
Suggested proposal

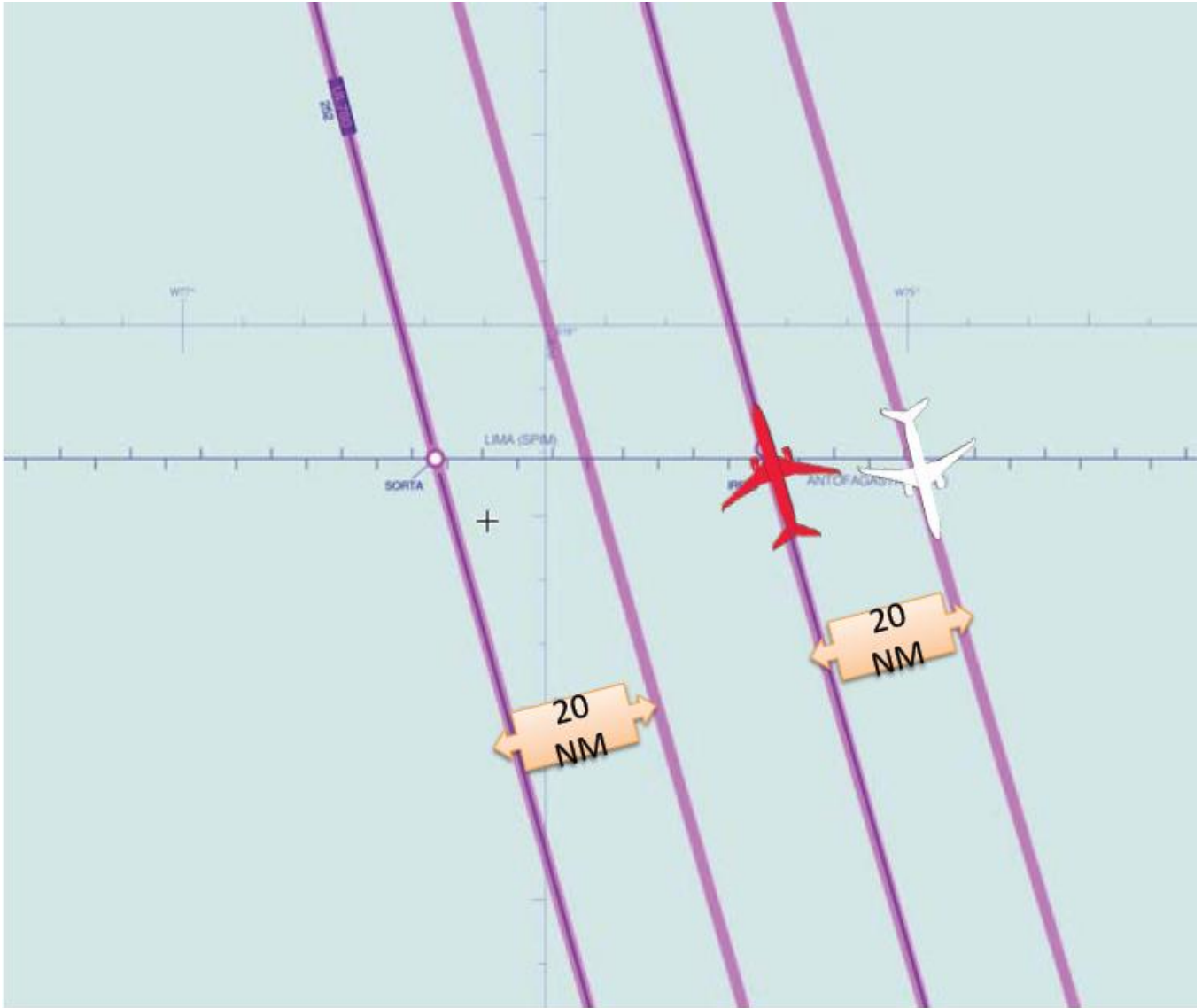
Proposal 01				
MIAMI /SANTIAGO DE CHILE NORTH-SOUTH FLOW				
<ul style="list-style-type: none"> • Within this context, the proposed parallel RNAV routes in the Santiago de Chile/Miami flow are analysed taking into account the entry and exit points at the SCEL and SPIM TMAs; and URSUS and TADPO at the MIA FIR. • This trunk route will serve the flows of the following cities: Santiago de Chile, Lima, Guayaquil, Quito, and Panama. • The new unidirectional parallel routes between Santiago de Chile and Lima will permit compliance with the strategic objective related to safety. 				
FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Santiago, Antofagasta, Lima, Guayaquil, Bogota, Panama	Santiago/ Miami flow	Existing segment SCEL/ SPIM/ SEGU/ SKBO/MPZL	UL780/ UL302	<ul style="list-style-type: none"> • Proposal by States. • Data on the route • Statistical data • Analysis of the proposal • CNS analysis • Savings • SMS analysis
		Proposed segment Create route parallel to unidirectional UL780. Create route parallel to UL302 extending to serve the MIA flow.	UL780 realigned from MOXES to the north. U...new route parallel to UL780. New route parallel to UL302 extending to URSUS.	

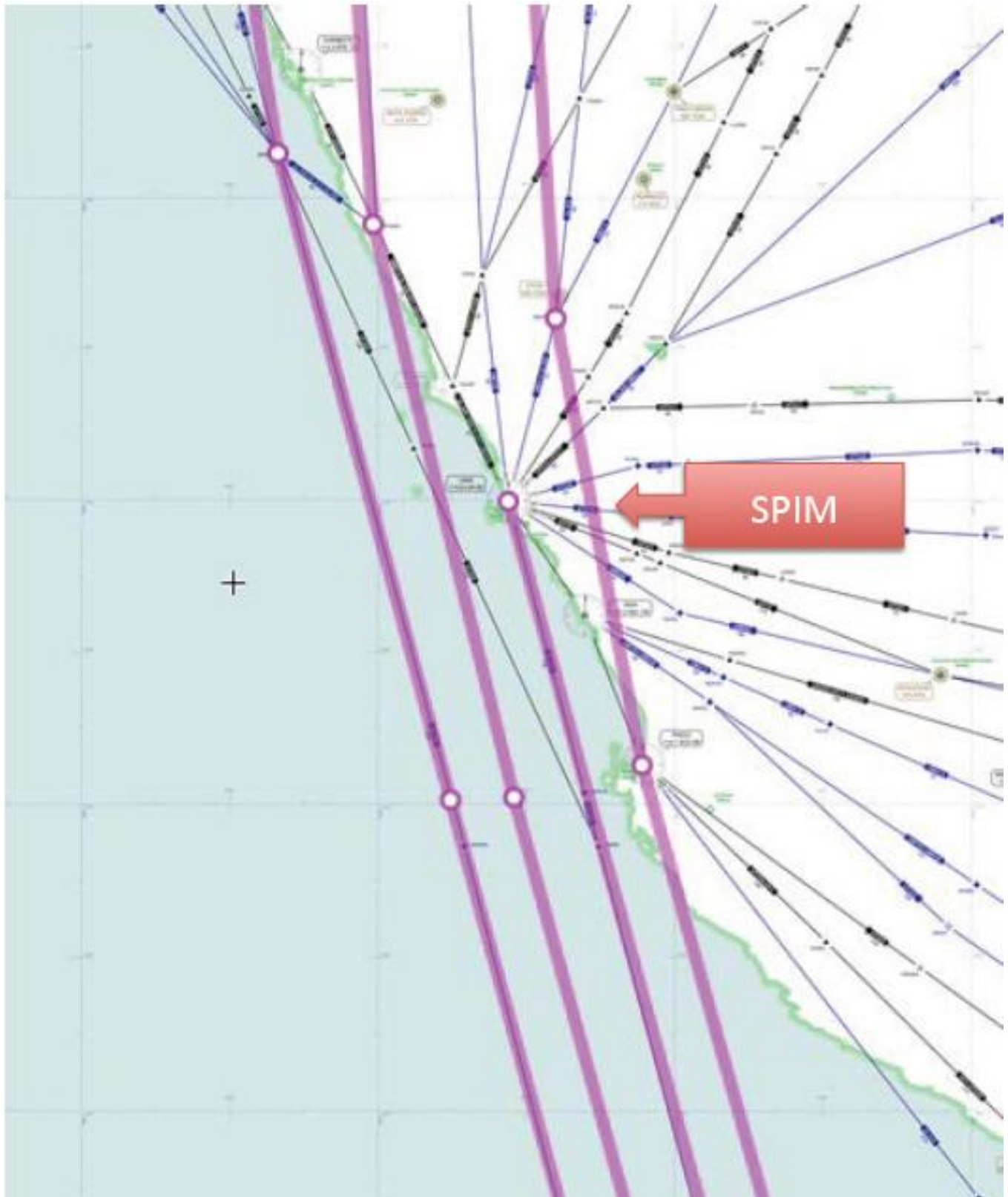


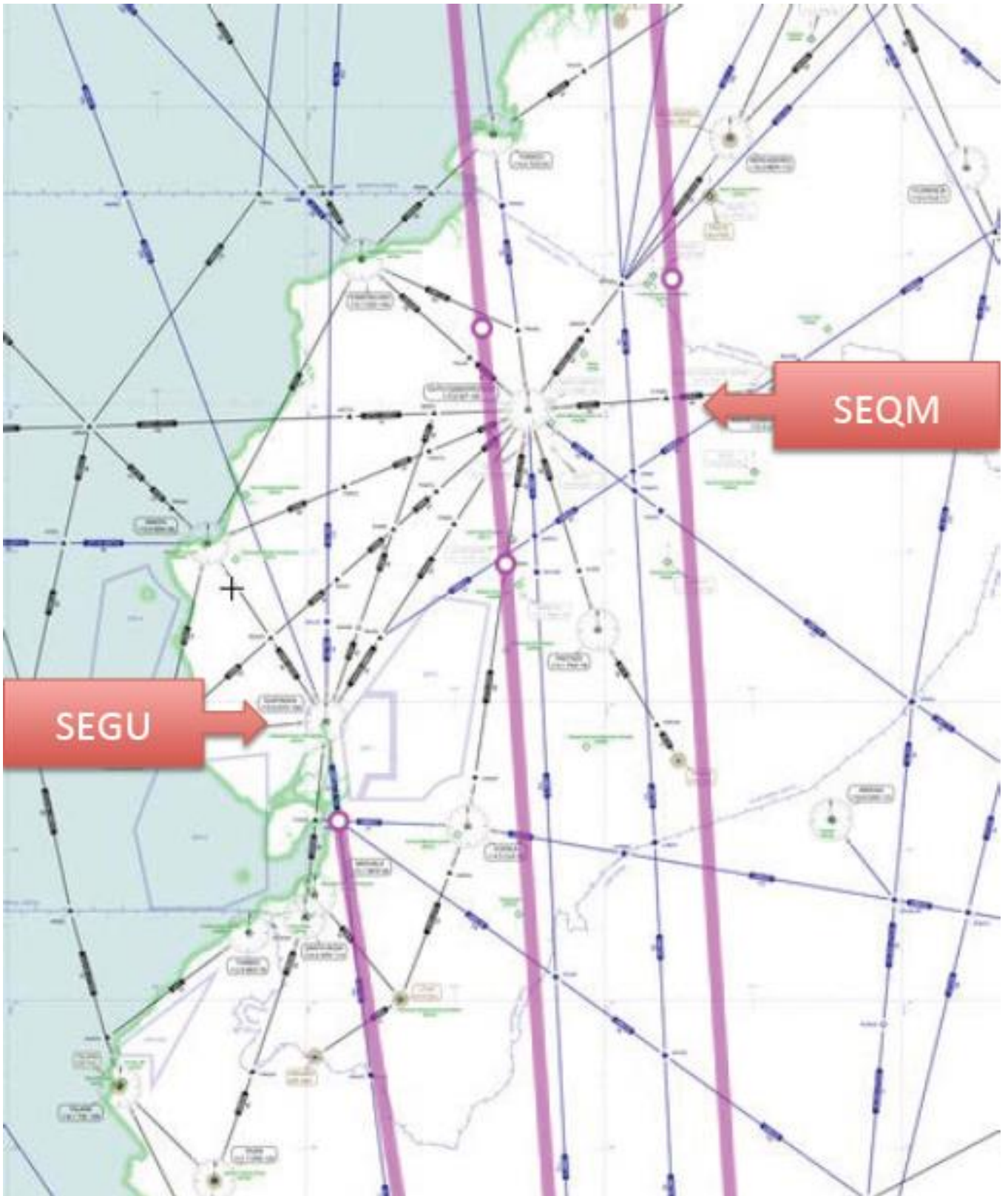


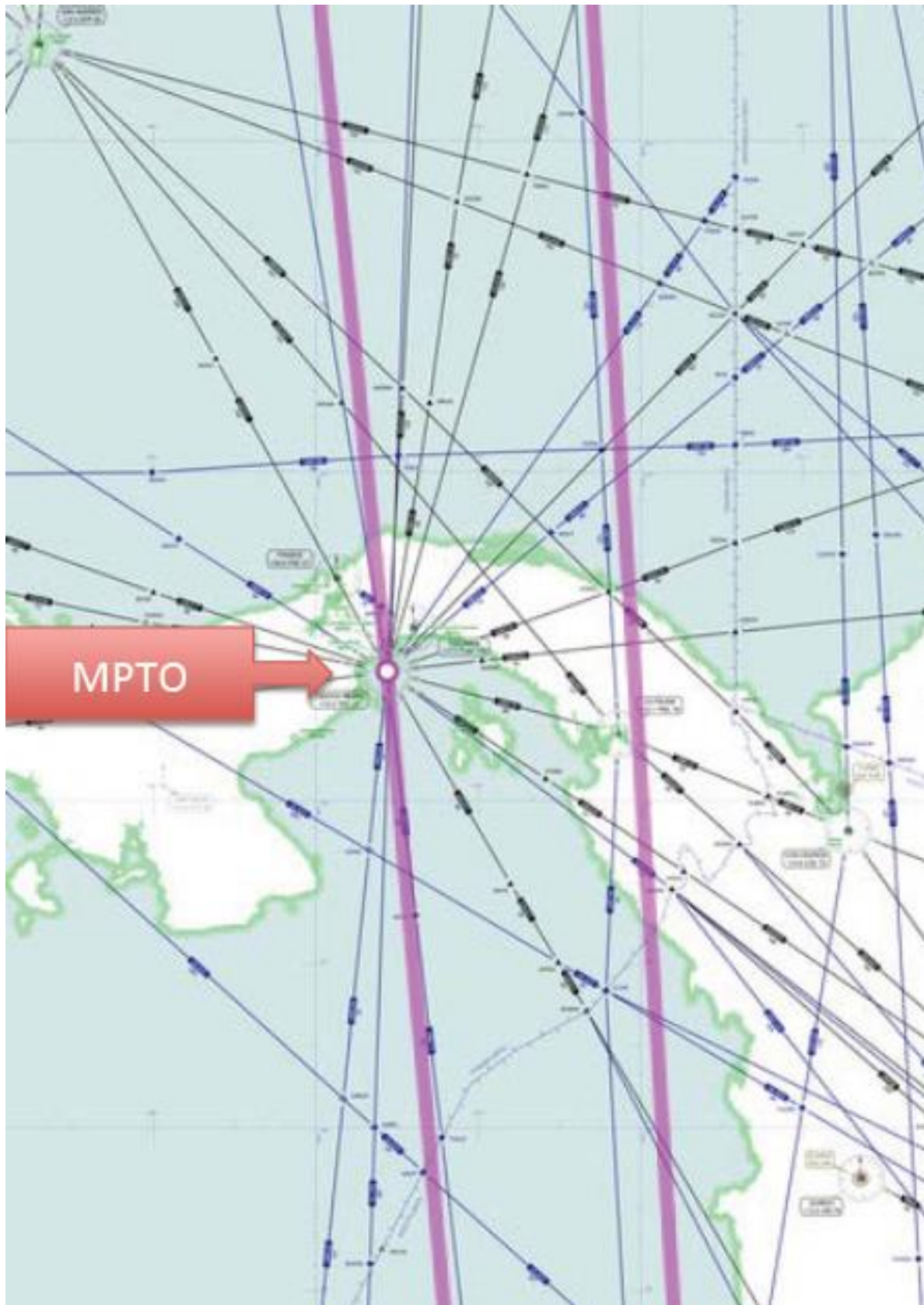


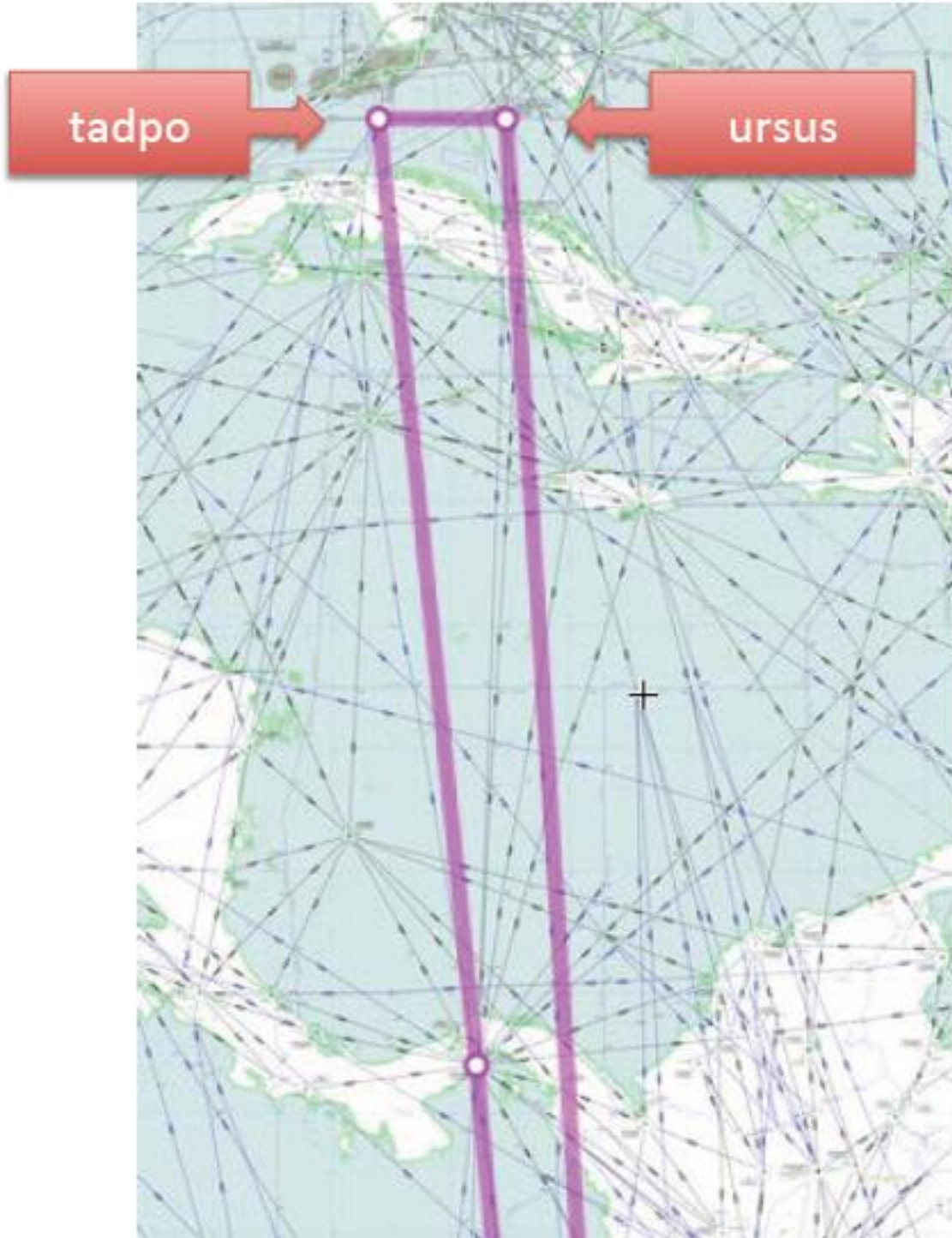




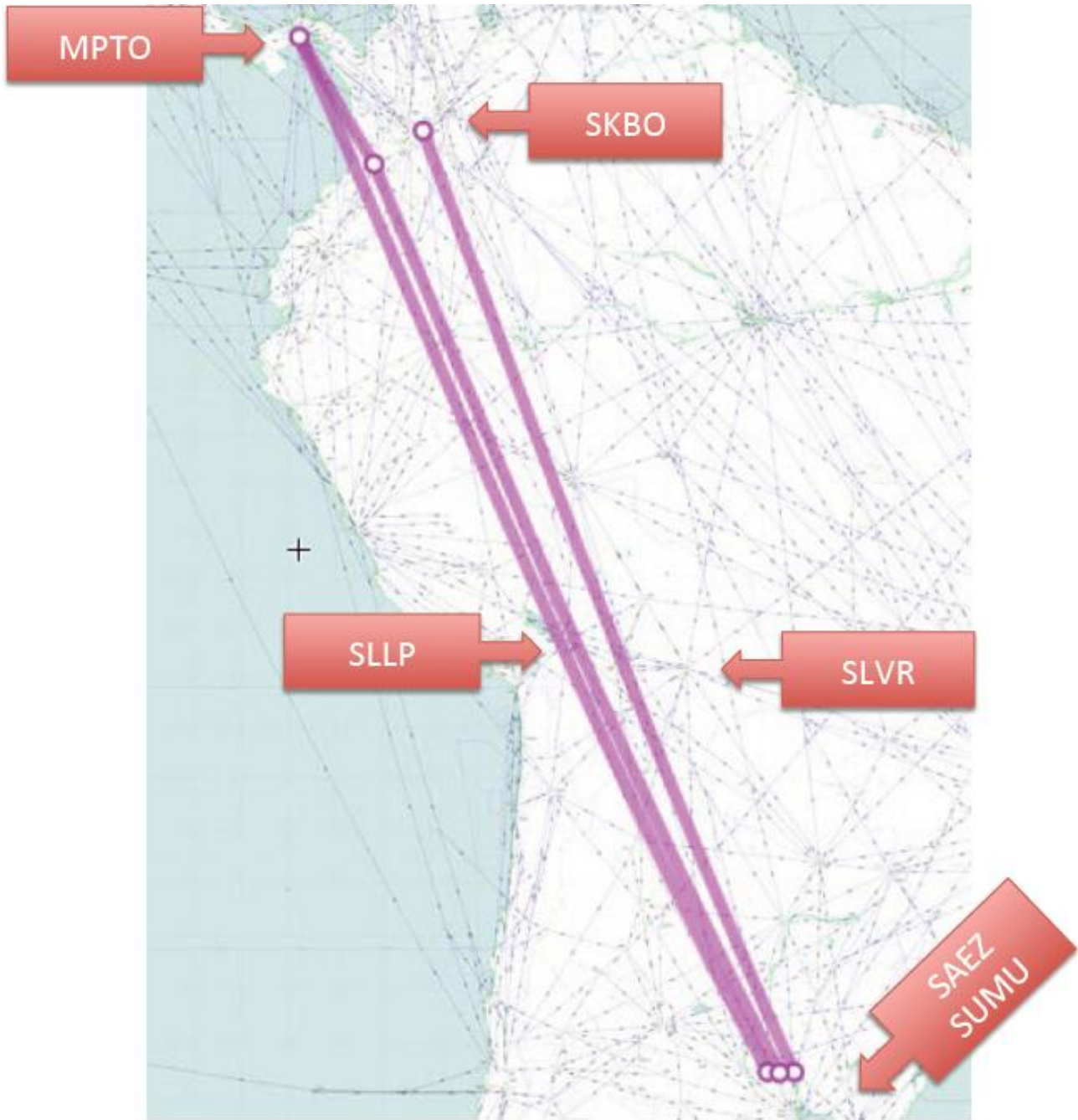




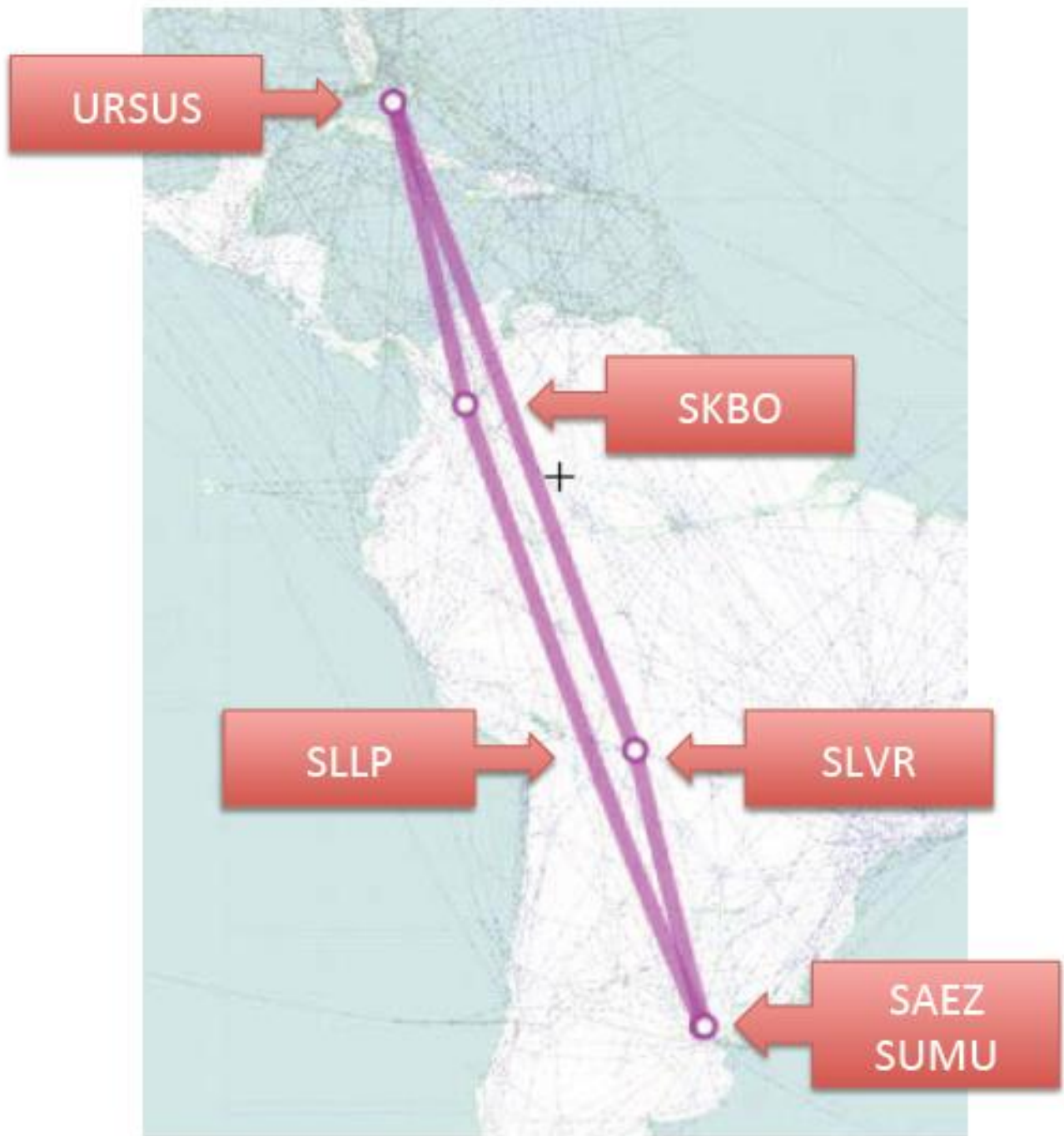




Proposal 02				
PANAMA /BUENOS AIRES NORTH-SOUTH FLOW				
<ul style="list-style-type: none"> • RNAV route in the Panama /Buenos Aires - Montevideo flow. • This trunk route will serve the flows of the cities of: Panama, Cali, Iquitos, La Paz, Buenos Aires, and Montevideo. • Possibility of establishing a parallel RNAV5 route 				
FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Panama, Bogota, Lima, Guayaquil, Amazonica, La Paz, Cordoba, Ezeiza.	Panama/ Buenos Aires, Montevideo flow	Bidirectional route from Panama terminal to Baires terminal.	UA321/ UR559/ UA558/ UW8	<ul style="list-style-type: none"> • Proposal by the States. • Data on the route • Statistical data • Analysis of the proposal • CNS analysis • Savings • SMS analysis



Proposal 03				
MIAMI /BUENOS AIRES NORTH-SOUTH FLOW				
<ul style="list-style-type: none"> • RNAV route in the Miami/ Bogotá /Buenos Aires flow. • RNAV route in the Miami/ Viru Viru flow. • These trunk routes will serve the flows in the cities of: Miami, Bogotá, Santa Cruz de la Sierra, and Buenos Aires. 				
FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Miami, Bogota, Ezeiza.	Miami /Bogota/ Buenos Aires flow	Bidirectional route from URSUS - Bogota to Baires terminal.	UA321/ UR559/ UA558/ UW8	<ul style="list-style-type: none"> • Proposal by the States. • Data on the route • Statistical data • Analysis of the proposal • CNS analysis • Savings • SMS analysis



Proposal 04				
LIMA / SAO PAULO WEST-EAST FLOW				
<ul style="list-style-type: none"> • RNAV route in the Lima /Sao Paulo flow. • This trunk route will serve the flows in the cities of: Lima, La Paz, Viru Viru, and Sao Paulo. 				
FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Lima, La Paz, Curitiba.	Lima /La Paz, Viru Viru and Sao Paulo flow.	Bidirectional route from Lima terminal to Sao Paulo terminal.	UM415	<ul style="list-style-type: none"> • Proposal by the States. • Data on the route • Statistical data • Analysis of the proposal • CNS analysis • Savings • SMS analysis

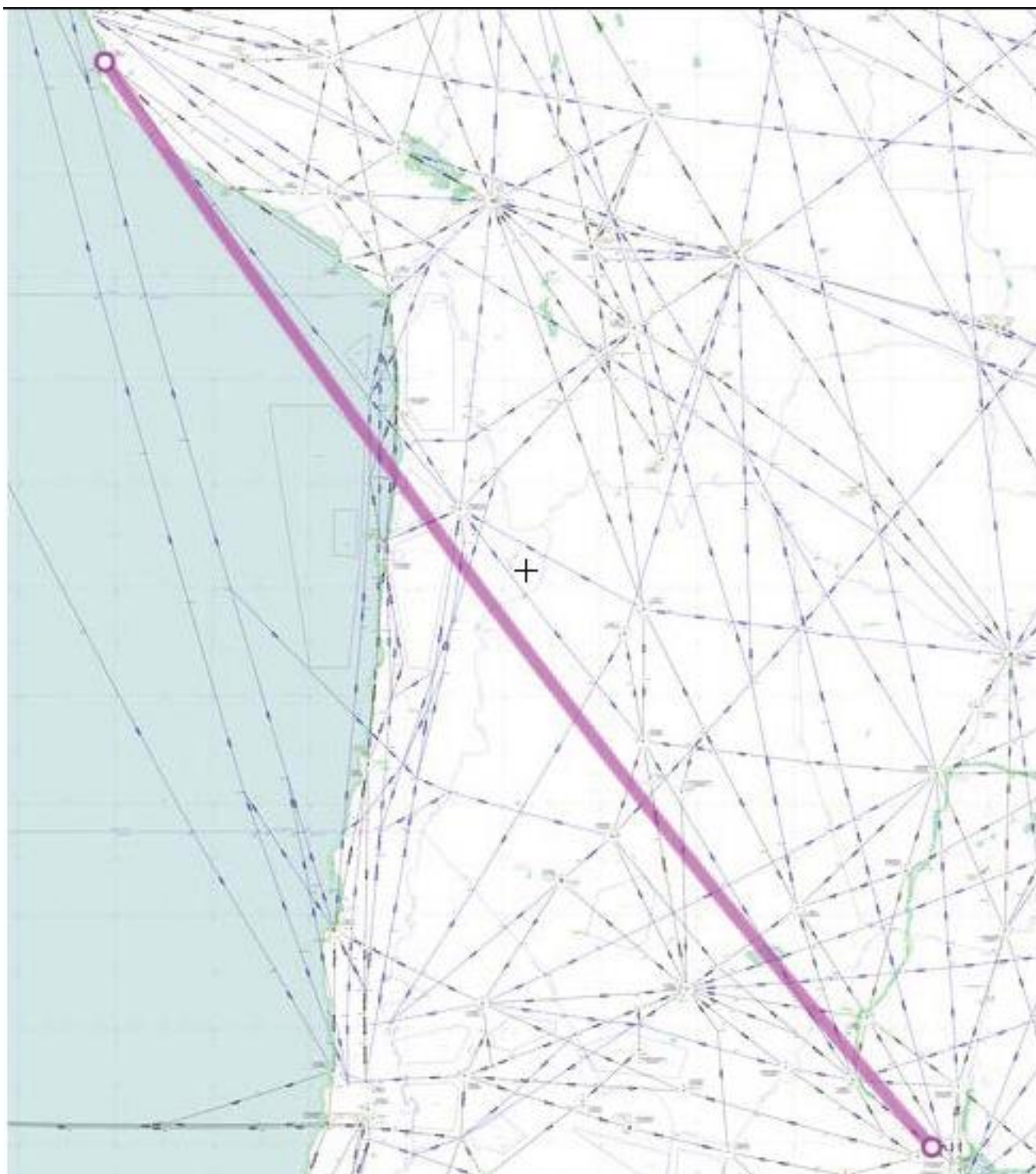


Proposal 05

LIMA / BUENOS AIRES WEST-EAST FLOW

- RNAV route in the Lima / Buenos Aires flow.
- This trunk route will serve the flows in the cities of: Lima and Buenos Aires.

FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Lima, Antofagasta, Cordoba and Ezeiza.	Lima/Buenos Aires flow	Bidirectional route from Lima terminal to Baires terminal	UL550	<ul style="list-style-type: none">• Proposal by the States.• Data on the route• Statistical data• Analysis of the proposal• CNS analysis• Savings• SMS analysis



3. **PART II**

3.1. Other objectives established for the workshop include fine-tuning the routes of Stage 1 of Version 03 of the SAM Route Network and receiving proposals from users or providers in the Region for the implementation of other routes, as needed, for analysis by the group.

3.2. **Suggested proposals**

Suggested proposal – 01				
NEW RNAV ROUTE				
<p>Note 1: Corresponds to proposal N° 34 of the master table.</p> <p>Note 2: The request seeks to enhance safety in the traffic between the Montevideo and Ezeiza FIRs.</p> <ul style="list-style-type: none"> • Uruguay proposes the creation of a new RNAV route in the segment CRR/DUR/LOA/UL550 to PISCO. • The UB555 is eliminated in all its length (CRR/PAR). • All the benefits of the PBN operational concept are obtained in the direct RNAV navigation segments; according to the comparison between the current flight plan and the new proposed route using the IFSET tool, fuel savings amount to 1.10% (10 tonnes of fuel). CO₂ amounts to -31.600, accounting for 88 operations per month. • The difference in distance between the existing and the proposed paths was calculated using the tool of Copa Airlines, resulting in 18 NM of distance saved. 				
FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Montevideo, Ezeiza, Resistencia, Cordoba, Antofagasta, Lima	New RNAV route	Carrasco/Durazno/ Calama/ UL550/ Asia/Pisco	Eliminate UB555, in all its length	Define LOA responsibilities, design and publications

Suggested proposal – 02				
ELIMINATION OF ROUTE UA556				
<ul style="list-style-type: none"> • Corresponds to proposal N° 24 in the master table. • The request seeks to enhance safety in the traffic between the Montevideo and Resistencia FIRs. • Uruguay proposes that traffic joins the existing RNAV UM402 through SEKLO to CRR. • UA556 is eliminated from MCS to CRR. • All the benefits of the PBN operational concept are obtained in the direct RNAV navigation segments. • Consumptions and savings are being analysed. 				
FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Montevideo, Ezeiza, Resistencia Asuncion	Elimination of route	Monte Caseros/ Carrasco	Eliminate UA556, from MCS to Carrasco.	Define LOA responsibilities, design and publications

Suggested proposal – 03				
ELIMINATION OF ROUTE UA305 AND EXTENSION OF UM424				
<ul style="list-style-type: none">• Eliminate route UA305 in the EZE/CRR/LDS/POR segment• Extend UM424 in the EZE/CRR/LDS/POR segment. This segment will be unidirectional EZE/LDS/POR.• Corresponds to proposal N° 4 in the master table• This proposal is consistent with the modifications foreseen by Brazil.				
FIR	PROPOSAL	PATH	AWY	ACTIVITIES
Ezeiza, Montevideo, Curitiba	Eliminate route UA305 and extend UM424	Santiago de Chile/ Argentina/Uruguay	Eliminate route UA305 Extend UM424	Submit proposal to update LOA SMS Publish

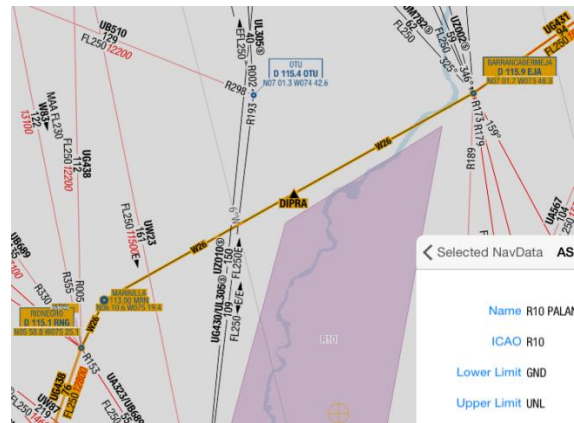
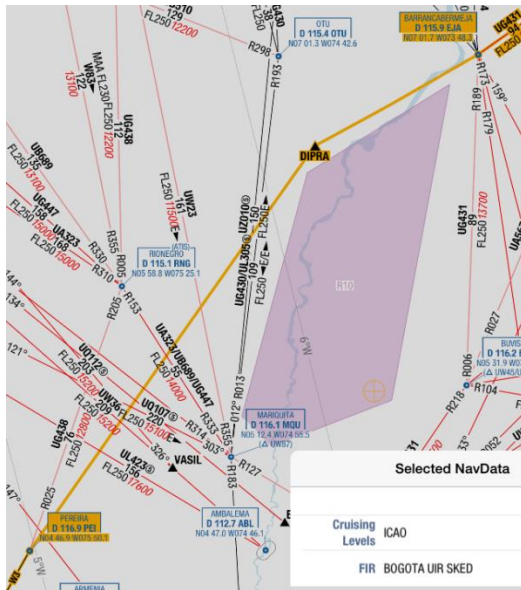
3.3. KLM proposals

3.3.1. SHORT-TERM ROUTE OPTIMIZATION INITIATIVES

KLM Royal Dutch Airlines requested the Civil Aviation Authority of Colombia to consider the implementation of the following route optimization initiatives in the short term (by order of preference):

3.3.1.1. New upper airway north of restricted area R10 Palanquero:

- a) New upper route: PEI-DIPRA-EJA (preferred).
- b) Or, alternatively, an upper route over lower airway W26 between RNG and EJA (routing: RNG-MRN-DIPRA-EJA).



3.3.1.2. Establishment of a new reporting point at the intersection of airways UM414-UM662, to allow a transfer between these airways.



3.3.2. In addition to short-term proposals, the workshop assessed KLM proposals, with the following results:

PROPOSAL KLM 1A				
FIR	PROPOSAL	PATH	AWY	
Bogota and Barranquilla	Direct RNAV route (conditioned upon crossing SKR10)	PEI – EJA in the upper level		Refer request to Colombian authorities

PROPOSAL KLM 1B				
FIR	PROPOSAL	PATH	AWY	
Bogota and Barranquilla	New RNAV route In order to avoid SKR10 on the north	PEI – DIPRA - EJA in the upper level		Refer request to Colombian authorities

PROPOSAL KLM 1C				
FIR	PROPOSAL	PATH	AWY	
Bogota and Barranquilla	Create RNAV route in the upper level over existing lower route. In order to avoid SKR10 on the north		W26 between RNG - EJA	Refer request to Colombian authorities

PROPOSAL KLM 1D				
FIR	PROPOSAL	PATH	AWY	
Bogota and Barranquilla	Create RNAV routes in the upper level over existing lower routes. In order to avoid SKR10 on the south		W1 – W17 between ULQ and BOG.	Refer request to Colombian authorities

PROPOSAL KLM 2				
FIR	PROPOSAL	PATH	AWY	
Bogota and Barranquilla	Create direct RNAV route to optimize exit from Cali.	Direct segment between RNG and BAQ VORs		Refer request to Colombian authorities

PROPOSAL KLM 3				
FIR	PROPOSAL	PATH	AWY	
Guayaquil, Bogota and Barranquilla	Establish WPT at the intersection of UW5 and UM525 routes		UW5 – UM525	Feasible in the short term. Submit request to Colombian authorities

PROPOSAL KLM 4				
FIR	PROPOSAL	PATH	AWY	
Bogota and Barranquilla	Direct RNAV route from Ecuador to northern Colombia	TCO – OROSA and establish a WPT at the intersection with UM525.	UR564 – UG438 – CTG – UA574.	Refer request to Colombian authorities

	Create RNAV route between GYV and RHC.	At VULKY – OSIGO –TCO – WPT (INT UQ101) – BUTAL – WPT (INT UG444) - RHC		Assessed by AD HOC Group 2. Ecuador deemed it feasible in the medium term.
--	--	---	--	--

PROPOSAL KLM 5

FIR	PROPOSAL	PATH	AWY	
Bogota and Barranquilla	Create routes to enter/exit the BAQ UIR close to the Guajira peninsula.	VOR/DME RHC – RNG –TCO.		Refer request to Colombian authorities

PROPOSAL KLM 6

FIR	PROPOSAL	PATH	AWY	
Bogota	Establish WPT at the intersection of routes UM414 and UM662		UM414 – UM662	Feasible in the short term Submit request to the Colombian authority

PROPOSAL KLM 7

FIR	PROPOSAL	PATH	AWY	
Bogota	Establish new route from ILMUX - AMAYA and establish WPT at the intersection of routes UQ110 and UM662 and of routes UM414 and UM662		UM414 – UM662 UQ110 – UM662	Feasible in the short term Submit request to the Colombian authority Peru considers that the new route could go from IQT to AMAYA.

PROPOSAL KLM 8				
FIR	PROPOSAL	PATH	AWY	
Guayaquil	Establish WPT at the intersection of routes UW21 and UM662		UW21 – UM662	Ecuador considers it feasible in the short term

3.4. **Proposals by COPA**

EXISTING AND PROPOSED ROUTES - COPA AIRLINES
<ul style="list-style-type: none"> • COPA has proposed and discussed segments between Panama and the different cities of the Region, with the representatives of each State concerned. • Some of the analysed proposals are being applied through paths that can be optimized using the adjusted existing route network. COPA Airlines will make the corresponding arrangements for regular use of the recommended paths. • Likewise, it has been noted that other paths will achieve their optimum profile by only adjusting some short segments identified in specific FIRs, thus permitting the implementation of RNAV routes by adjusting paths and optimizing the route. • It should also be noted that the adjustments made or to be made in Stage 2 of Version 03 will significantly favour major destinations in Argentina, Paraguay and Uruguay.

EXISTING AND PROPOSED ROUTES - COPA AIRLINES:		
ORG-DST	ROUTE (EXISTING/PROPOSED)	NM (EXISTING/PROP)
MPTO-SAEZ	MPTO OREPI1B IRATA BUSMO UA321 RCO UL417 ERE UA558 MULTA UW24 SNT SNT6A SAEZ	2825
	MPTO OREPI1B IRATA BUSMO UA321 PLG RBC UL417 ERE UA558 MULTA UW24 SNT SNT6A SAEZ	2817
MPTO-SBGL	MPTO OREPI1A DAKMO UM549 MTU UM782 ABIDE UM549 OGTIT UZ40 BSI UZ6 ISOPI UZ35 LUVSU UZ24 OGMUK VAKUB1A SBGL	2906
	MPTO OREPI1A DAKMO UM549 MTU UM782 ABIDE UM549 OGTIT POVOX OGMUK VAKUB1A SBGL	2867
MPTO-SBPA	MPTO OREPI1B DAKMO UQ114 ASAPA UL655 DIKAL UL793 EVOLO UL216 FOZ UL216 EAGLE EAGLE1 SBPA	2737
	MPTO OREPI1B DAKMO UQ114 ASAPA ARMUK UL216 FOZ UL216 EAGLE EAGLE1 SBPA	2724

EXISTING AND PROPOSED ROUTES - COPA AIRLINES:		
ORG-DST	ROUTE (EXISTING/PROPOSED)	NM (EXISTING/ PROP)
MPTO-SBRF	MPTO OREPI1A DAKMO UW87 MQU UA323 MNS UZ11 ILNOT ILNOTA SBRF	2907
	MPTO OREPI1A DAKMO UW87 MQU UA323 SGC ILNOT REC SBRF	2904
MPTO-SCEL	MPTO OREPI1A OREPI BUXOS UL780 SULNA UT315 TOY UL302 ISGUD UQ815 SIMOK SIMOK1A SCEL	2612
	MPTO OREPI1A OREPI BUXOS UL780 VAKUD ISGUD UQ815 SIMOK SIMOK1A SCEL	2603
MPTO-SGAS	MPTO OREPI1B IRATA UA321 LIMPO UM784 PALIV UA320 UKELA SGAS	2448
	MPTO OREPI1B IRATA UA321 LIMPO UM784 KILEV MCL UA320 UKELA SGAS	2434
MPTO-SUMU	MPTO OREPI1A OREPI IRATA UA321 BUSMO UQ106 PLG UA321 LIMPO UM784 PALIV UA320 MOROS UL793 SIS UW7 MCS UA556 MONSA MONSA1C SUMU	2932
	MPTO OREPI1A OREPI IRATA UA321 BUSMO UQ106 PLG UA321 LIMPO UM784 PALIV MCS UA556 MONSA MONSA1C SUMU	2897
MPTO-SLVR	MPTO OREPI1B IRATA UA321 PAKES PAKES VVI SLVR	1883
	MPTO OREPI1B IRATA UA321 PLG EGBAK UA321 PAKES VVI SLVR	1874
SACO-MPTO	SACO IRAVO LOGET UW6 SDE GAVEX UBRIX UL417 RCO UA321 IRATA ITEDO1 MPTO	2699
	SACO IRAVO LOGET UW6 SDE GAVEX UA558 PAZ UR559 IQT UA321 IRATA ITEDO1 MPTO	2620
SBPA-MPTO	SBPA JAUNT1A JAUNT UM216 EVOLO UL793 DIKAL UL655 ASAPA UQ114 DAKMO ITEDO1 MPTO	2879
	SBPA JAUNT1A JAUNT UL216 SIDAK ASAPA UQ114 DAKMO ITEDO1 MPTO	2860
SBRF-MPTO	SBRF IBEK2A IBEK ILNOT UZ11 MNS UA323 MQU UW87 DAKMO ITEDO1 MPTO	2909
	SBRF IBEK2A IBEK ILNOT SGC UA323 MQU UW87 DAKMO ITEDO1 MPTO	2906
SGAS-MPTO	SGAS VAS UA321 CLO A321 ASIKO UA321 BUSMO ITEDO1 MPTO	2436
	SGAS VAS UA321 RBC SIDOV UA321 BUSMO ITEDO1 MPTO	2429
SLVR-MPTO	SLVR PAKES1 PAKES UA321 BUSMO ITEDO1 MPTO	1646
	SLVR PAKES1 PAKES UA321 RBC SIDOV UA321 BUSMO ITEDO1 MPTO	1637

MPTO-SAEZ



MPTO-SBPA



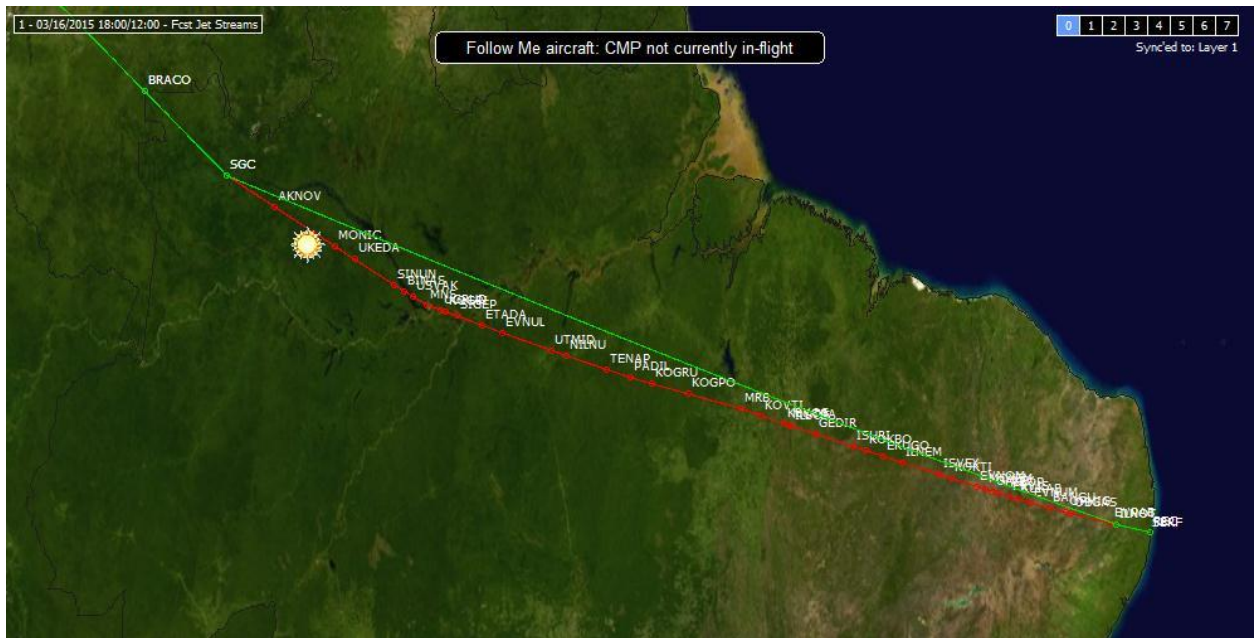
MPTO-SBGL



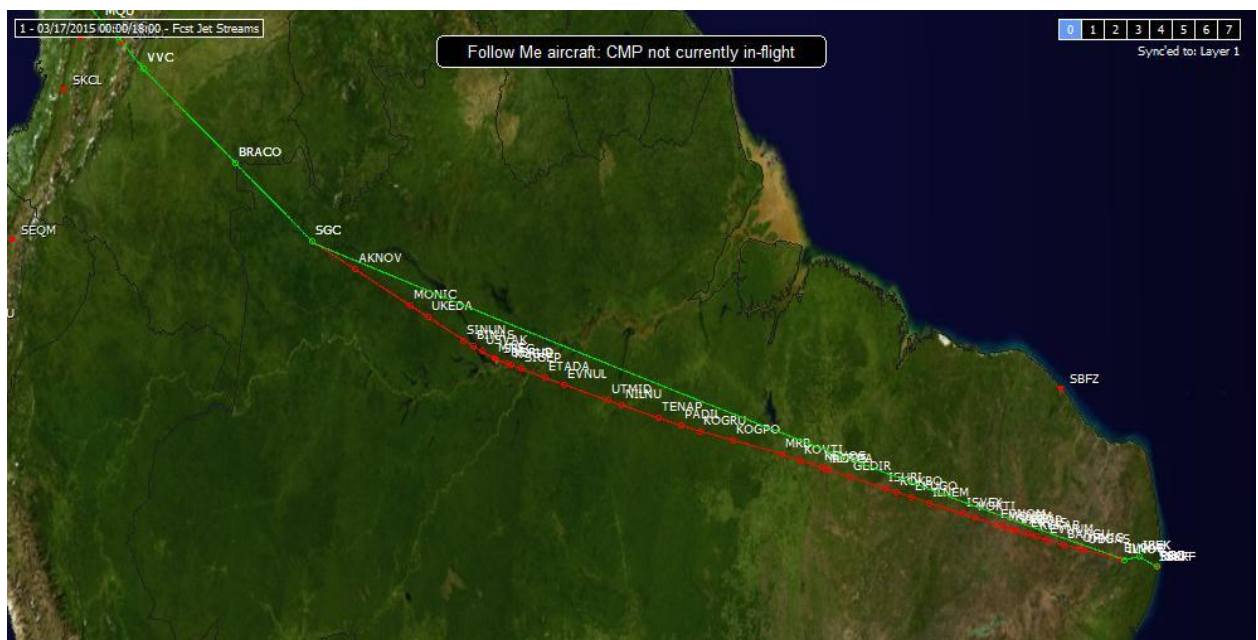
SBPA-MPTO



MPTO-SBRF

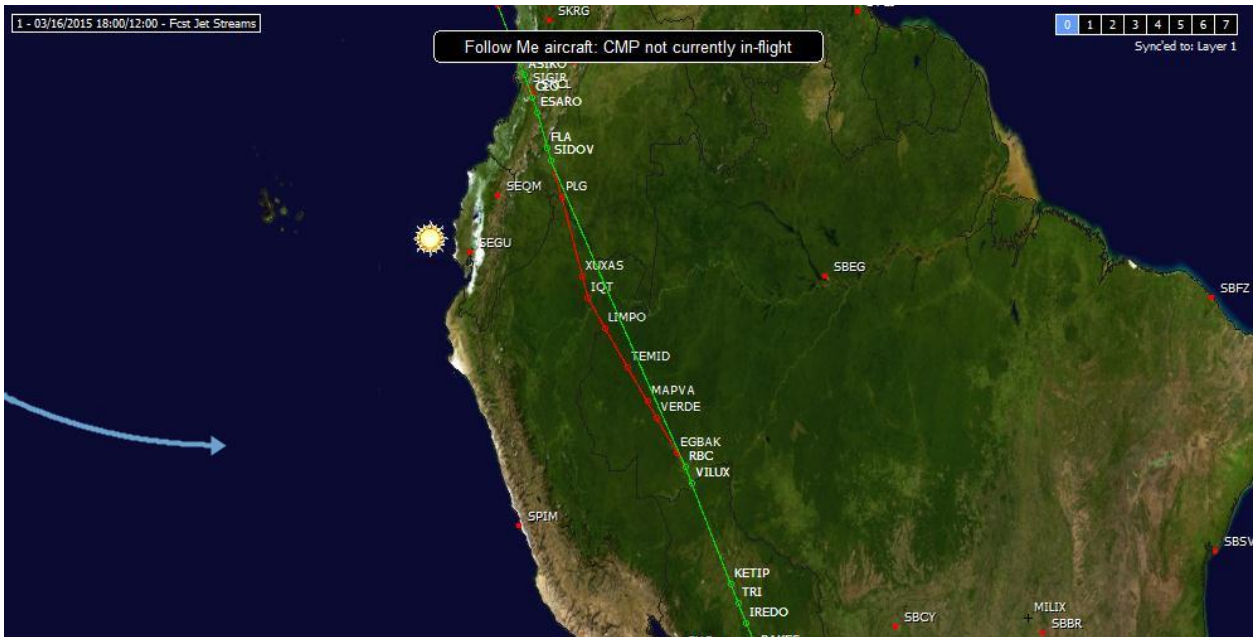


SBRF-MPTO





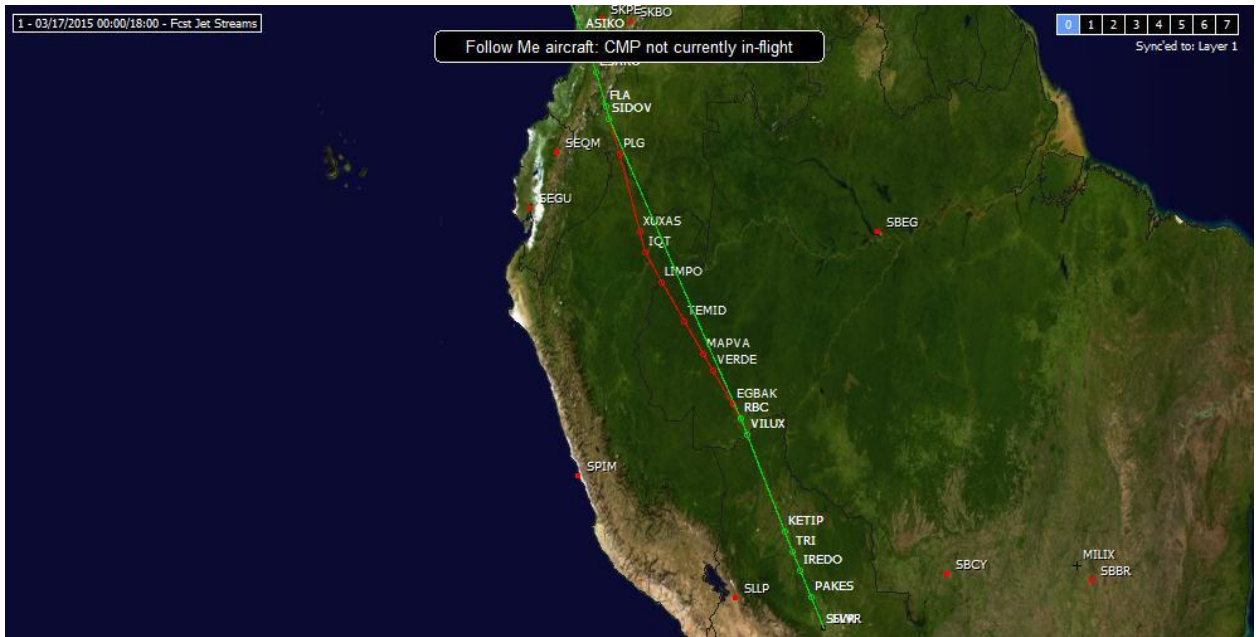
SGAS-MPTO



MPTO-SUMU



SLVR-MPTO



MPTO-SLVR



SACO-MPTO



Quantification of benefits:							
Nº	ORIGIN-DESTINATION	CURRENT NM	PROPOSED NM	NM/FLIGHT SAVINGS	ANNUAL KG FUEL SAVINGS*	ANNUAL KG CO2 SAVINGS**	FLIGHTS PER YEAR
1	MPTO-SAEZ	2825	2817	8	40,652.93	128,463.27	884
2	MPTO-SBGL	2906	2867	39	209,840.87	663,097.16	936
3	MPTO-SBPA	2737	2724	13	27,201.59	85,957.04	364
4	SBPA-MPTO	2879	2860	19	39,756.18	125,629.52	364
5	MPTO-SBRF	2907	2904	3	3,587.02	11,334.99	208
6	SBRF-MPTO	2909	2906	3	3,587.02	11,334.99	208
7	MPTO-SCEL	2612	2603	9	88,778.83	280,541.11	1716
8	MPTO-SGAS	2448	2434	14	46,033.47	145,465.76	572
9	SGAS-MPTO	2436	2429	7	23,016.73	72,732.88	572
10	MPTO-SUMU	2932	2897	35	115,083.67	363,664.40	572
11	MPTO-SLVR	1883	1874	9	29,592.94	93,513.70	572
12	SLVR-MPTO	1646	1637	9	29,592.94	93,513.70	572
13	SACO-MPTO	2699	2620	79	165,302.00	522,354.32	364
					822,026.22	2,597,602.85	
References:							
*(NM/FLIGHT SAVINGS)*FLIGHTS PER YEAR*(5.75kg/NM)							
**(AHORRO KG FUEL ANNUAL*3.16)							

Pre-arrangements between Copa Airlines – States

- MPTO – SBGL: The proposal was refused by the Brazilian State, since it is over a “one-way” route for flights leaving SBGL.
- MPTO – SAEZ: Pending confirmation by the Brazilian State if PLG – RBC direct is included in the “master” route redesign document.
- MPTO – SBPA: Only involves the Brazilian State. An analysis will be conducted to see if ASAPA – ARMUK direct is included in the “master” route redesign document. According to the State, there should be no problem with its inclusion, if so required.
- SBPA – MPTO: The Brazilian State agrees, in the absence of confirmation with the “master” route redesign document. The Bolivian State proposes that route SIDAK ALGIB VAROM ASAPA be used.
- MPTO – SBRF: The Brazilian State authorises direct from BRACO (FIR boundary) to some point prior to arrival (e.g.: ILNOT); or from VVC if authorised by the Colombian State.
- SBRF – MPTO: The Brazilian State authorises direct from some point after departure (e.g.: ILNOT) to BRACO (FIR boundary); or to VVC if authorised by the Colombian State.
- MPTO – SCEL: The Chilean State made two counterproposals *via* OREPI TOKUT EVLIM ATOGO LIM ILMAR TOY ISGUD SIMOK (airways UL780 and UM302).
- MPTO – SGAS: Paraguay made a counterproposal *via* BUSMO PLG IQT RBC TRI VIR UKELA.
- SGAS – MPTO: Paraguay made a counterproposal *via* UKELA VIR TRI RBC IQT PLG BUSMO.
- MPTO – SUMU: Try route using airway UM402 instead of UA556, which is normally used. Use route BUSMO PLG IQT RBC TRI VIR and from thereon, *via* KIMIK SEKLO MUKIB MIGOT ILSIM ETEXU OGLAP ANDAN VUKAS CRR to SUMU.
- MPTO – SLVR: Pending confirmation by the Brazilian State as to the inclusion of PLG – RBC direct in the “master” route redesign document.
- SLVR – MPTO: Pending confirmation by the Brazilian State as to the inclusion of PLG – RBC direct in the “master” route redesign document.
- SACO – MPTO: The Bolivian State proposes that route JUJ TEBOK RBC or route OVKUL KILEV be used through airway UM784.

Agenda Item 3: Other business

3.1 No other business were discussed.