International Civil Aviation Organization
South American Regional Office
Third SAM Workshop/Meeting on ATS Routes Network Optimisation (SAM ATSRO/3) - RLA/06/901
Lima, Peru, 4 to 8 July 2011

Agenda Item 2: Analysis of Version 1 of the SAM ATS routes network

MODIFICATION OF REGIONAL AND DOMESTIC ROUTES OF ARGENTINA

(Presented by IATA)

Summary

This working paper proposes the realignment/implementation of regional and domestic routes in Argentina to enable more efficient flights for IATA operators in the SAM Region.

References:

- Annex 11 to ICAO Convention.
- Document 4444, Procedures for Air Navigation Services - ATM
- Doc 9426, Air Traffic Services Planning Manual
- GREPECAS 14 - Conclusion 14/149
- SAMIG/4 meeting report

ICAO Strategic Objectives:	***A – Safety*** ***C – Environmental protection and sustainable development of air transport***

1. Background

2.1 Taking into account the results of the 36th ICAO Assembly and the ALLPIRG/5 meeting, the SAMI/IG/3 meeting (Lima, April 2009), through Conclusion SAM/IG/ 3-1, agreed that SAM States should take relevant action to follow the guidelines established in the SAM route optimisation programme.

2.2 In this sense, the SAM Region concluded that this ATS route optimisation should be conducted in phases, taking into account the analysis/diagnosis of the ATS route network, and the planning criteria reflected in the SAM ATS route optimisation programme.

3 **Discussion**

3.1 The first and second workshops on SAM ATS route network optimisation (SAM ATSRO/1-2) held in Lima, Peru, on 1-5 March 2010, reviewed Version 1 of the SAM ATS route network resulting from a study conducted with the assistance of a special implementation project financed by ICAO and Regional Project RLA/06/901.

3.2 The SAM ATSRO/1 meeting, taking into account the extent of the work carried out, deemed it convenient for SAM States and IATA to conduct a more in-depth analysis of such work at this workshop and submit their results to the SAM/IG/5 meeting.

3.3 The SAM/IG/5 meeting (Lima, 10-14 May 2010) recalled that, starting from the SAM/IG/4 meeting, RNAV routes were not to be implemented in an isolated manner, considering that the objective of the SAM ATS route network optimisation programme is to achieve an inter-functional air traffic management system for all flight phases that meets the agreed safety levels, permits low-cost and environmentally sustainable operations, and meets national security requirements.

3.4 Several of the modifications requested were examined and approved at the first and second workshops on SAM ATS route optimisation, held in Lima, Peru, which also approved the terms, paths, boundaries, direction and all the necessary details for the implementation of these modifications in Argentinian airspace.

3.5 The regional directorates of Argentina and the IATA operators involved also approved these modifications. Likewise, at the meeting held in ANAC Argentina in April of this year, the heads of the air navigation divisions of the various regional directorates and the directors of ANAC Argentina agreed on the terms required to expedite the implementation of these RNAV routes in the short term.

3.6 It should be noted that, on 21 December 2009, an IATA operator (LAN Argentina) signed a cooperation agreement with ANAC Argentina for the implementation of PBN (performance-based navigation) in Argentina. This implementation will optimise the use of Argentinian airspace, while complying with current regulations and improving safety for all operators using these routes to/from Argentina.

3.7 In view of the above, we propose the realignment/implementation of the following regional routes (see **Appendix A**):

1. EZE-LIM: EZE VOR direct LIM VOR (PERU) bi-directional – RNAV
2. SCL (CHILE)-EZE: point NEBEG direct EZE VOR – RNAV
3. AEP-GRU: EZE VOR direct MELO VOR (URUGUAY)
4. GRU-AEP: BGE VOR (URUGUAY) direct to point KUKEN
5. FTE-USH: FTE VOR direct USH bi-directional via NAS TMA (CHILE) – RNAV
6. ROS-LIM: ROS VOR direct LOA VOR (CHILE) – RNAV
7. EZE-LIM: LAR direct DAT (CHILE) - RNAV for aeroplanes with 12 minutes of O2
8. SCL-GRU: ALBAL direct ARULA – RNAV
9. EZE-GYU: direct LIM (PERU) direct GYU (ECUADOR) - RNAV

3.8 We also propose the realignment/implementation of the following domestic routes of Argentina (see **Appendix B**):

1. AEP-IGR: RNAV MCS VOR direct ALDOS
2. EZE-SCL: RNAV TOSOR direct UMKAL
3. AEP-NQN: RNAV BIXIM direct ROPON
4. SCL-EZE: RNAV ALBAL direct ASADA
5. AEP-TUC: RNAV ATOVO direct TUC VOR
6. AEP-COR: RNAV ROS VOR direct ASISA
7. MDZ-AEP: RNAV KAMUV direct SNT VOR
8. BRC-AEP: RNAV CHATO direct ASADA
9. AEP-UAQ: UT653 MJZ VOR direct PAMAL
10. AEP-RGL: RNAV DIL VOR direct RGL VOR
11. AEP-CRD: RNAV DIL VOR direct VOR CRV
12. FTE-USH: FTE VOR DCT EGOSA
13. AEP-BHI: RNAV GBE DCT MOXAN

3.9 It is also important to note that these new routes will decongest the Argentinian airspace, optimising regional flights, giving more flexibility to domestic flights, and reducing flight times and fuel consumption, rationalising the use of non-renewable resources and contributing to environmental protection, significantly reducing the emission of contaminating gases (CO^2) into the atmosphere.

3.10 The use of airways UT650 and UM400 was analysed with a view to modifying route ALBAL direct ARULA route SCL (CHILE)-GRU-GIG-CFB (RNAV). As a result, the following aspects should be taken into account when designing and planning the route:

1. **Traffic converging in the Cordoba VOR**

3.11 This route is necessary in order to improve the efficiency of the Santiago de Chile and San Pablo-Rio de Janeiro-Cabo Frío route. Accordingly, the most direct possible vector is drawn. The path is in the upper airspace, leaving aside any analysis leading to believe that its use involves access to the Cordoba TMA, where climbs and descents must take into account the restricted airspaces of this TMA.

3.12 The path of airway UT650 and UM400 was defined within this sector, without taking into account the benefits provided by current autonomous navigation systems.

3.13 Accordingly, there are no operational criteria that justify the convergence of traffic in the Cordoba VOR, generating a growing need to fly direct from the point of entry to the Cordoba FIR, called TERON, to the FIR exit point, called SIKOB, making the airway a partial solution for users.

2. **Lack of a protection barrier against operational errors at point ROMUR**

3.14 This particular airway is shared, within a radius of 50 NM, by three area control centres--Cordoba, Ezeiza and Resistencia. Airways UM400 and UA558 converge at a point called ROMUR, where there is a possibility of AIRPROX.

3.15 The possibility of a jet stream would generate a significant re-estimate interval, resulting in permanent readjustment of traffic. Consequently, even with ideal crossing times, the same flight levels are not authorised, and unexpected encounters occur with narrow minimum times, even at the same flight level. On some occasions, when re-estimates are communicated between controls only when they exceed three (3) minutes, the re-estimates of Ezeiza differ from those of Resistencia. In this particular case, the

estimate to the crossing is reduced by almost seven (7) minutes, which translates in an AIRPROX over ROMUR. Depending on communication conditions (there are statistics on recurring interference in the frequencies used in this area), users may or may not know of the existence of the traffic involved in these routes.

3.16 This proposal has been developed in accordance with ICAO Strategic Objectives C, Environmental Protection, and D, Efficiency.

4 Suggested action

4.1 Given the immediate benefits to be derived, the Meeting is requested to:

a) approve the inclusion of these routes in the SAM ATS route network optimisation programme; and

b) modify the path of airways UT650 and UM400 from point ALBAL direct to point ARULA or an equidistant point that permits a point of convergence between these airways, creating a common point of traffic acknowledgment while creating an effective barrier to temporary variations that might occur in this convergence area.

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New Routes Request

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LATAM CAR, NAT NAM, ATC-ATM Efficiencies -Projections 2011

Region	Descriptor	FORECAST 2011								IMPLEMENTED Y T D		
		Domain- Fuel- Kgs (Per Airac cycle)			Savings (13 Airac Cycles)					KGS	USD$ Price Per Kilo	CO2 Kg
		ENROUTE	TMA	GROUND	DIST	TIME	IMP DATE	FUEL	CO2 Kg			
	LATAM / CAR										$1.06	
	SCL - EZE	21,100				4	15-Dec-11	274,300	864,045	274,300	$290,758	864,045
	LIM-EZE-LIM	74,944				2	15-Dec-11	974,272	3,068,957	974,272	$1,032,728	3,068,957
	AEP-GRU	13,428				1.5	15-Dec-11	174,564	549,877	174,564	$185,038	549,877
	GRU-AEP	17,952				2	15-Dec-11	233,376	735,134	233,376	$247,379	735,134
	FTE-USH-FTE	14,028				6.6	15-Dec-11	182,364	574,447	182,364	$193,306	574,447
	LATAMCAR.TOTAL	141,452	0	0	0	0		1,838,876	5,792,459	1,838,876	$1,949,209	5,792,459

Route Proposals

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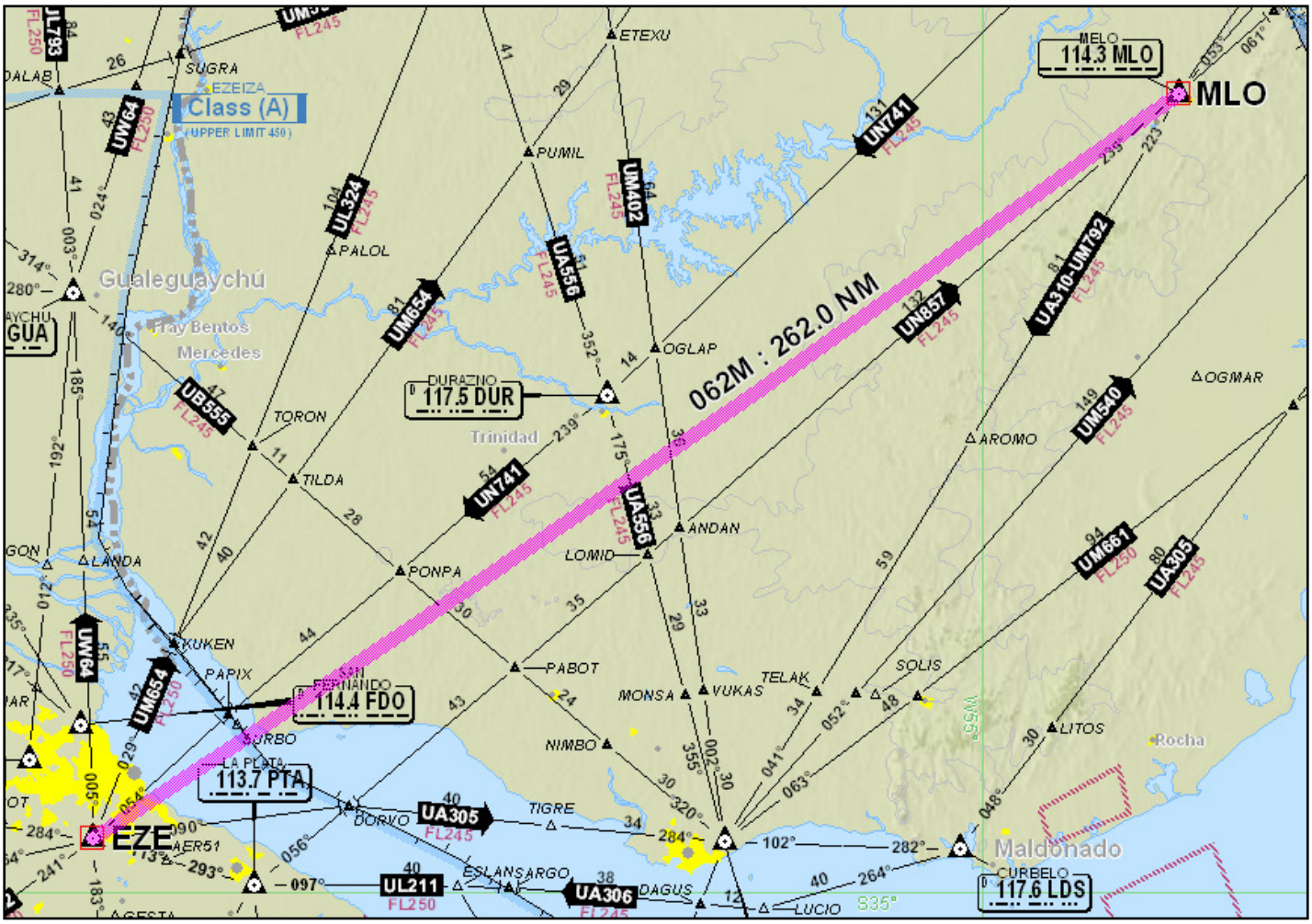
LATAM CAR, NAT NAM, ATC-ATM Efficiencies -Projections 2011

Region	Descriptor	FORECAST 2011								IMPLEMENTED Y T D		
		Domain- Fuel- Kgs (Per Airac cycle)			Savings (13 Airac Cycles)					KGS	USD$ Price Per Kilo	CO2 Kg
		ENROUTE	TMA	GROUND	DIST	TIME	IMP DATE	FUEL	CO2 Kg			
	LATAM / CAR										$1.06	
	RNAV Dir.. MCS-ALDOS, AEP-IGR(6) IGR -AEP(6)	19,856			12		15-Dec-11	258,128	813,103	258,128	$273,616	813,103
	RNAV Dir.. TOSOR-UMKAL, EZE - SCL	7,844			4		15-Dec-11	101,972	321,212	101,972	$108,090	321,212
	RNAV DIR.. BIXIM-ROPON, AEP-NEU (NQN)	3,696			6		15-Dec-11	48,048	151,351	48,048	$50,931	151,351
	RNAV Dir.. ALBAL-ASADA, SCL-EZE	5,960			2		15-Dec-11	77,480	244,062	77,480	$82,129	244,062
	RNAV Dir.. ATOVO-TUC, AEP-TUC(5)AEP-SLA(6)	16,836			11		15-Dec-11	218,868	689,434	218,868	$232,000	689,434
	RNAV Dir..ROSARIO-ASISA, AEP-COR	6,360			2		15-Dec-11	82,680	260,442	82,680	$87,641	260,442
	RNAV Dir.. KAMUV-SNT, MDZ-AEP	4,268			4		15-Dec-11	55,484	174,775	55,484	$58,813	174,775
	RNAV Dir.. LIMAY-ASADA, BRC-AEP	6,804			6		15-Dec-11	88,452	278,624	88,452	$93,759	278,624
	UT653-MJZ-PAMAL, AEP-UAQ	200			1		15-Dec-11	2,600	8,190	2,600	$2,756	8,190
	RNAV Dir.. DIL-RGL, AEP-RGL	9,432			27		15-Dec-11	122,616	386,240	122,616	$129,973	386,240
	RNAV Dir..RGL-DIL, RGL-AEP	3,456			10		15-Dec-11	44,928	141,523	44,928	$47,624	141,523
	RNAV Dir.. DIL-CRV, AEP-CRV	27,128			14		15-Dec-11	352,664	1,110,892	352,664	$373,824	1,110,892
	SCL - EZE	21,100				4	15-Dec-11	274,300	864,045	274,300	$290,758	864,045
	LIM-EZE-LIM	74,944				2	15-Dec-11	974,272	3,068,957	974,272	$1,032,728	3,068,957
	AEP-GRU	13,428				1.5	15-Dec-11	174,564	549,877	174,564	$185,038	549,877
	GRU-AEP	17,952				2	15-Dec-11	233,376	735,134	233,376	$247,379	735,134
	FTE-USH-FTE	14,028				6.6	15-Dec-11	182,364	574,447	182,364	$193,306	574,447
	LATAMCAR TOTAL	253,292	0	0	99	0		3,292,796	10,372,307	31,769,142	3,490,364	10,372,307

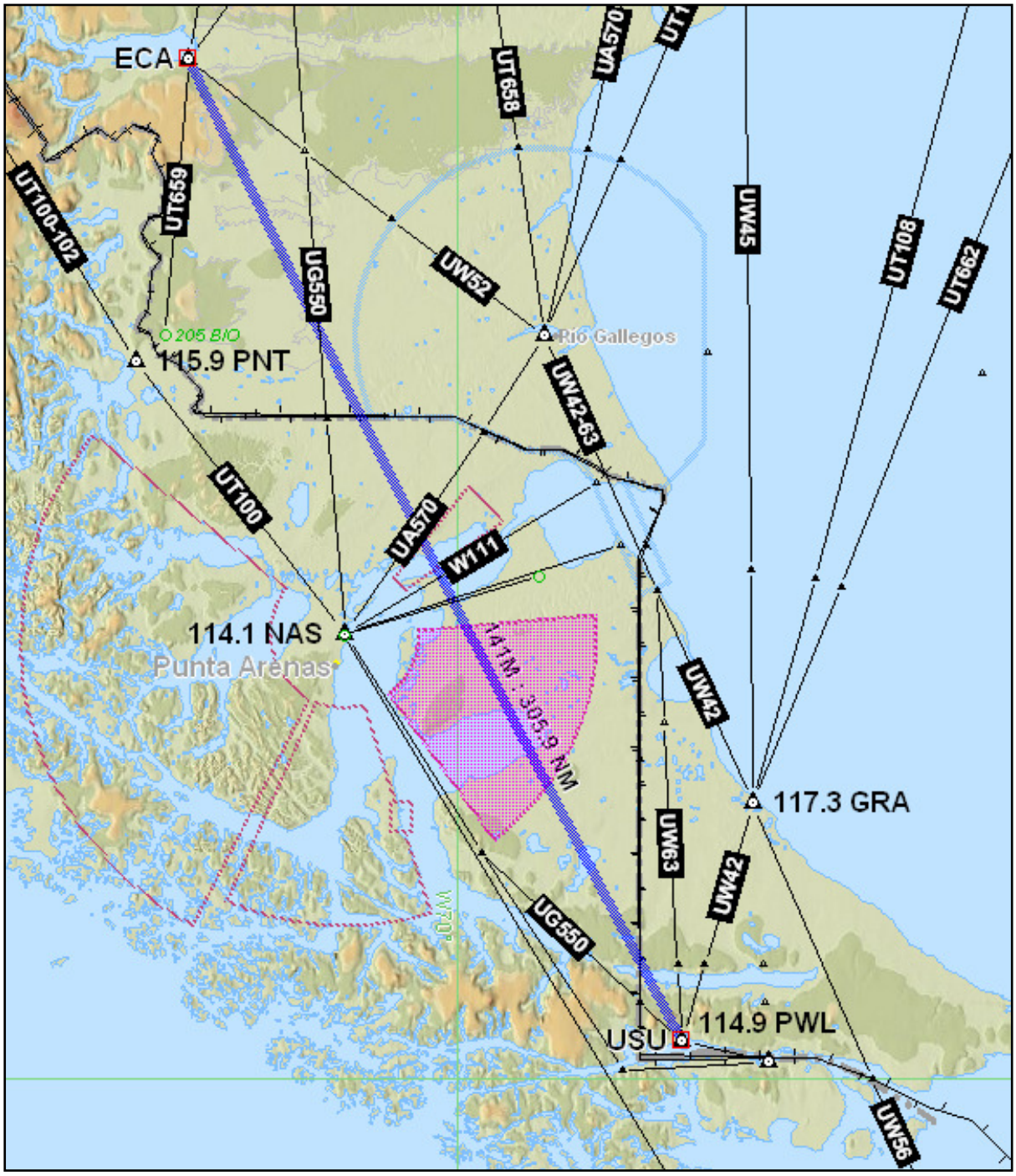
AEP – GRU
EZE VOR Direct MELO VOR

Savings 1.5 minutes



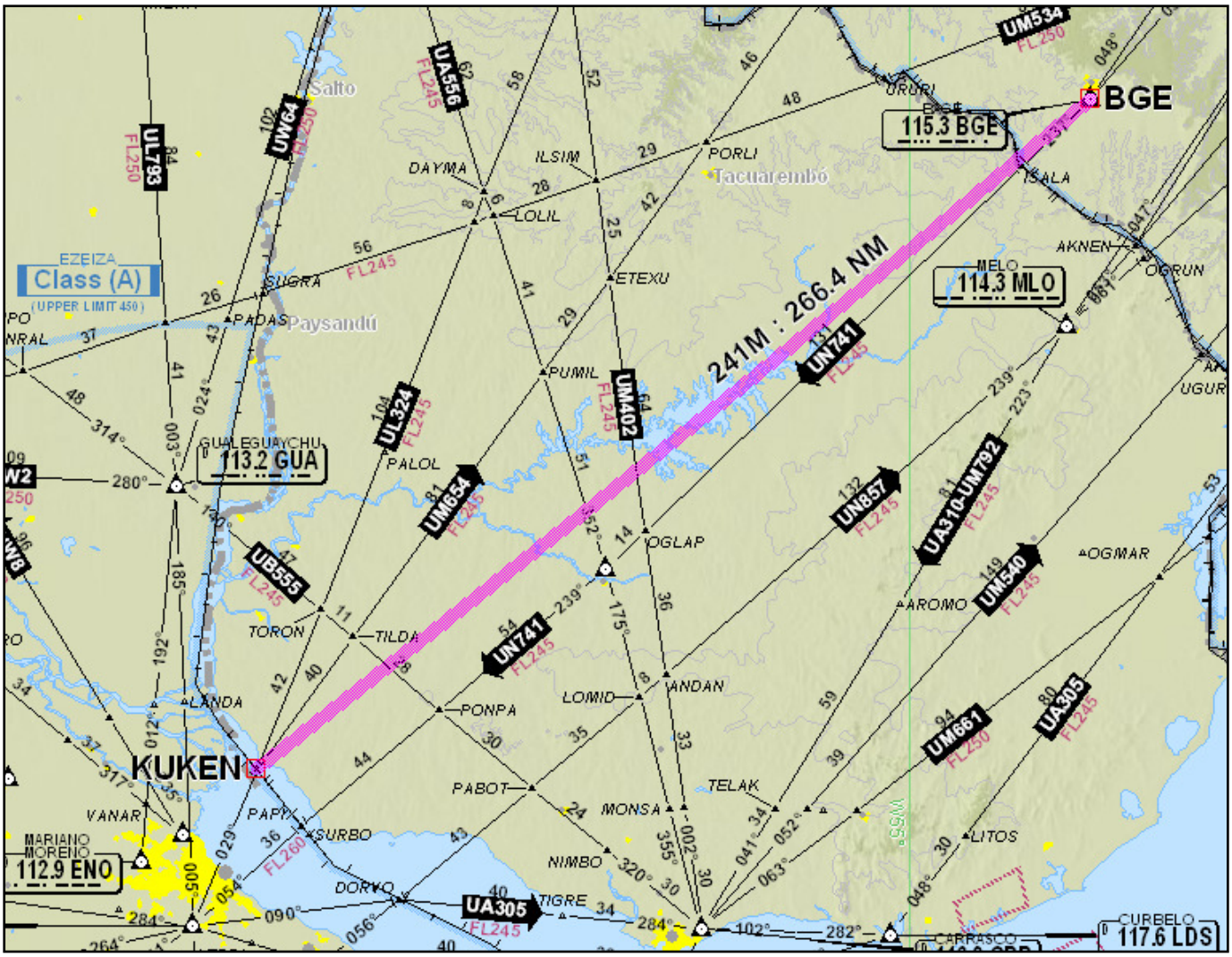
FTE – USH
ECA VOR…Direct…USU VOR

Savings 3.3 minutes / 6.6 minutes round trip



GRU – AEP
BGE…Direct…KUKEN

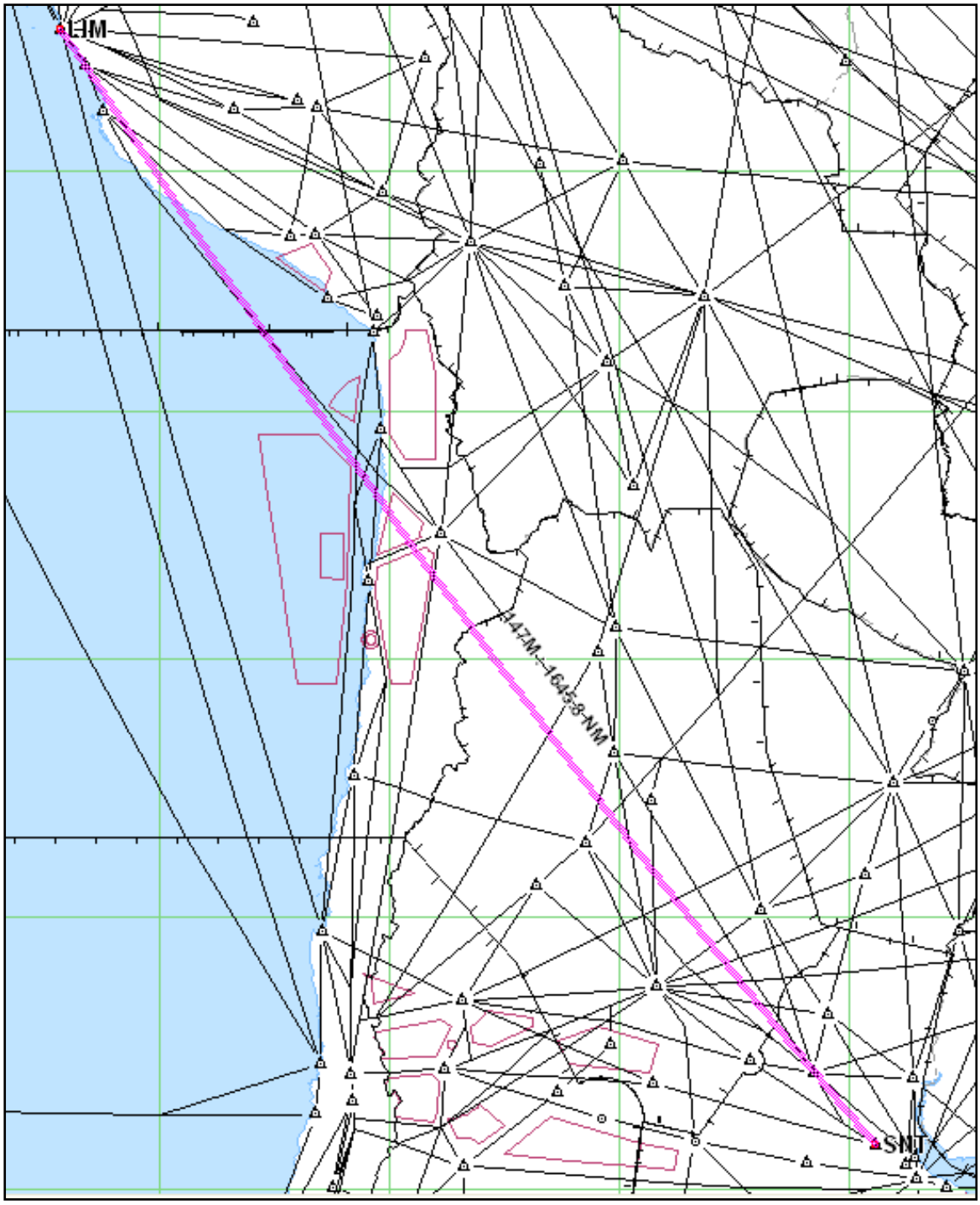
Savings 2.0 minutes



ILM – EZE – LIM

Savings 2.0 minutes / 4.0 minutes round trip

Nav Route 1656 NM Direct RNAV Route 1645 NM



SCL – EZE
NEBEG…ESITO…Direct…ASADA

Savings 2.0 minutes savings