International Civil Aviation Organization
South American Regional Office
Twelfth Meeting of Civil Aviation Authorities of the South American Region (RAAC/12)
(Lima, Peru, 3-6 October 2011)

RAAC/12-WP/19
28/6/11

Agenda Item 6: Analysis on environmental protection and sustainable development of air transport

b) Fuel savings and reduction of CO2 emissions

FUEL SAVINGS AND REDUCTION OF CO2 EMISSIONS AS A RESULT OF THE IMPLEMENTATION OF PHASE 2, VERSION 1, OF THE ATS ROUTE NETWORK

(Presented by the Secretariat)

SUMMARY

This working paper presents the progress made in the South American Region with the ATS Route Network Optimisation Programme and the future plans for increasing efficiency and improving the environment with the support of SAM States.

References:

-37th Assembly - Resolution A37-19: Consolidated statement of continuing ICAO policies and practices related to environmental protection – Climate Change (Appendix H);
- RACC/9, Santiago de Chile, 18-20 April 2005;
- RAAC/11 meeting, Santiago de Chile, 6-8 May 2009;
- SAM/IG/3 meeting, Lima, Peru, 20-24 April 2009;
- SAM/IG/4 meting, Lima, Peru, 19-23 October 2009;
- SAMI/IG/5 meeting, Lima, Peru, 10-14 May 2010; and
- SAM/IG/7 meeting, Lima, Peru, 23-27 May 2011.

ICAO strategic objectives:	*C- Environmental protection and sustainable development of air transport*

1. Introduction

1.1 At the Ninth Meeting of Civil Aviation Authorities (RAAC/9) held in Santiago de Chile in April 2005, the SAM Region recognised that efficient fuel consumption was a concept that encompassed all aspects of the industry, from aircraft design and construction, aviation regulatory requirements, to airline operations and the provision of navigation services.

1.2 At that same meeting, IATA informed about the launching of a fuel saving campaign in which service providers were requested to save just one minute through a better airspace design and/or management. It was estimated that, in 2005, this mere action would represent savings of US $1 billion per year in total operating costs for airspace users.

1.3 Regarding the above, the RAAC/9 meeting, in its Conclusion 9/16 on efficient use of fuel, agreed that SAM States should make their utmost to support the campaign initiated by IATA to maximise the efficiency in the use of fuel, and after analysing the global air traffic management (ATM) concept, agreed to establish a regional technical cooperation project to support the implementation of performance initiatives in the evolution towards the global ATM.

1.4 Likewise, the 37th Session of the ICAO Assembly, in Resolution A37-19 on the consolidated declaration of the permanent policies and practices of ICAO related to protection of the environment – Climate Change (Appendix H), resolved that the States and relevant organisations would work through ICAO to achieve a global annual mean improvement of 2% in fuel yield in the medium term until 2020 and an annual rate of fuel yield improvement of 2% in the long term between 2021 and 2050, as a global goal, estimated based on the volume of fuel consumed per revenue tonne-kilometre performed. It also requested States to expedite the creation and implementation of more efficient routes and procedures to reduce aviation emissions in coordination with ICAO.

2. Discussion

2.1 Since 2001, the ICAO South American Region, under its airspace optimisation programme, is realigning and/or implementing new RNAV routes and eliminating conventional routes, thus contributing to the reduction of fuel consumption and, as a consequence, the reduction of CO2 emissions into the atmosphere. Since the beginning of the optimisation programme, **a reduction of approximately 134,460 tonnes of CO2 emissions has been achieved per year**, this being an absolutely conservative estimate. **Appendix A** to this working paper illustrates the reduction of emissions in the corresponding flows to the South American Region.

2.2 As may be recalled, the South Atlantic airspace route system (Europe-South American–EUR/SAM Corridor) was restructured in 2007, thus permitting a better traffic distribution and the assignment of flight levels to aircraft operating along the corridor. After nine months of implementation, the system showed that **an average reduction of 5,399 tonnes of CO2 emissions would be achieved** per year, with an estimated traffic growth of 7%. In the case of an optimistic 10% growth, this figure would reach **an average reduction of 9,826 tonnes of emissions**. **Appendix B** to this working paper shows a graph prepared by the South Atlantic Monitoring Agency (SATMA) with figures estimated up to 2015.

2.3 It should also be noted that the progress in the reduction of harmful environmental effects of aviation has been achieved without taking into account RVSM implementation, which took place simultaneously in the NAM, CAR and SAM Regions in January 2005.

2.4 Taking into account ICAO Strategic Objective C concerning the environment, the States of the Region attending the RAAC/11 meeting deemed it advisable to consider the possibility of further improving the SAM route network, through a feasibility study, in order to develop an ATS route network that responded to current operational requirements and, at the same time, reduced the use of fuel and the associated gas emissions.

2.5 In this regard, the RAAC/11 meeting recognised that the implementation of RNAV-5 and RNAV and RNP procedures in SAM TMAs and airports, together with the optimisation of the ATS route network and the implementation of air traffic flow management, would take into account ICAO Strategic Objective C concerning environmental protection. Likewise, it would be considered under Project RLA/06/901, as the basis for the development and implementation of the regional ATM operational concept.

SAM ATS Route Network Optimisation Programme

2.6 ICAO SAM States, with the assistance of Project RLA/06/901, developed the SAM ATS route network optimisation programme and its corresponding Action Plan, which were approved by the Third Meeting of the South American Implementation Group (SAM/IG/3) held in Lima, Peru on 20-24 April 2009. Through Conclusion SAM/IG/3-1, SAM States were urged to take relevant action to follow the guidelines and meet the deadlines established in the Optimisation Programme.

2.7 Activities in preparation for the implementation continued in 2009 and 2010, and at the SAM/IG/7 meeting held in Lima on 23-27 May 2011, an analysis was made of the ATS route network optimisation programme and its three phases. Regarding **Phase 1** of the programme, concerning the implementation of RNAV 5 that was scheduled for September 2011, it was decided to postpone such implementation until **20 October 2011**.

2.8 Regarding **Phase 2** of the programme, which includes Version 1 of the ATS route network, it may be noted that the scheduled date of March 2011 was met with the implementation of 15 new RNAV routes, the realignment of 19 routes and the elimination of 18 routes, both conventional and RNAV. As to efficiency and environmental benefits, the fuel **savings** foreseen based on a predictive estimate made with IATA for a period corresponding to 13 AIRAC cycles, taking as a reference **a cost of US$ 1.06 per kilogramme of fuel,** exceed **U$S 7'600,000,** and the foreseen contribution to environmental improvement in the Region, as a result of reduced emissions, amounts to more than **22'600,000 kilogrammes of CO2** as shown in **Appendix C** to this working paper**.**

Tools and methodology used

2.9 The following means were used for this predictive calculation: FWZ flight planning tool, IATA SRS analyser, ATM infrastructure calculator (developed by IATA), and third-party tools. IATA uses this metrics for assessing ATM operational concept initiatives in the SAM Region.

2.10 Traffic data, as provided by the SRS analyser or by the control agency, is introduced in the calculator. The calculator can estimate fuel savings for all modern transport categories, both individually or by generic group; for example, narrow body, wide body, such as Tri-Quad and wide RJ, respectively. The calculator is capable of quantifying savings in kilogrammes or in pounds, using either distance or time as a factor. Then, the flight phases are selected (taxiing, climb, cruise, descent, approach for landing). The current IATA global average price of fuel is selected subsequently, and the calculator provides cost/savings in USD in terms of price per kilogramme or pound, and also calculates CO2 savings associated to reduced fuel consumption.

Further ATS route optimisation in the SAM Region

2.11 Regarding **Phase 3,** which involves the implementation of Version 2 of the ATS route network, the SAM/IG/7 meeting reviewed and adjusted the planning of pending tasks to its associated Action Plan with a view to the implementation of **Version 2** of the ATS route network, and formulated Conclusion SAM/IG/7-1 on the *Optimisation of the SAM ATS route network Phase 3 Version 2,* urging ICAO SAM States to take relevant action to follow the guidelines and meet the established deadlines for Phase 3 Version 2 of the SAM ATS Route Network Optimisation Programme.

2.12 The next phase, Phase 3 is very important because it seeks a more in-depth restructuring of the ATS route network, with full integration of ATS routes, control sectors, terminal areas, etc., applying the flexible use of airspace concept, as well as a significant increase in fuel savings and a greater reduction of polluting emissions into the environment. To carry out this task, it is expected that specific airspace modelling and accelerated-time ATC simulation tools will be used.

3. Suggested action

3.1 Based on the above, and taking into account the progress made to date in terms of fuel saving and reduced CO2 emissions into the atmosphere, and recognising the importance of continued support to Phase 3 of the ATS route network optimisation programme in SAM airspace with the support of Project RLA/06/901, the Meeting is invited to review this working paper and the information contained in **Appendices A, B and C**, and approve the following conclusion if deemed advisable:

Conclusion RAAC/12-X - SAM ATS route network optimisation programme (ATS/RO)

That, taking into account the significant fuel savings and the reduction in CO2 emissions into the atmosphere as a result of the phased implementation of the ATS route network optimisation programme, it is essential to continue supporting the implementation of the subsequent phases of the ATS/RO programme in order to improve efficiency and environmental protection in the South American Region.

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APPENDIX A / APENDICE A

Routes	Avg. Conv. Dist	Avg. Ortho. Dist	Avg. Difference	Avg. Time Saved	Narrow Body (Small- Medium)	Wide Trí´s & Quad (Large)	Narrow Body (Small- Medium)	Wide Trí´s & Quad (Large)	Narrow Body (Small- Medium)	Wide Trí´s & Quad (Large)	Narrow Body (Small- Medium)	Wide Trí´s & Quad (Large)	Total Kg CO2	Total Tons CO2	Total Tons CO2
						2 semanas	1 semana	1 semana	Fuel (KG) por 1 mes	Fuel (KG) por 1 mes	CO2 (KG) por 1 mes	CO2 (KG) por 1 mes	Por Ruta 1 mes	Por Ruta 1 año	Por Ruta 8 años
TF 1 Buenos Aires - Santiago de Chile															
Santiago - Montevideo	800	739	61	7.625	41	0	21	0	26636	0	84888	0	84888	**1019**	**8149**
Santiago - Buenos Aires	670	616	54	6.750	181	23	91	11	102176	41654	325634	132751	458385	**5501**	**44005**
Santiago - Mendoza	186	106	80	10.000	87	0	43	0	71527	0	227957	0	227957	**2735**	**21884**
TF 2 Buenos Aires/Sao Paulo-Rio de Janeiro															
Buenos Aires - Sao Paulo	954	914	40	5.000	239	23	119	12	98974	33660	315429	107274	422703	**5072**	**40580**
Buenos Aires - Rio de Janeiro	1105	1097	8	1.000	95	0	48	0	7984	0	25446	0	25446	**305**	**2443**
Montevideo - Sao Paulo	878	831	47	5.875	44	0	22	0	1955	0	6229	0	6229	**75**	**598**
Montevideo - Rio de Janeiro	1013	1002	11	1.375	9	0	5	0	1144	0	3645	0	3645	**44**	**350**
TF 3 Santiago de Chile/Sao Paulo-Rio de Janeiro															
Santiago _Sao Paulo	1520	1399	121	15.125	140	0	70	0	176115	0	561279	0	561279	**6735**	**53883**
TF 4 Sao Paulo-Rio de Janeiro/Europe (Corredor EUR/SAM)															
Buenos Aires - Madrid	5499	5439	60	7.500	12	59	6	30	7485	126224	23856	402276	426132	**5114**	**40909**
Rio de Janeiro - Lisbon	4351	4163	188	23.500	16	13	8	7	31272	92284	99665	294108	393773	**4725**	**37802**
Rio de Janeiro - Madrid	4427	4396	31	3.875	21	11	11	6	7090	13043	22597	41568	64165	**770**	**6160**
Santiago - Madrid	5962	5784	178	22.250	0	21	0	11	0	137304	0	437586	437586	**5251**	**42008**
Sao Paulo - Dakar	2889	2853	36	4.500	0	23	0	12	0	30294	0	96546	96546	**1159**	**9268**
TF 5 Sao Paulo-Rio de Janeiro/Lima															
Lima - Sao Paulo	1869	1836	33	4.125	59	0	29	0	19899	0	63417	0	63417	**761**	**6088**
Lima - Santa Cruz	909	878	31	3.875	4	0	2	0	1289	0	4109	0	4109	**49**	**394**
Lima - La Paz	610	583	27	3.375	71	0	36	0	20211	0	64411	0	64411	**773**	**6183**
Santa Cruz - Sao Paulo	960	958	2	0.250	59	0	29	0	1206	0	3843	0	3843	**46**	**369**
Santa Cruz - La Paz	300	300	0	0.000	130	0	65	0	0	0	0	0	0	**0**	**0**
TF 6 Santiago-Lima/Los Angeles															
Santiago - Mexico	3629	3551	78	9.750	34	0	17	0	27571	0	87870	0	87870	**1054**	**8436**
Lima - Mexico	2356	2284	72	9.000	29	0	15	0	22456	0	71568	0	71568	**859**	**6871**
Lima - Los Angeles	3645	3621	24	3.000	34	0	17	0	8483	0	27037	0	27037	**324**	**2596**
TF 7 Santiago-Lima/Miami															
Santiago - Miami	3653	3581	72	9.000	156	0	78	0	116772	0	372154	0	372154	**4466**	**35727**
Santiago - Bogota	2482	2296	186	23.250	13	0	6	0	23205	0	73954	0	73954	**887**	**7100**
Lima - Miami	2320	2266	54	6.750	91	0	45	0	50527	0	161028	0	161028	**1932**	**15459**
Guayaqui - Miami	1696	1669	27	3.375	30	0	15	0	8421	0	26838	0	26838	**322**	**2576**
Panama - Miami	2320	2266	54	6.750	181	0	91	0	102176	0	325634	0	325634	**3908**	**31261**

Routes	Avg. Conv. Dist	Avg. Ortho. Dist	Difference	Time Saved	Narrow Body (Small- Medium)	Wide Trí´s & Quad (Large)	Narrow Body (Small- Medium)	Wide Trí´s & Quad (Large)	Narrow Body (Small- Medium)	Wide Trí´s & Quad (Large)	Narrow Body (Small- Medium)	Wide Trí´s & Quad (Large)	Total Kg CO2	Total Tons CO2	Total Tons CO2
						2 semanas	1 semana	1 semana	Fuel (KG) por 1 mes	Fuel (KG) por 1 mes	CO2 (KG) por 1 mes	CO2 (KG) por 1 mes	Por Ruta 1 mes	Por Ruta 1 año	Por Ruta 8 años
TF 8 Sao Paulo-Rio de Janeiro/Los Angeles															
Sao Paulo - Los Angeles	5484	5350	134	16.750	0	60	0	30	0	281900	0	898416	898416	**10781**	**86248**
Sao Paulo - Bogota	2403	2350	53	6.625	30	0	15	0	16530	0	52682	0	52682	**632**	**5057**
Sao Paulo - Panama	2795	2736	59	7.375	13	0	6	0	7361	0	23458	0	23458	**281**	**2252**
Sao Paulo - Mexico	4104	4008	96	12.000	15	0	8	0	15969	0	50893	0	50893	**611**	**4886**
Panama - Los Angeles	2689	2619	70	8.750	13	0	6	0	8733	0	27832	0	27832	**334**	**2672**
TF 9 Sao Paulo-Rio de Janeiro/Miami															
Sao Paulo - Miami	3571	3507	64	8.000	244	85	122	43	162350	192982	517410	615035	1132445	**13589**	**108715**
Rio de Janeiro - Miami	3718	3624	94	11.750	86	1	43	1	84044	6592	267850	21008	288858	**3466**	**27730**
TF 10 Sao Paulo-Rio de Janeiro/New York															
Sao Paulo - New York	4168	4106	62	7.750	45	58	23	29	29651	126084	94496	401829	496325	**5956**	**47647**
Rio de Janeiro - NY	4239	4174	65	8.125	3	20	2	10	2703	45581	8615	145266	153881	**1847**	**14773**
TF 11 Sao Paulo-Rio de Janeiro/New York															
Buenos Aires - New Yrk	4681	4605	76	9.500	67	6	34	3	53729	15988	171233	50955	222188	**2666**	**21330**
TF 12 Buenos Aires/Miami															
Buenos Aires - Bogota	2597	2534	63	7.88	21	0	11	0	14409	0	45923	0	45923	**551**	**4409**
Buenos Aires - Miami	3926	3830	96	12.00	0	123	0	61	0	410648	0	1308737	1308737	**15705**	**125639**
Bogota - Miami	1330	1299	31	3.88	161	0	81	0	52211	0	166396	0	166396	**1997**	**15974**
Kingston - Miami	550	511	39	4.88	119	0	59	0	47844	0	152480	0	152480	**1830**	**14638**
TF 13 North of South America/Europe															
Bogota - Paris	4710	4469	241	30.125	0	12	0	6	0	101400	0	323161	323161	**3878**	**31023**
Bogota - Madrid	4384	4338	46	5.750	0	30	0	15	0	48386	0	154206	154206	**1850**	**14804**
Bogota - London	4745	4430	315	39.375	12	0	6	0	132535	0	422389	0	422389	**5069**	**40549**
Caracas - Paris	4138	4123	15	1.875	0	16	0	8	0	8415	0	26818	26818	**322**	**2575**
Caracas - Madrid	3836	3785	51	6.375	0	40	0	20	0	71527	0	227956	227956	**2735**	**21884**
Caracas - London	4272	4040	232	29.000	0	12	0	6	0	97613	0	311093	311093	**3733**	**29865**
TF 17 Sudamerica/Africa															
Sao Paulo - Johannesburg	4157	4024	133	16.625	0	8	0	4	0	37306	0	118895	118895	**1427**	**11414**
Buenos Aires - Johannes..	4438	4389	49	6.125	0	17	0	8	0	27489	0	87607	87607	**1051**	**8410**
TF 18 Santiago/Easter Island-Papeete															
Santiago - Easer Island	2032	2029	3	0.375	8	0	4	0	499	0	1590	0	1590	**19**	**153**
Easter Island - Papeete	4326	4288	38	4.750	8	0	4	0	6321	0	20145	0	20145	**242**	**1934**
													TOTAL	**134460**	**1075677**

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APPENDIX B / APÉNDICE B

RESULTS / RESULTADOS

1. FUEL SAVINGS / COMBUSTIBLE AHORRADO

FUEL SAVINGS (US$)/ AHORRO DE COMBUSTIBLE (US$)	PERCENTAGE PER YEAR/ PORCENTAJE POR AÑO	2008	2015	2008-2015
Normal case/ Caso normal (7%)	1,500,363	1,228,438	1,729,415	12,002,901
Optimistic case/ Caso optimista (10%)	2,028,952	1,572,719	2,321,298	16,231,614

2. CO_2 EMISSION SAVINGS / AHORRO DE EMISIÓN DE CO_2

CO_2 EMISSION SAVINGS (TON CO_2)/ AHORRO DE EMISIÓN DE CO_2 (TON CO_2)	PERCENTAGE PER YEAR/ PORCENTAJE POR AÑO	2008	2015	2008-2015
Normal case/ Caso normal (7%)	5,399	4,800	8,342	55,022
Optimistic case/ Caso optimista (10%)	9,826	5,998	11,310	73,437

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SAM Region, 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			
	SAM Region										**$1.06**	
TMA	CCS, VEN. 2 RNAV SIDS		129,988			1	13-Jan-11	1,689,844	5,323,009	**1,689,844**	**$1,791,235**	**5,323,009**
TMA	CCS, VEN. 4 RNAV App. RNAV GNSS 10 Y,Z RNAV GNSS 28, Y,Z		10,372			1	13-Jan-11	134,836	424,733	**134,836**	**$142,926**	**424,733**
TMA	LIMA VOR landing North VOR 33 App.		28,656			7	10-Mar-11	372,528	1,173,463	**372,528**	**$394,880**	**1,173,463**
TMA	BOG SID CACUTA 1B added SOA - EJA				5							
SPECIAL USE AIRSPACE	Palenquero Arrivals BOG REMOL / OUT		256,308		28		15-Dec-11	3,332,004	10,495,813		**$0**	
SPECIAL USE AIRSPACE	Palenquero Arrivals BOG Rio Negro		88,968		3		15-Dec-11	1,156,584	3,643,240		**$0**	
	Maldonado -Beunos Aires, PDP-AEP	46,608			44		15-Dec-11	605,904	1,908,598		**$0**	
	Montevideo-Buenos Aires MVD - AEP	107,712			42		15-Dec-11	1,400,256	4,410,806		**$0**	
	Panama City - Montevideo UM784	7,273			37		15-Dec-11	94,549	297,829	**94,549**	**$100,222**	**297,829**
	Santiago-Sao Paulo, UT650 / UM400	30,224			20		13-Jan-11	392,912	1,237,673	**392,912**	**$416,487**	**1,237,673**
	Sao Paulo- Santiago, UL310 / UM400	20,884			14		13-Jan-11	271,492	855,200	**271,492**	**$287,782**	**855,200**
	Santiago - Rio De JaneiroUM400	2,716			20		13-Jan-11	35,308	111,220	**35,308**	**$37,426**	**111,220**
	Rio De Janeiro - Santiago UL301,UM400	1,904			14		13-Jan-11	24,752	77,969	**24,752**	**$26,237**	**77,969**
	Toluca - Cancun TLC - CUN - TLC	19,680			3,12		15-Dec-11	255,840	805,896		**$0**	
	Toluca - San Jose Del Cabo TLC - SJD	1,512			4		15-Dec-11	19,656	61,916		**$0**	
	RNAV Dir.. MCS-ALDOS, AEP IGR(6) IGR -AEP(6)	19,856			12		15-Dec-11	258,128	813,103		**$0**	
	RNAV Dir.. TOSOR-UMKAL, EZE - SCL	7,844			4		15-Dec-11	101,972	321,212		**$0**	
	RNAV DIR.. BIXIM-ROPON, AEP-NEU (NQN)	3,696			6		15-Dec-11	48,048	151,351		**$0**	
	RNAV Dir.. ALBAL-ASADA, SCL-EZE	5,960			2		15-Dec-11	77,480	244,062		**$0**	

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			
REGIONAL ROUTES	RNAV Dir.. ATOVO-TUC, AEP TUC(5)AEP-SLA(6)	16,836			11		15-Dec-11	218,868	689,434		$0	
	RNAV Dir..ROSARIO-ASISA, AEP-COR	6,360			2		15-Dec-11	82,680	260,442		$0	
	RNAV Dir.. KAMUV-SNT, MDZ-AEP	4,268			4		15-Dec-11	55,484	174,775		$0	
	RNAV Dir.. LIMAY-ASADA, BRC-AEP	6,804			6		15-Dec-11	88,452	278,624		$0	
	UT653-MJZ-PAMAL, AEP-UAQ	200			1		15-Dec-11	2,600	8,190		$0	
	RNAV Dir.. DIL-RGL, AEP-RGL	9,432			27		15-Dec-11	122,616	386,240		$0	
	RNAV Dir..RGL-DIL, RGL-AEP	3,456			10		15-Dec-11	44,928	141,523		$0	
	RNAV Dir.. DIL-CRV, AEP-CRV	27,128			14		15-Dec-11	352,664	1,110,892		$0	
	Cordoba-Porto Alegre UM418 COR - POA	13,000			69		10-Mar-11	169,000	532,350	169,000	$179,140	532,350
	Rio Branco-Brazilia UM530	26,160			40		10-Mar-11	340,080	1,071,252	340,080	$360,485	1,071,252
	Rosario-Porto Alegre UM534	2,712			24		10-Mar-11	35,256	111,056	35,256	$37,371	111,056
	Lima-Brazilia UM668	22,320			126		10-Mar-11	290,160	914,004	290,160	$307,570	914,004
	Santiago - Lima - Miami US East Coast, UM795	101,656			14		10-Mar-11	1,321,528	4,162,813	1,321,528	$1,400,820	4,162,813
	MIA - SVD (SSA),UZ41	8,060			31		10-Mar-11	104,780	330,057	104,780	$111,067	330,057
	REC-MIA-JFK- AA UM791	10,296			65		10-Mar-11	133,848	421,621	133,848	$141,879	421,621
	SVD-MIA-JFK -AA UZ20				120		10-Mar-11					
	JFK- ATL IAD-EZE, AA UM 402 POS - BVI	127,568			70		10-Mar-11	1,658,384	5,223,910	1,658,384	$1,757,887	5,223,910
	Guayaquil-Madrid, GYE-MAD	22,708			26		15-Dec-11	295,204	929,893		$0	
	Bogota-New york	43,770			45		15-Dec-11	569,010	1,792,382			
	Manaus-Fortaleza UZ12	10,496			25		10-Mar-11	136,448	429,811	136,448	$144,635	429,811
SAM.TOTAL		739,099	514,292	0	915	9		16,294,083	51,326,361	7,205,705	$7,638,047	22,697,971
	TOTAL FORCAST x 13 AIRAC CYCLES	9,608,287	6,685,796	0	915	9		16,294,083	51,326,361	7,205,705	7,638,047	22,697,971