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International Civil Aviation Organization
UNDP/ICAO Regional Project RLA/98/003
Transition to CNS/ATM Systems in the CAR and SAM Regions

Tenth Meeting/Workshop of ATM Authorities and Planners in the CAR/SAM Regions (AP/ATM/10)

(Lima, Perú, from 10 to 14 May 2005)

Agenda Item 1: Review of the RNAV Routes Implementation Programme in the CAR/SAM Regions

Status of the Execution of the RNAV Routes Implementation Programme in the CAR/SAM Regions (Phase II-b)

(Presented by the Secretariat)

Summary

This Working Paper presents information on the Status of the Execution of the RNAV Routes Implementation Programme in the CAR/SAM Regions (Phase II -b).

1. Introduction

1.1 During the Twelfth Meeting of the GREPECAS, La Havana, Cuba, 7-11 June 2004, **Conclusion 12/7** was approved, through which the ***Guidance Material for the RNAV Routes Network Implementation in the CAR/SAM Regions*** was adopted, contemplating Phases II-a and II-b of the Implementation Programme, which is presented in **Appendix A** to this Working Paper.

1.2 Having concluded up to date Phase II-a, ICAO initiated coordination with the Administrations the CAR/SAM Regions involved in the corresponding RNAV routes of Phase II-b of the Implementation Programme.

2. Analysis

2.1 **Appendix B** shows the routes corresponding to this Phase II-b of the implementation, as well as the results of the coordination made.

3. Suggested Action

3.1 The Meeting is invited to take note of the information presented in Appendix B to this Working Paper and, to the Administrations which have not sent the corresponding information, to send as soon as possible this information to ICAO Secretariat.

INTERNATIONAL CIVIL AVIATION ORGANIZATION

GUIDANCE MATERIAL FOR THE RNAV ROUTES NETWORK IMPLEMENTATION IN THE CAR/SAM REGIONS

June 2004

AMENDMENTS

The publication of amendments and corrigenda is regularly announced through ICAO by means of correspondence with States and ICAO NACC and SAM Offices websites, documents that should be consulted by those persons using this publication. The blank spaces facilitate the annotation of such amendments.

REGISTRY OF AMENDMENTS AND CORRIGENDA

AMENDMENT			
No.	Date of Application	Date of Entry	Recorded by

CORRIGENDA			
No.	Date of Application	Date of Entry	Recorded by

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Glossary of Terms / Acronyms

For purposes of this guidance material, the following are applied:

Accuracy. A degree of conformance between the estimated or measured value and the true value. .[Annex 15]

Note.— *For measured positional data the accuracy is normally expressed in terms of a distance from a stated position within which there is a defined confidence of the true position falling.*

Advisory route. A designated route along which air traffic advisory service is available. . [Annex 2]

Aeronautical chart. A representation of a portion of the earth, its culture and relief, specifically designated to meet the requirements of air navigation. [Annex 4]

Aeronautical Information Circular (AIC). A notice containing information that does not qualify for the origination of a NOTAM or for inclusion in the AIP, but which relates to flight safety, air navigation, technical, administrative or legislative matters. of assurance against loss or alteration of data. [Annex 15]

Aeronautical Information Publication (AIP). A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation. *[Annex 2]*

Aeroplane system. An aeroplane system includes all elements of equipment necessary for the control and performance o a particular mayor function. It includes both the equipment specifically provides for the function in question and other basic related aeroplane equipment such as that required to supply power for the equipment operation. The power-unit is not considered to be an aeroplane system. [Annex 6 – Volume I]

AIP Amendment. Permanent changes to the information contained in the AIP. [Annex 15]

AIP Supplement. Temporary changes to the information contained in the AIP which are published by means of special pages. [Annex 15]

Aircraft avionics. A term designating any electronic device — including its electrical part — for use in an aircraft, including radio, automatic flight control and instrument systems. [Annex 1]

Air-ground communication. Two-way communication between aircraft and stations or locations on the surface of the earth. [Annex 10]

Air-to-ground communication. One-way communication from aircraft to stations or locations on the surface of the earth. [Annex 10]

Air traffic. All aircraft in flight or operating on the manoeuvring area of an aerodrome. [Annex 2]

Air traffic control clearance. Authorization for an aircraft to proceed under conditions specified by an air traffic control unit. [Annex 2]

Note 1.— *The term "ATS route" is used to mean variously, airway, advisory route, controlled or uncontrolled route, arrival or departure route, etc.*

Note 2.— *An ATS route is defined by route specifications which include an ATS route designator, the track to or from significant points (way-points), distance between significant points, reporting requirements and, as determined by the appropriate ATS authority, the lowest safe altitude.*

Air traffic control unit. A generic term meaning variously, area control centre, approach control unit or aerodrome control tower. [Annex 2]

Air Traffic Flow Management (ATFM). A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority. [Annex 11]

Air traffic service (ATS). A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service). [Annex 2]

Air traffic services airspaces. Airspaces of defined dimensions, alphabetically designated, within which specific types of flights may operate and for which air traffic services and rules of operation are specified. [Annex 11]

Air traffic services unit. A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office. [Annex 2]

Airway (AWY). A control area or portion thereof established in the form of a corridor. [Annex 2]

Appropriate ATS authority. The relevant authority designated by the State responsible for providing air traffic services in the airspace concerned. [Annex 2]

Area control centre (ACC). A unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction. [Annex 2]

Area navigation route (RNAV). An ATS route established for the use of aircraft capable of employing area navigation. [Annex 11]

ATS communication (s); air traffic services (ATS) communication (s) (ATSC). Communication related to air traffic services including air traffic control, aeronautical and meteorological information, position reporting and services related to safety and regularity of flight. This communication involves one or more air traffic service administrations. This term is used for purposes of address administration [Annex 10 – Volume III]

ATS route. A specified route designed for channelling the flow of traffic as necessary for the provision of air traffic services. . [Annex 2]

Note 1.— *The term "ATS route" is used to mean variously, airway, advisory route, controlled or uncontrolled route, arrival or departure route, etc.*

Note 2.— *An ATS route is defined by route specifications which include an ATS route designator, the track to or from significant points (way-points), distance between significant points, reporting requirements and, as determined by the appropriate ATS authority, the lowest safe altitude.*

Commercial air transport operation. An aircraft operation involving the transport of passengers, cargo or mail for remuneration or hire. [Annex 6]

Control area. (CTA). A controlled airspace extending upwards from a specified limit above the earth. [Annex 2]

Controlled airspace. An airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification. [Annex 2]

Note.— Controlled airspace is a generic term which covers ATS airspace Classes A, B, C, D and E as described in Annex 1 .

Controlled flight. Any flight which is subject to an air traffic control clearance. [Annex 2]

Cruising level. A level maintained during a significant portion of a flight. [Annex 2]

Extended range operation (ETOPS). Any flight by an aeroplane with two turbine power-units where the flight time at the one power-unit inoperative cruise speed (in ISA and still air conditions), from a point on the route to an adequate alternate aerodrome, is a greater than the threshold time approved by the State of the Operator. [Annex 3, Annex 6 – Part I]

Flight information centre (FIC). A unit established to provide flight information service and alerting service. [Annex 2]

Flight information region(FIR) An airspace of defined dimensions within which flight information service and alerting service are provided. [Annex 2] [Annex 4]

Flight level (FL). A surface of constant atmospheric pressure which is related to a specific pressure datum, 1 013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals. [Annex 2]

Note 1.— *A pressure type altimeter calibrated in accordance with the Standard Atmosphere:*

1. *when set to a QNH altimeter setting, will indicate altitude;*
2. *when set to a QFE altimeter setting, will indicate height above the QFE reference datum;*
3. *when set to a pressure of 1 013.2 hPa, may be used to indicate flight levels.*

Note 2.— *The terms "height" and "altitude", used in Note 1 above, indicate altimetric rather than geometric heights and altitudes.*

Flight time (aircraft). The total time from the moment an aircraft first moves under its own power for the purpose of taking off until the moment it comes to rest at the end of the flight. .

Note 1.— *Flight time as here defined is synonymous with the term "block to block" time or "chock to chock" time in general usage which is measured from the time an aircraft moves from the loading point until it stops at the unloading point.*

Note 2.— *Whenever helicopter rotors are engaged, the time will be included in the flight time.* [Annex 1, Annex 6, Volume I, II and III]

Ground-to-air communication. One-way communication from stations or locations on the surface of the earth to aircraft. [Annex 10]

Heading (of the aircraft). The direction in which the longitudinal axis of an aircraft is pointed, usually expressed in degrees from North (true, magnetic, compass or grid). [Annex 2]

IFR flight. A flight conducted in accordance with the instrument flight rules. [Annex 2]

Integrated Aeronautical Information Package. A package which consists of the following elements:

(1) AIP, including amendment service;

(2) supplements to the AIP;

(3) NOTAM and pre-flight information bulletins (PIB);

(4) AIC;

(5) checklists and summaries. [Annex 15]

Knot (kt). The speed equal to 1 nautical mile per hour [Annex 5]

Nautical Mile (NM). The length equal to 1,852 metres exactly. [Annex 5]

NOTAM. A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations. [Annex 15]

Position (geographical). Set of coordinates (latitude and longitude) referenced to the mathematical reference ellipsoid which define the position of a point on the surface of the Earth. *[Annex 15]*

Relief flights. Flights operated for humanitarian purposes, which carry relief personnel and relief supplies such as food, clothing, shelter, medial and other items during or after an emergency and/or disaster and/or are used to evacuate persons from a place where their life or health is threatened by such emergency and/or disaster to a safe haven in the same State or another State willing to receive such persons. [Annex 9]

Required navigation performance (RNP). A statement of the navigation performance necessary for operation within a defined airspace. [Annex 6]

Note.— *Navigation performance and requirements are defined for a particular RNP type and/or application.*

RNP type. A containment value expressed as a distance in nautical miles from the intended position within which flights would be for at least 95 per cent of the total flying time. [Annex 6]

Example.– *RNP 4 represents a navigation accuracy of plus or minus 7.4 km (4 NM) on a 95 per cent containment basis.*

Route stage. A route or portion of a route flown without an intermediate landing. [Annex 15]

Significant point. A specified geographical location used in defining an ATS route or the flight path of an aircraft and for other navigation and ATS purposes. [Annex 11] [Annex 4]

Standard instrument departure (SID). A designated instrument flight rule (IFR) departure route linking the aerodrome or a specified runway of the aerodrome with a specified runway of the aerodrome with a specified significant point, normally on a designated ATS route, at which the en-route phase of a flight commences.

Standardised arrival routes (STAR) Routes identified in an instrument approach procedure by which aircraft may proceed from the en-route phase of flight to an initial approach fix. [Annex 4]

System level requirement. The system level requirement is a high-level technical requirement that has been derived from operational requirements, technological constraints and regulatory constraint (administrative and institutional). The system level requirements are the basic for the functional requirements and lower-level requirements [Annex 10 – Part III] [Doc. 9713 – Vocabulary]

Terminal control area (TMA). A control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes [Annex 2]

Through-flight. A particular operation of aircraft, identified by the operator by the use throughout of the same symbol, from point of origin via any intermediate points to point of destination. [Annex 9]

Track. The projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (true, magnetic or grid). [Annex 2]

Transferring unit. Air traffic control unit in the process of transferring the responsibility for providing air traffic control service to an aircraft to the next air traffic control unit along the route of flight. [Annex 11]

VFR flight. A flight conducted in accordance with the visual flight rules. [Annex 2]

1. INTRODUCTION

1.1 The CAR/SAM/3 RAN Meeting, Buenos Aires, Argentina, 1999, based on the planning being carried out and considering the operational advantages and the financial benefits, in charge of the GREPECAS to establish a Routes Network RNAV in the CAR/SAM Regions and to prepare an strategy for its implementation.

1.2 In the GREPECAS environment, said task was assigned to the RNAV/RNP Task Force and the implementation of RNAV routes in the CAR/SAM Regions has been carried out through the CAR/SAM Regions Air Traffic Management Authorities and Planners meetings (AP/ATM), sponsored by the RLA/98/003 Project, Transition to the CNS/ATM Systems in the CAR/SAM Regions.

1.3 In an initial stage, through AP/ATM/1 and AP/ATM/2 Meetings trials and RNAV routes pre-operational implementation, aimed at gaining experience, identifying difficulties in the implementation process and improve the regional coordination procedures and based on that experience, Phase 1 began, during which the RNAV routes implementation process continued, through AP/ATM/3, AP/ATM/4, AP/ATM/5 and AP/ATM/6 meetings.

1.4 The experience gained during Phase 1, has enabled to acknowledge that the RNAV routes implementation is complex and laborious and that it requires of the commitment and active participation of all parties involved in such process.

1.5 Notwithstanding the successful implementation of RNAV routes and the objectives achieved during Phase 1, some factors affecting the timely implementation of RNAV routes in the CAR/SAM Regions, have been identified.

1.6 The current Guidance Material for the RNAV Routes implementation in the CAR/SAM Regions has been prepared taking into account the experience attained in Phase 1, with the purpose of standardizing the criteria, views and RNAV routes planning and implementation strategy, considering the ICAO documentation on this matter, as well as minimizing the impact of factors that are precluding its implementation in the CAR/SAM Regions.

2. RNAV OPERATIONS

2.1 RNAV operations allow flying in any region of the airspace without the need to fly over the ground base navigation facilities. RNAV techniques applied in several parts of the world have proved that they have advantages over other traditional forms of navigation and that they give certain benefits, among which are:

- establishment of more direct routes;
- reduction of flight distances;
- establishment of deviation routes for aircraft flying over high traffic density areas;
- establishment of double or parallel routes to fit a larger amount of en-route traffic; and
- reduction of ground base navigation facilities.
- a better design or the airspace and the routes network.

2.2 The planning and implementation of RNAV routes demands an extensive analysis of all related issues that could affect such a process. The general guidelines for the analysis needed for this process are hereby presented.

3 PLANNING PRINCIPLES

3.1 Airspace planners must be take into account the following planning principles:

a) Air traffic volume in existing routes and proposed routes
b) Establishment of the shortest routes possible for most of flights
c) Prioritize planning of areas with greater volume of air traffic
d) Comply with the civil and military users needs
e) Integration of the RNAV routes network and sectorization of back-up in the initiation of planning.
f) Integration of RNAV routes network and arrival and departure (SID/STAR) of TMAs

Air Traffic volume in existing and proposed routes

3.2 Keeping in mind the advantages of RNAV routes and the growing number of users capable to fly RNAV, normally the implementation of a RNAV route absorbs most of the air traffic in one or more "conventional" routes. Thus, through an analysis of the air traffic volume of each one of the routes involved, either RNAV or non-RNAV, it should be evaluated if any of the existing "conventional" routes should be eliminated. It is important to recall that, in maintaining "conventional" routes, in function of a small amount of non-RNAV users, does not necessarily mean that there is an increase of the airspace complexity, keeping into account that this complexity is due to the amount of existing flights in each route, and not by the additional crossing points that aeronautical charts would show.

Establishment of the shortest possible trajectories for the majority of flights

3.3 Keeping in mind the need to attend most of the users in their optimum flight profiles, the establishment of direct routes as close as possible, should be prioritized, over those departure/arrival trajectories. Taking into consideration that normally the RNAV route absorbs most of the air traffic it is very likely that the implementation of the RNAV route will have preference over the "conventional" route. It is important to emphasize that it may be necessary to maintain routes for users which aircraft do not have RNAV capacity.

3.4 Taking into account that it is not always feasible to establish a route between the origin and destination, the need to implement specific one-way routes for arrival and departure to a TMA, must be considered, using departure and arrival control sectors. The airspace planning must consider the requirement to establish a new air-space sectorization at the beginning of the RNAV implementation process.

Prioritize the planning of areas of greater air traffic volume

3.5 In order to achieve the objective, to have trajectories as short as possible for most of the users, airspace planning should depart from those airspace regions with greater air traffic volume over those of lesser volume, prioritizing flows of greater air traffic volume.

RNAV routes integration and supporting sectorization at the planning initial stage.

3.6 Since the inception of the planning of the process it is necessary to guarantee an adequate sectorization of the air space. In addition, the planning should not consider the FIR boundaries, aimed at constituting a "seamless" air space, including, if the case requires, the delegation of air traffic service.

RNAV routes integration and the TMA arrival/departure trajectories

3.7 At the initial stage planning for the RNAV routes implementation, the RNAV routes network integration, as well as the TMA arrival/departure trajectories, must be considered, noting the need for pilots and air traffic controllers workload reduction, mainly through the most effective use of the Flight Management Systems (FMS) and ground/air/ground communications load.

4. Issues to consider during the implementation process

4.1 During the implementation process, the following issues must be taken into account:

a) Start/end points of the proposed RNAV routes;
b) The existing traffic flows and trajectories in the TMAs where the airports are located from the start/end points of the RNAV route;
c) The incorporation of traffic coming from intermediate cities;
d) The conventional ATS routes that are near the proposed RNAV routes;
e) The fleet that is not RNAV equipped;
f) The forbidden and restricted airspaces, which affect the RNAV route;
g) The adjacent FIRs airspaces, mainly CTRs and TMAs, that could affect or be affected by the RNAV routes;
h) The mountainous areas located near airports and along the RNAV route.

Start/end points of the RNAV routes

4.2 One of the dilemmas for the implementation of RNAV routes that will join city pairs is to determine which reference to use in order to define the end points. Most airports are located in the terminal control areas that have already established the trajectories to order the traffic flows, IFR and VFR, National and International.

4.3 The selection of these points, either existent or new, shall determine definitively the real trajectory of the route, and therefore, the FIRs, ATS conventional routes and RNAV routes, and prohibited and restricted airspaces, etc., involved in the same.

4.4 The analysis for the selection of these points will have to contemplate all factors involved in order to avoid further modifications to the proposed trajectory and consequently to repeat the whole process, which would delay the implementation.

Traffic flows and trajectories in the TMAs

4.5 Traffic conditions at the TMA of airports could determine that traffic that flies over the proposed RNAV routes comes in through a different trajectory in order to maintain the great circle or to not interfere with the established trajectories. The complexity of the TMA, the importance of the traffic flows and/or the ATC workload have to be considered and incorporated into the traffic flows.

4.6 During the RNAV routes implementation process that is being carried out in the CAR/SAM Regions, some FIRs, especially the FIRs whose airports are located in the ends of the routes, have the tendency to establish a sole entrance or exit point to/from the FIR for all the routes proceeding from a same sector. In some cases, this point is located at a distance of hundreds of nautical miles from the exit/destiny aerodrome.

4.7 This happens due to the existence of forbidden and restricted airspaces as well as the preference to incorporate new RNAV routes to the existing arrival and exit trajectories. If the tendency is maintained without alterations, the flight distance may be significantly increased and it would impede the implementation of the parallel routes that will allow the optimum use of the airspace, alleviate the traffic congestion or make possible for the aircraft to fly at optimum flight levels.

4.8 Furthermore, the traffic from/to the TMAs at intermediate airports may be incorporated to the RNAV routes through SIDs/STARs and/or through RNAV auxiliary routes that allow maintaining the proposed RNAV routes in the great circle. The need to have RNAV routes arriving to intermediate cities is to be thoroughly analysed in order to avoid the separation of the great circle trajectory routes and to avoid the consequences mentioned in the last paragraph.

4.9 In this regard, it is necessary to use all necessary efforts and to establish the pertinent coordination to implement more direct RNAV routes, which will benefit air operations and the economy of air transport.

Conventional ATS Routes

4.10 It is necessary to have an analysis of the existing conventional ATS routes that coincide or are near the proposed RNAV routes. Considering that there will be numerous aircraft that will not have the area navigation equipment, there is the option to redirect to the conventional ATS routes and to move them far from the proposed RNAV routes. This will require the redesign of the airspace or they could be kept as they are and then establish maximum flight levels for these routes and minimum flight levels from RNAV routes.

4.11 During the transition stage, it seems most convenient to choose the second option, which is to segregate the use of the airspace, and for this end, there should be an extensive analysis to determine the real needs and the establishment of minimum operation requirements as well as specific ATS procedures for each block of airspace that allows the application and unequivocal compliance on behalf of the ATC and the users.

4.12 On the other hand, the analysis of traffic density in a particular traffic flow could make an RNAV route insufficient to meet the demands, considering that there are existing areas and route segments in which the aircraft are not operating at their optimum flight levels and it might be necessary to analyse establishing parallel RNAV routes to solve this situation.

Restricted and prohibited zones

4.13 Conceptually, the Airspace Management (ASM) assumes that civil and military users should dynamically share the airspace. In an integrated ATM system, the airspace management is not limited to the tactical aspects of sharing airspace; it is also directed to bring strategic planning capabilities by taking into account the necessary harmonization that should exist when airspace is shared.

4.14 In this regard, special attention should be given to the geographic location of forbidden and restricted airspaces, including the lateral and vertical boundaries and their impact on the implementation of more direct RNAV routes for the use of civil aviation.

4.15 The existence of restricted and forbidden zones affects the proposed trajectories of RNAV routes and will significantly increase the distances to be flown. Therefore, in order to accomplish the implementation of more direct RNAV routes, the corresponding authorities are required to take the necessary measures in order to have harmonized civil/military coordination.

Mountainous Areas

4.16 The existence of mountainous areas along the boundaries of an airport may force a proposed RNAV route to be redirected in order to allow the SIDs/STARs design to be compatible with the aircraft performance during the corresponding ascent and descent.

4.17 The presence of mountainous areas along a route may affect the aircraft operations during the en-route phase and consequently may cause a redirection of the proposed RNAV route in order to comply with Annex 6 requirements, as far as oxygen provision in certain altitude and pressure conditions is concerned.

5. AIRBORNE NAVIGATION EQUIPMENT REQUIREMENTS

5.1 Currently there are various types of navigation equipment that satisfy requirements for RNAV routes flights. Airborne navigation equipment encompasses:

a) Systems which use external navigation aids; such as VOR/DME, DME/DME and GNSS; and
b) Systems that are self contained: Inertial Reference System (IRS) and Inertial Navigation System (INS).

5.2 States must establish requirements for aircraft intending to fly in RNAV routes. This is essential to guarantee safety of air space, avoiding that aircraft without RNAV capacity or that not comply with the established requirements fly in those routes.

5.3 Keeping in mind the GPS application growth, special attention must be paid to the establishment to this system utilization requirement.

6 RNAV ROUTES IMPLEMENTATION IN THE CAR/SAM REGIONS

6.1 For RNAV implementation programming during Phase II, an important study prepared by IATA was taken as reference, in which, besides a list of trajectories requested by users, shows detailed information as regards weekly operations, distance savings, annual fuel savings and annual operational costs in each one of the trajectories.

6.2 The resulting programming is composed by:

a) A general list of RNAV trajectories between pairs of cities.
b) A list of selected trajectories for immediate implementation (Phase II-a).
c) A list of selected trajectories for further implementation (Phase II-b).
d) A list of trajectories from and to the NAM Region.

6.3 In accordance with Annex 11, on ATS Safety Management and with requirements for RVSM Evaluation of RVSM Implementation Safety assessment in CAR/SAM Regions, the corresponding consultation to the CARSAMMA must be carried out before RNAV routes implementation proposed for Phases II-a and II-b.

IMPLEMENTATION PROGRAMME GENERAL LIST

6.4 The RNAV routes general list foreseen for implementation in all Phase II, is shown in **Attachment A.**

FASE II-a

6.5 In Phase II-a of the RNAV Routes Implementation Programme in the CAR/SAM Regions, the routes considered with high implementation priority were included, keeping in mind the benefits foreseen in each one of them. **Attachment B** to this guidance material shows these routes and their corresponding graphics, together with the implementation programme of same.

PHASE II-b

6.6 Routes that must be thoroughly studied and that shall be implemented shortly were included in Phase II-b of the RNAV Routes Implementation Programme in the CAR/SAM Regions. The list and graphics of the routes to be implemented in this phase are shown in **Attachment C** to this Guidance Material.

RNAV Routes to/from the NAM Region

6.7 A list and the corresponding graphics of routes foreseen to and from NAM Region are shown in **Attachment D**. The same should be evaluated by States/Territories/International Organizations involved, to establish the order of implementation, in view of the fact that they require a thorough study and coordination for its implementation.

ATTACHMENT / ADJUNTO A

CAR/SAM RNAV ROUTE PROGRAM - PROGRAMA DE RUTAS RNAV CAR/SAM (Summary - Listado General)							
N° Summary/ N° Listado Gral	**Trajectory between/ Trayectoria entre**		**Total weekly operations / Total operaciones semanal**	**Distance saved in N.M./ Dist. Ahorro en NM**	**Operational annual savings/ Ahorro operacional anual**	**Annual fuel savings in us gallons/ Ahorro anual comb en Galon US**	**Notes**
1	Antigua	Miami	34	17.5	$274,174	78,375	
2	Aruba	San Juan	14	8.3	$37,684	10,549	
3	Asuncion	Buenos Aires	42	3.9	$54,952	14,686	
4	Balmaceda	Buenos Aires	0	0	$0	0	Route requested for operations from Buenos Aires to Australia/Ruta solicitada para operaciones de Buenos Aires a Australia
5	Barbados	Miami	39	23.7	$394,608	107,656	IATA request to be implemented during the year 2004/IATA solicita se implante durante el año 2004
6	Belize	Miami	16	18.2	$99,368	27,415	
7	Bonaire	Guayaquil	7	6	$34,028	11,297	
8	Bonaire	Lima	7	50	$283,567	94,144	
9	Bonaire	Quito	7	5.7	$32,327	10,732	
10	Buenos Aires	Lima	48	7.7	$164,300	44,271	
11	Buenos Aires	Santiago	107	3.6	$163,926	48,205	Westbound only/En dirección oeste
12	Buenos Aires	Puerto Montt	0	2.4	$0	0	Route requested for operations from Buenos Aires to Australia/Ruta solicitada para operaciones de Buenos Aires a Australia
13	Cancun	Havana	40	29.9	$355,765	101,538	
14	Cancun	Houston	112	9	$351,155	94,958	
15	Cancun	New York	42	176.8	$2,899,397	798,946	
16	Cancun	Panama	10	8.6	$37,315	8,906	
17	Cap Haitien	Puerto Plata	0	0	$0	0	Route requested by Cuba and Haiti, unknown traffic/Ruta solicitada por Cuba y Haiti, tráfico desconocido
18	Cap Haitien	Santiago de Cuba	0	0	$0	0	Route requested by Cuba and Haiti, unknown traffic/Ruta solicitada por Cuba y Haiti, tráfico desconocido
19	Caracas	Havana	0	21.6	$0	0	At this moment there is not traffic, but in near future traffic will increase/Al momento no hay tráfico pero en un futuro próximo el tráfico aumentará
20	Caracas	Lima	20	24.2	$137,348	40,684	
21	Caracas	Mexico	14	81.1	$402,420	95,439	
22	Caracas	Miami	112	20.3	$1,039,353	285,168	
23	Caracas	San Jose	16	22.7	$133,512	32,056	
24	Cucuta VOR	Villavicencio VOR	10	49.2	$386,157	128,204	Domestic route in Colombia/Ruta doméstica en Colombia
25	Elorza	San Gabriel	0	19.5	$0	0	Requested by Colombia, unknown traffic/Solicitada por Colombia, tráfico desconocido
26	Great Inagua	Kingston	0	0	$0	0	Traffic unknown, exit route to Europe, requested by Jamaica/Tráfico desconocido, ruta hacia Europa solicitada por Jamaica
27	Great Inagua	Montego Bay	0	0	$0	0	Traffic unknown, exit route to Europe, requested by Jamaica/Tráfico desconocido, ruta hacia Europa solicitada por Jamaica
28	Guadalajara	Houston/Dallas	98	6.4	$195,318	55,733	
29	Guatemala	Houston/Dallas	44	36	$599,856	163,650	
30	Guatemala	Miami	82	12.3	$407,571	115,301	
31	Guayaquil	Lima	42	5.5	$98,821	26,333	

CAR/SAM RNAV ROUTE PROGRAM - PROGRAMA DE RUTAS RNAV CAR/SAM (Summary - Listado General)							
N° Summary/ N° Listado Gral	Trajectory between/ Trayectoria entre		Total weekly operations / Total operaciones semanal	Distance saved in N.M./ Dist. Ahorro en NM	Operational annual savings/ Ahorro operacional anual	Annual fuel savings in us gallons/ Ahorro anual comb en Galon US	Notes/Notas
32	Guayaquil	San Jose	39	24.2	$333,505	93,084	
33	Havana	Panama	48	5.7	$88,346	24,761	
34	La Paz	Lima	22	3.4	$29,605	7,888	
35	Lima	Houston/Dallas	28	23.7	$296,978	87,018	
36	Lima	New York	16	77.3	$646,759	179,335	
37	Lima	San Jose	22	34.3	$248,066	63,430	Segment route Lima-Houston/Dallas / Segmento ruta Lima-Houston/Dallas
38	Lima	Sao Paulo	30	10.6	$158,395	42,733	Continuation of UM415 to be implemented in Jun04/Continuación de UM415 a ser implantada en Jun 04
39	Managua	Miami	62	7.2	$234,129	67,687	
40	Merida	Houston	8	46.7	$158,760	37,685	
41	Mexico	Houston/Dallas	177	11.7	$791,931	205,899	
42	Mexico	Miami	76	24.4	$897,641	260,559	
43	Mexico	Salvador	22	14.3	$103,421	26,444	Segment of route Mexico-San Jose/Segmento de ruta México-San José
44	Mexico	San Jose	48	9.7	$185,841	48,139	
45	Mexico	San Pedro	7	62.3	$195,166	57,186	
46	Montego Bay	Miami	60	0.9	$24,685	6,736	
47	Panama	Houston	14	9.7	$44,040	12,328	
48	Panama	New York	14	30.1	$136,660	38,256	
49	Panama	Port au Prince	4	21.5	$37,507	8,964	
50	Port au Prince	Miami	77	4.9	$177,460	50,431	
51	Salvador	Houston/Dallas	36	67	$798,364	215,362	
52	Salvador	San Francisco	14	42.7	$211,878	50,249	
53	Salvador	San Jose	42	7.2	$107,180	25,419	Domestic route within Cenamer, tramo ruta Mexico-San Jose/Ruta doméstica dentro de Cenamer, tramo ruta México-San José
54	San Jose	Houston	28	24.7	$309,509	90,689	Segment route Lima-Houston/Dallas/Segmento ruta Lima-Houston/Dallas
55	San Jose	New York	24	71.8	$580,468	151,607	
56	San Pedro	New Orleans	8	7.5	$17,027	5,043	
57	Santa Cruz	Santiago	10	24.6	$113,108	28,949	
58	Santiago	Buenos Aires	107	14.2	$646,599	190,143	Eastbound only/En dirección este solamente
59	Sao Paulo	Houston\Dallas	28	36.5	$662,871	187,276	
60	Sao Paulo	Memphis	14	39	$517,711	165,223	
61	Tegucigalpa	Miami	29	21.1	$246,100	65,765	
62	Havana	Santo Domingo	4	92.3	$169,754	$43,448	
63	Cancun	Miami	42	7.7	$113,794	32,983	Southbound operations only, northbound no need improvement/Operaciones en dirección al sur solamente, en dirección al norte no necesitan mejorar

ATTACHMENT B

SCHEDULE FOR THE RNAV ROUTES IMPLEMENTATION PROGRAMME IN THE CAR/SAM REGIONS (Phase II-a)

EXPLANATION OF THE TABLE

Column 1	Describes the activities to be carried out by the States/Organizations involved
Column 2	Shows the target dates for completion of the activities described in column 1
Column 3	Contains additional information

Activities under the responsibility of the States and International Organizations, which FIR/s are involved		
ACTIVITY	**COMPLETION DATE**	**REMARKS**
-1-	**-2-**	**-3-**
States' preliminary analysis	**30/04/04**	CAR/SAM States should analyze RNAV Routes proposals under their responsibility and send the results to the ICAO NACC and SAM Offices, keeping in mind the planning principles and issues to be considered in the planning process appearing in this Guidance Material.
CAR/SAM analysis regarding the routes implementation impact in the CAR/SAM RVSM implementation programme.	**30/11/04**	The CARSAMMA shall evaluate the implementation impact of phase 2 of the CAR/SAM RVSM implementation programme in the CAR/SAM RVSM Implementation Programme Safety Assessment
Agreement on the RNAV routes to be implemented	**23/07/04**	Route paths, reporting points, agreements, etc., to be defined at the Third Meeting/Workshop of ATM Authorities and Planners.
Review of bilateral/ multilateral agreements between service suppliers and/or identification of cases requiring their execution	**23/07/04**	According to the route paths, reporting points (including the geographical coordinates), agreements, etc., established during the Third Meeting/Workshop of ATM Authorities and Planners.
Verification and approval of geographical coordinates	**23/07/04**	The geographical coordinates should be established in the course of the meeting. Otherwise, the necessary coordination will be made for that purpose through the respective ICAO NACC and SAM Regional Offices.

Activities under the responsibility of the States and International Organizations, which FIR/s are involved		
ACTIVITY	**COMPLETION DATE**	**REMARKS**
-1-	**-2-**	**-3-**
Distribution of the proposal for amendment to the ANP CAR/SAM – Basic Vol. by the ICAO NACC and SAM Regional Offices.	**30/07/04**	The distribution of the proposal for amendment will enable parties involved expressing their comments or observations.
Remittance of comments or remarks on the proposal for amendment to the ANP CAR/SAM – Basic Vol. to the corresponding ICAO NACC and SAM Regional Offices.	**30/08/04**	The timely response to the proposal for amendment will enable a quick processing of the comments or remarks for submission to the ICAO Council and further approval.
Inclusion of agreements and procedures in national operating manuals	**30/11/04**	If necessary, States shall include the agreements and procedures in their operating manuals
Publication of AIP Supplement	**12/04**	States affected by RNAV routes should publish a common AIC and AIP Supplement with three AIRAC cycles in advance.
Entry into effect of the Implementation	**03/05**	

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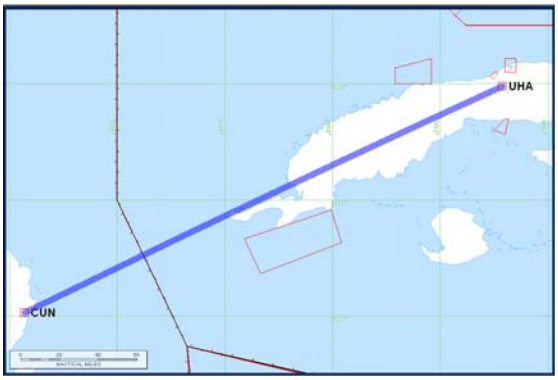
ATTACHMENT / ADJUNTO B

CAR/SAM RNAV ROUTE PROGRAM - PROGRAMA DE RUTAS RNAV CAR/SAM (FASE II-a)								
N° Summary/ N° Listado Gral	**N°**	**Trajectory between / Trayectoria entre**		**Total weekly operations / Total operaciones semanal**	**Distance saved in N.M./Dist. Ahorro en NM**	**Operational annual savings/ Ahorro operacional anual**	**Annual fuel savings in us gallons / Ahorro anual comb en Galon US**	**Notes / Notas**
13	1	Cancun	Havana	40	29.9	$355,765	101,538	
20	2	Caracas	Lima	20	24.2	$137,348	40,684	
10	3	Buenos Aires	Lima	48	7.7	$164,300	44,271	
21	4	Caracas	Mexico	14	81.1	$402,420	95,439	
32	5	Guayaquil	San Jose	39	24.2	$333,505	93.084	
38	6	Lima	Sao Paulo	30	10.6	$158,395	42,733	Continuation of UM415 to be implemented in Jun04/Continuar UM415 a ser implantado Jun 04
59	7	Sao Paulo	Houston\Dallas	28	36.5	$662,871	187,276	
23	8	Caracas	San Jose	16	22.7	$133,512	32,056	
37	9	Lima	San Jose	22	34.3	$248,066	63,430	Segment route Lima-Houston/Dallas / Segmento ruta Lima-Houston/Dallas
57	10	Santa Cruz	Santiago	10	24.6	$113,108	28,949	Continuation UL 322 Viru-Viru-Salta/Continuar UL322 Viru-Viru-Salta
62	11	Havana	Santo Domingo	4	92.3	$169,754	$43,448	
60	12	Sao Paulo	Memphis	14	39	$517,711	165,223	

ATTACHMENT / ADJUNTO B

CAR/SAM RNAV ROUTES PROGRAMME – PROGRAMA DE RUTAS RNAV CAR/SAM

PHASE / FASE II-a



Cancun– La Habana

FIR/CTA involved/involucrados:

Mérida, Havana

Caracas – Lima

FIR/CTA involved/involucrados:

Maiquetía, Bogotá, Lima

Buenos Aires – Lima

FIR/CTA involved/involucrados:

Ezeiza, Cordoba, Antofagasta, Lima

Note: GREPECAS/10 approved UL 777 Buenos Aires-Lima-Los Angeles. To date not implemented /
Nota: GREPECAS/10 Aprobó UL 777 Buenos Aires-Lima-Los Angeles. A la fecha sin implantar

Caracas – Ciudad Mexico

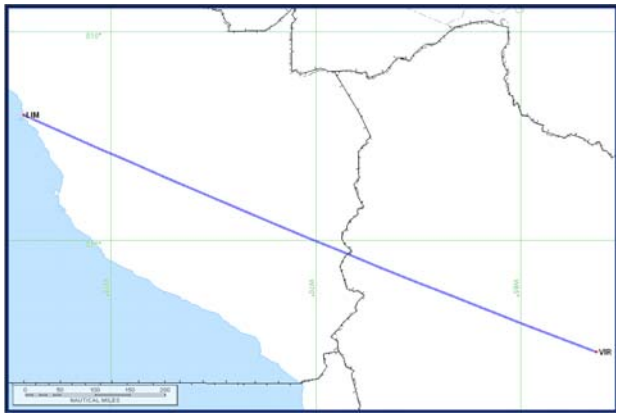
FIR/CTA involved/involucrados:

Maiquetía, Barranquilla, Kingston, Panama, Central America, Mérida, Mexico

Guayaquil – San Jose

FIR/CTA involved/involucrados:

Guayaquil, Bogotá, Panama, Central America



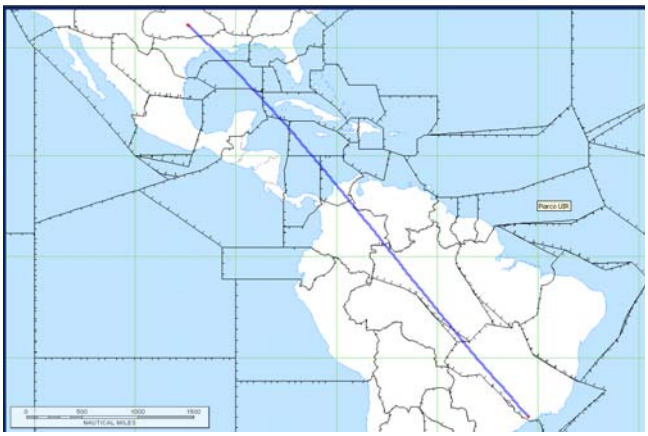
Lima – Sao Paulo

FIR/CTA involved/involucrados:

Lima/ Viru Viru: Lima, La Paz

luego/then **UM 415** Viru Viru/Sao Paulo:

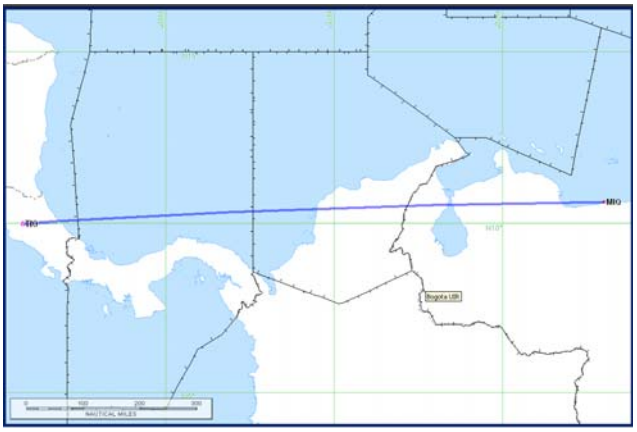
Note: Requires to continue UM41 to Lima/
Nota: Requiere continuar UM 415



Sao Paulo - Houston - Dallas

FIR/CTA involved/involucrados:

Brasilia, Manaus, Bogotá, Barranquilla, Panama, Kingston, Central America, Havana, Mérida, Houston



Caracas – S. Jose

FIR/CTA involved/involucrados:

Maiquetía, Barranquilla, Panama, Central America

Lima – San Jose

FIR/CTA involved/involucrados:

Lima, Guayaquil, Bogotá, Panama, Central America, Mérida, Houston

Note: GREPECAS/10 Approved Lima-San José-Houston-Dallas (UL219). A la fecha sin implantar

Nota: GREPECAS/10 aprobó Lima-San José-Houston-Dallas (UL219). A la fecha sin implantar

Santa Cruz – Santiago de Chile

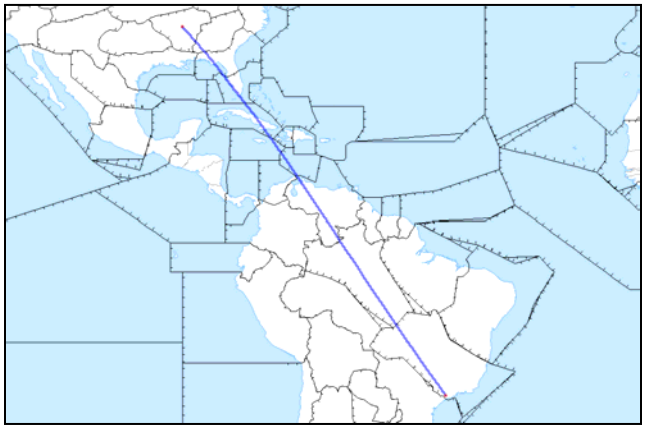
FIR/CTA involved/involucrados:

La Paz, Cordoba, Mendoza, Santiago

Havana – Santo Domingo

FIR/CTA involved/involucrados:

Havana, Port-au-Prince, Santo Domingo



Sao Paulo - Memphis

FIR/CTA involved/involucrados:

Brasilia, Manaus, Maiquetía, Curacao, Kingston, Havana, Miami

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ATTACHMENT / ADJUNTO C

CAR/SAM RNAV ROUTE PROGRAM - PROGRAMA DE RUTAS RNAV CAR/SAM (FASE II-b)								
N° Summary/ N° Listado Gral	**N°**	**Trajectory between/ Trayectoria entre**		**Total weekly operations/ Total operaciones semanal**	**Distance saved in N.M./ Dist. Ahorro en NM**	**Operational annual savings/ Ahorro operacional anual**	**Annual fuel savings in us gallons/ Ahorro anual comb en Galon US**	**Notes / Notas**
2	1	Aruba	San Juan	14	8.3	$37,684	10,549	
3	2	Asuncion	Buenos Aires	42	3.9	$54,952	14,686	
4	3	Balmaceda	Buenos Aires	0	0	$0	0	Route requested for operations from Buenos Aires to Australia/Ruta solicitada para operaciones de Buenos Aires a Australia
7	4	Bonaire	Guayaquil	7	6	$34,028	11,297	
8	5	Bonaire	Lima	7	50	$283,567	94.144	
9	6	Bonaire	Quito	7	5.7	$32,327	10,732	
58	11	Santiago	Buenos Aires	107	14.2	$646,599	190,143	Eastbound only/En dirección este solamente
12	8	Buenos Aires	Puerto Montt	0	2.4	$0	0	Route requested for operations from Buenos Aires to Australia/Ruta solicitada para operaciones de Buenos Aires a Australia
16	9	Cancun	Panama	10	8.6	$37,315	8,906	
17	10	Cap Haitien	Puerto Plata	0	0	$0	0	Route requested by Cuba and Haiti, unknown traffic/Ruta solicitada por Cuba y Haiti, tráfico desconocido
18	11	Cap Haitien	Santiago de Cuba	0	0	$0	0	Route requested by Cuba and Haiti, unknown traffic/Ruta solicitada por Cuba y Haiti, tráfico desconocido
19	12	Caracas	Havana	0	21.6	$0	0	At this moment there is not traffic, but in near future traffic will increase/Al momento no hay tráfico pero en un futuro próximo el tráfico aumentará
24	15	Cucuta VOR	Villavicencio VOR	10	49.2	$386,157	128,204	Domestic route in Colombia/Ruta doméstica en Colombia
25	16	Elorza	San Gabriel	0	19.5	$0	0	Requested by Colombia, unknown traffic/Solicitada por Colombia, tráfico desconocido
33	17	Havana	Panama	48	5.7	$88,346	24,761	
34	18	La Paz	Lima	22	3.4	$29,605	7,888	
37	19	Lima	San Jose	22	34.3	$248,066	63,430	Segment route Lima-Houston/Dallas/Segmento ruta Lima-Houston/Dallas
45	20	Mexico	San Pedro	7	62.3	$195,166	57,186	
49	21	Panama	Port au Prince	4	21.5	$37,507	8,964	
11	22	Buenos Aires	Santiago	107	3.6	$163,926	48,205	Westbound only/En dirección oeste solamente
31	23	Guayaquil	Lima	42	5.5	$98,821	26,333	UL 780 segment Guayaquil/Trujillo to Lima / UL 780 segment Guayaquil/Trujillo, then UG436 to Lima/UL 780 tramo Guayaquil/Trujillo a Lima/UL780 segmento Guayaquil/Trujillo, luego UG436 hasta Lima

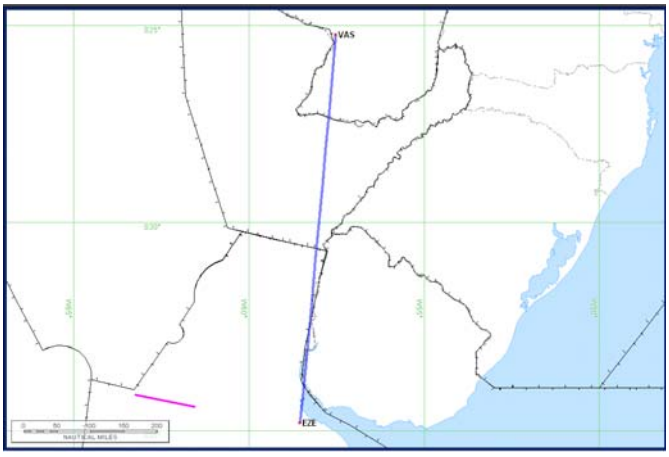
CAR/SAM RNAV ROUTES PROGRAMME – PROGRAMA DE RUTAS RNAV CAR/SAM

PHASE /PHASE II-b

Aruba – San Juan

FIR/CTA involved/involucrados:

Aruba, San Juan Oceanic



Buenos Aires – Asunción

FIR/CTA involved/involucrados:

Ezeiza, Resistencia, Asunción

Balmaceda – Buenos Aires

FIR/CTA involved/involucrados:

Puerto Montt, Comodoro Rivadavia, Ezeiza

Bonaire - Guayaquil

FIR/CTA involved/involucrados:

Curacao, Maiquetia, Bogota, Guayaquil

Nota/Note: Posible connection with Donaire-Quito /Posible conexión con Bonaire-Quito (SID-STAR)

Bonaire – Lima

FIR/CTA involved/involucrados:

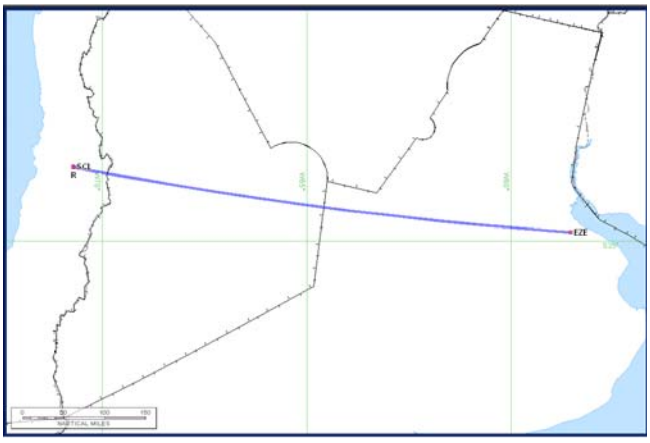
Curacao, Maiquetía, Bogotá, Lima

Bonaire – Quito

FIR/CTA involved/involucrados:

Curacao, Maiquetía, Bogotá, Guayaquil

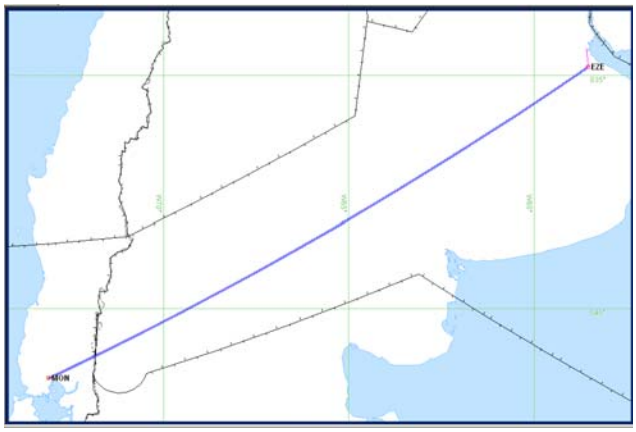
Note/Nota: Feasible SID / STAR with Donaire/Guayaquil Trajectory / Factible SID / STAR con trayectoria Bonaire/Guayaquil



Santiago – Buenos Aires (eastbound)

FIR/CTA involved/involucrados:

Santiago, Mendoza, Ezeiza,



Buenos Aires – Puerto Montt

FIR/CTA involved/involucrados:

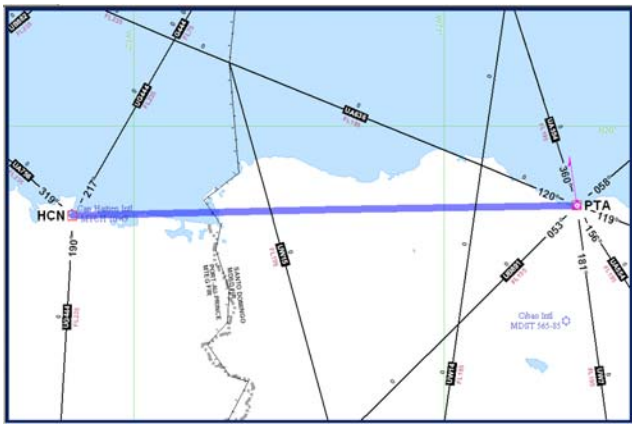
Ezeiza, Puerto Montt

Cancun – Panama

FIR/CTA involved/involucrados:

Mérida, Central America, Panama

Note: GREPECAS/10 approved UL 785, to date not implemented
Nota: GREPECAS/10 Aprobó UL 785 a la fecha sin implantar

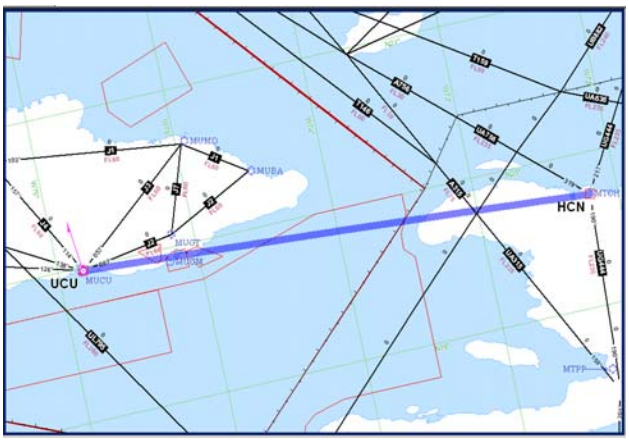


Cap. Haitien – Puerto Plata

FIR/CTA involved/involucrados:

Port-au-Prince, Santo Domingo

Note/Nota: Total distance/Distancia total 92 NM



Cap Haitien – Santiago de Cuba

FIR/CTA involved/involucrados:

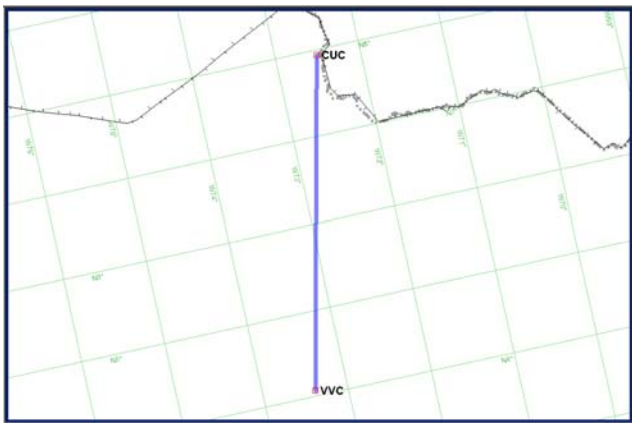
Port-au-Prince, Havana

Note/Nota: Total distance/Distancia total 206 NM

Caracas – La Habana

FIR/CTA involved/involucrados:

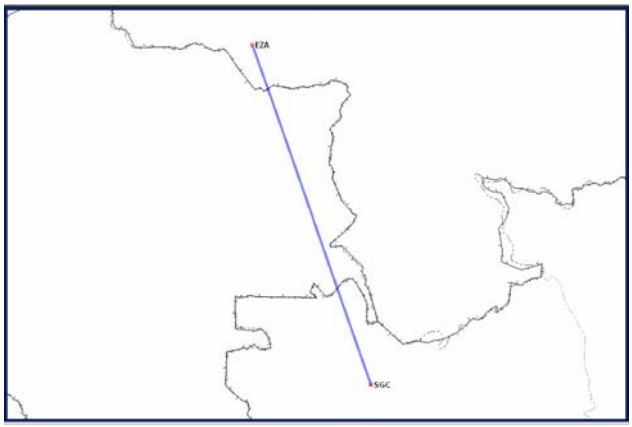
Maiquetía, Curacao, Kingston, Havana



Cucuta VOR – Villavicencio VOR

FIR/CTA involved/involucrados:

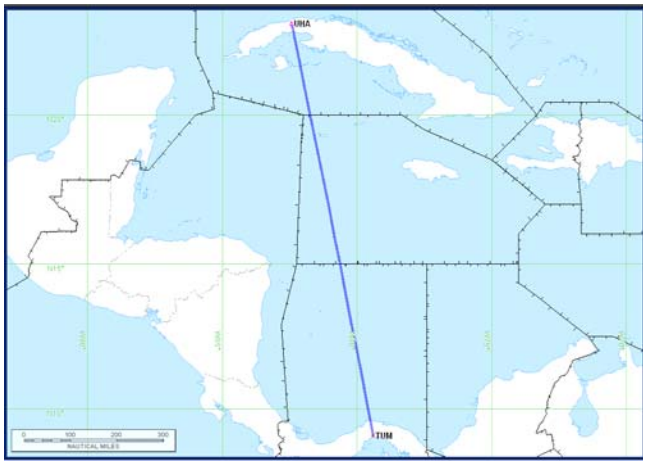
Bogota



Elorza – San Gabriel

FIR/CTA involved/involucrados:

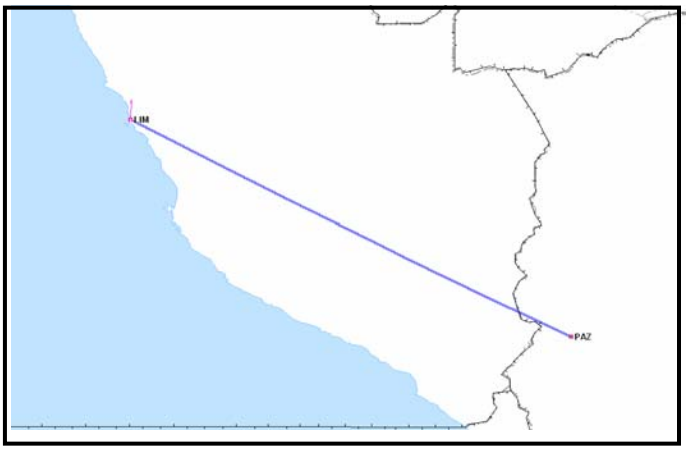
Maiquetía, Bogota, Manaus



La Habana – Panama

FIR/CTA involved/involucrados:

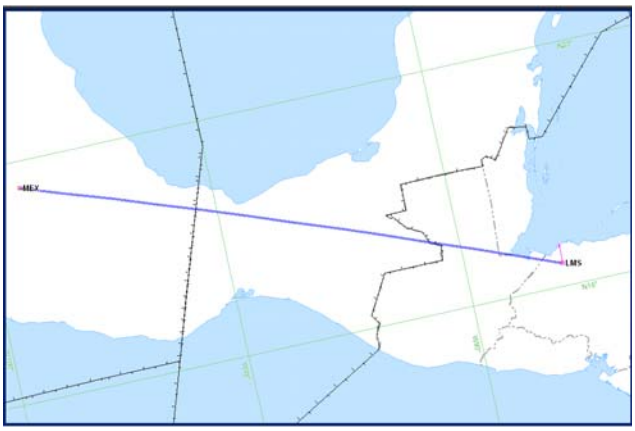
Havana, Kingston, Panama



La Paz - Lima

FIR/CTA involved/involucrados:

La Paz, Lima



Mexico – San Pedro

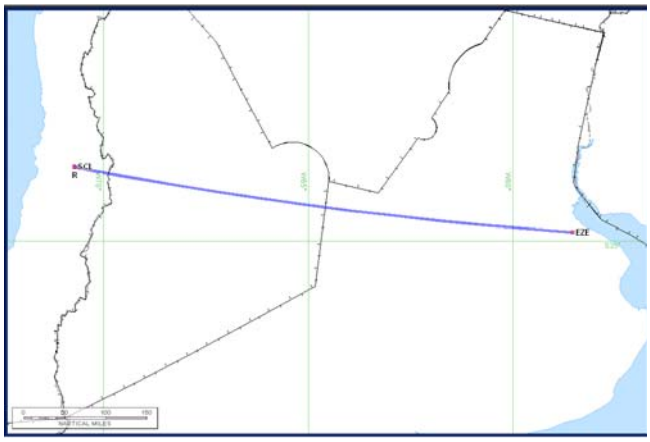
FIR/CTA involved/involucrados:

Mexico, Mérida, Central America

Panama – Port-au-Prince

FIR/CTA involved/involucrados:

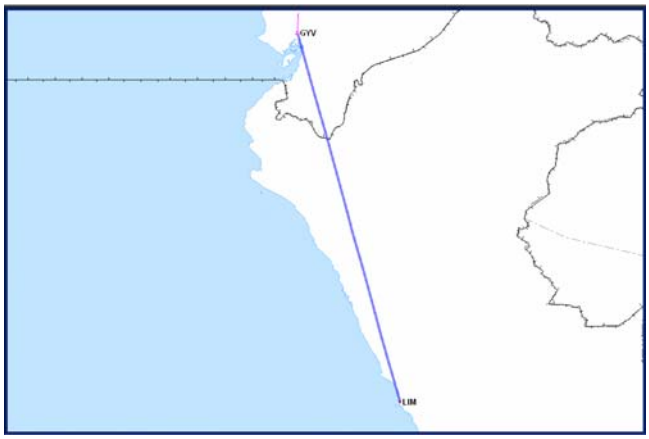
Panama, Barranquilla, Kingston, Port-au-Prince



Buenos Aires – Santiago (westbound)

FIR/CTA involved/involucrados:

Ezeiza, Mendoza, Santiago



Guayaquil - Lima

FIR/CTA involved/involucrados:

Guayaquil, Lima

Note: Coincides with UB 696 already implemented
Nota: Coincide con UB 696 ya implantada.

ATTACHMENT / ADJUNTO D

CAR/SAM RNAV ROUTES PROGRAM FROM/TO NAM REGION - PROGRAMA DE RUTAS RNAV CAR/SAM DESDE/HACIA REGION NAM

N° Summary/N° Listado Gral	N°	Trajectory between/ Trayectoria entre		Total weekly operations/ Total operaciones semanal	distance saved in N.M./ Dist. Ahorro en NM	Operational annual savings/ Ahorro operacional anual	Annual fuel savings in us gallons / Ahorro anual comb en Galon US	Notes / Notas
1	1	Antigua	Miami	34	17.5	$274,174	78,375	
5	2	Barbados	Miami	39	23.7	$394,608	107,656	
6	3	Belize	Miami	16	18.2	$99,368	27,415	
14	4	Cancun	Houston	112	9	$351,155	94,958	
15	5	Cancun	New York	42	176.8	$2,899,397	798,946	
22	6	Caracas	Miami	112	20.3	$1,039,353	285.168	IATA requests to be implemented during the year 2004/IATA solicita se implante durante el año 2004
28	7	Guadalajara	Houston/Dallas	98	6.4	$195,318	55,733	
29	8	Guatemala	Houston/Dallas	44	36	$599,856	163,650	
30	9	Guatemala	Miami	82	12.3	$407,571	115,301	IATA requests to be implemented during the year 2004/IATA solicita se implante durante el año 2004
35	10	Lima	Houston/Dallas	28	23.7	$296,978	87,018	
36	11	Lima	New York	16	77.3	$646,759	179,335	
39	12	Managua	Miami	62	7.2	$234,129	67,687	
40	13	Merida	Houston	8	46.7	$158,760	37,685	
41	14	Mexico	Houston/Dallas	177	11.7	$791,931	205,899	
42	15	Mexico	Miami	76	24.4	$897,641	260,559	
46	16	Montego Bay	Miami	60	0.9	$24,685	6,736	
47	17	Panama	Houston	14	9.7	$44,040	12,328	
48	18	Panama	New York	14	30.1	$136,660	38,256	
50	19	Port au Prince	Miami	77	4.9	$177,460	50,431	
51	20	Salvador	Houston/Dallas	36	67	$798,364	215,362	
52	21	Salvador	San Francisco	14	42.7	$211,878	50,249	
54	22	San Jose	Houston	28	24.7	$309,509	90,689	Segment route Lima-Houston/Dallas/Segmento Lima-Houston/Dallas (IATA comment - Comentario de IATA)
55	23	San Jose	New York	24	71.8	$580,468	151,607	
56	24	San Pedro	New Orleans	8	7.5	$17,027	5,043	
60	25	Sao Paulo	Memphis	14	39	$517,711	165,223	
61	26	Tegucigalpa	Miami	29	21.1	$246,100	65,765	
62	27	Cancun	Miami	42	7.7	$113,794	32,983	Southbound operations only, northbound no need improvement/Operaciones en dirección norte solamente, no necesitan mejora. (IATA comment - Comentario de IATA)

ATTACHMENT / ADJUNTO D

CAR/SAM RNAV ROUTES PROGRAM FROM/TO NAM REGION – PROGRAMA DE RUTAS RNAV CAR/SAM DESDE /HACIA REGION NAM

Antigua (V.C.Bird) – Miami

FIR/CTA involved/involucrados:

Piarco, San Juan Oceanic, Miami Oceanic

Barbados – Miami

FIR/CTA involved/involucrados:

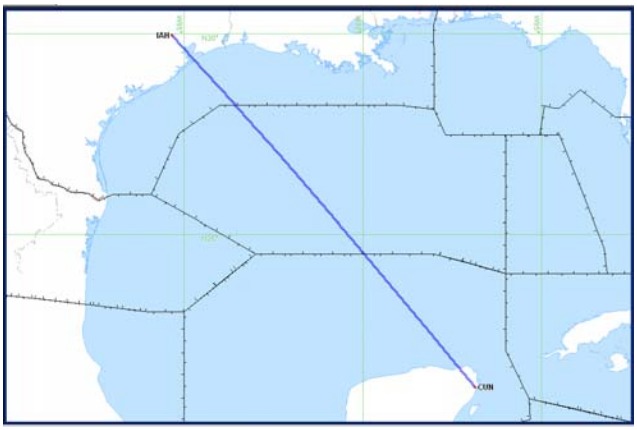
Piarco, San Juan, Santo Domingo, Miami Oceanic

Belize – Miami

FIR/CTA involved/involucrados:

Central America, Merida, Habana, Miami

Note/Nota: Trajectory coincides with Guatemala – Miami / Trayectoria coincide con Guatemala – Miami



Cancun - Houston

FIR/CTA involved/involucrados:

Mérida, Houston Oceanic

Cancun – New York

FIR/CTA involved/involucrados:

Mérida, Havana, Miami Oceanic

Caracas – Miami

FIR/CTA involved/involucrados:

Maiquetía, Curacao, Santo Domingo, Port-au-Prince, Havana, Miami

Guadalajara – Houston/Dallas

FIR/CTA involved/involucrados:

Mexico, Monterrey, Houston

Guatemala – Houston/Dallas

FIR/CTA involved/involucrados:

Central America, Mérida, Monterrey, Houston

Guatemala – Miami

FIR/CTA involved/involucrados:

Central America, Mérida, Havana, Miami Oceanic

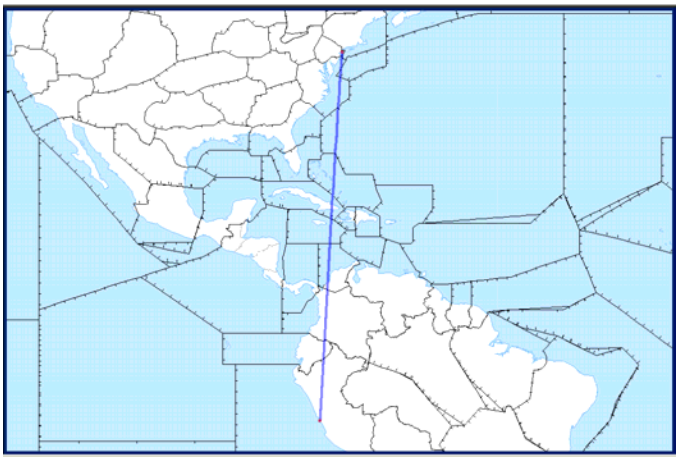
Note: IATA request to be implemented during 2004
Nota: IATA solicita se implante durante 2004

Lima - Houston / Dallas

FIR/CTA involved/involucrados:

Lima, Guayaquil, Bogotá, Panama, Central America, Mérida, Houston

Note: GREPECAS/10 approved route UL 219 for this trajectory. Not implemented yet
Nota: GREPECAS/10 aprobó ruta UL 219 para esta trayectoria. Aún sin implantar.



Lima – New York

FIR/CTA involved/involucrados:

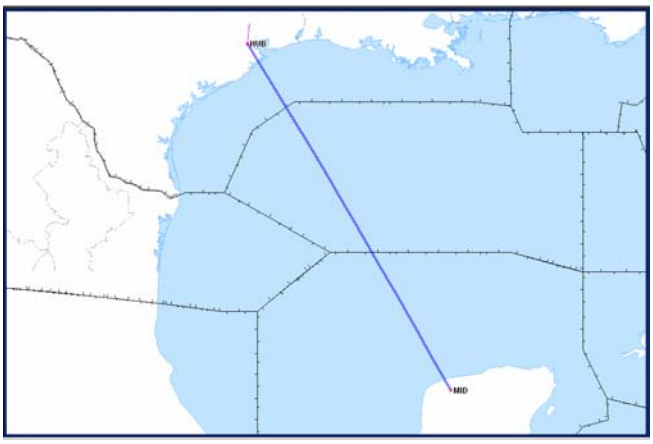
Lima, Guayaquil, Bogotá, Barranquilla, Kingston, Havana, Miami Oceanic

Note/Nota: GREPECAS/10 approved route UL670 for trajectory Lima-Bogota-New Cork. Not implemented yet / GREPECAS/10 aprobó ruta UL UL670 para trayectoria Lima-Bogotá-New York. Aún sin implantar

Managua – Miami

FIR/CTA involved/involucrados:

Central America, Havana, Miami



Mérida - Houston

FIR/CTA involved/involucrados:

Mérida, Houston

Mexico – Houston / Dallas

FIR/CTA involved/involucrados:

Mexico, Monterrey, Houston

Ciudad Mexico – Miami

FIR/CTA involved/involucrados:

Mexico, Mérida, Houston, Oceanic, Miami

Montego Bay – Miami

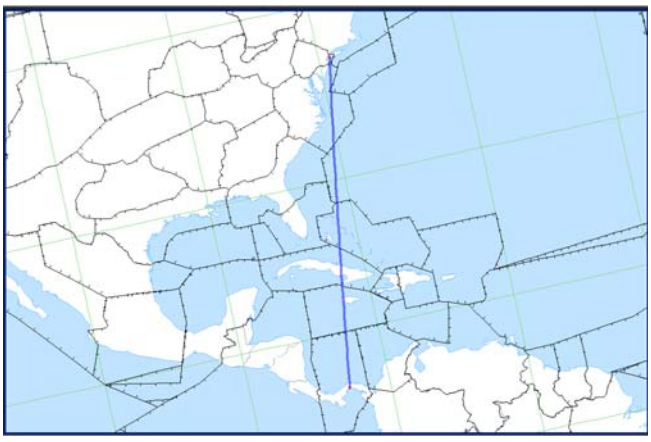
FIR/CTA involved/involucrados:

Kingston, Havana, Miami

Panama - Houston

FIR/CTA involved/involucrados:

Panama, Central America, Mérida, Houston



Panama – New York

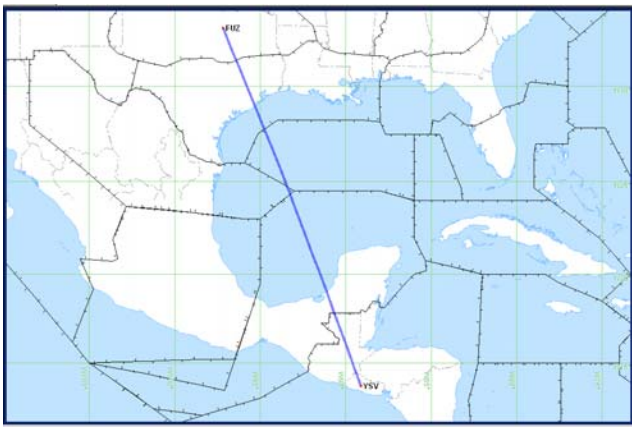
FIR/CTA involved/involucrados:

Panama, Kingston, Havana, Miami

Port-au-Prince - Miami

FIR/CTA involved/involucrados:

Port-Au-Prince, Havana, Miami



San Salvador –- Houston - Dallas

FIR/CTA involved/involucrados:

Central America, Mérida, Monterrey, Houston

San Salvador – San Francisco

FIR/CTA involved/involucrados:

Central America, Mérida, Mexico, Monterrey, Mazatlan, Albuquerque

San Jose – Houston

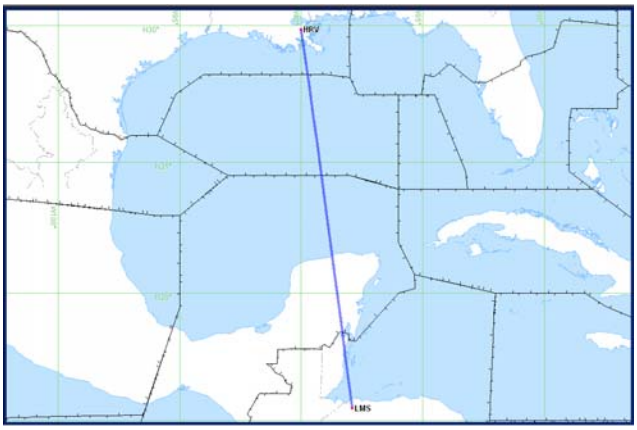
FIR/CTA involved/involucrados:

Central America, Mérida, Houston

San Jose – New York

FIR/CTA involved/involucrados:

Central America, Mérida, Havana, Miami



San Pedro Sula – New Orleans

FIR/CTA involved/involucrados:

Central America, Mérida, Houston

Follow up of coordinations for RNAV Routes Implementation Program in the CAR/SAM Regions (Phase II-b)

Seguimiento de las coordinaciones del Programa de Implantación de rutas RNAV en las Regiones CAR/SAM (Fase II- b)

Bonaire/Quito (1) **Bonaire/Guayaquil (1)**				
	Netherland Antilles	**Venezuela**	**Colombia**	**Ecuador**
Inicio/Fin Start/End	ALCOT	Santa Barbara del Zulia (STB VOR/DME) (2)	BOGOTA (BOG VOR/DME) (1)	GUAYAQUIL (GYV VOR/DME)
Límite FIR FIR Limit	ALCOT (2) (Curacao-Maiquetia)		Por determinar To be determined (Maiquetía-Bogota)	Por determinar To be determined (Bogota-Guayaquil)

(1) Colombia y Ecuador proponen unir las rutas Bonaire/Quito y Bonaire/Guayaquil en una sola ruta **Bonaire/Bogota/Guayaquil**.

(1) Colombia and Ecuador propose to join the routes Bonaire/Quito and Bonaire/Guayaquil in only one route **Bonaire/Bogota/Guayaquil**.

(2) Venezuela propone unir las rutas Bonaire/Quito y Bonaire/Guayaquil en una sola ruta, ingresando a la FIR Maiquetia por **ALCOT** siguiendo la actual trayectoria de la ruta **UG 431** hasta **STB VOR/DME** y continuando hacia Guayaquil.

(2) Venezuela proposes to join the routes Bonaire/Quito and Bonaire/Guayaquil in only one route, entering to Maiquetia FIR by **ALCOT**, following the current trajectory of route **UG 431** until **STB VOR/DME** and continue to Guayaquil.

Bonaire/Lima (UM 414) (1) (3)				
	Netherland Antilles	**Venezuela**	**Colombia**	**Peru**
Inicio/Fin Start/End	ALCOT (2)	ELORZA (1) (3) (EZA NDB)	No Aplicable Non Applicable	LIMA (1) (LIM VOR/DME)
Límite FIR FIR Limit	ALCOT (2) (3) (Curacao-Maiquetia)		OPRUS (1) (Maiquetía-Bogota)	ILMUX (1) (Bogota-Lima)

(1) Peru y Venezuela proponen mantener la actual trayectoria de la ruta **UM 414** y extenderla desde **ESKIT** hasta **PBL VOR/DME** y continuar directo hacia Bonaire.

(1) Peru and Venezuela propose to keep the current trajectory of route **UM 414** and extend it from **ESKIT** until **PBL VOR/DME** and continue direct to Bonaire.

(2) Propuesta por Netherland Antilles.

(2) As proposed by Netherland Antilles.

(3) Pareciera que no existiera compatibilidad entre estas dos propuestas.

(3) It seems that there is no compatibility between these two proposals.

Cancun/Panama			
	Mexico	**COCESNA**	**Panama**
Inicio/Fin Start/End	**(1)**	**(1)**	**(1)**
(1) México, COCESNA y Panamá han acordado que las trayectorias de las rutas **UJ 52, UM 782** y **UA 321** satisfacen los actuales requerimientos del flujo de tránsito. (1) Mexico, COCESNA and Panama have agreed that the trajectories of ATS routes **UJ 52, UM 782** y **UA 321** satisfy the current traffic flow requirements.			

Maiquetia/La Habana				
	Venezuela	**Netherland Antilles**	**Jamaica**	**Cuba**
Inicio/Fin Start/End	AVELO (1)	No Aplicable Non Applicable	No Aplicable Non Applicable	Cayo Largo del Sur (UCL) VOR/DME
Límite FIR FIR Limit	AVELO (1) (Maiquetía-Curacao)	16° 05' 04" N 073° 54' 59" W (2) (Curacao-Kingston)	20° 00' 00" N 079° 13' 07" W (2) (Kingston-Habana)	
(1) Venezuela propone mantener la actual trayectoria de la ruta **UA 315** hasta **PGJ VOR/DME** y continuar hacia La Habana. (1) Venezuela proposes to keep the current trajectory of route **UA 315** until **PGJ VOR/DME** and continue ~~direct~~ to La Habana. (2) Propuesta por Jamaica. (2) As proposed by Jamaica.				

Elorza/Sao Gabriel da Cachoeira			
	Venzuela	**Colombia**	**Brasil**
Inicio/Fin Start/End	Elorza (EZA) NDB	No Aplicable Non Applicable	No ha informado No information Provided
Límite FIR Limit FIR	Por determinar To be determined (Maiquetía-Bogota)	ATATU 02° 02' 01" N 067° 44' 40" W (1) (Bogota-Amazonica)	
(1) Brasil ha informado que, en coordinación con Colombia, acordaron estas coordenadas geográficas. (1) Brasil has informed that, in coordination with Colombia, they have agreed in this geographical coordinates.			

La Habana/Panama			
	Cuba	**Jamaica**	**Panama**
Inicio/Fin Start/End	DUTAN	No Aplicable Non Applicable	Taboga (TBG) VOR/DME
Límite FIR Limit FIR	20° 00’ 00” N 081° 16’ 15” W (1) (Habana-Kingston)		15° 00’ 00” N 080° 29’ 13” W (1) (Kingston-Panama)
(1) Jamaica propone que la trayectoria prosiga directo a **Cayo Largo del Sur (UCL) VOR/DME.** (1) Jamaica proposes that trajectory of route follows direct to **Cayo Largo del Sur (UCL) VOR/DME.**			

Panama/Port-au-Prince				
	Panama	**Colombia**	**Jamaica**	**Haiti**
Inicio/Fin Start/End	Taboga (TBG) VOR/DME	No Aplicable Non Applicable	No Aplicable Non Applicable	No ha informado No information Provided
Límite FIR FIR Limit	Por determiner To be determined (Panama-Barranquilla)	15° 00’ 00” N 074° 57’ 40” W (1) (Barranquilla-Kingston)		17° 11’ 48” N 073° 15’ 32” W (1) (Kingston-Port-au-Prince)
(1) Jamaica propone que la trayectoria prosiga directo a **Obleon (OBN) VOR/DME.** (1) Jamaica proposes that trajectory of route follows direct to **Obleon (OBN) VOR/DME.**				

Buenos Aires/Asunción		
	Argentina	**Paraguay**
Inicio/Fin Start/End	**(1)**	No ha informado No information provided
Límite FIR FIR Limit	Por determiner To be determined (Resistencia-Asuncion)	
(1) Argentina ha informado que esta ruta RNAV no es necesaria por el momento. (1) Argentina has informed that this route is not necessary by now.		

Buenos Aires/Balmaceda		
	Argentina	**Chile**
Inicio/Fin Start/End	**(1)**	**(1)**
(1) Argentina y Chile han informado que esta ruta RNAV no es necesaria por el momento. (1) Argentina and Chile have informed that this route is not necessary by now.		

Buenos Aires/Santiago de Chile (Sentido unico / One way only)		
	Argentina	**Chile**
Inicio/Fin Start/End	**(1)**	**(1)**
(1) Argentina y Chile han informado que la trayectoria de la ruta UA 306 satisface los actuales requerimientos del flujo de transito. (1) Argentina and Chile have informed that the trajectory of route UA 306 satisfies the current traffic flow requirements.		

Santiago de Chile/Buenos Aires (Sentido unico / One way only)		
	Chile	**Argentina**
Inicio/Fin Start/End	ALBAL (1)	Ezeiza (EZE) VOR/DME (2)
Límite FIR FIR Limit	ALBAL (2) (Santiago-Mendoza)	
(1) Chile ha informado que la trayectoria de la ruta **UA 305 dentro de la FIR Santiago** satisface las actuales necesidades del flujo de transito. (1) Chile has informed that the trajectory of the route **UA 305 within Santiago FIR** satisfies the current traffic flow requirements. (2) Argentina ha informado que la trayectoria de la ruta RNAV propuesta dentro de Mendoza y Ezeiza FIR seria: **ALBAL (actual limite FIR Santiago-Mendoza) – San Rafael (SRA) VOR – ASADA – Ezeiza (EZE) VOR/DME.** (2) Argentina has informed that the trajectory of proposed RNAV route within Mendoza and Ezeiza FIR would be: **ALBAL (current FIR limit Santiago-Mendoza) – San Rafael (SRA) VOR – ASADA – Ezeiza (EZE) VOR/DME.**		

Buenos Aires/Puerto Montt		
	Chile	**Argentina**
Inicio/Fin Start/End	**(1)**	**(1)**
(1) Argentina y Chile han informado que esta ruta RNAV no es necesaria por el momento. (1) Argentina and Chile have informed that this RNAV route is not necessary by now.		

Aruba/San Juan de Puerto Rico		
	Netherland Antilles	**United Status**
Inicio/Fin Start/End	SCAPA	No ha informado No information provided
Límite FIR FIR Limit	SCAPA (1) (Curacao-San Juan Oceanic)	
(1) Propuesta por Netherland Antilles. (1) As proposed by Netherland Antilles.		

Mexico/San Pedro Sula		
	Mexico	**COCESNA**
Inicio/Fin Start/End	**(1)**	**(1)**
(1) Mexico y COCESNA han informado que esta ruta RNAV no es necesaria por el momento. (1) Mexico and COCESNA have informed that this RNAV route is not necessary for now.		

Cap Haitien/Puerto Plata		
	Haiti	**Republica Dominicana**
Inicio/Fin Start/End	No ha informado No information provided	No ha informado No information provided
Límite FIR FIR Limit	Por determiner To be determined (Port-au-Prince-Santo Domingo)	

Cap Haitien/Santiago de Cuba		
	Haiti	**Cuba**
Inicio/Fin Start/End	No ha informado No information provided	**(1)**
(1) Cuba ha informado que, en coordinación con Haití, ellos ha acordado no implantar esta ruta RNAV por el momento. (1) Cuba has informed that, in coordinations with Haiti, they have agreed not to implement this RNAV route by now.		

La Paz/Lima		
	Bolivia	**Peru**
Inicio/Fin Start/End	**(1)**	**(1)**
(1) Bolivia y Peru han informado que esta ruta RNAV ya no seria necesaria y que la ruta RNAV UM 415 satisface los actuales requerimientos del flujo de transito. (1) Bolivia and Peru have informed that this RNAV route is no longer necessary and that the RNAV route UM 415 satisfies the current traffic flow requirements.		

Guayaquil/Lima		
	Ecuador	**Peru**
Inicio/Fin Start/End	**(1)**	**(1)**
(1) Ecuador y Peru han informado que esta ruta RNAV ya no seria necesaria y que la ruta RNAV UL 780 satisface los actuales requerimientos del flujo de transito. (1) Ecuador y Peru has informed that this RNAV route is no longer necessary and that the RNAV route UL 780 satisfies the current traffic flow requirements.		