AP/ATM/2

INTERNATIONAL CIVIL AVIATION ORGANIZATION

South American Regional Office

UNDP/ICAO Regional Project RLA/98/003

Transition to the CNS/ATM Systems in the CAR/SAM Regions

REPORT

Second Meeting/workshop of Air Traffic Management

Authorities and Planners

(AP/ATM/2)

(Lima, Peru, 14 to 18 May 2001)

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HISTORY OF THE MEETING

ii-1 PLACE AND DURATION OF THE MEETING

The Second Meeting/workshop of Air Traffic Management (ATM) Authorities and Planners, was held in Lima, from 14 to 18 May 2001.

ii-2 OPENING CEREMONY AND OTHER MATTERS

Mr. Paulo Imre Hegedus, Regional Director for South America (a.i.), welcomed the participants and highlighted the objectives of the meeting, giving a wide explanation on the issues, which would be dealt with. Likewise, the Director General of Civil Aviation from Peru, Dr. Edgardo Rebagliati Castañon, addressed the meeting and welcomed the participants emphasizing the importance of the issues to be dealt with. He then declared the meeting open. Mr. Luis Alberto Sarmiento Silva Rodriguez, Board President of CORPAC, S.A, was also present at this ceremony.

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

The Meeting held its sessions from 0900 to 1430 hours, with appropriate breaks. Work was done with the Meeting as a Single Committee, and Ad-hoc Groups worked during the schedule of the Meeting to discuss certain items on the Agenda.

Mr. Fidel Ara was unanimously elected as Chairman of the Meeting, and Mr. Roberto Arca was elected as Vice-Chairman. Mr. Jorge Fernández, ATM/SAR Regional Office, Lima, acted as Secretary, being assisted by Mr. Gustavo De León, ATM/SAR Regional Officer, Mexico. Additional cooperation was received from the following ICAO Officers:

Mr. Carlos Stehli, CNS Regional Officer, SAM Office
Mr. Roberto Jean-François, AIS/MAP Regional Officer, SAM Office
Mr. Alberto Orero, ATM/SAR Regional Officer, SAM Regional Office
Mr. José Moreno, ATM Consultant, Project RLA/98/003

ii-4 WORKING LANGUAGES

The working languages of the Meeting and its relevant documentation were English and Spanish.

ii-5 **AGENDA**

The following agenda was adopted:

Agenda Item 1: Evaluation of the pre-operational trials and demonstrations in the RNAV routes UT 780 (Santiago- Lima/Miami), UT 795 and UT 799 (Sao Paulo-Rio de Janeiro/Miami).

Agenda Item 2: Definitive implementation of the RNAV routes UT 780, UT 795 and UT 799 and analysis of new pre-operational trials and demonstrations in such routes.

Agenda Item 3: Analysis of pre-operational trials and demonstrations in new RNAV routes between Buenos Aires/Miami, Sao Paulo-Rio de Janeiro/New York and Sao Paulo/Los Angeles and evaluation of other paths.

Agenda Item 4: Requirements which should be fulfilled for the trials and demonstrations in the RNAV routes between Buenos Aires/Miami, Sao Paulo/New York and Sao Paulo*/Los Angeles.

Agenda Item 5: Review of the operational letters of agreement (LOA) between the ACCs involved.

Agenda Item 6: Review of the implementation programme of pre-operational trials and demonstrations of RNAV routes.

Agenda Item 7: Other matters

ii-6 **ATTENDANCE**

Eight States of the CAR Region, 13 States of the SAM Region and 3 International Organizations, COCESNA, IATA and SITA, totaling 44 participants, attended the meeting. The list of participants is shown in pages iii-1 to iii-9.

International Civil Aviation Organization

UNDP/ICAO Regional Project RLA/98/003
Transition to the CNS/ATM Systems in the CAR/SAM Regions

Second Meeting/workshop of Air Traffic Management (ATM) Authorities and Planners

List of participants

(Lima, Peru, 14 to 18 May 2001)

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Agenda Item 1: Evaluation of the pre-operational trials and demonstrations in the RNAV routes UT 780 (Santiago- Lima/Miami), UT 795 and UT 799 (Sao Paulo-Rio de Janeiro/Miami).

1.1 The meeting took note of the information provided by States, the Secretariat and IATA on the results obtained during the evaluation of trials and demonstrations on RNAV routes UT 780, UT 795 and UT 799.

1.2 The meeting also took note with satisfaction that pre-operational trials and demonstrations had been carried out normally, without operational difficulties; on the contrary the achievements reached were very important. Among others, the main benefits obtained were as follows:

a) Reduction of distances and flight times.

b) Significant fuel savings with the consequent money saving,

c) Greater possibilities to obtain optimum flight levels.

d) Trajectories far away from mountainous region.

e) Flexible use of the airspace permitting overflights in restricted areas and special use airspaces.

f) Uniform application of longitudinal separation.

g) Improvements of some shortcomings and deficiencies in ATS ground/air speech communications.

h) Extended use of the Mach Number Technique.

i) Significant Improvements in the process of coordination among al parties involved in these pre-operational trials and demonstrations.

1.3 The aforementioned information revealed the following:

UT 780

a) Available charts containing the RNAV trial routes did not show all the operational information necessary for flight planning and development, thus requiring the additional use of other charts showing the missing data.

b) Publication of standard departure and arrival routes (SID/STARs) at the beginning, throughout and at the end of the routes was lacking, thus hindering instrument navigation when entering and/or exiting such routes.

UT 795 and UT 799

a) Available charts containing the RNAV trial routes did not show all the operational information necessary for flight planning and development, thus requiring the additional use of other charts showing the missing data.

b) Publication of standard departure and arrival routes (SID/STARs) at the beginning, throughout and at the end of the routes was lacking, thus hindering instrument navigation when entering and/or exiting such routes.

c) Some problems were identified in the optimum flight levels obtained.

d) Some air/ground communication problems were identified in the Havana, Kingston, Curaçao, Maiquetía, Manaus and Brasilia FIRs.

e) A 15-minute longitudinal separation was applied in some FIRs between aircraft flying at the same level.

f) Daytime enforcement of warning area W-1001 affected some trial operations.

Note: The information provided by IATA is shown in detail in **Appendices A and B** to this part of the Report.

1.4 The meeting also took note of the following comments made by some delegates:

a) The delegate from Chile stated that his administration has foreseen the relocation of the Quintero (ERO) VOR/DME, which is the origin/end of route UT 780, to a position approximately 2 to 3 NM from its present site. This will result in a minor modification of the path of said route within its airspace.

b) Likewise, the delegate from Brazil informed the meeting that the Campinas (CPN) VOR/DME, which is the starting/ending point of route UT 795, causes traffic routing problems in the Sao Paulo terminal area (TMA) due to the fact that this navaid is used only by incoming traffic. Therefore, he proposed the establishment of an additional point to be used by traffic leaving the Sao Paulo TMA.

c) Furthermore, the convergence of routes UT 795 (Sao Paulo/Miami) and UT 799 (Rio de Janeiro/Miami) to MUGAS has resulted in an increase in the number of aircraft to/from Sao Paulo and Rio de Janeiro not flying at optimum flight levels.

d) As to the difficulties encountered in VHF communications, he reported that the reason was that some remote VHF stations were of difficult access and this, in some cases, hindered efficient maintenance. He added that Brazil is implementing a programme for the relocation of these stations.

e) The delegate from Cuba informed the meeting that route UT 795 causes traffic conflicts in the Havana FIR because several southbound high-density routes coming from the Miami FIR converge at the URSUS reporting point (origin/end of the route). He

suggested the need to establish an alternate NW directional routing (GELOG-BORDO) in order to obtain lateral separation from SE traffic (URSUS-GELOG).

f) In this respect, the delegate from Venezuela stated that his administration is making efforts to improve communications, to which end it has plans to install two VSAT stations, one in Santa Elena del Uaivén and the other in San Carlos de Río Negro, for communication testing purposes. With test completion and commissioning foreseen within four (4) months, the implementation of the required longitudinal separation minimum of 10 minutes MNT and/or 80 NM RNAV between aircraft flying at the same level will be possible by November 2001.

1.5 In view of the foregoing, and in order to expedite the discussions and find a solution to these problems, the meeting deemed it advisable to establish an ad-hoc group made up by representatives of all the FIRs concerned, to review routes UT 780, UT 795 and UT 799 and their paths, and decide whether to continue with the trials or to proceed with the definitive implementation of the routes.

1.6 The ad-hoc committee informed the meeting that the States involved in pre-operational trial and demonstration RNAV routes UT 780, UT 795/UT 799 have reached the following agreements:

Route UT 780 (Chile, Colombia, Cuba, Ecuador, Jamaica, Panama, Peru and United States)

a) The analysis made of the evaluation of pre-operational trials and demonstrations on route UT 780 shows beneficial results for all the parties involved.

b) The shifting of the Quintero (ERO) VOR/DME, origin/end of route UT 780, to the new Ventanas (VTN) VOR/DME facility only affects the segment contained in the airspace of the Santiago and Antofagasta FIR, and does not compromise the established structure of the route in the rest of the FIRs.

c) To publish an AIP Supplement effective on 12 July 2001, extending the validity of route UT 780 to 11 July 2002. Furthermore, Chile will publish the changes corresponding to its airspace.

d) To implement Standard Departure and Arrival (SID/STAR) routes at intermediate airports to allow for proper connection to route UT 780.

e) To request the ICAO NACC and SAM Regional Offices to start the amendment process for the incorporation of route UT 780 into the CAR/SAM Regional Air Navigation Plan for its definitive implementation.

f) To include in this amendment process the deletion of that segment of route UL 312 between the Ventanas (VTN) and the Salinas (SLS) VOR/DMEs. The deletion of this segment would only affect the Santiago and Antofagasta (Chile) and Lima (Peru) FIRs.

g) The segment of route UL 312 referred to in paragraph f. would be deleted on the same date as of the definitive implementation of route UT 780.

Routes UT 795 and UT 799 (Brazil, Cuba, Curaçao, Jamaica, United States and Venezuela)

a) The analysis made of the evaluation of pre-operational trials and demonstrations on routes UT 795 and UT 799 shows satisfactory results for all the parties involved.

b) Considering that the Campinas (CPN) VORF/DME is a navaid used in the Sao Paulo TMA to route only incoming traffic, route UT 795 will start/end at MATEC. Outgoing traffic will be routed *via* the Bragança (BGC) VOR/DME.

c) The convergence of routes UT 795 and UT 799 in the Manaus FIR results in a lack of lateral separation and some aircraft not operating at their optimum flight levels.

d) Taking into account that route UT 799 coincides with domestic route UZ-6 in the Brasilia and Manaus FIRs, route UT 799 should be eliminated. Brazil will extend route UZ-6 to meet route UT 795.

e) Since trials and demonstrations have shown difficulties in URSUS with Northbound traffic of route UT795, traffic will be routed Northbound via GELOS-BORDO.

f) To implement Standard Instrument Departure and Arrival (SID/STAR) routes for intermediate airports to allow for proper connection to route UT 795.

g) To publish an AIP Supplement effective 12 July 2001 extending the validity of route UT 795 up to 11 July 2002. Furthermore, Brazil and Cuba will publish the changes corresponding to their airspaces.

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

Second Meeting/workshop of Air Traffic Management (ATM) Authorities and Planners
(Lima, Peru, 14 to 18 May 2001)

Agenda Item 1: Evaluation of the pre-operational trials and demonstrations in the RNAV routes UT780, UT795 and UT799. – Pilots´ feedback

(Presented by IATA)

Summary

This working paper presents the feedback collected by the IATA Regional Office from the pilots that have participated in the trials and demonstrations on the routes UT780, UT795 and UT799.

1 Introduction

1.1 At the previous meeting/workshop of the Air Traffic Management Authorities and Planners the IATA Regional Office was requisitioned to collect feedback from the pilots participating in the trials and demonstrations of the above routes. For this purpose a "Pilot Evaluation Form" was prepared and distributed to the participating airlines. This pilot form has a 15-item questionnaire to be filled out by the crewmembers. Ten of these items were formulated to collect general information of the flights such as date, flight number etc; no information related to these items is provided in this working paper. The remaining five items of the "Pilot Evaluation Form" were dedicated to:

10) Vertical and longitudinal separation
11) Route clearances and rerouting
13) Communications
14) Approval of the route by the crew based on reduction of operational costs
15) Suggestions by the crewmembers related to safety and regularity

1.2 A total of 258 reports were received from five airlines. All the statements received from the crewmembers have been classified by airway flown and listed accurately in Appendixes 2,3

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and 4. All the input and suggestions received from the crewmembers were treated with minimum editing in order to avoid unintentional alterations of the statements. Original reports are available upon request.

1.3 Appendix 3 deals with route UT799 only in its segment from MUGAS to PCX; the portion from URSUS to MUGAS is incorporated in Appendix 4 that deals with route UT795. The reason for this is that the portion from URSUS to MUGAS is a common portion for both routes.

1.4 The input collected for the three routes are summarized as follows:

2 **Analysis**

2.1 Route UT780 Santiago de Chile – Miami

2.1.1 Twenty-six reports received from American Airlines and United Airlines

2.1.2 The reports do not advise of any problems in relation to the vertical or longitudinal separation on the route. It is worth noting that there was excellent communication during entire route.

2.1.3 Two reports indicated that the flight was not cleared to airway UT780 by the controller. These two cases occurred during the beginning of the test phase, and is presumably because the controller was not informed of the test.

2.1.4 Ninety-six percent of the reports considered that implementation of this route will improve the system. The single report against the implementation of the route does not give any reason for it.

2.1.5 As for the rest of the routes, pilots are urged to issue a new chart with the data needed during the flight, such as frequencies, navigation aids, airports, escape routes, etc…

2.1.6 Acclaims from the pilots support the implementation of this route.

2.1.7 Two comments recommend the revising of the arrival into Santiago de Chile.

2.2 Route UT799 Rio de Janeiro – Miami

2.2.1 Seventy reports provided by American Airlines, United Airlines and VARIG

2.2.2 On the flight levels and longitudinal separation, there are no important notations.

2.2.3 Several pilots informed that a traffic conflict exists at the south end of UT799. It appears that the SID's and STAR's at SBGL do not connect with UT799.

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2.2.4 Several reports inform of poor VHF communications in the vicinity of NABOL. In some instances it also includes poor HF communication. In contrast to the previous comments, two reports indicate good communications throughout the whole route.

2.2.5 When crews were asked to approve the route, 67 out of 70, or ninety-six percent were in favor. Three negative reports are based on poor flight levels, too much traffic and 15 minutes separations.

2.2.6 Among the positive reports we are told that the route reduces chattering and frequency congestion which brings about a reduction of miscommunication and language barriers which clearly results in the enhancement of safety.

2.3 Route UT795 Sao Paulo – Miami

2.3.1 Two hundred and thirty three reports provided by American Airlines, TAM, United Airlines and VARIG.

2.3.2 Regarding vertical separation 48 reports were received indicating problems with the clearance to desired flight levels, while four reports informed having no problems on the route. The main causes detected for not obtaining the requested flight levels are: traffic on the airway, interference with traffic in other airways, and the inability to obtain planned flight levels because of increase of longitudinal separation.

2.3.3 Sixteen reports informed that the longitudinal separation was 15 minutes and not 10 minutes as specified on the test terms of reference. Five reports informed that Curaçao FIR was requesting 15 minutes separation, four reports stated that Maiquetia was requesting 15 minutes and two reports do not specify the FIR.

2.3.4 Nineteen reported on problems related to the route. Basically, the reports advised of problems on the Manaus and Brasilia FIR, such as interference with other airways and possible lack of connection of the airway with SBGR SID'S and STAR's .

2.3.5 With regard to communication 109 reports informed of problems in the route. These problems are classified by FIR's as follows:

- Havana FIR – 15 reports. No communication ten minutes before GELOG in 120.25 and 123.7. Few reports noticed poor communication at GELOG.

- Kingston FIR – 2 reports – No communication 10 minutes prior to the FIR. No communication at the FIR.

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- Curaçao FIR – 33 reports – All the reports express concern over no VHF communications in the neighborhood of DIBOK at the northwest corner of the Curaçao FIR.

- Maiquetia FIR – 44 reports – No VHF communication for a large part of the southern portion of the Maiquetia FIR. The report also reflects poor communication in HF.

- Manaos and Brasilia FIR's – 20 reports were received which reflect poor to no communication on the northern part of Manaus FIR on VHF. Also some spots detected in different parts of Brasilia and Manaos FIR. Reports inform that HF communications substituted wherever VHF unavailable.

2.3.6 One hundred fifty two reports, or 93 percent, voted for implementation of the route. Eleven reports do not agree with the implementation of the route due to traffic congestion, which made them unable to obtain optimum levels.

2.3.7 A great concern for the pilots is the using of two different charts to fly the route. It is essential, as soon as possible, to incorporate this and the previous routes in the regular chart or create a new RNAV chart for the CAR/SAM Region.

2.3.8 Two reports commented that VUMPI should be a compulsory reporting point. Others suggest to the development of parallel routes.

2.3.9 Finally, one report commented, "Saved 2.8 tons and 32 min".

3 **Suggested Action**

3.1 The Group is invited to take note of the input collected by the crew that participated in the tests and demonstrations, especially those related to safety.

3.2 Also the Group should take note of the following deficiencies and possible improvements reported and suggested by the crew members:

a. Revising the SID's and STAR's that connect the airways to the airports

b. Implement or improve communications wherever needed

c. Establish 10 minutes longitudinal separation

d. Application of RNP values and parallel routes

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e. Application of RVSM to reduce congestion

f. Timely implementation of these routes in order that they may be published on regular charts

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Long-haul RNAV Routes
Trials and Demonstrations Program
Caribbean and South America ICAO Regions
Pilots Evaluation Form

INSTRUCTIONS

Flight Crew - Please fill out one form per flight. Without this input permanent implementation of Long-haul RNAV routes will not be achievable. Upon arrival please hand this form to the flight operations agent or follow your airline's instructions. A complementary questionnaire will be filled out by the ATC controller.

Flight Operations Agent - Please forward this questionnaire to Angel Lucas, IATA Regional Operations Office: e mail - lucasa@iata.org - Telephone 1 305 266 7552 - Fax 1-305-266 7718, or follow your Airline's instructions. This evaluation program will end 22 March 2001.

1-Date	2-Airline	3-Flight #	4-From	5-To	6-Aircraft Registration	7-Aircraft type

8-Route Evaluated UT780 (SCL) ❑ UT795 (SAO) ❑ UT799 (RIO) ❑

9-Is the aircraft equipped with FMS ❑ IRS or INS ❑ GPS ❑

10-If unable to obtain the FL proposed in the Flight Plan, requested during flight or maintain 10 minutes longitudinal separation, please note reasons (e.g. ,not authorized by controller, traffic, weather conditions, aircraft weight, etc...)

11-If unable to proceed with the route approved in the Flight Plan, please note reasons (e.g., not authorized by controller, weather, traffic, etc…)

12-If you have ACARS on board.
Did you send messages to the ATC? Yes ❑ No ❑ Did you receive messages from the ATC? Yes ❑ No ❑

13-If unable to establish proper communication with ATC, please indicate if VHF or HF, position or portion of the route, control center and the possible reasons.

14-Additional comments - Compared to conventional route, do you consider that this route reduces the operational cost of your flight?
Yes ❑ No ❑

15-Please add any other comments that can help us to evaluate this route, especially in reference to Safety and Regularity issues.

Thank you for helping in improving the efficiency of the Air Transport in the CAR/SAM Region

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Appendix 2

Reports from the "Pilots Evaluation Form" on the route UT780 Santiago de Chile - Miami

Answers to item number 10 – Problems encountered with Flight Levels and Separation

9 reports out of 26 make the following observations:

- 4 reports – "No problem with Flight Levels"
- "Fl290 for awhile due to traffic"
- "Miami controller authorized FL290 (filled 330) when reached Havana authorized fl370"
- "Unable initial FL due to traffic"
- "Unable to altitude requested due to turbulence"
- "Unable to climb to fl 350 according to on calculation we had longitudinal separation with American 912 ahead also 912 was on separate airway, we stayed at 310 until Havana airspace"

Answers to item 11 – Problems encountered in route

5 reports out of 26 make the following observations:

- 3 reports – No problems with the route selected
- 2 reports – Not cleared to proposed route by Santiago Control

Answers to item 13 – Problems encountered in communication

4 reports out of 26 make the following observations:

- "No contact with Lima on 128.7"
- "Good comm. on VHF"
- "Good comm. entire route "
- "Great route good communication"

Answers to item 14 – Compared with the standard route do you think this one is better?

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25 reports out of 26 assert than the proposed RNAV route is better than the standard one. The report which is not in favor of the RNAV route does not provide the reason for this conclusion.

Answers to item 15 – Any comments or suggestions by the crew members

16 reports out of 26 make the following observations:

- 6 reports – Need chart, need freq., navaid, escape routes, emergency airports… etc
- "Parallel routes will improve the system "
- "Since route is mostly over water it avoids convective activity over the land"
- "Route south bound should be changed to after SULNA direct TOY UW208 EMBAL Andes 4 arrival"
- "Route should be filed to TOY as this is normal clearance"
- "No problem with route"
- "Keeps you away from Andes better"
- "Lowers work load"
- "I like the small number of reporting points and I like no high altitude emergency escape routes"
- "Good route no problems noted"
- "Easier to flight than the old route"
- "Cut down operational work load"
- "South of GVY route infigies on high terrain area"
- "ATC controllers requiring high mach numbers to cross a fix at a certain time this increase operational cost of the route"

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Appendix 3

Reports from the "Pilots Evaluation Form" on the route UT799 Rio de Janeiro - Miami

Pilots' comments provided in this annex refer only to the UT799 portion from MUGAS to PCX. Pilots' comments related to the rest of the route from MUGAS to URSUS (common part with UT795) are included in the next Annex 4

Answers to item number 10 – Problems encountered with Flight Levels and Separation

2 reports out of 69 reported

- "Requested FL350 for route assigned FL330 from GIG to north of BRS until aircraft ahead flew off another route allowing us to climb to FL350"
- "Unable to climb at NABOL due to traffic"

Answers to item 11 – Problems encountered in route

11 reports out of 69 reported:

- "Not authorized due to traffic rerouted UA315"
- "After BRS Brasilia center would like us on UT317 to PAI which is the arrival fix for Rio if you stay on UT799 after BRS you are in conflict with aircraft departing Rio northbound"
- "At BRS was cleared direct to PAI"
- "Need SID's. "
- "In RIO controllers does no know the route"
- "No authorized by the controller to use UT799"
- "Once the controlled turned us off route for traffic"
- "Terminate route at PAI VOR"
- "There is confusion over Brasilia the cleared routing is UT799 to PCX but ATC said they expected us to transition to UA317 for the arrival in GIG"
- "We were warned by other flight crew to watch out for the route change from UT799 to UA317 over Brasilia, We had to ask the controller and he took us off the filed route over Brasilia and put us on UA317"
- "Route should terminate at PAI not at PCX - facilitate approach"

Answers to item 13 – Problems encountered in communications

8 reports out of 69 reported:

- "A bit difficult around NABOL on 125.2 8855 55526 10094 125.05"
- "At NABOL unable to contact MANAOS center, on HF reception poor"

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- ‘’Difficult contacting Brasilia on both HF and vhf from NABOL to 75 nm south of NABOLl”
- “Good comm. entire route”
- “No contact Brasilia approaching NABOL at fl330 on 125.2 called Manaos on HF”
- “No contact with Brasilia on 125.2 or 135.9 from NABOL to DAGLO”
- “Unable to talk to Manaos at crossing point from Brasilia”
- “VHF entire route”

Answers to item 14 – Compared with the standard route do you think this one is better?

Out of 69 reports, 66 consider that this route is superior to the standards one. 3 reports consider is inferior to the standard one due to:

- “Today was not beneficial”
- “Route was clogged. Route is not valid with 15 minutes “
- “No beneficial low FLs “

Answers to item 15 – Any comments or suggestions by the crew members

17 out of 69 reported:

- 8 report - Escape routes, airports frequencies on chart needed
- “As safe and regular as a non RNAV route”
- “Easier to flight than the old route”
- “Efficient RNAV route”
- “Most absolutely reduces operational cost, recommended we announce of frq 123.45 and in use”
- “No problems”
- “Please put it permanent”
- “Reduces chattering, miscommunication and enhances safety”
- “Route was clogged. Route is not valid with 15 minutes”
- “Several aircraft were observed on TCAS at our altitude. One instance required the controller in Brasilia control to vector us behind him”
- “Should we report deviations from UT799 on 123.45?”
- “This kind of routes are more efficient and should be implement as a permanent route”
- “Today was not beneficial”
- “Too much traffic”
- “Very efficient route”
- “Very nice route”
- “This route reduces chatter, freq. Congestion, miscommunications and languages barriers

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Appendix 4

Reports from the "Pilots Evaluation Form" on the route UT795 Sao Paulo - Miami

Answers to item number 10 – Problems encountered with flight levels and Separation

60 out of 232 reported:

Although longitudinal separation and vertical separation are interrelated, it was classified into two groups for clear understanding.

Related to vertical separation

- 4 reports – "no problems in FL"
- "23 reports - No beneficial low FL's or not obtained the requested FL"
- "Over EKUNA was unable to climb FL390 due to another flight same route mach .82"
- "Controller had us to descend from FL350 to Fl310 due to us passing other UT095 traffic at fl 350 (non radar environment)"
- "Given FL250 climbing out of Miami, this is the first time in 4 years to have this happen. Miami told us this is due to traffic, if you look at the charts all 3 routes south begin at the same fix"
- "In Kingston area were need to descend to 330 due to control request due to traffic on UA311 and returned to 370 near ESPINO"
- "Initially flight planned alt of fl 350 but at controllers request we had to descend to FL310 prior to leaving radar coverage in Brazil"
- "Manus do not authorize FL350 intermediate altitude without justification, requested due to weather "
- "Not authorized by Maiquetia to FL390 at VUMPI"
- "Not authorized FL310 over SURDO due to traffic we descended to FL280"
- "Our proposed fl was 350 we had to stay at FL310 the entire flight due to traffic"
- "Restrictions on FL"
- "Takes longer to get altitude"
- "Unable FL's due to traffic. This happens every day I used this route. Traffic congestion"
- "Unable initial cruise FL350 till north of Manaos due to slower 767"
- "Unable to maintain FL350 in Manaos due to traffic 50 nm ahead"
- "Unable to obtain 350 or 310 upon entering Manaos airspace maintained FL280 because other traffic on UA315. Obtained FL350 80 nm prior to MUGAS with limited mach 0.79"
- "We were not authorized Maiquetia control to FL390 at VUMPI "
- "Due to traffic during 3 hours we reduced the speed from .82 to .8 to obtain the FL proposed"

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- "We are not authorized by Manaos center to maintain FL proposed due to controllers ignore this rules"

Related to longitudinal separation

- 2 reports – "Curaçao maintaining 15 minutes longitudinal separation"
- "On Curaçao have to reduce from Mach .81 to Mach .76"
- "Over EKUNA requested FL390 and MAIQUETIA informed that Curaçao requested 15 min separation we had to maintain FL350"
- "Unable to get requested altitude due to traffic behind us he was 12 minutes behind but Maiquetia said they required 15 minutes separation on UT799"
- "Reduction on Manaos to mach .81 due to separation"
- "At SUMBA Maiquetia req. mach .74"
- "15 minutes separation instead 10 "
- "Curaçao using 15 min separation too much time We initially got FL270 but were given FL370 all the way to SAO PAULO"
- "During over flight Curaçao area this center requested us a 15 minutes separation between aircraft's when the correct separation on the routes is 10 minutes"
- "Not authorized due to a traffic behind with separation of 8 minutes"
- "Unable to obtain FL proposed on MAIQUETIA area due to MAIQUETIA wants 15 minutes separation (not 10 minutes) between another traffic on FL350"
- "Unable to step climb from FL310 to 350 due to AA980 being 10 minutes in from at FL350"
- "FL390 not authorized by Maiquetia control 127.95 due to 15 minutes aircraft spacing"

Answers to item 11 – Problems encountered in route

18 reports out of 232 reports make the following observations:

- "Miami center not cleared on UT795 controllers very hostile lost 40 minutes of flight"
- "No authorized by controller due to traffic"
- "Route should be go from MATEC to CURTI or MARCO RPR CURTI to pick up Tuca 2 Arrival to Sao Paulo"
- "A good idea is a shorter track to join UT795 instead of SCB UB694 until BRU then MARCO which is the present clearance "
- "Brasilia center cleared us direct to PASTA then UL5 with no further clearance. The controller could not understand why we wanted to go back to UT795, so next controller who spoke better English cleared us back to UT795"
- "Cleared by ATC to join UT795 at MARCO"
- "Miami center does no have route in the computer"

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- "A problem exist with the airways UW9 from CPN to ATF, then route UT795 overlays those airway we had clearance problem with Brasilia center, they would only clear us on UW9, they said Manaos center would have to authorize the use of UT795, having RONIL and SURDO be the same is also a problem for controller"
- "Crl. Clearance did not recognize UT795 off of TONI departure to CPN cleared us via TONI SCB UB694 BRU then direct MARCO"
- "Deviation - + 20 nm from route due to weather"
- "Flight plan was not approved due to weather and traffic"
- "Minor weather deviation"
- "No authorized by controller till ATF"
- "Not authorized by controller until Marco intersection"
- "Send from SAO PAULO to East given TONI departure CSB transition direct to BRU NDB then dct to MARCO. Filled route was TONI dct CPN (than will never happed) BRU dct PASTA intersection (not on RTE) but obtained direct to MARCO the UT795"
- "The route of flight was never changed from the filled one"
- "Weather deviation at ATF"
- "Dispatch filed conventional route. Requested RNAV from Brasilia after MARCO, ATC advise unavailable"

Answers to item 13 – Problems encountered in communication

109 reports out of 232 reports made the following observations:

Related to Havana FIR

- "Unable to make contact with Havana center 10 min before Havana boundary 120.5, 123.7 128.7 contact was made on GELOC"
- "No communication with Havana in 120.25 prior entering fir."
- "No VHF coverage in 120.25 at GELOC –"
- "No contact with Havana 10 min prior"
- "Need to improve Havana center VHF coverage south of GELOG."
- "Does not exist coverage from Havana on 120.25 or 123.7"
- "Unable to contact Havana 10 min prior GELOG "
- "Unable to contact Havana center 10 minutes prior GELOG freq. 120.25 FL350, contact established 4 min before GELOG "
- "Unable to contact Havana freq. 120.25 till 10 NM se of GELOG at fl 310 "
- "Unable to contact Havana 10 minutes before DIBOK we contact just after DIBOK "
- "VHF with Havana north bound we could not receive on 120.25 or 123.7, relay aircraft said Havana was reading us"
- "Unable to com with Havana at GELOS"
- "Unable Havana at GELOG 120.25, we hear Havana the not hear us"

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- "no contact Havana on 120.25 south of GELOG, established contact with Havana 4 minutes prior to GELOG"
- "Unable to contact Havana from 30 NM south of GELOG"
- "unable to establish contact with Havana 10 min prior to GELOG"

Related to Kingston FIR

- "No communication with Kingston on 128.1 entering fir. "
- "No contact with Kingston 10 min prior"
- "Lost contact with Kingston in DIBOK"

Related to Curaçao FIR

- Unable to establish contact with Curaçao on freq. 127.1 VHF form DIBOK intersection until crossing airway UG444 - Difficulties to establish contact with Curaçao on 127.1 neither 124.1 before DIBOK intersection we use to call 10 minutes before each position of entrance
- Unable to contact with Curaçao control 124,1 at DIBOK
- No contact with Curaçao on 127.1 until 12 minutes south of DIBOK
- Unable contact Curaçao 12 minutes south of DIBOK on 127.1 or 124.1
- Unable contact with Curaçao on 127.1 from DIBOK to 150 south
- Unable to contact Curaçao 127.1 at DIBOK
- Unable to contact Curaçao from 10 minutes south of DIBOK
- Unable VHF Curaçao at DIBOK used VHF relay with other aircraft
- 10 minutes before Curaçao boundary we were unable to establish communications with Curaçao control due to technical difficulties on 127.1 124.1 in the sector
- At DIBOK no Contact with Curaçao 127.1
- Curaçao control 124.1 over DIBOK intersection was difficult
- Curaçao do not reach DIBOK in 127.1
- Curaçao on 127.1 over DIBOK no contact
- also as instructed called Kingston on 128.1 at DIBOK due to out of range for Curaçao on 124.1
- No contact with Curaçao ATS at DIBOK
- No contact with Curaçao on 127.1 or 124.1 south bound from DIBOK
- No VHF contact for the first 80-100 mile into Curaçao airspace after passing their fir
- At DIBOK no contact for 10 minutes in 127.1 with Curaçao
- West north of Curaçao airspace has weak VHF coverage
- Western portion of Curaçao Airspace has poor VHF coverage
- Unable VHF com with northern Curaçao
- Unable to contact Curaçao at DIBOK –
- Unable com with Curaçao position at DIBOK
- Poor radio contact VHF at DIBOK with Curaçao.

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- Position DIBOK unable to contact with Curaçao on 124.1 and 127.1 aprox 10 minutes into Curaçao
- we lost contact with Curaçao control 127.1 30 NM to DIBOK
- Problems with Curaçao on 127.1 and 124.1, 10 minutes before Curaçao control and also 10 minutes after already within Curaçao control airspace
- Poor communication in VHF with Curaçao control when entering Curaçao fir coming from Miami
- Unable to contact Curaçao on 127.1 at DIBOK
- Unable to communicate with Curaçao for 10 min after leaving Kingston
- No VHF from DIBOK south towards ESPINO freq. 127,1 per about 100 NM Curaçao center
- No com with Curaçao from 5 minutes before DIBOK until 10 minutes after
- and just established contact with Curaçao 80 NM after DIBOK -
-
- Related to Maiquetia FIR
-
- at VUMPI unable contact Maiquetia on VHF on HF communication ok
- no contact with Maiquetia over VUMPI
- At VUMPI unable contact Maiquetia neither on VHF on HF communication ok
- In VUMPI no comm. with Maiquetia in VHF neither in HF
- Maiquetia 127.95 no contact at VUMPI, HF 8855 worked ok
- Lost communication with Maiquetia 120 nm of VUMPI, unable to contact Maiquetia after that
- at VUMPI intersection no contact with Maiquetia on freq. 127.95.
- Poor radio contact with Maiquetia at ESPINO and
- No comm. from VULPI till 15 min beyond VHF 127.95, 130.6 and HF 8855
- Southern Maiquetia control unable on 127.95
- Unable to contact Maiquetia at the south boundary
- Unable to contact MAIQUETIA control on 127.95 and 130.6 on VUMPI
- Unable to contact VHF and HF with Maiquetia at VUMPI contact made 100 nm after
- Unable to establish comm. at Maiquetia FIR
- Unable VHF 127.95, 130.6, HF 8855 with Maiquetia control in VUMPI at 10 minutes after VUMPI I get relay with American 972
- Unable VHF comm. between VUMPI and 214 nm north of VUMPI with MAIQUETIA control on 127.95 or 130.6 as assigned by Manaus control
- At VUMPI no contact with Maiquetia, lost contact with Maiquetia on VHF prior to their fir with Manaos
- At VUMPI position we got contact with Maiquetia control 129.95 through relay Transbrasil 7766, clear contact to Maiquetia control 127.95 approximately 30 minutes after VUMPI position
- Attempted to log on ACARS with MAIQUETIA
- At VUMPI position no contact with Maiquetia

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- Between VUMPI and EKUMA comm. only in HF 8855 with Maiquetia
- Minor difficulties at ESSIO lost contact Curaçao 127.1. Lost contact with Maiquetia 127.95 30 minutes to CUMPI
- Difficult to contact Maiquetia on VHF
- First contact with Maiquetia control 127.95 28 minutes after VUMPI position
- Had to call Maiquetia 127.95 on 8855 in southern Venezuelan reason out of VHF range HF comm. on 8855 only between VUMPI/EKUMA at MAIQUETIA
- At VUMPI was difficult to contact Maiquetia on 127.95 130.6 8855 and 5526, contact established 15 minutes later in 127.95
- It was unable establish comm. With Maiquetia ATC around VUMPI in VHF and HF
- Living Manaos airspace we had not comm. for 200 NM prior to talking with Maiquetia
- No contact with Maiquetia on 127.95 over VUMPI
- No contact with Maiquetia at VUMPI on 127.95 or 130.6
- No contact with Maiquetia center in 127.95 contact made in 8855
- No contact with Maiquetia from VUMPI until, 10 minutes after
- No contact with Maiquetia in VHF or HF
- No contact with Maiquetia on 127.95 over VUMPI
- Unable VHF contact with Maiquetia between VUMPI and EKUNA, HF contact only.
- Unable to establish com on 127.95 and 126.3 at VUMPI position
- Unable Maiquetia till aporx 100 NM north of VUMPI
- Maiquetia 127.95 contact only 218 NM after VUMPI
- No com with Maiquetia on 127.95 over VUMPI
- No contact after VUMPI for 15 minutes with Maiquetia
- No VHF contact with Maiquetia at VUMPI -
- When at 280 NM to VUMPI instructed by Maiquetia to contact Manaos in 124.4 the contact with Manaos was a 120 NM from VUMPI.
- Poor com with Maiquetia over EKUNA and no control with Maiquetia over VUMPI on 127.95
-
- Related to Manaus and Brasilia FIR
-
- Manaus communications bad at the northern side at FL280 must get south of VUMPI to talk to them
- Manaus center had terrible VHF comm. gaps both directions - we made position reports in HF 8855
- Manaus center on HF, only VHF till near Manaus
- Manaus center was difficult with HF Comm - the sun was up between VIBOT and NABOL
- No contact with Manaos on 126.3 over VILBO. No contact with Maiquetia over VUMPI on 127.95 , contact made on HF 8855
- Southern Manaos center unable on 123.9, contact made on 8855 then 123.9
- poor radio contact with Manaos at VUMPI

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- In SURDO no contact with Manaos in all freq. 2479, 5526, 8855, 19996. 15 minutes later contact was established in 8855.
- Between SURDO and ATF no contact with Manaos on VHF nor HF.
- Unable to contact Manaos center 123.9 at SURDO
- Unable to contact Manaos center VHF 80 NM south of ARSAX until SURDO. Could hear Manaos transmitting to other aircraft. HF worked ok
- Unable VHF com in northern Brazil center prior to entering Manaos airspace and while in southern Manaos airspace unable com with Maiquetia initially and
- VHF contact with Manus unable southern ????? - ground radios very bad
- Unable Brasilia center between ARSAX and SURDO had to communicate with Manaos on HF from SURDO to UGEMU
- Poor radio com between SURDO and ATF at FL390 , com with Manaos established 10 minutes after SURDO
- Several HF freq. were very difficult to understand (especially 8855 Manaos
- There seemed to be route confusion with Brasilia control they keep trying to clear us to points on UW9
- Manaos center sector 5 aft to SURDO on numerous frequencies VHF and HF all aircraft were hearing Manaos center but they no hearing us
- No com from SURDO in VHF, HF is ok
- Lost com with Brasilia between ARSAX and aft

Answers to item 14 – Compared with the standard route do you think this one is better?

152 reports or 93 per cent declare that the route is more beneficial operationally than the standard one. Eleven reports consider that the route is not favorable due to the following reasons:

- Total flight time was the same as conventional route
- Unable FL's due to traffic. This happens every day I used this route. Traffic congestion
- While using these routes we seen to be stuck at lower altitudes for longer time. So if the idea is to save fuel it doesn't work
- Given Fl250 climbing out of Miami, this is the first time in 4 years to have this happen. Miami told us this is due to traffic, If you look at the charts all 3 routes south begin at the same fix. This system does not seem as efficient as regular airways. T routes to SJU they do not either work
- We used more fuel because we were unable to climb
- Takes longer to get altitude
- Unable to obtain the right levels
- Too many aircraft on the same route unable to maintain altitude
- Traffic
- This is the second time I have flown this route both times i have nor been able to take advantage - lost saving due to altitude restrains
- Traffic

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Appendix 2

Answers to item 15 – Any comments or suggestions by the crew members

68 reports out of 163 reports make the following observations:

-
- 24 reports - Need freq., escape routes, airports in chart.
- Fuel saved 2.5 tons 25 min
- Aircraft heading NW decompression instructions are confusing when with in 182 NM se VUMPI it should be either NW VUMPI or se EKUMA
- Chart is inadequate no emergency airports no terrain depicted, difficult to transpose position from RNAV chart to UAL lam Sam chart - no frequencies - no escape routes
- Created added hazard when pilots request and obtain clearance to fly wrong altitude for direction of flight. This is due in part to modern navigation systems enabling more precise flying of air routes center line
- Difficulty in SAO PAULO departures transition to UT795, SAO PAULO ATC had us back tracking if unable vector direct - recommended add freq.
- Difficult to trans late RNAV position with la high chart
- Excellent routing and comm. shouldn't way points on fir boundaries be compulsory reporting points
- Great improvement.
- Great route
- I would line to see way points that use reference to geographical location
- Excellent system much better that regular airway
- For the safety and regularity of the system, ATC involved will know and uses rules correctly
- It seems quite possible that with the comparable speed and number of aircraft scheduled to use this routes at about the same time some airplanes will be relegated to the low flight levels placing in jeopardy satisfactory destination arrival fuel
- Move the route slightly so it does nor coincide with exiting airways and conventional traffic
- Much better route operationally
- Route interferes with UW9
- No decompression route found in brief guide suggest to put into chart as booklets pages are not numbers
- No problems
- Obtained final altitude earlier with no problems
- Parallel routes or passing procedures with TCAS use
- Perfect route
- Please make these routes permanent, they are very efficient over standard routes
- Really like not making so many position reports
- Reduces radio chatter because no need to request direct

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- Route after BRS is wrong 99 percent of the time you approach BRS UA317 PAI ILS 15, you never go to PCX
- Route approved by the crew
- Route is very beneficial and cost savings
- Route reduces congestion.
- Save time and money.
- Saved 2.8 tons and 32 minutes
- Some controllers unaware of these trials and demonstrations
- The RNAV route are effective allow to proceed directly to our destination saspo
- This is the second time I have flown this route both times I have nor been able to take advantage
- lost saving due to altitude restrains
- This system does not seem as efficient as regular airways. T routes to SJU they do not either work
- Too many aircraft on the same route unable to maintain altitude
- Total flight time was the same as conventional route
- Two directional parallel routes are needed
- Very nice, keep things more simple
- We used more fuel because we were unable to climb
- While using these routes we seen to be stuck at lower altitudes for longer time. So if the idea is to save fuel it doesn't work
- Parallel routes will improve the system.
- VUMPI needs to be a compulsory point in FIR Maiquetia Manaos for safety reasons in long haul non radar flights is safer to have the RNAV route, shown in your high act chart this way you can see airways that you cross and parallel with a few miles, important when deviating for weather
- VUMPI should be required position report since it is a FIR boundary

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08/05/01

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

Second Meeting/Workshop of Air Traffic Management (ATM) Authorities and Planners. (Lima, Perú, 4-18 May 2001)

Agenda Item 1: Evaluation of the pre-operational trials and demonstrations in the RNAV routes UT780, UT795 and UT799. – Airlines feedback

(Presented by IATA)

Summary

This working paper presents the feedback collected by the IATA Regional Office from the airlines participating in the Trials and Demonstrations on the routes UT780, UT795 and UT799.

1. **Introduction**

1.1. At the previous meeting/workshop of the Air Traffic Management Authorities and Planners the IATA Regional Office was requisitioned to collect feedback from the Airlines. The information provided in this working paper has been collected from the Flight Operations Departments of the airlines participating in the Trials and Demonstrations of the above routes.

2. **Analysis**

2.1. The information in presented airline by airline:

American Airlines

American tested this route using their flight planning systems with a B767-300 aircraft under a typical mission weights and with zero wind scenarios. The comparisons made against the most frequently used conventional routes is summarized as follows:

SCEL – KMIA Distance savings 68NM
Fuel savings 2.000 lbs
Time savings 8 minutes

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SBGR – KMIA Distance savings 30NM
Fuel savings 800 lbs
Time savings 3 minutes

SBGL – KMIA Distance savings 25 NM
Fuel savings 600 lbs
Time savings 3 minutes

American Airlines wishes a prompt and full implementation of these routes.

Continental Airlines

Continental flies to Lima from Newark, and considers that the route has better possibilities to obtain optimal flight level and is less involved in mountainous terrain than the standard route. Also the new route allows a safer arrival to Lima. Continental claims to save up to five minutes compared with the regular route.

COPA Airlines

COPA is using route UT780 from Miami to Panama and vice versa. Their main concern is on the SID's and STAR's of the airports they operate along the route. With harmonized SID's and STAR's the efficiency of the route can be improved

COPA is soliciting:

a) A STAR into MPTO from DAGUD to TBG. Since DAGUN is approximately 350 miles from TBG an intermediate fix between DAGUN and TBG could be created to facilitate the controlers' task. Also a STAR into MPTO from the south.
b) A STAR into SCEL from SULNA to TOY VOR to join Andes 4 Arrival.
c) Two STAR's into SPIM from the north and the south

At the times there has been proper and good communication with the respective ATC on VHF.

On the economical side, COPA is saving time, and consequently fuel, with the utilization of the new routes.

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Delta Airlines

Delta has analyzed the routes and has come up with the results of savings in time and fuel. On the route from Atlanta to Sao Paulo, Delta claims time savings of approximately ten minutes

Delta informed of some problems in joining the route over URSUS, Miami ARTCC does not clear the flights to join UT799 and UT795 (perhaps this occurred at the beginning of the test phase)

Delta is operating from Atlanta to Sao Paulo and Santiago de Chile and incorporate into the route at URSUS

LanChile

LanChile advises that they have not encountered any problems on route UT780 from Santiago de Chile to Miami and vice versa.

After a two-month study of the route from UT780 from Santiago de Chile to Miami and vice versa, the average savings in time was of 12 minutes and 378 gallons of fuel per flight.

LanChile would like to see similar work of direct routes between Europe and South America

TACA

TACA Is using a portion of the route. One of TACA's concerns is the implementation of SIDs and STAR's connecting the route destinations.

TAM

Excellent results in saving and fuel in the route UT790 SBGR to KMIA. TAM is the only airline operating this route during daytime, therefore is affected by area W1001. Unofficially the IATA Regional office was informed that area W1001 has changed its operations times, moving from daylight operation to NOTAM operation. Whenever TAM requests to over-fly W1001, it is not cleared to over-fly the area.

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Unite Airlines

United Airlines reports that it is saving time and fuel in the three routes.

United would like to see the creation of a SID from KMIA to URSUS, for the three routes.

3. **Action Suggested**

3.1. The Group should take note of the benefits that these routes provide to the users on the safety and economical aspects. The meeting should take action on the following issued:

a. SID’s and STAR’s of the airports connecting to the route.

b. Clearances to the flights proceeding from other airports but KMIA to join the route at URSUS

c. W1001 operational hours, and inform the adjacent FIR’s.

Agenda Item 2: Definitive implementation of the RNAV routes UT 780, UT 795 and UT 799 and analysis of new pre-operational trials and demonstrations in such routes.

2.1 **Definitive implementation of RNAV routes UT 780, UT 795 and UT 799**

2.1.1 The meeting recalled that during the CAR/SAM/3 RAN Meeting, the CAR/SAM ATS route network was incorporated into the Basic CAR/SAM Air Navigation Plan. For this reason, the AP/ATM/1 considered that RNAV routes UT 780, UT 795 and UT 799 should not be part of the CAR/SAM route network until they were incorporated into the Basic ANP.

2.1.2 In this respect, the meeting noted that the GREPECAS ATS Subgroup (now called the ATM Committee of the ATM/CNS Subgroup) had thoroughly examined the ATS route network and identified the RNAV routes that are necessary to accommodate each of the traffic flows contained in the ATM Evolution Tables of the CAR/SAM FASID.

2.1.3 As a result, the ATS Subgroup is preparing a detailed account of the RNAV routes and their significant points, based on the criterion used in the air navigation plan to describe the routes. This will permit the drafting of a proposal for amendment to the Basic ANP to be submitted to the ATM/CNS/SG/1 Meeting in July 2001 for analysis and subsequent delivery to and approval by GREPECAS/10.

2.1.4 Consequently, the meeting considered that there were two possibilities to decide on regarding the definitive implementation of the RNAV routes: one would be to wait until the general amendment to the CAR/SAM RNAV route network being prepared by GREPECAS were completed and once it had been included in the Basic ANP, to proceed to their definitive implementation; and the second would be, if the RNAV routes were considered to be mature, to immediately initiate the proposal for amendment for their inclusion in the ANP and once this amendment had been approved, to publish the definitive implementation with the proper UL designator for its incorporation into the regional ATS route network.

2.1.5 Upon analysing this matter, the meeting agreed that it would be highly beneficial if such RNAV routes were included in the CAR/SAM Regional Plan as soon as possible, and thus decided on the immediate amendment to the ANP.

2.1.6 After a lengthy discussion of this matter, it was concluded that, according to the information provided by the users, as shown in detail in Appendices **A** and **B** to Item 1 of this report, no inconvenience could be identified for initiating the process of amendment of the RNAV routes in question, nor for the definitive implementation of UT 780.

2.1.7 Due to the problems directly affecting RNAV routes UT 795 and UT 799, such as the deficiencies in ATS speech circuits between the Manaus and Maiquetía ACCs, lack of reliable ground/air communications to the south of the Maiquetía FIR, as well as the impact that the utilisation schedule of warning area W 1001 has on these routes, the meeting deemed it advisable to condition their implementation to the definitive resolution of all these deficiencies.

2.1.8 Regarding the afore mentioned, the meeting was pleased to hear that the States affected were undertaking the following: Venezuela would install the necessary equipment to provide reliable VHF coverage in those areas currently affected by this shortcoming. Brazil and Venezuela pledged to do their utmost to improve ATS speech circuits between the Manaus and Maiquetía ACCs. In turn, the United States reported that the respective civil/military coordinations were being carried out for obtaining a letter of operational agreement among the authorities concerned, as well as the modification of the W 1001 activation system, currently active at daytime, from Monday to Saturday, to a 30-day pre-notice NOTAM-activated system.

2.1.9 Likewise, the meeting considered that route UT 799 linking Rio de Janeiro with route UT 795 at the MUGAS reporting point should not be incorporated into the Air Navigation Plan and that it be maintained as a domestic route within Brazilian territory, thus allowing the administration to use the best routing for air operations from Rio de Janeiro to Miami.

2.1.10 In view of the foregoing, the meeting agreed to formulate the following conclusion:

Conclusion 2/1 Definitive implementation of RNAV routes UT 780 and UT 795 with their new designators UL 780 and UL 795

That the ICAO Secretariat, using the model shown in **Appendix C** to this part of the report, and on behalf of the CAR/SAM States:

a) Initiate the process of amendment to the Basic CAR/SAM Air Navigation Plan to incorporate RNAV routes UT 780 and UT 795 with their new designators UL 780 and UL 795;

b) Publish the definitive implementation of route UT 780 with its new designator (UL 780), following approval of the amendment by the ICAO Council;

c) Condition the definitive implementation of route UT 795 with its new designator (UL795) to the solution of the deficiencies that have been identified as affecting said route;

d) Take, in coordination with the States involved, proper measures for the implementation of route UL 795, once those difficulties have been overcome; and

e) Include in that same amendment process the deletion from the CAR/SAM Air Navigation Plan of that segment in route UL 312 between the Ventanas (VTN) and the Salinas (SLS) VOR/DMEs

2.1.11 As a result of the previous conclusion, the States involved in the extension/definitive implementation of routes UT 780 and UT 795 should issue an AIP Supplement (AIRAC) describing the new route structure with the modifications made by this meeting, as well as the extension of pre-operational trials and demonstrations to end 11 July 2002, date in which, as per **Conclusion 2/1**, new designators will be definitely implemented.

2.1.12 Furthermore, and although an AIC has already been issued with general route information on the routes and the procedures applicable to them, States should issue a new AIC, similar to the aforementioned, confirming said information. In the case of Brazil, the AIRAC should include the elimination of RNAV route UT 799. For ease of reference, **Appendix D** to this part of the report contains a table that may serve as a guide to those States that must extend the validity of the routes in question. Consequently, the meeting reached the following conclusion:

Conclusion 2/2 Publication of AIP Supplement and AIC for extending the validity of routes UT 780 and UT 795

That the States affected by the extension of validity of routes UT 780 and UT 795:

a) Issue an AIP Supplement (AIRAC) describing the new route structure as well as the extension of pre-operational trials and demonstrations to end **11 July 2002**;

b) Publish a new AIC with general information on the routes and the procedures applicable to them;

c) Brazil include in the AIRAC the elimination of route UT 799 and publish the new routing connecting the Rio de Janeiro airport with route UT 795; and

d) Use as a guide the table shown in **Appendix D** to this part of the report.

2.2 RNP/RVSM pre-operational trials and demonstrations

2.2.1 The meeting noted that the First Meeting of ATM Authorities and Planners (AP/ATM/1), in addition to approving the original pre-operational trials and demonstrations in the RNAV routes, it had also decided to include, in a subsequent phase, trials and demonstrations of CNS elements and functions, as well as other ATM elements, such as the assignment of RNP and RVSM values.

2.2.2 On the other hand, the meeting recognised that, according to the information provided by the States/organizations themselves and to the analysis of CAR/SAM traffic flows being carried out by UNDP/ICAO Project RLA/98/003 “Transition to the CNS/ATM Systems in the CAR/SAM Regions”, in general terms, there was no traffic congestion in the region.

2.2.3 However, it was also recognised that some airspace segments are already having traffic congestion, especially during "peak" periods or hours, and, as a result, a significant number of aircraft were not operating at their optimum flight levels, thus affecting the efficiency of air operations.

2.2.4 The meeting noted that, in addition to the work on RNP and RVSM being carried out by the GREPECAS ATS Subgroup, the CAR/SAM/3 RAN Meeting had included in the ANP FASID the ATM evolution of the main traffic flows identified in homogeneous areas in the region. For most of these flows, gradual implementation of RNP 10 is foreseen to start in 2004. In the case of RVSM, no implementation dates had been planned.

2.2.5 In light of the ATM evolution foreseen for the main traffic flows, the meeting considered that the need to increase airspace capacity in some FIRs of the CAR/SAM Regions could be accommodated by applying reduced separations using RNP and/or RVSM.

2.2.6 In view of the above, the start-up of pre-operational trials and demonstrations of some of these ATM functions in RNAV trial and demonstration routes UT 780 and UT 795 was considered advisable and highly beneficial in order to gain operational experience and obtain operational and economic benefits, while maintaining and improving the required safety levels.

2.2.7 Following a useful exchange of opinions and various considerations on this matter, it was felt that it would be better to start these pre-operational trials and demonstrations establishing a route parallel to RNAV route UT 780, and assigning both routes an RNP value of 10 with a lateral separation of 50 NM between route centre lines.

2.2.8 In view of the above, the meeting recognized that, before implementing the reduced minimum separation based on RNP 10, a safety assessment should be made on the airspace in question in order to comply with the provisions stated in the CAR/SAM/3 RAN Meeting (Recommendations 5/23, 5/28 and 5/29).

2.2.9 The meeting also noted that it was necessary to compile as much statistical data as possible for timely performance of the corresponding safety assessment. Consequently, the meeting felt that not only the States involved in the implementation of the RNP pre-operational trial and demonstration programme should begin collecting this information, but also all of the CAR/SAM States. **Appendix B** to this part of the report contains the navigation deviation data collection form, as well as a list of the data required for the safety assessment.

2.2.10 The meeting also recognised that Project RLA/98/003 would be a very useful tool for conducting these pre-operational trials and demonstrations, which would last at least two years; that is, RNP 10 implementation on RNAV route UT 780 and its parallel route was foreseen for late 2003. To this end, users and civil aviation administrations would have to undertake the funding of the costs involved.

2.2.11 A review was also made of some requirements to be met prior to RNP 10 implementation. It was felt that the task of drafting an implementation programme should be entrusted to the ATM Committee of the ATM/CNS Subgroup, and the results of this work should be submitted to GREPECAS/10 and to the next Meeting/Workshop of ATM Authorities and Planners. This programme should clearly define the tasks and target dates for achieving the final objective of pre-operational implementation.

2.2.12 In view of the foregoing, the meeting formulated the following conclusions:

Conclusion 2/3 Implementation of an RNP 10/50 NM pre-operational trial and demonstration programme

That, considering the operational advantages and the experience to be derived from the development of a pre-operational implementation programme:

a) Study the implementation of a route parallel to RNAV route UT 780 with a view to starting RNAV pre-operational trials and demonstrations using the RNP value of 10/50 NM of separation between route centre lines;

b) To this end, and taking into account the minimum requirements shown in **Appendix A** to this part of the report, the ATM Committee of the GREPECAS ATM/CNS Subgroup develop an RNP implementation programme;

c) This RNP implementation programme be submitted to GREPECAS/10 for information purposes and to the next Meeting/Workshop of ATM Authorities and Planners for its review and execution.

Conclusion 2/4 Collection of statistical information

That, in order to have the necessary information for the safety assessment of RNP and/or RVSM implementation in the CAR/SAM Regions, the States:

a) Start as soon as possible a programme for collecting data on navigation deviations and other data as indicated in **Appendix B** to this part of the report; and

b) Keep this information available for delivery in due time to the agency conducting the corresponding safety assessment.

2.3 ACARS trials

2.3.1 The discussion of this matter took place when reviewing the new pre-operational trials and demonstrations connected to RNAV routes UT780, UT795 and UT799, and it began with a presentation by SITA on its AIRCOM system, which had been implemented worldwide to provide the airlines with data links using the ACARS protocol. SITA provided information on the use of ACARS for ATM applications such as pre-departure clearance (PDC) and ATIS, according to ARINC specification 623. It was noted that these applications were implemented in many heavy-traffic airports in Europe and the United States. Mention was made that an evolution towards bit-oriented ATM applications such as ADS and CPDLC required the implementation of ARINC specification 622 for conversion to a text message format that allowed transmission via the ACARS network.

2.3.2 The meeting was informed that 70% of the aircraft fleet flying in the CAR/SAM Regions is equipped with ACARS and that very few aircraft (less than 10) also meet ARINC specification 622 (FANS 1/A system). The meeting clearly understood that the ACARS protocol developed by the aeronautical industry had not been considered by ICAO within the plans for the development of CNS/ATM systems, which had quite a different network architecture for data communications, as specified in ICAO Annex 10, Vol. III. It was also clear to the meeting that, although the data link system being considered was old, operational benefits could be obtained in some cases due to existing ACARS avionics, especially in those airports where ATS CLRD and ATIS functions were required according to the CAR/SAM FASID (Table CNS 2A).

2.3.3 Some of the participants indicated that their State aeronautical authorities had been in contact with SITA/ARINC to examine this matter. The meeting noted that Brazil had an ACARS network called DATACOM, already in operation for several years, and had plans for the future implementation of PDC and ATIS. The meeting agreed on the convenience of testing ATM applications such as PDC and ATIS, using ARINC specification 623 or any other available in the industry, and making the respective cost-benefit analysis for possible solutions.

2.3.4 The meeting considered that this matter should be examined by the GREPECAS mechanism, so that States could be advised on the possible use of character-oriented data link protocols such as ACARS and their corresponding operational benefits. It was noted that the ATM/CNS Subgroup and its ATM and CNS Committees would meet next July, and that it would be the appropriate GREPECAS body to examine this matter. In this sense, the following Conclusion was formulated:

Conclusion 2/5 Pre-operational testing of ATM applications using the ACARS protocol

That the GREPECAS ATM/CNS Subgroup examine, from a technical and operational viewpoint, the possibility of using the ACARS protocol to conduct pre-operational tests of ATM applications such as PDC and ATIS, as defined in ARINC specification 623 or others, and, based on a cost-benefit analysis, advise States on this matter.

APPENDIX A

Prerequisites for RNP 10 implementation

6. Identification of the operational need

a) Traffic congestion during "peak" periods and hours;
b) Delays and increased flight time;
c) Non-direct routes and increase in the distance flown;
d) Fuel consumption;
e) Aircraft that do not operate at their optimum flight levels;
f) Lack of uniformity in longitudinal separation minima;
g) Longitudinal separation minima based on time instead of distance;

7. Impact on airspace

a) Simultaneous operation of aircraft with RNAV equipment and aircraft not RNAV-equipped and/or that do not meet the requirements, and application of the same ATS procedures, especially the longitudinal separation minima;
b) Need for better airspace sectorizing;
c) Existence of airspaces for special use;
d) Need to make airspace more flexible;
e) WGS 84 implementation

8. Impact on Air Traffic Services

a) Normal and contingency ATS procedures;
b) Appropriate amendments to the CAR/SAM Regional Supplementary Procedures;
c) Training of ATC personnel;
d) Reduction of ATC workload;
e) Reduction in the number of incidents;
f) Increased safety of air operations

9. Impact on aircraft fleet

a) Aircraft with RNAV equipment that meets the requirements;
b) State approval of RNAV equipment
c) Impact on the crew
d) Normal and contingency operational procedures;
e) Crew training

10. Cost-benefit analysis

b) Air traffic forecasts;
c) Reduction of traffic congestion;
d) Reduction of delays;
e) Reduction of distance flown;
f) Fuel and flight time savings;

g) Financial feasibility

6. **Impact on civil aviation administrations**

a) Implementation planning;
b) Establishment of a method to assess airspace safety, considering the desired safety level of 5×10^{-9} established by the Third CAR/SAM RAN Meeting;
c) Establishment of a Central Safety Oversight and Surveillance Agency during the pre-operational trial phase to ensure compliance with pre-determined safety criteria;
d) Modification of the proposed system parameters after the trial phase, if necessary;
e) Operational implementation;
f) Maintenance of safety oversight and surveillance.

- - -

APPENDIX B

NAVIGATION DEVIATION DATA COLLECTION FORM			
☐			
Type of Report: ☐ PILOT – Flight ☐ CONTROLLER – ATC Unit			
Date/Time (UTC):	Type of Error: ☐ LATERAL ☐ VERTICAL	☐ Type (See 2 a to g)) (*) ☐ Type (See 1a to i)	
Causes: ☐ WEATHER (See 2-g) ☐ OTHERS (Specify)			
Conflict Alert Systems:			

DETAILS OF AIR1CRAFT	**First Aircraft**		**Second Aircraft (for vertical)**	
Aircraft Identification:				
Name of Owner/Operator:				
Aircraft Type:				
Departure Point:				
Destination:				
Route Segment:				
Flight Level:	Requested	Cleared	Requested	Cleared
Cleared Track:				
Extent of deviation - magnitude and direction: (NM for lateral; feet for vertical)				
Amount of time at incorrect Flight Level/Track:				
Position where deviation was observed: (BRG/DIST from fixed point or LAT/LONG)				
Action Taken by ATC/Pilot:				
Other comments:				

(*) See deviation classification

EXPLANATION OF THE

NAVIGATION DEVIATION DATA COLLECTION FORM

- The ATCO/Pilot should fill as many items as possible.
- Additional data can be attached.

- The notification of any deviation (vertical or lateral) has to be classified, when possible, according to the following types:

1.- For Large Height Deviations (vertical deviation)

a) Contingency action due to engine fault
b) Contingency action due to pressurisation failure
c) Contingency action due to OTHER CAUSE
d) Failure to climb/descend as cleared
e) Climb/descend without ATC clearance
f) Entry airspace at an incorrect level
g) Deviation due to ACAS/TCAS
h) Aircraft unable to maintain level
i) Other

2.- For lateral deviations

a) Committed by aircraft not certified for operation in the RNP airspace
b) ATC system loop error
c) Equipment control error including inadvertent waypoint error
d) Other with failure notified to ATC in time for action
e) Other with failure notified to ATC too late for action
f) Other with failure notified/received by ATC
g) Lateral deviations due to weather when unable to obtain prior ATC clearance

Note: There are data that have to be notified by the pilot.

DATA COLLECTION FOR AIRSPACE SAFETY ASSESSMENT

The conduction of an airspace safety assessment requires, in the first place, a database of different parameters to allow for proper processing. To this end, it is suggested that the administrations begin with the collection, *inter alia*, of the following data:

a. Air traffic forecasts for the next 10 years

b. Hourly distribution of traffic

c. Deviations (not authorized by ATC)

d. Deviations due to meteorological conditions

e. Traffic frequency in opposite directions

f. Aircraft overtaking frequency

g. Traffic operations with crossing tracks

h. Flight level and Mach speed over the same reporting point, etc.

APPENDIX C

Model of proposal for amendment to incorporate routes UT 780 and UT 795 to the Basic ANP

Note: The routes designators of the referred routes shall be modified according to Appendix 1 to Annex 11.

Subject: Proposal for amendment to the CAR/SAM Air Navigation Plan (Serial N° SAM or CAR XX/XX-ATS)

a) **Plan**: CAR/SAM, Doc. 8733

b) **Proposal for Amendment**: Inclusion of RNAV routes XXX y XXX in the CAR/SAM Regions Basic Air Navigation Plan.

c) **Originated by**: (Indicate States originating the proposal)

d) **Reasons of the originator for the amendment:**

1. Within the framework of ATM Evolution as approved by the Third CAR/SAM Regional Air Navigation Meeting (RAN CAR/SAM/3) the States which originate this proposal for amendment have carried out pre-operational trials and demonstrations in RNAV routes RNAV XXX, XXX and XXX duly coordinated with users.

2. The result of these pre-operational trials and demonstrations has been highly satisfactory, reason for which it is considered that these routes are stable enough to be incorporated to the ATS routes network of the Basic CAR/SAM ANP.

e) **Proposed date for implementation:** Immediately after the proposal for amendment be approved by ICAO Council.

f) **Proposal circulated to the following States/Territories and Organizations:**

(Include States//Territories and Organizations to whom the proposal will be circulated)

g) **Comments of the Secretariat:**

1. The inclusion of routes XXX and XXX in the Basic Air Navigation Plan for the CAR/SAM Regions is framed within the ATM evolution process in the CAR and SAM Regions, as approved by GREPECAS and further addressed through CAR/SAM/3 RAN Recommendations 5/14, 5/15 and 5/16.

2. The trajectories have been configured keeping in mind the need to save fuel and air operations economy and its inclusion in the ANP will permit a wider use of such routes, favoring a greater number of the mentioned airspace users.

APPENDIX D

Activities to extend the validity of RNAV routes UT780 y UT795

Activity	**Publication date of the AIRAC Supplement**	**Validity date of routes UT780 and UT795**	**Remarks**
Publication of AIP Supplement (AIRAC) extending the validity and publication of the corresponding AIC Brazil shall include in the AIRAC the cancellation of RNAV route	14 June 2001	12/July/01 to 11/July/02	Step 1) and 2) of the Guide included as **Annex 1** to Appendix A to the Report on Agenda Item 4.
AIC Publication	14 June 2001		

Agenda Item 3: Analysis of pre-operational trials and demonstrations in new RNAV routes between Buenos Aires/Miami, Sao Paulo-Rio de Janeiro/New York and Sao Paulo-Rio de Janeiro/Los Angeles and evaluation of other paths.

3.1 Introduction

3.1.1 The meeting took note that, in keeping with the planning done by the CAR/SAM Regional Planning and Implementation Group (GREPECAS) and subsequently endorsed by the CAR/SAM/3 RAN meeting, pre-operational trials and demonstrations would be carried out on the use of direct RNAV routes with the purpose of identifying problems during the implementation process and to allow users to use the avionics already installed on their aircraft.

3.1.2 The meeting also took note of the activities carried out to date by UNDP/ICAO project RLA/98/003, aimed at assisting CAR/SAM States in their transition to CNS/ATM systems. This project considered, in the first place, that the introduction of some CNS/ATM-based solutions would improve operational safety and efficiency and would provide considerable operational savings to aircraft operators. Secondly, gradual transition to CNS systems, based primarily on the use of satellites well suited to this type of operational environment, would generate substantial savings to service providers.

3.1.3 The project also considered that the incorporation into its activities of the trials and demonstrations on the Buenos Aires-Miami, Sao Paulo-Los Angeles and Sao Paulo/Rio de Janeiro-New York routes would be beneficial since it would allow the States/Organisations involved to gain the necessary experience and identify problems during the implementation process.

3.2 Agreement to conduct trials and demonstrations

3.2.1 The meeting made a general review of the proposals presented for the conduction of trials and demonstrations on the Buenos Aires-Miami, Sao Paulo-Los Angeles, Sao Paulo/Rio de Janeiro-New York (Secretariat); Buenos Aires-New York, Dallas/Houston-Caracas (IATA); Bogota-New York (Colombia) routes, and of the changes to RNAV route Buenos Aires-Miami submitted by Argentina.

3.2.2 The meeting took note of the general comments made by the delegates from Bolivia, Brazil, Cuba, Ecuador, Guyana, Jamaica, Mexico, Panama, Uruguay, Trinidad and Tobago, COCESNA, IATA, and the Secretariat regarding the various aspects to be taken into account when deciding whether or not to use the aforementioned RNAV routes for trials and demonstrations. Since the meeting considered that detailed preliminary information was available for dealing with them, it agreed to start trials and demonstrations on the Buenos Aires-Miami, Sao Paulo-Los Angeles, and Sao Paulo/Rio de Janeiro-New York RNAV routes.

3.2.3 Several delegates felt that, in view of the little time available during the meeting to analyse the other RNAV routes proposed by IATA and Colombia and mainly due to the lack of detailed preliminary information on them, it would not be possible to incorporate the Buenos Aires-New York, Dallas/Houston-Caracas and Bogota-New York RNAV routes into this phase of trials and demonstrations. Nevertheless, they should be taken into account, on a priority basis, for the next stage of trials and demonstrations foreseen to start in 2002.

3.2.4 The delegate of IATA informed the meeting that the Buenos Aires-Miami RNAV route coincided with the projection line of the orthodromic to Chicago and run very close to Atlanta, which might allow the addition of flights from these cities to Buenos Aires, using this RNAV route. The meeting also noted that this Buenos Aires-Miami route was probably being used by at least 42 weekly flights of B-777 aircraft equipped with ADS/CPDLC, which might enable testing of these CNS/ATM elements.

3.2.5 Regarding the routes connecting Sao Paulo/Los Angeles and Sao Paulo-Rio de Janeiro/New York, the meeting took note of the possibility of connecting other cities to the new routes. This would also shorten the distance between points of origin and destination and thus generate time and fuel savings which would translate into economic benefits.

3.2.6 In view of the need for a thorough analysis of the Buenos Aires-Miami, Sao Paulo-Los Angeles, and Sao Paulo/Rio de Janeiro-New York RNAV routes, the meeting decided to form three *ad-hoc* groups to carry out the following activities and report back its results to the plenary:

a) Review the paths of the RNAV routes proposed in WP/8;

b) Analyse the impact that the implementation of these routes could have on airspace structure; and

c) Review any other aspect which might affect the implementation of said routes.

3.2.7 The meeting took note of the results obtained by the three *ad-hoc* groups, which are summarised as follows:

RNAV route UT 410 (Buenos Aires-Miami)

a) Minimum longitudinal separation along the route: 10 minutes/80 NM RNAV using the Mach number technique.
b) Minimum allowable flight level: FL 250
c) Path to/from: The route starts/ends in the CERES VOR/DME (Cordoba FIR) and ends/starts in the Manzanillo VOR/DME (Havana FIR). See Appendix A to this part of the report for a full description of the route. The geographical coordinates of the various points on the route shall be obtained from Jeppesen through IATA and then circulated among the States by the corresponding ICAO Regional Office. Argentina, Bolivia and Brazil, in direct coordination with ICAO SAM Office, shall provide the information on the routes segments located within their respective areas of jurisdiction.
d) Status of ATS speech links and air/ground communications: Satisfactory.
e) Restricted, danger or prohibited areas: They do not affect the route.
f) Operational agreements: Operational agreement supplements that will be required for this route were discussed on a bilateral basis. Supplementary conditions were also discussed among the various States affected and will be included in the respective appendices to the letters of agreement. Amongst these, those discussed between Brazil and Colombia for traffic management along this route are worth mentioning.

g) Bolivia, Brazil and Argentina agreed to publish a national and international NOTAM to inform on the temporary suspension of RNAV routes UL 315 and UL 415 (the latter within Argentinean airspace only).
h) The date of publication of this change will coincide with the publication and effective date of RNAV trials and demonstrations agreed upon by this meeting.
i) SIDs/STARs: Are envisaged at the beginning and at the end of the route. IATA would provide information to airlines.

Route UT 655 (Sao Paulo-Los Angeles)

a) Minimum longitudinal separation along the route: 10 minutes/80 NM RNAV using the Mach number technique.
b) Minimum allowable flight level: FL 290
c) Path to/from: The route starts/ends in the Bauru VOR/DME (Brasilia FIR) and ends/starts at the Julian VOR/DME (Los Angeles). See Appendix B to this part of the report. The geographical coordinates of the various points on the route shall be obtained from Jeppesen through IATA and then circulated among the States by the corresponding ICAO Regional Office. Brazil, in direct coordination with ICAO SAM Office, shall provide the information on the routes segments located within their area of jurisdiction..
d) Some operational problems detected in the PABON intersection and in the convergence points of routes UT 655 and UT 780 were analysed. The affected States will discuss their solution on a bilateral basis. The recommendation was made to establish reporting points on route crossings as required, although they would not be obligatory to allow for better ATC management of the route.
e) Status of ATS speech links: Satisfactory.
f) Restricted, danger or prohibited areas: They do not affect the route.
g) Operational agreements: Operational agreement supplements required for this route were discussed on a bilateral basis. Supplementary conditions were also discussed among the various States/Organisations affected and will be included in the respective appendices to the letters of agreement.
h) SIDs/STARs: Are envisaged at the beginning and at the end of the route.

Routes UT 776 (Sao Paulo-New York) and UT 419 (Rio de Janeiro-New York)

a) Minimum longitudinal separation along the route: 10 minutes/80 NM RNAV in the FIRs to the north of the Paramaribo FIR towards New York and 15 minutes to the south of the Paramaribo FIR towards Brazil.
b) Minimum allowable flight level: FL 290, except for the Piarco FIR, where it will be FL 310.
c) Path to/from: Route UT 776 starts/ends in the BRAGANCA VOR/DME (Brasilia FIR) and ends/starts in BERGH (New York). Route UT 419 starts/ends in the CONFINS VOR/DME (Brasilia FIR) up to VIEJO (Paramaribo/Belem FIRs) and then continues to New York, coinciding with route UT 776. See Appendix C to this part of the report. The geographical coordinates of the various points on the route shall be obtained from Jeppesen through IATA and then circulated among the States by the corresponding ICAO Regional Office.
d) According to the minimum requirements for the conduction of trials and demonstrations, air traffic control services should be provided all along the routes. In

this case, it was noted that route UT 776/UT 419 was affected by uncontrolled airspace in the Georgetown FIR. Guyana informed the meeting that it intended to establish an area control centre (ACC) to provide ATC services above FL 240 in the Georgetown FIR starting in September 2001.

e) Status of ATS speech links: Satisfactory, except for the Paramaribo ACC/Belem ACC ATS speech circuit. Both Brazil and Suriname assured the meeting that arrangements were being made to solve this problem as soon as possible.

f) Restricted, danger or prohibited areas: They do not affect the route.

g) Operational agreements: Operational agreement supplements required for this route were discussed on a bilateral basis.

h) SIDs/STARs: Are envisaged at the beginning and at the end of the route.

3.2.8 Following an extensive discussion of the reports of the *ad-hoc* groups, the meeting considered that trials and demonstrations on the Buenos Aires-Miami, Sao Paulo-Los Angeles, Sao Paulo/Rio de Janeiro-New York RNAV routes could be started and formulated the following conclusions:

Conclusion 2/6 Agreement to conduct pre-operational trials and demonstrations on the Buenos Aires-Miami (UT 410), Sao Paulo-Los Angeles (UT 655), Sao Paulo-New York (UT 776) and Rio de Janeiro-New York (UT 419/UT 776)

In order to gain experience in the implementation process, from inception to operational use, and also to allow users to use the avionics already installed in their aircraft and thus obtain substantial flight time and fuel savings between the selected city pairs, the participating States, on the one hand, and IATA in representation of the airlines, on the other, agree to the following:

a) To conduct pre-operational trials and demonstrations on the **Buenos Aires-Miami (UT 410), Sao Paulo-Los Angeles (UT 655), Sao Paulo-New York (UT 776), and Rio de Janeiro-New York (UT 419/UT 776) RNAV routes**, whose structures are shown in **Appendices A**, **B** and **C** to this part of the report;

b) To start pre-operational trials and demonstrations, from **4 October 2001** to **11 July 2002;**

c) IATA undertakes to provide ICAO, no later than **4 September 2001**, with a list of the participating airlines;

d) Non-IATA airline users, general international aviation, and State aircraft may participate in the trials and demonstrations described in a) above, provided they meet the corresponding requirements; and

e) The procedures, minimum requirements for use of the routes in question, and training aspects for ATC controllers and crews will be those set forth under item 4 of this report.

Conclusion 2/7 Measures to complement trials and demonstrations on routes UT 776/UT 419

That, in order to further trials and demonstrations, the following complementary measures are agreed upon:

a) Guyana undertakes to provide area control services in the Georgetown FIR starting in **September 2001** to allow route UT 776/UT 419 to be a controlled ATS route all along; and

b) Brazil and Suriname undertake to solve the problem of the Belem ACC/Paramaribo ACC ATS speech circuit to permit the establishment of the longitudinal separation minima of 10 minutes/80 NM RNAV all along route UT 776/UT 419.

3.2.9 The delegate from Colombia asked the meeting to reconsider the decision set forth in paragraph 3.2.3, with a view to expediting the trial and demonstration process on RNAV route Bogota-New York, and to start working towards the development of said RNAV route upon conclusion of this meeting instead of waiting until the next meeting in May 2002.

3.2.10 The proposal of the delegate from Colombia was supported by Haiti. Likewise, the delegate from the Netherlands Antilles proposed that the Buenos Aires-New York and Caracas-Houston/Dallas routes requested by IATA receive the same treatment as that requested by the delegate from Colombia for the Bogota-New York route.

3.2.11 The delegates from Jamaica and Trinidad and Tobago had no objections to for the implementation of the route Bogota/New York and supported the decision to expedite the three routes mentioned in paragraphs 3.2.9 and 3.2.10 above.

3.2.12 The delegate from IATA stated that, of the routes proposed by its organisation, only the Caracas-Houston/Dallas route should be taken into account for this speeding up of trials, since the other could wait until the next meeting.

3.2.13 The Secretariat informed the meeting that the inclusion of the Bogota-New York and Caracas-Houston/Dallas routes in the trials and demonstrations as requested by the meeting could be done starting on the day this meeting concludes. However, it drew the attention of the delegates to the complexity of the coordination process required to agree on their paths and other operational aspects inherent to their implementation.

3.2.14 Based on the above, the Secretariat indicated that it could not assure whether or not it was possible to expedite the process of implementation of these two RNAV routes, but that it would do its utmost without detriment to the work required to ensure the implementation of RNAV trials and demonstrations according to Conclusion 2/6 of this meeting.

APPENDIX A

Approximate geographical coordinates of RNAV Route Buenos Aires/Miami

RNAV Route UT-410 BUENOS AIRES / MIAMI			
FIRs or significant points	**LATITUDE**	**LONGITUDE**	**CODE**
CERES VOR/DME	S 29° 52.0’	W 061° 50.0’	ERE
MONTE QUEMADO VOR/DME	S 25° 45.0’	W 062° 52.0’	MTQ
CORDOBA/LA PAZ	S 22° 14.5’	W 064° 03.6’	ELAKA
LA PAZ / PORTO VELHO	S 10° 36.4’	W 067° 40.6’	ISARA
RIO BRANCO VOR/DME	S 09° 52.3’	W 067° 53.7’	RBC
PORTO VELHO / BOGOTA	S 03° 28.0’	W 069° 47.6’	ARUXA
Reporting point	S 02° 42.5’	W 070° 00.8’	PABON
BOGOTA / BARRANQUILLA	N 08° 13.9’	W 073° 31.1’	IROTI
BARRANQUILLA / KINGSTON	N 15° 00’	W 075° 46.6’	EGAPO
MANLEY VOR/DME	N 17° 55.6’	W 076° 46.7’	MLY
KINGSTON / LA HABANA	N 19° 16.3’	W 076° 57.6’	PULKA
MANZANILLO VOR	N 20° 18.2	W 077° 06.0’	UMZ

FIRs involved:

Ezeiza
Córdoba
La Paz
Porto Velho
Bogota
Barranquilla
Kingston
Habana
Miami

APPENDIX B

Approximate geographical coordinates of RNAV Route San Paulo / Los Ángeles

RNAV Route UT-655 SAO PAULO / LOS ANGELES			
FIRs or significant points	**LATITUDE**	**LONGITUDE**	**CODE**
BAURU VOR/DME	S 22° 18.8’	W 049° 06.4’	BRU
CURITIBA / BRASILIA	S 17° 34.2’	W 054° 41.5’	EGIMO
BRASILIA / PORTO VELHO	S 14° 23.2’	W 058° 11.3’	ISENA
PORTO VELHO / BOGOTA	S 03° 01.0’	W 069° 42.7’	ASAPA
Reporting point	S 02° 42.5’	W 070° 00.8’	PABON
BOGOTA / PANAMA	N 05° 45.3’	W 079° 19.6’	ASEPI
PANAMA / América Central	N 08° 51.7’	W 082° 49.1’	EGODI
América Central / MÉRIDA	N 16° 04.7’-IATA	W 091° 23.1’-IATA	ASOKU
MÉRIDA / MÉXICO	N 18° 59.7’	W 095° 08.8’	UGATA
NAUTLA VOR/DME	N 20° 11.9’	W 096° 44.8’	NAU
MEXICO / MONTERREY	N 23° 29.1’	W 100° 39.4’	IREKO
CONCEPCIÓN VOR/DME	N 24° 09.5’	W 101° 29.0’	CDR
MONTERREY / MAZATLAN	N 28° 35.4’	W 108° 30.0’	UDIPO
PEÑASCO VOR/DME	N 31° 21.2’	W 113° 31.1’	PPE
MAZATLAN / LOS ÁNGELES	N 32° 38.5’-IATA	W 115° 43.0’ –IATA	ASUTA
JULIAN VOR/DME	N33° 08.4’	W 116° 35.1’	JLI

FIRs/CTAs involved: Brasilia, Curitiba, Porto Velho, Bogotá, Panamá, América Central, Mérida*, México*, Monterrey*, Mazatlán*, Los Ángeles*.

* Control Areas (CTA)

APPENDIX C

Approximate geographical coordinates of RNAV Route Sao Paulo / New York

RNAV Route UT-776 SAO PAULO / NEW YORK			
FIRs or significant points	**LATITUDE**	**LONGITUDE**	**CODE**
BRAGANCA VOR/DME	S 22° 57.08’	W 046° 34.19’	BGC
BRASILIA / BELEM	S 10° 12’ 6.49’’	W 051° 38’ 57.19’’	ORETA
BELEM / PARAMARIBO	N 02° 13’ 4.50´’	W 055° 56’ 45.80’’	TIRIOS
PARAMARIBO/GEORGETOWN	N 05° 32.9’	W 057° 12.9’	UGRIS
GEORGETOWN / PIARCO	N 08° 55.0’	W 058° 31.4’	KAISO
V C BIRD VOR/DME	N 17° 07.6’ 36’’	W 061° 47.9’ 53’’	ANU
PIARCO / SAN JUAN	N 17° 56’ 7.52’’	W 062° 04’ 49.77’’	IREXA
SAN JUAN / NEW YORK	N 23° 30.8’	W 064° 06.3’	ORAKO
Reporting point	N 29° 48’ 36’’	W 066° 33’ 30’’	PRUIT
Reporting point	N 37° 31.0’	W 071° 41’	CHAMP
Reporting point	N 39° 08’	W 072° 03’ 06’’	BERGH

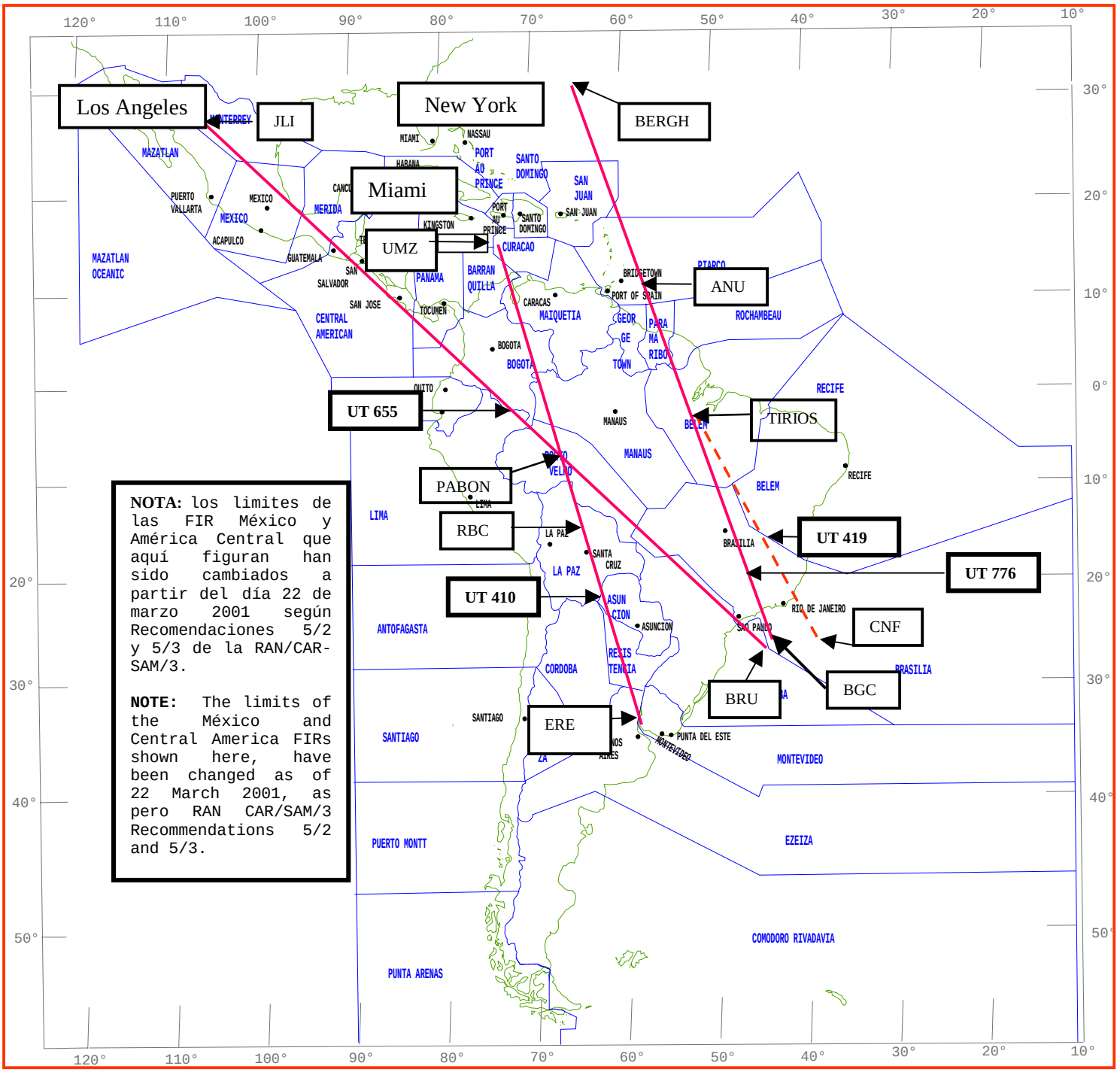
FIRs involved:
Brasilia
Belem
Paramaribo
Georgetown
Piarco
San Juan
New York

Approximate Geographical Coordinates of RNAV Route Río de Janeiro / New York

RNAV ROUTE UT419 RIO DE JANEIRO/ NEW YORK			
FIRs or significant points	**LATITUDE**	**LONGITUDE**	**CODE**
CONFINS VOR / DME	S 19° 33.5’	W 044° 02.9’	CNF
BRASILIA / BELEM	S 10° 38.4’	W 048° 56.4’	ARUKI
BELEM / PARAMARIBO	N 02° 13’ 4.50”	W 055° 56’45.80”	TIRIOS
Route UT419 is coincident with trajectory UT776 from TIRIOS to New York			

FIRs involved:

Brasilia
Belem
Paramaribo


Los Angeles
JLI
New York
BERGH
Miami
UMZ
ANU
UT 655
TIRIOS
PABON
RBC
UT 410
UT 419
UT 776
CNF
BGC
BRU
ERE
NOTA: los limites de las FIR México y América Central que aquí figuran han sido cambiados a partir del día 22 de marzo 2001 según Recomendaciones 5/2 y 5/3 de la RAN/CAR-SAM/3.
NOTE: The limits of the México and Central America FIRs shown here, have been changed as of 22 March 2001, as pero RAN CAR/SAM/3 Recommendations 5/2 and 5/3.

Agenda Item 4: Requirements, which should be, fulfilled for the trials and demonstrations in the RNAV routes between Buenos Aires/Miami, Sao Paulo-Rio de Janeiro/New York y Sao Paulo-Rio de Janeiro/Los Angeles.

4.1 **Minimum requirements for RNAV pre-operational trials and demonstrations**

4.1.1 The meeting took note of the minimum requirements identified by the CNS/ATM/IC Subgroup and which the AP/ATM/1, with the exception of the minimum allowable level (FL 310), had agreed for use during the trials and demonstrations on the Santiago-Lima/Miami (UT 780) and Sao Paulo/Rio de Janeiro-Miami (UT795/UT799) RNAV routes, as follows:

a) Aircraft using these routes should have RNAV navigation equipment;

b) The minimum level allowed in these routes should be FL310; and

c) A minimum longitudinal separation of 10 minutes using the Mach number technique and/or 80 NM RNAV between aircraft between aircraft flying at the same level would be applied.

4.2 **Minimum requirements identified by the meeting**

4.2.1 Each of the delegates from the States affected by the trial and demonstration routes, and IATA expressed their agreement with the aforementioned minimum requirements, except for the minimum allowable level of FL310. In this respect, the meeting considered that the most convenient allowable level would be FL290.

4.2.2 The meeting was informed that the Manual on Required Navigation Performance, **Doc 9613**, Chapter 6 and Appendix C, explains in detail the equipment that aircraft should have on board for RNAV navigation. As regards the longitudinal separation of 10 minutes/80 NM RNAV, **Doc 4444**, Part III, sections 8.4 and 8.5 contain the necessary information to apply these separations. The Air Traffic Planning Manual, **Doc 9426**, Part II, Section 2, Chapter 2, contains guidelines for applying the Mach Number Technique (MNT).

4.2.3 With regard to the aforementioned, the meeting decided to formulate the following conclusion:

Conclusion 2/8 Minimum requirements for trials and demonstrations on the Buenos Aires-Miami (UT 410), Sao Paulo-Los Angeles (UT 655), Sao Paulo-New York (UT 776) and Rio de Janeiro-New York (UT 419) RNAV routes

The minimum requirements to be met by aircraft and ATS service providers for trials and demonstrations on the Buenos Aires-Miami (UT 410), Sao Paulo-Los Angeles (UT 655), Sao Paulo-New York (UT 776), and Rio de Janeiro-New York (UT-419) RNAV routes are as follows:

a) Aircraft using routes UT 410, UT 655, UT 776 and UT 419 should have minimum required RNAV navigation equipment;

b) The minimum allowable level will be FL290, with the exceptions indicated for each case;

c) A longitudinal separation of 10 minutes using the Mach number technique (MNT) and/or 80 NM RNAV shall be applied between aircraft on the same flight level.

d) ATS speech link and air/ground communications.

4.3 **ATS coordination between the ACCs involved**

4.3.1 The meeting examined the status of ATS coordination means of those ACCs involved in RNAV trials and demonstrations and concluded that, although the reliability of ATS speech circuits between ACCs affected has significantly improved, some cases were identified where these ATS coordination means needed improvement by the corresponding Administrations.

4.3.2 After an intense debate on ATS speech communications, the meeting recognised that, in spite of the efforts made by some civil aviation administrations, especially of the SAM Region, deficiencies still existed in ATS speech communications between some pairs of ACCs. However, these deficiencies would not hinder the proposed trials and demonstrations. This notwithstanding, it was concluded that States affected by these deficiencies should do their utmost to solve the difficulties identified, and it was considered appropriate to formulate the following conclusion:

Conclusion 2/9 ATS speech circuits

That:

a) The ACCs affected by trials and demonstrations on RNAV routes UT 410, UT 655, UT 776, UT 419 use the ATS coordination means agreed upon in their Letters of Operational Agreement for ATS coordination; and

b) The States that have identified difficulties in ATS speech communications take as soon as possible appropriate measures to overcome such deficiencies.

4.4 **ATS procedures**

4.4.1 The meeting took note of the work presented by *ad-hoc* group 4, which, among other matters, proposed the following regional ATS procedures:

a) Aircraft using these routes should have minimum required RNAV equipment.

b) The minimum level for use of the RNAV routes shall be FL290, with the exceptions indicated in each particular case;

c) A minimum separation of 10 minutes using the Mach number technique (MNT)/80 NM RNAV will be used between aircraft flying at same level;

d) For RNAV trial and demonstration flights, ACCs will make the ATS coordinations through the coordination means that appear in their Letter of Operational Agreement.

e) Aircraft using these CAR/SAM RNAV trial and demonstration routes should fill in box No. 10 of the flight plan form with the letter S. Box 15 should indicate the speeds foreseen during the flight, expressed in Mach number values, and Box 18 should state that the aircraft is participating in "RNAV Trial".

f) RNAV trial and demonstration routes shall be controlled all along;

g) The flight levels assigned and ATS coordination methods shall be the those currently set forth in the letters of agreement, and must be specified in the Appendix that will be added for this purpose; and

h) In case of failure of ATS speech links, the minimum longitudinal separation will be increased by 5 minutes or 40 NM.

4.4.2 Regional ATS procedures should be supplemented with ATS procedures applicable to each FIR, which would be developed by each State.

4.4.3 The meeting considered that the ATS procedures for regional use should be published and promulgated in an AIP Supplement (AIRAC) and in the corresponding AIC that the States affected by RNAV trials and demonstrations in the CAR/SAM Regions should publish on the same date. Both models are shown in **Appendix A** to this part of the report. In this regard and for ease of reference, the Secretariat deemed it advisable to attach to said Appendix a Guide on Common Requirements for the Promulgation of RNAV Routes (**Annex 1 to Appendix A**), with a view to establishing a common methodology for States affected by the implementation of RNAV routes.

4.5 Civil/military coordination

4.5.1 Regarding this matter, the meeting recalled that the AP/ATM/1, taking into account special use airspaces affecting RNAV routes UT 795 and UT799, deemed it advisable to draw the attention of all the administrations in the CAR/SAM Regions to Resolution A32-14, Appendix P, of the ICAO Assembly, and Recommendations 5/6, civil/military coordination, and 5/7, analysis of special use of airspace, developed by the CAR/SAM/3 RAN Meeting held in Buenos Aires, Argentina (October 1999), which deals with arrangements for shared use of airspace and services by civil and military aviation.

4.5.2 Based in the above, the aforementioned meeting decided to formulate Conclusion 2/3 – Special use airspaces affecting routes UT 795 and UT 799, which is attached to **Appendix E** to this part of the report, for information purposes.

4.6 Training

4.6.1 General aspects

4.6.1.1 The meeting, through an *ad-hoc* working group, examined details relating to training requirements for both controllers and pilots. It established, first of all, that training should be provided within each ACC involved in the proposed routes and within each airline participating in the programme, under IATA coordination. Referred to the other users, through the corresponding AIC

4.7 Training of air traffic controllers

4.7.1 In the specific case of controllers, it was felt that training should be provided directly to ACC personnel participating in the programme. However, it also considered the convenience of facilitating attendance by personnel from other ACCs, which, although not directly involved in the programme, could be involved in it indirectly.

4.7.2 The meeting considered that the training of controllers should cover the following topics:

a) Purpose and general aspects of routes and trials;

b) General RNAV and RNP navigation concepts (Ref. Doc. 9613 - Required Navigation Performance Manual);

c) Use of the Mach Number technique (Ref. Doc 9426 – Air Traffic Services Planning Manual) and minimum speed tables for various aircraft types;

d) Separation minima applied;

e) Reception and routing of meteorological and/or volcanic ash reports from pilots on predetermined route points, if applicable;

f) application of contingency plans;

g) phraseology aspects;

h) letters of agreement;

i) coordination; and

j) completion and routing of the corresponding evaluation form (**Appendix C**).

4.8 **Training of pilots**

4.8.1 It was felt that the training of pilots should include the following topics:

a) general aspects of routes and trials;

b) meteorological reports on predetermined route points;

c) reports on the presence of volcanic ash;

d) completion and routing of the corresponding form (**Appendix B**).

4.9 **Other aspects to be borne in mind**

4.9.1 Finally, the meeting considered that the personnel at the destination airport offices receiving forms from other users should be instructed on the routing procedures to be followed.

4.10 **Processing and routing of evaluation forms**

4.10.1 The meeting concluded that airlines should keep in mind the procedures for sending to IATA the trial evaluation forms for their processing. Once processed, these would be sent to the ICAO Regional Offices.

4.10.2 In turn, States should foresee the procedures for the routing of the forms completed by controllers, their subsquent processing and delivery of the resulting information to the Regional Offices.

4.10.3 Likewise, States should foresee the procedures for routing, processing and delivery to the Regional Offices of the information resulting from the forms presented by other users pertaining to the general, corporate or military aviation.

4.10.4 These users should keep in mind that the objective of these trials is to assess the routes and, consequently, their utilisation entails the commitment to do the corresponding assessment and to present the evaluation form at the airport of destination.

4.10.5 The forms shall be completed only when the information indicates problems and/or difficulties in the use of RNAV routes in which pre-operational trials and demonstrations are carried out. The information processed should indicate the total number of flights carried out and the problems and/or difficulties reported or observed.

APPENDIX A

AIC Model for the Implementation of RNAV Trial and Demonstration Routes in the CAR/SAM Regions

Telephone: **Fax:** **E-mail:** **Sitatex:** **Telex:**	**GENERAL BUREAU OF CIVIL AERONAUTICS** **AIC** **(STATE)**	**AIC** **DATE**

1 **INTRODUCTION**

1.1 GREPECAS, with the support of the UNDP/ICAO Regional Project RLA/98/003, through the International Civil Aviation Organization (ICAO), the International Air Transport Association (IATA), the Corporación Centroamericana de Servicios de Navegación Aérea (COCESNA) and CAR/SAM States/International Organizations, has developed a trial and demonstration programme for the new (list corresponding RNAV route or routes), with the aim to permit the users to allow users to use the avionics already installed in their aircraft, and thus obtain substantial flying time and fuel savings between the selected city pairs, through the use by ATS service providers affected by these routes in both regions of the 10-minute minimum longitudinal separation and/or 80 NM RNAV between aircraft flying at the same level, guaranteed by the use of the Mach number technique (MNT).

1.2 The RNAV Trial and Demonstration Route Implementation Programme includes the following appendices:

Appendix 1 Regional and National Chart and Details of the Routes
Appendix 2 Units and services that participate in trials and demonstrations
Appendix 3 Training Plan ATC

2 OBJECTIVES

2.1 The objective of this AIC is to resume the operational procedures that will support the RNAV CAR/SAM Trials and Demonstrations programme. For more information and details please consult the ICAO NACC and SAM Regional Offices, the IATA Latin American Office, COCESNA, or the Civil Aviation Administrations of the States included in these tests.

2.2 A complete version of these RNAV CAR/SAM tests and demonstrations may be found at the following Internet address **"http://www.lima.icao.int".**

3 RNAV Tests and Demonstration Routes

3.1 The AIP Supplement …. dated … is included as Appendix 1, where the route is described with its corresponding graphic.

3.2 Appendix 2 shows the ATC training plan for these pre-operational trials and demonstrations.

4 ATS Procedures

a) The aircraft that use these routes should be equipped with RNAV equipment.
b) The minimum level of utilization of the RNAV XXXXXXXXXXXX route will be FL XXX and that of route XXXX is FL XXX
c) A minimum separation of 10 minutes/80 NM RNAV will be used between same level aircraft ensured with Mach Number Technique (MNT).
d) For these tests and demonstration flights agreed in paragraph 3 above, the ACCs will carry out ATS coordinations through the coordination means currently established.
e) The aircraft Flight Plan forms used by these pre-operational tests and demonstration RNAV CAR/SAM Routes should complete box No. 10, with letter S (RNAV Equipment); and if necessary, specify what kind of RNAV Equipment is used on board. In Box 15, the speeds preview during flight indicated in Mach number will be included and in Box 18 should be completed indicating the aircraft participated in "RNAV Trial".

5 Airline procedures, General Aviation and State Aviation

5.1 The airlines shall communicate the minimum Procedures/requirements to the dispatchers and crews to fly these RNAV tests and demonstrations in the CAR/SAM Regions.

5.2 The users of general civil aviation and State aircraft (military aviation) shall establish procedures/requirements, to air crews and will make sure that aircraft are RNAV equipped.

6. Contingency procedures

6.1 In case of contingency, these RNAV routes would adjust to contingency plans, as established by this administration (indicate the name of the administration).

AIP Supplement Model for the Implementation of RNAV Trial and Demonstration Routes in the CAR/SAM Regions

Telephone: **Fax:** **E-mail:** **Sitatex:** **Telex:**	**GENERAL BUREAU OF CIVIL AERONAUTICS** **AIRAC** **(STATE)**	**AIRAC SUPPLEMENT** **DATE**

As of XXXXXX until XXXXX the RNAV route UT will be implemented, with the following characteristics:

(Description of the route and graphic)

Annex 1 to Appendix A

COMMON REQUIREMENTS GUIDE FOR PROMULGATION OF RNAV TEMPORARY ROUTES

The purpose of this guide is to establish a common methodology for States affected in the implementation of temporary RNAV routes.

1. Consider the dates scheduled in the AIRAC calendar to promulgate the AIP Supplement.

2. An AIP Supplement identified by the acronym "AIRAC", should be published and promulgated, indicating the validity period on a temporary basis of RNAV route along with technical-operational characteristics of the same.

3. An Appendix to the Supplement should be prepared, containing a graphic with the route trajectory within the respective airspace.

4. A final note to the Supplement should be included, clearly indicating that in order to obtain complementary information on the established route referring to the AIC Serial Number which will be promulgated together with the Supplement and which will contain al the information of an administrative nature regarding the implementation of the referred RNAV route.

5. For the enlargement of the validity period and/or modifications of the technical/operational aspects of the route, a NOTAM should be promulgated containing the reference of the Supplement Serial previously issued.

6. If necessary modify aspects related to the information promulgated in the AIC published, a new AIC replacing the previous one should be published.

APPENDIX B
Evaluation form to be used by Air crews

Long-haul RNAV Routes
Trials and Demonstrations Program
Caribbean and South America ICAO Regions
Crew Evaluation Form

INSTRUCTIONS

Flight Crew - Please fill out one form per flight. Without this input permanent implementation of Long-haul RNAV routes will not be achievable. Upon arrival please hand this form to the flight operations agent or follow your airline's instructions. A complementary questionnaire will be filled out by the controller.
Flight Operations Agent - Please forward this questionnaire to Angel Lucas, IATA Regional Operations Office: e mail - lucasa@iata.org - Telephone 1 305 266 7552 - Fax 1-305-266 7718, or follow your Airline's instructions.
This evaluation program will end ...

1-Date	2-Airline	3-Flight #	4-From	5-To	6-Aircraft Registration	7-Aircraft type

8-Route Evaluated ❑

9-Is the aircraft equipped with FMS ❑ IRS or INS ❑ GPS ❑

10-If unable to obtain the FL proposed in the Flight Plan or requested during flight, please note reasons (e.g. ,not authorized by controller, traffic, weather conditions, aircraft weight, etc.)

11-If unable to proceed with the route approved in the Flight Plan, please note reasons (e.g., not authorized by controller, weather, traffic, etc)

12-Additional comments - Compared to conventional route, do you consider that this route reduces the operational cost of your flight? Yes ❑ No ❑
13-Please add any other comments that can help us to evaluate this route, especially in reference to Safety and Regularity issues

Thank you for helping in improving the efficiency of the Air Transport in the CAR/SAM Region

APPENDIX C

Evaluation Form to be used by ACC

RNAV Trials and Demonstrations Programme	**Date:** **From: ……. To: ……..**
ATS Route Evaluation Form	

1.FIR	**2.ATS Unit**	**3.Ref. N°**
4.Route evaluated	**UT 410**	**UT 655** **UT 776**
5.Route segment evaluated: from.…..…….. to…….		
6.Control service:	**Radar**	**No radar**

7.Date:	**8. Route entry time:**	**9.Route Exit Time:**
(The time should be recorded in UTC)		

10. Aircraft participating								
Operator:	**N° flight/license**	**Type**	**Origin**	**Destination**	**FL Rq.**	**FL Aut.**	**FL Chg a**	**FL Chg occurred in**

11. If aircraft did not flight the requested FL
Due to weather conditions Due to traffic Other causes Specify:

12. Route detour	**YES**	**NO**	**Time and/or detour position:**
If yes, please include:			
Due to weather conditions	**Due to traffic**	**Other causes**	**Specify:**

13. Communications difficulties	**YES**	**NO**
13A. Controller / Pilot	**13C. Controller / Controller**	
VHF HF CPDLC	**ATS Speech Telephone AFTN Other means**	
13B. Type of failure		
Interference Out of coverage ATS faulty equipment Onboard faulty equipment		

14. Aditional comments
14A. From the Air Traffic Controller
CTA
14B. From ATS Unit:
ATS Chief

Note: For evaluation purposes, this form shall be delivered to the Chief, ATS unit for its Processing and further remittance to the ICAO Regional Office.

APPENDIX D

Status of ATS speech circuits between ACCs involved in pre-operational trials and demonstrations of RNAV routes Sao Paulo-Río de Janeiro/New York, Sao Paulo/Los Angeles and Buenos Aires/Miami

UT-776 y UT-419 Sao Paulo-Río de Janeiro/New York Route

ATS Speech Circuit	Condition	Remarks
BRASILIA ACC / BELEN ACC	Satisfactory	
BELEN ACC / PARAMARIBO ACC	Acceptable	SMA HF frequencies used and public switched telephone network as auxiliary channel
PARAMARIBO ACC / GEORGETOWN ACC	Satisfactory	
GEORGETOWN ACC / PIARCO ACC	Satisfactory	
PIARCO ACC / SAN JUAN ACC	Satisfactory	
SAN JUAN ACC / NUEVA YORK ACC	Satisfactory	

UT-655 Sao Paulo/Los Angeles Route

ATS Speech Circuit	Condition	Remarks
BRASILIA ACC / CURITIBA ACC	Satisfactory	
BRASILIA ACC / PORTO VELHO ACC	Satisfactory	
PORTO VELHO ACC / BOGOTA ACC	Satisfactory	
BOGOTA ACC / PANAMA ACC	Satisfactory	
PANAMA ACC / CENAMER ACC	Satisfactory	
CENAMER ACC / MERIDA ACC	Satisfactory	
MERIDA ACC / MEXICO ACC	Satisfactory	
MÉXICO ACC / MAZATLÁN ACC	Satisfactory	
MAZATLAN / LOS ANGELES ACC	Satisfactory	

UT-410 Buenos Aires/Miami Route

ATS Speech Circuit	Condition	Remarks
EZEIZA ACC / CORDOBA ACC	Satisfactory	
CORDOBA ACC / LA PAZ ACC	Satisfactory	
LA PAZ ACC / PORTO VELHO ACC	Satisfactory	
PORTO VELHO ACC / BOGOTA ACC	Satisfactory	
BOGOTA ACC / BARRANQUILLA ACC	Satisfactory	
BARRANQUILLA ACC / KINGSTON ACC	Satisfactory	
KINGSTON ACC / HABANA ACC	Satisfactory	
HABANA ACC / MIAMI ACC	Satisfactory	

APPENDIX E

Conclusion 2/3 to the AP/ATM/1

Conclusion 2/3 Warning areas affecting routes UT795/UT799

That, ICAO requests the:

a) United States and Venezuela administrations to take the necessary measures to allow international civil aviation to utilize the special use airspaces (W1001 and SVR 2534-2535 and 2536) that affect routes UT795/UT799 at or above FL290; and

b) Cuban administration to take the necessary measures to allow international civil aviation to utilize warning area established by Cuba MU-D53 that affect routes UT795/UT799 to or above FL290.

Agenda Item 5: Review of the operational letters of agreement (LOA) between the ACCs involved.

5.1 The meeting took note that, for satisfactory planning of international flights, regional and bilateral agreements should exist for regulating airspace and traffic based on proper coordination.

5.2 The meeting also noted that the implementation of RNAV routes UT 410 (Buenos Aires/Miami), UT 655 (Sao Paulo/Los Angeles) and UT 419/UT 776 (Sao Paulo-Rio de Janeiro/New York) required that they be depicted in an appendix to the existing operational agreements between the ACCs affected by these routes, indicating in a clear and precise manner the way in which traffic in these RNAV routes will be coordinated.

5.3 The meeting considered that the appendices to the operational agreements currently in effect should include details to facilitate ATS coordination of these flights with a level of safety similar to that of other air operations in other ATS routes. These details would be: ATS route, table of levels/SSR codes, transfer of responsibility points, longitudinal separation in time/distance, frequency and other aspects required for ATS coordination.

5.4 The meeting adopted, as guide, the model of Appendix to the letters of operational agreement between the ACCs affected by these RNAV routes, to be completed and approved by the States/Organisations responsible for the FIRs crossed by the routes in question.

5.5 Based on the above, the meeting formulated the following Conclusion:

Conclusion 2/10 Model of Appendix to the Letters of Operational Agreement between ACCs

That, in order to facilitate ATS coordination in RNAV routes UT 410 (Buenos Aires/Miami), UT 655 (Sao Paulo/Los Angeles) and UT 419/UT 776 (Sao Paulo-Rio de Janeiro/New York):

a) The model shown in **Appendix A** to this part of the Report be used as guide to the letters of operational agreement; and

b) These appendices be signed (as necessary) and exchanged by the States/Organisations affected by the aforementioned RNAV routes, and a copy thereof be sent to the corresponding ICAO Regional Office no later than 31 July, 2001.

APPENDIX A

Complement model to operational letters of agreement between ACCs affected by tests and demonstration routes.

APPENDIX XX

REFERENCE TABLE FOR THE TRANSFERENCE OF RESPONSIBILITIES WITH RESPECT TO ATS RNAV ROUTE _____

ATS ROUTE	FL TABLE AND SSR DATA TO BE ASSIGNED BY:				RESPONSIBILITY TRANSFERENCE POINTS AGREED TO ROUTE	MINIMA ESTABLISHED FOR LONGITUDINAL SEPARATION	
	ACC XXX		ACC XXX			TIME/ DISTANCE	REMARKS
1	2		3		4	5	6
	FL	SSR	FL	SSR			

Note 1: Numbers “1" and “2" under columns indicate the series of IFR cruising levels shown in Appendix C to ICAO Annex 2 for tracks of 000° to 179° and 180° to 359°, respectively, or based in previous agreements of the corresponding ACCs.

Agenda Item 6: Review of the implementation programme of pre-operational trials and demonstrations of RNAV routes

6.1 As a result of the agreement to carry out a pre-operational trial and demonstration programme on the Buenos Aires/Miami (UT 410), Sao Paulo/Los Angeles (UT 655) and Sao Paulo-Rio de Janeiro/New York (UT 776/UT 419) RNAV routes, an implementation timetable was developed, which will give a clear idea of the activities to be performed for the successful implementation of the aforementioned RNAV routes.

6.2 The pre-operational trial and demonstration implementation timetable describes the activities to be carried out by the States, users, IATA and ICAO. It also indicates the completion dates for said activities and, finally, where applicable, provides additional information.

6.3 The meeting concluded that the most convenient date for implementing these RNAV routes UT 410, UT 655, UT 776 and UT 419 was 4 October 2001. The timetable was prepared on that basis, giving sufficient time for successful implementation of each of the tasks to be fulfilled by each of the parties involved.

6.4 In view of the foregoing, the meeting concluded the following:

Conclusion 2/11 Timetable of activities for the implementation of RNAV routes UT 410, UT 655, UT 776 and UT 419

That, in light of the agreements reached during the meeting, the parties involved in the pre-operational trials and demonstrations of RNAV routes UT 410, UT 655, UT 776 and UT 419 (States, Users, IATA and the ICAO NACC and SAM Regional Offices) take into account and put into practice the timetable of activities shown in **Appendix A** to this part of the report, with a view to implementing the programme on **4 October 2001**.

APPENDIX A

TIMETABLE FOR IMPLEMENTATION OF A PROGRAMME OF PRE-OPERATIONAL TRIALS AND DEMONSTRATIONS ON THE BUENOS AIRES/MIAMI (UT 410), SAO PAULO / LOS ANGELES (UT 655), AND SAO PAULO-RIO DE JANEIRO/NEW YORK (UT 776) (UT 419) RNAV ROUTES

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 that are the responsibility of the States/Organizations whose FIR/s are involved		
ACTIVITY	**COMPLETION DATE**	**REMARKS**
1	**2**	**3**
Agreement on the RNAV routes to be implemented and on the trials/demonstrations to be conducted	**18/05/01**	Route paths, reporting points, agreements, etc., to be defined at the Second Meeting/Workshop of ATM Authorities and Planners (14-18/5/01)
Verification and approval of geographical coordinates	**13/07/01**	The geographical coordinates should be established in the course of the meeting. Otherwise, the necessary coordinations will be made for that purpose through the respective ICAO NACC and SAM Regional Offices.
Review of bilateral/ multilateral agreements between service suppliers and/or identification of cases requiring their execution	**31/07/01**	According to the route paths, reporting points (including the geographical coordinates), agreements, etc., that are defined at the Second Meeting/Workshop of ATM Authorities and Planners. The States/Organizations shall submit to the corresponding ICAO Regional Office, the operational agreements reached.
Publication of AIC and AIP Supplement	**09/08/01**	States affected by the RNAV trials should publish a common AIC and AIP Supplement
Training of controllers and, if necessary, development of procedures	**04/09/01**	The more information that is given to the controllers, the greater the chance of success in the trials and demonstrations
Inclusion of agreements and procedures in national operating manuals	**04/09/01**	If necessary, States/Organizations shall include the agreements and procedures in their operating manuals
Decision to start the trials and demonstrations	**04/09/01**	The ICAO NACC and SAM Regional Offices will make an evaluation together with each of the States involved and it will be decided whether to keep or postpone the starting date for trials and demonstrations
Entry into effect of the pre-operational trials and demonstrations	**04/10/01**	**RNAV trial and demonstration routes to be agreed upon at the Second Meeting/Workshop of ATM Authorities and Planners (14-18/05/01)**
Collection of trial and demonstration data	**31/12/01**	To be carried out by the unit appointed by each State

Activities that are the responsibility of the States/Organizations whose FIR/s are involved		
ACTIVITY	**COMPLETION DATE**	**REMARKS**
1	**2**	**3**
Conclusion of the assessment period of trials and demonstrations	**21/02/02**	Processing of data by each State and IATA for presentation at the Third Evaluation Meeting.
Third Evaluation Meeting (CAR/SAMAP/ATM/3)	**20-24/05/02)**	Conclusions of trials and demonstrations will be assessed with a view to the definite implementation of pre-operational trials and demonstrations RNAV routes and the pre-operational RNP implementation programme prepared by ATM Committee of the GREPECAS ATM/CNS Subgroup shall be reviewed.
Completion of trials and demonstrations	**11/7/02**	**The trials and demonstrations are expected to cover a period of 9 months**

Activities for which the Users are responsible		
ACTIVITY	**COMPLETION DATE**	**REMARKS**
1	**2**	**3**
Agreement on the routes to be implemented and on the trials/demonstrations to be conducted	**18/05/01**	Route paths, reporting points, agreements, etc., to be defined at the Meeting/Workshop of ATM Authorities and ATS Planners (14-18/05/01)
Crew training/development of procedures, if needed	**04/09/01**	The more information that is given to the crews, the better the chance of success in the trials and demonstrations
Entry into effect of the pre-operational trials and demonstrations	**04/10/01**	**RNAV Trial and Demonstration routes to be agreed upon by the Second Meeting of ATM Authorities and Planners (14-18/05/01)**
Collection of trial and demonstration data	**31/12/01**	To be carried out by each of the users, which will forward the information to IATA (for its member enterprises) and to the aeronautical authority of its State (for non-IATA member users)
Conclusion of the trial and demonstration period	**21/02/02**	In principle, trials and demonstrations will be carried out over a period of 9 months
Processing of trial and demonstration data	**21/02/02**	To be carried out by each State and IATA
Third Evaluation Meeting (CAR/SAMAP/ATM/3)	**20-24/05/02**	Conclusions of trials and demonstrations will be assessed with a view to the definite implementation of pre-operational trials and demonstrations RNAV routes and the pre-operational RNP implementation programme prepared by ATM Committee of the GREPECAS ATM/CNS Subgroup shall be reviewed
Completion of trials and demonstrations	**11/7/02**	**The trials and demonstrations are expected to cover a period of 9 months**

Activities for which IATA is responsible		
ACTIVITY	**COMPLETION DATE**	**REMARKS**
1	**2**	**3**
Agreement on RNAV routes to be implemented and on trials and demonstrations to be conducted	**18/05/01**	Route paths, reporting points, agreements, etc, and the like to be defined at the Second Meeting/Workshop of ATM Authorities and Planners (14-18/05/01)
Coordination with Jeppesen to obtain precise route coordinates	**18/06/01**	Jeppesen should be contacted in order to obtain the precise geographical coordinates, which should be forwarded to the ICAO NACC and SAM Regional Offices for distribution to the States involved
Printing of charts incorporating the new RNAV routes to be implemented	**29/06/01**	Agreements should be reached with Jeppesen for the printing of the appropriate charts
Circulation of trial and demonstration information to the airlines. Selection of airlines capable of flying the routes in question	**04/09/01**	The more information that is distributed among the users, the better the chance of success in the trials and demonstrations
Entry into effect of the pre-operational trials and demonstrations	**04/10/01**	**RNAV Trial and Demonstration routes to be agreed upon by the Second Meeting of ATM Authorities and Planners (14-18/05/01)**
Collection of data	**31/12/01**	IATA will collect data from its participating member airlines and will send copy of such data to the respective ICAO Regional Offices
Conclusion of the trial and demonstration evaluation period	**21/02/02**	IATA should analyse the data obtained from the airlines participating in the trials and draw relevant conclusions for presentation to and evaluation at the Third Meeting/Workshop of ATM Authorities and Planners (CAR/SAMAP/ATM/3)
Third Evaluation Meeting (CAR/SAMAP/ATM/3)	**20-24/05/02**	Conclusions of trials and demonstrations will be assessed with a view to the definite implementation of pre-operational trials and demonstrations RNAV routes and the pre-operational RNP implementation programme prepared by ATM Committee of the GREPECAS ATM/CNS Subgroup shall be reviewed
Completion of trials and demonstrations	**11/7/02**	**The trials and demonstrations are expected to cover a period of 9 months.**

Activities for which ICAO is responsible		
ACTIVITY	**COMPLETION DATE**	**REMARKS**
1	**2**	**3**
Agreement on the RNAV routes to be implemented and on the trials and demonstrations to be conducted	**18/05/01**	Route paths, reporting points, agreements, etc., to be defined at the Second Meeting/Workshop of ATM Authorities and Planners (14-18/05/01)
Coordination /assistance in reviewing the bilateral/ multilateral agreements between service suppliers and/or identification of cases requiring their execution	**18/05/01**	According to the route paths, reporting points (including the geographical coordinates), agreements, etc., that are established at the Second Meeting/Workshop of ATM Authorities and Planners (14-18/05/01).
Remittance of geographical coordinates to the States/Organizations involved	**31/07/01**	The ICAO NACC and SAM Regional Offices will coordinate the route information supplied by IATA with the States/Organizations for its publication in the AIC and AIP Supplement
Verification with the States of the schedules for publication of the AIC and AIP Supplement	**01/08/01**	RNAV trial and demonstration routes to be agreed upon by the Second Meeting/Workshop of ATM Authorities and Planners (14-18/05/01)
Decision to start trials and demonstrations on the selected routes	**04/09/01**	The NACC and SAM Regional Offices will make an evaluation with each of the States/Organizations involved and it will be decided whether to keep or postpone the starting date for the trials and demonstrations. The decision taken will be forwarded to all interested parties
Entry into effect of the pre-operational trials and demonstrations	**04/10/01**	**RNAV Trial and Demonstration routes to be agreed upon by the Second Meeting of ATM Authorities and Planners (14-18/05/01)**
Coordination of data processing	**25/02/02**	The processing of trial and demonstration data to be presented at the Third Meeting of ATM Authorities and Planners will be coordinated with the States/Organizations and IATA

Activities for which ICAO is responsible		
ACTIVITY	**COMPLETION DATE**	**REMARKS**
1	**2**	**3**
Coordination of the Third Evaluation Meeting (CAR/SAMAP/ATM/3)	**20-24/05/02**	Conclusions of trials and demonstrations will be assessed with a view to the definite implementation of pre-operational trials and demonstrations RNAV routes and the pre-operational RNP implementation programme prepared by ATM Committee of the GREPECAS ATM/CNS Subgroup shall be reviewed
Completion of trials and demonstrations	**11/7/02**	**The trials and demonstrations are expected to cover a period of 9 months.**

Agenda Item 7: Other matters

7.1 Visit to CORPAC facilities

7.1.1 Responding to a kind invitation by CORPAC, the delegations had the opportunity of visiting the Lima ACC facilities, where they took a look at the new radar system and the ADS/CPDLC panel.

7.2 Focal points for coordination between the ICAO Secretariat and the States/Organizations

7.2.1 The meeting agreed to designate the heads of delegation attending the meeting as focal points for coordination of the implementation program. Those States wishing to modify said designation should forward the name, telephone, fax and e-mail address of the new focal point to the respective ICAO Regional Offices.

7.3 Meeting for evaluating the new pre-operational trials and demonstrations approved at this meeting

7.3.1 The meeting considered necessary to carry out a new meting during the third week of May 2002, in order to evaluate the new RNAV trials and demonstrations, as well as to review and initiate the execution of the trial and demonstration program for RNP implementation on route UT 780 and its parallel route to be drafted by the ATM Committee of the GREPECAS ATM/CNS Subgroup. Accordingly, it formulated the following conclusion:

Conclusion 2/12 Third Meeting of ATM Authorities and Planners of the CAR/SAM Regions (CAR/SAM AP/ATM/3)

That ICAO convene a third meeting/workshop of ATM Authorities and Planners of the CAR/SAM Regions for 20-24 May 2002 with the purpose of evaluating the new RNAV pre-operational trials and demonstrations and to review the RNP pre-operational trial and demonstration programme to be drafted by the ATM Committee of the GREPECAS ATM/CNS Subgroup.

7.4 Comments in support of UNDP/ICAO Project RLA/89/003

7.4.1 The meeting reiterated the words of the delegate from Uruguay who recalled that, although UNDP/ICAO Project RLA/78/003 had in due time considered that it would be extremely advantageous to incorporate RNAV trials and demonstrations into the activities of the project, it had been clearly shown that, in addition to the results of that work in particular, other related goals had been met, by far exceeding the expectations as to the implementation period.

7.4.2 In this respect, the meeting underlined the fact that it had even considered the possibility of including tests of CNS elements, the assignment of RNP values and airspace safety assessment studies. It specifically stressed the importance of the many coordinations carried out between ACCs, and of the letters of agreement, operational arrangements, civil/military coordinations, arrangements concerning restricted and danger areas, drafting of training programmes, improvements in the provision of air traffic

control services and communications, all positive steps taken by States to carry out these pre-operational trials and demonstrations, and which represented a great indirect achievement of the project in the interest of operational safety.

7.4.3 On the other hand, it was recognized that Project RLA/98/003 had proven to be a very powerful implementation tool to assist States/organizations in supporting their needs beneficiating, at the same time, users in technical end economical matters.

7.4.4 In this respect, the representative of IATA fully acknowledged these efforts and offered the full support of its Organisation to this project. He also stated that, at the last coordination meeting held in December 2000 in Miami, United States, IATA had expressed its willingness to cooperate with the States by making arrangements with its associated airlines for free transportation of one delegate from each State. To that end, the name of the person to be awarded the air ticket, date and flight number should be forwarded to IATA's LATAM Regional Office beforehand.