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

Sixth Meeting/workshop of Air Traffic Management (ATM) Authorities and Planners for RVSM, RNAV routes and RNP implementation in the CAR and SAM Regions

(San José, Costa Rica, 29 September-3 October 2003)

Agenda Item 2: Action Plan for RNP Implementation in the CAR/SAM Regions

a) Review of the Action Plan for RNP 10 Pre-Operational Implementation in parallel routes UL 780 and UL 302 in the Santiago de Chile-Lima segment

Follow up and updating of the Action Plan

(Presented by Peru and Chile)

Summary

This Working Paper presents the revision of the Action Plan for the Pre-Operational implementation of RNP 10 in the airspace corresponding to parallel routes UL 780 and UL 302 in the section Santiago -Lima, concerning the activities that have been developed Chile and Peru Administration working together.

1. Introduction

1.1 During the AP/ATM/5 meeting (conclusion AP/ATM/5/25) the Action Plan for RNP 10 Pre-operational implementation in routes UL780 and UL302, parallels in the segment between Santiago and Lima, was approved. This Plan describes the activities that should be carried out by Chile, Peru, IATA, and ICAO NACC and SAM Regional Offices.

1.2 Subsequently, the statement of the activities carried out jointly by the administrations of Chile and Peru was analyzed.

2. Analysis

2.1 *Activity 11*: Program for the airspace safety assessment.- As agreed in the AP/ATM/5 meeting, Peru and Chile have received an advanced report of the safety assessment carried out by CARSAMMA. This advance report indicates that the collision risk values are under the limit of 5 x 10^{-9} (assumed TLS) and recommends to continue with RNP 10 implementation in the airspace established between the Lima FIR and Antofagasta FIR.

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2.2 Additionally, CARSAMMA requested a new data collection of 30 days, the same one that has been carried out in August simultaneously in the Lima ACC and Santiago ACCU. The data have been sent to the CARSAMMA and the definitive result of the safety assessment will be presented by this agency during the present meeting.

2.3 *Activity 13*: Publication of an AIC. - Peru and Chile Administrations have jointly prepared a project of Aeronautical Information Circular - AIC, the same that describes ATS procedures, special control procedures, contingency procedures applicable to the air operations, descriptive graphic of RNP 10 airspace, etc. See the **Appendix A** to this Working Paper.

3. **Suggested Action**

3.1 The meeting is invited to take note of the information contained in this working paper.

DRAFT

AERONAUTICAL INFORMATION CIRCULAR

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RNP 10 PRE-OPERATIONAL IMPLEMENTATION IN THE AIRSPACE CORRESPONDING TO PARALLEL ROUTES UL780 AND UL302

1. INTRODUCTION

1.1 The RNAV parallel routes UL780 and UL302 are located in the oceanic area, which lies within Flight Information Regions of Santiago, Antofagasta and Lima.

1.2 The International Civil Aviation Organization (ICAO) has specified that Required Navigation Performance (RNP) is an important element of the Communications, Navigation and Surveillance / Air Traffic Management System (CNS/ATM) and is encouraging early implementation in the en-route environment.

1.3 In accordance with the approved CAR/SAM Planning and Implementation Group (GREPECAS) strategy through the ATM/CNS Subgroup, Chile and Peru are planning to implement with pre-operational character two RNAV parallel routes based on RNP 10 in the oceanic airspace.

1.4 The pre-operational implementation will be starting on January 22, 2004. The SAM Air Navigation Plan (DOC 8733) and the Special procedures for in flight contingencies were agreed during the Sixth Meeting/ Workshop of Air Traffic Management Authorities and Planners (AP/ATM/6).

2. PURPOSE

2.1 The intention of this Circular is to disseminate additional information concerning the plan to implement RNP 10 in the Airspace between Santiago de Chile and Lima in parallel RNAV routes UL780 and UL302, as well as the operational approval process for aircraft.

3. AREA OF APPLICATION

3.1 As determined by GREPECAS (Conclusion 10/17) and the Third Meeting/Workshop of Air Traffic Management Authorities, the RNP-10 shall be applicable in the airspace limited vertically between FL 290 and FL 410 and horizontally by a quadrangle as follows: (*See graphic in **Attachment A**)*

From:

a) 14°23' 24" S / 077° 49' 52" W b) 14° 09' 33" S / 076° 06' 04" W

c) 27° 22' 16" S / 072° 00' 34" W d) 27° 55' 39" S / 073° 46' 45" W

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4 OPERATIONS WITHIN THE RNP-10 AIRSPACE

4.1 Only RNP 10 approved aircraft will be authorized to operate within the RNP-10 airspace, except aircraft mentioned in 4.2 bellow.

4.2 Non-RNP 10 approved State aircraft flights and humanitarian flights will be authorized to enter and operate within the RNP-10 airspace. Special ATS procedures have been developed for handling said aircraft. It is however expected that, state aircraft operating extensively within the RNP-10 airspace will be modified as necessary to comply with the RNP-10 requirements.

4.3 Special procedures for flight planning within the context of RNP-10 implementation have been developed. These procedures will be introduced into AFI Regional Supplementary Procedures (ICAO Doc 7030)

4.4 A letter "R" should be inserted in box 10 of the ICAO flight plan form indicating RNP 10 approval of a flight.

5. RNP APPROVAL

5.1 **(*….Both States, Chile and Peru, will incorporate their procedures and applicable documents for RNP 10 users approval.)***

6. RNP IMPLEMENTATION SCHEDULE FOR RNP

6.1 During the Sixth Meeting/workshop of Air Traffic Management Authorities and Planners AP/ATM/6 (San José, Costa Rica, 29 September/03 October), the meeting decided to proceed with the RNP-10 pre-operational implementation in RNAV parallel routes. Such decision was based on, the following parameters:

a) the outcome of the pre-implementation safety assessment,

b) the operations performed in such airspace by RNP 10 approved aircraft, exceeds the percentage of 90% established for this purpose, and

c) the State and ATS provider readiness to conduct RNP-10 operations.

INFORMATION REGARDING RNP-10 ATS PROCEDURES

7. ATS PROCEDURES

7.1 ATS procedures required for RNP 10 application will be:

a) The aircraft that use these routes should be approved with RNAV RNP 10 equipment.

b) A minimum longitudinal separation of 10 minutes (80 NM RNAV will be used between aircraft flying at the same flight level ensured with Mach Number Technique (MNT) on RNAV UL780 and UL302.

c) The ACC will make the ATS appropriate coordination through the coordination means currently established and incorporating these routes in the Operational Letter of Agreement.

d) Operators of aircraft using RNP 10 routes, should complete the letter R (RNP Equipment) in box 10 of their Flight Plan (FPL). Mach Number will be entered in box 15.

e) Non RNP approved State aircraft flights, and humanitarian flights will be allowed to operate in RNP airspace with prior coordination. Prior coordination will consist of the filing of a flight plan with the appropriate ATS facility, with the words **"STS/NONRNP**", in the item 18 of the International Civil Aviation Organization (ICAO) Flight Plan Form.

8. SPECIAL CONTROL PROCEDURES

8.1 Aircraft using these parallel RNAV routes UL 780 and UL 302 are allowed to conduct 1 or 2 nautical miles (1 or 2 NM) lateral offset as follows:

a) Aircraft are operating in the airspace without radar control and/or it is not possible to assure direct pilot/ATC communication.

b) The lateral offset must be performed to the RIGHT of centerline with respect to the flight direction.

c) The lateral offset procedure is adopted at the pilot's discretion; and

d) When reestablishing communication with ATC, the pilot should report that is performing lateral offset procedure.

9. SPECIAL PROCEDURES FOR IN- FLIGHT CONTINGENCIES

9.1 Introduction

9.1.1 The following procedures are intended for guidance only and will be applicable within the airspace corresponding to parallel routes UL780 and UL302 in the segment of the routes between Santiago de Chile and Lima as a consequence of the implementation of RNP10 in the above-mentioned airspace. Although all possible contingencies cannot be covered, they provide for cases of:

a) inability to maintain assigned flight level due to weather, aircraft performance, pressurization failure and problems associated with high level supersonic flight;

b) loss of, or significant reduction in, the required navigation capability when operating in parts of the airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations; and

c) en-route diversion across the prevailing traffic flow in the parallel routes UL780 and UL302.

9.1.2 With regard to a) and c) above, the procedures are applicable primarily when rapid descent, turn-back or both are required. The pilot's judgement shall determine the sequence of actions taken,

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having regard to the specific circumstances. Air traffic control (ATC) shall render all possible assistance.

9.2 General procedures

9.2.1 The following general procedures apply to both subsonic and supersonic aircraft.

9.2.1.1 If an aircraft is unable to continue flight in accordance with its ATC clearance, and/or an aircraft is unable to maintain the navigation performance accuracy specified for the airspace, a revised clearance shall, whenever possible, be obtained prior to initiating any action, using the distress or urgency signal as appropriate. Subsequent ATC action with respect to that aircraft shall be based on the intentions of the pilot and the over-all traffic situation.

9.2.1.2 If prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time and, until revised clearance is received, the pilot shall:

a) if possible, deviate away from an organized track or route system;

b) establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: aircraft identification, flight level, aircraft position (including ATS route designator or the track code) and intentions, on the frequency in use and on frequency 121.5 Mhz (or, as a back-up, on the inter-pilot air-to-air frequency 123.45 Mhz);

c) watch for conflicting traffic both visually and by reference to ACAS (if equipped);

d) turn on all aircraft exterior lights (conmensurate with appropriate operating limitations);

e) switch on the SSR transponder at all times; and

f) initiate such action as necessary to ensure safety of the aircraft.

9.3 Subsonic aircraft

9.3.1 Initial action

9.3.1.1 If unable to comply with the provisions of 9.2 to obtain a revised ATC clearance, the aircraft should leave its assigned route or track by turning 90 degrees to the right or left whenever this is possible. The direction of the turn should, where possible, be determined by the position of the aircraft relative to any organized route or track system (e.g. whether the aircraft is outside, at the edge of, or within the system). Other factors which may affect the direction of the turn are the direction to an alternative airport, terrain clearance and the flight levels allocated to adjacent routes.

9.3.2 Subsequent action

9.3.2.1 An aircraft able to maintain its assigned flight level should turn to acquire and maintain in either direction a track laterally separated by 46 km (25 NM) from its assigned route or track in a multi-track system spaced at 93 km (50 NM) or otherwise, at a distance which is mid-point from the adjacent parallel route or track; and:

a) if above FL 290, climb or descend 300 m (1 000 ft); or

b) if at FL 290, climb 300m (1 000 ft) or descend 150m (500 ft).

9.3.2.2 An aircraft unable to maintain its level flight should:

a) initially minimize its rate of descent to the extent that it is operationally feasible;

b) turn while descending to acquire and maintain in either direction a track laterally separated by 46 km (25 NM) from its assigned route or track in a multi-track system spaced at 93 km (50 NM) or otherwise, at a distance which is the mid-point from the adjacent parallel route or track; and

c) for the subsequent level flight, a level should be selected which differs from those normally used by 300 m (1 000 ft) if above FL 290.

9.3.3 Extended range operations by aeroplanes with two-turbine power-units (ETOPS)

9.3.3.1 If these contingency procedures are employed by a twin-engine aircraft as a result of an engine shutdown or failure of an ETOPS critical system, the pilot should advise ATC as soon as practicable of the situation reminding ATC of the type of aircraft involved, and request expeditious handling.

9.4 Supersonic aircraft

9.4.1 Turn-back procedures

9.4.1.1 If a supersonic aircraft is unable to continue flight to its destination and a reversal of track is necessary, it should:

a) when operating on an outer track of a multi-track system, turn away from the adjacent track;

b) when operating on a random track or on an inner track of a multi-track system, turn either left or right as follows:

1) if the turn is to be made to the right, the aircraft should attain a position 46 km (25NM) to the left of the assigned track and then turn to the right into its reciprocal heading, at the greatest practical rate of turn;
2) if the turn is to be made to the left, the aircraft should attain a position 46 km (25NM) to the right of the assigned track and then turn to the left into its reciprocal heading, at the greatest practical rate of turn;

c) while executing the turn-back, the aircraft should lose height so that it will be at least 1850 m (6 000 ft) below the level at which turn-back was started, by the time the turn-back is completed;

d) when turn-back is completed, heading should be adjusted to maintain a lateral displacement of 46 km (25NM) from the original track in the reverse direction, if possible maintaining the flight level attained on completion of the turn.
Note.- For multi-track systems where the route spacing is greater than 93 km (50 NM), the mid-point distance should be used instead of 46 km (25 NM).

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9.5 Weather Deviation Procedure

9.5.1 General

9.5.1.1 The following procedures are intended to provide guidance. All possible circumstances cannot be covered. The pilot's judgement shall ultimately determine the sequence of actions taken. ATC shall render all possible assistance.

9.5.1.2 If the aircraft is required to deviate from track to avoid weather and prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time. Until an ATC clearance is received, the aircraft shall follow the procedures detailed in paragraph 9.4.5 below.

9.5.1.3 The pilot shall advise ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to the centre line of its cleared route.

9.5.2 Obtaining priority from ATC when weather deviation is required

9.5.2.1 When the pilot initiates communications with ATC, rapid response may be obtained by stating WEATHER DEVIATION REQUIRED to indicate that priority is desired on the frequency and for ATC response.

9.5.2.2 The pilot still retains the option of initiating the communications using the urgency call PAN PAN (preferably spoken three times) to alert all listening parties to a special handling condition which will receive ATC priority for issuance of a clearance or assistance.

9.5.3 Actions to be taken when controller-pilot communications are established

9.5.3.1 The pilot notifies ATC and requests clearance to deviate from track advising, when possible, the extent of the deviation expected.

9.5.3.2 ATC takes one of the following actions:

a) if there is no conflicting traffic in the horizontal plane, ATC will issue clearance to deviate from track; or

b) if there is conflicting traffic in the horizontal plane, ATC separates aircraft by establishing appropriate separation; or

c) if there is conflicting traffic in the horizontal plane and ATC is unable to establish appropriate separation, ATC shall:

1) advise the pilot unable to issue clearance for requested deviation;
2) advise the pilot of conflicting traffic; and
3) request the pilot's intentions.

SAMPLE PHRASEOLOGY
"UNABLE (requested deviation), TRAFFIC IS (call sign, position, altitude, direction), ADVISE INTENTIONS."

9.5.3.3 The pilot will take the following actions:

a) advise ATC of intentions;

1) comply with the ATC clearance issued; or
2) execute the procedures detailed in 9.4.5 below; and

b) if necessary, establish voice communications with ATC to expedite dialogue on the situation.

9.5.4 Actions to be taken if a revised air traffic control clearance cannot be obtained

9.5.4.1 The provisions of this section apply to situation where a pilot has the need to exercise the authority of a pilot in command under the provisions of Annex 2, 2.3.1

9.5.4.2 If a revised ATC clearance cannot be obtained and deviation from track is required to avoid weather, the pilot shall take the following actions:

a) if possible, deviate away from the organized track or route system;

b) establish communications with and alert nearby aircraft broadcasting at suitable intervals: flight level, aircraft position (including ATS route designator or the track code) and intentions on the frequency in use and on frequency 121.5 Mhz (or as a back up, on the inter-pilot air to air frequency 123.45)

c) watch for conflicting traffic both visually and by reference to ACAS (if equipped);

d) Turn on all aircraft exterior lights (commensurate with appropriate operating limitations);

e) for deviations of less than 19 km (10 NM), aircraft should remain at a level assigned by ATC;

f) for deviation of greater than 19 km (10 NM), when the aircraft is approximately 19 km (10 NM) from track, initiate a level change based on the following criteria:

Route center line track	**Deviation greater than 19 Km (10 NM)**	**Level Change**
000° - 179° magnetic	LEFT	DESCEND 150 m. (500 ft)
	RIGHT	CLIMB 150 m. (500 ft)
180° - 359° magnetic	LEFT	DESCEND 150 m. (500 ft)
	RIGHT	CLIMB 150 m. (500 ft)

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Note: If, as a result of actions taken under the provisions of paragraphs 9.4.5.2 b) and c) above the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict

g) when returning to track, be at its assigned level, when the aircraft is within approximately 19 km (10 NM) of centre line; and

h) if contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.

10. REFERENCE DOCUMENTS

ICAO: Doc. 7030/4 - AFI/SAM, Part 1, Rules of the Air, Air Traffic Services and Search and Rescue.

ICAO. Doc. 7474 AFI Air Navigation Plan.

ICAO. Doc. 8733 SAM Air Navigation Plan.

ICAO: Doc. 9613 - "Manual on Required Navigation Performance (RNP)".

FAA: Order 8400.12A Required Navigation Performance 10 (RNP-10) Operational Approval.

11. ADDITIONAL INFORMATION

11.1 Further information on policy, planning and implementation issues for RNP-10 can be obtained from:

DIRECCION GENERAL DE AERONAUTICA CIVIL (CHILE)
Dirección de Seguridad Operacional, Subdirección de Aeronavegabilidad, Santiago de Chile.
TEL(562) 4107691
FAX(562)3355710
E-MAIL:Operaciones tpublico@dgac.cl
Aeronavegabilidad:aprado@dgac.cl

Dirección de Aeródromos y Servicios Aeronáuticos, Subdirección de Servicios de Navegación
Aerea, Santiago de Chile.
TEL(562) 2904610
FAX(562) 6441446
E-MAIL: sna@dgac.cl

DIRECCION GENERAL DE AERONÁUTICA CIVIL (PERÚ)
Dirección de Navegación Aérea Av. 28 de julio 800 Lima, Perú
TELEFAX. (511) 4251780
E-MAIL : rrodriguez@mtc.gob.pe

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ATTACHMENT A

LIMA - SANTIAGO RNP 10 AIR SPACE FOR UL780 AND UL302 PARALLEL ROUTES