

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**Informal CAR/SAM AIS/ATM/CNS 02/00 Meeting**

**(Cayenne, 27-29 March, 2001)**

Item 2 a): Application of longitudinal separation minima

(Presented by the Secretariat)

**Summary**

This working paper highlights the need for a joint effort from States and ICAO to achieve a uniform application of the minimum longitudinal separation, taking into account some basic operational factors.

**References:**

- *Report of the CAR/SAM/RAN/3 Meeting;*
- *Regional Air Navigation Plan – Volumes I and II;*
- *PANS/RAC (Doc. 4444);*
- *Annex 11 – Air Traffic Services;*
- *Air Traffic Services Planning Manual (Doc. 9426);*
- *CAR/SAM Regional CNS/ATM Implementation Plan;*
- *Report of the Informal NAM/CAR ATS 1/00 Meeting (Mexico, 23-25 August, 2000);*  
*and*
- *Report of the Informal SAM ATM/SAR 02/00 Meeting (Lima, September 2000).*

**1. Background**

1.1 It should be recalled that many variables are involved in determining separation minima. For that reason, it was decided from the very beginning of ICAO that, at an international level, such minima would have to be established or modified through international agreements.

1.2 On a regional level, the CAR/SAM RAN/2 Meeting (Santiago, Chile, May 1989) already pointed out the importance of adopting a uniform longitudinal separation as reduced as possible but compatible with safety on successive ATS route segments. It was stressed that, to that date, such uniformity had not yet been attained, and that separations of **10, 15, and 20 minutes** existed between several pairs of FIRs.

1.3 Subsequently, at the Third Regional CAR/SAM Air Navigation Meeting (CAR/SAM RAN/3) held in Buenos Aires, Argentina, in October 1999, matters relating to the longitudinal separation minima were addressed under agenda item 5. As a result, and taking into account the *Procedures for Air Navigation Services –Rules of the Air and Air Traffic Services (PANS-RAC)*, the Meeting formulated Recommendation 5/22, which is included in the *Basic ANP, Appendix A, paragraph 7.15 (Appendix A)*.

## 2. Application of longitudinal separation minima in the CAR/SAM Regions

2.1 The CAR/SAM RAN/3 Meeting understood that, in an ideal ATS route structure, the uniform application of longitudinal separation minima as reduced as possible would result in a more effective use of airspace. It also understood that there were factors that somehow hindered the possibility of reducing such values below those currently in use, such as the general level and the type of service provided by the ATC, the siting of navigation aids, or the availability and quality of air-ground communications.

2.2 It was noted, however, that many aircraft with RNAV capabilities were being used in the CAR/SAM Regions and that the number of those equipped with GNSS was growing. Improvements in air navigation performance would make it possible to improve the design of ATS route networks and to reduce separation.

2.3 On the other hand, the *Procedures for Air Navigation Services –Rules of the Air and Air Traffic Services (PANS-RAC)* already include provisions for the introduction of 10-minute and 80-NM RNAV longitudinal separation minima on high-density ATS main routes.

2.4 In view of the above, the meeting formulated **Recommendation 5/22**, requiring States to take the necessary steps to allow for 10-minute and 80-NM RNAV longitudinal separation minima on high-density ATS main routes.

2.5 It also analysed a proposal to establish a 10-minute longitudinal separation minimum using the Mach number technique. The meeting felt that airspace capacity would thus be increased significantly in areas lacking communication, navigation, and surveillance facilities.

2.6 As a result, **Recommendation 5/24 (Appendix A)** was formulated, allowing for the possibility of establishing a 10-minute longitudinal separation using the Mach number technique. Its full text is contained in the *Basic ANP, Appendix A, paragraph 7.14*.

## 3. Measures adopted in the CAR/SAM Regions

3.1 In keeping with that agreed upon by the CAR/SAM RAN/3 meeting on this issue and under the sponsorship of the respective Regional Offices, the States of both Regions have held meetings in which they have approved intra-regional actions aimed at the application of 10-minute longitudinal separation minima.

3.2 In the case of the CAR Region, the States present at the Informal NAM/CAR ATS 1/00 Meeting held in Mexico City on 23-25 August, 2000, felt that this implementation could be done by **July 2001** at

the latest, and formulated Conclusion 1/8 – Use of a longitudinal separation minimum of 10 minutes using the Mach number technique and/or of RNAV 80-NM in the Caribbean Region (**Appendix A**).

3.3 The Informal SAM ATM-SAR 02/00 Meeting held in Lima on 4-8 September 2000, issued **Conclusion 3/4** (see **Appendix A**) on longitudinal separation minima, according to which SAM States would apply a 10-minute longitudinal separation on international routes by **July 2001**. The Meeting also took note that this date had been co-ordinated with the NACC Office in regard to the application of this separation on CAR/SAM boundaries.

3.4 This Conclusion also requests the ICAO SAM Regional Office to take the necessary steps to co-ordinate with the States, International Organisations, and other ICAO Regional Offices so that the corresponding measures are taken to allow for its implementation.

3.5 Therefore, the SAM Regional Office circulated letter LT 2/3.80 – SA1133 dated 11 December, 2000, (**Appendix B**) asking for appropriate steps to be taken for its implementation on ATS international routes by 12 July 2001 at the latest.

#### 4. **Basic factors to be considered for applying separation minima**

4.1 The application of reduced procedural longitudinal separations should be aimed at expediting traffic flow without losing sight of safety aspects.

4.2 When considering the application of a 10-minute separation, the meeting should take into account and examine many factors, particularly the basic ones, which could be summarised as follows:

- a) **Navigation and surveillance precision factors:** These factors refer to the precision of aircraft positioning and the precision with which the progress of the flight can be followed. These factors are related more than anything to the precision of the navigation system, whether airborne or ground-based.
- b) **ATS organizational and structural factors:** These factors have to do with the capacity and general efficiency of the ATC system and include mainly the ATC support systems, the organization and structure of air traffic services, and the technical characteristics and reliability of available communication systems.
- c) **Human factors:** These factors are extremely important and concern both pilots and controllers and are associated with training, experience, and professional satisfaction, among other things.

4.3 Based on an assessment of these factors, the meeting will be able to determine whether all the safety considerations for applying the 10-minute longitudinal separation on the corresponding ATS international routes in the FIRs concerned are met.

4.4 If the assessment shows that there are no impediments to its application, then it should be kept in mind that aircraft flying with a 10-minute separation between them will require all ATC units involved to have precise instructions to ensure close co-ordination. Therefore, the meeting should clearly establish the need for ACC authorities with jurisdiction on the FIRs involved to proceed to review and update the Letters of Operational Agreement that are in effect.

## 5 **Conclusion**

5.3 If an ideal ATS route structure is to be attained, as the CAR/SAM States intend, then it is essential to adopt standard criteria and operational procedures.

5.2 The establishment of a 10-minute longitudinal separation is an important and essential ingredient of all such criteria and procedures. This means that the continued existence of airspace sectors or route segments with greater separations in time or distance, whatever their length, will constitute an insurmountable barrier to the harmonization of the CAR/SAM route network undertaken by the States and the fulfilment of current requirements of international civil aviation users.

5.3 Based on the foregoing and on the recommendations and conclusions developed at various regional fora, the basic conditions have been met in this subregion as to ATS organization and structure and to navigation, communication, and surveillance, for considering the application of the longitudinal separation minimum on all ATS international routes.

## 6 **Suggested action**

6.1 The meeting is invited to take note of the information presented in this working paper and, if it deems it feasible based on the foregoing, to adopt the following draft Conclusion:

### **Draft Conclusion xxx**

That Brazil, French Guiana, Guyana, Suriname, Trinidad and Tobago, and Venezuela:

- a) apply a 10-minute longitudinal separation minimum on the corresponding international routes of the FIRs involved, starting on 12 July 2001;

- b) review and update the existing Letters of Operational Agreement between the interested ACCs, bearing in mind the safety levels that must be maintained when applying such separation; and
- c) forward to the CAR or SAM Regional Office, as applicable, information about the agreements reached.

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**Attachments:**

**Appendix A:** Recommendation 5/22 (CAR/SAM/RAN/3);  
Recommendation 5/24 (CAR/SAM/RAN/3);  
Conclusion 1/8 (NAM/CAR ATS 1/00); and  
Conclusion 3/4 (SAM ATM-SAR 02/00).

**Appendix B:** LT 2/3.80 SA1133 – SAM Regional Office.



**CAR/SAM RAN**

**Recommendation 5/22 — Systematic application of 10-minute and 80-NM RNAV longitudinal separation minima**

That the States implement the necessary facilities for introducing 10-minute and 80-NM RNAV longitudinal separation minima on high-density ATS main **routes**.

*Note.* – *This text is contained in the Basic ANP, Appendix A, paragraph 7.15.*

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**Recommendation 5/24 — Application of a 10-minute separation minimum using the Mach number technique**

That a 10-minute longitudinal separation be applied in the CAR/SAM Regions minimum using the Mach number technique in those areas lacking appropriate communication, navigation, and surveillance facilities to support other separation minima.

*Note.* – *This text is contained in the Basic ANP, Appendix A, paragraph 7.14.*

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**CARIBBEAN REGION**

**CONCLUSION 1/8 Use of a longitudinal separation minimum of 10 minutes using the Mach number technique and/or of RNAV 80 NM in the Caribbean Region**

That:

- a) the States in the Caribbean Region that have not yet done so take the necessary measures to establish, as soon as possible, a longitudinal separation minimum of 10 minutes using the Mach number technique and/or of RNAV 80 NM for aircraft equipped with this capacity;

- b) the longitudinal separation minimum mentioned in a) above be established by July 2001 at the latest through bilateral contacts and/or using the good offices of the ICAO NACC Regional Office;
- b) the ICAO NACC Regional Office inform the affected South American about the intention of Mexico and COCESNA to reduce the longitudinal separation minima from 15 to 10 minutes and/or RNAV80 NM using the Mach number technique on ATS Pacific routes, on a date to be decided by all the parties concerned, but no later than **July 2001**; and
- d) the ICAO NACC Regional Office inform Venezuela about the intention of the Netherlands Antilles to reduce the longitudinal separation minimum from 15 to 10 minutes and/or RNAV 80 NM using the Mach number technique on ATS routes between the Central Caribbean and South America, on a date to be decided by the two parties concerned, but no later than **July 2001**.

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**SOUTH AMERICAN REGION**

**CONCLUSION 3/4**

**UNIFORM APPLICATION OF LONGITUDINAL SEPARATION MINIMA**

That:

- a) with a view to the uniform application of longitudinal separation minima in the SAM Region and on its boundaries with other Regions, the States that have not yet done so take the necessary measures to implement the separation of 10 minutes using the Mach Number Technique and/or RNAV 80 NM; and
- b) the ICAO SAM Regional Office take the necessary measures to co-ordinate the application of the aforementioned separation with the States, Organisations, and other ICAO Regions involved by **July 2001**.



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LT 11/3.19.1  
LT 2/3.80 – SA1133

11 December 2000

**Subject: Uniform application of the 10-minute/RNAV 80-NM longitudinal separation minimum**

**Ref.:** Report of the CAR/SAM RAN/3 Meeting  
Report of the Informal SAM ATM/SAR 02/00 Meeting

Dear sir:

I am writing to you with reference to the aforementioned subject and to the SAM Informal ATM/SAR 02/00 Meeting held in Lima, Peru, on 4-8 September 2000.

Based on Recommendation 5/22 –Systematic application of 10-minute and 80-NM RNAV longitudinal separation minima – approved by the CAR/SAM RAN/3 Meeting (Buenos Aires, Argentina, October 1999) and with a view to a more effective use of airspace, said Meeting examined, inter alia, the possibility of applying a longitudinal separation of 10 minutes using the Mach Number Technique (MNT) and/or RNAV 80 NM on a uniform basis in the SAM Region on ATS routes that affect the CAR/SAM Regions.

The meeting considered that the facilities and means required for its application were appropriate and approved **Conclusion 3/4** setting July 2001 as the date for the implementation of the cited separation minimum on ATS international routes. For ease of reference, you will find attached Recommendation 5/22 and Conclusion 3/4 referred to above.

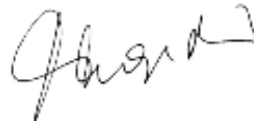
As you will note, Conclusion 3/4 also requested the ICAO SAM Regional Office to co-ordinate with the States, International Organisations, and other ICAO Regional Offices, so that steps are taken for its application by July 2001 at the latest.

In order to ensure its uniform application, the States involved that have not yet done so should agree on its implementation with the adjacent States and, if necessary, modify the Appendix to the Letters of Operational Agreement that specify the separation to be applied on the respective ATS routes; this can be accomplished through reversal letters.

The July 2001 date was agreed with the NACC Regional Office, inasmuch as the CAR States had also adopted the same date for the uniform implementation of the cited separation on routes affecting the CAR/SAM Regions. More specifically, the date should coincide with the AIRAC date of **12 July 2001**.

In view of the foregoing and with a view to a more effective use of airspace, I would very much appreciate it if your administration, if it has not yet done so, take the necessary steps to implement the longitudinal separation of 10 minutes using the Mach Number Technique and/or RNAV 80 NM on ATS international routes by **12 July 2001**.

Accept, Sir, the assurances of my highest consideration.



Paulo Imre Hegedus  
Regional Director  
South American Office  
Lima

**Attachment to communication SA1133**

**CAR/SAM RAN/3 Meeting**

**Recommendation 5/22 — Systematic application of 10-minute and 80-NM RNAV longitudinal separation minima**

That the States implement the necessary facilities for the introduction of 10-minute and RNAV 80-NM longitudinal separation minima on high-density ATS main routes.

*Note. – This text is contained in the Basic ANP, Appendix A, paragraph 7.15.*

**SAM Informal ATM/SAR 02/00 Meeting**

**CONCLUSION 3/4 UNIFORM APPLICATION OF LONGITUDINAL SEPARATION MINIMA**

That:

- a) with a view to the uniform application of longitudinal separation minima in the SAM Region and on its boundaries with other Regions, the States that have not yet done so take the necessary measures to implement the separation of 10 minutes using the Mach Number Technique and/or RNAV 80 NM; and
- b) the ICAO SAM Regional Office take the necessary measures to co-ordinate the application of the aforementioned separation with the States, Organisations, and other ICAO Regions involved by **July 2001**.

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