

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**SOUTH AMERICAN OFFICE**



**REPORT OF THE CAR/SAM SEMINAR/MEETING IN PREPARATION OF ELEVENTH AIR  
NAVIGATION CONFERENCE (AN-Conf/11)**

**LIMA, PERU, 18 TO 22 AUGUST 2003)**

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## HISTORY OF THE SEMINAR/MEETING

### 1. Introduction

1.1 The CAR/SAM Seminar/Meeting in Preparation of Eleventh Air Navigation Conference (AN-Conf/11) was held in Lima from 18 to 22 August 2003.

### 2. Objective of the Seminar/Meeting

2.1 The objective of the Seminar/Meeting was to provide information on the subjects to be dealt with at the Eleventh Air Navigation Conference, so that interested States/Territories and international organizations based on the presentations made during the event, could exchange points of view on matters to be discussed at the Conference. Likewise, and according to Conclusion 11/54 of GREPECAS/11 Meeting, it was discussed regional positions with respect to agenda items 5, 6 and 7 of the AN-Conf/11.

### 3. Opening of the Seminar/Meeting

3.1 Mr. José Miguel Ceppi, Regional Director of the ICAO SAM Office, welcomed the participants and offered an explanation on the matters to be dealt with during the Seminar/Meeting. In addition, Mr. Raymundo Hurtado Paredes, representing the Civil Aviation Directorate, welcomed the participants on behalf of Peru and declared the event opened.

### 4. Attendance

4.1 The Seminar/Meeting was attended by 13 CAR/SAM States and 3 International Organizations. The list of participants is at **Appendix A**. The programme of activities is attached as **Appendix B**.

### 5. Officers and the Secretariat

5.1 The Seminar/Meeting was conducted informally. It was developed in three parts. The First part was a seminar on ATM matters. The Second part was another seminar on CNS matters and the Third part was a meeting to deal with Working Papers prepared to present a regional position, in accordance to Conclusion 11/54 of GREPECAS/11 Meeting. The event was organized as follows:

Moderator ATM matters	José Antonio Alvarez (Argentina)
Moderator CNS matters	Daniel Salvano (United States)
Moderator of the Report	Normando Araujo de Medeiros (Brazil)
Secretary	Carlos Stehli A/DEPRD, assisted by:
	Jorge Fernández RO/ATM/SAR
	Onofrio Smarrelli RO/CNS
	Roberto Jean-Francois RO/AIS/MAP
	Alberto Orero RO/ATM/SAR

5.2 The first day, a video-conference system was used, enabling the direct participation of the following ICAO Headquarters personnel: Messrs. Vincent Gallotti, C/ATM, Victor Iatsouk, TO/CNS and Aleksandar Pavlovic, C/AIS/MAP.

## 6. **Agenda of the Seminar/Meeting**

6.1 The following was the Agenda of the Seminar/Meeting:

Agenda Item 1: Introduction to the Global ATM Operational Concept

Agenda Item 2: ATM requirements, SARPs development, role of the global plan and interoperability

Agenda Item 3: Regional framework for the implementation of an ATM global system

Agenda Item 4: Guidance Material for ATS Safety Management

Agenda Item 5: Required total system performance (RTSP)

Agenda Item 6: Measures to extend airspace capacity

Agenda Item 7: Revision of the forthcoming ITU WRC-2003 Conference and its impact in the utilization of the electromagnetic spectrum

Agenda Item 8: Aeronautical Navigation Issues

Agenda Item 9: Ground-air and ground-ground aeronautical communications

Agenda Item 10: Other matters

## 7. **Organization, Working Arrangements and Language**

7.1 The working languages were English and Spanish. Simultaneous translation services were provided. In case of the presentations, when finalizing each one of them, a series of questions and answers took place.

7.2 The participants were provided with a CD containing the presentations made during the event.

**APPENDIX / APENDICE A****LIST OF PARTICIPANTS / LISTA DE PARTICIPANTES****ARGENTINA**

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<b>APPENDIX B</b>		
<b>SEMINAR/MEETING PROGRAMME</b>		
<b>MONDAY 18 AUGUST 2003</b>		
08:00 – 09:30	Registry	
09:30 – 10:00	Opening Ceremony	
10:00 – 10:45	<b>General Presentation</b> <ul style="list-style-type: none"> <li>• Results of the Tenth Air Navigation Conference.</li> <li>• CNS/ATM development in CAR/SAM Regions.</li> <li>• AN-Conf/11: Expected results and possible impact in the CAR/SAM Regions and development perspectives of CNS/ATM.</li> <li>• Questions.</li> </ul>	<b>Mr. Carlos Stehli</b> Deputy Director, a.i. SAM Office
10:45 – 11:00	<b>Preparation for Video Conference</b> <ul style="list-style-type: none"> <li>• Introduction to Headquarters' presentations.</li> <li>• Questions.</li> </ul>	<b>Mr. Carlos Stehli</b> Deputy Director, a.i. SAM Office
11:00 – 11:30	<i>Coffee break</i>	
11:30 – 12:20	<b>Agenda Item 1: Introduction to the Global ATM Operational Concept</b> <ul style="list-style-type: none"> <li>• First presentation from HQ ATM Section. AN-Conf/11 working papers 2 and 4.</li> <li>• Questions.</li> </ul>	<b>Mr. Vincent Gallotti</b> C/ATM ICAO Headquarters
12:20 – 13:10	<b>Agenda Item 2: ATM requirements, SARPs development, role of the global plan and interoperability</b> <ul style="list-style-type: none"> <li>• Second presentation from HQ ATM Section. AN-Conf/11 working papers 9, 21, 22 and 26.</li> <li>• Questions.</li> </ul>	<b>Mr. Vincent Gallotti</b> C/ATM ICAO Headquarters
13:10 – 14:00	<b>Agenda Item 8: Aeronautical Navigation Issues</b> <ul style="list-style-type: none"> <li>• Presentation from HQ CNS Section. AN-Conf/11 working papers 17, 18, 19, 20, 37 and 38.</li> <li>• Questions.</li> </ul>	<b>Mr. Victor Iatsouk</b> TO/CNS ICAO Headquarters
14:00 – 14:30	<ul style="list-style-type: none"> <li>• Presentation from AIS/MAP Section. AN-Conf/11 working papers 29 and 30.</li> <li>• Questions.</li> </ul>	<b>Mr. Aleksandar Pavlovic</b> C/AIS/MAP ICAO Headquarters

<b>TUESDAY 19 AUGUST 2003</b>		
09:00 – 09:45	<b>Agenda Item 3: Regional framework for the implementation of an ATM global system</b> <ul style="list-style-type: none"> <li>• Presentation on regional framework for implementation of an ATM global system.</li> <li>• Questions.</li> </ul>	<b>Mr. Jorge Fernandez</b> ATM Regional Officer SAM Office
09:45 – 10:45	<b>Agenda Item 6: Measures to extend airspace capacity</b> <ul style="list-style-type: none"> <li>• Presentation on measures to extend airspace capacity.</li> <li>• Questions.</li> </ul>	<b>Mr. Alberto Orero</b> ATM Regional Officer SAM Office
10:45 – 11:15	<i>Coffee break</i>	
11:15 – 11:4	<ul style="list-style-type: none"> <li>• Presentation on contributions from CAN/MEX/USA Working Group to AN-Conf/11.</li> <li>• Questions.</li> </ul>	<b>Mr. Víctor Hernández Sandoval</b> ATM Specialist, SENEAM
11:45 – 12:30	<b>Agenda Item 4: Guidance Material for ATS Safety Management</b> <ul style="list-style-type: none"> <li>• Presentation on ICAO regulations on ATS safety.</li> <li>• Questions.</li> </ul>	<b>Mr. Jorge Fernandez</b> ATM Regional Officer SAM Office
12:30 – 13:15	<b>Agenda Item 5: Required total system performance (RTSP)</b> <ul style="list-style-type: none"> <li>• Presentation on required total system performance (RTSP).</li> <li>• Questions.</li> </ul>	<b>Mr. Alberto Orero</b> ATM Regional Officer SAM Office
13:15 – 13:45	<i>Coffee break</i>	
13:45 – 14:30	<ul style="list-style-type: none"> <li>• Presentation on AIS global computerized system (CAIS).</li> <li>• Questions.</li> </ul>	<b>Mr. Roberto Jean-Francois</b> AIS/MAP Regional Officer SAM Office
<b>WEDNESDAY 20 AUGUST 2003</b>		
09:00 – 09:45	<b>Agenda Item 7: Revision of the forthcoming ITU WRC-2003 Conference and its impact in the utilization of the electromagnetic spectrum</b> <ul style="list-style-type: none"> <li>• Presentation on civil aviation needs with respect to radio frequency spectrum.</li> <li>• Questions.</li> </ul>	<b>Mr. Onofrio Smarrelli</b> CNS Regional Officer SAM Office
09:45 – 10:30	<ul style="list-style-type: none"> <li>• Presentation of Brazil on results of WRC-2003.</li> <li>• Questions.</li> <li>• Discussion on working paper prepared by Brazil for presentation at AN-Conf/11.</li> </ul>	<b>Mr. Carlos Alberto Cirilo Ramos Junior</b> Alternate, CNS División DECEA Brazil
10:30 – 11:00	<i>Coffee break</i>	
11:00 – 12:45	<b>Agenda Item 8: Aeronautical Navigation Issues</b> Presentation on regional navigation systems.	<b>Mr. Onofrio Smarrelli</b> CNS Regional Officer SAM Office
12:45 – 15:00	<ul style="list-style-type: none"> <li>• CAR/SAM GNSS activities.</li> <li>• Questions</li> <li>• Discussion on working paper prepared by Colombia for presentation at AN-Conf/11.</li> </ul>	<b>Mr. José Riveros</b> Aeronautical Professional UAEAC Colombia

<b>THURSDAY 21 AUGUST 2003</b>		
09:00 – 09:45	CAR/SAM GNSS Activities – Working paper presented by Colombia for AN-Conf/11 (Cont.).	
09:45 – 10:45	<ul style="list-style-type: none"> <li>• Presentation on contributions to An-Conf/11 with respect to air-ground communications / Working paper presented by COCESNA for AN-Conf/11.</li> </ul>	<b>Mr. Uriel Urbizo</b> CNS/ATM Manager COCESNA
10:45 – 11:45	<ul style="list-style-type: none"> <li>• Presentation on contributions to AN-Conf/11 with respect to ground-air data communications</li> <li>• Questions.</li> </ul>	<b>Mr. Onofrio Smarrelli</b> CNS Regional Officer SAM Office
11:45 - 12:15	<i>Coffee break</i>	
12:15 – 13:30	<ul style="list-style-type: none"> <li>• Presentation on IATA contributions to AN-Conf/11.</li> <li>• Questions.</li> </ul>	<b>Mr. Angel Lucas</b> Deputy Director IATA LATAM/CAR
14:00 -	Lunch offered by ICAO	
<b>FRIDAY 22 AUGUST 2003</b>		
09:00 – 09:45	<ul style="list-style-type: none"> <li>• Presentation on contributions for the AN-Conf/11 on air navigation systems.</li> <li>• Questions</li> </ul>	<b>Mr. Onofrio Smarrelli</b> CNS Regional Officer SAM Office
09:45 – 10:15	<ul style="list-style-type: none"> <li>• Presentation on IFATCA contributions to AN-Conf/11.</li> <li>• Questions.</li> </ul>	<b>Mr. Juan Pérez Mafla</b> Executive President for America, IFATCA
10:15 – 10:45	<i>Coffee break</i>	
10:45 – 12:15	Review of the Summary of Discussions	
12:15 – 12:30	<i>Coffee break</i>	
12:30	Closing ceremony	

**Agenda Item 1: Introduction to the Global ATM Operational Concept****Agenda Item 2: ATM requirements, SARPs development, role of the global plan and interoperability****Agenda Item 8: Aeronautical Navigation Issues**

1.1 Most of the presentations on these items were carried out on the first day of the Seminar/Meeting, using the facility of the video-conference, which permitted ICAO Headquarters personnel to participate directly in this event. The video-conference was successfully carried out, demonstrating to be a cost-effective possibility for future similar events.

1.2 With regard to the ATM part, presentations were made on issues related with the ATM integrated global system operational concept, SARPs development, CNS/ATM Global Plan role and interoperability, making an thorough explanation of AN-Conf/11: WP/2, WP/4, WP/9, WP/21, WP/22 and WP/26.

1.3 These presentations enabled the participants to acknowledge the basis of the ATM integrated global system operational concept, as well as the future work to be developed in ICAO as regards the elaboration of requirements and technical standards for ATM.

1.4 The participants shared their concern as to how transition from current ATM systems to a global ATM system will take place. Therefore, it was considered that this question should be taken into account by AN-Conf/11, and that ICAO should provide specific guidelines in the future.

1.5 With respect to Agenda Item 8, presentations were made on WPs 17, 18, 19, 20, 37 and 38 regarding Aeronautical Radio Navigation matters, to be dealt with during the AN-Conf/11. The participants noted the progress of the GNSS development and the measures to mitigate interferences caused to the services, as well as the advantages that these measures would mean for the GNSS implementation and the corresponding reduction of conventional radio navigation aids. Likewise, note was taken on the proposals to update ICAO strategy for the introduction and application of non-visual aids and to review the SARPs on ground aids, taking into consideration the current and foreseen GNSS services. Also, note was taken on the studies on the viability of CAT II/III operations with GNSS. It was considered important that the AN-Conf/11 may develop Agenda Item 6.2 in a convenient manner, which would facilitate GNSS implementation.

1.6 Also, and as part of Agenda Item 1, issues related with Aeronautical Information Services were presented, mainly on the AIS computerized global system and the development of data bases with web services for global and regional ICAO air navigation plans. The matter of AIS automated systems raised interest by the participants, since the aeronautical information management and the exchange of such information with integrity, high quality and if possible in real time, is a key issue for the implementation of the future ATM system, in accordance to the global air traffic management operational concept.

1.7 As result of the exchange of points of view on the subjects presented under Agenda Items 1 and 2, the Seminar/Meeting indicated its support to the air traffic management global operational concept presented in working paper 4 (WP/4) of AN-Conf/11.

**Agenda Item 3: Regional framework for the implementation of an ATM global system**

3.1 AN-Conf/11 WP/27 and WP/4 were taken as reference documents for the presentation of this agenda item. In this connection, it was informed that, as regional and national plans for the air navigation systems are formulated, in line with the CNS/ATM systems concept, there is a progressive maturity permitting users to obtain early benefits.

3.2 These actions will bring as consequence the need to manage the system so it satisfies the challenges related with the integration, inter-operability and harmonization of these systems, which will require that GREPECAS establish the appropriate regional framework and mechanism in technical, operational, political and institutional aspects.

3.3 In this regard and considering that ICAO has established the global ATM operational concept, the participants considered that a global planning framework should be present in regional requirements and priorities. In consequence, each regional air navigation plan would be a specific document for a determined region, but in harmonization with the other regions.

**Agenda Item 4:           Guidance Material for ATS Safety Management**

4.1           AN-Conf/11 Working Papers 24, 5, 10 and 32 were considered as reference for the presentation of this agenda item. In this regard, some guidelines and orientation were provided to permit States and International Organizations to implement ATS Safety Management programmes, with the aim of maintaining the safety in the provision of air traffic services in airspace and at aerodromes.

4.2           In accordance with some participants, there would be a need to further disseminate these guidelines and orientations, as well as related documentation and personnel training, indicating also that many administrations would not be ready yet to implement these ATS safety programmes by the dates established. Consequently, the need to have a more viable State compliance date was recognized upon.

**Agenda Item 5: Required total system performance (RTSP)**

5.1 For the presentation of this agenda item, AN-Conf/11 WPs 4, 8 and 50 were used as reference material. In this connection, an analysis was made to the required total system performance (RTSP) concept, as stipulated in the work programme of the Air Traffic Management Operational Concept Panel (ATMCP), and comments were exchanged on the relationship of RTSP with other components within the ATM systems performance. The participants agreed that there is still much work to be done by ATMCP to define RTSP and its components.

5.2 In this regard, there were also comments from some participants that it would be convenient to evaluate whether it would be necessary to consider other parameters, such as AIS or MET as part of RTSP.

**Agenda Item 6: Measures to extend airspace capacity**

6.1 For the presentations on this agenda items, AN-Conf./11-WP/7; WP/28; WP/35, WP/51 and WP/74 were taken into consideration. In this connection, the problems experienced by many regions with regard to the increase in traffic demand and to the limited airspace capacity were analysed, and identification was made of the efforts carried out globally and regionally to increase the capacity and establish a more efficient operational environment.

6.2 In addition, the participants agreed on the need to continue with the efforts to revise and adequate national standards and procedures to reach harmonization with SARPs, SUPPs and the regional ANP. It was recognized that elimination of deficiencies can be reached through the implementation of the future ATM global systems.

**Agenda Item 7:           Revision of the forthcoming ITU WRC-2003 Conference and its impact in the utilization of the electromagnetic spectrum**

**Agenda Item 8:           Aeronautical Navigation Issues**

**Agenda Item 9:           Ground-air and ground-ground aeronautical communications**

7.1           The Seminar/Meeting, as part of the information material in support to above agenda items, received several presentations. These were oriented to disseminate the working papers to be presented by ICAO at the Eleventh Air Navigation Conference in the radio-electrical spectrum, aeronautical radio navigation and ground-air aeronautical data communications areas. In addition, IATA presented the Seminar/Meeting with a summary of the working papers it will present at the Conference.

7.2           Likewise, the Seminar/Meeting, pursuant to GREPECAS/11 Meeting Conclusion 11/54, discussed draft working papers on possible regional positions with regard to agenda items 5, 6 and 7 to be dealt with at AN-Conf/11. After extensive debates, the working papers prepared by Brazil, Colombia and COCESNA, received, with contributions from the Seminar/Meeting, the support of all assisting States and International Organizations. Said working papers are presented as **Appendices A, B and C** to this part of the Summary.

7.3           The Seminar/Meeting considered that the above-mentioned working papers be circulated through the ICAO NACC and SAM Regional Offices to all CAR/SAM States/Territories not present at the Seminar/Meeting, for their knowledge and support. Likewise, the Regional Offices would send the working papers to ICAO Headquarters for their processing and introduction in the documentation for the AN-Conf/11.

7.4           The Secretariat informed the Seminar/Meeting that the mentioned working papers would be presented to AN-Conf/11 by the States/Organizations that had originally elaborated them, indicating in same that they represented the States/Organizations mentioned in the papers.

7.5           In view of the above, the Seminar/Meeting formulated the following Conclusion:

**Conclusion 1/1-   Regional positions for the Eleventh Air Navigation Conference**

That:

- a) States and international organizations assisting at the CAR/SAM Seminar/Meeting in preparation of the Eleventh Air Navigation Conference, support the working papers shown as Appendices A, B and C to this part of the Summary, for presentation as regional positions at the AN-Conf/11.
- b) The ICAO NACC and SAM Offices, as a matter of urgency, circulate the mentioned working papers to the CAR/SAM States/Territories not present at the Seminar/Meeting, for their knowledge and support; and

- c) Once the corresponding responses are received, the ICAO Regional Offices send said working papers to ICAO Headquarters for their inclusion in the AN-Conf/11 documentation.

**APPENDIX A**AN-Conf/11-WP/XX  
31/07/03**ELEVENTH AIR NAVIGATION CONFERENCE**

Montreal, 22 September - 3 October 2003

**Agenda Item 5: Results of the ITU 2003 World Radio Conference and its impact on the use of the aeronautical electromagnetic spectrum**

(Prepared by Brazil)

**RESUMEN**

This draft working paper presents the results of the ITU 2003 World Radio Conference and its impact on the use of the aeronautical electromagnetic spectrum. This working paper was developed pursuant to Conclusion 11/54 of GREPECAS/11 Meeting.

**1. Introduction**

1.1 The aeronautical administration of Brazil, following Conclusion 11/54 of GREPECAS/11 (Manaus, Brazil, 3 to 7 December 2002), elaborated this working paper, which has been reviewed and supported by the following States/International Organizations of the CAR/SAM Regions:

Argentina	México
Bolivia	Panamá
Brazil	Perú
Chile	United States
Colombia	Venezuela
Cuba	COCESNA
El Salvador	IATA
Haiti	IFATCA

1.2 The Aeronautical Administration of Brazil (DECEA) attended the meeting held in Geneva in preparation for the Conference, in which the regional position of the Inter-American Telecommunications Commission (CITEL) concerning aeronautical communications was consolidated.

1.3 At the WRC-03, ICAO held several co-ordination meetings to strengthen its position and to anticipate any discrepancies or difficulties which could have emerged during the conference.

1.4 The work was organised in committees to deal with the agenda items. These committees were sub-divided into working groups and these, in turn, into sub-groups and drafting groups to discuss specific issues of each agenda item.

## 2 **Agenda items**

### 2.1 **Agenda Item 1.4:**

Issue:

To review the findings of the studies conducted in relation to Resolution 114 (WRC-95) regarding the use of the 5.091-5.150 MHz band by the fixed satellite (ground-space) service, limited to the use of feeder links of the mobile satellite service (MSS), and the allocations for the Aeronautical Radio Navigation (ARNS) and fixed satellite services in the 5.091-5.150 MHz frequency band.

Position of ICAO:

To maintain the current mechanism, accepting a date extension from 2010 to 2018, at which time the FSS will start operating as secondary in the 5.091-5.150 MHz frequency band.

Discussion:

Discussions on this item proceeded based on the various proposals of CITEL, CEPT and APT. Following an extensive debate, a consensus was reached to modify the footnote to extend the date from de 2010 to 2018, at which time the FSS would revert to secondary status, and, starting in 2012, not to grant new services to the FSS in this band. The meeting also approved the modification in Resolution 114, and discussed service sharing until 2018.

Final result concerning ICAO:

The issue was closed in keeping with the guidance provided by ICAO.

### 2.2 **Agenda Item 1.5:**

Issue:

To review, pursuant to Resolution 736 (WRC-00), the regulatory resolutions and spectrum requirements for new and additional allocations for mobile, fixed, satellite exploration of the earth and space research services, and review the allocation to the radio location service in the 5.150-5.725 MHz band, with a view to changing it from secondary to primary, based on the findings of ITU-R studies.

Position of ICAO:

To accept the “upgrade” of the radio location service to primary status in the 5.350-5.470 MHz band, provided it does not cause interference to the ARNS (operating in 5.449) nor require protection from the ARNS. To monitor this band to prevent new uses.

Discussion:

This issue dealt with several bands above 5 GHz. The main aeronautical interest is to defend the 5.350-5.470 MHz band, also allotted to the aeronautical radio navigation service. It was quite a controversial issue, and much care was taken when drafting the agreement. Following an intense debate, a consensus was reached and the services were approved, together with several footnotes and a resolution.

In the 5.350-5.470 MHz band, an upgrade of radio location to primary status was approved, but with a footnote to ensure protection to radio navigation, as recommended by ICAO.

New services were also granted for wireless access networks (RLAN) in the 5.150-5.350 MHz band. In the meantime, only the 5.150-5.250 MHz sub-band will be allocated to the ARNS, but the new service in this band was for exclusive indoor use. In addition to that, it is left out of the MLS band (5.030-5.150 MHz).

Final result concerning ICAO:

The issue was closed in keeping with the guidance provided by ICAO. However, indoor use was granted for the RLAN in the 5.150 – 5.250 MHz band, without affecting the ARNS, which at present does not use the band (expansion of the MLS).

2.3 **Agenda Item 1.6:**

Issue:

To consider the regulations required to protect the feeder (ground-space) links of the mobile satellite service operating in the 5.150-5.250 MHz band, taking into account the latest recommendations of the ITU-R.

Position of ICAO:

To monitor the development of future aeronautical systems which might be implemented in the 5.150-5.250 MHz band, with a view to supporting the relevant proposals of the WRC-03.

Discussion:

This issue was discussed together with agenda item 1.5 of the WRC-03. The resolution approved for this issue included MSS protection limits.

Final result concerning ICAO:

The issue was closed in keeping with the guidance provided by ICAO, with the same remarks as in the previous item.

2.4 **Agenda Item 1.15:**

Issue:

To review the results of the studies conducted concerning the Radio Navigation Satellite Service (RNSS), in keeping with WRC-2000 Resolutions 604, 605 and 606.

Position of ICAO:

Res. 604: Does not affect aeronautical interests.

Res. 605: To impose the efd aggregate limit of  $-121.5$  dB (W/m<sup>2</sup>) to the radio navigation satellite service in the 1.164-1.215 MHz band, as a necessary measure to avoid interference to the DME currently operating in this band.

Res. 606: To support the adoption of a single regulatory method for the whole 1.215 – 1.300 MHz band, in order to protect radars from harmful interference by current and future RNSS systems.

Discussion:

Various proposals were submitted and discussed. Three discussion groups were created (in addition to several informal groups) and met in order to try to reach a consensus on each of the resolutions.

The discussion on Resolution 604 proceeded more expeditiously and was subsequently approved by the Plenary based on the Brazilian proposal. This issue has no impact on aeronautical interests.

Discussions on Resolution 605 were more intense. All measures required to protect the DME were included, but serious discrepancies on regulatory aspects persisted. DME protection was ensured through the adoption of an aggregate power density limit (epfd) of  $-121.5$  dB (W/m<sup>2</sup>). The involvement of the Radio Communications Bureau in the process of dividing the aggregate power among RNSS operators was secured, thus giving more transparency to the process. A second resolution was drafted stipulating that, as of 2005, system reports that meet a list of “real” criteria are subject to Art. 9. A consensus was reached and the issue was closed to the full satisfaction and the aeronautical community.

Regarding Resolution 606, the inclusion of a footnote to protect the radio location service in the 1.215-1.300 MHz band was accepted. This position is being adopted to ensure that as many RNSS providers as possible have equitable access to the satellite resource, supported this method, but a foot note was included stating that, in some countries, this band is also allocated on a primary basis to radio navigation. Thus, significant flexibility is provided in the event that the CAR/SAM Region decides to use this band for radio navigation in the future.

Final result concerning ICAO:

This issue was closed in keeping with the guidance provided by ICAO.

2.5 Agenda Item 1.17:

Issue:

Upgrading the radio location service to primary status in the 2.900-3.100 MHz band.

Position of ICAO:

To ensure that any status upgrade of radio location in the bands allocated to the aeronautical radio navigation service is made only on condition that the current and future aeronautical radio navigation service (ARNS) is duly protected. Particularly, it should cause no interference to radio navigation, and radio location should not require any protection.

Discussion:

Following several days of debate, an agreement was reached on the text of the footnote as follows: “In the 2.900-3.100 MHz band, radio location service stations should not cause harmful interference nor claim protection from radio navigation radar systems”.

This note meets the needs of the international aeronautical (civil) community, the radar systems used for air navigation will be protected from radio location systems which, in most countries, are used for air defense.

Final result concerning ICAO:

The issue was closed in keeping with the guidance provided by ICAO.

2.6 Agenda Item 1.28:

Issue:

To permit the use of the 108-117,975 MHz band for the transmission of satellite radio navigation correction signals by ground-based systems (GBAS) that meet ICAO standards.

Position of ICAO:

To support the use of the 108-117,975 MHz band by navigation and surveillance support systems that meet ICAO standards, provided priority and protection are given to aeronautical radio navigation services. Also, to ensure compliance with ITU-RT Recommendation SM. 1009 concerning compatibility with FM broadcast in the 87,5-108 MHz band.

Discussion:

The proposal initially discussed contemplated to use the band only for the GBAS and to leave the VDL-4 (surveillance) for the WRC-07, in the absence of conclusive studies within the ITU-R.

This position differed from that of ICAO, and noted that this issue would have to be referred back to a new Conference, which would be expensive and its results might be different from those intended by the aeronautical community, and would also delay VDL-4 implementation for countries that are interested in using it.

Consequently, the approved resolution permits the use of the GBAS throughout the band (108-117,975 MHz), following the WRC-03. However, in keeping with our proposal, the use of surveillance equipment—*i.e.*, the VDL-4 so far—is restricted to the upper segment of the band (above 112,000 MHz) until all the studies concerning the compatibility between this system and FM broadcast are completed and have been submitted to the ITU-R, there being no need to submit the issue to a future conference (WRC-03 Resolution COM5/2).

This fact served as an extremely important argument before the broadcast service, since this community is very strong in all the countries, and has a very active representation in working group discussions. The big problem was the misgivings of operators with respect to transmissions on board aircraft in the band immediately above, a new element within the already complicated co-existence between the services concerned (ARNS and broadcasting).

Final result concerning ICAO:

The issue was closed in keeping with the guidance provided by ICAO.

**3 Agenda for the WRC-07**

3.1 Through Resolution COM7/A, the Conference approved the agenda for the WRC 2007, including several items of aeronautical interest. Consequently, the countries should participate actively in the selection of the items to be included in the studies by aeronautical experts, so as to provide guidance to the countries in the formulation of their positions, based on aeronautical interests.

**4 Suggested action**

4.1 The Conference is invited to:

- a) urge States to participate actively in ITU activities in order to ensure the protection and use of the radio frequency spectrum granted to aeronautical services.
- b) that States increase the participation of members of the aeronautical community in the preparatory work for the WRC 2007.
- c) that the States assist and support ICAO in the elaboration of the position of the Organization at the WRC 2007.

**APPENDIX B**AN-Conf/11-WP/XX  
01/08/03**ELEVENTH AIR NAVIGATION CONFERENCE**

Montreal, 22 September – 3 October 2003

**Agenda Item 6: Aeronautical navigation issues****PROPOSALS FOR THE FUTURE DEVELOPMENT OF GNSS NAVIGATION SYSTEMS**

(presented by Colombia)

**SUMMARY**

This paper describes the current status and the progress made in the CAR/SAM Regions regarding the conduction of trials and the development of implementation plans for the GNSS navigation system, highlighting the facts and aspects of this regional process that require the attention, co-operation and participation of the States and the Regions. Also, paragraph 11 describes the action suggested to the Conference in order to provide better guidance on the planning, implementation and development of the GNSS and its augmentation systems. This working paper was developed pursuant to Conclusion 11/54 of GREPECAS/11 Meeting.

**1. INTRODUCTION**

1.1 The aeronautical administration of Colombia, following Conclusion 11/54 of GREPECAS/11 (Manaus, Brazil, 3 to 7 December 2002), elaborated this working paper, which has been reviewed and supported by the following States/International Organizations of the CAR/SAM Regions:

Argentina	México
Bolivia	Panamá
Brazil	Perú
Chile	United States
Colombia	Venezuela
Cuba	COCESNA
El Salvador	IATA
Haiti	IFATCA

1.2 CAR/SAM States, as well as other Regions of the world, have been participating actively in research, development, analysis and study tasks aimed at the implementation and use of GNSS systems in our airspaces. These tasks have been based on the guidance provided by the Third CAR/SAM Regional Air Navigation Meeting (CAR/SAM/3 RAN), held in Buenos Aires, Argentina, on 5-15 October 1999, and on the conclusions of the CAR/SAM Regional Planning and Implementation Group (GREPECAS), in keeping with the Global Air Navigation Plan for CNS/ATM Systems, and taking into account ICAO standards and available guidelines.

1.3 The aforementioned tasks have been characterised by the introduction of GNSS demonstrations such as GBAS and SBAS contemplated in Table CNS 3 – *Radio Navigation Aids Table* of the CAR/SAM FASID; and the issuance by the States of the corresponding legislation/regulations authorising the use of the GNSS in their respective airspaces; the use of available GNSS signals for area navigation and other applications; and the conduction of demonstrations and trials related to GNSS augmentation systems.

## 2. GNSS TRIALS IN THE CAR/SAM REGIONS

2.1 Pursuant to conclusions 8/36, 11/45 and 11/46 of GREPECAS, two SBAS-type GNSS augmentation trial projects are being carried out in the CAR/SAM Regions: one on WAAS-type SBAS augmentation trials, and the other on EGNOS-type SBAS augmentation trials.

### *GNSS SBAS-WAAS trials in the CAR/SAM Regions*

2.2 WAAS-type SBAS trials in the CAR/SAM Regions, denominated CSTB (CAR/SAM Test Bed), are being conducted under an ICAO-UNDP regional technical co-operation project for Latin America and the Caribbean (RLA/00/009). This project is being executed thanks to the co-operation of the United States government, through the FAA, with the participation and co-operation of the following States and Organisations: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Panama, United States, Venezuela and COCESNA. ICAO signed a memorandum of understanding with the FAA to borrow the equipment required for the trials, and to obtain the support necessary for training and trial analyses.

2.3 The CSTB trial platform consists of 13 reference stations, two master stations, and one ground station for linkage to the geostationary satellite. This platform has been fully installed, and only the earth station for the satellite link is pending. Since the beginning of the project (June 2001), important trials have been conducted that have led to significant results for the CAR/SAM Regions, which will contribute to the implementation of a regional SBAS augmentation system to support some air navigation phases (en-route and NPA). Furthermore, personnel from the aeronautical administrations involved in the project have received training on installation of reference stations, data processing, SBAS performance analysis, and management of data processing tools (FAA GPS solution), since this is a new technology. The project is expected to be completed by mid 2004.

### *GNSS SBAS-EGNOS trials in the CAR/SAM Regions*

2.4 The second SBAS augmentation trial project is related to the EGNOS, using the EDISA platform. It is being executed thanks to the co-operation of the European Community, through ESA, and of the participating States/International Organisations. EGNOS-type SBAS trials, denominated EDISA, are also being carried out through an ICAO/UNDP regional technical co-operation project for Latin America and the Caribbean (Project RLA/02/903), with the participation of the following States and International Organisations: Colombia, Cuba, Spain, COCESNA and the European Community. Phase I

of this project envisages the implementation of the EDISA platform, which consists of three reference stations (RIMS), as well as VSAT communication stations installed next to each RIM. The information collected by the RIMS is sent to a master station in Europe for processing and issuance of the augmentation signal through the INMARSAT AOR-E geostationary satellite. This signal can be used by duly-equipped aircraft. The project started in early 2003; the trial platform has been fully installed and flight tests for en-route, NPA and APV1 functions have been carried out in the States involved. Personnel from these States has received training on data processing and analytical tools (Pegasus plus of EUROCONTROL), and to raise an awareness among States as to the benefits of satellite navigation, the future of GNSS, and, especially, the European strategy in the GNSS field. The analysis of the data collected during Phase 1 trials is expected to be completed by November 2003, when this phase will come to an end.

2.5 This project also contemplates a second phase, which is expected to start once the first phase has been completed. It includes personnel training activities, trials with an architecture different to the one used in Phase I, collection and analysis of GNSS data, use of the Pegasus Plus tool, studies to be submitted to the GREPECAS ATM/CNS Subgroup, and other activities which will be very useful to all States for building GNSS technical capability and human resources in the CAR/SAM Regions.

### 3. CURRENT INFRASTRUCTURE IN THE CAR/SAM REGIONS FOR GNSS IMPLEMENTATION

3.1 A detailed knowledge of satellite navigation capabilities and systems available in CAR/SAM States will be used to make a diagnosis of these Regions *vis-a-vis* the implementation and knowledge of these technologies, and to develop a strategic plan for making good use of them when reviewing the regional GNSS plan.

3.2 To this end, as mentioned in the previous paragraphs, two trial platforms are currently available for conducting verification tests and trials of the SBAS augmentation systems. But only Brazil, Chile and Colombia have their own airborne equipment for collecting GNSS SIS flight data for conducting flight tests in the CAR/SAM Regions; other States/Organisations have used borrowed equipment. Likewise, as a result of co-operation projects on GNSS augmentation, the CAR/SAM Regions have software tools for data processing and analysis: the FAA GPSsolution and Pegasus plus of EUROCONTROL.

3.3 The results of SBAS tests conducted in the CAR/SAM States will be taken into account and will be part of the inventory of GNSS capabilities and tasks in these Regions.

3.4 The databases with historical information on the behaviour of GNSS signals, obtained both in flight and on the ground, will be integrated and included in the study and diagnosis of the GNSS status in the CAR/SAM Regions.

#### 4. ANALYSIS AND DEFINITION OF THE GNSS ARCHITECTURE FOR THE CAR/SAM REGIONS

4.1 With the results of the trials of the two aforementioned test platforms and of the studies carried out by both projects, the CAR/SAM Regions will have an idea of the level of service of the individual and joint operation of the systems.

4.2 States that have not done so yet would be urged to equip their aircraft with in-flight GNSS data collection capabilities and, together with those that already have such capabilities, to collect data during traditional routine flights, and during radio aid or aircraft movement inspection flights. This, combined with the establishment of simple earth stations, consisting of GNSS receivers and data storage units, and existing GNSS SIS analysis software tools, would constitute a very cost-effective way of having a sound regional database that would enable a more precise appraisal of the GNSS in the Regions (WAAS, CSTB, EGNOS, stand alone GPS, GALILEO, etc.), in keeping with ICAO SARPs and guidelines.

4.3 Likewise, the Caribbean and South American Regions are planning to get seriously involved in GNSS interoperability issues by participating as members in the corresponding panels (IWG among others). In working for the development and testing of a future SBAS augmentation system, the Regions are obliged to be informed on the subject and to develop strategies and approaches that will contribute to the achievement of this particular objective.

#### 5. CAR/SAM REQUIREMENTS FOR GNSS IMPLEMENTATION

5.1 The availability of geostationary satellites to correct the signals from the satellite constellation in the CAR/SAM Regions is a latent need since the existing geostationary satellites that cover these regions would not be sufficient to transmit the correction signals over such a broad area as the Caribbean and South America, in addition to the initial target areas of the systems currently providing coverage, *i.e.*, WAAS and EGNOS.

5.2 It should also be noted that communication systems such as the MEVA and REDDIG digital networks support the communication requirements of a future SBAS system. However, if we take into account the compliance of GNSS SIS availability as specified in the SARPs and the number of stations required for an operational SBAS architecture in the CAR/SAM Regions, VSAT channels and stations currently envisaged would not meet the corresponding requirements.

5.3 In the CAR/SAM Regions have mainly conducted SBAS trials, and GBAS trials have started to gather experience for the implementation of GNSS.

5.4 Manpower deficiencies regarding personnel duly trained in the verification of signals in the GNSS SIS space, in correspondence to ICAO SARPs, and on air safety considerations, is a factor that should be taken into account in order to properly conduct a GNSS performance analysis and research.

5.5 Lack of personnel highly trained in satellite navigation issues in the aeronautical entities points to the need to train experts to the same or higher level of expertise than they currently have with respect to conventional systems, so that they may duly implement the GNSS, in keeping with the ICAO SARPs. Similarly, operational personnel with training in the design of GNSS procedures is scarce.

5.6 Likewise, adequate on-board and ground equipment for GNSS verification is lacking, together with SBAS service volume simulation tools. Consequently, this is another task to carry out.

## 6. RELATIONSHIP WITH OTHER ECONOMIC SECTORS OF THE STATE

6.1 State aeronautical entities, in their transition to the GNSS, should consider that, unlike conventional navigation systems, improvements and developments introduced in satellite navigation will benefit all economic sectors of the State. Therefore, the involvement of the other development sectors of the State should be considered of great importance for obtaining greater institutional, financial, economic and technical support for upgrading, developing and implementing the GNSS. Transportation and communication authorities, mapping institutes and other national agencies of the State should make maximum efforts to be engaged in this process.

6.2 Note should be taken that the promotion of national and international GNSS management bodies and associations would permit a more significant development and greater support for investments and for the transition to the GNSS.

## 7 REGIONAL CO-OPERATION

7.1 Projects such as the ionospheric behaviour research project being implemented in Brazil should encourage to develop regional cooperation mechanisms so that scientists from other States interested develop specific tasks that will enable a more consistent participation by all States, so as to ensure the transfer of the GNSS knowledge required by the Regions. Similarly, other issues such as the completion of the WGS 84 survey and the regional communication network should be addressed to support the SBAS.

## 8. INTER-REGIONAL CO-OPERATION

8.1 Mechanisms for co-operation with States from other regions that are in similar latitudes and show an ionospheric behaviour similar to that of CAR/SAM States should be improved, so as to join efforts and exchange information for the development of more appropriate algorithms and reduce the cost of obtaining such a necessary product for SBAS systems.

8.2 As a result of the recent implementation of the WAAS system in the United States, CAR/SAM States, particularly those in the Caribbean and the north part of South America, will assess the level of service and the possibilities of using the WAAS system as a means of navigation that provides a better level of service than the one obtained with ABAS (Ranging, status of satellites and basic differential corrections) alone. The solution involving the ABAS + WAAS and message 27 should be assessed against SARP requirements for the different flight stages and traffic volumes supported.

8.3 In this sense, consideration should be given to aspects such as co-operation and participation by the FAA through the provision of said service to the aforementioned regions, mechanisms for the generation of the corresponding NOTAMs, and any other co-ordination required, such as signal monitoring tools in the cited area.

8.4 On the other hand, co-operation with Europe should continue in order to proceed to the subsequent phases of EDISA, and the use of EGNOS should be assessed once it is operational.

## 9 AIR NAVIGATION PLAN

9.1 CAR/SAM States are developing CNS/ATM transition plans which require mutual integration. The exchange of information among States concerning their transition plans and their co-ordinated work will permit the definition of plans which are more consistent with the reality of the implementation.

9.2 Since the future GNSS will have multiple constellations and signals, special attention will need to be paid to the implementation of the Regional Plan, to GREPECAS guidelines, compliance with the SARPs and international co-operation. In order to co-ordinate the implementation of GNSS systems at the regional level, GREPECAS, based on the work being carried out by the ATM/CNS Subgroup with the support of regional GNSS augmentation projects, will define a plan for the implementation of a GNSS system that is suitable for the CAR/SAM Regions, based on operational requirements.

9.3 It was also noted that, as a product of SBAS augmentation, new non-precision approach modalities could be carried, out, which would require necessary amendments to the air navigation plan.

## 10. CONCLUSIONS

10.1 The active work being carried out in the CAR/SAM Regions for the implementation and development of satellite navigation generates the following ideas which might be useful for all the Regions.

- a) Activities of great significance for regional and global satellite navigation can be carried out with a small investment and the committed participation of the States of a region.
- b) States should have technological tools (inter-operability, databases, earth stations, equipped aircraft, software tools, etc.) available, which should be coordinated, integrated and assessed in order to have a thorough knowledge of the GNSS and to establish strategies for implementing satellite navigation services.
- c) States of some ICAO Regions still face serious technological and human resources training challenges and must address GNSS implementation and development issues at the national and regional level.
- d) Once GNSS regional trials are concluded, the corresponding PIRG would have sufficient information for a more detailed regional air navigation plan.
- e) States, Regions, and operational users are urged to cooperate and work together in the implementation of the new CNS technologies, in keeping with ICAO guidelines and standards, taking into account the results of the relevant cost-benefit analysis. This will optimise resources for testing, implementation, and for the search of the best global and regional alternatives to harmonise the future navigation systems.
- f) Consider that the binding and management of satellite navigation at the level of the State national policy and the integration of institutions and other satellite navigation projects would give more effectiveness and thrust to GNSS transition and

implementation.

- g) ICAO, considering the current GNSS development, should elaborate guidance material on institutional aspects, with the aim of facilitating the implementation of the satellite navigation service.

11. Suggested action

11.1 The conference is invited to:

- a) take note of the information provided in this working paper;
- b) review and conclusions contained in paragraph 10.1 above and formulate pertinent recommendations;
- c) urge ICAO to continue assisting States in the adoption of the appropriate decisions for the implementation of the various future navigation systems, in keeping with the different scenarios, and taking into account GNSS interference and the use of multiple constellations, signals and systems, and in the conduction of cost-benefit analyses.

- END -

**APPENDIX C**AN-Conf/11-WP/XX  
30/7/03**ELEVENTH AIR NAVIGATION CONFERENCE****Montreal, 22 September – 3 October 2003****Agenda item 7: Air-ground and air-air aeronautical communications****POSITION OF THE CAR/SAM REGIONS CONCERNING THE FUTURE DEVELOPMENT OF  
AIR-GROUND AERONAUTICAL COMMUNICATIONS**

(presented by ...)

**SUMMARY**

This paper presents information describing the status and progress made in the CAR/SAM Regions concerning the implementation of air-ground aeronautical communications based on CNS, as well as the position of these Regions regarding the development of such communications based on ATM requirements, and the feasibility of implementing new digital link technologies for data and voice services. This working paper was developed pursuant to Conclusion 11/54 of GREPECAS/11 Meeting.

**1. BACKGROUND**

1.1 COCESNA, following Conclusion 11/54 of GREPECAS/11 (Manaus, Brazil, 3 to 7 December 2002), elaborated this working paper, which has been reviewed and supported by the following States/International Organizations of the CAR/SAM Regions:

Argentina	México
Bolivia	Panamá
Brazil	Perú
Chile	United States
Colombia	Venezuela
Cuba	COCESNA
El Salvador	IATA
Haiti	IFATCA

1.2 Based on the results of the Tenth Air Navigation Conference, the work of the CAR/SAM Regional Planning and Implementation Group (GREPECAS), and the recommendations of the Third Caribbean/South American Regional Air Navigation Conference (CAR/SAM/3 RAN), held in Buenos Aires, Argentina, from 5 to 15 October 1999; and in keeping with the Global Air Navigation Plan for CNS/ATM Systems, and taking into account the standardisation carried out by ICAO, CAR/SAM States and International Organisations have been working on the planning and implementation of the new CNS/ATM systems that will meet the needs of aviation at a regional and global level and help to overcome the deficiencies of the current systems.

1.3 The achievement of the air traffic management global operational concept will require speech communications and the implementation of data communications.

1.4 The Communications/Operations Divisional Meeting held in 1995 developed recommendations of relevance to date. Consequently the ICAO ANCP Panel elaborated SARPs for 8.33 Khz. AM/DSB voice transmissions and VDL 2 and 3 modes.

1.5 Regarding air-ground communications, the CAR/SAM/3 RAN meeting agreed on several recommendations on the AM(R)S Plan and on the use of the VHF frequency spectrum, including provisions to expedite the introduction of VDL. Likewise, GREPECAS has begun studies for the implementation of VDL, providing guidelines for the conduction of trials.

1.6 This working paper gives details of the progress made, and the position adopted, by the CAR/SAM Regions regarding the development and implementation of air-ground aeronautical communications.

## **2. CURRENT STATUS**

2.1 CAR/SAM States have met the air-ground communication requirements of FASID Table CNS2A and ICAO Annex 10, Volumes III and V, making use of VHF DSB-AM 25-kHz analog channeling technologies, covering ground areas and using AM(R)S HF frequencies for communications in oceanic and remote areas. Furthermore, the 117.975 – 137 MHz frequency band is not saturated in the CAR/SAM Regions, but there is a greater congestion in the assignment of frequencies in the 118 – 118.925 MHz sub-band, allotted to the aerodrome control service.

2.2 In keeping with the guidelines provided by GREPECAS, measures are being taken in the CAR/SAM Regions to improve and develop air-ground voice and data communications, with the following main objectives:

- a) optimise the use of communication services;
- b) improve VHF and HF coverage;
- c) protect from interference;
- d) implement character-oriented ATIS data links;
- e) implement ACARS; and
- f) others.

2.3 Furthermore, ground-ground digital communication networks have been implemented in the CAR/SAM Regions which have improved the AFS and have contributed to support and improve the ground segment of some air-ground communication links, thus providing the main support infrastructure for the implementation of the ATN and its applications.

2.4 Also, some CAR/SAM States have conducted tests using the ACARS protocol for ATM applications; studies have been initiated for the conduction of VDL Mode 2 trials, and demonstrations of the ADS-C system have been carried out. Some Area Control Centres and related systems have been updated with the capacity to process the data of these new technologies, such as CPDLC and ADS-C, which will permit the conduction trials and tests with these systems.

2.5 In other regions, pre-operational trials of air-ground aeronautical communications systems are being carried out. As these trials become successful and in agreement with COM/OPS Divisional Meeting (1995), it can be inferred that from the avionics point of view, the system can be economically implemented through multimode equipment to standardize the new SMA technologies, through global operational approval, both in the various flight phases as in the services and their compatibility with other CNS systems.

### **3. POSITION OF THE CAR/SAM REGIONS**

3.1 It is considered important that the air-ground communication infrastructure should accommodate the new functions and provide the adequate capacity, safety and quality of service required to support ATM requirements. In this infrastructure the communication technology to be selected, the application scenarios, its cost-benefit analysis, and the capacity and optimised used of the radio frequency spectrum are highlighted.

3.2 GREPECAS has taken into account the guidelines on air-ground communications set forth in the Global Air Navigation Plan for CNS/ATM Systems, including air-ground data links (VDL, HFDL and SSR Mode S); but has been awaiting the establishment of concrete operational requirements and the standardisation by ICAO. It has also kept abreast of global and regional VDL implementation plans, since it is felt that the harmonised global implementation is important in order to standardise air-ground communications.

3.3 According to the studies conducted by GREPECAS, the implementation of VDL Mode 2 in the medium term is considered feasible, in principle, to support data link applications, such as CPDLC. The implementation of VDL Mode 3 or 4 will be subject to regional agreements, together with other future data link options, and it is expected that ICAO thoroughly define AMS communications scenarios for regional application.

3.4 In view of the foregoing, it is felt that ICAO should continue studying, on a global basis, the implementation of technologies to develop future air-ground aeronautical digital voice and data communications. It is also felt advisable that ICAO continue coordinating the development of detailed information on future air-ground communications, so as to assist States in the adoption of adequate decisions on the selection of implementation alternatives.

**4. Suggested action**

4.1 The conference is invited to:

- a) take note of the information provided in this paper;
- b) with a view to assisting States in the adoption of appropriate decisions on future AMS communications, exhort ICAO to complete studies and disseminate findings on:
  - 1) comparative analyses of new technologies so as to standardise the new air-ground communication systems; and
  - 2) implementation scenarios for future air-ground aeronautical communications, taking into account the results obtained by the Aeronautical Communications Panel (ACP).
- c) urge the States, Regions, and users to co-operate and work together towards the implementation of the new CNS technologies, based on the guidelines and standardisation provided by ICAO and bearing in mind the results of the relevant cost-benefit analyses, so as to optimise resources for testing and implementation; and in the search for better global and regional alternatives to harmonise the future air-ground aeronautical communications systems.

- END -

**Agenda Item 10: Other Matters**

10.1 With regard to this agenda item, the Seminar/Meeting did not identify any other matters to deal with.

10.2 During the Seminar/Meeting, the Delegate of Mexico made a presentation on the AN-Conf/11 working papers that Canada, United States and Mexico will present in a joint manner. Brazil, Colombia and COCESNA made presentations with regard to the documentation prepared for the regional position, in correspondence to GREPECAS/11 Meeting Conclusion 11/54.

10.3 In addition, IATA and IFATCA representatives made presentations on the working papers their Organizations will present at AN-Conf/11.