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**International Civil Aviation Organization  
South American Regional Office**

**FIRST WORKSHOP/MEETING OF THE SAM IMPLEMENTATION GROUP (SAM/IG/1)  
REGIONAL PROJECT RLA/06/901**

**Lima, Peru, April 21-25, 2008**

**Agenda Item 3: Assessment of operation requirements in order to determine the implementation of communications and surveillance capacity improvement for en-route and terminal area operations**

**ACTION PLAN FOR THE IMPLEMENTATION OF COMMUNICATIONS AND  
SURVEILLANCE CAPACITY IMPROVEMENT FOR EN-ROUTE AND TERMINAL AREA  
OPERATIONS.**

(Presented by the Secretariat)

**Summary**

This working paper provides necessary information in order that the meeting may draft implementation plans for voice and data communication systems improvement for aeronautical fixed and mobile service, as well as for surveillance systems with the purpose to improve capacity, efficiency and safety in en-route and terminal areas operations in a short and medium term. Communications and surveillance requirements specified in CAR/SAM Regions Air Navigation Plan (FASID), as well as material prepared by GREPECAS are supplied to support development of action plans.

**References:**

- Project Document RLA/06/901
- CAR/SAM Regional Air Navigation Plan, Doc 8733 Volume I Basic and Volume II FASID
- Global Air Navigation Plan, Doc. 9750
- Reports of GREPECAS Meetings Nr. 12, 13 and 14
- ICAO Annex 10, Volumes III and IV

## 1 Background

1.1 Project RLA/06/901, within the results for the implementation of initiatives of Global Air Navigation Plan, with the purpose to achieve benefits in ATM in a short and medium term, has considered - among other results- the implementation of communication and surveillance capacity improvement for en-route and terminal area operations.

1.2 The activities considered in Project RLA/06/901 for the implementation of communication and surveillance capacity improvement for en-route and terminal area operations are, first of all, to make an analysis of implementation status of fixed and mobile communications services, as well as those of surveillance of SAM Region, implementation plans for improvement in national communication networks of SAM Region states, implementation status or implementation plans in SAM Region related to systems AMHS, AIDC, VDL, HF DL, AMSS and ADS.

1.3 Another activity considered in Project RLA/06/901 is the analysis of current and planned ATS operational requirements in a short and medium term, in order to improve the capacity, efficiency and safety in air traffic control operations in the SAM Region.

1.4 As the last activity of this first phase it is considered the development of an action plan for the implementation of communications and surveillance systems improvement, considering the technical and operational activities aforementioned.

## 2 Discussion

### *Air-ground systems communications Improvement.*

2.1 For the analysis of activities considered for voice and data air-ground systems communications improvement, Table CNS 2 A of FASID is presented (See **Appendix A** of this working paper) reviewed during GREPECAS/14 meeting. When analyzing **Appendix A**, it could be observed that most of the voice services requirements for air-ground communications have been implemented, while the data communications requirements for air-ground operations are planned to be implemented as of 2008.

2.2 **Appendix B** of this Working Paper presents the CAR/SAM planning and implementation activity plan for air-ground data links formulated by GREPECAS through Conclusion 13/72 "*Regional Strategy for updating evolutive implementation of air-ground data links plan*". **Appendix C** shows the CAR/SAM Regional Programme for the implementation of air-ground data links also formulated by GREPECAS through Conclusion 13/72.

2.3 The Meeting, based on the information described in **Appendices A, B** and **C** to this working paper, and considering the current ATS operational requirements and those planned in a short and medium term which would be presented in the Meeting; should elaborate an action plan for the short and medium term for the implementation of air-ground data communication systems in SAM Region, and also another action plan for the short term for the improvement in air-ground voice communication systems in the SAM Region.

2.4 At present in SAM Region, voice and data communications requirements (AFTN) for aeronautical fixed services specified in Tables CNS 1 A and 1C of FASID are fully implemented. With startup of VSAT REDDIG digital network in September 2003, availability of voice and data circuits among the ATS and SAM Region units, has considerably increased.

2.5 Data communication among different ATS, AIS, MET units in SAM Region, are made through AFTN. Most of AFTN centres installed in SAM Region have more than 10 years and are beginning to have maintenance problems.

2.6 Accordingly, AMHS implementation system plans, which would be replacing AFTN systems, are foreseen in most of SAM Region States. Presently, AMHS system is operating in Argentina, Paraguay and Ecuador (Guayaquil). For this year, the implementation of an AMHS system in Chile, Brazil and Peru is foreseen. The implementation of these systems as a whole, with REDDIG availability and interconnection plans with other regional networks, as MEVA II and CAFSAT, will highly contribute in the short and medium term to ground-ground data communications improvement.

2.7 In this regard, considering the information in **Appendix D** (ATN ground-ground Applications planning, as well as of the ATN routers) AMHS systems current implementation plans and ATS requirement for a short and medium term to be presented in the Meeting, should elaborate an action plan for a short and medium term with the purpose to improve ground-ground voice and data communication systems in SAM Region.

#### ***Improvement in surveillance systems***

2.8 **Appendix E** to this working paper presents Table CNS 4 of FASID, which indicates the surveillance requirements in CAR/SAM Regions, reviewed during GREPECAS/12 (Conclusion 12/50).

2.9 Furthermore, GREPECAS ATM/CNS Subgroup CNS Committee Surveillance Task Force developed a surveillance implementation strategy system in CAR/SAM Regions which is attached to this paper as **Appendix F**.

2.10 The Meeting should prepare an action plan for implementation of surveillance systems, considering the implementation requirements of surveillance systems specified in Table CNS 4 A of FASID (Appendix E) and the surveillance systems implementation strategy (Appendix F), as well as surveillance service requirements for short and medium term for ATS personnel, to be discussed during the meeting.

3 **Suggested Action**

3.1 The Meeting is invited to:

- a) Take note of information provided in present working paper.
- b) Develop an action plan for the implementation of SAM Region air-ground voice and data communication system improvement, considering the information described in paragraphs 2.2 to 2.4, as well as the information in Appendices A, B and C to this working paper.
- c) Develop an action plan for the implementation of SAM Region ground-ground communications systems improvement, considering information described in paragraphs 2.5 to 2.7, as well information in Appendix D of this working paper.
- d) Develop an action plan for the implementation of SAM Region surveillance system improvement, considering the information described in paragraphs 2.8 to 2.10, as well as information in Appendices E and F of this working paper.
- e) Analyze any other information provided in this respect.

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## APÉNDICE A

### Table CNS 2A c Tableau CNS 2A c Tabla CNS 2A

#### AERONAUTICAL MOBILE SERVICE AND AMSS SERVICE MOBILE AÉRONAUTIQUE ET SMAS SERVICIO MÓVIL AERONÁUTICO Y SMAS

#### EXPLANATION OF THE TABLE

#### Column

- 1 The name of the State and the locations within the same where the service is provided.
- 2 The required services or functions are provided. Suitable abbreviations for these services or functions are listed below.

|          |  |
|----------|--|
| ACC-L    | Area control service for flights up to FL 250.   |
| ACC-SR-I | Area radar control service up to FL 250.   |
| ACC-SR-U | Area radar control service up to FL 450.   |
| ACC-U    | Area control service up to FL 450.   |
| AFIS     | Aerodrome flight information service.  |
| APP-L    | Approach control services below FL 120.  |
| APP-I    | Approach control service below FL 250.   |
| APP-PAR  | Precision approach radar service up to FL 40.  |
| APP-SR-I | Surveillance radar approach control service up to FL 250.  |
| APP-SR-L | Surveillance radar approach control service up to FL 120.  |
| APP-SR-U | Surveillance radar approach control service up to FL 450.  |
| APP-U    | Approach control service below FL 450.   |
| ATIS     | Automatic terminal information service.  |
| D-ATIS   | Data link-automatic terminal information service.  |
| CLRD     | Clearance delivery.  |
| FIS      | Flight information service.  |
| VHF-ER   | VHF C Extended range.  |
| GP       | Facility providing VHF or HF en-route general purpose system (GPS) communication. These facilities provide air-ground radiotelephony for all categories of messages listed in Annex 10, Volume II, 5.1.8. This system of communication is normally indirect, i.e. exchanged through the intermediary of a third person who is usually a communicator at an aeronautical station. |
| SMC      | Surface movement control up to limits of aerodrome.  |

- |        |                            |
|--------|----------------------------|
| TWR    | Aerodrome control service. |
| VOLMET | VOLMET broadcast.          |
- 3 Number of voice VHF channels for the corresponding services indicated in column 2. The number of implemented channels is shown in parentheses.
  - 4 Number of VHF channels for data communication for the corresponding services indicated in column 2. The implementation date (month/year) is shown in parentheses.
  - 5 HF network designators for the corresponding services indicated in column 2. The number of implemented frequencies is shown in parentheses.
  - 6 Requirement for HF data link (x) for the corresponding services indicated in column 2. The implementation date (month/year) of the service is shown in parentheses.
  - 7 Requirement for satellite voice communications (x) for the corresponding services indicated in column 2. The implementation date (month/year) of the service is shown in parentheses.
  - 8 Requirement for satellite data communications (x) for the corresponding services indicated in column 2. The implementation date (month/year) of the service is shown in parentheses.
  - 9 Requirement for Mode S data communications (x) for the corresponding services indicated in column 2. The implementation date (month/year) of the service is shown in parentheses.
  - 10 Remarks.

*Note.C The implementation year for the data links and satellite voice communication are indicated by two digits.*

## EXPLICATION DU TABLEAU

### Colonne

- 1 Nom de l'État et des emplacements de cet État où le service est assuré.
- 2 Services ou fonctions requis assurés. Les abréviations utilisées ont les significations suivantes:

|          |  |
|----------|--|
| ACC-L    | Contrôle régional jusqu=au FL 250                            |
| ACC-SR-I | Contrôle radar régional jusqu=au FL 250                      |
| ACC-SR-U | Contrôle radar régional jusqu=au FL 450                      |
| ACC-U    | Contrôle régional jusqu=au FL 450                            |
| AFIS     | Service d=information de vol d=aérodrome                     |
| APP-L    | Contrôle d=approche au-dessous du FL 120                     |
| APP-I    | Contrôle d=approche au-dessous du FL 250                     |
| APP-PAR  | Radar d=approche de précision jusqu=au FL 40                 |
| APP-SR-I | Contrôle d=approche au radar de surveillance jusqu=au FL 250 |
| APP-SR-L | Contrôle d=approche au radar de surveillance jusqu=au FL 120 |

|          |   |
|----------|---|
| APP-SR-U | Contrôle d=approche au radar de surveillance jusqu=au FL 450  |
| APP-U    | Contrôle d=approche au-dessous du FL 450  |
| ATIS     | Service automatique d=information de région terminale   |
| D-ATIS   | Service automatique d=information de région terminale par liaison de données  |
| CLRD     | Délivrance des autorisations  |
| FIS      | Service d=information de vol  |
| VHF-ER   | VHF à portée étendue  |
| GP       | Installation de communications VHF ou HF en route d=emploi général (GP). Permet des communications radiotéléphoniques air-sol pour toutes les catégories de messages énumérées dans l=Annexe 10, Volume II, 5.1.8. Système normalement indirect, c=est-à-dire dans lequel les communications se font par l=intermédiaire d=un tiers, généralement un opérateur de télécommunications situé dans une station aéronautique. |
| SMC      | Contrôle des mouvements à la surface jusqu=aux limites de l=aérodrome   |
| TWR      | Contrôle d=aérodrome  |
| VOLMET   | Émissions VOLMET  |

- 3 Nombre de canaux vocaux VHF pour les services indiqués dans la colonne 2. Le nombre des canaux mis en œuvre est indiqué entre parenthèses.
- 4 Nombre de canaux VHF pour les communications de données des services indiqués dans la colonne 2. La date de mise en œuvre (mois/année) est indiquée entre parenthèses.
- 5 Identification du réseau HF pour les services indiqués dans la colonne 2. Le nombre de fréquences utilisées est indiqué entre parenthèses.
- 6 Besoin d=une liaison de données HF (X) pour les services indiqués dans la colonne 2. La date de mise œuvre (mois/année) est indiquée entre parenthèses.
- 7 Besoin de communications vocales par satellite (X) pour les services indiqués dans la colonne 2. La date de mise en œuvre (mois/année) est indiquée entre parenthèses.
- 8 Besoin de communications de données par satellite (X) pour les services indiqués dans la colonne 2. La date de mise en œuvre (mois/année) est indiquée entre parenthèses.
- 9 Besoin de communications de données mode S (X) pour les services indiqués dans la colonne 2. La date de mise en œuvre (mois/année) est indiquée entre parenthèses.
- 10 Remarques

*Note.C L=année de mise en œuvre des liaisons de données et des communications vocales par satellite est indiquée par deux chiffres.*

## EXPLICACIÓN DE LA TABLA

### Columna

- 1 El nombre del Estado y de las localidades dentro del mismo donde se proporciona el servicio.
- 2 Se proporcionan los servicios o funciones que se requieren. Se enumeran a continuación las abreviaturas correspondientes a estos servicios o funciones.

|          |   |
|----------|---|
| ACC-L    | Servicio de control de área hasta el FL 250   |
| ACC-SR-I | Servicio de control de área radar hasta el FL 250   |
| ACC-SR-U | Servicio de control de área radar hasta el FL 450   |
| ACC-U    | Servicio de control de área hasta el FL 450   |
| AFIS     | Servicio de información de vuelo de aeródromo   |
| APP-L    | Servicio de control de aproximación por debajo del FL 120   |
| APP-I    | Servicio de control de aproximación por debajo del FL 250   |
| APP-PAR  | Servicio radar para la aproximación de precisión hasta el FL 40   |
| APP-SR-I | Servicio de aproximación de control con radar de vigilancia hasta el FL 250   |
| APP-SR-L | Servicio de aproximación de control con radar de vigilancia hasta el FL 120   |
| APP-SR-U | Servicio de aproximación de control con radar de vigilancia hasta el FL 450   |
| APP-U    | Servicio de control de aproximación por debajo del FL 450   |
| ATIS     | Servicio automático de información terminal   |
| D-ATIS   | Servicio automático de información terminal por enlace de datos   |
| CLRD     | Servicio de entrega de autorización de tránsito   |
| FIS      | Servicio de información de vuelo  |
| VHF-ER   | VHF Alcance ampliado  |
| GP       | Instalación que proporciona comunicaciones VHF o HF en ruta para fines generales (GPS). Estas instalaciones suministran transmisión radiotelefónica aeroterrestre en todas las categorías de mensajes citadas en el Anexo 10, Vol II, 5.1.8. En este sistema las comunicaciones son normalmente indirectas, es decir, que son intercambiadas por intermedio de un tercero que habitualmente es un operador de comunicaciones de una estación aeronáutica. |
| SMC      | Control del movimiento en la superficie hasta los límites del aeródromo.  |
| TWR      | Servicio de control de aeródromo.   |
| VOLMET   | Radiodifusiones VOLMET.   |

- 3 Número de canales VHF para comunicaciones orales para los correspondientes servicios indicados en la Columna 2. El número de canales implantados se indica entre paréntesis.
- 4 Número de canales VHF para comunicaciones en datos para los correspondientes servicios indicados en la Columna 2. La fecha de implantación (mes/año) se indica entre paréntesis.
- 5 Designadores de red HF para comunicaciones orales para los correspondientes servicios indicados en la Columna 2. El número de frecuencias implantados se indica entre paréntesis.
- 6 Requisito para enlace de datos HF (x) para los correspondientes servicios indicados en la Columna 2. La fecha de implantación (mes/año) del servicio se indica entre paréntesis.
- 7 Requisito para comunicaciones orales por satélite (x) para los correspondientes servicios indicados en la Columna 2. La fecha de implantación (mes/año) del servicio se indica entre paréntesis.
- 8 Requisito para comunicaciones de datos por satélite (x) para los correspondientes servicios indicados en la Columna 2. La fecha de implantación (mes/año) del servicio se indica entre paréntesis.
- 9 Requisito para comunicaciones de datos en Modo S (x) para los correspondientes servicios indicados en la Columna 2. La fecha de implantación (mes/año) del servicio se indica entre paréntesis.
- 10 Observaciones.

*Nota.C El año de implementación para los enlaces de datos y comunicaciones orales por satélite se indican en dos dígitos.*

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF   | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF             | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones  |
|---|--|--|--------------------------------------|---|-----------------------------------|---|---|------------------|--|
| 1   | 2  | 3  | 4                                    | 5   | 6                                 | 7   | 8   | 9                | 10   |
| <b>ANGUILLA (United Kingdom)</b>                                |  |  |                                      |   |                                   |   |   |                  |  |
| TQPF THE VALLEY/Wall<br>Blake, Anguilla I.                      | TWR  | (1) 1  |                                      |   |                                   |   |   |                  |  |
| <b>ANTIGUA AND BARBUDA</b>                                      |  |  |                                      |   |                                   |   |   |                  |  |
| TAPA SAINT JOHNS/<br>V.C. Bird Antigua I.                       | APP<br>TWR<br>SMC<br>APP-SR-I<br><u>D-ATIS</u>                   | 1 (1)<br>1 (1)<br>1 (1)<br>1<br><u>1</u>                                       |                                      |   |                                   |   |   |                  |  |
| <b>ARGENTINA</b>  |  |  |                                      |   |                                   |   |   |                  |  |
| SAEU BUENOS AIRES   | ACC-U<br>GP  | <u>11(11)</u><br><u>2(2)</u>   | 2 (06/0 <u>58</u> )                  | SAM-1( <u>52</u> )<br>SAM-2 ( <u>52</u> ) | X (06/0 <u>810</u> )              | X (06/0 <u>810</u> )                                  | X (06/0 <u>810</u> )                                      |                  |  |
| SAE BE BUENOS AIRES/<br>Aeroparque Jorge Newbery                | APP-L<br>APP-SR-I<br>TWR<br>SMC<br>ATIS<br>CLRD                  | <u>+2 (+2)</u><br><u>+2(2)</u><br><u>+2(2)</u><br>1 (1)<br>1 (1)<br>1 (1)      |                                      |   |                                   |   |   |                  |  |
| SAEZ BUENOS AIRES/<br>Ezeiza, Ministro Pistarini                | APP-SR-I<br>APP-L<br>ATIS<br>SMC<br>TWR<br><u>CLRD</u>           | <u>+2 (+2)</u><br><u>+2(2)</u><br>1 (1)<br>1 (1)<br><u>+2 (+2)</u><br><u>+</u> |                                      |   |                                   |   |   |                  | * Implementation<br>by 2002<br>*Mise en oeuvre en<br>2002<br>*Implantación<br>prevista en 2002 |
| SADD BUENOS AIRES/Don<br>Torcuato                               | TWR<br>SMC   | 1 (1)<br>1 (1)   |                                      |   |                                   |   |   |                  |  |
| SADF BUENOS AIRES/San<br>Fernando                               | APP<br>TWR<br>SMC  | 1<br>1 (1)<br>1 (1)  |                                      |   |                                   |   |   |                  |  |
| SARI CATARATAS DEL<br>IGUAZU/My. Carlos<br>Eduardo K.           | TWR  | <u>+2 (+2)</u>   |                                      |   |                                   |   |   |                  |  |
| SAVF COMODORO<br>RIVADAVIA                                      | ACC-U<br>ACC-L<br>GP   | 2 (2)<br>1 (1)<br>1 (1)  | 1 (06/0 <u>610</u> )                 | SAM-1 ( <u>52</u> )                       | X (06/0 <u>810</u> )              | X (06/0 <u>810</u> )                                  | X (06/0 <u>810</u> )                                      |                  |  |
| SAVC COMODORO<br>RIVADAVIA/General<br><br>Mosconi               | APP<br>TWR   | <u>1(1)</u><br><u>+2 (+2)</u>  |                                      |   |                                   |   |   |                  | Implementation by<br>2008<br>Implementación<br>prevista en 2008                                |
| SACF CORDOBA  | ACC-U<br>GP  | <u>34 (34)</u><br>1  | 1 (06/0 <u>69</u> )                  | SAM-1 ( <u>31</u> )                       |                                   |   |   |                  | Implementation by<br>2008<br>Implementación  |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones  |
|---|--|----------------------------------|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|--|
| 1   | 2  | 3                                | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10   |
| SACO CORDOBA/Ing. A. Taravella                                  | APP-SR-I<br>TWR<br>SMC   | 1 (1)<br>+2 (+2)<br>1 (1)        |                                      |                               |                                   |   |   |                  | <a href="#">prevista en 2008</a>   |
| SARF FORMOSA/Formosa  | APP-L<br>TWR   | 1 (1)<br>1 (1)                   |                                      |                               |                                   |   |   |                  |  |
| SASJ JUJUY/Gobernador Guzmán                                    | APP-SR-1<br>TWR  | 1 (1)<br>1 (1)                   |                                      |                               |                                   |   |   |                  |  |
| SAZM MAR DEL PLATA/<br>Brig. Gral. B. de la Colina              | APP-SR-I<br>TWR<br>SMC<br>ATIS                                   | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1) |                                      |                               |                                   |   |   |                  |  |
| SAMF MENDOZA  | ACC-U<br>GP  | 3 (3)<br>1 (1)                   | 1 (06/0610)                          | SAM-1 (31)                    |                                   |   |   |                  |  |
| SAME MENDOZA/EI Plumerillo                                      | APP-SR-I<br>TWR<br>SMC<br>ATIS                                   | 1<br>1 (1)<br>1 (1)<br>1 (1)     |                                      |                               |                                   |   |   |                  |  |
| SAZN NEUQUEN/Presidente Perón                                   | APP<br>TWR   | 1<br>1 (1)                       |                                      |                               |                                   |   |   |                  |  |
| SARP POSADAS/Libertador Gral. D. José de San Martín             | APP-L<br>TWR   | 1 (1)<br>1 (1)                   |                                      |                               |                                   |   |   |                  |  |
| SARR RESISTENCIA  | ACC-U<br>GP  | 3 (3)<br>1 (1)                   | 1 (06/06)                            | SAM-1 (31)                    | X (06/06)                         |   |   |                  |  |
| SARE RESISTENCIA/<br>Resistencia                                | APP-SR-I<br>TWR<br>ATIS  | 1 (1)<br>1 (1)<br>1              |                                      |                               |                                   |   |   |                  | Implementation by 2002<br>Mise en œuvre en 2002<br>Implantación prevista en 2002 |
| SAWG RIO GALLEGOS/<br>Piloto Civil N. Fernández                 | APP-L<br>TWR<br>ATIS<br>GP                                       | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1) |                                      |                               |                                   |   |   |                  |  |
| SAWE RIO GRANDE/<br>Rio Grande                                  | APP<br>TWR   | 1<br>1 (1)                       |                                      |                               |                                   |   |   |                  |  |
| SAAR ROSARIO/Rosario  | APP-L<br>TWR<br>ATIS   | 1 (1)<br>1 (2)<br>1              |                                      |                               |                                   |   |   |                  | Implementation by 2002<br>Mise en œuvre en 2002<br>Implantación prevista en 2002 |
| SASA SALTA/Salta  | APP-L<br>TWR<br>GP   | 1 (1)<br>1 (1)<br>+2 (+2)        |                                      |                               |                                   |   |   |                  | <a href="#">Implementation by 2008</a>   |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF          | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones   |
|---|--|---|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---|
| 1   | 2  | 3   | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10  |
| SAZS SAN CARLOS DE<br>BARILOCHE/San Carlos<br>de Bariloche      | APP-SR-I<br>TWR<br>ATIS  | 1<br>1 (1)<br>1 (1)                       |                                      |                               |                                   |   |   |                  | <a href="#">Implementación prevista en 2008</a>   |
| SANT TUCUMAN/Tte.<br>Benjamin Matienzo                          | APP-L<br>TWR<br>GP   | 1 (1)<br>1 (2)<br>1 (1)                   |                                      |                               |                                   |   |   |                  |   |
| SAWH USHUAIA/Malvinas<br>Argentinias                            | APP-L<br><br>TWR<br>GP   | 1 (1)<br><br>1 (1)<br>1 (1)               |                                      |                               |                                   |   |   |                  | <a href="#">Implementation by 2008</a><br><a href="#">Implementación prevista en 2008</a> |
| <b>ARUBA (Netherlands)</b>                                      |  |   |                                      |                               |                                   |   |   |                  |   |
| TNCA ORANJESTAD/<br>Reina Beatriz, Aruba I.                     | APP-SR-L<br>APP-L<br>TWR<br>SMC<br><u>D-ATIS</u>                 | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1) |                                      |                               |                                   |   |   |                  |   |
| <b>BAHAMAS</b>  |  |   |                                      |                               |                                   |   |   |                  |   |
| MYBS ALICE TOWN/<br>South Bimini, Bimini I.                     | TWR  | 1   |                                      |                               |                                   |   |   |                  |   |
| MYSM COCKBURN TOWN/<br>San Salvador I.                          | TWR  | 1   |                                      |                               |                                   |   |   |                  |   |
| MYGF FREEPORT/Intl.,<br>Grand Bahama I.                         | APP-U<br>APP-L<br>TWR<br>SMC                                     | 1<br>1<br>1<br>1                          |                                      |                               |                                   |   |   |                  |   |
| MYEG GEORGETOWN/<br>Georgetown, Exuma Intl.                     | APP-L<br>TWR   | 1<br>1                                    |                                      |                               |                                   |   |   |                  |   |
| MYEM GOVERNOR=S<br>HARBOUR/ Governor=s<br>Harbour, Eleuthera I. | APP-L<br>TWR   | 1<br>1                                    |                                      |                               |                                   |   |   |                  |   |
| MYNA NASSAU   | ACC-U<br>GP<br>ACC-L   | 3<br>1<br>1                               |                                      |                               |                                   |   |   |                  |   |
| MYNN NASSAU/Intl.,<br>New Providence I.                         | APP-I<br>TWR<br>SMC<br>APP-SR-I<br><u>D-ATIS</u>                 | 1<br>1<br>1<br>1<br><u>1</u>              |                                      |                               |                                   |   |   |                  |   |
| MYEH NORTH ELEUTHERA/<br>New Providence I.                      | TWR  | 1<br>1                                    |                                      |                               |                                   |   |   |                  |   |
| MYLS STELLA MARIS/Long<br>Island I.                             | TWR  | 1   |                                      |                               |                                   |   |   |                  |   |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF        | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|---|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2  | 3                                       | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
| MYAT TREASURE CAY/<br>Treasure Cay, Abaco I.                    | TWR<br>APP-L   | 1<br>1                                  |                                      |                               |                                   |   |   |                  |                                       |
| MYGW WEST END/West<br>End, Grand Bahama I.                      | TWR  | 1                                       |                                      |                               |                                   |   |   |                  |                                       |
| <b>BARBADOS</b>   |  |   |                                      |                               |                                   |   |   |                  |                                       |
| TBPB BRIDGETOWN/<br>Grantley Adams Intl.                        | APP-U<br>APP-I<br>TWR<br>SMC<br>APP-SR-U<br><del>D-ATIS</del>    | 1<br>5<br>1<br>1<br>1<br><del>1</del>   |                                      |                               |                                   |   |   |                  |                                       |
| <b>BELIZE</b>   |  |   |                                      |                               |                                   |   |   |                  |                                       |
| MZBZ BELIZE/Intl.   | APP-I<br>APP-I<br>TWR<br>SMC<br><del>D-ATIS</del>                | 1<br>1<br>1<br>1<br><del>1</del>        |                                      |                               |                                   |   |   |                  |                                       |
| <b>BOLIVIA</b>  |  |   |                                      |                               |                                   |   |   |                  |                                       |
| SLCB COCHABAMBA/Jorge<br>Wilsterman                             | TWR<br>APP-I<br>SMC  | 1 (1)<br>2 (1)<br>1 (1)                 |                                      |                               |                                   |   |   |                  |                                       |
| SLLP LA PAZ   | ACC-U<br>ACC-U<br><del>GP</del><br>ACC-L                         | 1<br>1 (1)-ER<br>4<br>1 (1)             | 1 (06/06)                            | SAM-1 (3)<br>SAM-2 (3)        | X (06/06)                         |   |   |                  |                                       |
| SLLP LA PAZ/EI Alto Intl.                                       | APP-I<br>TWR<br>SMC<br><del>ATIS</del>                           | 3<br>1 (1)<br>1 (1)<br><del>±</del>     |                                      |                               |                                   |   |   |                  |                                       |
| SLVR SANTA CRUZ/Viru-Viru<br>Intl.                              | APP-I<br>TWR<br>SMC<br><del>ATIS</del>                           | 3 (1)<br>1 (1)<br>1 (1)<br><del>±</del> |                                      |                               |                                   |   |   |                  |                                       |
| SLTJ TARIJA/Oriel Lea Plaza                                     | APP-I<br>TWR   | 1 (1)<br>1 (1)                          |                                      |                               |                                   |   |   |                  |                                       |
| SLTR TRINIDAD/Tte. Av.<br>Jorge Henrich Arauz                   | APP-I<br>TWR<br>SMC  | 2 (1)<br>1 (1)<br>1                     |                                      |                               |                                   |   |   |                  |                                       |
| <b>BRAZIL</b>   |  |   |                                      |                               |                                   |   |   |                  |                                       |
| SB.. AMAZONICA  | ACC-SR-U<br>GP   | 24 (24)<br>1                            | 2 (06/08)                            | SAM-2 (4)                     | X (06/08)                         |   |   |                  |                                       |
| SB.. ATLANTICA  | ACC-U  |   |                                      | SAM-2 (4)<br>SAT-1<br>SAT-2   | X (06/08)                         | X (06/08)   | X (06/68)   |                  |                                       |
| SBBE BELEM/Val de Cães<br>Intl.                                 | APP-SR-I<br>TWR<br>SMC   | 4 (4)<br>1 (1)<br>1 (1)                 |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF          | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|---|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2  | 3   | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
| SBCF BELO HORIZONTE/<br>Tancredo Neves Intl.                    | APP-SR-I<br>TWR<br>SMC<br>CLRD<br>ATIS                           | 4 (4)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1) | 1 (06/01)                            |                               |                                   |   |   |                  |                                       |
| SBS BRASILIA  | ACC-SR-U   | 16 (16)                                   | 8 (06/08)                            | SAM-2 (4)                     | X (06/08)                         |   |   |                  |                                       |
| SBBR BRASILIA/Brasília Intl.                                    | APP-SR-I<br>TWR<br>SMC<br>CLRD<br>ATIS                           | 4 (3)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1) | 1 (06/01)                            |                               |                                   |   |   |                  |                                       |
| SBBV BOA VISTA/<br>Boa Vista Intl.                              | APP-I<br>TWR<br>SMC  | 1 (1)<br>2 (2)<br>1                       |                                      |                               |                                   |   |   |                  |                                       |
| SBKP CAMPINAS/Viracopos<br>Intl.                                | APP-SR-I<br>TWR<br>SMC   | 1 (1)<br>1 (1)<br>1                       |                                      |                               |                                   |   |   |                  |                                       |
| SBCG CAMPO GRANDE/<br>Campo Grande Intl.                        | APP-SR-I<br>TWR<br>ATIS  | 1 (1)<br>1 (1)<br>1                       |                                      |                               |                                   |   |   |                  |                                       |
| SBCR CORUMBA/<br>Corumba Intl.                                  | AFIS   | 1 (1)                                     |                                      |                               |                                   |   |   |                  |                                       |
| SBCZ CRUZEIRO DO SUL/<br>Cruzeiro do Sul Intl.                  | AFIS   | 1 (1)                                     |                                      |                               |                                   |   |   |                  |                                       |
| SBCY CUIABA/Marechal<br>Rondon Intl.                            | APP-SR-I<br>TWR  | 1 (1)<br>1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| SB CW CURITIBA  | ACC-SR-U   | 10 (10)                                   | 2 (06/08)                            | SAM-2 (4)                     | X (06/08)                         |   |   |                  |                                       |
| SBCT CURITIBA/<br>Afonso Peña Intl.                             | APP-SR-I<br>TWR<br>ATIS<br>SMC<br>CLRD                           | 3 (3)<br>2 (2)<br>1<br>1 (1)<br>1 (1)     |                                      |                               |                                   |   |   |                  |                                       |
| SBFL FLORIANÓPOLIS/<br>Hercílio Luz Intl.                       | APP-SR-I<br>TWR<br>SMC   | 3 (3)<br>2 (2)<br>1                       |                                      |                               |                                   |   |   |                  |                                       |
| SBFZ FORTALEZA/<br>Pinto Martins Intl.                          | APP-SR-I<br>TWR<br>SMC<br>CLRD                                   | 2 (2)<br>1 (1)<br>1 (1)<br>1 (1)          |                                      |                               |                                   |   |   |                  |                                       |
| SBFI FOZ DO IGUAÇU/<br>Cataratas Intl.                          | APP-SR-I<br>TWR  | 2 (2)<br>1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| SBMQ MACAPA/<br>Macapa Intl.                                    | APP-I<br>TWR   | 1<br>1                                    |                                      |                               |                                   |   |   |                  |                                       |
| SBEG MANAUS/Eduardo<br>Gomes Intl.                              | APP-SR-I<br>TWR<br>SMC   | 4 (4)<br>1 (1)<br>1 (1)                   |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or<br>function<br>Service ou<br>fonction<br>Servicio o<br>función | VHF voice<br>Voix VHF<br>Voz VHF          | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite<br>voice<br>Voix satellite<br>Voz por<br>satélite | Satellite data<br>Données<br>satellite<br>Datos por<br>satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|---|---|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2   | 3   | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
| SBNT NATAL/Augusto Severo<br>Intl.                              | APP-SR-I<br>TWR<br>SMC<br>CLRD  | 4 (4)<br>2 (2)<br>1 (1)<br>1              |                                      |                               |                                   |   |   |                  |                                       |
| SBPP PONTA PORÃ/<br>Ponta Porã Intl.                            | AFIS  | 1 (1)                                     |                                      |                               |                                   |   |   |                  |                                       |
| SBPA PORTO ALEGRE/<br>Salgado Filho Intl                        | APP-SR-I<br>TWR<br>SMC<br>CLRD<br>ATIS                                    | 4 (4)<br>1 (1)<br>1 (1)<br>1<br>1         |                                      |                               |                                   |   |   |                  |                                       |
| SBRE RECIFE   | ACC-SR-U<br>GP  | 16 (16)<br>1                              | 5 (06/08)                            | SAT-2 (4)                     | X (06/08)                         |   |   |                  |                                       |
| SBRF RECIFE/Guararapes<br>Intl.                                 | APP-SR-I<br>TWR<br>SMC<br>ATIS<br>CLRD                                    | 4 (4)<br>1 (1)<br>1 (1)<br>1<br>1         |                                      |                               |                                   |   |   |                  |                                       |
| SBGL RIO DE JANEIRO/<br>Galeão Antonio Carlos<br>Jobim Intl.    | APP-SR-I<br>TWR<br>SMC<br>CLRD<br>ATIS                                    | 6 (6)<br>2 (2)<br>1 (1)<br>1 (1)<br>1 (1) | 1 (06/01)                            |                               |                                   |   |   |                  |                                       |
| SBSV SALVADOR/Deputado<br>Luis Eduardo Magalhães<br>Intl.       | APP-SR-I<br>TWR<br>SMC<br>GP<br>ATIS                                      | 4 (4)<br>1 (1)<br>1 (1)<br>1<br>1         |                                      |                               |                                   |   |   |                  |                                       |
| SBSN SANTAREM/<br>Santarem Intl.                                | APP-I<br>TWR  | 2 (2)<br>1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| SBSL SÃO LUIS/Marechal<br>Cunha Machado Intl.                   | APP-I<br>TWR  | 1 (1)<br>1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| SBGR SÃO PAULO/<br>Guarulhos Intl.                              | TWR<br>SMC<br>CLRD<br>ATIS  | 3 (3)<br>1 (1)<br>1 (1)<br>1 (1)          | 1 (06/01)                            |                               |                                   |   |   |                  |                                       |
| SBTT TABATINGA/<br>Tabatinga Intl.                              | AFIS  | 1 (1)                                     |                                      |                               |                                   |   |   |                  |                                       |
| SBUG URUGUAIANA/<br>Rubem Berta Intl.                           | AFIS  | 1 (1)                                     |                                      |                               |                                   |   |   |                  |                                       |
| <b>CAPE VERDE</b>   |   |   |                                      |                               |                                   |   |   |                  |                                       |
| GVSC SAL I.   | ACC-U<br>ACC-L  | 2-ER<br>1                                 |                                      | SAT-1<br>SAT-2                |                                   |   |   |                  |                                       |
| <b>CAYMAN ISLANDS<br/>(United Kingdom)</b>                      |   |   |                                      |                               |                                   |   |   |                  |                                       |
| MWCB CAYMAN BRAC/<br>Gerrard Smith Intl.                        | TWR<br>SMC  | 1 (1)<br>1                                |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF                       | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|--|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2  | 3  | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
| MWCR GEORGETOWN/<br>Owen Roberts Intl.                          | APP-I<br>TWR<br>SMC<br><del>D</del> -ATIS                        | 1<br>-1<br>1<br>1 (1)                                  |                                      |                               |                                   |   |   |                  |                                       |
| <b>CHILE</b>  |  |  |                                      |                               |                                   |   |   |                  |                                       |
| SCFA ANTOFAGASTA/<br>Cerro Moreno                               | APP-SR-I<br>TWR<br>SMC<br><del>ATIS</del><br>GP                  | 2 (2)<br>1 (1)<br>1 (1)<br><del>+</del><br>1 (1)-ER    | 2 (06/08)                            | SAM-1 (4)                     | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
| SCAR ARICA/Chacalluta   | APP-I<br>TWR<br>SMC  | 1 (1)<br>1 (1)<br>1 (1)                                |                                      |                               |                                   |   |   |                  |                                       |
| SCIE CONCEPCION/<br>Carriel Sur                                 | APP-I<br>TWR<br>SMC  | 1 (1)<br>1 (1)<br>1 (1)                                |                                      |                               |                                   |   |   |                  |                                       |
| SCDA IQUIQUE/Gral. Diego<br>Aracena                             | APP-SR-I<br>TWR<br>SMC<br>GP                                     | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)-ER                    |                                      |                               |                                   |   |   |                  |                                       |
| SCTZ PUERTO MONTT<br><del>Tepual</del>                          | ACC-U<br>ACC-U<br>GP<br><del>APP-SR-I</del>                      | 2 (1)<br>1 (1)-ER<br>1 (1)-ER<br><del>2 (1)</del>      | 2 (06/08)                            | SAM-1 (4)                     | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
| SCTE PUERTO MONTT/<br><del>El Tepual</del>                      | TWR<br>SMC<br><del>ATIS</del>                                    | 1 (1)<br>1 (1)<br><del>+</del>                         |                                      |                               |                                   |   |   |                  |                                       |
| SCCZ PUNTA ARENAS   | ACC-U<br>GP-ER<br>APP-SR-I                                       | 3 (2)<br>1 (2)<br>2 (1)                                | 2 (06/08)                            | SAM-1 (3)                     | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
| SCCI PUNTA ARENAS/<br>Pdte. C. Ibáñez del Campo                 | TWR<br>SMC<br><del>ATIS</del>                                    | 1 (1)<br>1 (1)<br><del>+</del>                         |                                      |                               |                                   |   |   |                  |                                       |
| SCJZ SANTIAGO   | ACC-U<br>GP<br>APP-SR-I  | 4 (4)-ER<br>2 (2)-ER<br>4 (4)                          | 2 (06/08)                            | SAM-1 (3)                     | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
| SCEL SANTIAGO/<br>Arturo Merino Benitez                         | CLRD<br>TWR<br>SMC<br>ATIS                                       | 1 (1)<br><del>2</del> (1)<br><del>2</del> (1)<br>1 (1) | 1 (06/08)                            |                               |                                   |   |   |                  |                                       |
| SCTC TEMUCO/Manquehue   | APP-L<br>TWR<br>SMC  | 1 (1)<br>1 (1)<br>1 (1)                                |                                      |                               |                                   |   |   |                  |                                       |
| <b>COLOMBIA</b>   |  |  |                                      |                               |                                   |   |   |                  |                                       |
| SKJC BARRANQUILLA   | ACC-U<br>GP  | 2 (2)<br>1 (1)   | 2 (06/08)                            | CAR-A (2)                     | X (06/06)                         |   |   |                  |                                       |
| SKBO BARRANQUILLA/<br>Ernesto Cortissoz                         | APP-SR-I<br>TWR<br>SMC   | 2 (2)<br>1 (1)<br>1 (1)                                |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF          | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|---|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2  | 3   | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
| SKED BOGOTA   | ATIS<br>CLRD<br>ACC-UGP  | 1<br>1<br>5 (5)<br>1 (1)-ER               | 1 (06/01)<br>4 (06/06)               | SAM-2 (2)                     | X (06/06)                         | X (06/06)   |   |                  |                                       |
| SKCL CALI   | ACC-SR-IGP   | 1 (1)<br>1 (1)                            |                                      | SAM-1                         | X (06/06)                         |   |   |                  |                                       |
| SKCL CALI/Alfonso Bonilla<br>Aragón                             | APP-SR-I<br>TWR<br>SMC<br>ATIS                                   | 1 (1)<br>1 (1)<br>1 (1)<br>1              |                                      |                               |                                   |   |   |                  |                                       |
| SKCG CARTAGENA/<br>Rafael Núñez                                 | TWR  | 1 (1)                                     |                                      |                               |                                   |   |   |                  |                                       |
| SKCC CUCUTA/Camilo Daza   | APP-I<br>TWR   | 1 (1)<br>1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| SLLT LETICIA/Alfredo<br>Vásquez Cobo                            | APP-SR-I<br>TWR  | 1 (1)<br>1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| SKRG RIO NEGRO/<br>José María Córdova                           | APP-SR-I<br>TWR<br>SMC<br>ATIS                                   | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)          |                                      |                               |                                   |   |   |                  |                                       |
| SKSP SAN ANDRES I./<br>Sesquicentenario                         | APP-SR-I<br>APP-I<br>TWR<br>SMC                                  | 1 (1)<br>1 (1)<br>1 (1)<br>1              |                                      |                               |                                   |   |   |                  |                                       |
| SKBO SANTA FE DE<br>BOGOTA/Eldorado                             | APP-SR-I<br>TWR<br>SMC<br>ATIS<br>CLRD                           | 3 (3)<br>2 (2)<br>2 (2)<br>1 (1)<br>1 (1) | 1 (06/01)                            |                               |                                   |   |   |                  |                                       |
| <b>COSTA RICA</b>   |  |   |                                      |                               |                                   |   |   |                  |                                       |
| MROC ALAJUELA/<br>Juan Santamaría Intl.                         | APP-SR-I<br>TWR<br>SMC<br>D-ATIS<br>GP                           | 2 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1) |                                      |                               |                                   |   |   |                  |                                       |
| MRLB LIBERIA/Tomás<br>Guardia Intl.                             | APP-I<br>TWR<br>SMC  | 1 (1)<br>1 (1)<br>1 (1)                   |                                      |                               |                                   |   |   |                  |                                       |
| MRLM LIMON/Limón Intl.  | AFIS   | 1 (1)                                     |                                      |                               |                                   |   |   |                  |                                       |
| MRPV PAVAS/Tobías<br>Bolaños Intl.                              | TWR<br>SMC   | 1 (1)<br>1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| <b>CUBA</b>   |  |   |                                      |                               |                                   |   |   |                  |                                       |
| MUCM CAMAGUEY/<br>Ignacio Agramonte                             | APP-SR-L<br>TWR  | 1<br>1 (1)                                |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF             | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|--|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2  | 3  | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
| MUCL CAYO LARGO<br>DEL SUR/Viño Acuña                           | APP-L<br>TWR   | 1 (1)<br>1 (1)                               |                                      |                               |                                   |   |   |                  |                                       |
| MUCA CIEGO DE AVILA/<br>Máximo Gómez                            | APP-L<br>TWR   | 1<br>1 (1)                                   |                                      |                               |                                   |   |   |                  |                                       |
| MUHA HABANA   | ACC-SR-U<br>ACC-SR-I<br>GP-U                                     | 5 (4)-ER<br>3 (1)-ER<br>2 (1)                | 2 (06/08)                            | CAR-A (6)                     | X (06/08)                         |   |   |                  |                                       |
| MUHA HABANA/José Martí  | APP-SR-L<br>APP-SR-I<br>TWR<br>SMC<br><u>D-ATIS</u>              | 1<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1)        |                                      |                               |                                   |   |   |                  | <u>2008</u>                           |
| MUHG HOLGUIN/Frank País   | APP-SR-L<br>TWR  | 1<br>1(1)                                    |                                      |                               |                                   |   |   |                  |                                       |
| MUCU SANTIAGO DE CUBA/<br>Antonio Maceo                         | APP-SR-I<br>TWR<br>SMC   | 1 (1)<br>1 (1)<br>1                          |                                      |                               |                                   |   |   |                  |                                       |
| MUVR VARADERO/Juan<br>Gualberto Gomez                           | APP-SR-L<br>TWR<br>SMC<br><u>D-ATIS</u>                          | 1<br>1 (1)<br>1<br><u>1</u>                  |                                      |                               |                                   |   |   |                  | <u>2008</u>                           |
| <b>DOMINICA</b>   |  |  |                                      |                               |                                   |   |   |                  |                                       |
| TDPB MELVILLE HALL/<br>Dominica                                 | TWR  | 1 (1)  |                                      |                               |                                   |   |   |                  |                                       |
| TDPR ROSEAU/Canefield   | TWR  | 1 (1)  |                                      |                               |                                   |   |   |                  |                                       |
| <b>DOMINICAN REPUBLIC</b>                                       |  |  |                                      |                               |                                   |   |   |                  |                                       |
| MDBH BARAHONA/<br>Maria Montes Intl.                            | TWR  | 1 (1)  |                                      |                               |                                   |   |   |                  |                                       |
| <u>MDCY EL CATEY/<br/>El Catey Intl.</u>                        | <u>TWR</u><br><u>APP</u><br><u>SMC</u><br><u>D-ATIS</u>          | <u>2</u><br><u>1</u><br><u>1</u><br><u>1</u> |                                      |                               |                                   |   |   |                  |                                       |
| <u>MDHE HERRERA/<br/>Herrera Intl.</u>                          | <u>TWR</u>   | <u>1 (1)</u>                                 |                                      |                               |                                   |   |   |                  |                                       |
| <u>MDEH EL HIGUERO/<br/>Dr. Joaquín Balaguer Intl.</u>          | <u>TWR</u><br><u>APP</u><br><u>SMC</u>                           | <u>2</u><br><u>1</u><br><u>1</u>             |                                      |                               |                                   |   |   |                  |                                       |
| MDLR LA ROMANA/<br>La Romana Intl.                              | APP-L<br>TWR   | 1 (1)<br>1 (1)                               |                                      |                               |                                   |   |   |                  |                                       |
| MDPP PUERTO PLATA/<br>Gregorio Luperon                          | APP-SR-I<br>TWR<br>SMC   | 1 (1)<br>1 (1)<br>1 (1)                      |                                      |                               |                                   |   |   |                  |                                       |
| MDPC PUNTA CANA/Punta<br>Cana Intl.                             | APP-L<br>TWR   | 1<br>1 (1)                                   |                                      |                               |                                   |   |   |                  |                                       |
| MDST SANTIAGO/Cibao   | APP-L  | 1  |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF                    | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|---|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2  | 3   | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
| Santiago Intl.  | TWR  | 1 (1)   |                                      |                               |                                   |   |   |                  |                                       |
| MDCS SANTO DOMINGO  | ACC-U<br>ACC-SR-U<br>GP  | 4<br>1 (1)<br>1                                     | 1 (06/08)                            |                               |                                   |   |   |                  |                                       |
| MDSO SANTO DOMINGO/<br>De las Américas Intl.                    | APP-SR-I<br>TWR<br>SMC<br>D-ATIS<br>CLRD                         | 2 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1               |                                      |                               |                                   |   |   |                  |                                       |
| <b>ECUADOR</b>  |  |   |                                      |                               |                                   |   |   |                  |                                       |
| SEGU GUAYAQUIL  | ACC-U<br>ACC-U<br>GP   | 2 (2)<br>1-ER<br>1 (1)                              | <del>1 (06/08)</del>                 | SAM-1 (4)                     | <del>X (06/06)</del>              | <del>X (06/06)</del>                                  | <del>X (06/06)</del>                                      |                  |                                       |
| SEGU GUAYAQUIL/<br>Simón Bolívar                                | APP-SR-I<br>APP-I<br>TWR<br>SMC<br>ATIS                          | 1 (1)<br>2 (1)<br>1 (1)<br>1 (1)<br>1               |                                      |                               |                                   |   |   |                  |                                       |
| SELT LATACUNGA/Cotopaxi   | APP-I<br>TWR   | 1 (1)<br>1 (1)                                      |                                      |                               |                                   |   |   |                  |                                       |
| SEMT MANTA/Eloy Alfaro  | APP-I<br>TWR   | 1 (1)<br>1 (1)                                      |                                      |                               |                                   |   |   |                  |                                       |
| SEQU QUITO/Mcal. Sucre  | APP-SR-I<br>TWR<br>SMC<br>ATIS                                   | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)                    |                                      |                               |                                   |   |   |                  |                                       |
| <b>EL SALVADOR</b>  |  |   |                                      |                               |                                   |   |   |                  |                                       |
| MSLP SAN SALVADOR/<br>El Salvador Intl.                         | APP-I<br>APP-I<br>APP-SR-I<br>TWR<br>SMC<br>GP<br>D-ATIS         | 1<br>1<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1) |                                      |                               |                                   |   |   |                  |                                       |
| MSSS SAN SALVADOR/<br>Ilopango Intl.                            | APP-I<br>TWR<br>TWR<br>SMC                                       | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)                    |                                      |                               |                                   |   |   |                  |                                       |
| <b>FRENCH ANTILLES (France)</b>                                 |  |   |                                      |                               |                                   |   |   |                  |                                       |
| TFFF FORT-DE-FRANCE<br>Le Lamentin, Martinique                  | APP-U<br>APP-I<br>TWR<br>APP-SR-I<br>D-ATIS<br>SMC               | 1<br>1<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1)          |                                      |                               |                                   |   |   |                  |                                       |
| TFFR POINTE-A-PITRE/  | APP-U  | 1   |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or<br>function<br>Service ou<br>fonction<br>Servicio o<br>función | VHF voice<br>Voix VHF<br>Voz VHF  | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF       | HF data<br>Données HF<br>Datos HF | Satellite<br>voice<br>Voix satellite<br>Voz por<br>satélite | Satellite data<br>Données<br>satellite<br>Datos por<br>satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|---|-----------------------------------|--------------------------------------|-------------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2   | 3                                 | 4                                    | 5                                   | 6                                 | 7   | 8   | 9                | 10                                    |
| Le Raizet, Guadeloupe   | APP-I<br>TWR<br>APP-SR-I<br>D-ATIS<br>SMC                                 | 2<br>1 (1)<br>1 (1)<br>1 (1)<br>1 |                                      |                                     |                                   |   |   |                  |                                       |
| TFFJ SAINT-BARTHELEMY/<br>Saint-Barthelemy                      | AFIS  | 1                                 |                                      |                                     |                                   |   |   |                  |                                       |
| TFFG SAINT MARTIN/<br>Grand Case, Guadeloupe                    | AFIS  | 1                                 |                                      |                                     |                                   |   |   |                  |                                       |
| <b>FRENCH GUIANA (France)</b>                                   |   |                                   |                                      |                                     |                                   |   |   |                  |                                       |
| SOOO CAYENNE  | ACC-U<br>GP   | 2 (1)<br>1                        |                                      | CAR-A (1)<br>SAM-2 (1)<br>SAT-2 (1) |                                   |   |   |                  |                                       |
| SOCA CAYENNE/<br>Rochambeau                                     | APP-SR-I<br>TWR<br>SMC<br>ATIS  | 1 (1)<br>1 (1)<br>1<br>1          |                                      |                                     |                                   |   |   |                  |                                       |
| <b>GRENADA</b>  |   |                                   |                                      |                                     |                                   |   |   |                  |                                       |
| TGPZ LAURISTON/<br>Carriacou                                    | TWR   | 1                                 |                                      |                                     |                                   |   |   |                  |                                       |
| TGPY SAINT GEORGES/<br>Point Salines                            | APP-L<br>TWR<br>SMC   | 1 (1)<br>1 (1)<br>1 (1)           |                                      |                                     |                                   |   |   |                  |                                       |
| <b>GUATEMALA</b>  |   |                                   |                                      |                                     |                                   |   |   |                  |                                       |
| MGFL FLORES/Flores  | APP-L<br>TWR  | 1<br>1                            |                                      |                                     |                                   |   |   |                  |                                       |
| MGGT GUATEMALA/<br>La Aurora                                    | APP-SR-I<br>TWR<br>SMC<br>D-ATIS<br>GP                                    | 1<br>1<br>1<br>1<br>1             |                                      |                                     |                                   |   |   |                  |                                       |
| MGPB PUERTO BARRIOS/<br>Puerto Barrios                          | TWR   | 1 (1)                             |                                      |                                     |                                   |   |   |                  |                                       |
| MGSJ SAN JOSE/San José  | TWR   | 1 (1)                             |                                      |                                     |                                   |   |   |                  |                                       |
| <b>GUYANA</b>   |   |                                   |                                      |                                     |                                   |   |   |                  |                                       |
| SYGC GEORGETOWN   | ACC-U<br><br>ACC-U<br>GPS<br>ACC-L  | 1(1)<br><br>1-ER<br>1 (1)<br>1    | 1 (06/08)                            | CAR-A<br>SAM-2                      | X (06/08)                         |   |   |                  |                                       |
| SYCJ TIMEHRI/<br>Cheddi Jagan Intl.                             | APP-L<br>TWR<br>SMC   | 1<br>1 (1)<br>1 (1)               |                                      |                                     |                                   |   |   |                  |                                       |
| <b>HAITI</b>  |   |                                   |                                      |                                     |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF          | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|---|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2  | 3   | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
| MTCH CAP HAITIEN/Intl.  | APP-L<br>TWR   | 1<br>1 (1)                                |                                      |                               |                                   |   |   |                  |                                       |
| MTEG PORT-AU-PRINCE   | ACC-SR-U<br>GP   | <del>1</del> (1)<br>1                     | 1 (06/08)                            |                               |                                   |   |   |                  |                                       |
| MTPP PORT-AU-PRINCE/Intl.                                       | APP-SR-I<br>APP-I<br>TWR<br>SMC<br><u>D-ATIS</u>                 | 1<br>1 (1)<br>1 (1)<br>1<br><u>1</u>      |                                      |                               |                                   |   |   |                  |                                       |
| <b>HONDURAS</b>   |  |   |                                      |                               |                                   |   |   |                  |                                       |
| MHLC LA CEIBA/<br>Golósón Intl.                                 | APP-L<br>TWR<br>SMC  | 1<br>1 (1)<br>1                           |                                      |                               |                                   |   |   |                  |                                       |
| MHRO COXEN HOLE/Juan<br>Manuel Gálvez Intl.                     | TWR<br>SMC   | 1 (1)<br>1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| MHLM SAN PEDRO SULA/<br>La Mesa Intl.                           | APP-I<br>TWR<br>SMC<br>GP<br><u>D-ATIS</u>                       | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1) |                                      |                               |                                   |   |   |                  |                                       |
| MHTG TEGUCIGALPA<br>(CENAMER)                                   | ACC-SR-U<br>GP   | 7 (4)<br>1                                | 3 (06/08)                            | CAR-A (6)<br>SAM-1 (2)        | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
| MHTG TEGUCIGALPA/<br>Toncontin                                  | APP-I<br>TWR<br>SMC<br>GP<br><u>D-ATIS</u>                       | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1) |                                      |                               |                                   |   |   |                  |                                       |
| <b>JAMAICA</b>  |  |   |                                      |                               |                                   |   |   |                  |                                       |
| MKJK KINGSTON   | ACC-SR-U<br>ACC-U<br>GP  | 1<br>5 (2)<br>1                           | 2 (06/068)                           |                               | X (06/068)                        | X (06/068)  | X (06/068)  |                  |                                       |
| MKJP KINGSTON/Norman<br>Manley Intl.                            | APP-SR-I<br>APP-I<br>TWR<br>SMC<br><u>D-ATIS</u>                 | 1<br>1 (1)<br>1<br>1 (1)<br><u>1</u>      |                                      |                               |                                   |   |   |                  |                                       |
| MKJS MONTEGO BAY/<br>Sangster Intl.                             | APP-SR-I<br>APP-I<br>TWR<br>SMC<br><u>D-ATIS</u>                 | 1<br>1<br>1 (1)<br>1 (1)<br><u>1</u>      |                                      |                               |                                   |   |   |                  |                                       |
| <b>MEXICO</b>   |  |   |                                      |                               |                                   |   |   |                  |                                       |
| MMAA ACAPULCO/Gral.<br>Juan Alvarez Intl.                       | APP-SR-I<br>APP-SR-L<br><u>D-ATIS</u><br>SMC<br>TWR<br>GP        | 1 (1)<br>1 (1)<br>1<br>1<br>1 (1)<br>1    |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF                    | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|---|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2  | 3   | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
| MMBT BAHIAS DE HUATULCO/<br>Bahías de Huatulco                  | TWR  | 1 (1)   |                                      |                               |                                   |   |   |                  |                                       |
| MMCP CAMPECHE/Ignacio Alberto Acuña Ongay Intl.                 | TWR  | 1 (1)   |                                      |                               |                                   |   |   |                  |                                       |
| MMUN CANCUN/Cancún Intl.  | APP-L<br>APP-I<br>SMC<br>TWR<br>D-ATIS<br>CLRD<br>GP             | 1 (1)<br>1 (1)<br>1<br>1 (1)<br>1<br>1<br>1         |                                      |                               |                                   |   |   |                  |                                       |
| MMCM CHETUMAL/<br>Chetumal Intl.                                | TWR  | 1 (1)   |                                      |                               |                                   |   |   |                  |                                       |
| MMCU CHIHUAHUA/Gral. Roberto Fierro Villalobos Intl.            | APP-I<br>TWR<br>D-ATIS<br>GP                                     | 1 (1)<br>1 (1)<br>1<br>1                            |                                      |                               |                                   |   |   |                  |                                       |
| MMMC CIUDAD ACUÑA/Intl.   | AFIS   | 1 (1)   |                                      |                               |                                   |   |   |                  |                                       |
| MMCS CIUDAD JUAREZ/<br>Abraham González Intl.                   | APP-I<br>TWR   | 1<br>1 (1)  |                                      |                               |                                   |   |   |                  |                                       |
| MMCZ COZUMELCozumel/ Intl.                                      | TWR  | 1 (1)   |                                      |                               |                                   |   |   |                  |                                       |
| MMCL CULIACAN/Fidel Bachigualato                                | APP-I<br>TWR<br>GP   | 1 (1)<br>1 (1)<br>1                                 |                                      |                               |                                   |   |   |                  |                                       |
| MMDO DURANGO/Pte. Guadalupe Victoria, Intl.                     | TWR  | 1 (1)   |                                      |                               |                                   |   |   |                  |                                       |
| MMGL GUADALAJARA/<br>Don Miguel Hidalgo y Costilla Intl.        | APP-SR-I<br>APP-SR-L<br>D-ATIS<br>SMC<br>TWR<br>CLRD<br>GP       | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1<br>1 |                                      |                               |                                   |   |   |                  |                                       |
| MMGM GUAYMAS/Gral. José María Yáñez Intl.                       | TWR  | 1 (1)   |                                      |                               |                                   |   |   |                  |                                       |
| MMHO HERMOSILLO/Gral. Ignacio Pesqueira Garcia Intl.            | APP-I<br>D-ATIS<br>TWR<br>SMC                                    | 1 (1)<br>1 (1)<br>1 (1)<br>1                        |                                      |                               |                                   |   |   |                  |                                       |
| MMZH IXTAPA-ZIHUATANEJO/<br>Ixtapa-Zihuatanejo Intl.            | APP-I<br>TWR   | 1 (1)<br>1 (1)                                      |                                      |                               |                                   |   |   |                  |                                       |
| MMLP LA PAZ/Gral. Manuel Márquez de León Intl.                  | APP-I<br>TWR   | 1 (1)<br>1 (1)                                      |                                      |                               |                                   |   |   |                  |                                       |
| MMLO LEON/Guanajuato  | APP-L  | 1   |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|----------------------------------|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2  | 3                                | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
|   | TWR  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| MMLT LORETO/Loreto Intl.  | TWR  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| MMZO MANZANILLO/Playa de Oro Intl.                              | APP-L  | 1                                |                                      |                               |                                   |   |   |                  |                                       |
|   | TWR  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| MMMA MATAMOROS/Gral. Servando Canales                           | APP-L  | 1                                |                                      |                               |                                   |   |   |                  |                                       |
|   | TWR  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| MMMZ MAZATLAN/Gral. Rafael Buelna Intl.                         | ACC-SR-L   | 4                                | 5 (06/08)                            |                               | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
|   | ACC-SR-U   | 4 (5)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | APP-I  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | SMC  | 1                                |                                      |                               |                                   |   |   |                  |                                       |
|   | TWR  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | D-ATIS   | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | GP   | 1                                |                                      |                               |                                   |   |   |                  |                                       |
| MMMD MERIDA/Lic. Manuel Crescencio Rejón Intl.                  | ACC-SR-L   | 3                                | 3 (06/08)                            | CAR-A (5)                     | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
|   | ACC-SR-U   | 4 (4)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | APP-I  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | D-ATIS   | 1                                |                                      |                               |                                   |   |   |                  |                                       |
|   | GP   | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | TWR  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| MMML MEXICALI/Gral. Rodolfo Sánchez Taboada Intl.               | APP-I  | 1                                |                                      |                               |                                   |   |   |                  |                                       |
|   | TWR  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| MMM X MEXICO/Lic. Benito Juárez Intl.                           | ACC-SR-L   | 5                                | 3 (06/08)                            |                               | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
|   | ACC-SR-U   | 5 (7)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | APP-SR-I   | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | APP-SR-L   | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | D-ATIS   | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | GP   | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | SMC  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | TWR  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | CLRD   | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| MMAN MONTERREY/ Aeropuerto Del Norte Intl.                      | TWR  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| MMM Y MONTERREY/Gral. Mariano Escobedo Intl.                    | ACC-SR-L   | 2                                | 3 (06/08)                            |                               | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
|   | ACC-SR-U   | 2 (3)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | APP-SR-I   | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | APP-SR-L   | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | D-ATIS   | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
|   | GP   | 1                                |                                      |                               |                                   |   |   |                  |                                       |
|   | SMC  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| TWR   | 1 (1)  |                                  |                                      |                               |                                   |   |   |                  |                                       |
| MMMM MORELIA/ Gral. Francisco Mujica Intl.                      | APP-L  | 1                                |                                      |                               |                                   |   |   |                  |                                       |
|   | TWR  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |
| MMNG NOGALES/Nogales Intl.                                      | AFIS   | 1                                |                                      |                               |                                   |   |   |                  |                                       |
| MMNL NUEVO LAREDO/ Quetzalcoatl Intl.                           | APP-L  | 1                                |                                      |                               |                                   |   |   |                  |                                       |
|   | TWR  | 1 (1)                            |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or<br>function<br>Service ou<br>fonction<br>Servicio o<br>función | VHF voice<br>Voix VHF<br>Voz VHF               | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite<br>voice<br>Voix satellite<br>Voz por<br>satélite | Satellite data<br>Données<br>satellite<br>Datos por<br>satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|---|--|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2   | 3  | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
| MMPG PIEDRAS<br>NEGRAS/Intl.                                    | D-ATIS  | 1 (1)  |                                      |                               |                                   |   |   |                  |                                       |
| MMPR PUERTO VALLARTA/<br>Lic. Gustavo Díaz Ordaz<br>Intl.       | APP-SR-I<br>APP-SR-L<br>D-ATIS<br>SMC<br>TWR                              | 1 (1)<br>1 (1)<br>1<br>1<br>1 (1)              |                                      |                               |                                   |   |   |                  |                                       |
| MMRX REYNOSA/Gral. Lucio<br>Blanco Intl.                        | APP-L<br>TWR  | 1<br>1 (1)                                     |                                      |                               |                                   |   |   |                  |                                       |
| MMSF SAN FELIPE/<br>San Felipe Intl.                            | AFIS  | 1 (1)  |                                      |                               |                                   |   |   |                  |                                       |
| MMSD SAN JOSE DEL<br>CABO/San José del<br>Cabo Intl.            | APP-I<br>TWR<br>GP  | 1<br>1 (1)<br>1                                |                                      |                               |                                   |   |   |                  |                                       |
| MMTM TAMPICO/Gral.<br>Francisco Javier Mina Intl.               | APP-I<br>TWR<br>GP  | 1 (1)<br>1 (1)<br>1                            |                                      |                               |                                   |   |   |                  |                                       |
| MMTP TAPACHULA/<br>Tapachula Intl.                              | TWR   | 1 (1)  |                                      |                               |                                   |   |   |                  |                                       |
| MMTJ TIJUANA/<br>Gral. Abelardo<br>L. Rodríguez Intl.           | APP-SR-I<br>APP-SR-L<br>D-ATIS<br>GP<br>TWR<br>SMC                        | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 |                                      |                               |                                   |   |   |                  |                                       |
| MMTO/TOLUCA/Lic. Adolfo<br>Lopez Mateos                         | TWR<br>GP   | 1 (1)<br>1                                     |                                      |                               |                                   |   |   |                  |                                       |
| MMTC TORREON/Torreón<br>Intl.                                   | APP-L<br>TWR  | 1 (1)<br>1 (1)                                 |                                      |                               |                                   |   |   |                  |                                       |
| MMVR VERACRUZ/Gral.<br>Heriberto Jara Intl.                     | APP-L<br>TWR  | 1 (1)<br>1 (1)                                 |                                      |                               |                                   |   |   |                  |                                       |
| MMVA VILLAHERMOSA/<br>C.P.A. Carlos Rovirosa                    | APP-L<br>TWR  | 1<br>1 (1)                                     |                                      |                               |                                   |   |   |                  |                                       |
| MMZC ZACATECAS/Gral.<br>Leobardo Ruíz Intl.                     | APP-I<br>TWR  | 1<br>1 (1)                                     |                                      |                               |                                   |   |   |                  |                                       |
| <b>MONTSERRAT (United Kingdom)</b>                              |   |  |                                      |                               |                                   |   |   |                  |                                       |
| TRPM PLYMOUTH/<br>Blackburne, Montserrat I.                     | APP-L<br>TWR  | 1<br>1   |                                      |                               |                                   |   |   |                  |                                       |
| <b>NETHERLANDS ANTILLES<br/>(Netherlands)</b>                   |   |  |                                      |                               |                                   |   |   |                  |                                       |
| TNCF CURACAO  | ACC-U<br>GP   | 3 (2)-ER<br>1 (1)                              | 2 (06/08)                            |                               | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
| TNCB KRALENDIJK/<br>Flamingo, Bonaire I.                        | APP-I<br>TWR  | 1<br>1 (1)                                     |                                      |                               |                                   |   |   |                  |                                       |
| TNCE ORANJESTAD/<br>F.D. Roosevelt, St.<br>Eustacius I.         | TWR   | 1  |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF             | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|--|--------------------------------------|-------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2  | 3  | 4                                    | 5                             | 6                                 | 7   | 8   | 9                | 10                                    |
| TNCM PHILIPSBURG/Prinses Juliana, St. Maarten I.                | APP-I<br>TWR<br>SMC  | 1<br>1<br>1                                  |                                      |                               |                                   |   |   |                  |                                       |
| TNCC WILLEMSTAD/Hato, Curacao I.                                | APP-I<br>TWR<br>SMC<br>APP-SR-I<br><u>D-ATIS</u>                 | 1<br>1 (1)<br>1<br>1 (1)<br><u>1</u>         |                                      |                               |                                   |   |   |                  |                                       |
| <b>NICARAGUA</b>  |  |  |                                      |                               |                                   |   |   |                  |                                       |
| MNMG MANAGUA/Augusto César Sandino Intl.                        | APP-I<br>TWR<br>SMC<br>GP<br><u>D-ATIS</u>                       | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)<br><u>1</u> |                                      |                               |                                   |   |   |                  |                                       |
| MNPC PUERTO CABEZAS/<br>Puerto Cabezas                          | TWR  | 1  |                                      |                               |                                   |   |   |                  |                                       |
| <b>PANAMA</b>   |  |  |                                      |                               |                                   |   |   |                  |                                       |
| MPBO BOCAS DEL TORO/<br>Bocas del Toro                          | AFIS   | 1 (1)  |                                      |                               |                                   |   |   |                  |                                       |
| MMPCH CHANGUINOLA/<br>Cap. Manuel Niño                          | TWR  | 1 (1)  |                                      |                               |                                   |   |   |                  |                                       |
| MPDA DAVID/Enrique Malek  | TWR<br>SMC   | 1 (1)<br>1 (1)                               |                                      |                               |                                   |   |   |                  |                                       |
| MPMG PANAMA/Marcos A. Gelabert                                  | TWR<br>SMC<br>CLRD   | 1 (1)<br>1 (1)<br>1 (1)                      |                                      |                               |                                   |   |   |                  |                                       |
| MPZL PANAMA   | ACC-U<br>ACC-SR-U<br>APP-SR-I<br>GP                              | 2 (1)<br>1 (1)<br>3 (3)<br>1 (1)             | 1 (06/08)                            | CAR-A (3)<br>SAM-1 (2)        | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
| MPTO PANAMA/Tocumen   | TWR<br>SMC<br>ATIS-D<br>CLRD                                     | 1 (1)<br>1 (1)<br>1<br>1                     |                                      |                               |                                   |   |   |                  |                                       |
| <b>PARAGUAY</b>   |  |  |                                      |                               |                                   |   |   |                  |                                       |
| SGFA ASUNCION   | ACC-U<br>ACC-U<br>GP   | 1 (1)<br>1 (1)-ER<br>1 (1)                   | 1 (06/08)                            | SAM-1 (3)<br>SAM-2 (3)        | X (06/08)                         |   |   |                  |                                       |
| SGAS ASUNCION/<br>Silvio Pettrossi                              | APP-SR-I<br>APP-I<br>TWR<br>SMC                                  | 1 (1)<br>2 (2)<br>1 (1)<br>1 (1)             |                                      |                               |                                   |   |   |                  |                                       |
| SGES CIUDAD DEL ESTE/<br>Guarani                                | APP-SR-I<br>TWR  | 1 (1)<br>1 (1)                               |                                      |                               |                                   |   |   |                  |                                       |
| <b>PERU</b>   |  |  |                                      |                               |                                   |   |   |                  |                                       |
| SPQU AREQUIPA/<br>Rodríguez Ballón Intl.                        | APP-SR-U<br>TWR  | 1 (1)<br>1 (1)                               |                                      |                               |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF               | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF       | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|--|--------------------------------------|-------------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2  | 3  | 4                                    | 5                                   | 6                                 | 7   | 8   | 9                | 10                                    |
| SPHI CHICLAYO/<br>Cap. José Quiñones<br>Gonzáles                | APP-SR-I<br>TWR  | 1 (1)<br>1 (1)                                 |                                      |                                     |                                   |   |   |                  |                                       |
| SPZO CUZCO/Velazco Astete                                       | APP-SR-U<br>TWR<br>ATIS  | 1<br>1 (1)<br>1 (1)                            |                                      |                                     |                                   |   |   |                  |                                       |
| SPQT IQUITOS/Cnel. FAP<br>Francisco Secada Vignetta             | APP-SR-I<br>TWR  | 1 (1)<br>1 (1)                                 |                                      |                                     |                                   |   |   |                  |                                       |
| SPIM LIMA   | ACC-SR-U<br>GP   | 3 (3)-ER<br>1 (1)                              | 2 (06/06)                            | SAM-1 (2)                           | X (06/06)                         | X (06/06)   | X (06/06)   |                  |                                       |
| SPIM LIMA-CALLAO/Jorge<br>Chávez Intl.                          | APP-SR-I<br>APP-SR-U<br>TWR<br>SMC<br>CLRD<br>ATIS               | 1 (1)<br>2<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1) | 1 (06/01)                            |                                     |                                   |   |   |                  |                                       |
| SPSO PISCO/Pisco  | APP-I<br>TWR<br>SMC  | 1<br>1 (1)<br>1 (1)                            |                                      |                                     |                                   |   |   |                  |                                       |
| SPTN TACNA/Cnel. FAP<br>Carlos Ciriani Santa Rosa               | APP-I<br>TWR   | 1<br>1 (1)                                     |                                      |                                     |                                   |   |   |                  |                                       |
| SPRU TRUJILLO/Cap. Carlos<br>Martínez de Pinillos               | APP-I<br>TWR   | 1 (1)<br>1 (1)                                 |                                      |                                     |                                   |   |   |                  |                                       |
| <b>PUERTO RICO<br/>(United States)</b>                          |  |  |                                      |                                     |                                   |   |   |                  |                                       |
| TJBQ AGUADILLA/Rafael<br>Hernández Intl.                        | TWR  | 1 (1)  |                                      |                                     |                                   |   |   |                  |                                       |
| TJFA FAJARDO/Diego<br>Jiménez Torres                            | TWR  | 1 (1)  |                                      |                                     |                                   |   |   |                  |                                       |
| TJMZ MAYAGUEZ/Mayaguez  | SMC<br>TWR   | 1<br>1   |                                      |                                     |                                   |   |   |                  |                                       |
| TJPS PONCE/Mercedita  | TWR<br>SMC<br>APP-L  | 1<br>1   |                                      |                                     |                                   |   |   |                  |                                       |
| TJZS SAN JUAN   | ACC-U<br>GP-U  | 11   | 4 (06/08)                            | CAR-A (6)<br>CAR-B (1)<br>NAT-A (5) | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
| TJSJ SAN JUAN, PUERTO<br>RICO/Luis Muñoz Marin Intl.            | D-ATIS<br>TWR<br>SMC<br>APP-SR-I                                 | 1 (1)<br>2 (1)<br>1 (1)<br>2 (2)               |                                      |                                     |                                   |   |   |                  |                                       |
| TJVQ VIEQUES/Antonio<br>Rivera                                  | TWR  | 1 (1)  |                                      |                                     |                                   |   |   |                  |                                       |
| <b>SAINT KITTS AND NEVIS</b>                                    |  |  |                                      |                                     |                                   |   |   |                  |                                       |
| TKPK BASSETERRE/Golden<br>Rock, Saint Kitts I.                  | APP-L<br>TWR   | 1 (1)<br>1 (1)                                 |                                      |                                     |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or<br>function<br>Service ou<br>fonction<br>Servicio o<br>función | VHF voice<br>Voix VHF<br>Voz VHF      | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF       | HF data<br>Données HF<br>Datos HF | Satellite<br>voice<br>Voix satellite<br>Voz por<br>satélite | Satellite data<br>Données<br>satellite<br>Datos por<br>satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|---|---------------------------------------|--------------------------------------|-------------------------------------|-----------------------------------|---|---|------------------|---------------------------------------|
| 1   | 2   | 3                                     | 4                                    | 5                                   | 6                                 | 7   | 8   | 9                | 10                                    |
| TKPN CHARLESTOWN/<br>Newcastle, Nevis I.                        | TWR   | 1                                     |                                      |                                     |                                   |   |   |                  |                                       |
| <b>SAINT LUCIA</b>  |   |                                       |                                      |                                     |                                   |   |   |                  |                                       |
| TLPC CASTRIES/Vigie   | TWR<br>SMC  | 1 (1)<br>1 (1)                        |                                      |                                     |                                   |   |   |                  |                                       |
| TLPL VIEUX-FORT/<br>Hewanorra Intl.                             | APP-L<br>TWR<br>SMC   | 1 (1)<br>1 (1)<br>1 (1)               |                                      |                                     |                                   |   |   |                  |                                       |
| <b>SAINT VINCENT AND THE<br/>GRENADINES</b>                     |   |                                       |                                      |                                     |                                   |   |   |                  |                                       |
| TVSV BEQUIA/J. F. Mitchel                                       | TWR   | 1 (1)                                 |                                      |                                     |                                   |   |   |                  |                                       |
| TVSC CANOUAN/Canouan  | TWR   | 1 (1)                                 |                                      |                                     |                                   |   |   |                  |                                       |
| TVSV KINGSTOWNE/<br>E.T. Joshua                                 | APP-L<br>TWR  | 1 (1)<br>1 (1)                        |                                      |                                     |                                   |   |   |                  |                                       |
| TVSM MUSTIQUE/Mustique  | TWR   | 1 (1)                                 |                                      |                                     |                                   |   |   |                  |                                       |
| TVSU UNION ISLAND/<br>Union Island                              | TWR   | 1                                     |                                      |                                     |                                   |   |   |                  |                                       |
| <b>SENEGAL</b>  |   |                                       |                                      |                                     |                                   |   |   |                  |                                       |
| GOOO DAKAR  | ACC-U   | 1 (1)-ER                              |                                      | SAT-1<br>SAT-2                      | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
| <b>SURINAME</b>   |   |                                       |                                      |                                     |                                   |   |   |                  |                                       |
| SMNI NEW NICKERIE/<br>Maj. Fernandes                            | TWR<br>SMC  | 1 (1)<br>1                            |                                      |                                     |                                   |   |   |                  |                                       |
| SMPM PARAMARIBO   | ACC-U<br>GP   | 1 (1)-ER<br>1                         |                                      |                                     |                                   |   |   |                  |                                       |
| SMZO PARAMARIBO/<br>Zorg en Hoop                                | TWR<br>SMC  | 1 (1)<br>1 (1)                        |                                      |                                     |                                   |   |   |                  |                                       |
| SMJP ZANDERY/Johan A.<br>Pengel                                 | APP-I<br>TWR<br>SMC   | 1 (1)<br>1 (1)<br>1 (1)               |                                      |                                     |                                   |   |   |                  |                                       |
| <b>TRINIDAD AND TOBAGO</b>                                      |   |                                       |                                      |                                     |                                   |   |   |                  |                                       |
| TTZP PIARCO   | ACC-SR-U<br>ACC-U<br>GP   | 3<br>4 (2)<br>1 (1)                   | 2 (06/08)                            | CAR-A (3)<br>CAR-B (1)<br>SAM-2 (2) | X (06/08)                         | X (06/08)   | X (06/08)   |                  |                                       |
| TTPP PORT OF SPAIN/<br>Piarco Intl., Trinidad I.                | APP-I<br>APP-SR-I<br>TWR<br>SMC<br>ATIS                                   | 1<br>2 (1)<br>1 (1)<br>1 (1)<br>1 (1) |                                      |                                     |                                   |   |   |                  |                                       |

| Country and location<br>Pays et emplacement<br>País y localidad  | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF          | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF    | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satélite | Satellite data<br>Données satellite<br>Datos por satélite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones  |
|--|--|---|--------------------------------------|----------------------------------|-----------------------------------|---|---|------------------|--|
| 1  | 2  | 3   | 4                                    | 5                                | 6                                 | 7   | 8   | 9                | 10   |
| TTCP SCARBOROUGH/<br>Crown Point, Tobago I.                      | APP-I<br>TWR<br>SMC  | 1 (1)<br>1 (1)<br>1 (1)                   |                                      |                                  |                                   |   |   |                  |  |
| <b>TURKS AND CAICOS ISLANDS (United Kingdom)</b>                 |  |   |                                      |                                  |                                   |   |   |                  |  |
| MBGT GRAND TURK/<br>Grand Turk Intl.                             | APP-L<br>TWR   | 1<br>1 (1)                                |                                      |                                  |                                   |   |   |                  |  |
| MBPV PROVIDENCIALES/<br>Intl.                                    | APP-L<br>TWR   | 1 (1)<br>1 (1)                            |                                      |                                  |                                   |   |   |                  |  |
| MBSC SOUTH CAICOS/Intl.  | APP-L<br>TWR   | 1<br>1 (1)                                |                                      |                                  |                                   |   |   |                  |  |
| <b>UNITED STATES</b>   |  |   |                                      |                                  |                                   |   |   |                  |  |
| KZNY NEW YORK  | GP-U   | 1-ER                                      | 1 (06/08)                            | CAR-A<br>CAR-B                   | X (06/08)                         | X (06/08)   | X (06/08)   |                  |  |
| <b>URUGUAY</b>   |  |   |                                      |                                  |                                   |   |   |                  |  |
| SUCA COLONIA/<br>Departamental de Colonia                        | TWR  | 1 (1')                                    |                                      |                                  |                                   |   |   |                  |  |
| SULS MALDONADO C/C<br>Carlos A. Curbelo Intl<br>Laguna del Sauce | TWR<br>SMC<br>ATIS   | 1 (1)<br>1<br>1                           |                                      |                                  |                                   |   |   |                  |  |
| SUAA MONTEVIDEO/Angel<br>S. Adami Intl.                          | TWR  | 1 (1)                                     |                                      |                                  |                                   |   |   |                  |  |
| SUJO MONTEVIDEO  | ACC-U  | 3 (2)                                     | 1 (06/085)                           | SAM-1 (3)<br>SAM-2 (5)<br>SAT-X* | X (06/08)                         | X (06/08)   | X (06/08)   |                  | *Frequency to be designated<br>*Fréquence à déterminer<br>*Frecuencia por designar |
| SUMU MONTEVIDEO/<br>Carrasco Intl. Gral. Cesareo<br>Berisso      | APP-SR-I<br>APP-I<br><br>SMC<br>TWR<br>ATIS                      | 1 (1)<br>1 (1)<br><br>1 (1)<br>1 (1)<br>1 |                                      |                                  |                                   |   |   |                  |  |
| SURV RIVERA/Cerro<br>Chapeau Intl.                               | TWR  | 1 (1)                                     |                                      |                                  |                                   |   |   |                  |  |
| SUSO SALTO/Intl. Nueva<br>Hesperides                             | TWR  | 1 (1)                                     |                                      |                                  |                                   |   |   |                  |  |
| <b>VENEZUELA</b>   |  |   |                                      |                                  |                                   |   |   |                  |  |
| SVBC BARCELONA/Gral.<br>José Antonio Anzoátegui<br>Intl.         | APP-SR-I<br>TWR<br>SMC<br>ATIS                                   | 2 (2)<br>1 (1)<br>1 (1)<br>1 (1)          |                                      |                                  |                                   |   |   |                  |  |

| Country and location<br>Pays et emplacement<br>País y localidad | Service or function<br>Service ou fonction<br>Servicio o función | VHF voice<br>Voix VHF<br>Voz VHF          | VHF data<br>Données VHF<br>Datos VHF | HF voice<br>Voix HF<br>Voz HF | HF data<br>Données HF<br>Datos HF | Satellite voice<br>Voix satellite<br>Voz por satellite | Satellite data<br>Données satellite<br>Datos por satellite | Mode S<br>Modo S | Remarks<br>Remarques<br>Observaciones |
|---|--|---|--------------------------------------|-------------------------------|-----------------------------------|--|--|------------------|---------------------------------------|
| 1   | 2  | 3   | 4                                    | 5                             | 6                                 | 7  | 8  | 9                | 10                                    |
| SVZM MAIQUETIA  | ACC-SR-U<br>GP   | 5 (6)<br>1 (2)                            | 3 (06/08)                            | CAR-A (4)<br>SAM-2 (3)        | X (06/08)                         | X (06/08)  | X (06/08)  |                  |                                       |
| SVMI CARACAS/Maiquetia,<br>Simón Bolívar                        | APP-SR-L<br>TWR<br>SMC<br>ATIS<br>CLRD                           | 2 (2)<br>2 (2)<br>2 (2)<br>1 (1)<br>1     | <del>1 (06/01)</del>                 |                               |                                   |  |  |                  |                                       |
| SVMC MARACAIBO/<br>La Chinita Intl.                             | APP-SR-I<br>TWR<br>SMC<br>ATIS<br>GP                             | 2 (2)<br>1 (1)<br>1 (1)<br>1 (1)<br>1 (1) |                                      |                               |                                   |  |  |                  |                                       |
| SVMG MARGARITA/Intl. Del<br>Caribe, General Santiago<br>Marino  | APP-SR-I<br>TWR<br>SMC<br>ATIS                                   | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)          |                                      |                               |                                   |  |  |                  |                                       |
| SVJC PARAGUANA/Josefa<br>Camejo                                 | APP<br>TWR (1)   |   |                                      |                               |                                   |  |  |                  |                                       |
| SVSA SAN ANTONIO DEL<br>TACHIRA/San Antonio del<br>Tachira      | APP<br>TWR (1)   |   |                                      |                               |                                   |  |  |                  |                                       |
| SVVA VALENCIA/Zim<br>Valencia                                   | APP<br>TWR   | 1 (1)                                     |                                      |                               |                                   |  |  |                  |                                       |
| <b>VIRGIN ISLANDS<br/>(United Kingdom)</b>                      |  |   |                                      |                               |                                   |  |  |                  |                                       |
| TUPJ ROADTOWN/<br>Beef Island                                   | APP-L<br>TWR   | 1<br>1 (1)                                |                                      |                               |                                   |  |  |                  |                                       |
| TUPW VIRGIN GORDA/<br>Virgin Gorda                              | TWR  | 1   |                                      |                               |                                   |  |  |                  |                                       |
| <b>VIRGIN ISLANDS<br/>(United States)</b>                       |  |   |                                      |                               |                                   |  |  |                  |                                       |
| TISX SAINT CROIX/Henry E.<br>Rohlsen, St. Croix                 | APP-I<br>TWR<br>SMC  | 1 (1)<br>1 (1)<br>1 (1)                   |                                      |                               |                                   |  |  |                  |                                       |
| TIST SAINT THOMAS/<br>Cyril E. King                             | APP-I<br>TWR<br>SMC<br>D-ATIS                                    | 1 (1)<br>1 (1)<br>1 (1)<br>1 (1)          |                                      |                               |                                   |  |  |                  |                                       |

**APÉNDICE B****PLAN DE ACTIVIDAD SAM PARA LA PLANIFICACIÓN E IMPLEMENTACIÓN DE LOS ENLACES DE DATOS AIRE-TIERRA**

1. Participar en seminarios y talleres sobre enlaces de datos aire-tierra.
  2. Revisar y actualizar el Plan regional enlaces de datos aire-tierra (Tabla CNS 2A –FASID) para obtener beneficios de las comunicaciones de datos mejorando la seguridad, la eficiencia y la capacidad, a través de la reducción de las comunicaciones de voz e implementando de manera evolutiva procesos de automatización para cumplimentar los requerimientos operacionales coordinados y armonizados con el sistema mundial ATM.
  3. Evaluar la capacidad y necesidad de modernización de los centros de control y de la flota de aeronaves que opera en la FIR y en el espacio aéreo respectivo para implementar los enlaces de datos aire-tierra en conformidad con los requerimientos operacionales, las SARPS y las orientaciones de la OACI, incorporando la planificación de la implantación de la mencionada capacidad.
  4. Establecer y participar en un programa de ensayos y demostraciones sobre sistemas y aplicaciones de enlace de datos aire-tierra.
  5. Estudiar y evaluar los arreglos que han hecho otros Estados/Organizaciones internacionales para la implementación de los enlaces de datos, estableciendo mecanismos de cooperación sobre bases multinacionales.
  6. En conformidad con la hoja de ruta mundial, establecer un programa regional CAR/SAM para la implementación evolutiva de los enlaces de datos aire-tierra asegurando la interoperabilidad regional e interregional para satisfacer los requerimientos del sistema ATM mundial de una manera coordinada, armoniosa y sin costuras.
  7. Empezar y monitorear investigaciones y desarrollos de la tecnología de comunicaciones, así como efectuar el seguimiento a las SARPS y orientaciones de la OACI para la futura evolución de los enlaces de datos y sus servicios.
  8. Estas actividades se deben desarrollar para ejecutar el programa de implementación que se muestra en el **Apéndice C**.
-

## APÉNDICE C

| <b>PROGRAMA REGIONAL CAR/SAM PARA LA IMPLEMENTACIÓN DE LOS ENLACES DE DATOS AIRE-TIERRA*</b> |   |   |
|--|---|---|
| <b>TÉRMINO</b>   | <b>METAS EN LA IMPLEMENTACIÓN DE LA INFRAESTRUCTURA</b>   | <b>SERVICIOS</b>  |
| Plazo inmediato<br>(2005–2009)   | Implementar servicios de enlace de datos basados en ACARS y FANS e iniciar la utilización de VDL-Mode 2 y HFDL en conformidad con los SARPS y las orientaciones de la OACI. | Maximizar la utilización de: <ul style="list-style-type: none"> <li>- despacho pre-salida;</li> <li>- despacho oceánico;</li> <li>- D-ATIS;</li> <li>- otros mensajes de información de vuelo y rutina; y</li> <li>- reporte automático de posición sobre parte de las aeronaves que operan.</li> </ul> |
| Mediano plazo<br>(2009–2014)   |   | <ul style="list-style-type: none"> <li>- puede ser intercambiada información más compleja relacionada con la seguridad, incluyendo despacho ATC.</li> </ul>   |
| Largo plazo<br>(después de 2014)   | Implementar enlaces de datos VDL de acuerdo su evolución futura y en conformidad con los nuevos SARPS y orientaciones de la OACI.   | <ul style="list-style-type: none"> <li>- la utilización incluirá enlace descendente de parámetros de vuelo de la aeronave para uso del sistema ATM; y</li> <li>- enlace ascendente de datos de tránsito para mejorar la situación del conocimiento en la cabina de pilotaje.</li> </ul>                 |

**Nota:**

\* Este Programa regional está en conformidad con la hoja de ruta mundial para la implementación de los enlaces de datos aire-tierra.

## APÉNDICE D

### Table CNS 1Ba – ATN ROUTER PLAN

#### EXPLANATION OF THE TABLE

*Column*

- 1 Administration – the name of the State, Territory or International Organization responsible for management of an ATN router and Location.
- 2 ATN Router Type to be implemented at the location shown in column 2:  
  
    BBIS – Backbone Boundary Intermediate System performing Inter Domain Routing Protocol (IDRP).  
    BIS – Boundary Intermediate System with IDRP.  
    IS – Intermediate system (router) without IDRP.
- 3 Type of Interconnection:  
  
    Inter – Regional.  
    Intra – Regional.  
    Sub – Regional.
- 4 Name of the location of the correspondent router connected with router/location shown in column 2.
- 5 Link Speed – Speed requirements of the interconnecting link.
- 6 Link Protocol – Protocol requirements for the interconnecting link.
- 7 The means of connecting the ATN routers of columns 2 and 5.  
  
    CAMSAT – Central American digital network.  
    E/CAR – Eastern Caribbean digital network.  
    MEVA – MEVA digital network.  
    REDDIG – South American digital network.  
    DIR – Leased direct circuit.
- 8 Target date of implementation of the ATN facilities and means listed in columns 2, 5 and 8.  
  
    TBD – To be determined.
- 9 Remarks.

## Tabla CNS 1Ba – PLAN DE ENCAMINADORES ATN

### EXPLICACIÓN DE LA TABLA

#### Columna

- 1 Administración – Nombre del Estado, Territorio u Organización Internacional responsable para la gerencia del encaminador ATN y Localidad.
- 2 Tipo de encaminador ATN:  
  
BBIS – Sistema Intermedio Encaminador Principal que ejecuta el Protocolo de Encaminamiento Inter-Dominios (IDRP).  
BIS – Sistema Intermedio Encaminador con IDRP.  
IS – Sistema Intermedio (encaminador) sin IDRP.
- 3 Tipo de Interconexión:  
  
Inter – Regional  
Intra – Regional  
Sub – Regional
- 4 Nombre de la localidad del encaminador correspondiente conectado con el encaminador/ localidad mostrado en la columna 2.
- 5 Velocidad del Enlace – Requerimientos de velocidad del enlace de interconexión.
- 6 Protocolo de Enlace – Requerimientos del Protocolo para el enlace de interconexión.
- 7 Medio de comunicación mediante el cual serán conectados los encaminadores especificados en las columnas 2 y 5.  
  
CAMSAT – Red digital de Centro América.  
E/CAR – Red digital del Caribe Oriental.  
MEVA – Red digital MEVA.  
REDDIG – Red digital de Suramérica.  
DIR – Circuito directo arrendado.
- 8 Fecha meta implementación de las facilidades ATN y medios listados en las columnas 2, 3 y 8.  
  
TBD- A ser determinado.
- 9 Observaciones.

**APENDICE D**

**TABLE/TABLA CNS 1Ba – ATN ROUTERS REGIONAL PLAN / PLAN REGIONAL DE ENCAMINADORES ATN**

| Administration and Location/<br>Administración y Localidad | Type of Router /<br>Tipo de Encaminador | Type of Interconnection/<br>Tipo de interconexión | Connected Router-<br>Encaminador Conectado  | Link Speed-<br>Velocidad del enlace | Link Protocol-<br>Protocolo del Enlace | Vía<br>Vía                              | Target Date /<br>Fecha Meta | Remarks<br>Observaciones |
|--|---|---|---|-------------------------------------|--|---|-----------------------------|--------------------------|
| 1  | 2                                       | 3   | 4   | 5                                   | 6                                      | 7                                       | 8                           | 9                        |
| Argentina /Buenos Aires                                    | IP                                      | Inter/Intra Regional                              | AFI(Johannesburgo), Bolivia (La Paz) , Chile (Santiago de Chile), Brasil(Brasilia), Paraguay (Asunción), Perú (Lima) y Uruguay (Montevideo) | 2x 19200                            | IPv6                                   | CAFSAT y REDDIG                         | 2006                        |                          |
| Bolivia /La Paz  | IP                                      | Intra Regional                                    | Argentina (Buenos Aires), Brasil (Brasilia) y Perú (Lima)   | 2x 19200                            | IPv6                                   | REDDIG                                  | 2010                        |                          |
| Brasil /Manaus   | IP                                      | Intra Regional                                    | Colombia (Bogotá), Guyana (Georgetown), Guyana Francesa (Cayena), Perú (Lima), Surinam(Paramaribo) y Venezuela (Caracas)                    | 2x19200                             | IPv6                                   | REDDIG                                  | 2009                        |                          |
| Brasil /Brasilia   | IP                                      | Inter/Intra Regional                              | AFI (Dakar), EUR(Madrid) NAM (Atlanta) via Bogotá, Argentina (Buenos Aires), Bolivia(La Paz), Paraguay(Asunción) y Uruguay (Montevideo)     | 2x19200                             | IPv6                                   | CAFSAT y REDDIG                         | 2009                        |                          |
| Chile/Santiago   | IP                                      | Inter/Intra Regional                              | PAC(Christchurch, Brisbane), Argentina (Buenos Aires) y Perú (Lima )  | 2x19200                             | IPv6                                   | Communication Service Provider y REDDIG | 2008                        |                          |
| Colombia /Bogotá   | IP                                      | Inter/Intra Regional                              | NAM (Atlanta)*, Ecuador (Guayaquil), Brasil (Manaus) Perú (Lima), Venezuela (Caracas),Panama  | 2x19200                             | IPV6                                   | *Interconexión MEVA II REDDIG y REDDIG  | 2008                        |                          |
| Ecuador/Guayaquil  | IP                                      | Intra Regional                                    | Colombia (Bogotá) y Perú (Lima), Venezuela (Caracas)  | 2x19200                             | IPv6                                   | REDDIG                                  | 2009                        |                          |
|  | IP                                      | Intra Regional                                    | C-CAR (Piarco), Brasil  | 2x19200                             | IPv6                                   | REDDIG                                  | 2010                        |                          |

| Administration and Location/<br>Administración y Localidad | Type of Router /<br>Tipo de Encaminador | Type of Interconnection/<br>Tipo de interconexión | Connected Router-<br>Encaminador Conectado   | Link Speed-<br>Velocidad del enlace | Link Protocol-<br>Protocolo del Enlace | Vía<br>Vía                                 | Target Date /<br>Fecha Meta | Remarks<br>Observaciones |
|--|---|---|--|-------------------------------------|--|--|-----------------------------|--------------------------|
| 1  | 2                                       | 3   | 4  | 5                                   | 6                                      | 7  | 8                           | 9                        |
| Guyana   |   |   | (Manaos) ,<br>Surinam(Paramaribo)<br>y Venezuela(Caracas)  |                                     |  |  |                             |                          |
| Guyana Francesa  | IP                                      | Intra Regional                                    | Brasil (Manaus) y<br>Venezuela (Caracas)   | 2x19200                             | IPv6                                   | REDDIG                                     | 2010                        |                          |
| Panamá   | IP                                      | Inter/Intra<br>Regional                           | NAM(Atlanta), Bogota<br>Colombia   | 1x19200                             | IPv6                                   | MEVA II<br>Interconexión MEVA II<br>REDDIG | 2008                        |                          |
| Paraguay/Asunción  | IP                                      | Intra Regional                                    | Argentina (Buenos<br>Aires ) Brasil (Brasilia)   | 2x19200                             | IPv6                                   | REDDIG                                     | 2007                        |                          |
| Perú/Lima  | IP                                      | Inter/Intra<br>Regional                           | NAM(Atlanta),,Argenti<br>na(BuenosAires),Bolivi<br>a (La Paz),Brasil<br>(Manaos),Chile(Santia<br>go),Colombia<br>(Bogotá),Ecuador<br>(Guayaquil y<br>Venezuela (Caracas),  | 2x19200                             | IPv6                                   | REDDIG                                     | 2008                        |                          |
| Suriname/Paramaribo  | IP                                      | Intra Regional                                    | Brasil (Manaos),<br>Guyana<br>Francesa(Cayena) y<br>Venezuela (Caracas)  | 2x19200                             | IPv6                                   | REDDIG                                     | 2010                        |                          |
| Uruguay /Montevideo  | IP                                      | Intra Regional                                    | Argentina(Buenos<br>Aires), Brasil (Brasilia)  | 2x19200                             | IPv6                                   | REDDIG                                     | 2010                        |                          |
| Venezuela/Caracas  | IP                                      | Inter/Intra<br>Regional                           | CAM (San Juan ),<br>C-CAR(Piarco),<br>EUR(Madrid),Brasil<br>(Manaus), Colombia<br>(Bogotá) y Suriname<br>(Paramaribo), French<br>Guiana (Cayenne),<br>Guyana<br>(Georgetown),<br>Ecuador (Guayaquil),<br>Perú (Lima) |                                     | IPv6                                   | Interconexión MEVAII<br>REDDIG             | 2008                        |                          |

## APENDICE D

### TABLA CNS-1Bb – PLAN DE APLICACIONES TIERRA-TIERRA ATN

#### EXPLICACIÓN DE LA TABLA

*Columna*

- 1 Administración – Nombre del Estado, Territorio u Organización Internacional responsable para la gerencia de una instalación de aplicación tierra-tierra ATN y Localidad de la instalación.
- 2 Tipo de Instalación:  
  
AMHS – Sistema de tratamiento de mensajes ATS)  
AIDC – Comunicaciones de datos entre instalaciones ATS).
- 3 Nombre de la Administración y Localidad correspondiente a la instalación de la aplicación ATN tierra-tierra.
- 4 Norma usada en la instalación indicada en las columnas 1 y 2.
- 5 Fecha de implementación de la instalación .  
  
TBD – A ser determinado.
- 6 Observaciones.

**(SAM REGION / REGIÓN SAM)**

| ATN GROUND-GROUND APPLICATIONS PLAN / PLAN DE APLICACIONES TIERRA-TIERRA |   |   |                                      |  |                           |
|--|---|---|--------------------------------------|--|---------------------------|
| Administration and Location/<br>Administración y localidad               | Application Type/<br>Tipo de Aplicación | Conneted with Administration &<br>Location of/<br>Conectada con Administración y<br>Localidad de. | Used<br>Standard /<br>Norma<br>usada | Implementation Date/<br>Fecha de<br>Implementación | Remarks/<br>Observaciones |
| 1  | 2                                       | 3   | 4                                    | 5  | 6                         |
| Argentina, Buenos Aires  | AMHS                                    | Bolivia, Brasil, Chile, Paraguay Perú,<br>Uruguay y AFI   | IP o OSI<br>sobre IP                 | 2006   |                           |
|  | AIDC                                    | Bolivia, Brasil, Chile, Paraguay Perú,<br>Uruguay y AFI   | IP o OSI<br>sobre IP                 | TBD /Por determinar                                |                           |
| Bolivia , La Paz   | AMHS                                    | Argentina , Perú y Brasil   | IP o OSI<br>sobre IP                 | 2010   |                           |
|  | AIDC                                    | Argentina , Perú y Brasil   | IP o OSI<br>sobre IP                 | TBD /Por determinar                                |                           |
| Brasil, Brasilia   | AMHS                                    | Argentina, Bolivia Paraguay,Uruguay,<br>NAM,EUR,AFI   | IP o OSI<br>sobre IP                 | 2008   |                           |
|  | AIDC                                    | Argentina, Bolivia Paraguay,Uruguay,<br>NAM,EUR,AFI   | IP o OSI<br>sobre IP                 | TBD/ Por determinar                                |                           |
| Brasil ,Manaus   | AMHS                                    | Colombia, Guyana, Guyana Francesa,<br>Perú, Surinam , y Venezuela.                                | IP o OSI<br>sobre IP                 | 2008   |                           |
|  | AIDC                                    | Colombia, Guyana, Guyana Francesa,<br>Perú, Surinam , y Venezuela                                 | IP o OSI<br>sobre IP                 | TBD/ Por determinar                                |                           |
| Chile, Santiago  | AMHS                                    | Argentina, Perú y PAC.  | IP o OSI<br>sobre IP                 | 2008   |                           |
|  | AIDC                                    | Argentina, Perú y PAC.  | IP o OSI<br>sobre IP                 | TBD/Por determinar                                 |                           |
| Colombia , Bogotá  | AMHS                                    | Ecuador, Panamá, Perú y Venezuela.  | IP o OSI<br>sobre IP                 | 2008   |                           |
|  | AIDC                                    | Ecuador, Panamá, Perú y Venezuela.  | IP o OSI<br>sobre IP                 | TBD/Por determinar                                 |                           |
| Ecuador,Quito  | AMHS                                    | Colombia, Perú y Venezuela  | IP o OSI<br>sobre IP                 | 2009   |                           |
|  | AIDC                                    | Colombia, Perú y Venezuela  | IP o OSI<br>sobre IP                 | TBD/Por determinar                                 |                           |
| French Guyana ,Cayenne   | AMHS                                    | Brasil, Venezuela   | IP o OSI<br>sobre IP                 | 2010   |                           |
|  | AIDC                                    | Brasil, Venezuela   | IP o OSI<br>sobre IP                 | TBD/Por determinar                                 |                           |
| Guyana,Georgetown  | AMHS                                    | Brasil, Trinidad Tobago, Suriname y<br>Venezuela  | IP o OSI<br>sobre IP                 | 2010   |                           |
|  | AIDC                                    | Brasil, Trinidad Tobago, Suriname y<br>Venezuela  | IP o OSI<br>sobre IP                 | TBD/Por determinar                                 |                           |
| Panama, Ciudad de<br>Panama  | AMHS                                    | NAM y Colombia  | IP o OSI<br>sobre IP                 | 2008   |                           |
|  | AIDC                                    | NAM y Colombia  | IP o OSI<br>sobre IP                 | TBD/Por determinar                                 |                           |
| Paraguay,Asunción  | AMHS                                    | Argentina, Brasil   | IP o OSI<br>sobre IP                 | 2007   |                           |

| ATN GROUND-GROUND APPLICATIONS PLAN / PLAN DE APLICACIONES TIERRA-TIERRA |   |   |                                      |  |                           |
|--|---|---|--------------------------------------|--|---------------------------|
| Administration and Location/<br>Administración y localidad               | Application Type/<br>Tipo de Aplicación | Conneted with Administration &<br>Location of/<br>Conectada con Administración y<br>Localidad de. | Used<br>Standard /<br>Norma<br>usada | Implementation Date/<br>Fecha de<br>Implementación | Remarks/<br>Observaciones |
| 1  | 2                                       | 3   | 4                                    | 5  | 6                         |
|  | AIDC                                    | Argentina, Brasil   | IP o OSI<br>sobre IP                 | TBD/Por determinar                                 |                           |
| Perú, Lima   | AMHS                                    | Argentina,Bolivia,Brasil,Chile<br>Colombia,Ecuador,Venezuela y NAM                                | IP o OSI<br>sobre IP                 | 2008   |                           |
|  | AIDC                                    | Argentina,Bolivia,Brasil,Chile<br>Colombia,Ecuador,Venezuela y NAM                                | IP o OSI<br>sobre IP                 | TBD/Por determinar                                 |                           |
| Surinam, Paramaribo  | AMHS                                    | Brasil,French Guyana y Venezuela  | IP o OSI<br>sobre IP                 | 2010   |                           |
|  | AIDC                                    | Brasil,French Guyana y Venezuela  | IP o OSI<br>sobre IP                 | TBD/Por determinar                                 |                           |
| Uruguay, Montevideo  | AMHS                                    | Argentina, Brasil   | IP o OSI<br>sobre IP                 | 2010   |                           |
|  | AIDC                                    | Argentina, Brasil   | IP o OSI<br>sobre IP                 | TBD/Por determinar                                 |                           |
| Venezuela,Caracas  | AMHS                                    | Brasil, Colombia, Ecuador, Guyana,<br>French Guyana, Perú, Suriname,<br>NAM,CAR y EUR             | IP o OSI<br>sobre IP                 | 2008   |                           |
|  | AIDC                                    | Brasil, Colombia, Ecuador, Guyana,<br>French Guyana, Perú, Suriname,<br>NAM,CAR y EUR             | IP o OSI<br>sobre IP                 | TBD/Por determinar                                 |                           |

## Apéndice Y al Informe sobre la Cuestión 3 del Orden del Día

## APPENDIX/APENDICE E

**Table CNS 4A - SURVEILLANCE SYSTEMS (Updated)**  
**Tabla CNS 4A - SISTEMAS DE VIGILANCIA (Actualizada)**

| State(Territory)/Location<br>Estado(Territorio)/Ubicación | ATS Unite Served<br>Unidad ATS Servida       | PSR                |                               |                           | SSR                |                            |                               |                           | ADS          |                           | Remarks<br>Observaciones |
|---|--|--------------------|-------------------------------|---------------------------|--------------------|----------------------------|-------------------------------|---------------------------|--------------|---------------------------|--------------------------|
|   |  | Funtion<br>Función | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Funtion<br>Función | Modes<br>Modos<br>(A,C& S) | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Type<br>Tipo | Status<br>Impl.<br>Estado |                          |
| 1   | 3  | 4                  | 5                             | 6                         | 7                  | 8                          | 9                             | 10                        | 11           | 12                        | 13                       |
| <b>ANGUILA (UK)</b>                                       |  |                    |                               |                           |                    |                            |                               | NP                        |              |                           |                          |
| <b>ANTIGUA &amp; BARBUDA</b>                              |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Airport (4 NM North)                                      | V.C. Bird APP                                |                    |                               |                           | T                  | A/C                        | 180                           | I*                        |              |                           | * MSSR                   |
| <b>ARGENTINA</b>  |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Aeroparque Jorge Newbery                                  | Ezeiza ACC<br>Aeroparque APP                 | T                  | 60                            | P                         | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| Bahía Blanca, Airport                                     | Ezeiza ACC<br>Bahía Blanca APP               | T                  | 60                            | P                         | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| Bolívar, Airport  | Ezeiza ACC                                   |                    |                               |                           | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| Colonia Catriel, Airport                                  | Ezeiza ACC                                   |                    |                               |                           | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| Córdoba, Airport  | Córdoba ACC<br>Ezeiza ACC<br>Córdoba APP     | T                  | 60                            | I                         | E/T                | A/C                        | 180                           | I/P*                      |              |                           | * MSSR                   |
| Ezeiza, Airport   | Ezeiza ACC<br>Buenos Aires APP               | T                  | 90                            | I                         | E                  | A/C                        | 220                           | I*                        |              |                           | * MSSR                   |
| Jujuy, Airport  | Córdoba ACC                                  |                    |                               |                           | E                  | A/C                        | 220                           | p*                        |              |                           | * MSSR                   |
| La Rioja, Airport   | Córdoba ACC                                  |                    |                               |                           | E                  | A/C                        | 220                           | p*                        |              |                           | * MSSR                   |
| Las Lomitas, Airport                                      | Ezeiza ACC<br>Córdoba ACC                    |                    |                               |                           | E                  | A/C                        | 220                           | p*                        |              |                           | * MSSR                   |
| Mar de Plata, Airport                                     | Ezeiza ACC<br>Mar del Plata APP              | T                  | 60                            | I                         | E                  | A/C                        | 220                           | I*                        |              |                           | * MSSR                   |
| Mendoza, Airport  | Mendoza ACC<br>Mendoza APP                   | T                  | 60                            | I                         | E                  | A/C                        | 180                           | I*                        |              |                           | * MSSR                   |
| Merlo (Buenos Aires)                                      | Ezeiza ACC                                   | T                  | 220                           | P                         | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| Paraná, Airport   | Ezeiza ACC<br>Córdoba ACC                    |                    |                               |                           | E                  | A/C                        | 220                           | I*                        |              |                           | * MSSR                   |
| Posadas Airport   | Ezeiza ACC                                   |                    |                               |                           | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| Reconquista Airport                                       | Ezeiza ACC<br>Córdoba ACC                    |                    |                               |                           | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| Resistencia, Airport                                      | Ezeiza ACC<br>Córdoba APP<br>Resistencia APP | T                  | 60                            | P                         | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| San Carlos de Bariloche,<br>Airport                       | Ezeiza ACC<br>Bariloche APP                  | T                  | 60                            | P                         | E/T                | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| San Luis, Airport   | Córdoba APP<br>Ezeiza ACC                    |                    |                               |                           | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| Santa Rosa, Airport                                       | Ezeiza ACC<br>Ezeiza ACC                     |                    |                               |                           | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| Tartagal, Airport   | Córdoba APP                                  |                    |                               |                           | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |
| Tucumán, Airport  | Córdoba APP<br>Ezeiza ACC                    |                    |                               |                           | E                  | A/C                        | 220                           | P*                        |              |                           | * MSSR                   |

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| State(Territory)/Location<br>Estado(Territorio)/Ubicación | ATS Unite Served<br>Unidad ATS Servida | PSR                |                               |                           | SSR                |                            |                               |                           | ADS          |                           | Remarks<br>Observaciones   |       |
|---|--|--------------------|-------------------------------|---------------------------|--------------------|----------------------------|-------------------------------|---------------------------|--------------|---------------------------|--|-------|
|   |  | Funtion<br>Función | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Funtion<br>Función | Modes<br>Modos<br>(A,C& S) | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Type<br>Tipo | Status<br>Impl.<br>Estado |  |       |
| 1   | 3                                      | 4                  | 5                             | 6                         | 7                  | 8                          | 9                             | 10                        | 11           | 12                        | 13   |       |
| <b>ARUBA</b> (Kingdom of the Netherlands)                 | Reina Beatrix APP                      | T                  | 80                            | I                         | T                  | A/C                        | 256                           | I*                        |              |                           | *MSSR  |       |
| <b>BAHAMAS</b><br>Nassau                                  | Miami ACC<br>Nassau APP                | E/T                |                               | I                         | E/T                | A/C                        |                               | I                         |              |                           |  |       |
| <b>BARBADOS</b><br>Aiport                                 | Adams APP                              |                    |                               |                           | T                  | A/C                        | 250                           | I*                        |              |                           | *MSSR  |       |
| <b>BELIZE</b>   | Belize APP                             |                    |                               |                           |                    |                            |                               | NP                        |              |                           |  |       |
| <b>BOLIVIA</b><br><br>La Paz                              | La Paz ACC                             |                    |                               |                           | E                  | A/C                        |                               | I/P*                      |              |                           | *It is recomended to widen coverage and replacem to MSSR/ Se *Recommended/ Recomendado **Replacem ent recommended to MSSR / Recomendado reemplazo por MSSR |       |
| La Paz  | La Paz APP                             | T                  |                               | P*                        | T                  | A/C                        |                               | I/P**                     |              |                           |  |       |
| <b>BRASIL</b>   |  |                    |                               |                           |                    |                            |                               |                           |              |                           |  |       |
| Barra do Carcas   | Brasilia ACC                           | E                  |                               | I                         | E                  | A/C                        |                               | I                         |              |                           | *MSSR <-2000   |       |
| Belém   | Belem ACC                              | E                  |                               | I                         | E                  | A/C                        |                               | I                         |              |                           |  |       |
| Belém   | Belem APP                              | T                  |                               | I                         | T                  | A/C                        |                               | I                         |              |                           |  |       |
| Boa Vista   | Manaus ACC                             | E                  |                               | I                         | E                  | A/C                        |                               | I                         |              |                           |  |       |
| Bom Jesus da Lapa   | Recife ACC                             |                    |                               |                           | E                  | A/C                        |                               | P*                        |              |                           |  |       |
| Brasilia (Gama)   | Brasilia ACC                           | E                  |                               | I                         | E                  | A/C                        |                               | I                         |              |                           |  |       |
| Brasilia  | Brasilia APP                           | T                  |                               | I                         | T                  | A/C                        |                               | I                         |              |                           |  |       |
| Cachimbo  |  |                    |                               |                           | E                  | A/C                        |                               | P*                        |              |                           |  | *MSSR |
| Campinas  | Campinas APP                           | T                  |                               | P                         | T                  | A/C                        |                               | P*                        |              |                           |  | *MSSR |
| Cangucu   | Curitiba ACC                           | E                  |                               | I                         | E                  | A/C                        |                               | I                         |              |                           |  |       |
| Catanduvas  | Curitiba ACC                           | E                  |                               | I                         | E                  | A/C                        |                               | I                         |              |                           |  |       |
| Chapada Dos Guimaraes                                     | Brasilia ACC                           | E                  |                               | I                         | E                  | A/C                        |                               | I                         |              |                           |  |       |
| Confins   | Belo Horizonte APP                     | T                  |                               | I                         | T                  | A/C                        |                               | I                         |              |                           |  |       |
| Conceicao do Araguaia                                     |  | E                  |                               | P                         | E                  | A/C                        |                               | P*                        |              |                           | *MSSR  |       |
| Cruzeiro do Sul   |  | E                  |                               | P                         | E                  | A/C                        |                               | P*                        |              |                           | *MSSR  |       |
| Curitiba (Morro da Igreja)                                | Curitiba ACC                           | E                  |                               | I                         | E                  | A/C                        |                               | I                         |              |                           |  |       |
| Curitiba  | Curitiba APP                           | T                  |                               | I                         | T                  | A/C                        |                               | I                         |              |                           |  |       |
| Dianopolis  |  |                    |                               |                           | E                  | A/C                        |                               | P*                        |              |                           | *MSSR  |       |
| Eirunepe  |  | E                  |                               | P                         | E                  | A/C                        |                               | P*                        |              |                           | *MSSR  |       |
| Fernando Noronha  | Recife ACC                             |                    |                               |                           | E                  | A/C                        |                               | I                         |              |                           |  |       |
| Fortaleza   | Recife ACC                             | E                  |                               | I                         | E                  | A/C                        |                               | I                         |              |                           |  |       |
| Fortaleza   | Fotaleza APP                           | T                  |                               | I                         | T                  | A/C                        |                               | I                         |              |                           |  |       |

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| State(Territory)/Location<br>Estado(Territorio)/Ubicación | ATS Unite Served<br>Unidad ATS Servida | PSR      |                   |                 | SSR      |                  |                   |                 | ADS  |                 | Remarks<br>Observaciones |              |
|---|--|----------|-------------------|-----------------|----------|------------------|-------------------|-----------------|------|-----------------|--------------------------|--------------|
|   |  | Functión | Coverage          | Status          | Functión | Modes            | Coverage          | Status          | Type | Status          |                          |              |
|   |  | Función  | Cobertura<br>(NM) | Impl.<br>Estado | Función  | Modos<br>(A,C&S) | Cobertura<br>(NM) | Impl.<br>Estado | Tipo | Impl.<br>Estado |                          |              |
| 1   | 3                                      | 4        | 5                 | 6               | 7        | 8                | 9                 | 10              | 11   | 12              | 13                       |              |
| Foz do Iguazu   | Foz do Iguacu APP                      | T        |                   | I               | T        | A/C              |                   |                 | I    |                 |                          |              |
| Guajara - Mirim   |  | E        |                   | P               | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Guarulhos   | Sao Paulo APP                          | T        |                   | I               | T        | A/C              |                   |                 | I    |                 |                          |              |
| Imperatriz  |  |          |                   |                 | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Jacarcacanga  |  |          |                   |                 | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Jaraguari   | Curitiba ACC                           | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Macapa  |  | E        |                   | P               | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Maceió  | Recife ACC                             | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Manaus (E. Gomes)   | Manaus ACC                             | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Manaus (E. Gomes)   | Manaus APP                             | T        |                   | I               | T        | A/C              |                   |                 | I    |                 |                          |              |
| Natal   | Recife ACC                             | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Natal   | Natal APP                              | T        |                   | I               | T        | A/C              |                   |                 | I    |                 |                          |              |
| Petrolina   | Recife ACC                             |          |                   |                 | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR <-1999 |
| Pico do Couto   | Brasilia ACC                           | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Porto Alegre  | Porto Alegre APP                       | T        |                   | I               | T        | A/C              |                   |                 | I    |                 |                          |              |
| Porto Espiridiao  |  | E        |                   | P               | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Porto Seguro  | Recife ACC                             | E        |                   | P               | E        | A/C              |                   |                 | P    |                 |                          | *MSSR <-2000 |
| Porto Velho   |  | E        |                   | P               | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Recife  | Recife ACC                             | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Recife  | Recife APP                             | T        |                   | I               | T        | A/C              |                   |                 | I    |                 |                          |              |
| Río Branco  |  | E        |                   | P               | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Río de Janeiro (Galeao)                                   | Río APP                                | T        |                   | I               | T        | A/C              |                   |                 | I/P* |                 |                          | *MSSR        |
| Salvador  | Recife ACC                             | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Salvador  | Salvador APP                           | T        |                   | I               | T        | A/C              |                   |                 | I    |                 |                          |              |
| Sabtarém  |  | E        |                   | P               | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Santiago  | Curitiba ACC                           | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Sao Felix do Aragonia                                     |  |          |                   |                 | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| S.Feliz do Xingu  |  |          |                   |                 | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Sao Gabriel Cachoeira                                     | Manaus ACC                             | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Sao Luis  |  | E        |                   | P               | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Sao Paulo   | Sao Paulo APP                          | T        |                   | I               | T        | A/C              |                   |                 | I    |                 |                          |              |
| Sao Roque   | Brasilia ACC                           | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Sinop   | Brasilia ACC                           | E        |                   | P               | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Tabatinga   | Manaus ACC                             | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Tanabi  | Brasilia ACC                           | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Tefé  |  | E        |                   | P               | E        | A/C              |                   |                 | P    |                 |                          | *MSSR        |
| Tirios  |  |          |                   |                 | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| Tres Marias   | Brasilia ACC                           | E        |                   | I               | E        | A/C              |                   |                 | I    |                 |                          |              |
| Vilhena   |  | E        |                   | P               | E        | A/C              |                   |                 | P*   |                 |                          | *MSSR        |
| <b>CHILE</b>  |  |          |                   |                 |          |                  |                   |                 |      |                 |                          |              |
| Antofagasta   | Santiago ACC<br>Antofagasta APP        | T        |                   | I               | E/T      | A/C              |                   |                 | I*   |                 |                          | *MSSR        |
| Cerrillos   | Santiago ACC                           |          |                   |                 | T        | A/C              |                   |                 | I*   |                 |                          | *MSSR        |
| Iquique   | Santiago ACC<br>Iquique APP            | T        |                   | I               | T        | A/C              |                   |                 | I    |                 |                          |              |
| Los Angeles   | Santiago APP                           |          |                   |                 | E        | A/C              |                   |                 | I*   |                 |                          | *MSSR        |
| Puerto Montt  | Puerto Montt APP                       | T        |                   | I               | T        | A/C              |                   |                 | I    |                 |                          |              |
| Punta Arena   | Punta Arena ACC                        | E/T      |                   | I               | E/T      | A/C              |                   |                 | I    |                 |                          |              |

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| State(Territory)/Location<br>Estado(Territorio)/Ubicación | ATS Unite Served<br>Unidad ATS Servida   | PSR                |                               |                           | SSR                |                            |                               |                           | ADS          |                           | Remarks<br>Observaciones                  |
|---|--|--------------------|-------------------------------|---------------------------|--------------------|----------------------------|-------------------------------|---------------------------|--------------|---------------------------|---|
|   |  | Funtion<br>Función | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Funtion<br>Función | Modes<br>Modos<br>(A,C& S) | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Type<br>Tipo | Status<br>Impl.<br>Estado |   |
| 1   | 3  | 4                  | 5                             | 6                         | 7                  | 8                          | 9                             | 10                        | 11           | 12                        | 13  |
| Santiago  | Punta Arena APP<br>Santiago ACC<br>Santiago APP  | T                  |                               | I                         | T                  | A/C                        |                               | I*                        |              |                           | *MSSR                                     |
| Vallenar  |  |                    |                               |                           | E                  | A/C                        |                               | I*                        |              |                           | *MSSR                                     |
| <b>COLOMBIA</b>   |  |                    |                               |                           |                    |                            |                               |                           |              |                           |   |
| Araraguara  | Bogotá ACC   |                    |                               |                           | E/T                | A/C                        | 250                           | I*                        |              |                           | *MSSR                                     |
| Bucaramanga   | Villavicencio APP<br>Barranquilla ACC  |                    |                               |                           | E/T                | A/C                        | 250                           | P                         |              |                           | <2005                                     |
| Cali  | Bogotá ACC<br>Cúcuta APP<br>Bogotá ACC<br>Cali APP   | T                  | 80                            | P                         | T                  | A/C                        | 250                           | I*                        |              |                           | *MSSR                                     |
| Carepa  | Barranquilla ACC<br>Bogotá ACC<br>Rio Negro APP  | E/T                | 80                            | I                         | E/T                | A/C/S                      | 250                           | I*                        |              |                           | *MSSR, <2004<br>Used SAC-<br>ASTERIX Code |
| Carimagua   | Bogotá ACC<br>Villavicencio APP  | E/T                | 200                           | I                         | E/T                | A/C                        | 200                           | I                         |              |                           |   |
| Cerro Maco  | Barranquilla ACC<br>Bogotá ACC<br>Barranquilla APP<br>Cartagena TWR<br>Rio Negro APP           | E/T                | 165                           | I                         | E/T                | A/C                        | 250                           | I*                        |              |                           | *MSSR                                     |
| Cerro Verde   | Barranquilla ACC<br>Bogotá ACC<br>Barranquilla APP<br>Cali APP<br>Pereira APP<br>Rio Negro APP | E/T                | 60                            | I                         | E                  | A/C                        | 200                           | I*                        |              |                           | *MSSR                                     |
| El Dorado   | Bogotá ACC<br>Bogotá APP<br>Villacencio APP  | E/T                | 60                            | I                         | E/T                | A/C                        | 200                           | I*                        |              |                           | *MSSR                                     |
| Espinal   | Bogotá ACC<br>Bogotá APP   |                    |                               |                           | E/T                | A/C                        | 250                           | P                         |              |                           | <2005                                     |
| Leticia   | Bogotá ACC<br>Leticia APP<br>Villavicencio APP   | E/T                | 200                           | I                         | E/T                | A/C                        | 250                           | I                         |              |                           | *MSSR<br><2004                            |
| Leticia (MIL)   | Villavicencio APP  | T                  | 240                           | P                         | T                  | A/C                        | 240                           | P                         |              |                           |   |
| Marandúa  | Bogotá ACC<br>Villavicencio APP  | E/T                | 240                           | I                         | E/T                | A/C                        | 240                           | I                         |              |                           |   |
| Pereira   | Bogotá ACC<br>Bogotá APP<br>Cali APP<br>Pereira APP<br>Rio Negro APP                           |                    |                               |                           | E/T                | A/C                        | 250                           | P                         |              |                           | <2005                                     |
| Ríoacha   | Barranquilla ACC   | E                  | 240                           | I                         | E                  | A/C                        | 240                           | I                         |              |                           |   |
| S. J. Guaviare  | Bogotá ACC   | E/T                | 240                           | I                         | E/T                | A/C                        | 240                           | I                         |              |                           |   |

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|---|---|--------------------|-------------------------------|---------------------------|--------------------|----------------------------|-------------------------------|---------------------------|--------------|---------------------------|--------------------------|
|   |   | Funtion<br>Función | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Funtion<br>Función | Modes<br>Modos<br>(A,C& S) | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Type<br>Tipo | Status<br>Impl.<br>Estado |                          |
| 1   | 3   | 4                  | 5                             | 6                         | 7                  | 8                          | 9                             | 10                        | 11           | 12                        | 13                       |
| San Andrés (MIL)  | Villavicencio APP   | E/T                | 240                           | I                         | E/T                | A/C                        | 240                           | I                         |              |                           |                          |
| San Andrés  | Barranquilla ACC<br>San Andrés APP  |                    |                               |                           | E/T                | A/C                        | 250                           | I*                        |              |                           | *MSSR, <2007             |
| Santa Ana   | Barranquilla ACC<br>San Andrés APP  | E/T                | 165                           | I                         | E/T                | A/C                        | 250                           | I*                        |              |                           | *MSSR                    |
| Tablazo   | Bogotá ACC<br>Cali ACC/APP<br>Pereira APP   | E/T                | 80                            | P                         | E/T                | A/C                        | 250                           | I/P*                      |              |                           | *MSSR, <2004             |
| Tubará (Barranquilla)                                     | Bogotá ACC<br>Bogotá APP<br>Cali APP<br>Pereira APP<br>Rio Negro APP<br>Villavicencio APP | E/T                | 80                            | I                         | E/T                | A/C                        | 250                           | I*                        |              |                           | *MSSR                    |
| Villavicencio   | Barranquilla ACC<br>Barranquilla APP<br>San Andrés APP                                    | T                  | 80                            | I                         | E                  | A/C                        | 150                           | I                         |              |                           |                          |
| <b>COSTA RICA</b>   |   |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Ei Coco   | Ei Coco APP   | E/T                |                               | I                         | E/T                | A/C                        | 245                           | I*                        |              |                           | *MSSR                    |
| <b>CUBA</b>   |   |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Camagüey  | Habana ACC<br>Camagüey APP  |                    |                               |                           | E/T                | A/C                        | 200                           | I/P*                      |              |                           | *MSSR                    |
| Habana  | Habana TMA<br>Habana APP  | T                  |                               | P                         | T                  | A/C                        | 200                           | I/P*                      |              |                           | *MSSR                    |
| Holguín   | Habana ACC<br>Santiago de Cuba TMA  |                    |                               |                           | E/T                | A/C                        | 200                           | I/P*                      |              |                           | *MSSR                    |
| Menocal   | Holguín APP<br>Habana ACC<br>Habana TMA<br>Habana APP<br>Varadero APP                     |                    |                               |                           | E/T                | A/C                        | 200                           | I*                        |              |                           | *MSSR                    |
| San Julián  | Habana ACC  |                    |                               |                           | E                  | A/C                        | 200                           | I/P*                      |              |                           | *MSSR                    |
| Sta. Clara  | Habana ACC  |                    |                               |                           | E                  | A/C                        | 200                           | I/P*                      |              |                           | *MSSR                    |
| <b>DOMINICA</b>   |   |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
|   |   |                    |                               | NP                        |                    |                            |                               | NP                        |              |                           |                          |
| <b>DOMINICAN REPUBLIC</b>                                 |   |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Barahona  | Barahona APP  | T                  | 70                            | I                         |                    |                            |                               |                           |              |                           |                          |
| Puerto Plata  | Puerto Plata APP  | T                  | 70                            | I                         |                    |                            |                               |                           |              |                           |                          |
| Punta Cana  | Santo Domingo ACC<br>Punta Cana APP   | T                  | 70                            | P                         | E/T                | A/C                        | 250                           | P*                        |              |                           | *MSSR                    |
| Santo Domingo   | Santo Domingo ACC<br>Santo Domingo APP  | E/T                | 70                            | I                         | E/T                | A/C                        | 250                           | I*                        |              |                           | *MSSR                    |

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|---|--|--------------------|-------------------------------|---------------------------|--------------------|----------------------------|-------------------------------|---------------------------|--------------|---------------------------|--------------------------|
|   |  | Funtion<br>Función | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Funtion<br>Función | Modes<br>Modos<br>(A,C& S) | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Type<br>Tipo | Status<br>Impl.<br>Estado |                          |
| 1   | 3                                      | 4                  | 5                             | 6                         | 7                  | 8                          | 9                             | 10                        | 11           | 12                        | 13                       |
| <b>ECUADOR</b>  |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Guayaquil   | Guayaquil ACC                          | E/T                |                               |                           | E                  | A/C                        | 200                           | I*                        |              |                           |                          |
| Quito APP   | Guayaquil APP<br>Quito APP             | T                  |                               | I                         | T                  | A/C                        |                               | I/P*                      |              |                           | * 2000                   |
| <b>EL SALVADOR</b>  |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| El Salvador   | El Salvador APP                        | T                  |                               | I                         | T                  | A/C                        | 200                           | I*                        |              |                           | *MSSR                    |
| <b>FRENCH ANTILLES</b>                                    |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Fort-de-France  | Fort-de-France APP                     |                    |                               |                           | T                  | A/C                        | 250                           | I*                        |              |                           | *MSSR                    |
| Point-à-Pitre   | Point-à-Pitre APP                      |                    |                               |                           | T                  | A/C                        | 250                           | I*                        |              |                           | *MSSR                    |
| <b>GRENADA</b>  |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
|   | Point Salines APP                      |                    |                               |                           |                    |                            |                               | N/P                       |              |                           |                          |
| <b>GUATEMALA</b>  |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| C. Guatemala  | La Aurora APP                          | T                  |                               | I                         | T                  | A/C                        | 250                           | I*                        |              |                           | *MSSR                    |
| <b>GUYANA</b>   |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
|   | Georgetown ACC                         |                    |                               |                           |                    |                            |                               | N/P                       |              |                           |                          |
| <b>HAITI</b>  |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
|   | Port-au-Prince ACC                     |                    |                               |                           | E/T                | A/C                        |                               | P*                        |              |                           | *MSSR                    |
|   | Port-au-Prince APP                     |                    |                               |                           | T                  | A/C                        |                               | P*                        |              |                           | *MSSR                    |
| <b>HONDURAS</b>   |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| San Pedro Sula  | La Mesa APP                            | T                  |                               | I                         | T                  | A/C                        | 250                           | I*                        |              |                           | *MSSR                    |
| <b>JAMAICA</b>  |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Kingston  | Kingston APP                           | T                  | 60                            | I                         | E/T                | A/C                        | 250                           | I*                        |              |                           | *MSSR                    |
| Montego Bay   | Montego Bay APP                        | T                  | 60                            | I                         | T                  | A/C                        | 250                           | I*                        |              |                           | *MSSR                    |
| Mount Denham  | Kingston ACC                           | E                  | 120                           | I                         | E                  | A/C                        | 250                           | I*                        |              |                           | *MSSR                    |
| <b>MEXICO</b>   |  |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Acapulco  | Acapulco APP                           | T                  |                               | I                         | T                  | A/C                        | 240                           | I*                        |              |                           | *MSSR                    |
| Bajo Gto  | México ACC                             |                    |                               |                           | E/T                | A/C, S                     | 240                           | I*                        |              |                           | *MSSR                    |
|   | Bajo APP                               |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Cancún  | Mérida ACC                             | E/T                | 60                            | I                         | E/T                | A/C                        | 240                           | I*                        |              |                           | *MSSR                    |
|   | Cancún APP                             |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Cerro Potosi  | Monterrey ACC                          |                    |                               |                           | E                  | A/C                        | 240                           | I*                        |              |                           | *MSSR                    |
|   | México ACC                             |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Cerro Rusias  | Mazatlán ACC                           |                    |                               |                           | E                  | A/C                        | 240                           | I*                        |              |                           | *MSSR                    |
|   | México ACC                             |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
|   | Monterrey ACC                          |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Cerro Los Gallos  | Mazatlán ACC                           |                    |                               |                           | E                  | A/C                        | 240                           | I*                        |              |                           | *MSSR                    |
|   | México ACC                             |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
|   | Monterrey ACC                          |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Cerro Santa Eulalia                                       | Monterrey ACC                          |                    |                               |                           | E/T                | A/C                        | 240                           | I*                        |              |                           | *MSSR                    |
|   | Chihuahua APP                          |                    |                               |                           |                    |                            |                               |                           |              |                           |                          |
| Guadalajara   | Guadalajara APP                        | T                  | 80                            | I                         | T                  | A/C                        | 240                           | I*                        |              |                           | *MSSR                    |

## Apéndice Y al Informe sobre la Cuestión 3 del Orden del Día

| State(Territory)/Location<br>Estado(Territorio)/Ubicación | ATS Unite Served<br>Unidad ATS Servida        | PSR     |                   |                 | SSR     |                   |                   |                 | ADS  |                 | Remarks<br>Observaciones |                                     |
|---|---|---------|-------------------|-----------------|---------|-------------------|-------------------|-----------------|------|-----------------|--------------------------|-------------------------------------|
|   |   | Funtion | Coverage          | Status          | Funtion | Modes             | Coverage          | Status          | Type | Status          |                          |                                     |
|   |   | Función | Cobertura<br>(NM) | Impl.<br>Estado | Función | Modos<br>(A,C& S) | Cobertura<br>(NM) | Impl.<br>Estado | Tipo | Impl.<br>Estado |                          |                                     |
| 1   | 3   | 4       | 5                 | 6               | 7       | 8                 | 9                 | 10              | 11   | 12              | 13                       |                                     |
| Hermosillo  | Mazatlán ACC<br>Hermosillo APP<br>Tijuana APP |         |                   |                 | E/T     | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| Los Mochis  | Mazatlán ACC                                  |         |                   |                 | E       | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| Mazatlán  | Mazatlán ACC                                  |         |                   |                 | E       | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| Mérida  | Mérida ACC<br>Mérida APP                      | E/T     |                   | I               | E/T     | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| Cerro Sordo   | México ACC<br>Monterrey ACC                   |         |                   |                 | E       | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| Monterrey   | Monterrey ACC<br>Monterrey APP                | E/T     | 80                | I               | E/T     | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| Peñón   | México APP                                    |         |                   |                 | E       | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| Puerto Peñasco  | Mazatlán ACC                                  |         |                   |                 | E       | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| Puerto Vallarta   | Puerto Vallarta APP                           |         |                   |                 | T       | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| San José del Cabo   | Mazatlán ACC                                  |         |                   |                 | E       | A/C, S            | 240               | I*              |      |                 |                          | *MSSR                               |
| Tampico   | México ACC<br>Mérida ACC<br>Monterrey ACC     |         |                   |                 | E       | A/C, S            | 240               | I*              |      |                 |                          | *MSSR                               |
| Tijuana   | Tijuana APP                                   |         |                   |                 | T       | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| Toluca  | México ACC<br>Toluca APP                      | E/T     | 80                | I               | E/T     | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| Veracruz  | México ACC                                    |         |                   |                 | E       | A/C               | 240               | I*              |      |                 |                          | *MSSR                               |
| Villahermosa  | Mérida ACC<br>Mérida ACC                      |         |                   |                 | E       | A/C, S            | 240               | I*              |      |                 |                          | *MSSR                               |
| <b>MONSERRAT (United Kingdom)</b>                         |   |         |                   |                 |         |                   |                   |                 | N/P  |                 |                          |                                     |
| <b>NETHERLANDS ANTILLES (Netherlands)</b>                 |   |         |                   |                 |         |                   |                   |                 |      |                 |                          |                                     |
| Willemstad  | Curaçao ACC<br>Curaçao APP                    | E/T     | 120               | I               | E/T     | A/C               | 256               | I*              |      |                 |                          | *MSSR                               |
| Saint Maarten   | Juliana APP                                   | T       | 60                | I               | T       | A/C               | 256               | I*              |      |                 |                          | *MSSR                               |
| <b>NICARAGUA</b>  |   |         |                   |                 |         |                   |                   |                 |      |                 |                          |                                     |
| Managua   | Managua APP                                   | T       |                   | P               | T       | A/C               | 250               | P*              |      |                 |                          | *MSSR                               |
| Bluefields  | Bluefields TWR                                |         |                   |                 | T       | A/C               | 250               | N/I             |      |                 |                          |                                     |
| <b>PANAMA</b>   |   |         |                   |                 |         |                   |                   |                 |      |                 |                          |                                     |
| Panamá  | Panamá ACC<br>Panamá APP                      |         |                   |                 | E/T     | A/C               |                   | I*              |      |                 |                          | *MSSR                               |
| <b>PARAGUAY</b>   |   |         |                   |                 |         |                   |                   |                 |      |                 |                          |                                     |
| Asunción  | Asunción ACC                                  | T       | 60                | I               | E/T     | A/C               |                   | I               |      |                 |                          | Sistema PSR y SSR necesita remplazo |
| Ciudad del Este   | Ciudad del Este APP                           | T       | 60                | I               | E/T     | A/C               |                   | I               |      |                 |                          |                                     |
| <b>PERU</b>   |   |         |                   |                 |         |                   |                   |                 |      |                 |                          |                                     |
| Arequipa  | Arequipa APP                                  | T       |                   | P               |         |                   |                   |                 | R    |                 |                          |                                     |

## Apéndice Y al Informe sobre la Cuestión 3 del Orden del Día

| State(Territory)/Location<br>Estado(Territorio)/Ubicación                    | ATS Unite Served<br>Unidad ATS Servida  | PSR                |                               |                           | SSR                |                            |                               |                           | ADS          |                           | Remarks<br>Observaciones   |
|--|---|--------------------|-------------------------------|---------------------------|--------------------|----------------------------|-------------------------------|---------------------------|--------------|---------------------------|--|
|  |   | Funtion<br>Función | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Funtion<br>Función | Modes<br>Modos<br>(A,C& S) | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Type<br>Tipo | Status<br>Impl.<br>Estado |  |
| 1  | 3   | 4                  | 5                             | 6                         | 7                  | 8                          | 9                             | 10                        | 11           | 12                        | 13   |
| Cusco<br>Iquitos<br>Lima   | Cusco APP<br>Iquitos APP<br>Lima ACC<br>Lima APP                                    | T<br>T<br>T        |                               | P<br>P<br>I               | E<br>E             | A/C<br>A/C                 |                               | R<br>R<br>I*<br>I*        |              |                           | *MSSR, Se recomienda ampliar la cobertura de la FIR  |
| <b>PUERTO RICO (United States)</b><br>Pico del Este<br>San Juan              | San Juan ACC<br>San Juan APP  | E/T                |                               | I                         | E<br>T             | A/C<br>A/C                 |                               | I<br>I                    |              |                           |  |
| <b>SAINT KITTS AND NEVIS</b>   |   |                    |                               |                           |                    |                            |                               | NP                        |              |                           |  |
| <b>SAINT LUCIA</b>   | Santa Lucia APP   |                    |                               |                           |                    |                            |                               | NP*                       |              |                           | * Radar data sharing with Martinica planned/ Proyecto compartir datos radar con Martinica. |
| <b>SAINT VINCENT &amp; THE GRENADINES</b>                                    | E.T.Joshua APP  |                    |                               |                           |                    |                            |                               | NP                        |              |                           |  |
| <b>SURINAME</b>  |   |                    |                               |                           |                    |                            |                               | NP                        |              |                           |  |
| <b>TRINIDAD &amp; TOBAGO</b><br>Piarco (15 NM north)                         | Piarco ACC<br>Piarco APP  | E/T                |                               | I                         | E/T                | A/C                        | 230                           | I*                        |              |                           | *MSSR  |
| <b>TURKS &amp; CAICOS IS. (United Kingdom)</b><br>Grand Turks                | Miami ACC   |                    |                               |                           | E                  | A/C                        |                               | I                         |              |                           |  |
| <b>URUGUAY</b><br>Carrasco<br>Durazno  | Montevideo ACC<br>Carrasco APP<br>Montevideo ACC<br>Carrasco APP                    | E/T                | 80                            | I                         | E/T<br>E/T         | A/C<br>A/C                 | 180<br>256                    | I*<br>P                   |              |                           | MSSR<br>MSSR   |
| <b>VENEZUELA</b><br>Barquisimeto<br>Isla Margarita<br>Maiquetía<br>Maracaibo | Baruisimeto APP<br>Margarita APP<br>Maiquetía ACC<br>Maiquetía APP<br>Maracaibo APP | T<br>T<br>E/T<br>T | 60<br>60<br>60<br>60          | I<br>I<br>I<br>I          | T<br>T<br>E/T<br>T | A/C<br>A/C<br>A/C<br>A/C   | 200<br>200<br>200<br>200      | I<br>I<br>I<br>I*         |              |                           | *MSSR  |

## Apéndice Y al Informe sobre la Cuestión 3 del Orden del Día

| State(Territory)/Location<br>Estado(Territorio)/Ubicación   | ATS Unite Served<br>Unidad ATS Servida                                  | PSR                |                               |                           | SSR                   |                                 |                                 |                            | ADS          |                           | Remarks<br>Observaciones                  |
|---|---|--------------------|-------------------------------|---------------------------|-----------------------|---------------------------------|---------------------------------|----------------------------|--------------|---------------------------|---|
|   |   | Funtion<br>Función | Coverage<br>Cobertura<br>(NM) | Status<br>Impl.<br>Estado | Funtion<br>Función    | Modes<br>Modos<br>(A,C& S)      | Coverage<br>Cobertura<br>(NM)   | Status<br>Impl.<br>Estado  | Type<br>Tipo | Status<br>Impl.<br>Estado |   |
| 1   | 3   | 4                  | 5                             | 6                         | 7                     | 8                               | 9                               | 10                         | 11           | 12                        | 13  |
| <b>VIRGIN IS. (United Kingdom)</b>  |   |                    |                               |                           |                       |                                 |                                 | NP                         |              |                           |   |
| <b>VIRGIN IS. (United States)</b><br>Saint Thomas   | San Juan ACC<br>San Juan APP  | E/T                |                               | I                         | E/T                   | A/C                             |                                 | I                          |              |                           |   |
| <b>COCESNA</b><br>Cerro Santiago, Guatemala<br>Mata de Caña, Costa Rica<br>Puerdo Cabezas, Nicaragua<br>Roatán, Honduras<br>Tegucigalpa, Honduras | CENAMER ACC<br>CENAMER ACC<br>CENAMER ACC<br>CENAMER ACC<br>CENAMER ACC |                    |                               |                           | E<br>E<br>E<br>E<br>E | A/C<br>A/C<br>A/C<br>A/C<br>A/C | 245<br>245<br>245<br>245<br>245 | I*<br>I*<br>I*<br>I*<br>I* |              |                           | *MSSR<br>*MSSR<br>*MSSR<br>*MSSR<br>*MSSR |



## APENDICE F

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International Civil Aviation  
Organization

CNS/SUR/TF

WP CNS/SUR/TF/2 -01

XX February 2008

Agenda Item XX

### WORKING PAPER

**CNS SURVEILLANCE TASK FORCE**

**(CNS/SUR/TF)**

**2<sup>ND</sup> MEETING OF CNS/SUR/TF**

**Bogotá, XX<sup>th</sup> to XX<sup>th</sup> of February 2008**

**DRAFT SURVEILLANCE STRATEGY FOR CAR/SAM REGIONS**

(Prepared and presented by XXXXX)

#### **Summary**

This working paper presents a Draft Surveillance Strategy for CAR/SAM Region that defines an evolutionary path to promote safety, interoperability and cost effectiveness of the required infrastructure to meet the ATM needs, in short and medium terms.

**DRAFT**



# **The Surveillance Strategy for CAR/SAM Region**

**First Edition**

**Rev 1.0**

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

# DRAFT

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# DRAFT

## The Surveillance Strategy for CAR/SAM Region

### 1. Introduction

#### 1.1 Aim of the surveillance strategy

The main objective of this strategy is to propose the surveillance systems that are suitable to be applied in short and medium terms within CAR/SAM Region and to define an evolutionary path that will promote safety, interoperability and cost effectiveness of the required infrastructure to meet the future ATM needs.

The surveillance strategy should be seen as a guidance document to all stakeholders, without any regulatory or mandatory requirements. Appropriate regulations should be published by Air Navigation Authorities when the use of new surveillance techniques is to be introduced in the States.

The envisaged goal of this strategy is a regional surveillance infrastructure that enables the interoperability of aircraft equipage throughout CAR/SAM Region in cost effective way.

#### 1.2 Scope of the Surveillance Strategy

Implementation of surveillance systems should be based on a harmonized strategy for the CAR/SAM Regions that would take into account the operational requirements and relevant cost-benefit analyses. It should also be based on Action Plans to ensure that CAR/SAM States, Territories and International Organizations implement the necessary systems in accordance with consistent timescales.

Within the context of the GREPECAS/14, that was held in Costa Rica, in April 2007, the meeting took note of the new surveillance technologies that are arising and analyzed the Global Air Navigation Plan for CNS/ATM Systems (Doc. 9750) initiatives related to data link based surveillance and ADS-C and ADS-B implementation.

Even though the Surveillance Regional Plan was updated during the referred meeting, it was recognized that further analysis on that matter should take place by CNS Committee. The CNS Surveillance Task Force (CNS/SUR/TF) was then created and tasked, among other activities, to define an Air Surveillance Strategy for CAR/SAM Regions.

The surveillance technologies considered in this strategy to meet present and future ATM expectations are listed bellow and briefly explained in Attachment A:

- Primary Radar (PSR, SMR/ASDE);
- Secondary Surveillance Radar (SSR);
- Automatic Dependent Surveillance-Broadcast (ADS-B);
- Automatic Dependent Surveillance-Contract (ADS-C);
- Traffic Information Service – Broadcast (TIS-B); and
- Multilateration.

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In order to provide a global view of the surveillance strategy, the operational drivers, the required surveillance infrastructure and the regional studies and trials proposed in this document have been displayed in each chapter in a chronological presentation.

The dates illustrated in this document define when surveillance systems are expected to become regionally operational. Nevertheless, some of the surveillance systems described in this strategy will be used to solve local issues prior to the timescales in this document, and thereby will migrate from pioneer areas into bigger regional areas.

In other words, new surveillance technologies implementation policy for CAR/SAM Region should be first based on a voluntary implementation in pocket areas, using certified existing equipage which is to be followed by an implementation in wider areas supported by the Implementing Rule related to the upgraded equipage.

## **1.3 Structure of the Document**

This document is structured as follows:

- Section 1 (this section) presents the aim of the document, explains its scope and structure and describes the intended readers and relationship with other documents.
- Section 2 describes the Surveillance Operational Scenario Evolution, i.e. the envisaged operational drivers for the period between 2007 and 2020 in the Air Surveillance field, for En-Route and TMA Airspace, Aerodrome Operations and Aircraft Systems.
- Section 3 specifies the Surveillance Infrastructure Evolution required to cope with the foreseen environment for En-Route and TMA Airspaces, Aerodrome operations and Aircraft systems, during the above mentioned period.
- Section 4 specifies the regional studies and trials that are needed to be accomplished in a timely manner in order to gather sufficient knowledge about the operational use of the new surveillance technologies.
- Annex A provides the meaning of the Acronyms used in this document.
- Annex B provides the definitions of the different terms used in this document.
- Annex C describes the principles of known surveillance techniques.

## **1.4 Intended Readers**

This strategy was developed to the following stakeholders group within CAR/SAM Region:

- The departments of the National Supervisory Authorities of ECAC countries who are responsible for verifying ATM Surveillance Systems;
- The departments of the civil and military ANSP of CAR/SAM states who are responsible for procuring/designing, accepting, and maintaining ATM Surveillance Systems;
- The Airport Operators, who are responsible for procuring/designing, accepting, and maintaining Surveillance Systems at airports level; and
- The Airspace Users, who are the final client of the ATM Surveillance Systems chain.

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## **1.5 Relationship with other documents**

This surveillance strategy is derived from the Global Air Navigation Plan for CNS/ATM Systems (Doc. 9750), since technology is not an end in itself and should be based on clearly established operational requirements for ATM evolution.

Therefore, CAR/SAM States, Territories and International Organizations should, when implementing surveillance systems, the operational requirements of the mentioned Plan, specially the ones related to GPIs 09 and 17 (Situational Awareness and Implementation of data link applications).

In other words, surveillance strategy should be seen as a link between the Global Air Navigation Plan for CNS/ATM Systems (Doc. 9750) and the stakeholders' strategy for the air surveillance applications.

## **1.6 Acknowledgments**

This surveillance strategy has been developed by the CNS Surveillance Task Force, according to its Reference Terms and Working Program.

This document should be reviewed and updated every two years.

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## 2. Surveillance Operational Scenario Evolution

### 2.1 En-Route and TMA Airspace

The surveillance operational scenario evolution for En-Route and TMA airspace is based on three fundamental principals for ground users in such airspace. These principals are dominant throughout the complete surveillance strategy and are:

- An independent surveillance system to track non-cooperative targets in TMA and En Route airspace where and when required;
- An independent surveillance system to track cooperative targets in TMA and en-route airspace; and
- Dependant cooperative surveillance.

For En-Route and TMA Airspace, security and safety will remain key requirements throughout the strategy period. Therefore, the need to provide detection of aircrafts that are not equipped with SSR transponders or ADS-B, as well as the ones experiencing an avionics failure, is permanent for TMA Airspace. Detection of non cooperative targets for En-Route Airspace will also remain for specific areas, according to homeland security requirements.

Before 2010, independent surveillance systems will be predominant in CAR/SAM Regions. Until then, target position will only be determined by the ground sensors (eg. PSR, SSR and mode S radars).

From 2010 onwards, the provision of ADDs to ground stations to support TMA and En Route operations is envisaged, following the increasing rate of SSR Mode S equipped aircraft (new and overhauled) that will be able to transmit ADS-B messages (ADS-B out).

The first set of new applications that are envisaged to be supported in CAR/SAM Region are the ground Surveillance (ADS-B out) in a non-radar environment (ADS-B-NRA), in a radar environment (ADS-B-RAD) and Airborne Derived Data (ADS-B-ADD). ADS-B-out is expected to reach initial operational capability status in 2010.

Another set of possible new applications is related to Airborne Surveillance (ADS-B-in, possibly supplemented by TIS-B) including: Airborne situational awareness (ATSA-AIRB), visual separation on approach (ATSA-VSA) and In-trail Procedure in oceanic airspace (ATSA-ITP). ADS-B-in for air traffic situational awareness is expected to be launched after 2015.

It is expected that an integration of airport and airspace surveillance will become more widespread from 2015 onwards. This requires an increased integration of surveillance information at the SDPD level, which will require updating to process and deliver the new information to surveillance users as the new systems become operational.

Until 2018, the ground service provider will remain responsible for the separation service and for maintaining separation. However, from 2018 onwards, there will be a number of ATM concepts which will drive the evolution of the surveillance environment, these are:

- Enhanced medium term planning with the tasks of the controllers operating in En-Route and TMA sectors becoming increasingly supported by more automation.

# DRAFT

The controller will make use of more ADD to provide a more accurate view of the situation and improvements in safety nets;

- Surveillance derived information will be made available to support Airborne Traffic Situational Awareness;
- Flight data processing systems will be upgraded to provide full 4D trajectory prediction aligned with the capabilities of 4D FMS;
- The limited delegation of separation tasks to aircrews in low and medium density airspace. This will require additional avionics infrastructure and additional tools for the controller and aircrew; and
- Introduction of preferred routing will require flight information to be displayed in real time to the controller.

## 2.2 Aerodrome Operations

At selected airports, the aerodrome operations will be based on:

- The implementation of A-SMGCS level I (which may include ADS-B Package I, ADS-B-APT application) and A-SMGCS level II will be enabled by systems such as SMR and Multilateration, from 2007 onwards;
- From 2010, the use of ADDs to support aerodrome operations is envisaged; and
- Where airport operators foresee a benefit of A-SMGCS level III (which may include the ADS-B Package I, ATSA SURF application) and A-SMGCS IV from 2015 onwards. This may require an ADS-B and TIS-B infrastructure and an equipage of selected, appropriate airport vehicles with transponders.

## 2.3 Aircraft Systems

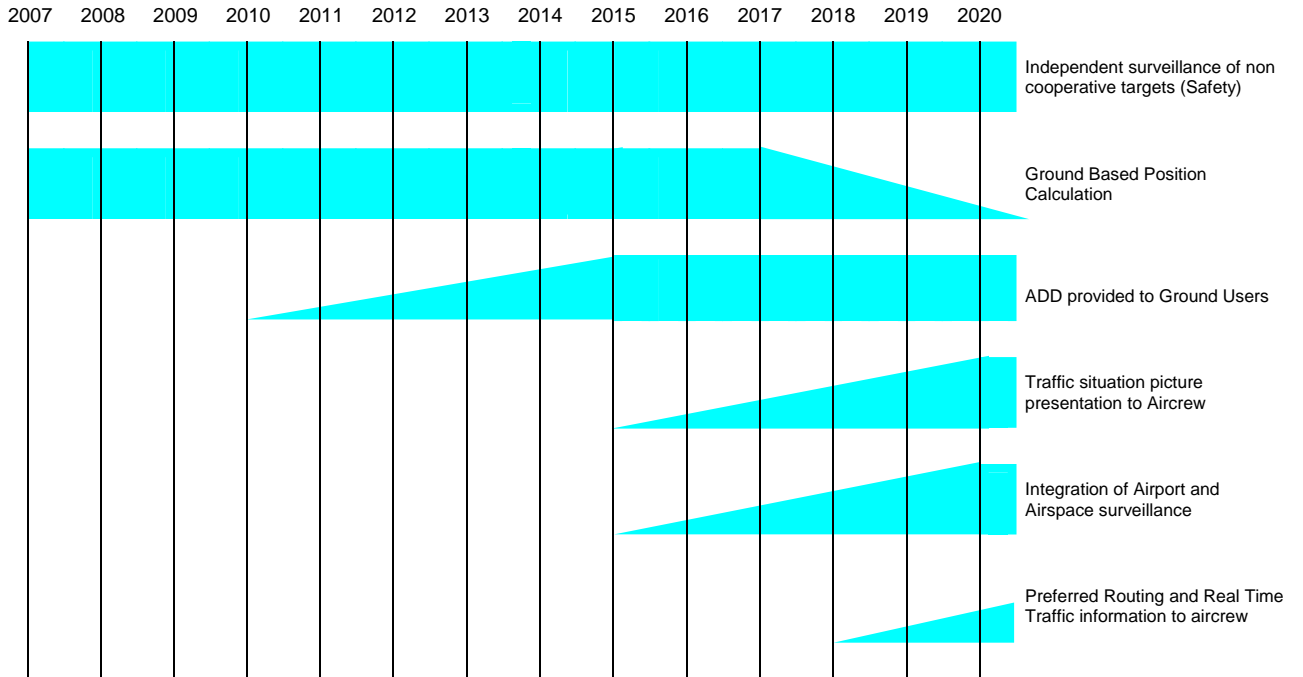
From an airborne perspective, the surveillance strategy is based on four steps, these are:

- Continuing the use of SSR or SSR Mode S systems for ground based surveillance radar or Multilateration systems. This means that no additional equipment is foreseen on the aircraft until 2010;
- The implementation of new ground Surveillance Applications (ADS-B out) from 2010 onwards which will require integration between the aircraft navigation system and mode S transponders, in order to transmit intent information to other aircraft and ground users. This is enabled by ADS-B using 1090 MHz Extended Squitter or other data-links;
- The implementation of ADS-B Package I ASAS situational awareness applications from 2015 onwards which will require an airborne SDPS and display system; and
- The implementation of ADS-B Package II ASAS separation applications from 2018 onwards. The enabling techniques are the same as ADS-B Package I, however there may be higher integrity requirements on the information presented to the aircrew which may result in an upgrade of the avionics.

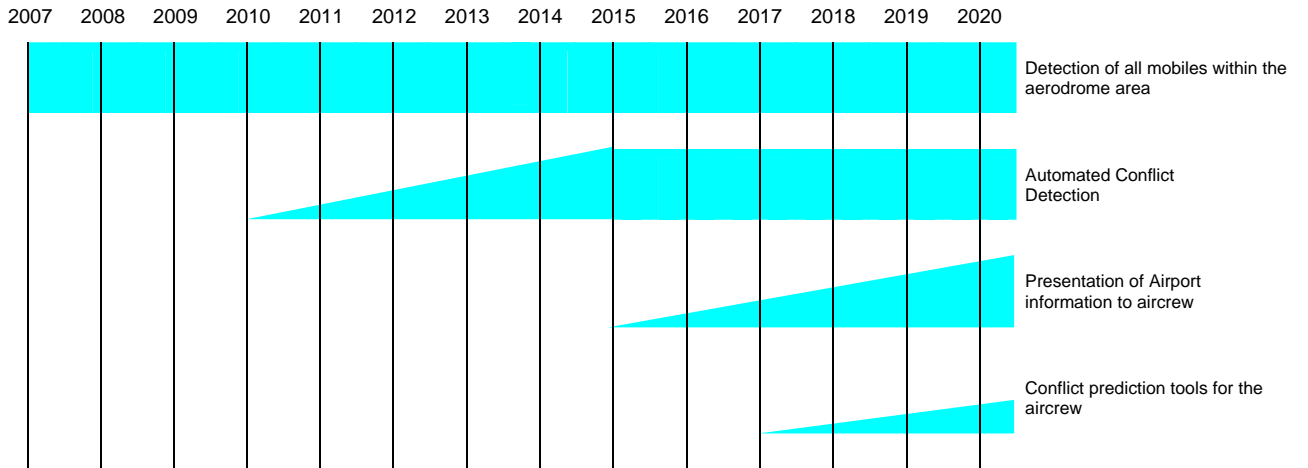
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## 2.4 Operational Drivers Timeframe

### En Route and TMA Airspace

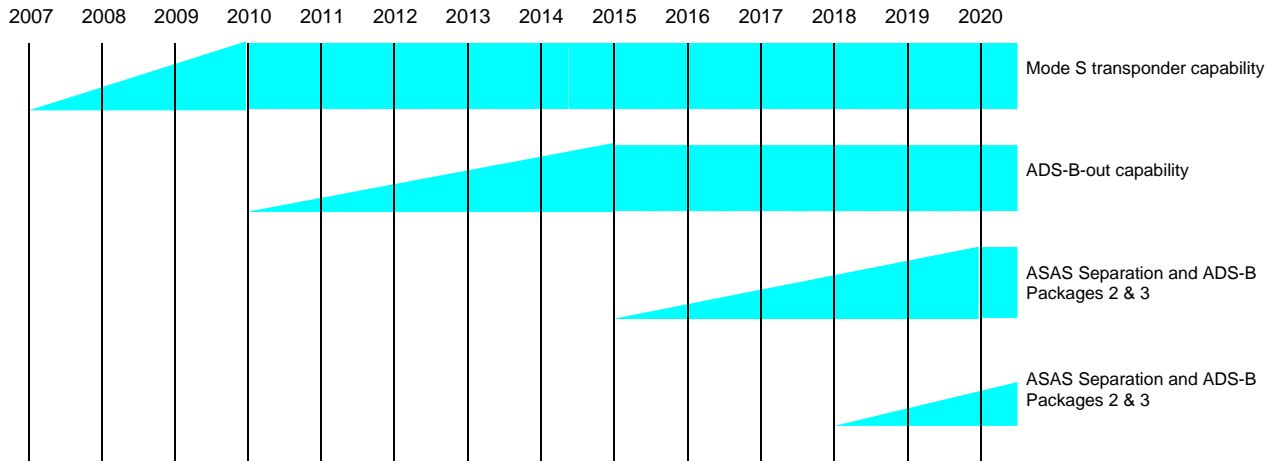


### Aerodrome Operations



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## Aircraft Systems



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## 3. Surveillance Infrastructure Evolution

### 3.1 En-Route and TMA Airspace

Independent Surveillance, in the form of Primary Surveillance Radar will be widely used in CAR/SAM regions within Air Traffic Management for Approach and Terminal Maneuvering Area (TMA) surveillance throughout the whole strategy period. In some areas, Primary Surveillance Radar will still be used in En-Route surveillance, based on local requirements, especially for homeland security.

From 2007 to 2010, co-operative surveillance, in the form of SSR and SSR Mode S, will still be the main means of surveillance and will be extensively used for air traffic surveillance by civil agencies for TMA and En-Route services within coverage of (ground based) interrogator station(s);

SSR Mode S elementary surveillance will be implemented from 2010 onwards in high density TMAs in order to improve secondary radar performances. Since there will still exist legacy aircrafts that won't be able to reply on mode S, a mixed mode interrogation will be required up to 2015.

Ground implementation for ADS-B (based on ES Mode S receivers) will increase from 2010 onwards to fill en route and terminal areas not covered with radar and to strengthen surveillance in areas covered with SSR Modes A/C and S.

Depending on the percentage of ADS-B equipped aircrafts, wide area multilateration (WAM) implementation should be considered as a possible transition path to ADS-B environment in a shorter timeframe.

From 2010 onwards ADS-C surveillance will be operationally used in all oceanic and remote airspace associated with FANS capacities.

Surveillance Data Processing and Distribution systems based on radar server technology will have to be progressively upgraded, from 2010 on, in order to merge legacy radar data and information contained in the ADD and/or from Multilateration position calculations and promote data sharing between States using TCP/IP patterns.

From 2012 on there will be an increasing implementation of "Mode S only" radars in high-traffic-density approach, en route, and terminal areas, and monopulse SSR, adaptable to Mode S, in medium-traffic en route and terminal areas.

It is predicted that by 2015 the majority of the SSR and SSR Mode S systems currently installed are at the end of their operational life. Therefore, SSR Mode A/C radars that have completed their life cycle by that time won't be replaced anymore. ADS-B or multilateration systems will fully replace those decommissioned SSRs.

### 3.2 Aerodrome Operations

From 2007 up to 2010, the main technology for calculating the position of mobiles (both aircraft and vehicles) will be Surface Movement (primary) Radar and Multilateration, using Mode S SSR transponder replies and Mode S Squitter messages.

From 2010 onwards, A-SMGCS Level I/II will provide the benefits at the aerodrome and additional information may be required by the ground systems. The most effective means of achieving this would be via ADS-B, since aircraft will already be equipped and there will be

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a cost-effective upgrade path for the Multilateration ground stations, although there may be an impact on the avionics.

Although many Multilateration systems are configured with their own data fusion trackers as standard, a possible upgrade to existing SDPDs to support Aerodrome operations will be required from 2010 onwards.

The introduction of A-SMGCS Levels III/IV at selected aerodromes will require aircrew to be presented, from 2015 onwards, with an airport map and other mobiles for situational awareness and possible conflict prediction tools in the aircraft. Where airports foresee a benefit from these kinds of applications then a TIS-B service may be required to ensure a complete and consistent airport situation picture.

### **3.3 Aircraft Systems**

In accordance with ICAO requirements, all aircraft flying within CAR/SAM controlled airspace are required to be equipped with a pressure altitude reporting device. It is not foreseen that there will be significant changes for aircraft systems prior to 2010 on that matter.

Until 2010 the implementation of ACAS II systems throughout commercial and general aviation will be completed, using Mode S transponder for elementary surveillance (ELS). From 2010 onwards, those transponders will have to be integrated to GNSS airborne systems so that they will operate in ADS-B environments (ADS-B out).

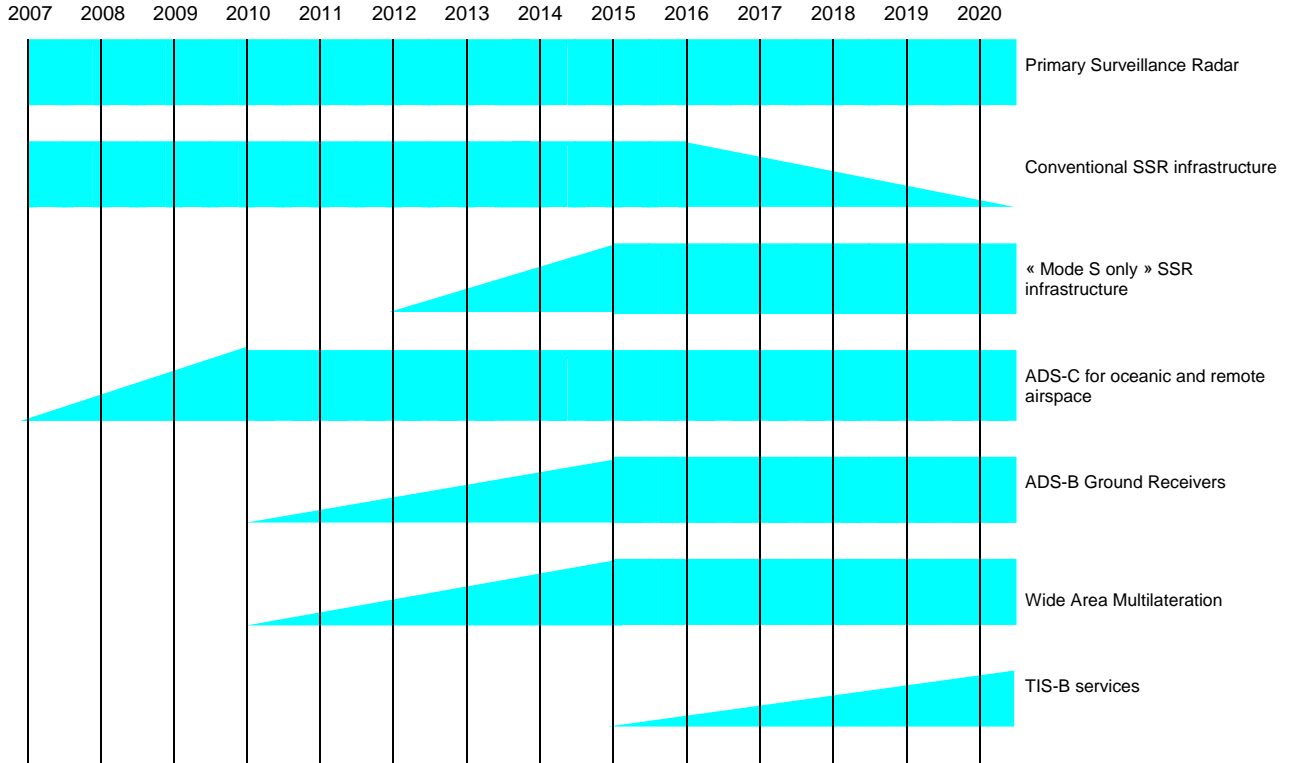
If aircraft are operating in airspace where the ADS-B Package I ground based surveillance applications are in use, then the avionics configuration will require changes to deliver the additional aircraft derived data required. Therefore, until 2015 Mode S transponders will have to be updated (enhanced surveillance – EHS).

From 2015 onwards, the move from ASAS spacing to ASAS separation and preferred routing may require a high integrity traffic situation picture, therefore the use of TIS-B will be required as well as the implementation of an airborne Surveillance Data Processing System (SDPS) to integrate ADS-B in and TIS-B for presentation of the air situation picture on a graphical display.

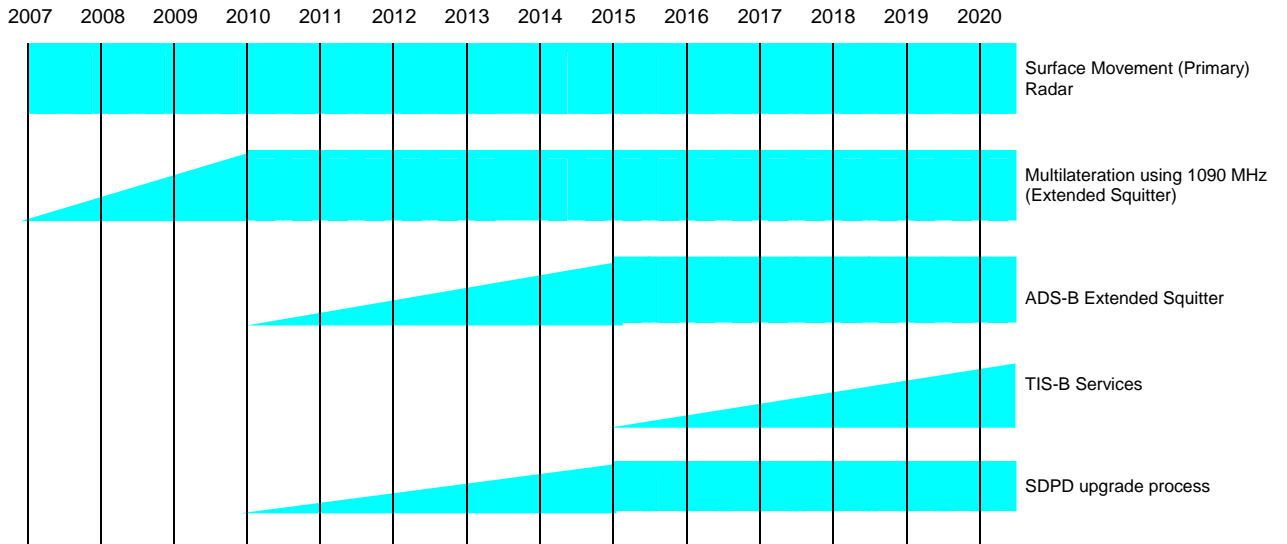
### **3.4 Surveillance Infrastructure Timeframe**

En Route and TMA Airspace

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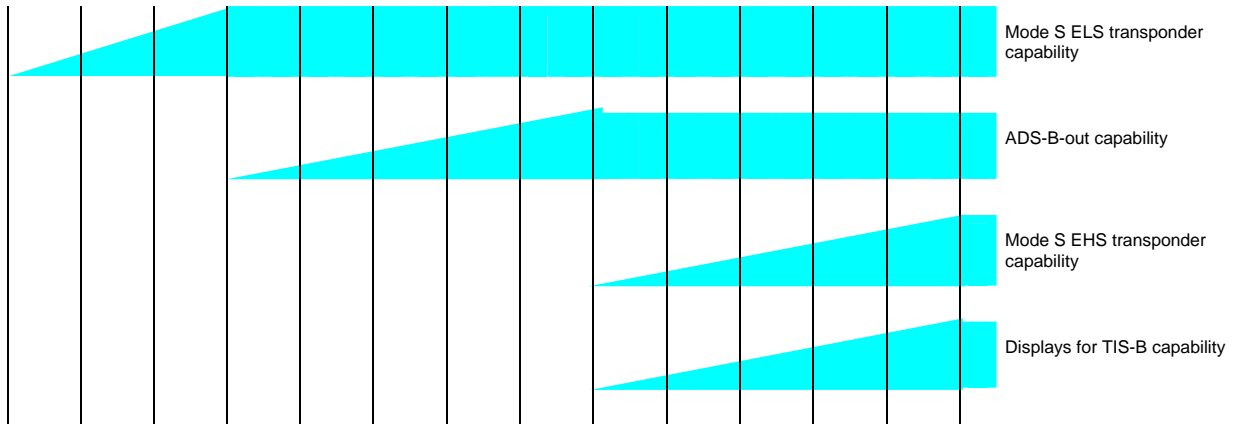
## Aerodrome Operations



## Aircraft Systems



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## 4. Surveillance Related Issues

### 4.1 Required Regional Studies and Trials

From 2007 onwards, there will be a continuous need to perform periodic assignment and monitoring of mode S 24-bits address by all Civil Aviation Authorities in CAR/SAM Region.

By the end of 2008 regional trials will have to be conducted in order to support the operational introduction of new techniques such as ADS-B and WAM. Such assessments would include Cost Benefit Analysis, safety assessments and detailing operational requirements.

In order to validate the timeframe forecasted by this surveillance strategy and assess the proportions of equipped aircrafts, until 2009, each State/Territory/International Organization should evaluate the:

- useful life of their radars and the potentiality for their replacement with ADS-B;
- locations of potential ADS-C or ADS-B ground station sites;
- capabilities of existing and planned ATC automation systems to support ADS-C or ADS-B applications;
- maximum density traffic nowadays and expected for the year 2020;
- number of equipped aircrafts operating in the concern airspace;
- number, name and type of equipped aircraft of the airlines that have equipped aircrafts for mode S, ADS-C and ADS-B;
- rate of faulty Mode S airborne equipment and its behavior; and
- categorization of the accuracy/integrity data available in the aircrafts.

The ADS-B deployment should be associated at early stages in coordination with the States/Territory/International Organizations responsible for the control of adjacent areas, and the correspondent ICAO Regional Office. Therefore, until 2009 a plan for data sharing should be established, aiming at a coordinated, harmonious and interoperable implementation of ADS-B.

It is also required to ensure that the regional surveillance standards and surveillance functional architecture are consistent with the Required Surveillance Performance (RSP), after the approval of RSP provisions (expected to be delivered by 2009).

As the increased dependence on ADS-B (1090 MHz Extended Squitter) is expected to grow, there is concern that the band will become saturated as more information is loaded onto the restricted band. Therefore it is required to study before 2010 whether the use of 1090MHz continues to support the surveillance requirements.

Until 2012, the capabilities of current Multi Sensor Trackers are to be assessed in light of the more stringent requirements need to support and process increasing amount of ADD.

It is required to identify, before 2015, the impact of the new procedures that are predicted to require 'intent' information from the aircraft. The precise definition of intent requires

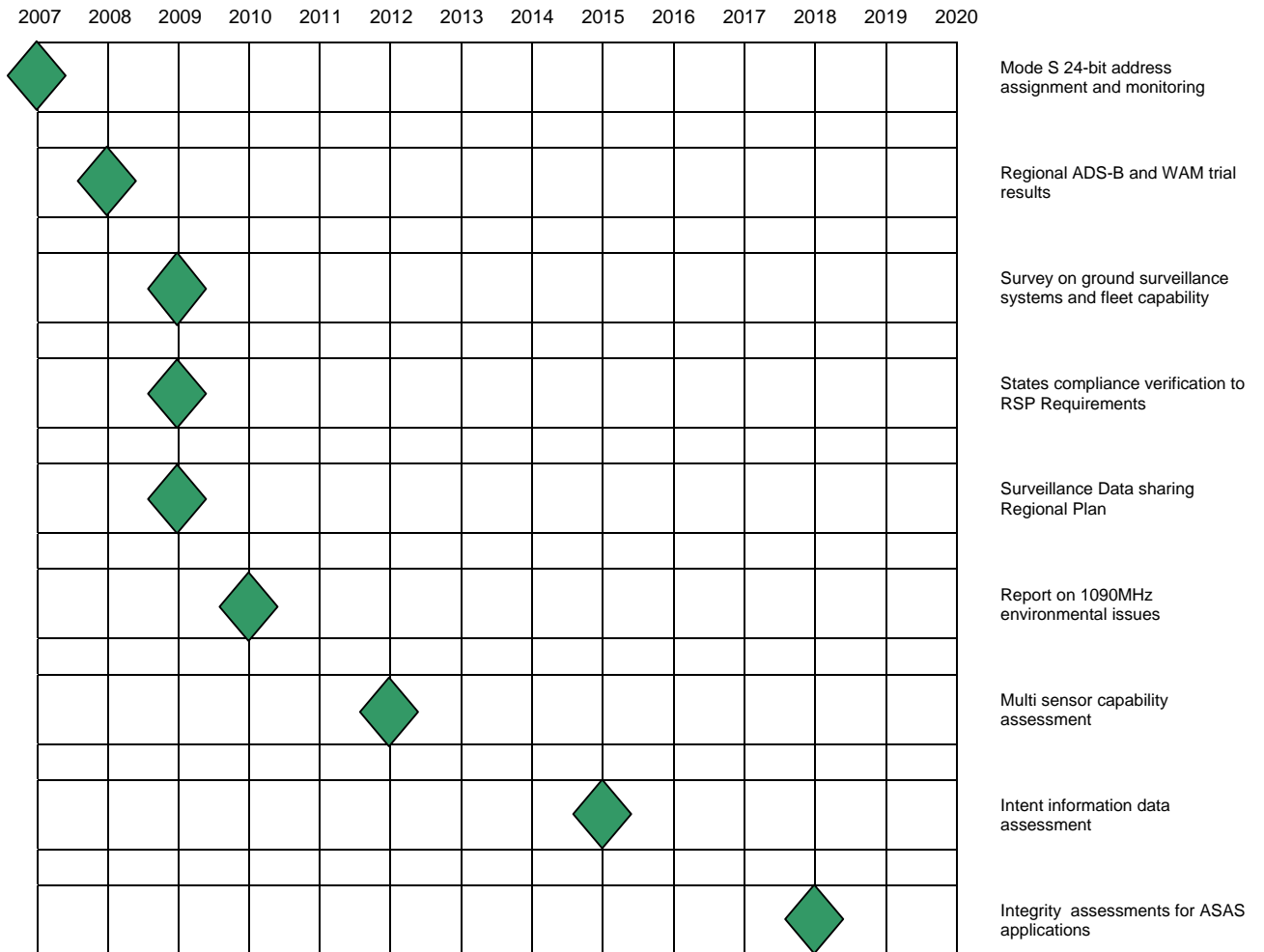
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clarification to ensure avionics equipment and ground processing products can be developed in time to deliver the required information.

By 2018 it is required to identify whether the integrity requirements of the information presented to the aircrew while performing ADS-B Package I airborne surveillance applications may require the need for the uplink of traffic information to the aircraft to validate the integrity of the navigation data transmitted by ADS-B.

## 4.2 Studies and Trials Timeframe

Studies and Trials



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## 5. Annex A – Acronyms

ACAS Aircraft Collision Avoidance System

ADD Aircraft Derived Data

ADS Automatic Dependent Surveillance

ADS-B ADS-Broadcast

ADS-C ADS-Contract

ANC Air Navigation Council

ANSP Air Navigation Service Provider

APP Approach (Centre or Control)

ASAS Airborne Separation Assistance System

ASDE Airport Surveillance Detection Equipment

A-SMGCS Advanced Surface Movement and Guidance Control System

ATC Air Traffic Control

ATM Air Traffic Management

CDTI Cockpit Display of Traffic Information

CNS Communications Navigation and Surveillance

CPDLC Controller Pilot Data link Communications

FDPS Flight Data Processing System

FMS Flight Management System

GNSS Global Navigation Satellite System

GPS Global Positioning System

ICAO International Civil Aviation Organisation

M-SSR Mono-pulse Secondary Surveillance Radar

PSR Primary Surveillance Radar

RSP Required Surveillance Performance

SARPs Standards and Recommended Practices

SDPD Surveillance Data Processing and Distribution System

SMGCS Surface Movement Guidance and Control System

SSR Secondary Surveillance Radar

TCAS Traffic Collision Avoidance System

TIS-B Traffic Information Service - Broadcast

TMA Terminal Maneuver (Control) Area

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## 6. Annex B – Definitions

**Surveillance** is defined as the technique for the timely detection of targets and the determination of their position (and if required, the acquisition of supplementary information relating to targets) and the timely delivery of this information to users in support of the safe control and separation of targets within a defined area of interest.

**Ground Based Surveillance** is defined as ‘ground based techniques for the timely detection of targets and the determination of their position (and if required, the acquisition of supplementary information relating to targets) and the timely delivery of this information to users in support of the safe control and separation of targets within a defined areas of interest’. The ‘defined area of interest’ relates to the ability of the User to select which information is deemed necessary to ensure the safe implementation of the surveillance application within the physical airspace for which they are responsible.

**Independent surveillance** is a technique where the position of the aircraft is calculated by the ground and is not dependent on position data transmitted by the aircraft.

**Dependent surveillance** like ADS-B is based on the principle of the target informing the ground system and other targets of its own position. The target may also provide aircraft derived data. Dependent surveillance delivers Aircraft Derived Data (ADD). ADD may contain navigation position, identification and other data from the aircraft.

**Cooperative surveillance** is a technique that requires the mobile to equip with a dedicated surveillance systems which responds to transmissions from the ground system.

**Non Cooperative surveillance** is a technique where the position of the aircraft is calculated by the ground and is not dependent on position data transmitted by the aircraft or upon any deliberate interaction in the aircraft with active components e.g SSR transponders.

**Basic surveillance** delivers to the surveillance user:

- Aircraft position (latitude, longitude and altitude)
- Mode A

**Elementary surveillance** includes basic surveillance and also delivers to the surveillance user:

- Aircraft identity - Flight Identity or tail registration and 24 bit address,
- Flight Status,
- Aircraft pressure altitude in 100 ft or 25 ft units, if the aircraft is appropriately equipped.

**Enhanced Surveillance** delivers to the surveillance user a set of Aircraft Derived Data (ADD) to provide additional information to ground or air based ATM systems and safety nets. Enhanced surveillance may be delivered to ground system through Mode S SSR, ADS-B or Multilateration system (through active interrogations).

**Aircraft Derived Data Different cooperative surveillance** technologies extract different information from the aircraft. In its simplest form, the Mode A and Mode C information provided by the aircrafts SSR transponder can be classified as aircraft derived data or down linked aircraft parameters. When implemented using SSR Mode S, the following current or short term Aircraft Parameters are automatically extracted from the aircraft:

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- Air Speed (Indicated Air Speed and Mach Number)
- Ground Speed
- Magnetic Heading Roll Angle
- Selected Altitude Track Angle Rate (or, if not available, True Air Speed)
- True Track Angle Vertical Rate

The enhanced surveillance parameters delivered by ADS-B include the position and longer term intent parameters e.g. 4D trajectory, trajectory change points etc.

**Surveillance users** are:

- Oceanic ATM Centers
- En-Route ATM Centers
- TMA/Approach ATM Units
- Airports/Tower ATM & Ground Traffic Management Units
- Military Centers
- Airline Aircraft Operations Centre
- Enhanced Tactical Flow Management System
- Data processing systems, such as Flight Data Processing Systems
- ATM Tools, such as Short Term Conflict Alert
- The target
- Adjacent Surveillance Functions
- Non ATM functions (e.g. Search and Rescue).

**Surveillance Data Processing and Distribution systems** accept information from surveillance sensors, process the information to develop the ‘best’ estimate of the position of a target and supply this information to users. In addition the SDPD may receive ADD and distribute this to surveillance users attached to the position information.

**A-SMGCS** is an airport system which provides surveillance to a ground controller. It has four implementation levels that provide different levels of functionality:

**Level I A-SMGCS** provides:

- Position; the presentation to a controller of the location of an aircraft or vehicle;
- Identification; the presentation to the controller the identity (flight identification or call sign) of the aircraft or vehicle.

**Level II A-SMGCS** provides a conflict prediction function to alert the controller of:

- Potential collisions (between aircraft/vehicle or aircraft/aircraft) on the runway surface or protected areas
- Potential entry of aircraft or vehicles into restricted areas.

**Level III A-SMGCS** includes functions that are being defined by the Airports and Environments Business Division to share traffic situation awareness amongst pilots and drivers and the introduction of the automated routing function. The guidance function may be enhanced by:

- Display of the airport map showing taxiways, runways, obstacles and the mobile position to aircrew and drivers;
- Providing dynamic map with updates of the runway status
- Triggering automatically the dynamic ground signs (stop bars, centerline lights, etc.) according to the route issued by the controller.

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**Level IV A-SMGCS** corresponds to the improvement of the functions implemented at the level III. Of particular note to the surveillance strategy, the control function will be complemented by a conflict resolution function in the cockpit or vehicle.

**ADS-B Package I** is a set of Ground Based Surveillance, Airborne Traffic Situational Awareness and Airborne Spacing applications (reference 6). Note that since reference 6 was published, the application descriptions have been refined, although they remain largely in accordance with the referenced document. The text below summarizes the applications as of November 2005.

**ADS-B Package I Ground Based Surveillance Applications** are aimed at improving ATC surveillance on the ground for En-Route and TMA airspace and on the airport surface and at enhancing ATC tools through the provision of aircraft derived data enabled by ADS-B. These applications are:

- ADS-B-RAD ATC surveillance for TMA and En-Route airspace in areas that are already covered by radar systems
- ADS-B-NRA ATC surveillance in non-radar areas
- ADS-B-APT Airport surface surveillance
- ADS-B-ADD Aircraft derived data for ATC tools

**ADS-B Package I Airborne Surveillance Applications** are aimed at improving airborne (cockpit) surveillance in En-Route and TMA airspace as well as on the airport surface. These applications are:

- ATSA-SURF Enhanced traffic situational awareness on the airport surface
- ATSA-VSA Enhanced visual separation on approach
- ATSA-ITP In-trail procedure in oceanic airspace
- ATSA-AIRB Enhanced traffic situational awareness during flight operations

**ADS-B Package I Airborne Spacing Applications** are aimed at using airborne (cockpit) surveillance capabilities to carry out applications where the flight crew is able to maintain a time or distance from designated aircraft. These applications are:

- ASPA-S&M Enhanced sequencing and merging operations
- ASPA-C&P Enhanced crossing and passing operations

**ASAS Applications** are a set of operational procedures for controllers and flight crews that make use of the capabilities of Airborne Separation Assistance Systems to meet a clearly defined operational goal.

**Airborne Spacing (ASPA)** is an ASAS application category where the flight crew is able to maintain a time or distance from designated aircraft. The controller can use new spacing instructions to expedite and maintain an orderly and safe flow of traffic and is still responsible for providing separation in accordance with the applicable ATC separation minima. New procedures and responsibilities are expected with the introduction of Airborne Spacing applications.

**Airborne Separation** is an ASAS application category where the flight crew is able to provide separation from designated aircraft in accordance with the applicable airborne separation minima. In this application the controller can delegate separation relative to a designated aircraft to the flight crew through a new clearance however the controller is responsible for providing separation in accordance with the applicable ATC separation

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minima from other aircraft. New procedures and responsibilities are expected with the introduction of Airborne Separation applications.

**Airborne Self Separation** is an ASAS application where the flight crew is able to provide separation from all known aircraft in accordance with the applicable airborne separation minima. Airborne self separation is not considered within the timescales of this strategy.

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## 7. Annex C – Surveillance Techniques

### **Primary Radar (PSR, SMR/ASDE)**

Primary Radar operates by radiating high levels of electromagnetic energy and detecting the presence and characteristics of echoes returned from reflected objects.

Target detection is totally based on the reception of reflected energy, it does not depend on any energy radiated from the target itself, i.e. no carriage of airborne equipment is required.

### **Secondary Surveillance Radar (SSR)**

Secondary Surveillance Radar (SSR) operates by transmitting coded interrogations in order to receive coded information from all SSR transponder equipped aircraft, providing a two way "data link" on separate interrogation (1030 MHz) and reply (1090 MHz) frequencies.

Replies contain positive identification, as requested by the interrogation, either one of 4096 codes (Mode A) or aircraft pressure altitude reports (Mode C). The co-operative concept ensures stable received signal strength and considerably lower transmitted power levels than Primary Radar. SSR enables Basic Surveillance.

SSR Mode S is a development of SSR using the same interrogation and reply frequencies as the SSR but the selective interrogations contain a unique 24 bit address that ensures all transmissions are only decoded by one aircraft's Mode S Transponder having that 24 bit address.

A Mode S station also transmits conventional SSR formats in order to detect SSR only aircraft (Mode A/C) in order to be downward compatible with SSR.

The SSR Mode S transponder is also a fundamental part of the ACAS airborne installation and the ADS-Broadcast when using the 1090 MHz Extended Squitter transmission. SSR Mode S enables elementary and enhanced surveillance.

### **Automatic Dependent Surveillance-Broadcast (ADS-B)**

Automatic Dependent Surveillance - Broadcast (ADS-B) is a surveillance technique that allows the transmission of aircraft derived parameters, such as position and identification, via a broadcast mode data link for use by any air and/or ground users.

Each ADS-B emitter periodically broadcasts its position and other data provided by the onboard aircraft avionics systems. Any user, either airborne or ground based, within range of the emitter may choose to receive and process the information. Three technology options are available, these are ADS-B 1090ES [which has been selected as the initial link for CAR/SAM Region], VDL Mode 4 (Very High Frequency Data Link) and UAT (Universal Access Time). ADS-B enables elementary and enhanced surveillance.

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## **Automatic Dependent Surveillance-Contract (ADS-C)**

Automatic Dependent Surveillance - Contract (ADS-C) is a surveillance technique in which aircraft provide, via a data link, data such as position and identification, derived from the onboard aircraft avionics systems. A "contract" is established between the aircraft and the ground to transmit data at a particular event. An event could be time based, position based or as specified in the contract.

Currently ADS-C is usually implemented via SATCOM but any data link having the range capability would suffice. Whilst originally envisaged to be an ATN compliant data link, current implementations exploit a large part of the functionality through the FANS 1/equipment currently carried by many aircraft.

## **Traffic Information Service – Broadcast (TIS-B)**

An air traffic situation picture derived by a ground based Surveillance Data Processing System may be broadcast from the ground to all aircraft within range and equipped with correct receivers. There are three roles of TIS-B, these are:

- TIS-B fundamental service: This ‘gap filler service broadcasts information about aircraft that cannot be adequately obtained directly by ADS-B and is used to enhance the availability of surveillance information to users that are not normally able to receive ADS-B transmissions from other aircraft. This service will normally exclude from transmission those aircraft broadcasting ADS-B messages
- ADS-B validation service: This optional service compares aircraft ADS-B state vector data with surveillance data from ground-based sensors and broadcasts validation data
- ADS-B rebroadcast service: The automatic rebroadcast of ADS-B messages received over one data link, translated directly onto other data links for the purpose of extending ADS-B connectivity to users of incompatible data links.

## **Multilateration**

Multilateration is a surveillance technique where aircraft replies from other SSR or SSR Mode S interrogations or spontaneous squitter message from Mode S transponder are passively received by 3 or more ground receiver stations. Using time of arrival techniques the position and altitude of the target can be determined. In some Multilateration systems, active Mode S selective interrogations are used to extract data from the aircraft.

The surveillance strategy distinguishes three levels of functionality, which are:

- Basic operation in which Multilateration uses time of arrival of signals to determine the position of aircraft.
- Elementary operation, which includes basic operation and the addition of active interrogations to extract aircraft identification information from the flight systems
- Enhanced operations, which includes basic operations and the addition of active interrogations to extract any information (including aircraft identification) from the aircraft systems.