



ICAO

International Civil Aviation Organization
North American, Central American and Caribbean Office

NAM/CAR/SAM Workshop on the ICAO Position for the International Telecommunication Union (ITU) World Radiocommunication Conference (2023) (WRC-23)

On-line, 20 October 2021

SUMMARY OF DISCUSSIONS

Date 20 October 2021
Location Online
Opening Ceremony The Workshop was attended by 45 delegates from 20 States/Territories and two International Organizations from the NAM/CAR Regions. The list of participants is shown in the **Attachment**.

Opening remarks were provided by Mr. Julio Siu, Deputy Regional Director, International Civil Aviation Organization, North American, Central American and Caribbean Regional Office.

1. Reference

1.1 Through State letter Ref.: Ref.: NT-NE 24-4 — E.OSG-NACC90726 REV, States from NAM and CAR regions were invited to the NAM/CAR/SAM Workshop on the ICAO Position for the International Telecommunication Union (ITU) World Radiocommunication Conference (2023) (WRC-23) held on line on 20 October 2021.

2. Objectives

2.1 According with aviation operation and development, a safe operation of aircraft relies completely on spectrum-dependent radio communication and radio navigation systems as outlined in the workshop that supported the States for their preparedness for the WRC-23, socializing the ICAO position document and its implications at the regional level.

2.2 Information of this event is under the following link:
<https://www.icao.int/NACC/Pages/meetings-2021-cmr23.aspx>.

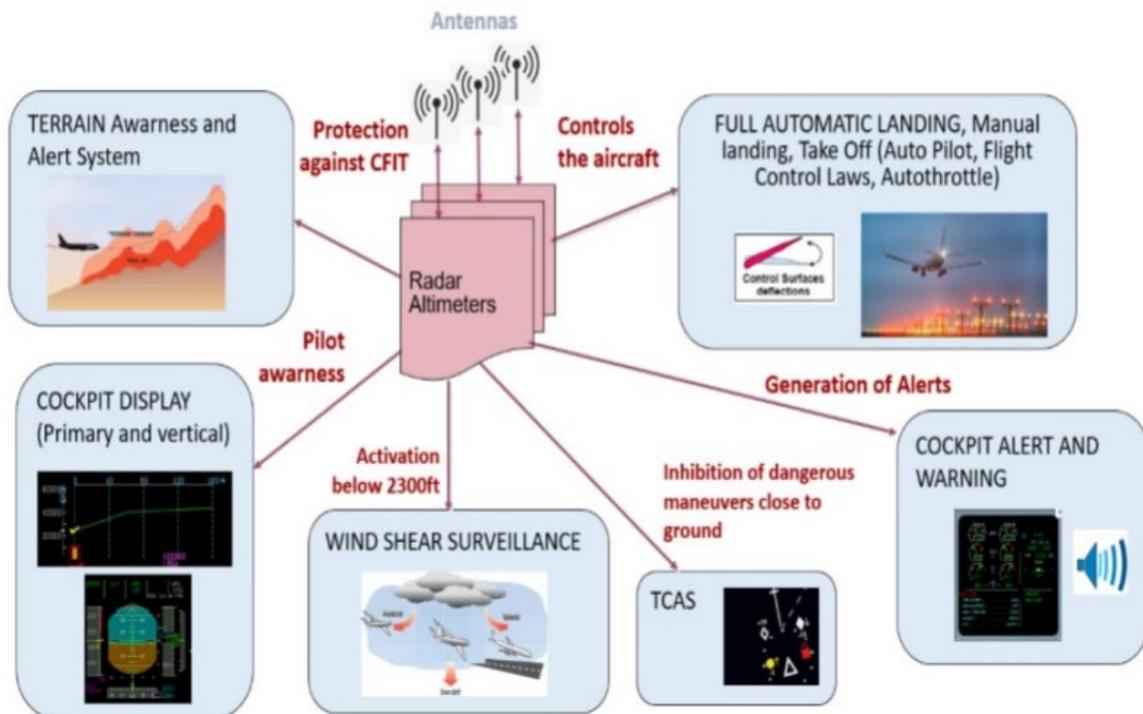
3. Potential safety concerns due to interference from 5G to aeronautical radio altimeters

3.1 Through State Letter Ref.: SP 74/1-21/22, ICAO shared information about previous meeting and concerns about interference to radio altimeters. A number of administrations are currently considering or have already begun deploying new cellular broadband technologies (such as 5G) in the frequency bands close to the radio altimeter's frequencies of operation (4.2-4.4 GHz), a critical aviation safety system.

3.2 The international aviation industry has noted with concern that these broadband technologies may cause harmful interference to radio altimeters.

3.3 The radio altimeter is a mandated critical aircraft safety system used to determine an aircraft's height above terrain. Its information is essential to enable several safety related flight operations and navigation functions on all commercial aircraft as well as a wide range of other civil aircraft. Such functions and systems include terrain awareness, aircraft collision avoidance, wind shear detection; flight controls, and functions to automatically land an aircraft. If not properly mitigated, harmful interference to the function of the radio altimeter during any phase of flight may pose a serious safety risk to passengers, crew and people on the ground.

Critical Roles of Aircraft Radio Altimeters



3.4 ITU indicated that “[5G is] an opportunity for policy-makers to empower citizens and businesses. 5G will play a key role in supporting governments and policy-makers in transforming their cities into smart cities, allowing citizens and communities to realize and participate in the socio-economic benefits delivered by an advanced, data-intensive, digital economy.”

1. Deployments of 5G need frequency spectrum – a very limited and finite natural resource
2. In the recent 5G spectrum auction, the telecommunication Industry spent US\$80+ billion to obtain a 10-year lease of spectrum from the United States government.
3. Immense political and economic pressure often overwhelmed aviation safety arguments.

3.5 A Serious Aviation Safety Risk: Potential for Catastrophic Consequence

1. ICAO State Letter 21/22 encourages “Administration[s] to consider as a priority, public and aviation safety when deciding how to enable cellular broadband/5G services in radio frequency bands near the bands used by radio altimeters.”

2. “If not properly mitigated, harmful interference to the function of the radio altimeter during any phase of flight may pose a serious safety risk to passengers, crew and people on the ground.”
3. (ICAO) undetected failure of the radio altimeter can lead to catastrophic results for people on board the aircraft and on the ground; and false alarms have the potential to undermine trust in the avionics systems. (IATA & IFALPA)
4. Similar concerns expressed formally by International Coordinating Council of Aerospace industries Associations (ICCAIA), Radio Technical Commission for Aeronautics (RTCA), and the United States Secretary of Transport.

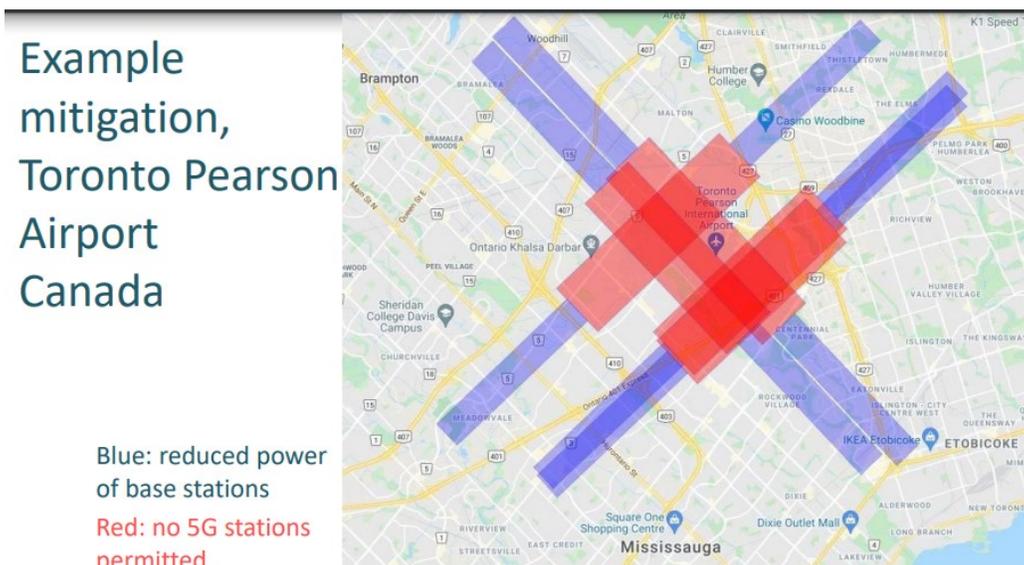
3.6 If not mitigated:

1. Limitation/Suspension of precision approach and landing capabilities – This limitation/suspension will reduce airlines access to airports in low-visibility conditions.
2. Limitation/Suspension of night operations, particularly for airports with challenging terrain – The radio altimeter is critical for the terrain awareness and warning system, which is mandatory for all air transport aircraft.
3. Lack of issuing of State regulations mandating retrofits and re-certification of aircraft radio altimeters and other related functions.

3.7 ICAO has received studies from several States and international organizations regarding the interference potential to radio altimeters. These studies generally conclude that some radio altimeters will be impacted, if high power cellular systems are implemented near the frequency band used by radio altimeters. Several States have already implemented temporary technical, regulatory and operational mitigations on new 5G systems in order to protect radio altimeters while more solutions that are permanent are being devised.

3.8 It is important that States analyse such impact and integrate mitigations measure as other States are doing right now with the aim to ensure safety.

3.9 Example of mitigation measure:



3.10 References:

- ICAO State Letter 21/22: <https://www.icao.int/MID/Documents/2021/FM%20WG2/74-1e.pdf>. The SL includes several useful links, including Report by Radio Technical Commission for Aeronautics (RTCA) and reports of several national studies and mitigations.
 - A better presentation on the actual Radio Altimeter and its use: <https://www.icao.int/NACC/Documents/Meetings/2018/RPG/RPGITUWRC2019-P08.pdf>
 - Frequency Spectrum Management Panel, Working Group/12 (4-15 October 2021)
1. WP/17 “ICCAIA updates on Industry Assessment of 5G Cellular Compatibility with Radio Altimeters” https://www.icao.int/safety/FSMP/MeetingDocs/FSMP%20WG12/WP/FSMP-WG12-WP17_ICCAIA_5GLRRA%20Input.docx
 2. IP/03 “Status on replanning the 3700-4200 MHz band in Australia” <https://www.icao.int/safety/FSMP/MeetingDocs/FSMP%20WG12/IP/FSMP-WG12->
 3. IP/07, ENRI Japan, “Interference Susceptibility Evaluations of Pulsed Radio Altimeters Due to 5G Mobile Base Station Signal” <https://www.icao.int/safety/FSMP/MeetingDocs/FSMP%20WG12/IP/FSMP-WG12->
 4. IP/08 “National efforts to implement broadband mobile near 4200-4400 MHz - Report from correspondence group on radio altimeters (CG-RA) “ https://www.icao.int/safety/FSMP/MeetingDocs/FSMP%20WG12/IP/FSMP-WG12-IP08_CG-RA%20Report%20V1.01.doc

4. Aviation frequency spectrum and the ITU World Radiocommunication Conferences (WRC)

4.1 The Aeronautical Frequency Spectrum Management: Accurate navigation, landing guidance, situational awareness (airborne collision avoidance system, radar, radio altimeters) weather radar and reliable communications with air traffic control are prerequisites for a safe flight.

4.2 The Aeronautical Frequency Spectrum Management: The highest level of Spectrum Management takes place at the ITU World Radiocommunication Conferences (WRC), held every four years:

1. Maintenance of the International provisions for Spectrum Management, contained in the ITU Radio Regulations (RR).
2. Maintenance of the Table of Frequency Allocations.
3. A consequence of this process is that aeronautical frequency managers need to develop, and lobby for an aviation position on frequency spectrum use.

4.3 It was explained the process of frequency spectrum management, especially why States have to socialize the ICAO position with their national authorities and obtain a regional position to protect aeronautical frequencies.

Aeronautical Frequency Spectrum Management



4.4 For the next WRC-23, ICAO provided information on certain, interesting for aviation operations:

1. WRC-23 Agenda Item 1.6: Spectrum use by sub-orbital vehicles

- To support ITU-R studies and the definition of relevant technical characteristics as called for by Resolution 772 (WRC-19) to ensure aviation needs are satisfied.
- To support, if identified as required by the studies called for in Resolution 772 (WRC-19), modifications to the Radio Regulations that help enable the integration of sub-orbital vehicles into the airspace structure.
- To support, if studies show the need for access to additional spectrum, the establishment of a WRC agenda item at a future competent conference.

2. WRC-23 Agenda Item 1.7: Potential facilitation of aeronautical VHF over satellite

- To support ITU-R studies and the definition of relevant technical characteristics as called for by Resolution 428 (WRC-19).
- To support a global allocation to the aeronautical mobile-satellite (route) service for both the Earth-to-space and space-to-Earth directions in the frequency band 117.975-137 MHz and that the use of the allocation be limited to the relaying of aeronautical VHF air traffic management communications.
- To support that those systems shall operate in accordance with international Standards and Recommended Practices and procedures established in accordance with the Convention on International Civil Aviation.
- To ensure that any change to the regulatory provisions and spectrum allocation resulting from this agenda item do not adversely impact the operation of existing VHF systems in the band

117.975-137 MHz operating in the AM(R)S, including regional usage of terrestrial VHF, nor require any changes to aircraft equipage or to existing installations.

3. WRC-23 Agenda Item 1.8: Finalization of a satellite allocation enabling beyond-line-of sight C2-link for RPAS Cont.

- To support ITU-R studies, as called for by Resolutions 155 (Rev.WRC-19) and 171 (WRC-19).
- To support the modification of No. 5.484B and Resolution 155 (Rev.WRC-19).
- ICAO is expecting that the decision of WRC-23 will result in a Resolution that:
 - clearly provides primary status;
 - removes any apparent inconsistencies;
 - acknowledges the Annexes of the Convention of the International Civil Aviation Organization (ICAO), ensuring that the safety-of-life aspects of the use of UAS Control and Non Payload Communications (CNPC) Link Availability is the role of the responsible States;
 - provides sufficient information to support and/or validate safety cases; and
 - ensures that safety cases do not need to be revisited as a result of future satellite co-ordination agreements.

4. WRC-23 Agenda Item 1.9: Modifications to aeronautical HF, potentially enabling crystal clear and reliable HF voice as well as high speed HF

- To support ITU-R studies as called for by Resolution 429 (WRC-19).
- To support, based on agreed studies, the necessary modification of Appendix 27 to the Radio Regulations that will enable the introduction of HF wideband aeronautical communication systems.
- Those systems shall be operated in accordance with international Standards and Recommended Practices and procedures established in accordance with the Convention on International Civil Aviation.

5. Outcomes/Recommendations

5.1 States must work very closely with national frequencies entities to share information on ICAO position and define a national position that has to be elevated to a regional level aiming to obtain a strong support in the WRC-23.

5.2 Analyse the implementation of the 5G cell phone communication in their States and implement any mitigation that they need to ensure safety in the aviation operations.

6. Accomplishments

6.1 According with Improvements to the ATS Voice Link Technical Management Group (MEVA/TMG/36) Meeting, the need to share this information with all NACC States was concluded. The ICAO NACC Regional Office provided this event to ensure that all States have and understand very well the implication for the WRC-23, specially ICAO concerns and States activities that need to developed for every State.



North American, Central American and Caribbean Office (NACC)
Oficina para Norteamérica, Centroamérica y Caribe (NACC)

NAM/CAR/SAM Workshop on the ICAO Position for the International Telecommunication Union (ITU) World Radiocommunication Conference (2023) (WRC-23)
Taller NAM/CAR/SAM sobre la postura de la OACI para la Conferencia Mundial de Radiocomunicaciones (2023) (CMR-23) de la Unión Internacional de Telecomunicaciones (UIT) (ITU/WRC23/W)

20 October 2021 / 20 de octubre de 2021

LIST OF PARTICIPANTS / LISTA DE PARTICIPANTES

ARGENTINA

1. Andres Espina
2. Moira Callegare
3. Pablo Otálora
4. Alfredo Fabián Iacono

ARUBA

5. Joselito Correia de Andrade

BARBADOS

6. Jackie Crichlow

BOLIVIA

7. Arturo Lopez
8. Jaime Yuri Alvarez Miranda
9. Ariel Salvatierra

BRAZIL/BRASIL

10. Vahe Antoine Yaghdjian
11. Wallace Gutemberg Medeiros Luz

CANADA/CANADÁ

12. Seyed Rastaghi

CAYMAN ISLANDS/ISLAS CAIMANES

13. Mark Danziger
14. Sean Bridle
15. Cleavy Scott

CHILE

16. Pedro Lazo
17. Cristian Parra

18. Francisco Gálvez

CUBA

19. Orlando Nevot

ECCAA

20. Trevor Davis

ECUADOR

21. Luis David Minango Lopez

EL SALVADOR

22. Luis Reyes

GRENADA/GRANADA

23. Margaret John

HAITI/HAITÍ

24. Emmanuel Jacques

HONDURAS

25. Samuel Isaí Palma Canales

JAMAICA

26. Derrick Gant

MEXICO/MÉXICO

27. Miguel Ramirez
28. Mario Sergio Davalos
29. Alvaro Perez
30. Thamar Azzeneth Orozco Lozada
31. Daniel Conrado Castañeda Cruz

PANAMA/PANAMÁ

- 32. Nimio Alvarez
- 33. Daniel De Avila

SAINT LUCIA/SANTA LUCÍA

- 34. Ricardo Charles

TRINIDAD AND TABAGO/TRINIDAD Y TABAGO

- 35. Steve Saroop
- 36. Naresh Seeparsad
- 37. Richard Halliday
- 38. Rupnarine Baboolal
- 39. Adam Khan
- 40. Satnarine Maharaj
- 41. Veronica Ramdath

URUGUAY

- 42. Horacio Berretta Kramer

COCESNA

- 43. Gabriel Quirós Pereira
- 44. Edwin Rivas Hernandez
- 45. Manuel Flores

ICAO/OACI

- 46. Julio Siu
- 47. Loftur Jonasson
- 48. Mayda Avila
- 49. Mie Utsunomiya
- 50. Francisco Almeida da Silva

LIST OF PARTICIPANTS / LISTA DE PARTICIPANTES

Name / Position Nombre / Puesto	Administration / Organization Administración / Organización	Telephone / E-mail Teléfono / Correo-e
Argentina		
Andres Espina Inspector / Auditor CNS	ANAC	E-mail espinaker@yahoo.com
Moira Callegare Directora de Proyectos de Navegación Aérea	ANAC	E-mail mcallegare@anac.gob.ar
Pablo Otálora Ingeniero	EANA	E-mail potalora@eana.com.ar
Alfredo Fabián Iacono Dpto. Comunicaciones - Gerencia de Ingeniería CNS	EANA S.E.	E-mail fabianiacono64@gmail.com
Aruba		
Joselito Correia de Andrade Manger CNS/ATM Systems	Air Navigation Services Aruba	E-mail joselito.correideandrade@ansa.aw
Barbados		
Jackie Crichlow Senior Electronics Technician	G.A.I.A Inc	E-mail jcrichlow@gaiainc.bb
Bolivia		
Arturo Lopez Analista de Otorgamientos	Autoridad de Regulación y Fiscalización de Telecomunicaciones y Transportes - ATT	E-mail arlopez.casas@gmail.com
Jaime Yuri Alvarez Miranda Jefe de la Unidad CNS	Dirección General de Aeronáutica Civil	E-mail jalvarez@dgac.gob.bo
Ariel Salvatierra Encargado de Seguimiento de Proyectos en Telecomunicaciones	Ministerio de Obras Públicas, Servicios y Vivienda	E-mail ariel.salvatierra@oopp.gob.bo
Brazil / Brasil		
Vahe Antoine Yaghdjian CNS Advisor	Department of Air Space Control	E-mail vahevay@decea.gov.br

Name / Position Nombre / Puesto	Administration / Organization Administración / Organización	Telephone / E-mail Teléfono / Correo-e
Wallace Gutemberg Medeiros Luz CNS Advisor	DECEA	E-mail gutembergwgml@gmail.com
Canada / Canadá		
Seyed Rastaghi Engineer	NAV CANADA	E-mail rastags@navcanada.ca
Cayman Islands / Islas Caimanes		
Mark Danziger Technical Operations Analyst	CIAA	E-mail mark.danziger@caymanairports.com
Sean Bridle CNS Manager	Cayman Islands Airports Authority	E-mail sean.bridle@caymanairports.com
Cleavy Scott Maintenance Program Coordinator	Cayman Islands Airports Authority	E-mail cleavy.scott@caymanairports.com
Chile		
Pedro Lazo Analista de Normativas	DGAC	E-mail plazo@dgac.gob.cl
Cristian Parra Encargado de Sección Sistemas de Telecomunicaciones	DGAC	E-mail cristian.parra@dgac.gob.cl
Francisco Gálvez Ingeniero de Mantenimiento	DGAC	E-mail francisco.galvez@dgac.gob.cl
Cuba		
Orlando Nevot Especialista Aeronáutico	IACC	E-mail IACC_karel_picallo@icao.int
ECCAA		
Trevor Davis CNS Manager	ECCAA	E-mail tdavis@eccaa.aero
Ecuador		
Luis David Minango Lopez Especialista CNS	DGAC Ecuador	E-mail davidminango@aviacioncivil.gob.ec
El Salvador		
Luis Reyes Inspector CNS	Autoridad de aviación civil	E-mail lreyes@aac.gob.sv

Name / Position Nombre / Puesto	Administration / Organization Administración / Organización	Telephone / E-mail Teléfono / Correo-e
Grenada		
Margaret John AIS/AIM	GAA	E-mail johnmargaret25@gmail.com
Haiti / Haití		
Emmanuel Jacques CNS Engineer	OFNAC	E-mail emmanueljacques@gmail.com
Honduras		
Samuel Isaí Palma Canales Inspector ANS	Agencia Hondureña de Aeronáutica Civil	E-mail sammyhunny@hotmail.com
Jamaica		
Derrick Gant Director Communication Navigation & Surveillance	Jamaica Civil Aviation Authority	E-mail Derrick.Grant@jcaa.gov.jm
Mexico / México		
Miguel Ramirez Tecnico en Equipos Electronicos Aeronauticos	SENEAM	E-mail MIGUEL_RAMIREZ22@HOTMAIL.COM
Mario Sergio Davalos Director de Tránsito Aereo	Seneam	E-mail mario.davalos@sct.gob.mx
Alvaro Perez Subdirector de Area	AFAC	E-mail aperegal@sct.gob.mx
Thamar Azeneth Orozco Lozada Técnico calificado en Equipo Aeronáutico	SENEAM	E-mail thamar.orozco.loz@gmail.com
Daniel Conrado Castañeda Cruz Inspector Verificador Aronáutico	Agencia Federal de Aviación Civil	E-mail dcastane@sct.gob.mx
Panama / Panamá		
Nimio Alvarez Supervisor de Comunicaciones	Aeronautia Civil de Panama	E-mail nimio.alvarez@aeronautica.gob.pa
Daniel De Avila Jefe de Gestion de CNV	Autoridad Aeronáutica Civil	E-mail daniel.deavila@aeronautica.gob.pa
Saint Lucia / Santa Lucía		
Ricardo Charles Air Traffic Control Officer	Saint Lucia Air and Sea Ports Authority	E-mail ricardo.charles@slaspa.com
Trinidad and Tabago / Trinidad y Tobago		

Name / Position Nombre / Puesto	Administration / Organization Administración / Organización	Telephone / E-mail Teléfono / Correo-e
Steve Saroop Ag. CNS Engineer	Trinidad and Tobago Civil Aviation Authority	E-mail ssaroop@caa.gov.tt
Naresh Seeparsad CNS Supervisor (Ag.)	TTCAA	E-mail naresh_central@yahoo.com
Richard Halliday CNS ENGINEER	Trinidad and Tobago Civil Aviation Authority	E-mail rhalliday@caa.gov.tt
Rupnarine Baboolal CNS Supervisor	Trinidad and Tobago Civil Aviation Authority	E-mail rbaboolal@caa.gov.tt
Adam Khan CNS Technician 2	Trinidad and Tobago Civil Aviation Authority	E-mail adamkhan@caa.gov.tt
Satnarine Maharaj CNS Supervisor (Ag)	Trinidad and Tobago Civil Aviation Authority	E-mail satnarinemaharaj@caa.gov.tt
Veronica Ramdath Manager Communication Navigation Surveillance	Trinidad and Tobago Civil Aviation Authority	E-mail vramdath@caa.gov.tt
Uruguay		
Horacio Berretta Kramer Asesor VII- (Ing. Electrónica)	DINACIA	E-mail horaciobk@gmail.com
COCESNA		
Gabriel Quirós Pereira Gerente Técnico	COCESNA	E-mail gabriel.quirós@cocesna.org
Edwin Rivas Hernandez Gestor Técnico	COCESNA	E-mail edwin.rivas@cocesna.org
Manuel Flores Subgerente Tecnico	COCESNA	E-mail manuel.flores.hn@gmail.com
ICAO / OACI		
Julio Siu Deputy Regional Director / Director Regional Adjunto	ICAO NACC Regional Office	E-mail jsiu@icao.int
Loftur Jonasson Chief, Communications, Navigation and Surveillance Services (CNSS) / Jefe, Servicios de Comunicaciones, Navegación y Vigilancia (CNSS)	ICAO Headquarters	E-mail LJonasson@icao.int

Name / Position Nombre / Puesto	Administration / Organization Administración / Organización	Telephone / E-mail Teléfono / Correo-e
Mayda Avila Communication, Navigation and Surveillance Regional Officer / Especialista Regional en Comunicaciones, Navegación y Vigilancia	ICAO NACC Regional Office	E-mail mavila@icao.int
Mie Utsunomiya Technical Officer / Oficial Técnico	ICAO Headquarters	E-mail MUtsunomiya@icao.int
Francisco Almeida da Silva Communication, Navigation and Surveillance Regional Officer / Especialista Regional en Comunicaciones, Navegación y Vigilancia	ICAO SAM Regional Office	E-mail falmeida@icao.int