



**Third Workshop/Meeting of  
the Interoperability Task  
Force (GT INTEROP/3)**

16 March 2022

Athayde Frauche

AIREON LLC PROPRIETARY INFORMATION

# OUTLINE

- SPACE-BASED ADS-B OVERVIEW
- SAM FEASIBILITY STUDY FOR A REGIONAL IMPLEMENTATION (AT A GLANCE)
- COORDINATION WITH ICAO AND APPROVAL FOR THE NODE IMPLEMENTATION

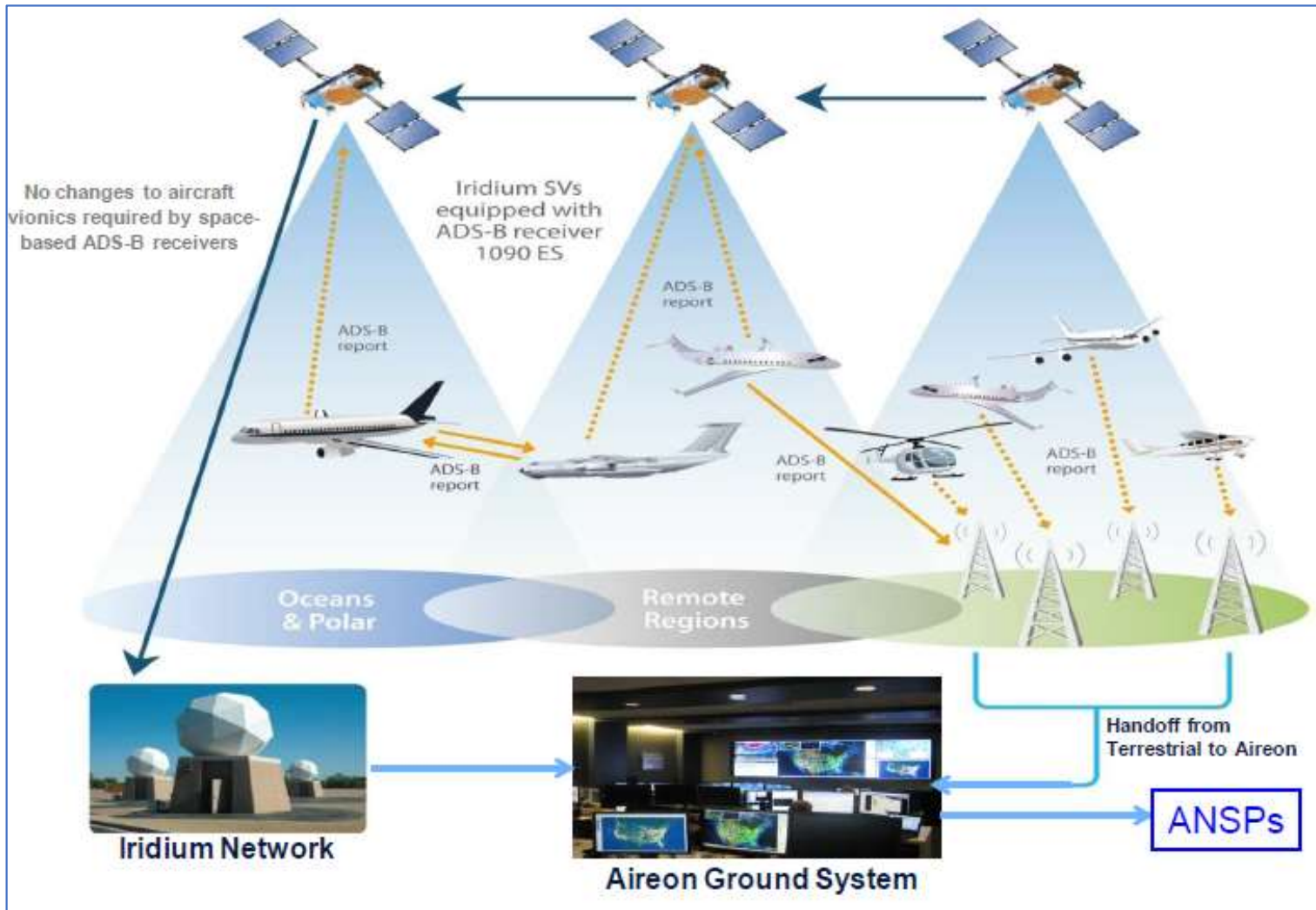
# SPACE-BASED ADS-B OVERVIEW



# Global Customer Base

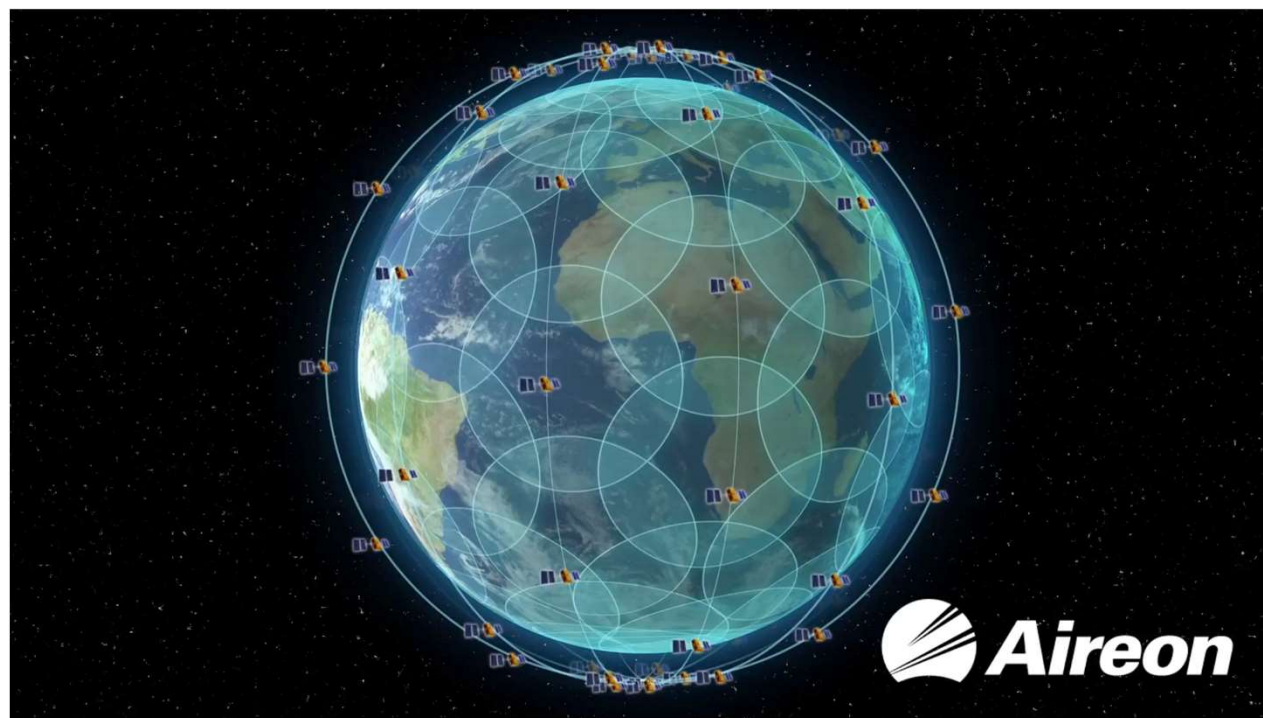


# SPACE-BASED ADS-B



# System Overview

- Satellites in orbit 66
  - 11 Satellites per Plane
  - 9 in-orbit Spares
  - 6 Ground Spares
- Orbital Planes 6
- Operational Altitude 780km
- North-South footprint 1970NM (9mins)



**Fully redundant – Global Capability**



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## Safety Pedigree with EASA

**June 2019: Aireon was officially approved by the European Union Aviation Safety Agency (EASA) as an Air Navigation Service Provider (ANSP) Organization to provide Air Traffic Management (ATM)/Air Navigation Service (ANS) surveillance services, to support the separation of aircraft. This authorizes Aireon as the first-ever certified provider of aircraft surveillance-as-a-service.**



**EASA**  
European Aviation Safety Agency

# Technical Performance Measures

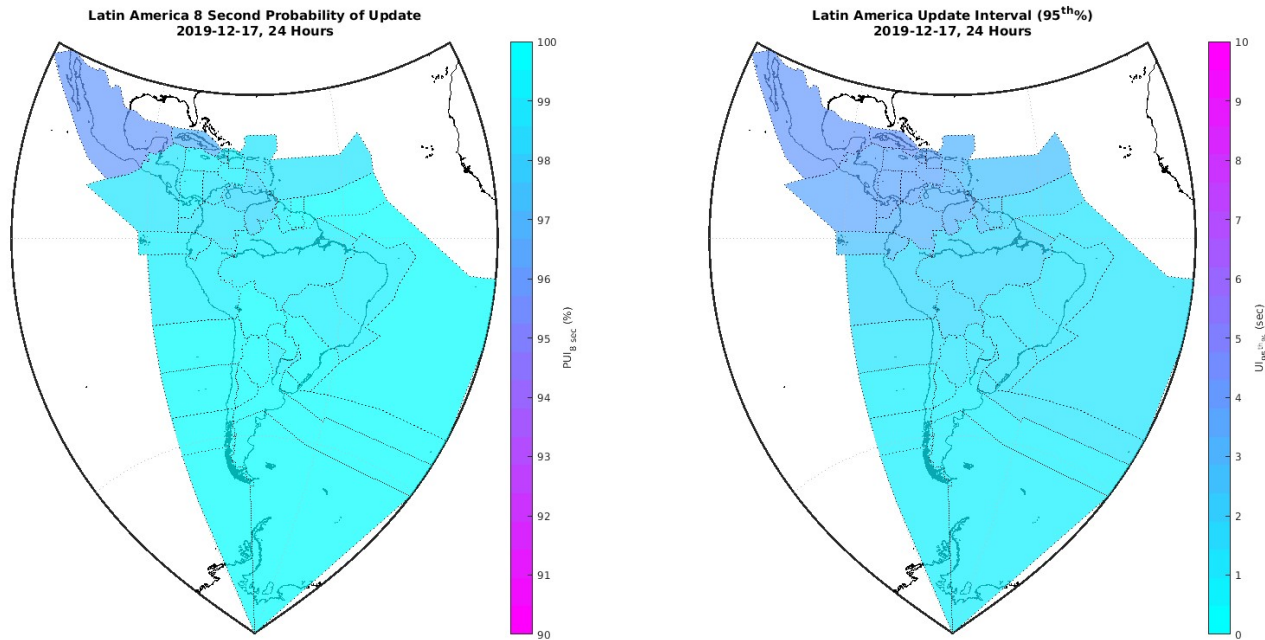


Parameter	Source (Standard)	Required Value
Service Volume Availability	ICAO Global Operational Data Link Document (GOLD); April 26, 2013	$\geq 0.999$
Latency (Message Receipt to Customer SDP)	Eurocontrol GEN SUR, Section 3.7.3.1.5 (ATC SUR Sensor + SUR Distribute) & Cir.326	$\leq 2.0s$ (99th percentile)
Probability of Update	EUROCAE Technical Specification for an 1090 MHz Extended Squitter ADS-B Ground System, ED-129B	$\geq 96\%$ for an Update Interval of 8 seconds (for low density en route airspace)

**Key safety requirements enabling reduced separation**

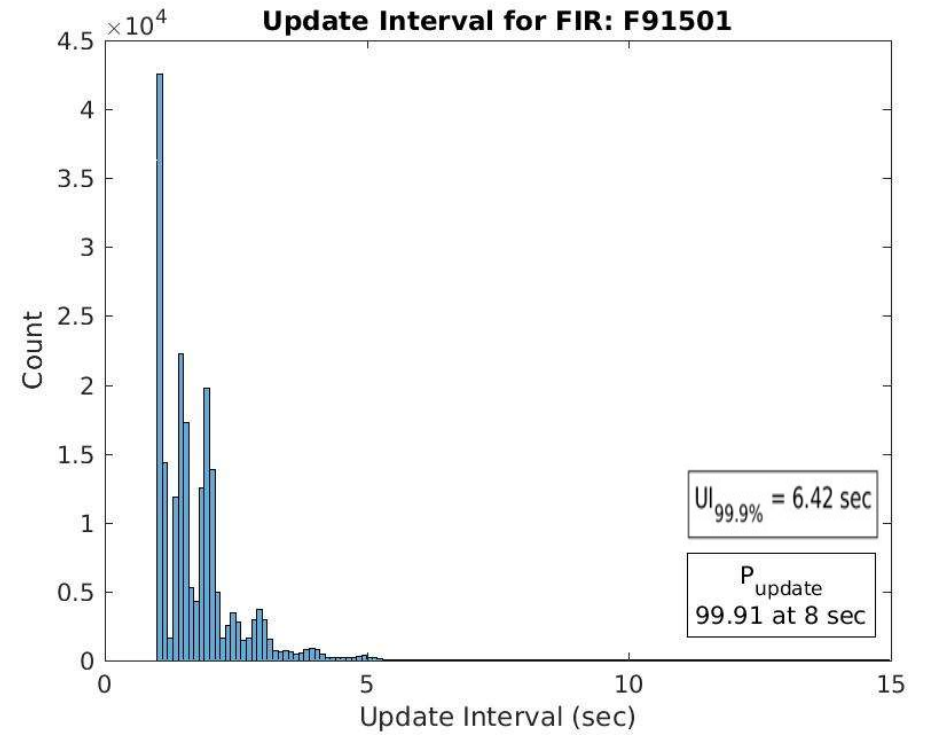
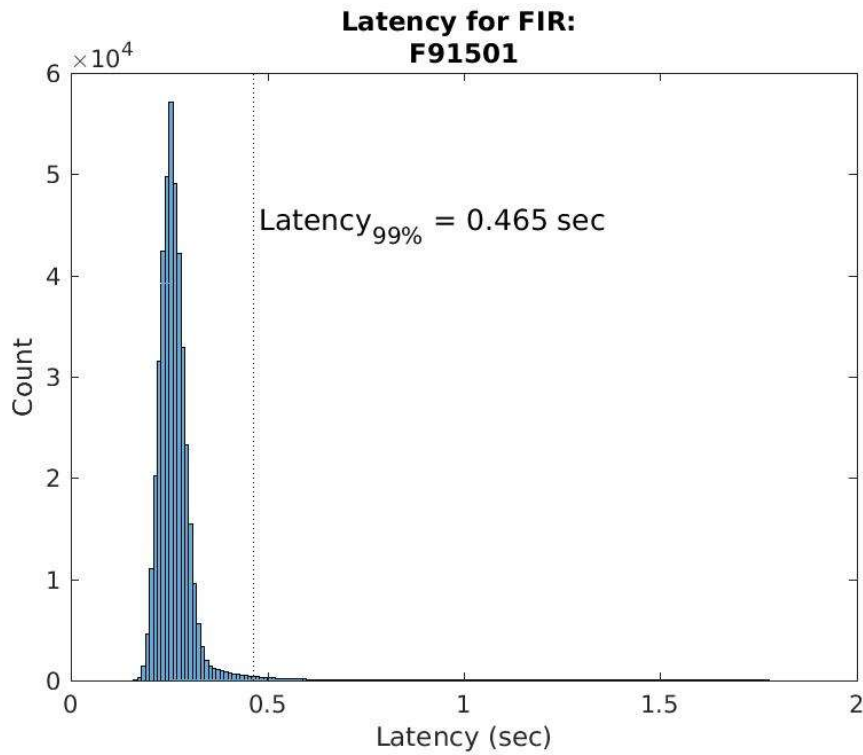


# Excellent Performance Levels in LATAM/CAR



- The probability of update for an update interval of 8 sec is between 98.5% and 100%
- The update interval for a probability of update of 95% is between 2 and 4 seconds

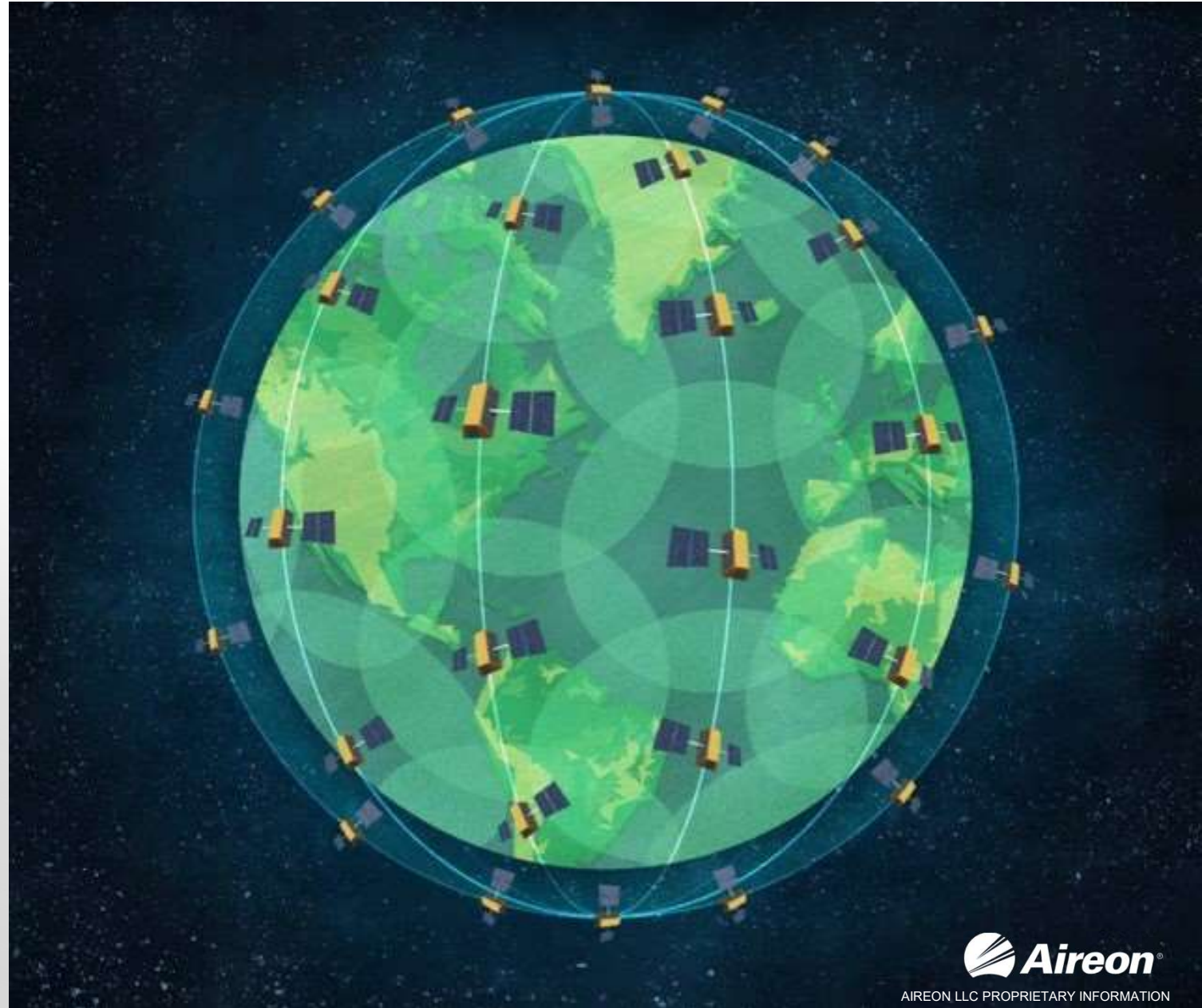
# Test Result COCESNA



**CONCLUSION:** PERFORMANCE COMPATIBLE FOR CONTINENTAL AIRSPACE APPLICATION



## SAM Feasibility Study for a Regional Implementation

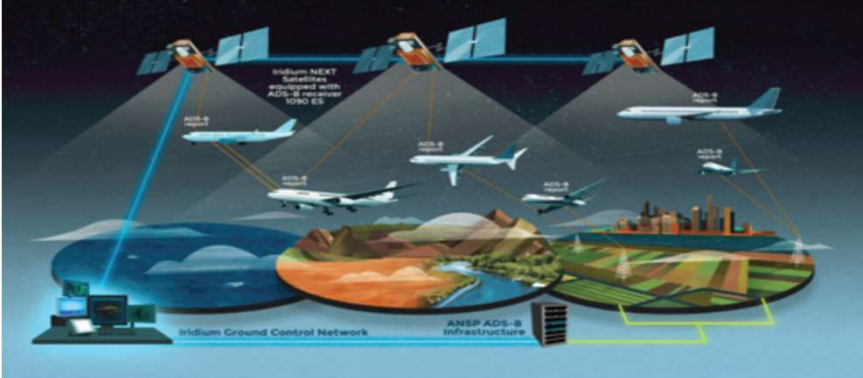


# SB ADS-B Possible Regional Implementation

**Purpose of the Study:** determine the effectiveness of space-based ADS-B services, to fulfil the requirements of air traffic control operations in upper and lower routes, in the South American Region (SAM), and its potential implementation and use at the regional level.



Conventional ADS-B



Space-Based ADS-B

# REDDIG Supporting the Regional Implementation

## Connection to the services of Aireon via REDDIG

The interconnection topology between Aireon and the ANSP, with the use of the REDDIG, will be evaluated over time among the members of the REDDIG with the support of telecommunications experts from the provider.

The feasibility of the previous architecture is being analyzed by Aireon along with other options for the distribution of the space-based ADS-B service through REDDIG, with the purpose of facilitating the regional implementation of space-based ADS-B in South America. The choice of the final platform will be a matter of discussion, opportunistically, between the experts of the region and the engineering team of Aireon.

With the use of the REDDIG, Member States will be provided with:

- A reduction of telecommunications circuit costs; and
- The adoption of a standard message exchange platform for ATFM, SWIM and other applications.



# Study Recommendations for the Region

## Technical Recommendations

The use of the Aireon services is feasible and would improve the current monitoring conditions due to the coverage that would be achieved and compliance with the minimum parameters of the proposed services, as well as the recovery of the ADS-B message at all times and in all places, as well as the transportation of this through reliable telecommunications networks.

Regarding the oceanic spaces, it is evident the importance of having data from the aircraft operating on these areas, which can be provided by Aireon, improving safety and operational efficiency.



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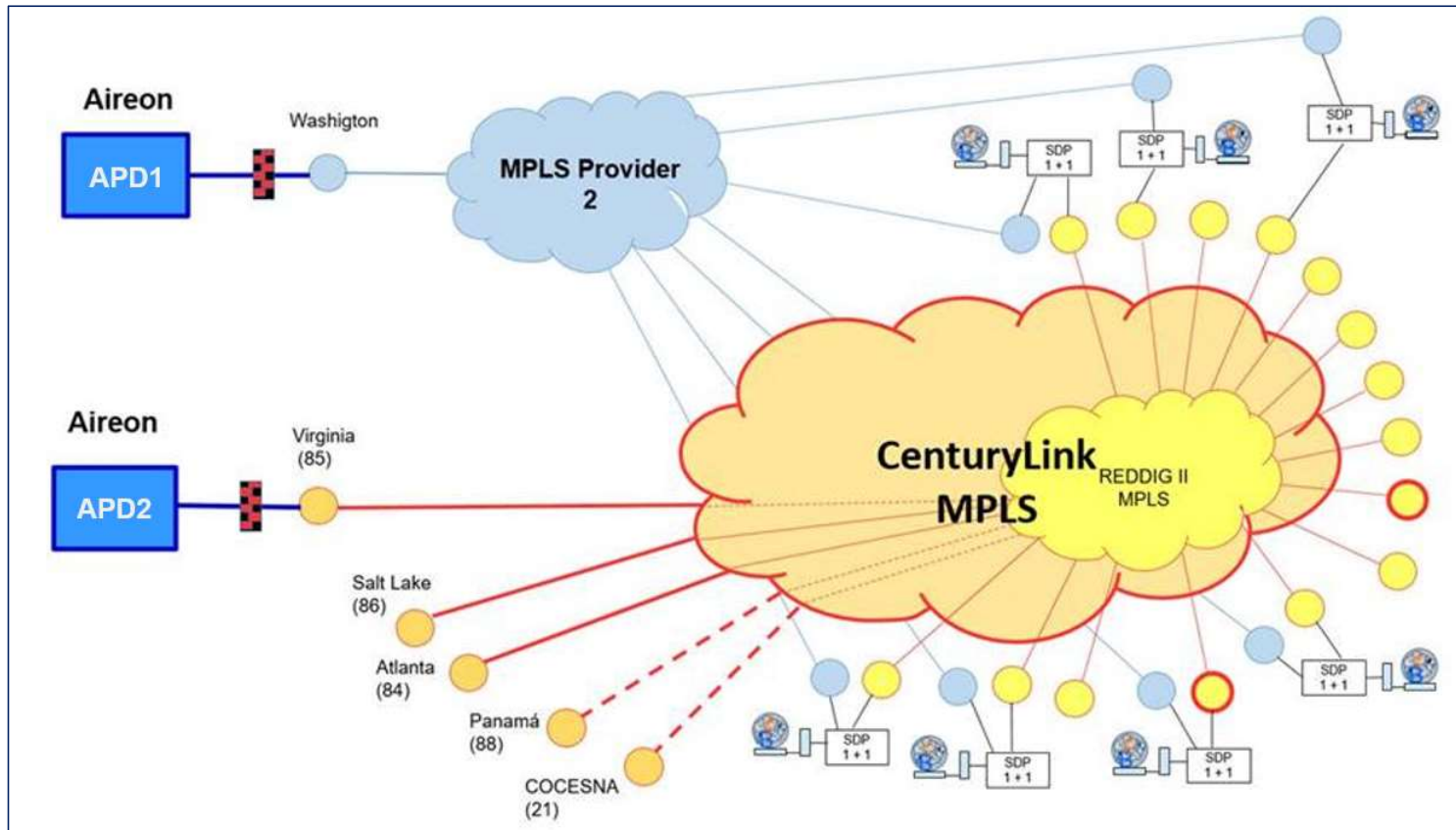
# Coordination with ICAO and Approval for the Node Implementation



# Actions Over Time

- **AIREON suggested topologies for the REDDIG node.**
- **GT Interop reviewed:**
  - a) Suggested topologies;**
  - b) Contractual and Administrative Aspects.**
- **AIREON sent a letter to ICAO.**
- **ICAO sent letters to the States (approval and participation interest).**
- **Coordination with TCB (Regional Office).**

# Chosen Topology



# Aireon`s letter (Main Parts)



Washington, September 4<sup>th</sup>, 2020

Mr. Fabio Faizi Rahnemay Rabbani  
Regional Director, South America  
International Civil Aviation Organization

CC: Mr. Francisco Almeida, CNS Officer

Dear Mr. Rabbani,

I hope the present finds you and the Lima office personnel well.

As we all know, the impact of the COVID-19 virus has been significant to our industry. States in the region are facing one of the biggest challenges in our history in keeping their operations continuity, while managing the large decrease in air traffic operations.

It is paramount during this time for the industry to come together and find innovative solutions to accomplish the objectives for the region in a safe, efficient, and flexible way. Aireon has committed to supporting States in providing state-of-the-art, EASA-certified, and cost-effective air traffic surveillance data services, via "space-based ADS-B".

As per the conclusions and action items established in the Interop GT, CNS/SUR subgroup, we want to confirm our interest in pursuing that solution with States and thus, kindly request the approval and support from the ICAO SAM Regional Office for the implementation of a REDDIG additional node at Aireon's facilities, with the aim to conduct testing of such infrastructure to distribute space-based ADS-B data to SAM States and for it to be used by any State that contracts Aireon's service, either independently or under a regional project.

The implementation of the REDDIG additional node at Aireon's facilities will have no costs to SAM States or REDDIG member States and will be conducted in collaboration with the ICAO SAM Regional Office and the Interop GT group, CNS/SUR sub-group.

I remain at your disposal for any questions or comments.

Best regards,

A handwritten signature in black ink, appearing to be "F. Rahnemay Rabbani", written over a light blue circular stamp.

# State Letter - Authorization for Aireon`s Node Installation



International  
Civil Aviation  
Organization

Organisation  
de l'aviation civile  
internationale

Organización  
de Aviación Civil  
Internacional

Международная  
организация  
гражданской  
авиации

منظمة الطيران  
المدني الدولي

国际民用  
航空组织

Ref.: LN3/20.1 - SA5269

Lima, 18 de septiembre de 2020

Para: Lic. Paola Viviana Tamburelli, Administradora Nacional, ANAC, Argentina  
Cmde. Angel German Rosas Cossio, Director Ejecutivo, DGAC, Estado Plurinacional de Bolivia  
Sr. Juliano Alcántara Noman, Director-Presidente Sustituto, ANAC, Brasil  
Ten. Brig. do Ar Heraldo Luiz Rodrigues, Director General, DECEA y Presidente, CERNAL, Brasil  
General de Aviación Victor O. Villalobos, Director General, DGAC, Chile  
Dr. Juan Carlos Salazar, Director General, UAEAC, Colombia  
Cmde. Anyelo Patricio Acosta Arroyo, Director General de Aviación Civil, Ecuador  
Sr. Félix Masao Kanazawa Makino, Presidente, DINAC, Paraguay  
Dr. Juan Carlos Pavic Moreno, Director General, DGAC, Perú  
Brig. Gral. (Av.) Gaetano Battagliese, Director Nacional, DINACIA, Uruguay  
M/G Juan Manuel Teixeira Diaz, Presidente, INAC, República Bolivariana de Venezuela

Asunto: **RLA03901 – Nodo Adicional de la REDDIG II**

Acciones requeridas: Informar a más tardar el **09 de octubre de 2020**.

Distinguido(a) señor(a):

Tengo el honor de dirigirme a usted con referencia al asunto arriba mencionado y a la conclusión RCC/23-1 (Ver Adjunto 1). En tal sentido le informo que la empresa Aireon nos ha informado sobre su interés de implantar un nodo adicional de la red terrestre (MPLS) de la REDDIG II (ver Adjunto 2). Esta implantación no representaría costos adicionales para los Estados miembros de REDDIG y será responsabilidad del solicitante la contratación, directamente con el proveedor de telecomunicaciones (MPLS) Centurylink, del enlace necesario para interconectarse a la REDDIG II.

El análisis sobre una potencial implantación regional de ADS-B Satelital, utilizando la REDDIG como plataforma para la distribución de la información de vigilancia, es parte del trabajo colaborativo que el Subgrupo CNS/SUR del Grupo Tarea de Interoperabilidad (GT Interop) está realizando con la participación de Aireon. El intercambio de informaciones de vigilancia podría representar beneficios operacionales y en la eficiencia en la prestación de los servicios de navegación aérea, además de aprovechar economías de escala con una implantación regional.

- 2 -

Sobre el particular y para poder continuar con las acciones y coordinaciones para la conexión del nodo adicional para la implantación de este servicio, mucho agradeceré me confirme, **no más tarde del 09 de octubre de 2020**, el interés de su Administración en la implantación del nodo adicional en las dependencias de Aireon.

De requerir mayor información, sírvase contactar al Sr. Francisco Almeida da Silva, Oficial Regional CNS de la Oficina Regional SAM de la OACI por medio del correo electrónico [falmeida@icao.int](mailto:falmeida@icao.int) y/o teléfono +51 977 814 722 (también WhatsApp).

Le ruego acepte, distinguido señor, los sentimientos de mi mayor consideración y estima.

Fabio Faizi Rahnemay Rabbani  
Director Regional  
Oficina Sudamericana de la OACI  
Lima

**Adjunto**  
*Lo indicado*



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# State Letter - Interest in Participating



International Civil Aviation Organization  
Organisation de l'aviation civile internationale  
Organización de Aviación Civil Internacional  
Международная организация гражданской авиации  
منظمة الطيران المدني الدولي  
國際民用航空組織

Ref.: LT2/3.1.2 - SA291

Lima, 21 de septiembre de 2020

Para: Lic. Paola Viviana Tamburelli, Administradora Nacional, ANAC, Argentina  
Cndre. Angel German Rosas Cossio, Director Ejecutivo, DGAC, Estado Plurinacional de Bolivia  
Sr. Juliano Alcántara Noman, Director-Presidente Sustituto, ANAC, Brasil  
Ten. Brig. do Ar Heraldo Luiz Rodrigues, Director General, DECEA y Presidente, CERNAL, Brasil  
General de Aviación Victor O. Villalobos, Director General, DGAC, Chile  
Dr. Juan Carlos Salazar, Director General, UAEAC, Colombia  
Cndre. Anyelo Patricio Acosta Arroyo, Director General de Aviación Civil, Ecuador  
Cap. Gustavo Pérez Morales, Director General, AAC, República de Panamá  
Sr. Félix Masao Kanazawa Makino, Presidente, DINAC, Paraguay  
Dr. Juan Carlos Pavic Moreno, Director General, DGAC, Perú  
Brig. Gral. (Av.) Gaetano Battagliese, Director Nacional, DINACIA, Uruguay  
M/G Juan Manuel Teixeira Diaz, Presidente, INAC, República Bolivariana de Venezuela

Asunto: **Implantación Regional de ADS-B Satelital**

Acción requerida: **Informar a más tardar el 02 de octubre de 2020.**

Distinguido(a) señor(a):

Tengo el honor de dirigirme a usted en referencia al tema arriba mencionado y a los avances del Subgrupo CNS/SUR del Grupo de Tarea de Interoperabilidad (GT Interop) para apoyar la próxima reunión del Grupo de Implantación de la Región SAM (SAM/IG/25) en la toma de decisiones con respecto a la implantación regional de ADS-B Satelital (Space-based ADS-B). (Ver Adjunto con los antecedentes).

Para continuar con el análisis, se hace necesario saber si su Estado tiene el interés de participar en una potencial implantación; considerando que un mayor número de Estados participantes impactaría en la reducción de los costos de adquisición de equipos, entrenamiento y negociación del servicio a ser proveído.

En tal sentido, mucho agradeceré me confirme, **no más tarde del 02 de octubre de 2020**, si hay interés de su administración en participar de la referida implantación regional.

Asunto: **Implantación Regional de ADS-B Satelital**

Acción requerida: **Informar a más tardar el 02 de octubre de 2020.**

Distinguido(a) señor(a):

Tengo el honor de dirigirme a usted en referencia al tema arriba mencionado y a los avances del Subgrupo CNS/SUR del Grupo de Tarea de Interoperabilidad (GT Interop) para apoyar la próxima reunión del Grupo de Implantación de la Región SAM (SAM/IG/25) en la toma de decisiones con respecto a la implantación regional de ADS-B Satelital (Space-based ADS-B). (Ver Adjunto con los antecedentes).

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En tal sentido, mucho agradeceré me confirme, **no más tarde del 02 de octubre de 2020**, si hay interés de su administración en participar de la referida implantación regional.

Av. Victor Andres Bolognini No.147  
Centro Empresarial Bolognini  
Via Principal No.02  
Edificio Bolognini 4, piso 4, San Isidro  
Lima 15075 - Perú

Spamfree #127  
Lima 100, Perú  
Web page: [www.aireon.com](http://www.aireon.com)

Email: [atencion@aireon.com](mailto:atencion@aireon.com)  
Email: [GREGORIO@aireon.com](mailto:GREGORIO@aireon.com)  
Tel: +51 1 441-8000  
Fax: +51 1 441-8000

# ICAO Answering AIREON



International  
Civil Aviation  
Organization

Organisation  
de l'aviation civile  
internationale

Organización  
de Aviación Civil  
Internacional

Международная  
организация  
гражданской  
авиации

منظمة الطيران  
المدني الدولي

国际民用  
航空组织

Ref.: LT12/8-SA447

Lima, 14 December, 2020

Ms. Ana Persiani  
Regional Director, Latin America and Caribbean  
Aireon LLC

Subject: **Implementation of an additional node of the REDDIG II terrestrial network (MPLS)**

Dear Ms. Persiani,

I wish to make reference to your letter dated 4 September 2020 in which you requested ICAO's support for the implementation of an additional node of the REDDIG II terrestrial network (MPLS) at Aireon's facilities.

In this regard, I am pleased to inform you that your request has been approved by the REDDIG II Coordination Committee (RCC), and coordinations must be carried out with Mr. Francisco Almeida - CNS Officer (falmeida@icao.int) and Mr. Javier Vittor - REDDIG Administrator (jvittor@icao.int).

Yours Sincerely,

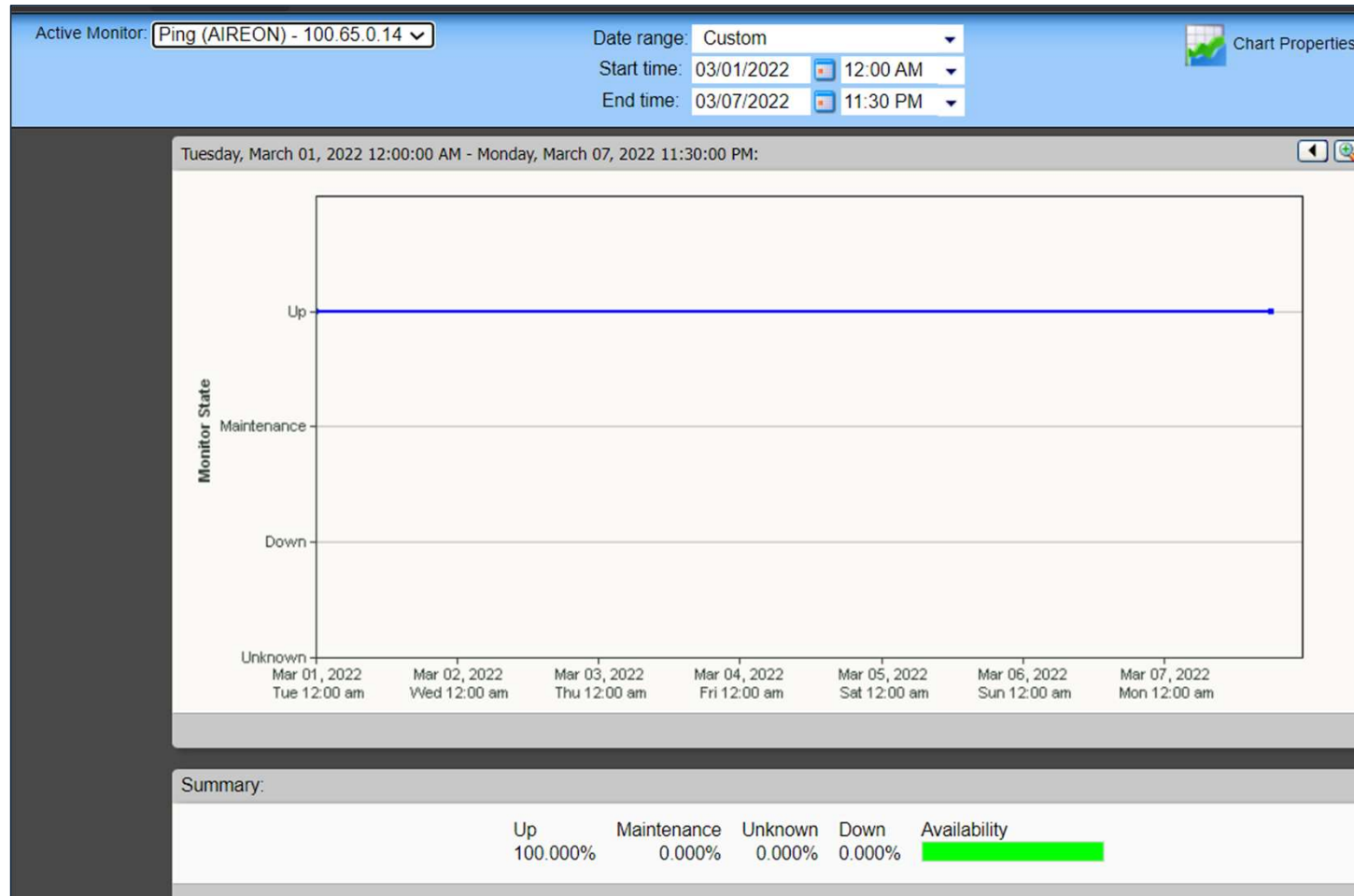
Fabio Faizi Rahnemay Rabbani  
Regional Director  
ICAO South American Office  
Lima

# Current Situation

- **AIREON`s REDDIG node is fully installed.**
- **REDDIG Administrator is monitoring performance (Layer 3 ISO-OSI) and availability.**



# Aireon Node (Availability)



Source: REDDIG Administrator Monitoring

# Future Actions

- **ICAO/TCB coordinates with States the analysis for the usage of the REDDIG Project (RLA 03/901).**
- **ICAO coordination with AIREON for future trials with a REDDIG MPLS node.**

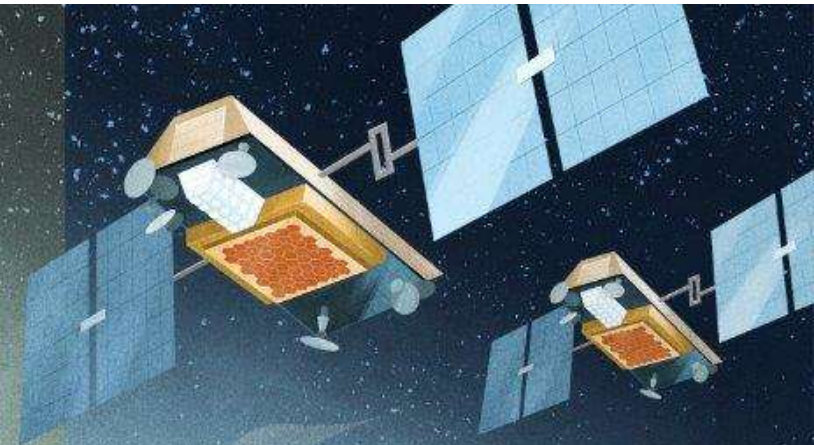


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# REVISITING THE OUTLINE



- SPACE-BASED ADS-B OVERVIEW
- SAM FEASIBILITY STUDY FOR A REGIONAL IMPLEMENTATION (AT A GLANCE)
- COORDINATION WITH ICAO AND APPROVAL FOR THE NODE IMPLEMENTATION

# THE FUTURE OF AIR TRAFFIC SURVEILLANCE IS HERE.





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