



**Agenda**  
**Item 4:**

**Work plan for 2022**

**IMPLEMENTATION OF THE AIREON MPLS REDDIG NODE**  
(Information paper presented by AIREON)

<b>SUMMARY</b>	
This Information Paper presents the updated situation of the implementation of the AIREON node in the REDDIG MPLS network.	
<b>REFERENCES</b>	
<ul style="list-style-type: none"><li>• Report of the SAM/IG/19 (Lima, from May 22 to 26, 2017).</li><li>• Report of the SAM/IG/21 (Lima, from May 21 to 25, 2018).</li><li>• Report of the SAM/IG/22 (Lima, from November 19 to 23, 2018).</li><li>• Report of the SAM/IG/24 (Lima, from November 4 to 8, 2019).</li><li>• Letter from AIREON to ICAO (September 4, 2020).</li><li>• ICAO letter to AIREON (December 14, 2020).</li><li>• Interop TF teleconferences (CNS/SUR Subgroup).</li></ul>	
<b>ICAO Strategic Objectives:</b>	<i>A – Safety</i> <i>B – Capacity y Efficiency</i>  <i>ASBU: ASUR-B0/1, ASUR-B0/3</i>

**1. Background**

1.1 At the Nineteenth Workshop/Meeting of the SAM Implementation Group (SAM/IG/19), a study was requested on the suitability and feasibility of the Space-Based ADS-B service for the SAM Region.

1.2 During SAM/IG/21 (Lima, May 21-25, 2018), the meeting took note of the preliminary study, prepared under the auspices of the Technical Cooperation Project RLA/06/901. To complement the study, the Meeting requested the States to review the preliminary study and provide the necessary information.

1.3 At the SAM/IG/22 Meeting, the final study was presented, which concludes that: “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”.

1.4 Considering that part of the process of delivering ADS-B messages to users through AIREON requires an adequate telecommunications network, and that the SAM Region has REDDIG II,

which provides the States of the SAM Region with the best of services by means of an ICAO Regional Technical Cooperation Project, the study pointed to savings in telecommunications costs with the use of REDDIG.

1.5 Although the Convenience and Feasibility Study provides a basic topology, it was decided that the choice of the final architecture would be made by experts from the SAM Region with the support of the company AIREON.

1.6 As of the SAM/IG/24 Meeting (Lima, November 4 to 8, 2019), the matter began to be dealt with by the CNS/SUR Subgroup of the Interoperability Working Group (INTEROP/TF).

## 2. Analysis

### 2.1 General Infrastructure of AIREON

2.1.1 AIREON's space-based global surveillance system is just an Automatic Dependent Surveillance (ADS-B) broadcast on a satellite. Instead of using traditional receivers on the ground, AIREON has redesigned them into flexible and highly effective receivers in Iridium's second-generation satellite constellation, called IRIDIUM NEXT. That enables 100 percent global surveillance, using the same ADS-B signal that aircraft already broadcast for ground infrastructure.

2.1.2 The satellite constellation consists of 75 vehicles, 66 operational and nine spare. The space segment contains the Hosted Payload (HPL). The HPL is inside each of the 66 satellites of the Iridium NEXT constellation, distributed in six polar orbital planes and offers the ability to receive the ADS-B signal from aircraft in the airspace. The HPL receives, decodes and transfers the ADS-B messages from the aircraft to the AIREON ground segment, through an interface of the primary payload of the Iridium NEXT system. Figure 1 describes the main parts of the Space and Ground Segments for the provision of Space-Based ADS-B.

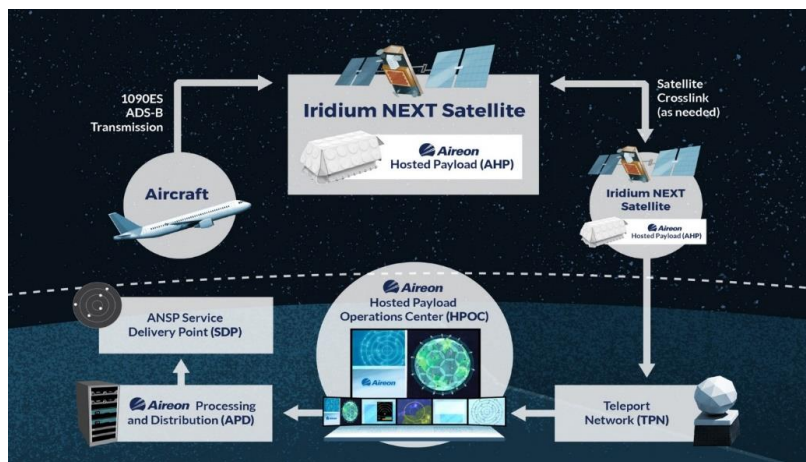


Figure 1: Basic Architecture of the Space-Based ADS-B

2.1.3 AIREON's ground segment is made up of the Payload Operations Center (HPOC) and the Processing and Distribution Department of AIREON (APD), with interfaces to AIREON Headquarters (HQ). The HPOC provides all the functions necessary to monitor and control the AIREON hosted payload, including telemetry monitoring, failover, and remote configuration. The APD provides full ADS-B data processing, mission planning, and payload functions, as well as data and status delivery to ANSPs.

## 2.2 Telecommunications Network between AIREON and the Costumer

2.2.1 For the provision of the service, with the required availability rates, it is necessary to install a service delivery point (SDP) with redundant equipment (1 + 1) and redundant communication links through two providers of MPLS telecommunications services. Figure 2 presents the basic configuration for the provision of the Space-Based ADS-B Services.

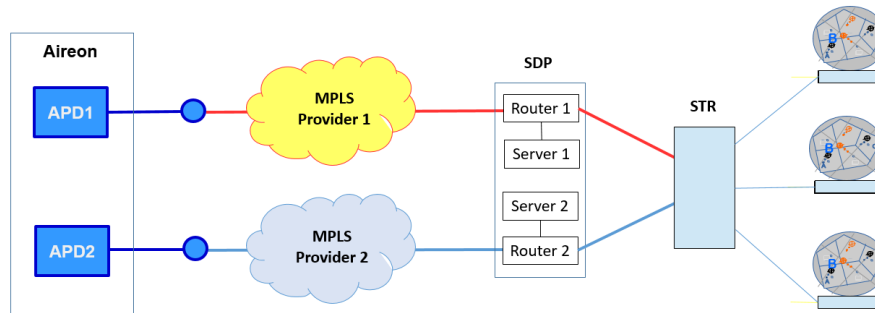


Figure 2: AIREON-Customer Telecommunications Basic Topology

2.2.2 At the SAM/IG/24 Meeting (Lima-Peru, November 4 to 8, 2019), the CNS/SUR Subgroup of the Interop TF was activated, with the task of studying and proposing the necessary activities for a regional implementation of Space-Based ADS-B in the SAM Region, using the REDDIG as one of the platforms for information distribution, reducing the cost with the contracting of telecommunications services, within the framework of regional development.

2.2.3 In the second teleconference of the CNS/SUR Subgroup, held on August 27, 2020, the company AIREON made a presentation outlining the general characteristics of the implemented system and three connection possibilities with the REDDIG member States and a evaluation, indicating pros and cons of each topology.

2.2.4 The choice of the final platform was the subject of discussion, opportunely, between the experts of the region and the AIREON team. The States reached the conclusion that the topology proposal reflected in Figure 3 is the most convenient considering technical, operational and financial aspects.

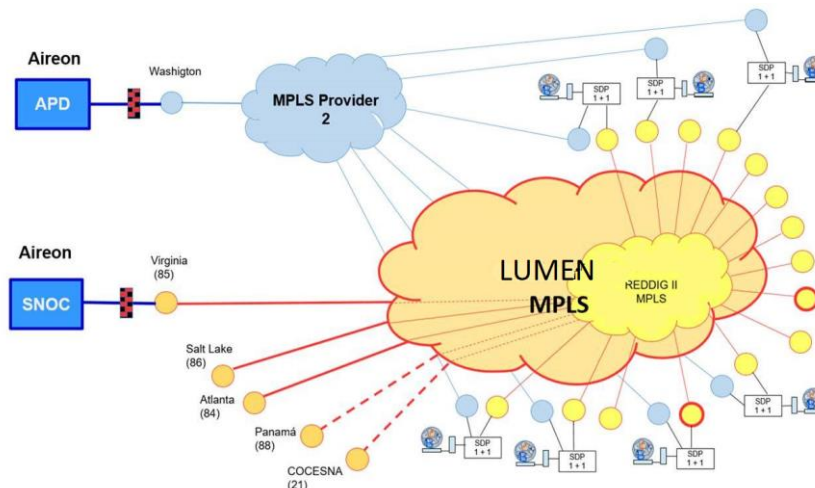


Figure 3: Chosen Topology

2.2.5 Based on the conclusion RCC/23-1 – Implementation of Additional Nodes of the Terrestrial Network (MPLS) of REDDIG II, the Secretariat of the Coordination Committee of the Regional Project RLA/03/901 must analyze the requests of States/Organizations not participating in the project, requiring connection to the network through “additional nodes”, not involving additional costs for the participants in the RLA/03/901 Project.

2.2.6 To comply with the Conclusion of RCC/23-1, the company AIREON sent a letter to ICAO with the request to join the REDDIG MPLS network.

2.2.7 After consulting with the REDDIG members, ICAO responded to AIREON authorizing the company to coordinate actions with Lumen for the installation of the node.

2.2.8 With the support of the REDDIG Administrator and the ICAO Lima Regional Office, AIREON coordinated with Lumen the installation of the node, which has been active since August 2021.

2.2.9 Since its installation, the AIREON MPLS REDDIG node has been monitored by the REDDIG Administrator, presenting excellent results in technical aspects of Layer 3 OSI ("Open Systems Interconnection Model"), in addition to very high availability.

2.2.10 The mechanism for the possible regional implementation may use a Regional Technical Cooperation Project, bringing together the States interested in receiving surveillance information from the AIREON'S Space-Based ADS-B system.

2.2.11 Although a regional implementation, using an ICAO Technical Cooperation Project, offers financial, managerial and administrative advantages to the interested States, nothing prevents a REDDIG Member State from signing a service provision contract with AIREON, if the State considers it more convenient.

2.2.12 In conclusion, it is pointed out that the infrastructure for the regional implementation of Space-Based ADS-B services already has one of the telecommunications lines ready with REDDIG, which lowers the costs in terms of telecommunications.

### 3. **Suggested Action**

3.1 The Coordination Committee is invited to:

- a) Take note of the content of this Information Paper.