International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)

WORKING PAPER

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02/09/24

Fourth GREPECAS-RASG-PA Joint Meeting and
Twenty-second Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/22)

Virtual Phase (Asynchronous, 16 September to 11 October 2024)
In-Person Phase (Lima, Peru, 20 to 22 November 2024)

Agenda Item 5: Implementation of CAR/SAM Air Navigation Services (ANS)
5.2 Communication, Navigation and Surveillance (CNS)

ATN-BR FLEXIBILITY AND ITS ROLE IN CNS/ATM RESILIENCE: USE CASE - FLOODS IN RIO GRANDE DO SUL

(Presented by Brazil)

EXECUTIVE SUMMARY

This paper presents the role of the Brazilian Air Traffic Network (ATN-Br) in maintaining the provision of air traffic services in the regions affected by the flood occurred in April and May 2024.

Action:	As indicated in Section 4
Strategic objectives:	• Safety • Air Navigation Capacity and Efficiency.
References:	• Doc 9750 – Global Air Navigation Plan. 2016 • The European Organisation for Civil Aviation Equipment. Voice Over Internet Protocol (VoIP) Air Traffic Management (ATM) System Operational and Technical Requirements – ED136. 2009 • The European Organisation for Civil Aviation Equipment. Interoperability Network Requirements and Performance for Voice over Internet Protocol (VoIP) Air Traffic Management (ATM) Systems (Part 1: Network Specification – Part 2: Network Design Guideline) ED-138. 2009

1. Introduction

1.1 ATN-Br (Air Traffic Network – Brazil) is a software-defined network (SDN) based on the IP suite and dedicated exclusively to supporting air traffic services and applications, such as radio communication (VHF) and RADAR. This Network is operational in 02 (two) of the 05 (five) ACCs in Brazil

- ACC Recife, responsible for control in the Northeast region, and ACC Curitiba, responsible for the South and Southeast regions of the country - and is in the implementation phase in the corridor Rio de Janeiro – São Paulo, which carries more than 50% of Brazilian air traffic.

1.2 As it is an IP-based network, it enables the implementation of voice communication between centers using VoIP, migration of old AFTN circuits to AMHS and inter-center data communication, as foreseen in Blocks 0, 1 and 2 of the GANP's Roadmap for ground-ground communications.

1.3 The ATN-Br Network was designed to offer greater availability, better use of long-distance means and flexibility in operation. To achieve this, the Network is based on 3 long-distance means (an MPLS Network, point-to-point E1 links and a satellite network), which connect the ACC to subordinate sites.

1.4 Initially, the priority order of the means is configured, but the decision on which link to use is based on the quality (delay, jitter and packet loss) required for each application. The means of communication are constantly monitored and, if one of the parameters suffers degradation, the application is switched to another means. This behavior is called "brown-out".

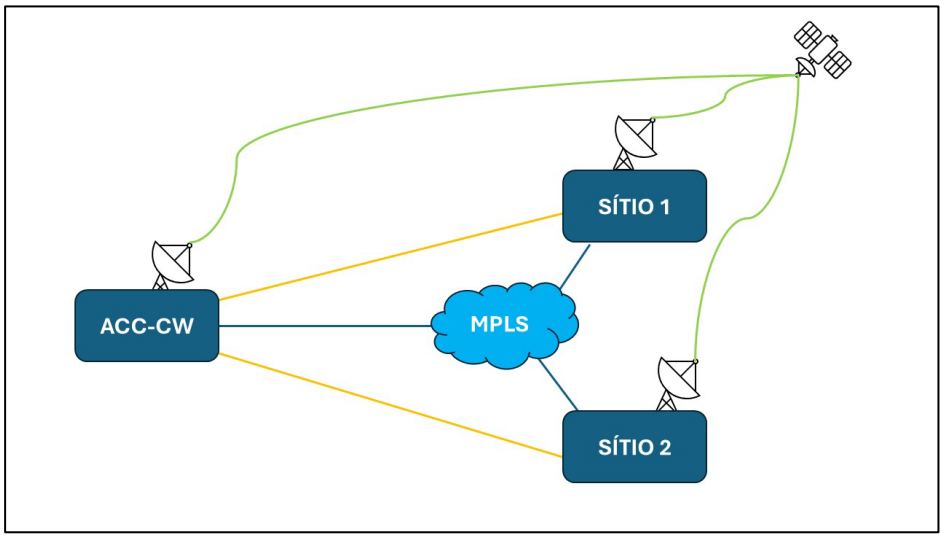

Figure 1: ATN-Br Network diagram

1.5 The configuration of the network, both the links to be used and the services which will use the network, is done centrally at the DECEA Technical Management Center (CGTEC).

1.6 This WP aims to present the use of ATN-Br Network in maintaining airspace control in response to the flood that occurred in Rio Grande do Sul in the months of April and May 2024.

2. Situation analysis

2.1 At the end of April 2024, heavy rain began, lasting for weeks, in the State of Rio Grande do Sul, which caused flooding in a large part of the State. There was a loss of human life and destruction of critical infrastructure. Several airports in the region, including the one in the capital Porto Alegre, were completely flooded and aeronautical communication and surveillance facilities were severely damaged, becoming completely inoperative.

2.2 Despite the closure of airports, there was an increase in air movement in the affected area due to rescue operations and humanitarian actions to supply food, water, clothing and blankets to the affected population.

2.3 Given this scenario, quick actions were necessary to maintain the provision of air traffic control services in the region, and ATN-Br Network played a fundamental role in the success of the mission.

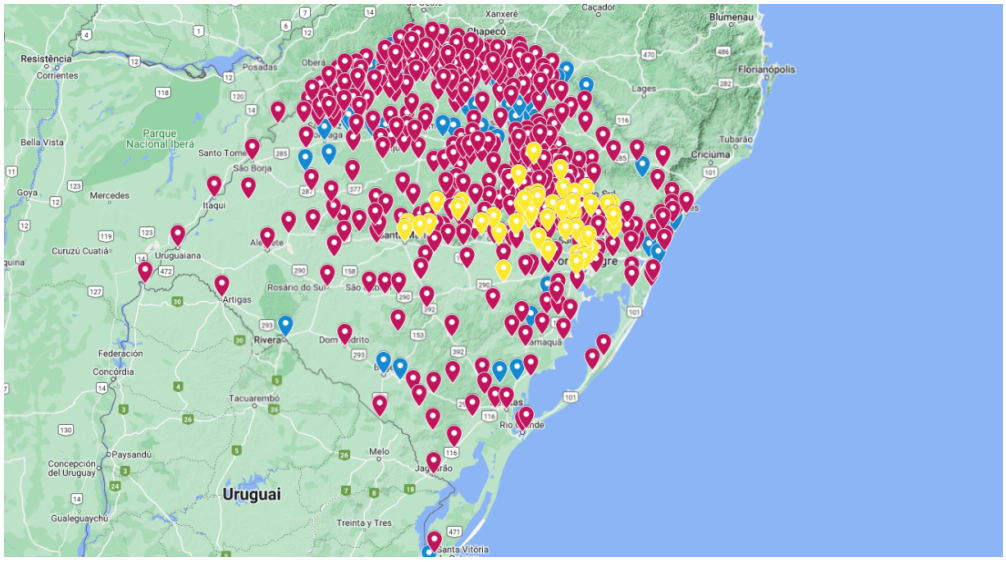

Figure 2: Cities affected by the flood in Rio Grande do Sul (red dots) and with confirmed deaths (yellow dots). Source: https://www.cnnbrasil.com.br/nacional/enchente-no-rs-mapas-interativos-mostram-locais-afetados-pela-chuva-veja/. Accessed on August 20th, 2024.

2.4 Due to the loss of the VHF station, the RADAR and the APP-PA satellite station (Porto Alegre), in the first week a transportable satellite station was installed in Canoas (13 km from Porto Alegre), from where the APP- PA with 3 APP frequencies and 1 ATIS frequency.

2.5 The frequencies in Caxias do Sul (130 km from the capital) were reconfigured for ACC-CW. A transportable RADAR was also installed in Caxias do Sul, whose data was channeled via ATN-Br to Curitiba. Thus, ACC-CW expanded its area of operation and began providing air traffic services at the location.

Figure 3: Distance from ACC-CW to APP-PA and Caxias do Sul

2.6 After confirming the stability of the service, the APP-PA services were migrated from Canoas and, within 1 hour, began to be operated from the remote APP created within ACC-CW.

3. Conclusion

3.1 ATN-Br Network demonstrated its ability to meet aeronautical communications demands quickly and safely, even in the face of calamity situations. The centralized configuration system and the flexibility of the network allowed the immediate reconfiguration of the control and ATIS frequencies and RADAR data from Porto Alegre and Caxias do Sul to the ACC-CW, enabling air rescue support and provision of items basic needs for the population affected by the flood.

4. Suggested actions

4.1 The Meeting is invited to:

a) Take note of the information provided in this Working Paper; and

b) Evaluate the possibility of establishing a Software Defined Network in the CAR/SAM Region to comply with the planning and security requirements established by ICAO.

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