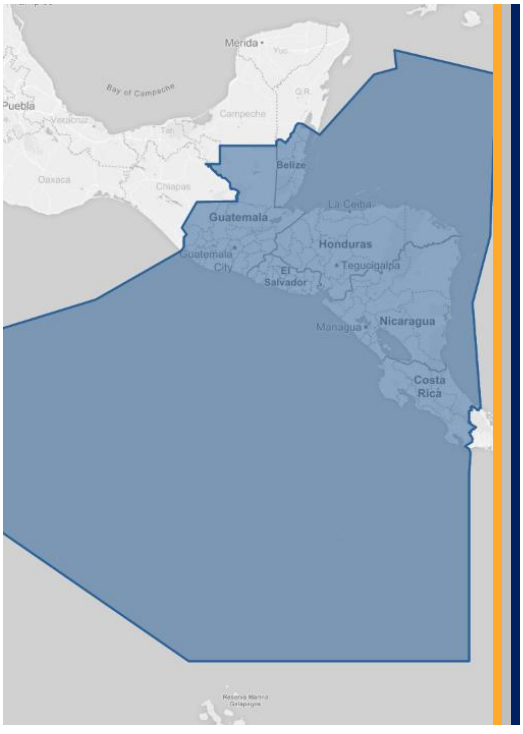

CENTRAL AMERICAN CORPORATION OF AIR NAVIGATION SERVICES (COCESNA)

Managing ANS Contingencies in Central America

CRC-FMTO-006

1

INTRODUCTION - COCESNA

The Central American Corporation for Air Navigation Services **COCESNA**, is a non-profit, public service organization created under the framework of Central American integration.

It was founded with the purpose of jointly managing and developing Air Navigation Services for the benefit of its Member States: Belize, Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

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INTRODUCTION - COCESNA

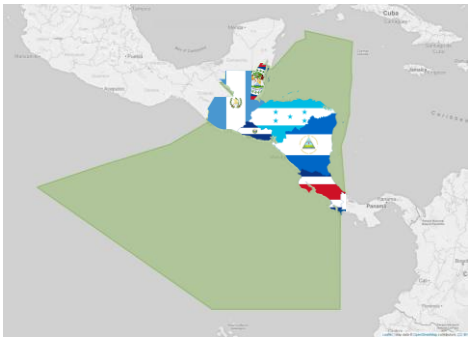
COCESNA is responsible for the provision of a wide range of essential services that ensure the safety, efficiency, and continuity of air operations in the region. These services include:

- Aeronautical Surveillance
- Aeronautical Telecommunications
- Navigation Aids (NAVAIDs)
- Air Traffic Services (ATS)
- Aeronautical Information Services (AIS)

INTRODUCTION - COCESNA

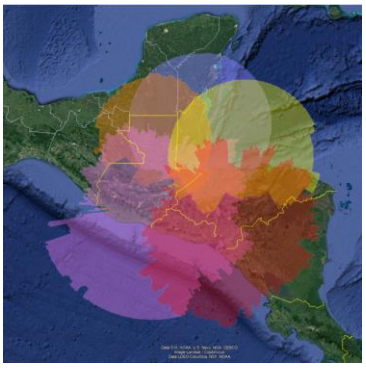
Through these functions, COCESNA contributes to the orderly development of civil aviation in the Central American region, operating under international standards and in alignment with the policies and recommendations of the International Civil Aviation Organization (ICAO).

COCESNA also plays a key role in regional cooperation and integration, facilitating coordination among States to enhance operational safety, technological modernization, and capacity building in support of sustainable aviation development.

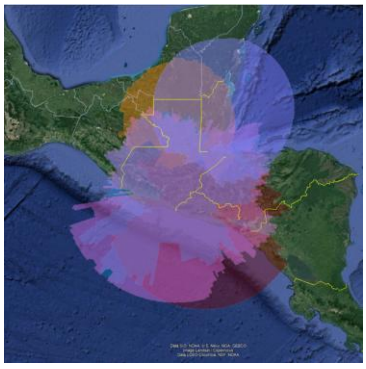


INTRODUCTION – COCESNA
AERONAUTICAL SURVEILLANCE

Belize



Guatemala



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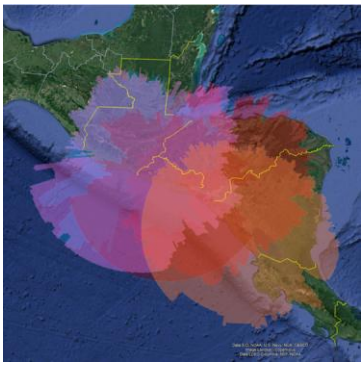
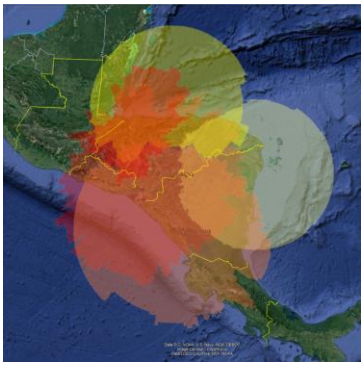
INTRODUCTION – COCESNA
AERONAUTICAL SURVEILLANCE

El Salvador



Honduras



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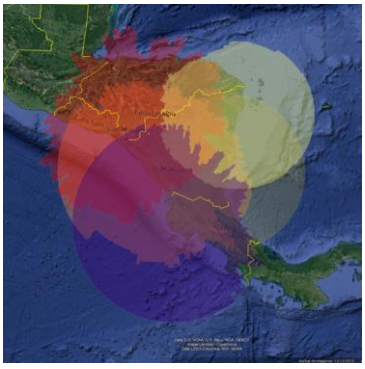
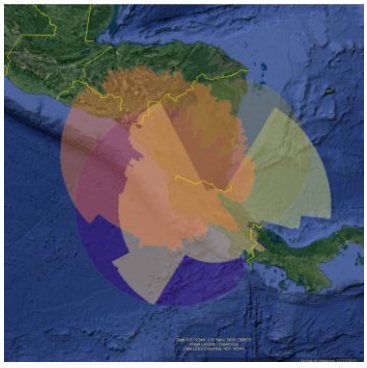
INTRODUCTION – COCESNA
AERONAUTICAL SURVEILLANCE

Nicaragua



Costa Rica



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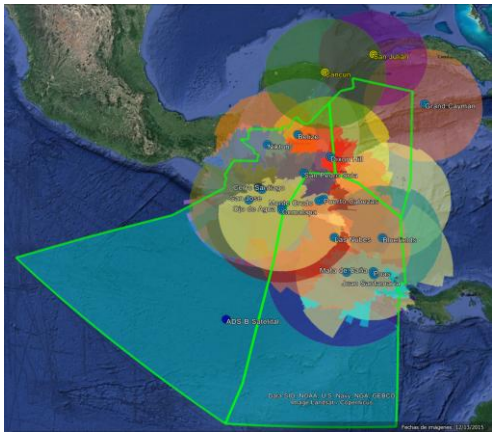
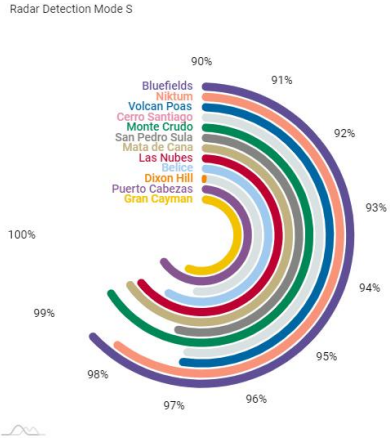
INTRODUCTION – COCESNA
AERONAUTICAL SURVEILLANCE





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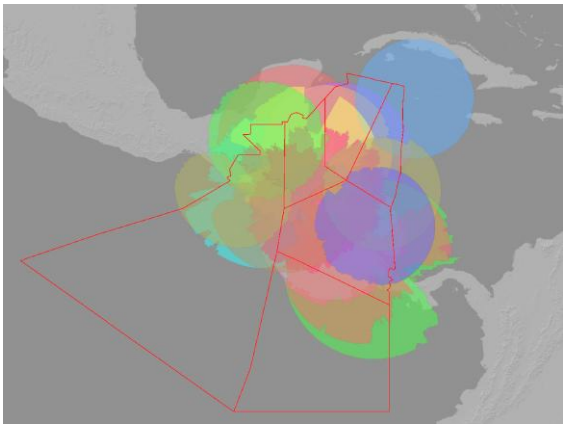
INTRODUCTION – COCESNA
AERONAUTICAL COMMUNICATION



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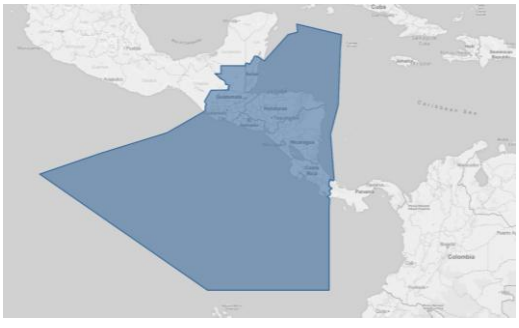
INTRODUCTION – COCESNA
AIR TRAFFIC SERVICE

The upper airspace of Central America (FIR MHCC) covers an area of **2,928,006 km²**.

It is a connected and coordinated airspace that ensures safe and consistent operations across borders. All types of airspace users can fly through this region without noticeable changes in:

- The quality or type of services they receive, or
- The navigation and communication systems they rely on.



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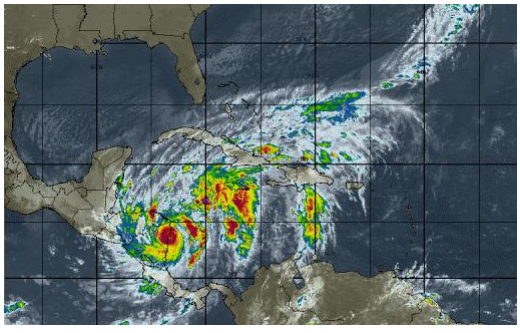
INTRODUCTION – COCESNA
NAVAIDS

CONTINGENCIES IN CENTRAL AMERICA

CONTINGENCIES

- Central America is characterized by high exposure to extreme weather events such as hurricanes and floods.
- This vulnerability poses a constant threat to critical infrastructure of Air Navigation Services (ANS).
- In November 2020, **Hurricanes ETA and IOTA severely impacted Nicaragua and Honduras**, while in July 2024, **Hurricane Beryl indirectly affected CENAMER** due to the closure of Jamaica's airspace.
- These events provided a real-world test of the effectiveness of ANS contingency plans in the region.



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CONTINGENCIES

- Analyze the impact of Hurricanes ETA, IOTA, and Beryl on air navigation services.
- Evaluate the implemented response from the perspective of contingency planning and management.
- Identify best practices and lessons learned.

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HURRICANES ETA AND IOTA

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CONTINGENCIES
HURRICANE ETA AND IOTA

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CONTINGENCIES
HURRICANE ETA AND IOTA

📍 **General Impact**

- Countries affected: 6 (Nicaragua, Honduras, Guatemala, El Salvador, Belize, Costa Rica)

- People affected: > 8.3 million
- People displaced: ~1.5 million

- Deaths reported: > 250
- Damaged/destroyed homes: > 100,000

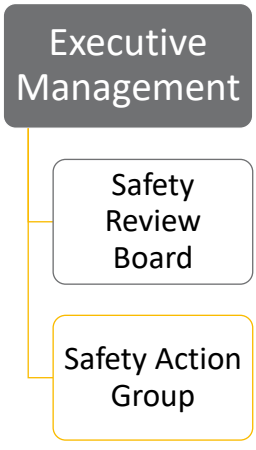
Phases and Organization

Contingency management phases:

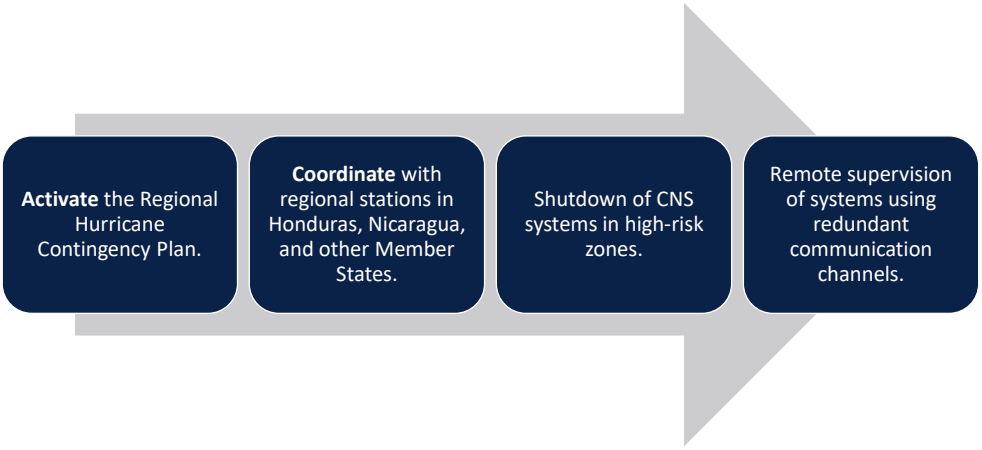
-Activation: Identification of the event and initial communication.
-Execution: Application of operational measures according to the scenario.
-Deactivation: Progressive return to normality.

Management structure:

-DE-CEO and Senior Air Navigation Management: They lead the entire process.
-SRB (Operational Safety) Committee: Evaluates, approves and supervises.
-SAG Group: Coordinates technical and operational actions during the contingency.



CONTINGENCIES
HURRICANE ETA AND IOTA



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CONTINGENCIES
HURRICANE ETA AND IOTA

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🛬 **Aviation & Air Navigation Infrastructure**

- Airports affected: 6 international aerodromes
- Navigation aids damaged:
  -VOR/DME
  -ILS
  -ATS affected: 1 TWR (temporary outage due to power/flooding)
- Communication systems interrupted: Multiple VHF stations due to power outages and flooding

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CONTINGENCIES
HURRICANE ETA AND IOTA

International Airports Affected by Hurricanes

- **Toncontín International Airport (Tegucigalpa, Honduras)**
  Operations were temporarily suspended due to extreme weather conditions and damaged access roads.
- **Ramón Villeda Morales International Airport (San Pedro Sula, Honduras)**
  Severely affected by flooding; the runway and terminal were submerged.
  Remained **closed for several days** and required full cleanup and infrastructure repair.
- **Augusto C. Sandino International Airport (Managua, Nicaragua)**
  Reported partial access disruptions and intermittent power outages.
  Some navigation aids and VHF stations were out of service for several hours.
- **La Aurora International Airport (Guatemala City, Guatemala)**
  Reported low visibility and minor damage to perimeter infrastructure.
  Operations were suspended during the peak impact hours.
- **El Salvador International Airport (San Salvador)**
  No major structural damage, but **temporary communication disruptions** were reported.
- **Philip S. W. Goldson International Airport (Belize)**
  Reported **degraded operational conditions**, mainly due to thunderstorms and surface water accumulation.

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CONTINGENCIES
HURRICANE ETA AND IOTA

Following Hurricanes ETA and IOTA , the Ramón Villeda Morales International Airport sustained severe flood damage, with water levels reaching between 1.5 and 3 meters.

The following systems were impacted:
- Navigation aids: DVOR and ILS
- Tower communication systems
- Meteorological equipment: AWOS system
- Backup power systems supporting these facilities

All these systems remained out of service due to flood-related damage.

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CONTINGENCIES
HURRICANE ETA AND IOTA

Condition in 2020:
- Communication systems depended on La Mesa substation and tower generators.

Steps taken:
- Alternative communication channels were evaluated and, where possible, activated.
- Coordination with national authorities was essential to resume services.

CONTINGENCIES
HURRICANE ETA AND IOTA

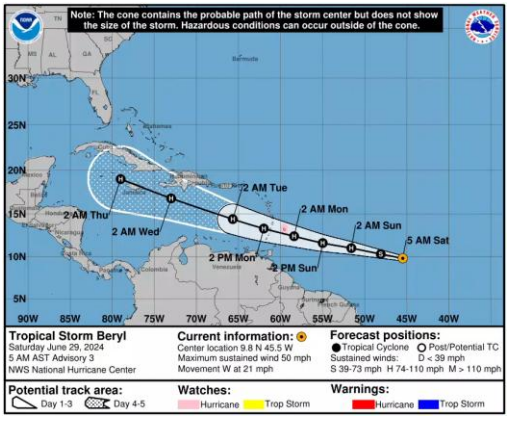
Impact in 2020:
- The DVOR system sustained severe damage due to flooding.
- Key components required replacement.

Recovery actions:
- Equipment was reused from other COCESNA stations.
- On-site testing and reinstallation were carried out.
- Recovery was estimated to take 3 weeks, depending on spare part availability.

HURRICANE BERYL

CONTINGENCIES
HURRICANE BERYL

- Hurricane Beryl, initially classified as a Category 3 storm but later reaching **Category 5** on the Saffir-Simpson scale, was a major meteorological event.
- With sustained winds of up to 185 kilometers per hour and even stronger gusts, Beryl significantly impacted several Caribbean islands, causing heavy rainfall, flooding, and severe damage to local infrastructure.



CONTINGENCIES
HURRICANE BERYL

On Wednesday, July 3rd, 2024, Jamaica closed its airspace due to the hurricanes path, resulting in the diversion of all aircraft flying between the U.S. East Coast and South America —both northbound and southbound—into Central American airspace.

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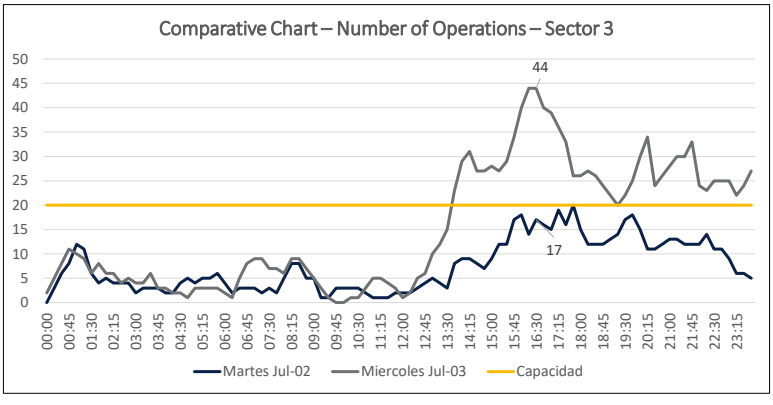
CONTINGENCIES
HURRICANE BERYL

The closure of Jamaica's airspace increased the number of flights, exceeding the sector's normal capacity of 20 aircraft, with up to 44 operations recorded in 15-minute segments.



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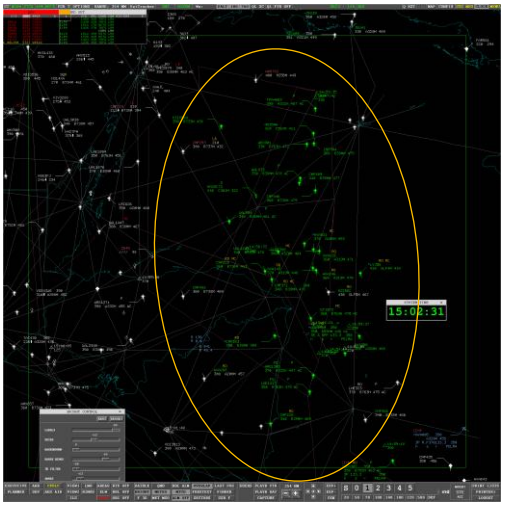
CONTINGENCIES
HURRICANE BERYL

Given the increase in operations and the weather conditions causing deviations in flight routes, which placed a significant burden on air traffic services, it became imperative to implement measures to mitigate these operational risks.



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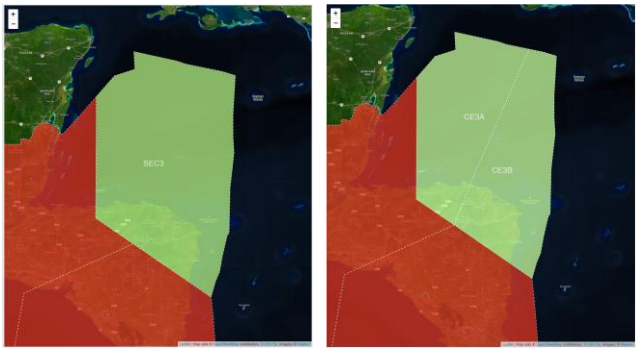
CONTINGENCIES
HURRICANE BERYL

Dynamic Sectorization:

With the aim of increasing Air Traffic Services (ATS) capacity and effectively managing the anticipated demand due to the rise in operations, Control Sector 3 was subdivided into the following subsectors:

- CE3A
- CE3B



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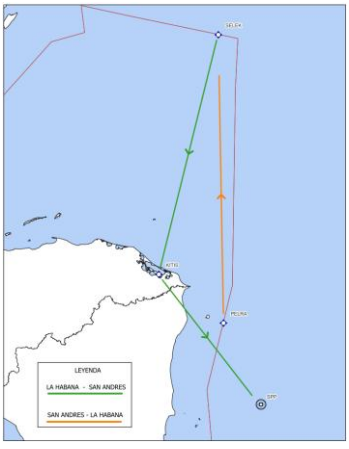
CONTINGENCIES
HURRICANE BERYL

Contingency Flow Coordination:

To reduce the complexity of air traffic, the following flows were defined:

1. Southbound traffic from Havana airspace to Panama airspace, overflying CENAMER/COCESNA, must proceed via SELEK DCT KITIS DCT SPP.
2. Northbound traffic from Panama airspace to Havana airspace, overflying CENAMER/COCESNA, must proceed via PELRA DCT SELEK.



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CONTINGENCIES
HURRICANE BERYL

Coordination with Airlines and ANSP:

With the aim of informing all parties involved, the following activities were carried out:

1. Notification to the ATFM CADENA group regarding the traffic flows to be implemented by CENAMER/COCESNA.
2. Publication of NOTAM A1505/24 to inform pilots and air navigation personnel of the actions implemented by CENAMER/COCESNA.


```
(A1505/24 NOTAMN
Q)MHCC/QAFXX/IV/NBO/E/000/999/1100N09130W999
A)MHCC B)2407031853 C)2407052359
E)MHCC FIR NOTIFIES ALL SOUTHBOUND TRAFFIC FROM HABANA(MUFH) AIRSPACE
TO PANAMA(MPZL) AIRSPACE OVERFLYING CENAMER/COCESNA MUST PROCEED FROM
SELEK DCT KITIS DCT SPP.
ALL NORTHBOUND TRAFFIC FROM PANAMA(MPZL) AIRSPACE TO HABANA(MUFH)
AIRSPACE OVERFLYING CENAMER/COCESNA MUST PROCEED FROM PELRA DCT
SELEK)
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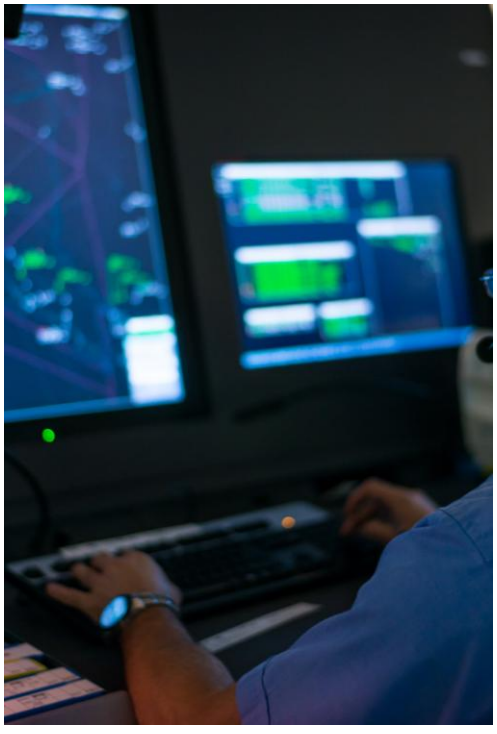

Conclusions

1. The Central American region is highly vulnerable to extreme natural events, which demands robust and up-to-date contingency plans to ensure the safe continuity of air navigation services.
2. Recent events (ETA, IOTA, and Beryl) highlighted the importance of resilient infrastructure, especially in communications, navigation aids, and backup power systems.
3. The implementation of measures such as dynamic sectorization, traffic flow coordination, and timely notification enabled an effective response to traffic overload and adverse operational conditions.
4. The experience gained underscores the need to strengthen joint planning and regional cooperation, particularly in scenarios involving high demand or unexpected airspace closures in nearby regions.

Gracias