ICAO

# INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY

# Introduction to Contingency Planning

Module 1

Silvio J. Michelena Álvarez

Pablo A. Luna Servellón

ICAO

# Module Objectives

Understand the conceptual, regulatory, and operational framework of contingency planning in air navigation services, with an emphasis on its importance in ensuring operational safety, service continuity, and system resilience to unforeseen events.

Upon completion of this module, participants will be able to:

- Define what a contingency is in the context of air traffic services (ATS).
- Identify the main types of events that can affect the normal provision of air navigation services.
- Recognize the life cycle of a contingency.
- Relate the planning levels and hierarchies established by ICAO and their application at the national, interstate, and regional levels.
- Understand the role of emergency response plans as an essential complement to contingency procedures.

# What is a Contingency?

*"A contingency is an unforeseen event or situation that may impact a State's ability to deliver air navigation services (ANS) safely, orderly, and efficiently."*

- Loss of major air traffic systems

  *e.g., communications, surveillance, flight data*

- Loss or failure of support facilities

  *e.g., electrical power, air conditioning, building structural integrity*

- Aircraft emergencies

  *e.g., emergency descent, hijacking, air defense security incident*

- Disruption of air traffic services

  *e.g., bomb threat or other action requiring evacuation of the operations room, emergency dispersal of traffic, closure of an adjacent air traffic control center*

# What is a Contingency?

*"A contingency is an unforeseen event or situation that may impact a State's ability to deliver air navigation services (ANS) safely, orderly, and efficiently."*

- Closure of national airspace or establishment of a zero-flow rate because of adverse environmental conditions

  *e.g., hurricane, typhoon, volcanic activity.*

- Cybersecurity incidents

  *e.g., breach of less critical systems with potential for spread, GPS interference, ransomware, malware.*

  - Incident containment/quarantine: In the event of a cyber incident, the emergency response plan should detail how to contain such an incident to minimize its impact. This will likely include disconnecting communication links with non-essential services and/or third parties.

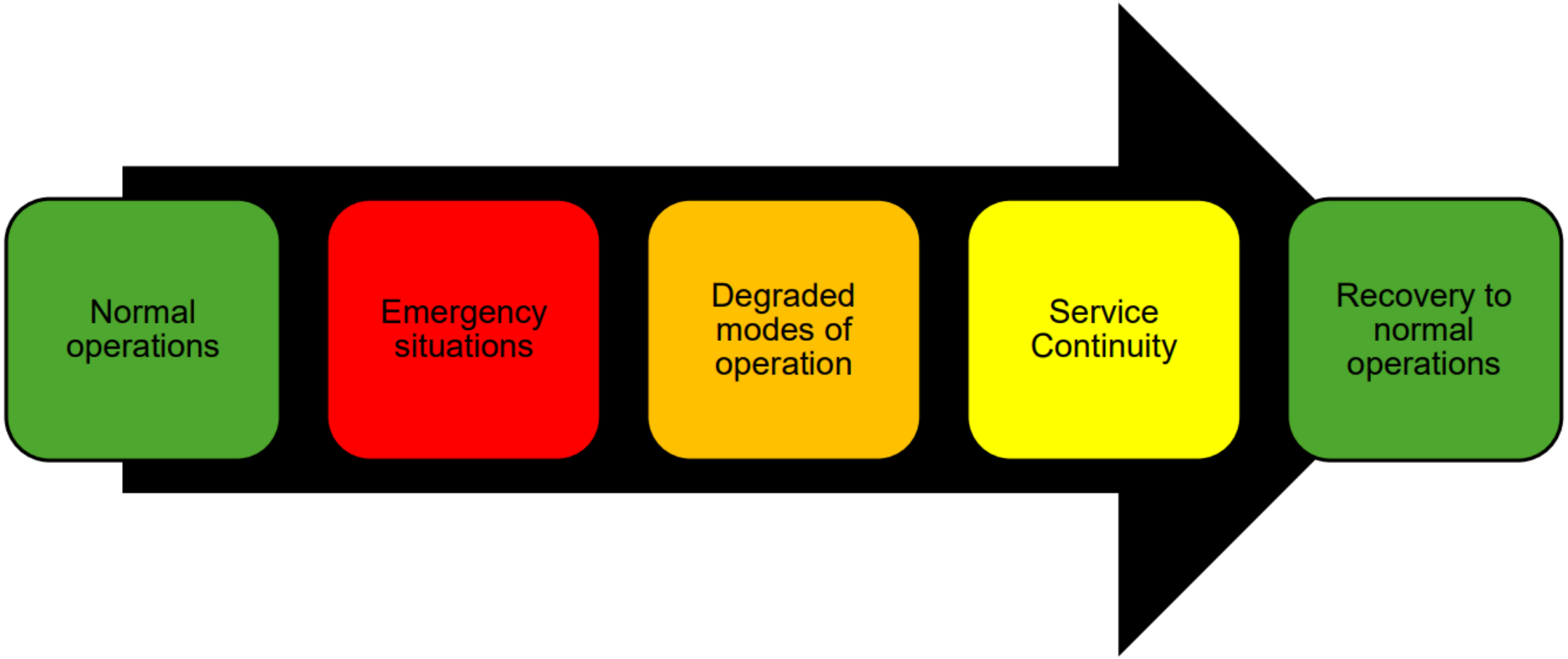
# What is a Contingency?

*“A contingency is an unforeseen event or situation that may impact a State's ability to deliver air navigation services (ANS) safely, orderly, and efficiently.”*

- Pandemic

  *e.g., the spread of a viral disease*

# Life cycle of a Contingency

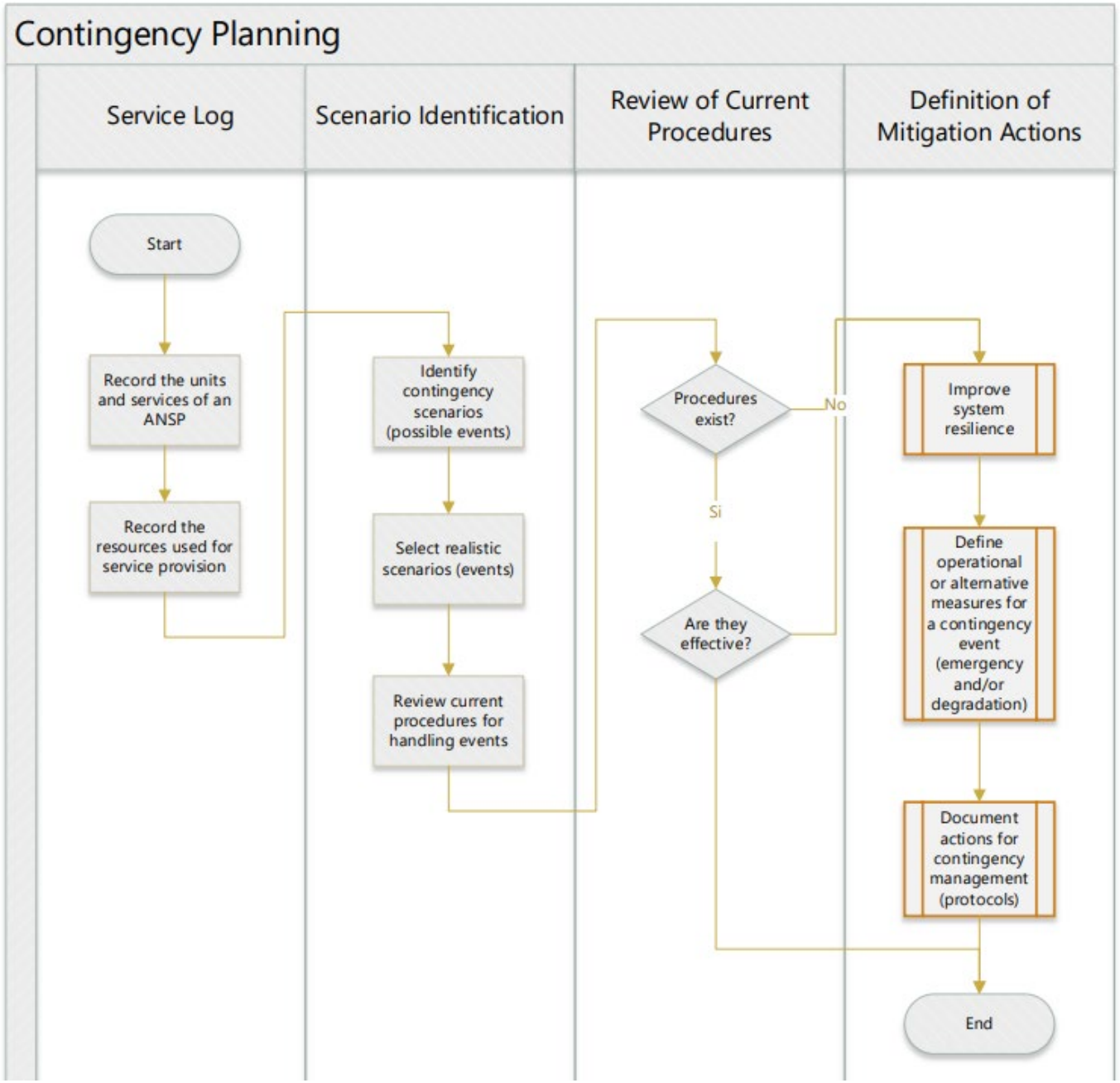


# Contingency Planning

The purpose of contingency planning is to ensure the safety and continuity of ANS in situations where unforeseen events may affect the ability of a service provider or a State to operate safely and normally.

Contingency plans aim to establish clear procedures, options/alternatives, and resources to respond effectively to disruptions, minimizing the impact on safety and air traffic flow.

This planning allows for the maintenance of essential services during interruptions by implementing operational, communication, and coordination measures with other entities, and, where possible, initiating a rapid recovery process to restore services to their normal level.


Contingency Planning
Service Log
Scenario Identification
Review of Current Procedures
Definition of Mitigation Actions
Start
Record the units and services of an ANSP
Record the resources used for service provision
Identify contingency scenarios (possible events)
Select realistic scenarios (events)
Review current procedures for handling events
Procedures exist?
No
Si
Are they effective?
Improve system resilience
Define operational or alternative measures for a contingency event (emergency and/or degradation)
Document actions for contingency management (protocols)
End

# Contingency Planning

- Emergency response plans help ANSPs ensure the safe and orderly flow of air traffic in the event of disruptions to air traffic services and related support services.

- *An ANSP, like any other organization supporting flight operations, must have an emergency response plan that complements its contingency procedures.*

# Contingency Planning

An emergency response plan:

- Facilitates the orderly and efficient transition from normal operations to emergency/contingency operations, as well as the subsequent return to normal operations.
- It must be properly coordinated with the emergency response plans of the organizations with which it must interact during the provision of its services.
- It describes what actions should be taken after an accident and who is responsible for each..

# Module Content

01 Concept and categorization of contingencies

02 Hierarchy and types of contingency plans

# ICAO Regulatory Framework on Contingencies

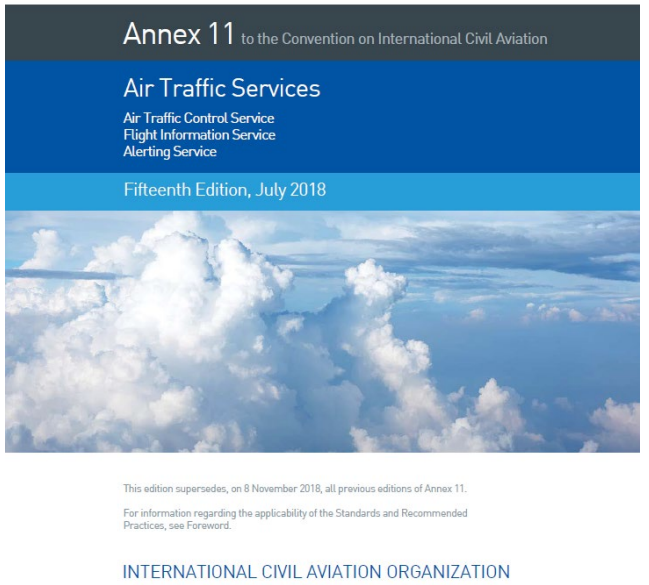
ICAO establishes fundamental principles for emergency planning and response through its Annexes and complementary documents:

### 📘 Annex 11 – Air Traffic Services

- Requires ATS contingency plans to **maintain operational safety and service continuity**.
- **Requires coordination with other States** and periodic drills.

### 📗 Annex 10 – Aeronautical Telecommunications

- Establishes the need for backup and redundancy for CNS services.
- Requires immediate recovery mechanisms in the event of a failure.



# ICAO Regulatory Framework on Contingencies

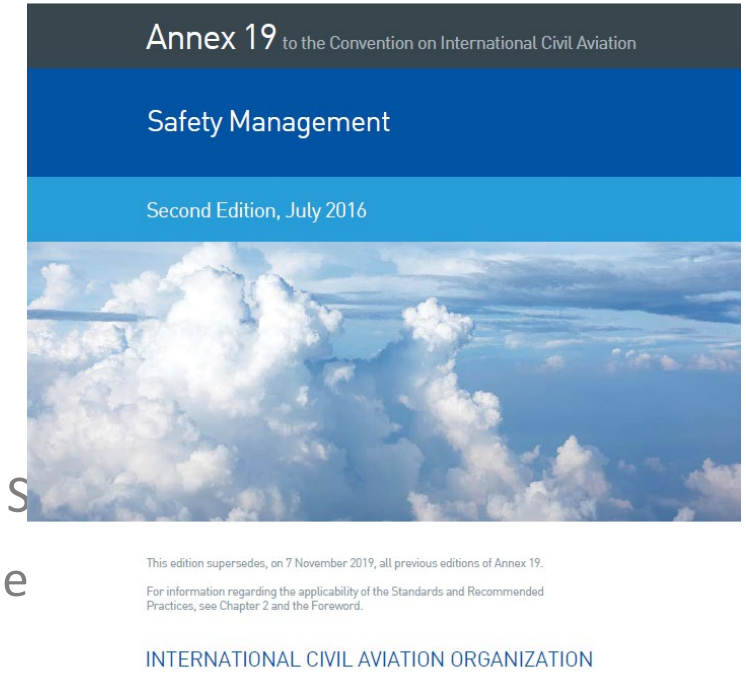
ICAO establishes fundamental principles for emergency planning and response through its Annexes and complementary documents:

### Annex 19 – Safety Management

- ANSP SMS must include emergency response plans.

### Doc 9859 – Safety Management Manual

- Reinforces emergency response planning as an integral part of the S
- It should be based on risk analysis and include training, defined role testing, and ongoing review.

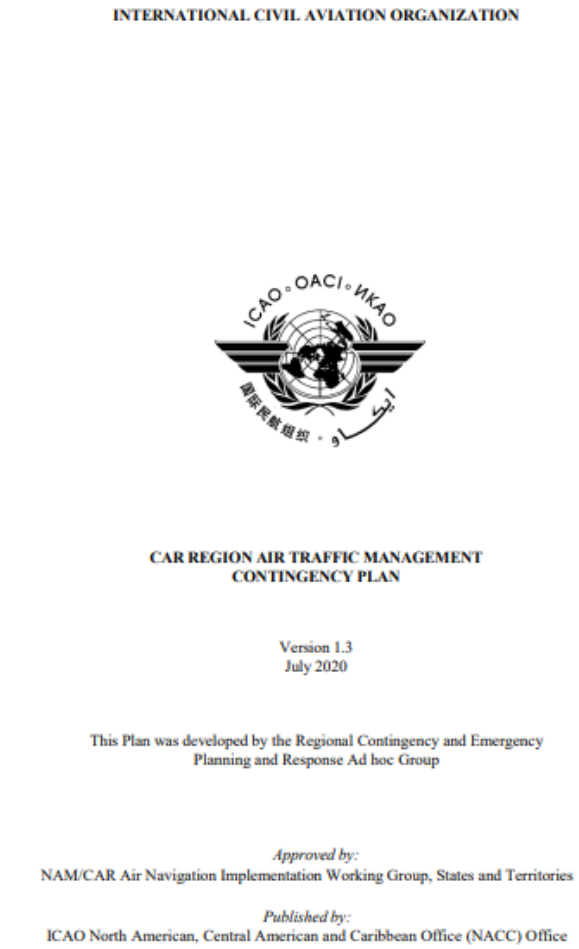


# ICAO Regulatory Framework on Contingencies

## 📌 Purpose of the CAR Region ATM Contingency Plan

Establish a coordinated regional framework for responding to Air Traffic Services (ATS) disruptions, in compliance with **ICAO Annex 11.**

It defines a **hierarchy of plans** (Levels 1, 2, and 3) and **event categories** (A, B, and C), and incorporates principles, procedures, and structures **to ensure operational continuity** in situations such as natural disasters, technical failures, or conflicts.



INTERNATIONAL CIVIL AVIATION ORGANIZATION

CAR REGION AIR TRAFFIC MANAGEMENT CONTINGENCY PLAN

Version 1.3
July 2020

This Plan was developed by the Regional Contingency and Emergency Planning and Response Ad hoc Group

*Approved by:*
NAM/CAR Air Navigation Implementation Working Group, States and Territories

*Published by:*
ICAO North American, Central American and Caribbean Office (NACC) Office

# Hierarchy of Contingency Plans

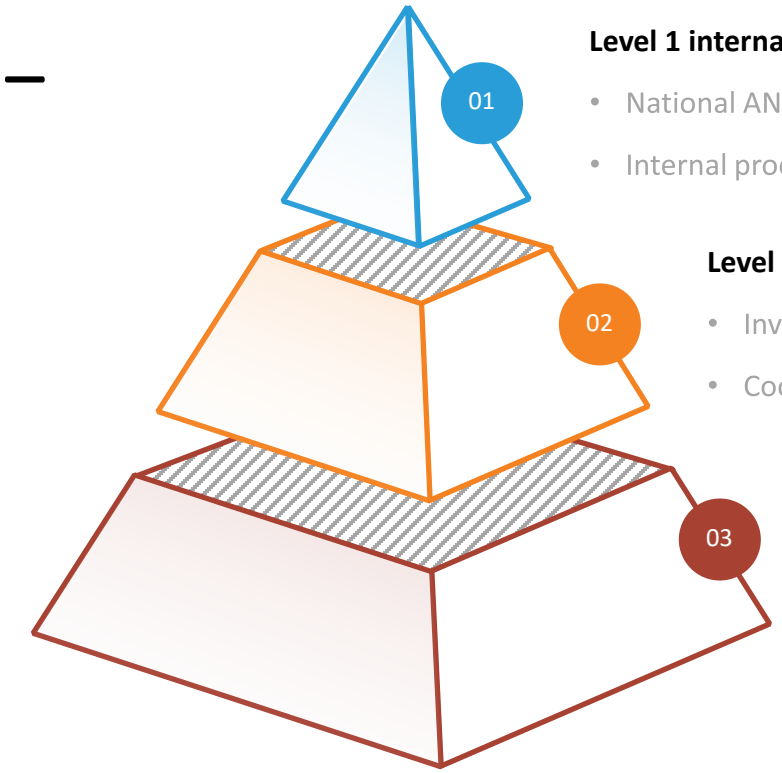
**What is it?**

Levels of **contingency plans** according to the **geographic and administrative** scope of application.

**Purpose**

To establish **who acts and how** (from local to regional).

# Hierarchy of Contingency Plans – CAR Region




**Level 1 internal State plans**

- National ANSP Coordination
- Internal procedures, roles, and backup protocols

**Level 2 interstate contingency plans**

- Involving two or more neighboring states
- Coordination of alternative routes and services

**Level 3 regional plans**

- They are activated in the event of major disruptions.
- They allow for alternative routes and joint provisioning of ATS.

ICAO

# Hierarchy of Contingency Plans – CAR Region

## 🔵 **Level 1 internal State plans** 📍 National Approach

➤ **What are they**?

Plans developed by each State to address contingencies without immediate intervention by other States.

➤ Example:

*If an ACC's primary radar fails completely, the State activates its Level 1 plan to continue providing ATS using non-radar procedures or relying on adjacent FIRs according to prior agreements.*

➤ What they include?

- ANSP internal procedures.
- Protocols for responding to operational, technological, or human resource disruptions (e.g., radar failures, personnel strikes, blackouts).
- National coordination mechanisms between ATS, AIM, MET, CNS, and civil and military authorities.
- Formation of the Central Coordination Committee (CCC) and the Operational Contingency Group (AOCG).

# Hierarchy of Contingency Plans – CAR Region

## 🔴 **Level 2 interstate contingency plans** 📍 Coordination between neighbouring States

➤ What are they?

Plans agreed bilaterally or multilaterally between States that allow for a coordinated response when an internal contingency has a cross-border impact.

➤ Example:

*If an ANSP experiences a contingency and is unable to manage its airspace, a neighboring ANSP applies ATFM measures to aircraft through agreements established at Level 2.*

➤ What they include?

- Tactical and strategic procedures for managing air traffic crossing neighboring FIRs.
- Joint definition of contingency routes, flight levels, access priorities, and temporary delegation of ATS services.
- Agreements for the publication of NOTAMs, contingency frequencies, minimum separations, etc.
- Promulgation of AIPs and direct links between ATS units of different countries.

# Hierarchy of Contingency Plans – CAR Region

🔴 **Level 3 regional plans (extended FIR or multiple States)** 📍 Coordinated regional planning

➤ What are they?

Plans designed to ensure safe and orderly traffic when there is a total or partial disruption of ATS in an entire region or multiple FIRs, or when events have a regional impact.

➤ Example:

*Given the simultaneous impact of a hurricane on several FIRs in the Caribbean, a regional Level 3 plan has been activated to maintain air traffic flow using alternate airways and temporary delegations between FIRs.*

➤ What they include?

- Publication of pre-established contingency routes so operators can plan their flights to avoid affected areas.
- Common procedures for:
  - Longitudinal and lateral spacing, Minimum separation
  - Communications and control transfers
  - Flight level assignment
- Coordination with the ICAO NACC Regional Office, IATA, and other key stakeholders.

# Contingency Categories

## What is it?

Classification of contingency events **according to the state of the airspace** and their impact on safety.

## Purpose

To define the type of **response** required based on the nature of the contingency.

What is it?
Purpose
To define the type of response required based on the nature of the contingency.

# Contingency Categories

**Category A - Safe airspace, but restricted or without ATS**

↳ strikes, pandemic, technical failure, earthquake

**Category B - Unsafe airspace**

↳ volcanic ash cloud, nuclear emergency, or armed conflict

**Category C - Unavailable airspace**

↳ political decision, national emergency, total closure

ICAO

# Contingency Categories

## Category A – : Safe airspace, but restricted or without ATS

➤ **Characteristics:**

- The airspace remains safe for flying, but ATS services are not being provided, or are limited. CNS systems may be degraded, or ATS personnel may be unavailable.

➤ **Example:**

*A strike by air traffic controllers has resulted in the suspension of air traffic control, but CNS infrastructure and airspace remain operational.*

➤ **Typical causes:**

- Strikes
- Earthquakes
- Severe technical failures
- Temporary closure of ATS facilities
- ➤ **Response:**
- Activate Level 1 or 2 contingency plans.

# Contingency Categories

## 🔴 Category B – Unsafe airspace

➤ **Characteristics:**

- Airspace cannot guarantee a minimum level of operational safety. There are active risks to flight safety.

➤ **Example :**

*A volcanic eruption throws ash onto air routes, making navigation unsafe due to visibility and engine hazards.*

➤ **Typical causes:**

- Volcanic ash clouds
- Armed conflict or military activity

➤ **Response :**

- Air traffic diversion to avoid the airspace.
- Publication of specific contingency routes via NOTAM/ASHTAM.
- Activation of Level 2 or 3 contingency plans.

# Contingency Categories

## ● Category C – Unavailable airspace (political decision)

➤ **Characteristics:**

- The airspace is formally closed by state decision. There may be political or national security reasons behind this.

➤ **Typical causes:**

- Geopolitical tensions
- Temporary flight ban

➤ **Example :**

*During a health emergency or internal armed conflict, the State prohibits all types of overflight or entry into airspace.*

➤ **Response :**

- Complete avoidance routes
- Coordination to enable alternate corridors through adjacent FIRs.
- Publish clear and updated NOTAM restrictions.

| Hierarchy of Plans (Levels) | Definition | Category A (Airspace safe but restricted) | Category B (Airspace not safe) | Category C (Airspace not available) |
|---|---|---|---|---|
| **Level 1 (National/Internal Plans)** | Internal plans of a State or ANSP for local contingencies. | - ATC technical failures.<br>- Staff strikes.<br>- Earthquakes affecting infrastructure. | - Preparation for volcanic ash (coordination with VAAC).<br>- Nuclear radiation alerts. | - Internal restrictions due to national security. |
| **Level 2 (Interstate Plans)** | Agreements between 2+ States/ANSPs for regional coordination. | - Delegation of ATS services to neighboring ANSPs.<br>- Flexible Use of Airspace (FUA). | - Joint alternative routing to avoid ash clouds.<br>- Coordinated military exclusion zones. | - Airspace closures due to diplomatic crises (e.g., unauthorized overflights). |
| **Level 3 (Published Regional Plans)** | Published contingency plans for the CAR Region, ICAO-valid. | - Predefined route structures.<br>- ATFM measures to manage demand. | - Publication of routes to avoid hazardous airspace.<br>- Mandatory NOTAM/ASHTAM issuance. | - Full FIR access restrictions.<br>- Protocols for humanitarian flights. |


# Thank You!

ICAO