





**APIRG  
INFRASTRUCTURE & INFORMATION (IIM) SUB-GROUP  
COMMUNICATION PROJECT 5**

## Africa-Indian Ocean (AFI) Region Air Navigation Services Cyber Resilience Framework



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## Table of contents

<b>Document History</b> .....	2
<b>Table of contents</b> .....	2
<b>Definitions</b> .....	2
<b>1. Introduction</b> .....	3
<b>1.1 Background</b> .....	3
<b>1.2 Scope of the document</b> .....	3
<b>2. Summary of Findings</b> .....	4
<b>2.1 Cybersecurity Defensive System</b> .....	4
<b>2.2 Integration of Cyber-resilience in Safety Management Activities</b> .....	4
<b>2.3 Identification of Cyber Threats</b> .....	4
<b>2.4 Reporting System for Cyber Security Incidents</b> .....	4
<b>2.5 Usage of TCP/IP Protocol</b> .....	4
<b>2.6 Internet Navigation on ATS or ATC Terminal Equipment:</b> .....	4
<b>2.7 Physical Separation of Ground-Ground Networks</b> .....	4
<b>2.8 Training Programs and Awareness Sessions</b> .....	5
<b>2.9 Awareness by Civil Aviation Authority/ANSP</b> .....	5
<b>3. Conclusion and recommendations</b> .....	6

## Definitions

Cyber resilience in civil aviation refers to the ability of an aviation system, organization, or infrastructure to withstand, respond to, and recover from cyber threats or incidents while maintaining essential operational functions and ensuring the safety, security, and efficiency of air transportation. It involves the integration of cybersecurity measures with operational resilience strategies to mitigate the impact of cyber attacks and maintain the continuity of critical aviation services.



## 1. Introduction

### 1.1 Background

The IIM Communication 5 project seeks to evaluate the existing level of cyber resilience and safety within the Air Navigation Services (ANS) in the AFI region. The project aims to achieve the following objectives:

- Cultivate a regional culture of cyber resilience and cyber safety in ANS.
- Formulate an Air Navigation Services Cyber Resilience Framework specifically designed for the AFI region.



To assess the present state of cyber resilience in ANS across the AFI region, the IIM COM 5 project has developed a baseline questionnaire. This questionnaire has been disseminated to AFI Stats and Air Navigation service providers.

### 1.2 Scope of the document

This report presents an analysis of the responses to a questionnaire addressing cyber resilience of air navigation services in the AFI region. The questionnaire was distributed to 54 African states, and only six (6) states responded, indicating a low response rate.

The responses to the 14 questions provide some insights into the current state of cyber resilience of Air Navigation Services in the region.

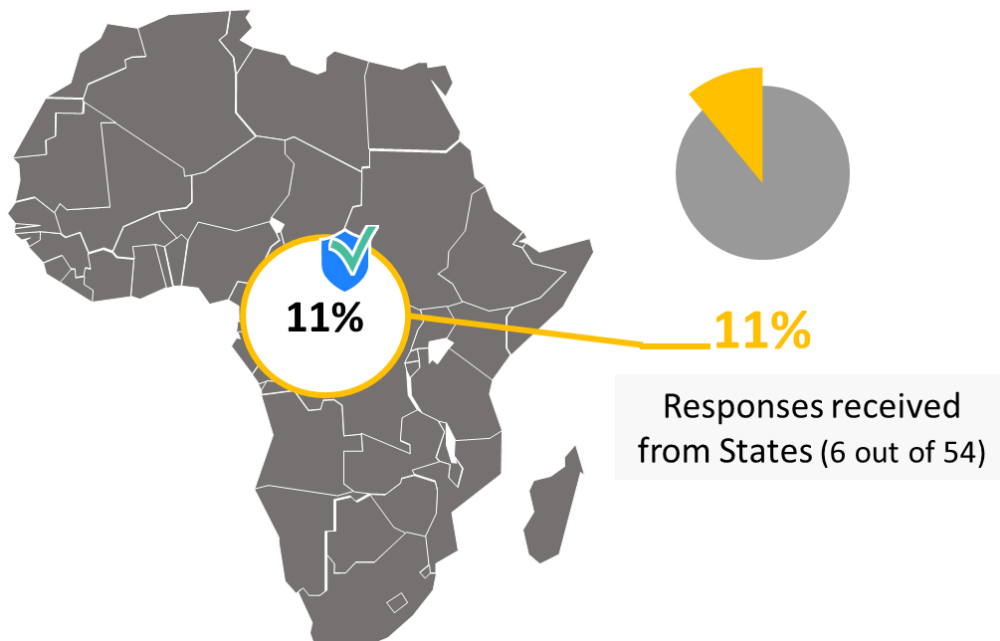


Figure 1 : Response rate to the project questionnaire



## 2. Summary of Findings

### 2.1 Cybersecurity Defensive System

**83%** of the states (out of 6) confirmed having a Cyber Security Defensive System or measures in place to protect CNS/ATM systems, aeronautical Network and Information Systems from cyber-threats.

However, only **33%** of the states ensure oversight of the cybersecurity measures established.

### 2.2 Integration of Cyber-resilience in Safety Management Activities

**33%** of the states have taken into account cyber-resilience in their safety management activities.

This includes considerations at both the organizational level (Safety Management System - SMS) and the state level (State Safety Programme - SSP).

### 2.3 Identification of Cyber Threats

**83%** of the states or Air Navigation Service Providers (ANSPs) have identified cyber threats to their CNS/ATM Systems, including aeronautical networks, data, and information systems.

### 2.4 Reporting System for Cyber Security Incidents

**67%** of the states or ANSPs have a reporting system for cyber security incidents on CNS/ATM systems, including aeronautical networks.

### 2.5 Usage of TCP/IP Protocol

All the states or ANSPs surveyed (**100%**) reported using the TCP/IP protocol in their Aeronautical Network Infrastructure.

### 2.6 Internet Navigation on ATS or ATC Terminal Equipment:

None of the states or ANSPs surveyed reported using internet navigation on their ATS or ATC terminal equipment.

### 2.7 Physical Separation of Ground-Ground Networks

All the states or ANSPs surveyed (100%) confirmed that their operational and administrative ground-ground networks are physically separate.

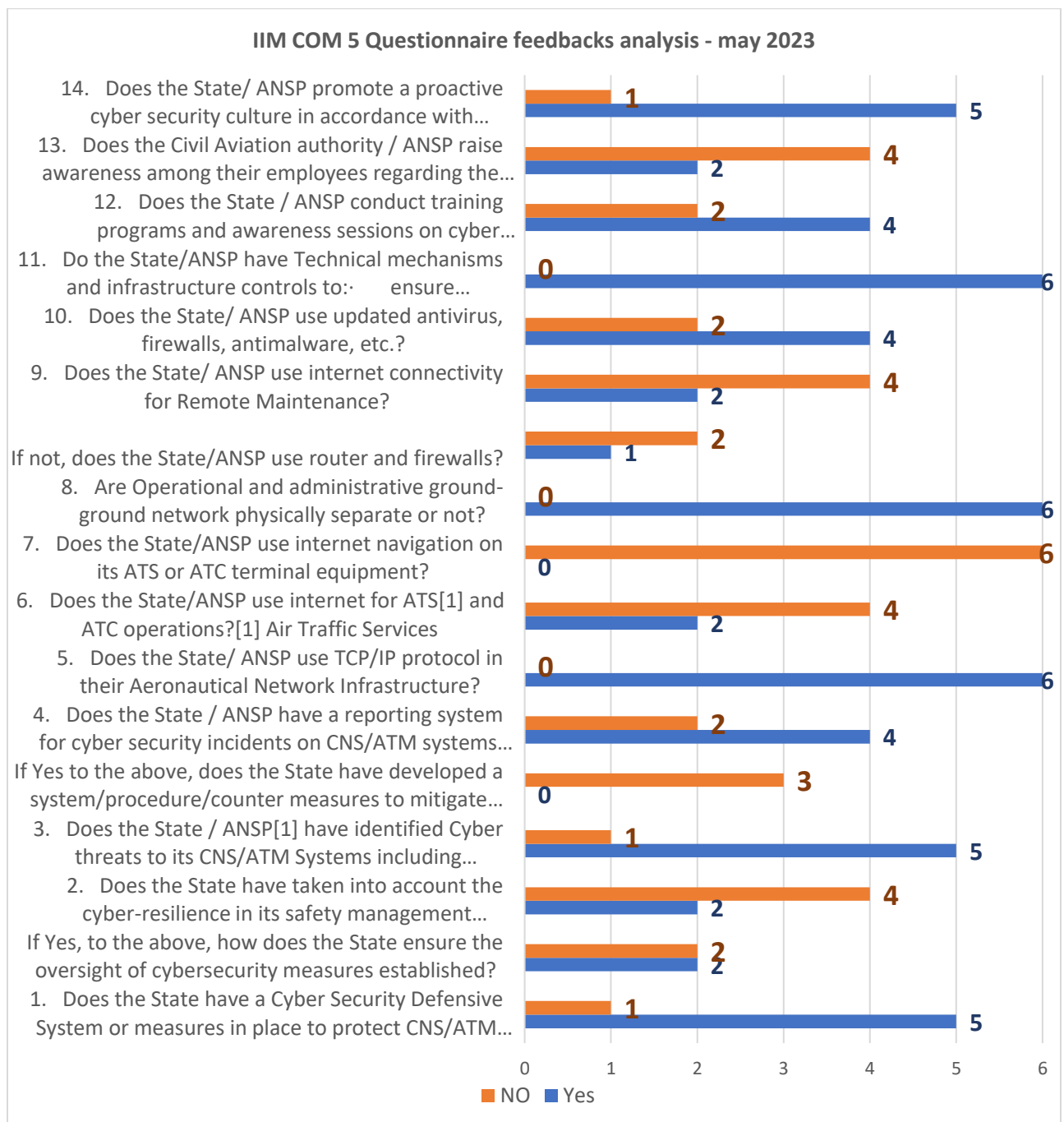


## 2.8 Training Programs and Awareness Sessions

67% of the states or ANSPs conduct training programs and awareness sessions on cybersecurity issues for Air Traffic Safety Electronics Personnel (ATSEP) responsible for the installation and maintenance of CNS/ATM systems.

## 2.9 Awareness by Civil Aviation Authority/ANSP

33% of the states or ANSPs raise awareness among their employees regarding the importance of cyber threats.





### 3. Conclusion and recommendations

The analysis of the questionnaire responses highlights the critical importance of cybersecurity awareness in Air Navigation Services (ANS) within the AFI region.

The low response rate suggests a need for increased attention and efforts to strengthen cybersecurity practices.

To address these challenges, the following recommendations are proposed by the IIM COM 5 project:

1. **Enhance Oversight:** States should strive to improve oversight of their cybersecurity measures to ensure their effectiveness and adherence to international standards.
2. **Promote Cyber-resilience:** States and ANSPs should incorporate cyber-resilience principles into their safety management activities, both at the organizational and state levels.
3. **Expand Threat Identification Efforts:** States and ANSPs need to conduct comprehensive assessments to identify and address potential cyber threats to their CNS/ATM systems and aeronautical networks, data, and information systems.
4. **Strengthen Incident Reporting:** States and ANSPs should establish robust reporting systems for cyber security incidents, enabling timely detection, response, and mitigation.
5. **Foster Awareness and Training:** Civil Aviation authorities and ANSPs should prioritize cybersecurity training programs and awareness sessions for all relevant personnel, emphasizing the importance of cyber threats and best practices.

By implementing these recommendations, the AFI region can enhance its cyber resilience posture and better safeguard air navigation services against evolving cyber threats.

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