PART 1- TERMS OF REFERENCE FOR THE ANS SUMMIT PREPARATION

1. **Introduction**

   1.1 The Africa-Indian Ocean Planning and Implementation Regional Group (APIRG) called, through conclusions 22/35 and 26/24, for the improvement in seamless air traffic flow in the AFI region and the conduct of the AFI ANS summit. The objective of the summit is to endorse an AFI ANS Master Strategy for the region, which if implemented, will ensure a seamless African sky.

   1.2 The successful conduct of the ANS summit will strongly rely on the effective preparedness of the materials required for its delivery. To achieve the objective of the summit, a framework has been established to ensure effective delivery through an organizational structure, SMART objectives, defined strategies and well-identified deliverables.

2. **Structure**

   2.1 The Organizational structure for the preparation of the ANS Summit includes the PRCC, the Secretariat and multidisciplinary project Teams in all Air Navigation Services and Aerodrome related domains (AOP, AIS, ATM, CNS, MET, PANS-OPS, SAR).

   2.2 Members of Project teams are provided by existing projects under the AASPG AAO and IIM Sub-groups.

   2.3 New members can be nominated by the States, Organizations or Industry as deemed necessary in compliance with the provisions of the AASPG Procedural Handbook.

3. **Objectives**

   3.1 Identify, develop and deliver well-structured bankable projects based on regional and State's needs.

   3.2 Develop and deliver Prioritization criteria for the selection of projects and eligible beneficiaries;

   3.3 Develop and deliver the ANS Master document named "THE AFI ANS MASTER DOCUMENT" including all expected deliverables.

   3.4 Develop and deliver the AFI ANS Master Strategy to steer the timely harmonized and implementation including financial strategy, technical partnership, resource mobilization strategies, implementation plans.

4. **Scope**

   4.1 The preparatory activities of the ANS Summit will be conducted within the framework of related APIRG conclusions and decisions as well as the AASPG Procedural Handbook.
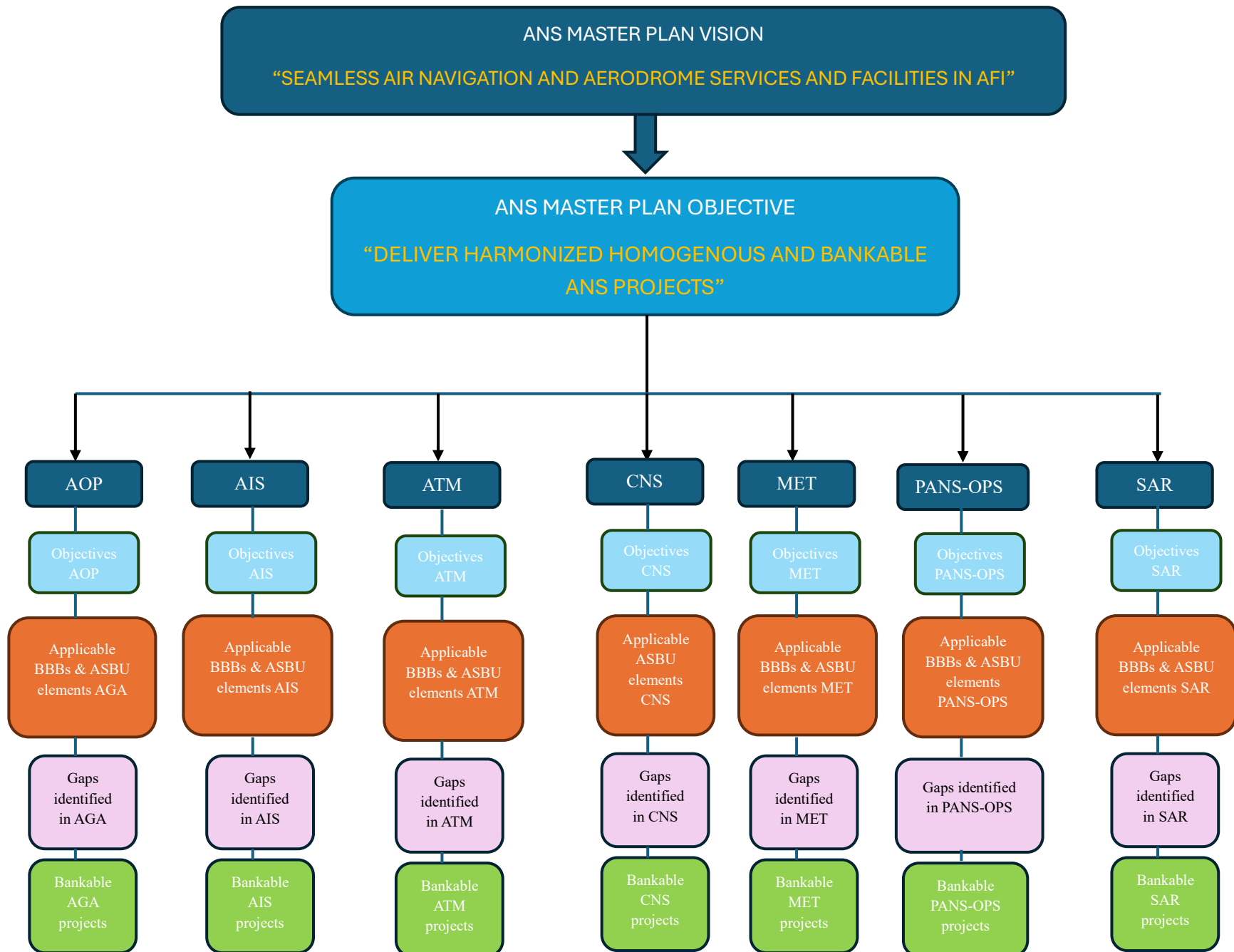
5. Deliverables

    5.1 Fundable projects identified and endorsed

    5.2 Project specifications in each technical area developed and validated;

    5.3 Projects templates for each ANS related area with clear scope, objectives, timelines, and funding strategy for synergistical implementation developed and validated.

    5.4 Draft projects catalogue including eligible, planned and ongoing projects developed and validated.

    5.5 Implementation plan(s) of the ANS Master Strategy in the short term, medium term, and long term as applicable, with clear objectives and timelines for each State, to ensure harmonized ANS for Africa developed and validated.

    5.6 AFI ANS Master Strategy developed and endorsed by African States.

    5.7 AFI ANS Master Document developed, consolidated and validated.

6. Working arrangements

    6.1 The PRCC, the Secretariat and the Project Teams will carry out their work as per the procedures defined by the AASPG Handbook.

PART 2- TECHNICAL SPECIFICATIONS OF THE ANS MASTER PLAN

ANS MASTER PLAN VISION

"SEAMLESS AIR NAVIGATION AND AERODROME SERVICES AND FACILITIES IN AFI"

ANS MASTER PLAN OBJECTIVE

"DELIVER HARMONIZED HOMOGENOUS AND BANKABLE ANS PROJECTS"

AOP	AIS	ATM	CNS	MET	PANS-OPS	SAR
Objectives AOP	Objectives AIS	Objectives ATM	Objectives CNS	Objectives MET	Objectives PANS-OPS	Objectives SAR
Applicable BBBs & ASBU elements AGA	Applicable BBBs & ASBU elements AIS	Applicable BBBs & ASBU elements ATM	Applicable ASBU elements CNS	Applicable BBBs & ASBU elements MET	Applicable BBBs & ASBU elements PANS-OPS	Applicable BBBs & ASBU elements SAR
Gaps identified in AGA	Gaps identified in AIS	Gaps identified in ATM	Gaps identified in CNS	Gaps identified in MET	Gaps identified in PANS-OPS	Gaps identified in SAR
Bankable AGA projects	Bankable AIS projects	Bankable ATM projects	Bankable CNS projects	Bankable MET projects	Bankable PANS-OPS projects	Bankable SAR projects

2.1 Technical specifications in AOP

2.1.1 Objectives

Streamline and enhance operational efficiency of aerodrome operational planning and infrastructure.

2.1.2 Rationale

Aerodrome operations encompass various critical activities such as aircraft handling, passenger services, security, and maintenance. Developing a strategic plan for the Aerodrome Operational Planning is essential for ensuring efficient, compliant, and sustainable operations. It provides a structured approach to managing resources and achieving long-term growth. By aligning the aerodrome's activities with its strategic goals, the plan ensures a cohesive and proactive approach to addressing current challenges and future opportunities, thereby contributing significantly to the vision of a seamless and integrated African and Indian Ocean airspace and airports.

2.1.3 Target areas in AOP

- *Target Area 1: Safety (Improve or maintain safety)*
- *Target Area 2: Accessibility (Improve timely access to airports in the AFI region)*

2.1.4 ASBU Applicable elements in AOP

ACDM - Airport Collaborative Decision Making

- ACDM-B0/1 - Airport CDM Information Sharing (ACIS)
- ACDM-B0/2 - Integration with ATM Network function

2.1.5 Gaps identified in Aerodrome infrastructure and services

XXXXX

2.1.6 Recommended projects

AOP Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
Project 1	Aerodrome Certification							

Project 2	Runway Safety							
Project 3	A-CDM Implementation		ACDM-B0/1 ACDM-B0/2					
Project 4	Training and Qualification of Aerodrome Operations and Inspectors							
Project 5	Airport Master Planning							
Project 6	Wildlife Hazard Management							
Project 7	Emergency planning at Aerodromes							

2.2 Technical specification in AIM

2.2.1   Objectives

Evolve into generic Information Management which is the full implementation of System Wide Information Management.

2.2.2 Rationale

Information Management will fully include AIM while also encompassing all other ATM information management functions not already incorporated in AIM. The vision is seamless provision of digital AFI AIM.

2.2.3 Target areas in AIM

- *Target Area 1: Safety (Improve or maintain safety)*
- *Target Area 2: Accessibility (Improve timely access to aeronautical information)*

- *Target Area 3: Predictability (Improve punctuality through timely availability of accurate and sufficient information)*

2.2.4 ASBU Applicable elements in AIM

2.2.5 Gaps identified in Aeronautical information infrastructure and services

XXXXX

2.2.6 Recommended projects

AIM Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
Project 1	AIM ADQ: Monitoring of the Aeronautical information quality and Improvement of NOTAM							
Project 2	AIM AMDIFP: Implementation of Aerodrome mapping data sets and Instrument flight							

	procedure data sets							
Project 3	AIM CBTS: Implementation of Competency-Based Training Standards for AIS personnel in the AFI Region							
Project 4	AIM AIXM: Implementation of the AIXM database and electronic AIP							
Project 5	AIM TOD: Implementation of Terrain and Obstacle Data Set							
Project 6	AIM-MET QMS: Implementation of QMS for AIM and MET							

2.3 Technical specification in ATM

2.3.1   Objectives
ATM 1.1 **Optimize and harmonize airspace organization and management**.
ATM 1.2 **Improve and harmonize air traffic services**
ATM 1.3 **Implement coordinated regional air traffic flow management**
ATM 1.4 **Optimize and harmonize regional contingency arrangement**

2.3.2 Rationale

To address the emerging challenges and threats and to exploit opportunities within the dynamic field of aviation and emerging technological trends to benefit social development and economic progress within Africa. The goal is to have a safe, secure, efficient, inter-operable and sustainable air navigation system. Developments should limit the impact of aviation on climate change utilizing agreed performance-based standards with interoperable and scalable systems.

a) *Airspace organization:* All airspace is organized in a flexible and dynamic way. Dynamic, four-dimensional, user-preferred trajectories are accommodated, and the air traffic services (ATS) route structure is mainly performance-based.

b) *Airspace management:* A special process should be adopted to balance the needs of different airspace users.

c) *Traffic synchronization (TS):* TS will be made on the day of operation and fully integrated with demand-capacity balancing and conflict management. Arriving traffic will be sequenced by very narrow timeslots being part of the dynamic trajectory. Sequencing between flights can be delegated to a flight deck to optimize runway throughput.

d) Airspace user operations: An integrated part of ATM where real-time data is always available. Aircraft capabilities allow user-preferred 4-D trajectories.

e) *Conflict management (CM)*: CM will have a negotiated trajectory approved well in advance. It should be conflict-free, meaning no further separation provision should be needed (strategic deconfliction). Requirements for separation provision will be primarily handled by the airspace users.

f) *Service delivery management*: The future role of ATC will move from a managerial role to a more monitoring one, where airspace users will assume an increased ATM role.

g) *Aerodrome operations*: Airport infrastructure per se is not an ATM component but airport capacity has a direct bearing on ATM capacity, at least when the former is strained.

h) ***Demand-capacity balancing***: ATFM should be considered as a part of a centralized flow management unit. Balancing will be made for the entire AFI airspace. Technical support tools have enabled the airspace to be used equitably by all users.

2.3.3 Target areas in ATM

- *Target Area 1: Safety (Improve or maintain safety)*
- *Target Area 2: Capacity (Improve En-route Airspace and terminal area capacity, reduce delay)*
- *Target Area 3: Efficiency (Reduce Flight time/distance, improve Vertical efficiency, reduce Fuel burn)*
- *Target Area 4: Environment (Maintain or improve environmental sustainability of aviation)*
- *Target Area 5: Access and equity (Improve access and equity)*
- *Target Area 6: Flexibility (Improve flexibility of air navigation system)*

2.3.4 ASBU Applicable elements in ATM

CSEP - Cooperative Separation

- CSEP-B1/3 - Performance Based Longitudinal Separation Minima
- CSEP-B1/4 - Performance Based Lateral Separation Minima

FRTO - Improved operations through enhanced en-route trajectories

- FRTO-B0/1 - Direct routing (DCT)
- FRTO-B0/2 - Airspace planning and Flexible Use of Airspace (FUA)
- FRTO-B0/4 - Basic conflict detection and conformance monitoring
- FRTO-B1/1 - Free Route Airspace (FRA)
- FRTO-B1/2 - Required Navigation Performance (RNP) routes
- FRTO-B1/3 - Advanced Flexible Use of Airspace (FUA) and management of real time airspace data
- FRTO-B1/4 - Dynamic sectorization
- FRTO-B1/5 - Enhanced Conflict Detection Tools and Conformance Monitoring
- FRTO-B2/3 - Large Scale Cross Border Free Route Airspace (FRA)

NOPS - Network Operations

- NOPS-B0/1 - Initial integration of collaborative airspace management with air traffic flow management

- NOPS-B0/2 - Collaborative Network Flight Updates
- NOPS-B0/3 - Network Operation Planning basic features
- NOPS-B0/5 - Dynamic ATFM slot allocation
- NOPS-B1/1 - Short Term ATFM measures
- NOPS-B1/2 - Enhanced Network Operations Planning
- NOPS-B1/5 - Full integration of airspace management with air traffic flow management
- NOPS-B2/3 - Collaborative Network Operation Planning
- NOPS-B2/6 - ATFM adapted for cross-border Free Route Airspace (FRA)

SNET - Ground-based Safety Nets
- SNET-B0/1 - Short Term Conflict Alert (STCA)
- SNET-B0/2 - Minimum Safe Altitude Warning (MSAW)
- SNET-B0/3 - Area Proximity Warning (APW)
- SNET-B0/4 - Approach Path Monitoring (APM)
- SNET-B1/1 - Enhanced STCA with aircraft parameters
- SNET-B1/2 - Enhanced STCA in complex TMAs

TBO - Trajectory-based operations
- TBO-B0/1 - Introduction of time-based management within a flow centric approach.
- TBO-B1/1 - Initial Integration of time-based decision-making processes

2.3.5 Gaps identified in Air traffic management
- Outdated regional air traffic flow network
- Unharmonized airspace organization with discrepancies in airspace classification
- High number of special use airspace near major ATS routes and airports, including high ceiling prohibited areas and danger areas
- Low level of implementation of Flexible Use of Airspace.
- High number of conventional ATS routes in small volumes of airspace with low percentage of utilization.
- Discrepancies in PBN route implementation in continental and remote continental airspace.
- Discrepancies in the types of ATS provided as well as horizontal separations applied in FIRs. Implementation of surveillance service is significant in the region, however a considerable number of ATS units are still providing

procedural air traffic control or flight information services despite being surrounded by ATS units providing ATC surveillance service.

- Discrepancies in ATC training and competency
- Non-resilient ATM system due to frequent ATM contingency situations and lack of robust ATM contingency plans
- Inconsistent implementation of alert service
- Low implementation of ATFM for domestic or cross-border operations
- Ineffective oversight of ATM operations
- Inconsistency of contingency plans affecting cross-border contingency coordination

2.3.6 Recommended projects

The following list of projects may be considered to address the gaps identified in ATM and to achieve the objectives set.

ATM Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
Project 1	Airspace optimization and modernization	Annex 11, chapter 2, App 1, 2, 3 & 4	FRTO-B0/2 FRTO-B1/4 NOPS-B0/1	Optimize and harmonize airspace organization and management				
Project 2	Reduced and harmonised longitudinal separations in remote and oceanic airspace	Annex 11 Chapter 3 PANS ATM – (Doc4444, Chapter 5)	CSEP-B1/3 FRTO-B0/4 FRTO-B1/5	-Increase airspace capacity -Improve flight efficiency				

ATM Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
Project 3	Civil/Military Cooperation in ATM & Flexible Use of Airspace implementation	Annex 11, chapter 2 Doc 10088	FRTO-B0/2 FRTO-B1/3	Optimize and harmonize airspace organization and management through effective civil military cooperation.				
Project 4	Cross-border ATFM implementation	Annex 11 Chapter 3 PANS-ATM – (Doc4444, Chapter 3)	NOPS-B0/1 NOPS-B0/2 NOPS-B0/3 NOPS-B0/5 NOPS-B1/1 NOPS-B1/2 NOPS-B1/5 NOPS-B2/3 NOPS-B2/6	Implement coordinated regional air traffic flow management				
Project 5	Cross-border FRA implementation	APIRG 22 Conclusion 22/36 AN Conf/14, Recommendation 3.1/4	FRTO-B1/1 FRTO-B2/3 NOPS-B2/6	Optimize and harmonize airspace organization and management through coordinated regional FRA implementation.				

ATM Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
Project 6	Air Traffic Services upgrade and harmonization	Annex 11 Chapter 3, 4 and 5 PANS-ATM – (Doc4444, Chapter 4)	FRTO-B0/4 FRTO-B1/5 SNET-B0/1 SNET-B0/2 SNET-B0/3 SNET-B0/4 SNET-B1/1 SNET-B1/2 TBO-B0/1 TBO-B1/1	Improve and harmonize air traffic services through communication, surveillance upgrade and interoperable and coordinated harmonized operational procedures.				
Project 7	ATC training harmonization and upgrade	Annex 1, Chapter 4 PANS-TRG (Doc9868)		Enhance and harmonize ATC competencies through effective coordination of ATOs training policies, programme and training resources.				
Project 8	ATM Oversight enhancement	Annex 19, chapter 4 Doc9735, part A Doc10070		Enhance ATM CASI's training and qualification to strengthen the State's safety				

ATM Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
				oversight of ATM operations.				
Project 9	Cross-border contingency arrangement implementation	Annex 11, Attachment C AFI eANP Vol II		Implement a robust coordinated AFI FIRs contingency plans and interregional contingency arrangements.				

2.4 Technical specification in CNS

2.4.1   Objectives

CNS1.1   **Improve aeronautical communication through gradual migration performance-based communication and space-based communication**.

CNS1.2   **Improve navigation through safe migration to Performance-based navigation.**

CNS1.3   **Increase interoperability of surveillance systems.**

2.4.2 Rational

The AFI ANS summit framework is rooted in the goal of achieving a seamless, harmonized, and interoperable air traffic management system across the Africa-Indian Ocean (AFI) region.

Foundation of Air Navigation: CNS systems are the backbone of safe and efficient air traffic operations. Without robust CNS infrastructure, seamless ATM is impossible.

Modernization & Rationalization: Many AFI States operate legacy systems. Promoting rationalization and upgrading CNS infrastructure to align with ICAO standards and future traffic growth projections will be very crucial.

Integration Across Regions: CNS strategies must be harmonized across Regional Economic Communities (RECs) to ensure consistent service quality and coverage, eliminate duplication and fragmentation in CNS systems to improve cost-efficiency and service delivery, and strengthen partnership among States, ANSPs, and regional economic communities.

2.4.3 Target areas in CNS

The target areas in CNS (Communication, Navigation, and Surveillance) for the AFI (Africa and Indian Ocean) region are defined in ICAO's AFI CNS/ATM Implementation Plan and the AFI eANP (electronic Air Navigation Plan). These targets aim to modernize infrastructure, enhance interoperability, and improve safety and efficiency across the region.

The key CNS Target Areas for the AFI Region are as follows:

Communication Systems

Aeronautical Fixed Telecommunications Network (AFTN)

- Complete implementation and rationalization of AFTN circuits.
- Transition to ATN (Aeronautical Telecommunication Network) for digital messaging.

ATS Direct Speech Circuits (ATS/DS)
- Full implementation of voice communication circuits between adjacent ATS units.
- Upgrade to VoIP-based systems for improved reliability.

VHF and HF Communication Coverage

- Extension of VHF coverage at all operationally significant altitudes
- Optimization and coordination of HF networks for en-route communications

Navigation Aids

- Implementation and maintenance of VOR/DME stations, ILS at key airports and GNSS-based navigation (including PBN routes), including the transition from conventional to Performance-Based Navigation (PBN)

Surveillance Systems

- Progressive implementation of Secondary Surveillance Radar (SSR), Mode S transponders, ADS-B (Automatic Dependent Surveillance – Broadcast), Multilateration (MLAT) in terminal areas, and Coordination of SSR Mode S II code and 24-bit address assignments.

ATM Automation and Data Interoperability

- Deployment of ATM automation systems at ACCs and major airports
- Integration with SWIM and digital AIM systems

2.4.4 ASBU Applicable elements in CNS

The Aviation System Block Upgrades (ASBU) framework identifies several applicable elements in the CNS (Communication, Navigation, and Surveillance) domain for the AFI (Africa and Indian Ocean) region, as outlined in ICAO's Global Air Navigation Plan (GANP) and the AFI Air Navigation Report2.

Applicable ASBU Elements in CNS for AFI

Communication Systems

ASBU Element	Description	Status
COMI-B0/1	ATS Inter-facility data communication (AIDC)	Partially implemented
COMI-B1/1	Ground-ground digital communication via ATN/AMHS	Recommended for full implementation
COMS-B0/1	ATS voice communication via ATS/DS circuits	Ongoing upgrades to VoIP
COMS-B1/1	ATS voice over IP (VoIP)	Priority for modernization

Navigation Systems

ASBU Element	Description	Status
NAVS-B0/1	GNSS-based navigation (PBN)	Widely applicable and expanding
NAVS-B1/1	GNSS augmentation (SBAS/GBAS)	Under feasibility studies
NAVS-B1/2	GNSS integrity monitoring	Recommended for national deployment

Surveillance Systems

ASBU Element	Description	Status
ASUR-B0/1	ADS-B Out (Broadcast)	Deployment underway in several FIRs
ASUR-B1/1	ADS-C (Contract) and integration with ATM	Recommended for oceanic airspace
ASUR-B1/2	Mode S SSR and Multilateration	Priority for terminal areas
ASUR-B1/3	Surveillance data sharing	Encouraged for regional harmonization

Strategic Priorities

- ADS-B and GNSS are considered high-priority enablers for surveillance and navigation modernization.
- VoIP and AMHS are key to improving communication reliability and interoperability.
- SBAS feasibility is being explored to support GNSS augmentation across AFI.

2.4.5 Gaps identified in Communication, Navigation, Surveillance

Based on the latest reports from ICAO and regional partners, several critical gaps have been identified in the CNS (Communication, Navigation, and Surveillance) domain across the AFI (Africa and Indian Ocean) region. These gaps hinder the region's ability to provide seamless, safe, and efficient air navigation services.

Key CNS Gaps identified in the AFI Region

Communication Gaps

- Limited VHF coverage in remote and oceanic areas, especially at lower flight levels
- Inadequate HF communication quality and reliability in some FIRs
- Incomplete implementation of ATS Direct Speech (ATS/DS) circuits
- Slow transition to digital communication systems (e.g., ATN/AMHS, VoIP)

Navigation Gaps

- Aging and poorly maintained ground-based navigation aids (e.g., VOR, DME, NDB)
- Limited GNSS augmentation infrastructure, such as SBAS (Satellite-Based Augmentation System)
- Inconsistent implementation of Performance-Based Navigation (PBN) procedures
- Lack of national GNSS monitoring and integrity systems.

Surveillance Gaps

- Sparse radar coverage, especially in central and western Africa
- Limited deployment of ADS-B ground stations, particularly in remote and oceanic airspace
- Lack of Mode S SSR and Multilateration systems in many terminal areas
- Uncoordinated assignment of 24-bit aircraft addresses and SSR Mode S II codes.

CNS Planning and Integration Gaps

- Fragmented CNS infrastructure planning across States and FIRs
- Limited regional data sharing and surveillance integration
- Insufficient CNS automation and interoperability with ATM systems
- Lack of national CNS implementation plans in several States

2.4.6 Recommended projects

CNS Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
Project 1	GNSS monitoring and integrity systems at national and regional levels	Annex 10 vol 1 GNSS Manual (Doc 9849)	NAVS-B0/1 B0/1 B0/4 B1/1 B1/2	To ensure the reliability, accuracy, and safety of satellite-based navigation services-				
Project 2	AFI-GGCOM AFI: Regional Ground Communication Modernization	Annex 10, Volume II §4.6 Annex 10, Volume III, Part I Chapter 1, Chapter 3	COMI-B0/1 COMI-B1/1 B0-FICE B0-FICE	To implement seamless ground-ground (G-G) communication exchange across the AFI Region through the standardized deployment of AMHS and AIDC systems, ensuring interoperability, efficiency, and alignment with global aviation standards.				
Project 3	AFI NAVMOD: AFI Navigation Modernization Initiative	Annex 10 vol 1 §3.7	NAVS-B0/1 NAVS-B1/1 NAVS-B1/2	To assist AFI States in modernizing aeronautical navigation services through: • Implementation of conventional navigation aids (ILS, VOR, DME) • Integration and oversight of GNSS (core and augmented)				

CNS Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
				• Strengthening GNSS monitoring and RFI mitigation • Definition of minimal operational networks for conventional aids to ensure redundancy • Enhancing regional capacity and coordination				
Project 4	AFI-SPEC: AFI Aviation Spectrum Coordination and Protection Initiative	Annex 10 volume 5 ICAO Doc 9718 vol. 1, Vol 2		To enhance the capacity of AFI States and regional bodies to coordinate, manage, and protect aviation spectrum effectively, ensuring safe and uninterrupted ANS operations.				
Project 5	AFI SURVDATA: AFI Surveillance and Data Sharing Enhancement Initiative	Annex 10 volume IV PART I, Chapter 5 SSR Mode S Air-Ground Data Link, Chapter 6(VDL) §Section 6.9 VDL, Chapter 9: Aircraft addressing system Chapter 12 (UAT)	ASUR-B0/1 ASUR-B1/1 ASUR-B1/2 ASUR-B1/3	To enhance surveillance coverage and interoperability in the AFI Region through the deployment of modern surveillance technologies and				

CNS Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
		Annex 11, Chapter 3, §3.6, §3.8, §3.9, 3.10 Doc 4444 chap 4, 5, 8, chap 13		the establishment of cross-border data sharing frameworks				
Project 6	AFI-IATI: AFI Integrated Aeronautical Telecommunication Infrastructure	Annex 10 Vol 3 Part I CHAPTER 3. Aeronautical Telecommunication Network . Doc 9896 Doc9880	COMI B1/1	Establish a seamless and interoperable ground-ground communication infrastructure across the AFI Region to support ATM, AIM, MET, and aeronautical services, by integrating existing VSAT networks and transitioning towards ATN/IPS-based systems.				
Project 7	AFI-SWIM: Implementation of System Wide Information Management (SWIM)							
Project 8	AFI-COMMOD: Modernization of Air-Ground Communication Infrastructure	Annexe 10 PART II — Voice communications system, chapter 3, chapter 6	COMS-B0/1 COMS-B1/1	To accelerate the modernization of air-ground communication infrastructure in the AFI Region by				

CNS Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
				deploying high-performance CPDLC, VHF Mode 2, Voice over IP and SATCOM systems, ensuring reliable, interoperable, and performance-based voice and data communication services in line with global aviation standards.				
Project 9	AFI-ATSEP: Capacity building and harmonization of training for ATSEP	Annex 10 — Aeronautical Telecommunications Procedures for Air Navigation Services — Training [PANS-TRG, Doc 9868] ICAO Doc 10057 – Manual on ATSEP Competency-Based Training and Assessment		To strengthen the competencies of Air Traffic Safety Electronics Personnel (ATSEP) across the AFI Region by developing and implementing a harmonized training framework that aligns with international standards, promotes regional consistency, and supports				

CNS Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
				sustainable capacity building.				
Project 10	AFI-CYRES: AFI Cyber Resilience in CNS/ATM Systems	Aviation Cybersecurity Strategy - ICAO Cybersecurity Policy Guidance ICAO Cybersecurity Action Plan Cybersecurity Culture in Civil Aviation Doc 9896 Doc. 9854 Doc 9855		Build a culture of cyber safety and resilience in air navigation systems by setting up clear governance and response plans.				

2.5 Technical specification in MET

2.5.1 Objectives

MET1.1: **Improve aerodromes meteorological wind shear warnings and alerts**

MET1.2: **Improve quality and the availability of operational meteorological information at aerodromes**

MET1.3: **Implement quality management system for aeronautical meteorological services**

MET1.4: **Implementation of the SADIS API system for the provision of WAFS gridded forecasts and data**

MET1.5: **Implementation of the IWXXM and provision of meteorological information in digital format**

2.5.2 Rational

- Around 33% of WACAF States stand with capacity of ensuring the implementation of BBBs less than 55%.
- Number States are facing persistent OPMET availability challenges at their aerodromes.
- Lack of compliance of the IWXXM requirements and low level of implementation of SADIS API.
- 21% of WACAF States are yet to implement a quality management system for MET.

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2.5.3 Target areas in MET

- Capacity: Optimized usage of airspace and aerodrome capacity due to MET support
- Efficiency: Reduced arrival/departure time, thus reduced fuel burn due to MET support
- Environment: Reduced emission due to reduced fuel burn due to MET support
- Flexibility: Supports pre-tactical and tactical arrival and departure sequencing through MET support

Safety: Reduced incidents/accidents in flight and at international aerodromes due to MET support

2.5.4 ASBU Applicable elements in MET

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- AMET-B0/1 Meteorological observations products
- AMET-B0/2 Meteorological forecast and warning products
- AMET-B0/4 Dissemination of meteorological products
- AMET-B1/1 Meteorological observations information
- AMET-B1/2 Meteorological forecast and warning information
- AMET-B1/4 Dissemination of meteorological information

2.5.5 Gaps identified in Aeronautical meteorology

- In WACAF Region: 16% (5 States) reported VOLMET broadcast fully implemented, while 26% (8 States) have not implemented yet and 34% (11 States) reported not applicable. 23% (7 States) have not provided data.
- Status of the World Area Forecast System (WAFS): 49% States (28 WACAF States) have implemented the WAFS services, while 11% (6 States reported not implemented and 14% in progress. 5% (3 States) planned the implementation while 21% (12 States) didn't provide data.
- WACAF average of implementation AMET-B0 elements is around 66,75%, while the level of compliance with IWXXM requirements is less than 39%.

2.5.6 Recommended projects

To address the performance issues outlined above, State subject matter experts identified the following MET projects.

MET Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
Project 1	Project on Strengthening Aeronautical Meteorological Personnel Competency Implementation in the AFI Region (AFI-AMP-COMP)			To assist AFI States in implementing and improving the WMO/ICAO competency standards for Aeronautical Meteorological Personnel (AMP)				
Project 2	Project on Enhancing Space Weather Readiness and Service Provision in the AFI Region (AFI-SPWX)			Support AFI States in implementing ICAO Annex 3 space weather requirements.				
Project 3	Project on Improving OPMET Delivery and MET Products Access in the AFI Region (DISMET-AFI)			Improve timely and reliable dissemination of MET information in line with ICAO Annex 3 and support AFI States in establishing				

				effective systems and procedures to ensure operational access to OPMET Information				
Project 4	Project on Enhancing Digital Exchange of Aeronautical Meteorological Information in the AFI Region (DIGIMET-AFI)			Support AFI States in implementing IWXXM-compliant digital exchange of meteorological information in accordance with ICAO Annex 3 requirements thereby enhancing the availability, accuracy, and interoperability of MET data for aviation safety and efficiency.				

Project 5	Project on Calibration and Control of Surface-based MET Sensors and Instruments (AFI-METCAL)			To improve the safety, efficiency, and reliability of aviation and weather services through accurate, traceable, and sustainable calibration of surface-based meteorological instruments and sensors.				
Project 6	Project on Strengthening Wind Shear Warning Capabilities in the AFI Region (AFI-WARN)			To support AFI States in implementing ICAO Annex 3 provisions related to wind shear detection and warning, enhancing aviation safety through timely and accurate WS information at airdromes.				

Project 7	Implementation of the SADIS API system for the provision of WAFS gridded forecasts and datasets (AFI_SADIS)			Assist States with the implementation of New WAFS Datasets System through Implementation of SADIS API				
Project 8	Implementation of aeronautical data link (D-VOLMET) and broadcasting (VOLMET) services (V-AFI)			Improve the provision of OPMET information to aircraft in-flight				
	ATIS-AFI: Implementation of ATIS (voice-ATIS and D-ATIS) (ATIS-AFI)			Provide pilots with essential, routine, and frequently terminal information, ensuring efficiency, safety and reducing ATC workload				

2.6 Technical specification in PANS-OPS

2.6.1   Objectives

  PANS-OPS1.1   **Advance PBN procedures implementation in the AFI Region**.

PANS-OPS1.2 **Improve and harmonize PBN Route network in AFI.**
PANS-OPS1.3 **Improve maintenance of flight procedures.**

2.6.2 Rational

PBN offers significant benefits, but successful implementation requires addressing challenges and capitalizing on opportunities available for the provision of PANS-OPS services. Improving the development of competence for the provision of PANS-OPS services is therefore crucial for ensuring safe and efficient implementation of the ASBU elements in accordance with global vision. The Regional Vision therefore is to advance PBN implementation in Africa, fostering collaboration among Civil Aviation Authorities (CAAs), air navigation service providers (ANSPs), and other stakeholders. Realization of this will ensure that PANS-OPS procedures are universally understood, rigorously followed, and contribute to the highest levels of flight safety.

2.6.3 Target areas in PANS-OPS

- *Target Area 1: Safety (Improve or maintain safety)*
- *Target Area 2: Efficiency (reduce Flight time/distance, improve Vertical efficiency, reduce Fuel burn)*
- *Target Area 3: Environment (Maintain or improve environmental sustainability of aviation)*
- *Target Area 4: Access and equity (Improve access and equity)*
- *Target Area 5: Flexibility (Improve flexibility of air navigation system)*

2.6.4 ASBU Applicable elements in PANS-OPS

APTA - Improve arrival and departure operations

- APTA-B0/1 - PBN Approaches (with basic capabilities)
- APTA-B0/2 - PBN SID and STAR procedures (with basic capabilities)
- APTA-B0/4 - CDO (Basic)
- APTA-B0/5 - CCO (Basic)
- APTA-B0/6 - PBN Helicopter Point in Space (PinS) Operations
- APTA-B1/1 - PBN Approaches (with advanced capabilities)
- APTA-B1/2 - PBN SID and STAR procedures (with advanced capabilities)
- APTA-B1/4 - CDO (Advanced)

- APTA-B1/5 - CCO (Advanced)

2.6.5 Gaps identified in PANS-OPS

- Very low level of PBN CCO/CDO (16.3%)
- PBN SID (40.4%) is still low
- PBN STAR (54.7%) is showing fairly good progress but still below the minimum regional target (75%)
- High number of SSCs in instrument flight procedure design maintenance and approval
- Low number of qualified IFP designers and approvers.

2.6.6 Recommended projects

The following projects can be implemented to improve flight procedure design, maintenance and approval in the AFI region.

PANS-OPS Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
Project 1	Departure and arrival trajectories optimization at international airports	Annex 11, chapter 2, App 4	APTA-B0/1 APTA-B0/2 APTA-B0/4 APTA-B0/5 APTA-B0/6 APTA-B1/1 APTA-B1/2 APTA-B1/4 APTA-B1/5	Improve departure and arrival operations in terminal areas serving international airports				
Project 2	Quality assurance implementation in Instrument Flight	Annex 11, App 7 Doc8168, Vol II Doc9906		Implement QMS in all IFPDS				

	Procedure Design							
Project 3	Capacity building in IFP design and validation	Doc9906, Vol 1,2,3,5 & 6		Enhance and harmonize the competencies of IFP Designers and validators				
Project 4	Capacity building in PANS OPS oversight	Annex 19, chapter 4 Doc9735, part A Doc10070		Enhance the competencies of State's PANS-OPS Inspectors in oversight of PANS-OPS				

2.7 Technical specification in SAR

2.7.1   Objectives
   SAR1.1 **Increase regional collaboration in Search and Rescue**.
   SAR1.2 **Increase and foster joint SAR Exercises.**
   SAR1.3 **Improve access to SAR information.**

2.7.2 Rational
   Search and Rescue (SAR) is a major component of ensuring the saving of lives and reduction of harm during emergency events. SAR is crucial for locating and saving individuals in distress. The service often requires cross-border coordination

and support. Article 25 of the Chicago Convention provides for the obligations of contracting states to collaborate in search and rescue efforts; it mandates that when an aircraft is missing, each contracting state will cooperate in coordinated measures recommended by the Convention to locate it. Recent survey indicates that the majority of AFI States have not signed SAR agreements with neighbouring States thus limiting rapid assistance to aircraft in distress. The conducting of SAR training including exercises is also very low in the region leading to low capacity in handling major SAR events.

2.7.3 Target areas in SAR

- *Target Area 1: Safety (Improve or maintain safety)*
- *Target Area 2: Efficiency (Improve response time)*
- *Target Area 3: Capacity (Enhance quality of service)*
- *Target Area 4: Prevention (Improve information data exchange for investigation purposes)*
- *Target Area 5: Economic benefits (protect valuable property and infrastructure, maintain public trust)*

2.7.4 ASBU Applicable elements in SAR

GADS - Global Aeronautical Distress and Safety System (GADSS)
- GADS-B1/1 - Aircraft Tracking
- GADS-B1/2 - Operational Control Directory
- GADS-B2/1 - Location of an aircraft in Distress
- GADS-B2/2 - Distress tracking information management
- GADS-B2/3 - Post Flight Localization
- GADS-B2/4 - Flight Data Recovery

2.7.5 Gaps identified in Search and Rescue
- Low level of SAR agreement signed between States (38%)
- Low level of suitably qualified RCC/RSC staff (29%)
- Low level of   large-scale SAR Exercise conducted (20%)
- Ineffective SAR Oversight (31%)

- Lack or insufficient SAR facilities
- Low level of subscription of RCC/RSC to the ICAO Operational control directory
- Low cooperation between Aeronautical and maritime SAR where applicable

2.7.6 Recommended projects

SAR Project #	Project title	ICAO reference covered	ASBU elements delivered	Project objectives	Project duration	Project deliverables	Project estimated unit cost	Assigned Project Team
Project 1	Multistate SAR agreement	Annex 12, chapter 3		Increase regional collaboration in Search and Rescue				
Project 2	RCC/RSC efficiency enhancement	Annex 12, chapter 2 IAMSAR Doc 9731 Vol I AFI SAR Plan	GADS-B1/1 GADS-B1/2	Enhance and harmonize SAR operations of RCC/RSC				
Project 3	National SAR oversight enhancement	Annex 19, chapter 4 Doc9735, part A Doc10070		Enhance State's SAR Inspectors oversight capability				
Project 4	Establishment of JRCC/JRSC	Annex 12, chapter 3 IMASAR Vol I		Establish effective JRCC/JRSC where applicable.				

Project 5	Training of SAR personnel including Conduct of SAREX	Annex 12, chapter 4 IAMSAR Vol I, II & III		Plan and timely conduct SAREX in each RCC/RSC with participation of all national SAR resources and adjacent SRR				