ICAO

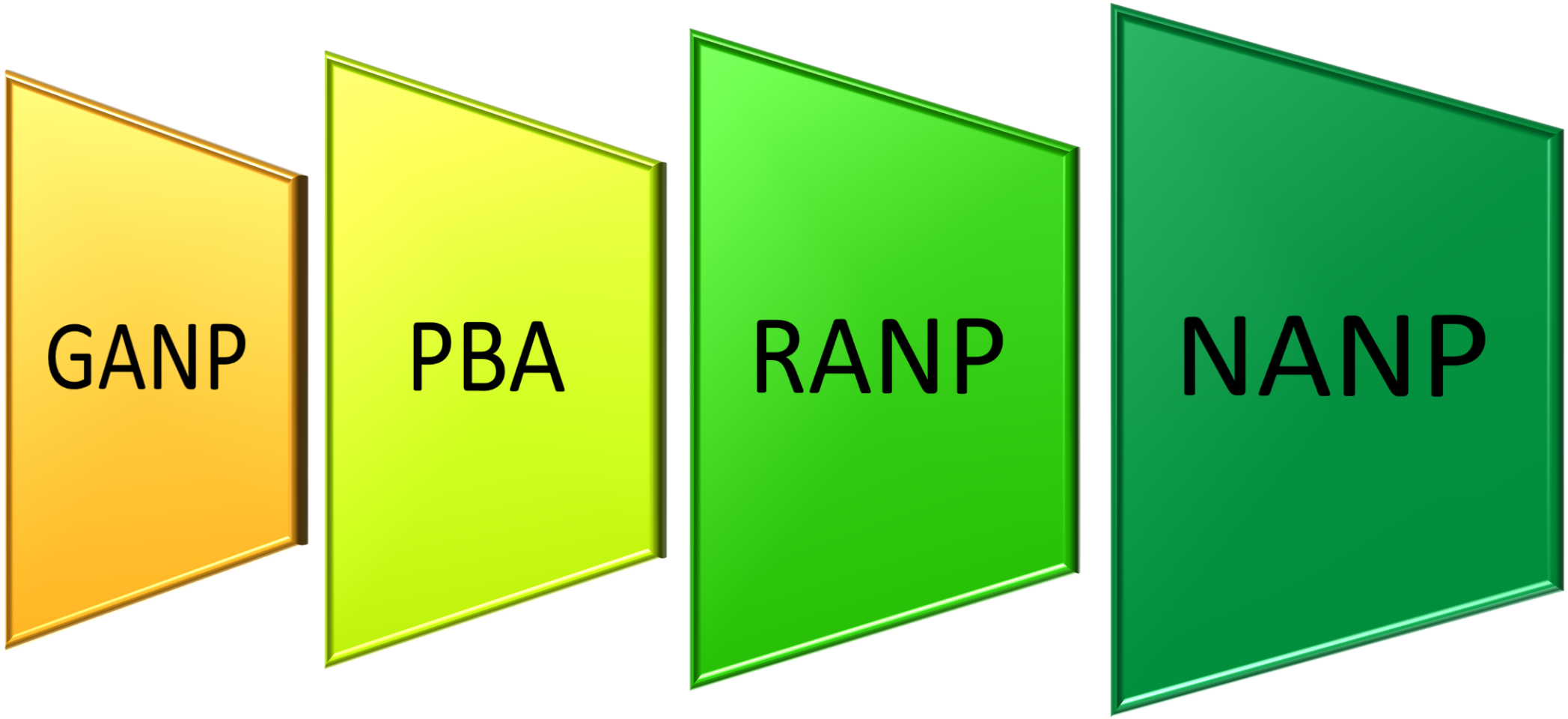
INTERNATIONAL CIVIL AVIATION ORGANIZATION

A UN SPECIALIZED AGENCY

GANP and PBA implementation

ICAO MID

Overview



GANP

ICAO GANP PORTAL

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WELCOME TO THE GLOBAL AIR NAVIGATION PLAN PORTAL

The GANP Portal is a web portal where all aviation stakeholders will be able to find the most relevant information related to the Seventh edition of the GANP

https://www4.icao.int/ganpportal/

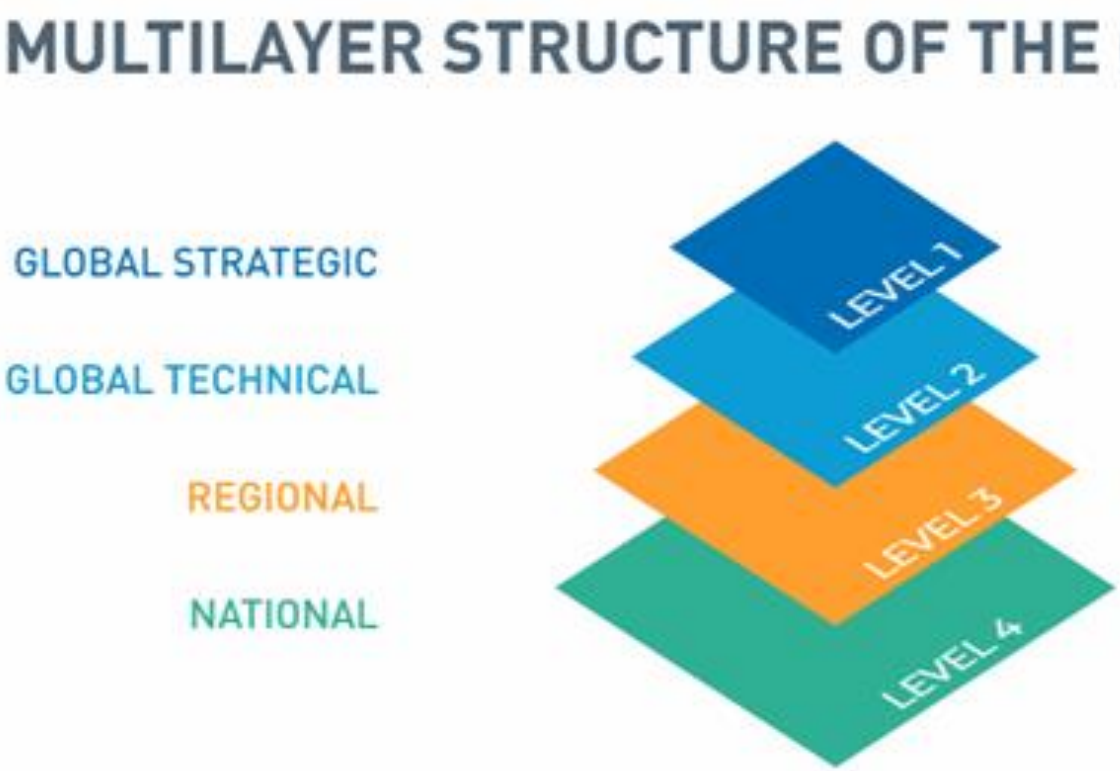
GANP

- ICAO Doc 9750 – 7th edition;
- ICAO's **highest air navigation strategic document** and important planning **tool** for setting **global priorities**;
- It's in line with the Global Air Traffic Management Operational Concept (**GATMOC**, Doc 9854) and the Manual on Air Traffic Management System Requirements (**Doc 9882**);
- **Seamless** development of ANS in collaboration with and for the benefit of stakeholders;
- Support the **United Nations 2030** Agenda for **Sustainable Development**
- GANP includes **minor changes** every **3** years & **major changes** every **6** years.

Objectives

With the GANP, ICAO brings the aviation community together to achieve an **agile**, **safe**, **secure**, **sustainable**, **high-performing** and **interoperable** global air navigation system.

GLOBAL AIR NAVIGATION PLAN (7th edition)



https://www4.icao.int/ganpportal/

Not subject to change in the short term

GLOBAL STRATEGIC

Provides high-level strategic directions for decision makers to drive the evolution of the global air navigation system towards a common agreed vision.

GANP DOCUMENT

Decision makers

- provide decision-makers with a strategic direction to **drive the evolution of the global ANS** by outlining a **vision**, the associated performance **ambitions** & a conceptual **roadmap**.
- also ensures the **stability** of the GANP within the defined timeframe and provides a clear view of the performance and technical frameworks described at the global technical level, for which it serves as the reference

INTRODUCTION - Global Air Navigation Plan Strategy (EN) (icao.int)

Strategic level development

GMVT

- GANP Multidisciplinary Vision Team (**GMVT**) was established by ICAO Assembly in 2016

AN-Conf/13

- Made up of executives of key industry and R&D stakeholders, developed the **vision**, performance **ambitions** and conceptual **roadmap** presented to the AN-Conf/13 in 2018

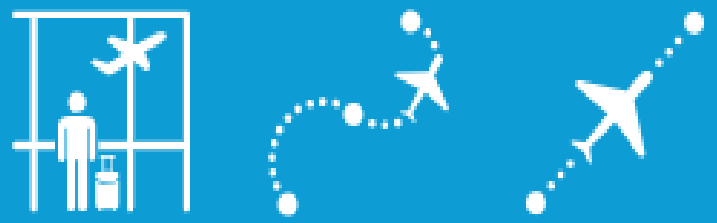
Spacecraft

- AN-Conf/13 **welcomed** these **initiatives** whilst highlighting that **commercial airspace vehicles** should be considered as **spacecraft** rather than aircraft.

Technical level evolves over time in response to technologies, operational environments, growing traffic demand, and emerging priorities.

GLOBAL TECHNICAL

Supports technical managers in planning the implementation of basic air navigation services and new operational improvements in a cost-effective manner.



ASBUs AN-SPA BBBs & PF

BBB

- BBB framework outlines the **foundation** of a robust **ANS**;
- It's the **commitment** of the State, under Chicago Convention;
- To provide **essential ANS** for the safe & orderly conduct of **international** civil aviation;

ASBU

- Subsequent **ANS performance** can be **improved** through the application of the **ASBU** framework;
- The **ASBU drives** the **evolution** of the global ANS towards the achievement of the **identified** performance **ambitions** by defining operational improvements and associated **performance benefits**;

Technical level development - ASBU

ASBU Panel Project Team composed of independent professionals from relevant ICAO expert groups, was established

Change management process was defined to keep the framework's content up to date

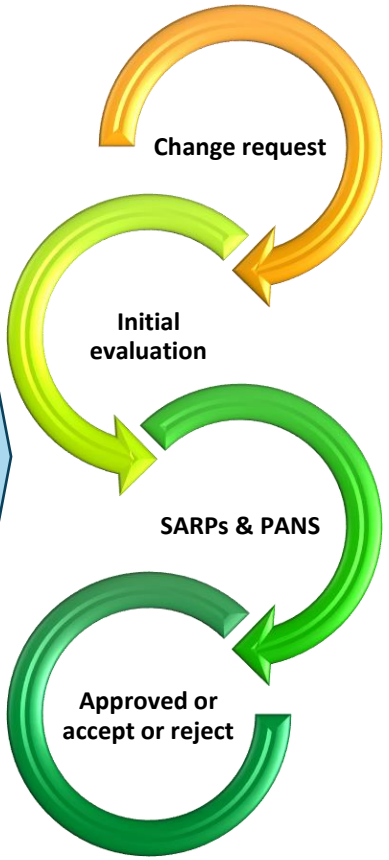
- **Change** to the ASBU framework can be **submitted** by any **member** of aviation community by **filling** in the **template**;

- Secretariat & ASBU PPT, will conduct an **initial evaluation** for further consideration;

- if **PfA relates** to **SARPs/PANS**, **ANC** will review & approve, modify or reject PfA;

- If **PfA** is **unrelated** to **SARPs/PANS**, **ASBU PPT** & **Secretariat** will review & accept, modify or reject PfA;

- if **PfA** is **approved**/**accepted**, Secretariat will include it in ASBU framework within the **next six months**.



GANP

Specification

- **5** Blocks (0-4)
- **22** Thread
- **231** Element
- **3** Category
  - Information
    - **4** Threads
    - **50** Elements
  - Operation
    - **14** Threads
    - **137** Elements
  - Technology
    - **4** Threads
    - **44** Elements

MID RANP (ANP Volume III)

Specification of Priority One

- **2** Blocks (0-1)
- **15** Thread
- **34** Element
- **3** Category
  - Information
    - **3** Threads
    - 8 Elements
  - Operation
    - **9** Threads
    - **19** Elements
  - Technology
    - **3** Threads
    - **7** Elements

| | Thread | Element | | |

Technical level development - BBB

The BBB framework will take into account amendments to ICAO air navigation **SARPs** and **PANS** and will be **updated** by the **Secretariat** on a **biannual** basis.

REGIONAL

Addresses regional and sub-regional needs aligned with the global objectives.

- AFI ANP
- APAC ANP
- EUR ANP
- MID ANP
- NAM ANP
- NAT ANP
- CARSAM ANP

NATIONAL

Development by States, in coordination with relevant stakeholders, of air navigation plans aligned with regional and global plans.

NANP TEMPLATE

CBA CHECKLIST

Consistency

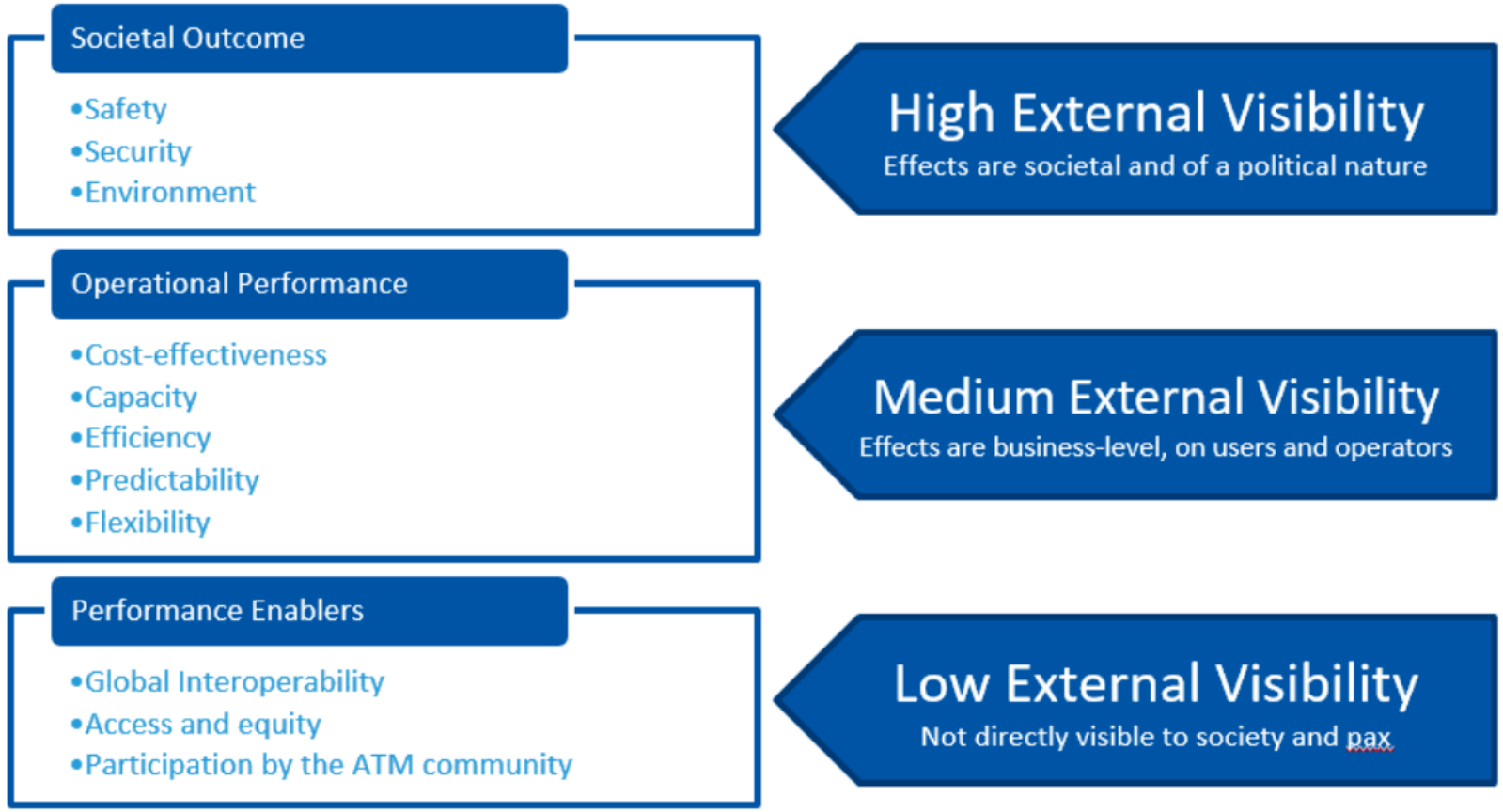
- Ensure **consistency** from the **initial** development of operational improvements to **final** implementation.
- These levels provide the global aviation community with a **common** basis for **short- & medium-term** implementation **planning**.
- **Regional level** of the GANP addresses **regional performance** & **operational needs**, **differences**, **constraints** & **opportunities** through MID ANP & other initiatives aligned with the global.
- **National level**, under the **responsibility** of the **State**, focuses on national planning in **coordination** with relevant **stakeholders** in line with **regional** and **global** plans

REGIONAL & NATIONAL LEVELS

- eANP tool
  - Under development
  - Available for the Eighth edition
- National template
  - Under development
  - Available for the Eighth edition

Relationship with Other Global Plans

Key to the operational concept is a clear statement of the **expectations** of the aviation community. These expectations are **defined** in **11** key performance areas (**KPAs**).



INTRODUCTION - Global Air Navigation Plan Strategy (EN) (icao.int)

- Deliver in-depth insights & solutions connected to the performance needs for the evolution; and
- fosters a new generation of competent aviation professionals.

- Provide up-to-date industrial standards, technical insight & expertise across the technological domains relevant to air transportation; and
- plays a consulting role with other stakeholders to identify & provide the most cost-effective solutions, services and equipment.

- Military aviation authorities as the main stakeholder actively participate in the development of the GANP by providing their operational requirements; and
- Military aviation authorities actively participate in State CMC.

- Identify future trends;
- Provide States and ANSPs any potential constraints GA operation;
- Separate State aircraft cannot comply for operational/technical reasons; and
- application of existing aviation protocols constrains the innovation; GANP provides a common point for sharing best practices.

- Share operational expertise & information with organization & raise awareness on compliance requirements through training & audit activities;
- Convey operational requirements to members & help them to plan effective solutions; and
- Use reporting mechanisms in SMS.

ROLES AND RESPONSIBILITIES - Global Air Navigation Plan Strategy (EN) (icao.int)

- ANSPs are responsible for planning, organizing & efficiently managing ANS;
- Timely distribution of information & data for the effective provision of ANS; and
- funding for upgrading the infrastructure, system capabilities and provisions.

- Develop NANP based on essential ANS for intel civil aviation & modernization of ANS; and
- Share best practices & lessons learned (challenges, cost-benefit, environmental impact, human performance & safety).

- ICAO provides tools & identifies global technical level of the GANP;
- ICAO recognizes different needs & expectations. So, the ASBU framework is flexible & scalable modernization;
- Develop global provisions;
- Review and update MID ANP in line with GANP & RANP; and
- Encourages States to support other States.

- Airport operators support GANP to increase efficiency; and
- Implement Airport collaborative decision-making by providing data, forecasts and resources.

- PIRGs are responsible for the regional level of the GANP;
- ANP Vol I (stable) & II (dynamic); assignment of responsibilities to States for provision of mandatory AD & AN facilities & services essential for international civil aviation;
- ANP Vol III (dynamic/flexible); planning elements for modernizing regional ANS (performance-based approach), in doing so, PIRGs define regional performance objectives, using KPIs to achieve the global performance ambitions and identify operational improvements.

Challenges and Opportunities

Challenges

- Aviation supports the growth of the global economy;
- +50% of world's tourists across intel borders are transported by air;
- Air transport carries some 35% of world trade by value;
- +90% of cross-border B2C is carried by air transport;
- air travel is becoming accessible to more people;
- growing market for air cargo;
- Air traffic growth will be boosted by new aircraft & vehicles;
- Movement of passengers & goods by air is expected to double within the next 15 years; and
- New entrants (UAS, GA, Spacecraft), with significantly different characteristics and needs.

GANP

Opportunities

- Support United Nation 2030 Agenda to build resilient infrastructure, promote inclusive & sustainable industrialization and foster innovation;
- Modernizing & building necessary infrastructure within ANS to generate new services & optimize current services;
- Analyse large amounts of information to support human decision making & understanding;
- Speed up change by including early stage research, industrial R&D, & implementation experiences within the innovation life cycle.
- Optimal use of human strengths & capacity to manage unexpected situations quickly & safely; and
- Transition from a centralized system to a system that is offers services tailored to the needs of the network & to those determined by users.

CHALLENGES AND OPPORTUNITIES - Global Air Navigation Plan Strategy (EN) (icao.int)

Conceptual Roadmap

STEP 1	STEP 2	STEP 3	STEP 4
Flight operation in a **digital rich environment**	**Time-based operations** enabled by an information revolution	**Trajectory-based operations** enabled by full connectivity through the internet of aviation	Total performance management system focus on **business / mission needs**

THE CONCEPTUAL ROADMAP - Global Air Navigation Plan Strategy (EN) (icao.int)

Step 1

In **information-poor system**, acceptable number of flights is restricted to declared capacity to eliminate possibility of excessive holding, sector overloads or diversions, which results from lack of sufficient information to provide tactical levels of planning.

The first step focuses on improving the **system's capacity**.

The introduction of digital technologies improves the quality of the information & removes or minimizes constraints to access to & use of air navigation resources, thereby **increasing the capacity** of the system while **maintaining & enhancing safety**.

The emergence of digital technologies not only **improves** the **quality** of data & information, but also **increases** data **storage** & **enhances processing** capabilities while allowing a **wider distribution** of information

Step 2

Isolated (local) nature of decisions can result in unforeseen delays to schedules and customer dissatisfaction, along with additional costs and inefficiencies

The second evolutionary step focuses on **improving efficiency**, **predictability** and **cost-effectiveness** by moving from isolated data pockets and automation to a single, shared view/coordinated system

The increased **availability** & greater **accuracy** of data & information will make it possible to apply **big data analysis methodologies** & take an improved, **proactive approach** to safety & efficiency of operations

The **expanded information pool** will enable the introduction/enhancements network management functions supporting a resilient & robust regional network approach. This increased regional **network capability**, with greater **availability of accurate** data & information, will support **synchronization** of local **tactical decision-making** supporting tools.

Step 3

One of the barriers to improving the regional air navigation system is the **lack of full participation** due to the **high cost** of aviation-specific technologies.

The third evolutionary step envisages a scenario in which everything in aviation that can be connected, is **connected**.

In this step, each actor will be seen as a system **node**, **source** of and **user** of information.

The **aircraft's intent** will be readily available to ANSPs, and **atmospheric conditions** surrounding each aircraft will be available. The **automation tools** of airspace users employ the state of the network and arrival management, surface management and departure management schedules **in real time**. As a result, network management will become a **globally shared endeavour**, **free of the boundary inefficiencies** caused by limitations in cross-regional boundary information.

Step 4

Moving passengers & cargo worldwide is not the sole purpose of aviation. The emergence of **multiple users** & different **vehicles** & **business models** has added significant **complexity** to **decision-making** among ANSPs

The last step of the conceptual roadmap is to take advantage of this information-rich environment to **fully optimize decision-making** and **satisfy** the **needs of airspace users**.

With this improved total system performance in mind, the entire focus will shift to **who is best positioned** and able to **make decisions**.

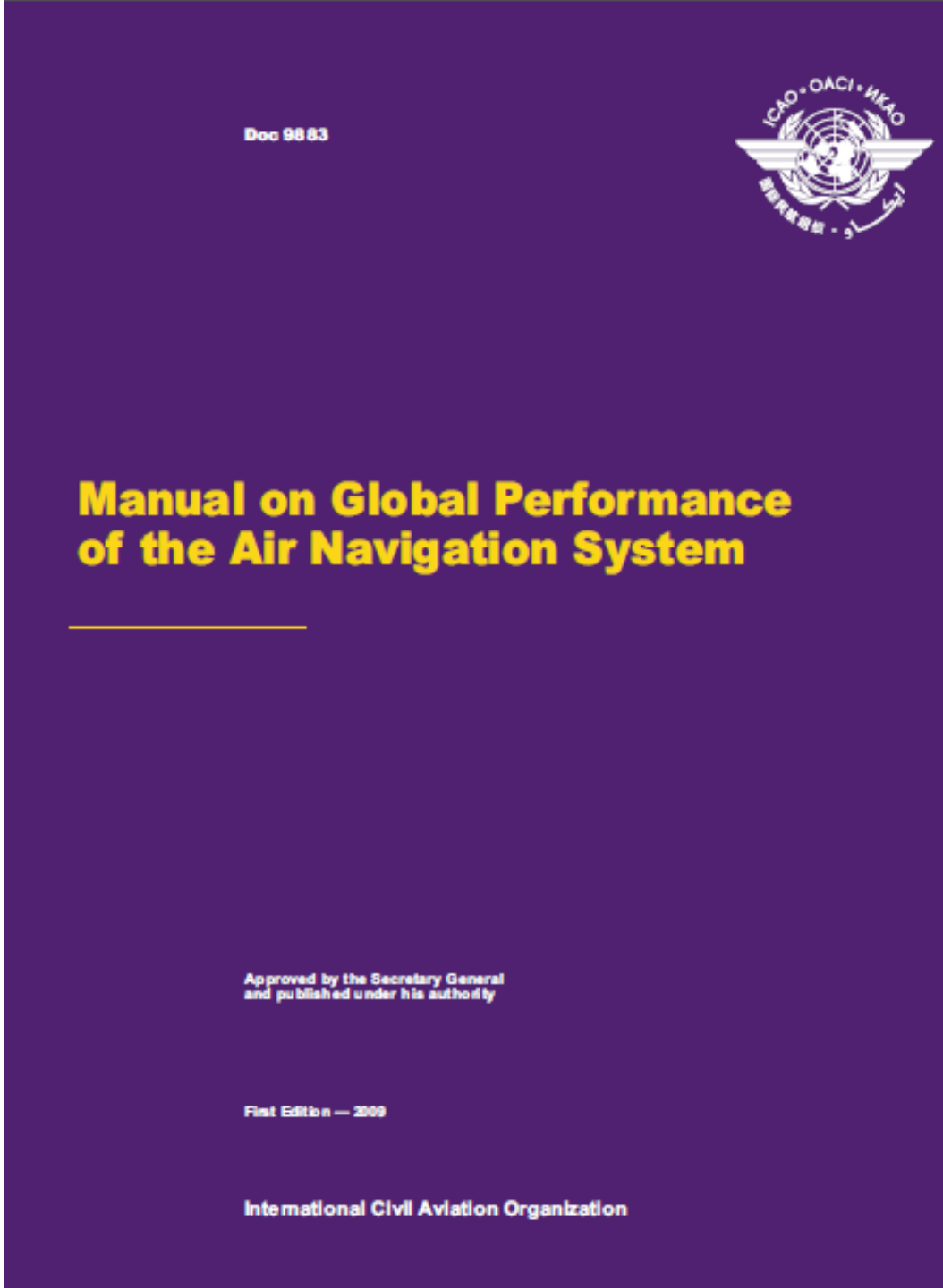
Processes and procedures will be developed to shift and enable the **operator to manage the flight trajectory**, while **ANSPs focus on managing constraints and air navigation resources**. With the move towards the **Internet** of things, **information will no longer be the limitation**, and the focus will shift to **who can make the best decisions** resulting in improvements to the total system performance.

PBA

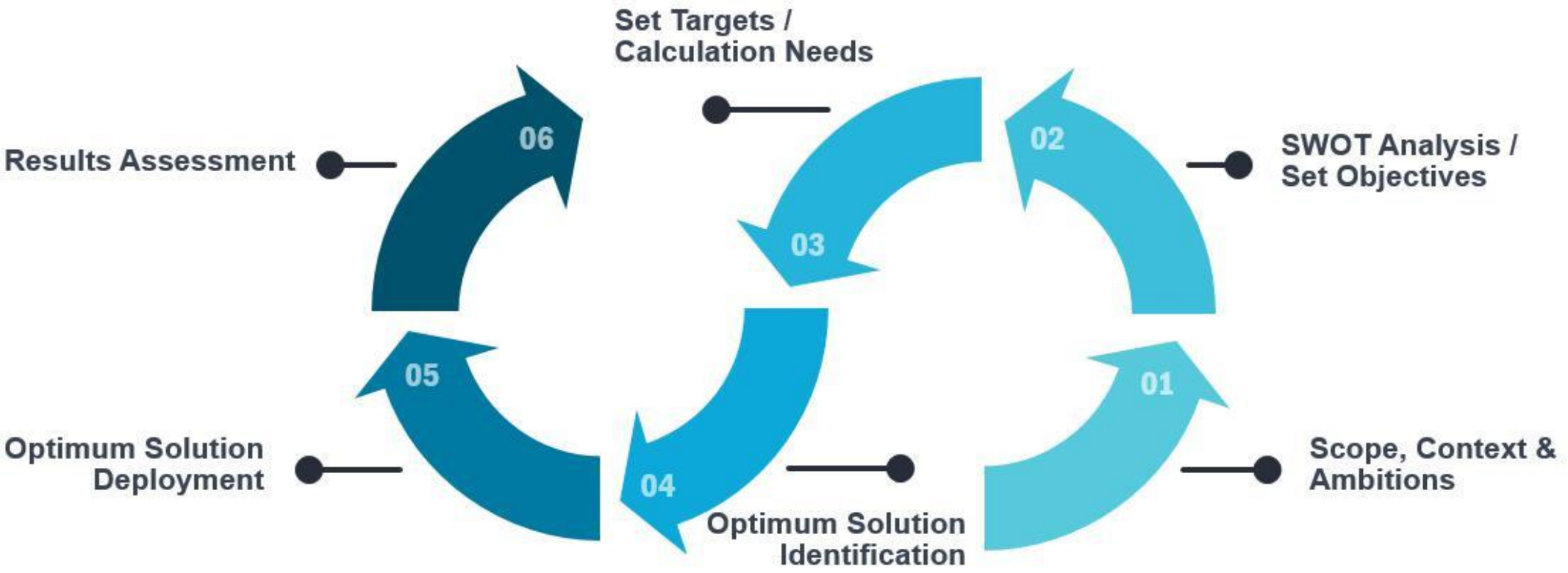
PERFORMANCE MANAGEMENT PROCESS

Principles:

- Strong focus on desired/required results
- Reliance on facts and data for decision making
- Collaborative justified decision-making



Six steps Method



Step 1 (DEFINE/REVIEW SCOPE, CONTEXT AND GENERAL AMBITIONS/EXPECTATIONS)

Purpose: to reach a common agreement on the **scope** & (**assumed**) **context** of the "system" on which the performance management process will be applied, as well as a common view on the general nature of the **expected performance improvements**.

Step 1.1: Define scope

Scope could be:

Aerodrome, **FIR**, **TMA**, **CTA**, etc., but the scope definition could include additional details such as type of (international, overflight, IFR, VFR)

Step 1.2: Define context

- make clear assumptions on what is "**surrounding**" performance management activity.

- with **whom** there is a need to **coordinate** & **collaborate**, and what the external **drivers** and **constraints** are for the scope.

Example: **airspace restructuring** is subject to coordinate with **military authority.**

Step 1.3: Identify ambitions & expectations

- "**expectation**" refers to desired results from **external** perspective.

- "**ambition**" the desired results refer to an **internal** initiative.

Example: General **expectation** of the **ATM** regarding to **capacity** is that the air navigation system will meet **airspace user demand** at **peak** times.

GANP Performance Ambitions

KPA	Ambition
Access and equity	No aviation community member excluded or treated unfairly.
Capacity	Nominal capacity easily scalable with demand
	Destructive events do not interrupt service provision and do not significantly affect the performance of the service.
Cost-effectiveness	No increase of total direct ANS cost while maintaining the safety and quality of service.
	Significant increase of ANS productivity, irrespective of demand.
Efficiency	Reduction of the gap between the flight efficiency achieved and the desired optimum trajectory of airspace users.
Environment	ANS-induced inefficiencies to be progressively removed to contribute to the global ICAO aspirational goals for CO2 emissions.
	To benefit from achieved flight efficiency gains.
Flexibility	To absorb required changes to individual business and operational trajectories.
Interoperability	Essential at an operational and technical level.
Participation by the ATM community	Pre-agreed level of participation to make the maximum shared use of the air navigation resources.
Predictability	No increase in ANS delivery variability including asset availability.
Safety	Achieve continual safety performance improvement in aviation in each ICAO region.
Security	Zero significant disruptions due cyber incident.

PERFORMANCE AMBITIONS - Global Air Navigation Plan Strategy (EN) (icao.int)

Step 2 (IDENTIFY OPPORTUNITIES, ISSUES AND SET (NEW) OBJECTIVES)

Purpose: to develop a detailed understanding of the performance behaviour of the system (**list of opportunities and issues**), & to **decide** which specific performance aspects are essential for meeting the general **expectations**.

Step 2.1: Develop a list of present & future opportunities & issues that require performance management attention

- This process Known as **SWOT** & should be conducted at **local/national level**.
- **Strengths** & **Weaknesses** refer to **internal** attributes.
- **Opportunities** & **Threats** refer to **external** conditions.
- SWOT identify **action** (**target** & **exploit** or **remove** factors).

Example: result of SWOT on ANS could be:
S: there is no staff shortage
W: lack of RADAR coverage at Northeast
O: ADS-B technology
T: change direction of overflight

Step 2.2: Focus efforts by defining & prioritizing performance objectives as needed

- GEN **expectations** into specific performance **objectives** (each **KPA**, identify **focus areas**).
- **Prioritization** based on **risk management** (identify most urgent based on historical data).

Example: the scope was defined as covering **en-route ATM capacity** for IFR flights
KPA is capacity: en-route ATM capacity for IFR
*Specific improvement **objective***: **increase** south **sector throughput** to handle traffic during peak periods.

Step 3 (QUANTIFY OBJECTIVES)

Purpose: objectives should be specific, measurable, achievable, relevant and time-bound (**SMART**). The purpose of Step 3 in the process is to ensure that these aspects are properly addressed.

Step 3.1: Define how progress in achieving performance objectives will be measured & which data are required

- As part of PBA needs to define **indicators**, **metrics** & definitions for **data aggregation** & **event classification**.
- **Indicators** are often measured by **calculation** of **supporting metrics** based on **formulas**.
- Performance **measurement** is done through **collection** of **data** for supporting **metrics**.

Example: Scope is **covering en-route ATM capacity** for IFR, ANSP chosen below **indicators** for agreed objective:
- throughput **demand** as No of IFR/hour
- throughput **capacity** as No of IFR/hour
- number of **sectors**.

Step 3.2: Define the desired speed of progress in terms of baseline and target performance

- Performance **targets** are **closely associated** with performance **indicators**. it represent the **values** of performance **indicators** that need to be **reached** or fully **achieved**.
- Once scope of target agreed, it becomes clear **where** & at **which level** performance management will need to be **applied**, **which stakeholders** needs to be **coordinated**, & **who** will need to be **involved**.

Example: performance is **2 sectors**, capacity **20** flight each, demand is **15** flight in each sector, traffic growth in next 15 years is **300**%.

Target: **baseline demand** multiplied by **growth** factor (**15*****3**=**45**)

Capacity Gap: 45-20=**25**

KPI (KPAs)	Title / Definition	Measurement Units	Variants
KPI01 (predictability)	Departure punctuality Percentage of flights departing from the gate on-time (compared to schedule).	% of flights	Variant to be selected from those available in the GANP
KPI02 (Efficiency Environmental Impact)	Taxi-out additional time Actual taxi-out time compared to an unimpeded/reference taxi-out time.	Excess taxi-out time in Minutes/flight	Variant to be selected from those available in the GANP
KPI06 (Capacity)	En-route airspace capacity The maximum volume of traffic an airspace volume will safely accept under normal conditions in a given time period.	Movements/hr	Variant to be selected from those available in the GANP
KPI09 (Capacity)	Airport peak capacity The highest number of operations an airport can accept in a one-hour time frame (also called declared capacity). Can be computed for arrivals, departures or arrivals + departures.	Number of arrivals / hour	Variant to be selected from those available in the GANP
KPI13 (Efficiency Environmental Impact)	Taxi-in additional time Actual taxi-in time compared to an unimpeded/reference taxi-in time	Excess taxi-in time in Minutes / flight	Variant to be selected from those available in the GANP
KPI14 (predictability)	Arrival punctuality Percentage of flights arriving at the gate on-time (compared to schedule)	% of flights	Variant to be selected from those available in the GANP
KPI20 (Safety)	Number of Aircraft Accidents Accident' is defined in ICAO Annex 13, Chapter 1-Definitions; ADREP: Accident Data Report	Number of accidents / year	Variant 1 (GASP): Aircraft MTOW > 2 250 kg 1.1 National accident occurrence level
KPI21 (Safety)	Number of RWY Incursions Number of occurrences at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and take-off of aircraft. (CICTT Taxonomy definition)	Number of runway incursions / year	None
KPI22 (Safety)	Number of RWY Excursions Number of veer offs or overruns of the runway surface.	Number of runway excursions / year	None
KPI23 (Safety)	Number of Airprox/TCAS Alert/Loss of separation/Near mid Air Collisions/Mid Air Collisions Number of airproxes, TCAS alerts, loss of separation as well as near collisions or collisions between aircraft in flight.	Number of airprox/TCAS alert/loss of separation/near midair collisions/midair collisions (MAC) / year	Variants to be selected from those available in the GANP

Step 4 (SELECT SOLUTIONS TO EXPLOIT OPPORTUNITIES AND RESOLVE ISSUES)

Purpose: to apply the principle of "**decision-making**, driven by the **desired/required results**".

Step 4.1: Select the decisive factors to reach the target performance

- to **what** extent, **when** & **which conditions** required to improve.
- **dominant factors first** need to be **undertaken**.

Example: after analysis of the data, it is decided that:

- **no capacity increases** are required for the next **5** years.
- **procedural** control is **dominant bocking factor**;
- other factors like ATCO **workload frequency** shortage and **staff** shortage may become issue

Step 4.2: Identify solutions to exploit opportunities & mitigate the effects of the selected drivers & blocking factors

- This part is about establishing the **list** of **options** & **solutions**
- consider **solutions** which are **readily available**
- decision-makers need to understand the **strategic fit**, **benefits**, **cost** & **feasibility** of each option

Example: moving from **procedural** to **radar** or to **ADS-B** would be options

Step 4.3: Select a sufficient set of solutions

Depending on the **nature** of the project, the output of this process step is either a **single** preferred **solution**, or a **road map** of selected **solutions**

Example: may be the solution is development of the roadmap to **procure** and **install ADS-B** and **recruitment** new **ATCOs**.

Step 5 (IMPLEMENT SOLUTIONS)

Purpose: the **execution** phase of the performance management process.

Once the optimum **solution**/s has/have been **identified**, it is the moment to start the execution phase of the performance management process. The changes and improvements that have been identified as the optimum solution for the problem during the previous steps are organized into plans, implemented and begin delivering services to achieve the expected performance.

During this execution phase, it is important to **keep track of the project deployments** (time, budget, etc.).

Example: based on the solutions, two following projects should be considered

- installation of ADS-B project; and

- recruitment of qualified Air Traffic Controller project.

Step 6 (ASSESS ACHIEVEMENT OF OBJECTIVES)

Purpose: to **continuously keep track of performance** and **monitor** whether performance **gaps** are being closed as planned and expected.

This step includes monitoring progress of the implementation projects, particularly in those cases where the implementation of solutions takes several years (as in our example), as well as checking periodically whether all assumptions are still valid and the planned performance of the solutions is still meeting the (perhaps changed) requirements.

Step 6 (ASSESS ACHIEVEMENT OF OBJECTIVES)

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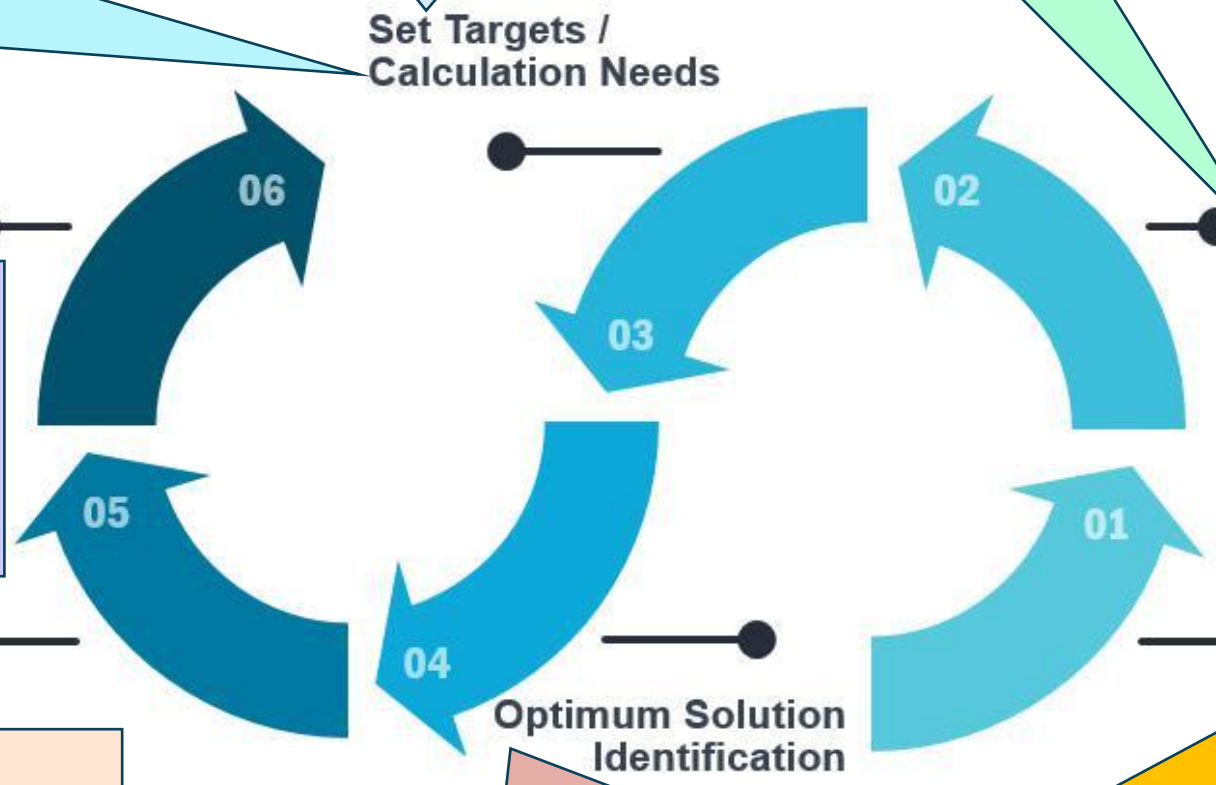
Current capacity **20**
Demand :**15** flight
Growth (15 years): **300**%.
Target: baseline demand * growth factor (**15***3=**45**)
Capacity Gap: 45-20=**25**

- throughput **demand** (No of IFR/H)
- throughput **capacity** (No of IFR/H)
- number of **sectors**.

Capacity (KPA)

S: no staff shortage
W: lack of RADAR coverage NE
O: ADS-B technology
T: change direction of OVF



- continuously **keep track** of performance
- **monitor** performance (**gaps are being closed** as planned

- **Aerodrome**
- **Enroute**
- **TMA**

- installation of **ADS-B** project;
- recruit **qualified** surveillance **ATCO**

- procure and install **ADS-B**
- recruitment new **ATCOs**

Increase airspace **capacity**

Military authority

Scope/ Applicability	KPA & Focus Area	Performance Objective	KPI/ Variant	KPI Baseline	KPI Target	Operational Improvements (ASBU Elements/Enablers & Non ASBU)	Target Date
1	2	3	4	5	6	7	8
Aerodrome	Predictability (Punctuality)	Maximize departure punctuality	**KPI 01** (Departure punctuality) **Variant X**	TBD for each Airport	TBD for each Airport	TBD by each State/Airport	TBD for each Airport
Aerodrome	Efficiency (Flight time/ distance)	Minimize Taxi-out time	**KPI 02** (Taxi-out additional time) **Variant X**	TBD for each Airport	TBD for each Airport	TBD by each State/Airport	TBD for each Airport
Aerodrome	Capacity (Capacity, throughput & utilization)	Increase airport peak arrival capacity	**KPI 09** (Airport peak capacity) **Variant X**	TBD for each Airport	TBD for each Airport	TBD by each State/Airport	TBD for each Airport
Aerodrome	Efficiency (Flight time/ distance)	Minimize Taxi-in time	**KPI 13** (Taxi-in additional time) **Variant X**	TBD for each Airport	TBD for each Airport	TBD by each State/Airport	TBD for each Airport

RANP

Other ICAO Regions

APAC Region

2. REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – B0-05/CDO:
Improved Flexibility and Efficiency in Descent Profiles

Performance Improvement Area 4:
Efficient Flight Path – Through Trajectory-based Operations

3. ASBU B0-05/CDO: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety
Applicable	N	N	Y	Y	Y

4. ASBU B0-05/CDO: Planning Targets and Implementation Progress

5. Elements	6. Targets and implementation progress (Ground and Air)
1. CDO	
2. PBN STARs	

7. ASBU B0-05/CDO: Implementation Challenges

Elements	Implementation Area			
	Ground system Implementation	Avionics Implementation	Procedures Availability	Operational Approvals
1. CDO				
2. PBN STARs				

8. Performance Monitoring and Measurement
8A. ASBU B0-05/CDO: Implementation Monitoring

Elements	Performance Indicators/Supporting Metrics
1. CDO	Indicator: Percentage of international aerodromes/TMAs with CDO implemented Supporting metric: Number of international aerodromes/TMAs with CDO implemented
2. PBN STARs	Indicator: Percentage of international aerodromes/TMAs with PBN STARs implemented Supporting metric: Number of international aerodromes/TMAs with PBN STARs implemented

8. Performance Monitoring and Measurement
8 B. ASBU B0-05/CDO: Performance Monitoring

Key Performance Areas (Out of eleven KPAs, for the present until experienced gained, only five have been selected for reporting through ANRF)	Where applicable, indicate qualitative Benefits,
Access & Equity	Not applicable
Capacity	Not applicable
Efficiency	Cost savings through reduced fuel burn. Reduction in the number of required radio transmissions.
Environment	Reduced emissions as a result of reduced fuel burn
Safety	More consistent flight paths and stabilized approach paths. Reduction in the incidence of controlled flight into terrain (CFIT).

9. Identification of performance metrics: It is not necessary that every module contributes to all of the five KPAs. Consequently, a limited number of metrics per type of KPA, serving as an example to measure the module(s)' implementation benefits, without trying to apportion these benefits between module, have been identified on page 5. For the family of ASBU modules selected for air navigation implementation, States/Region to choose the applicable performance (benefit) metrics from the list available on page 5. This approach would facilitate States in collecting data for the chosen performance metrics. States/Region, however, could add new metrics for different KPAs based on maturity of the system and ability to collect relevant data.

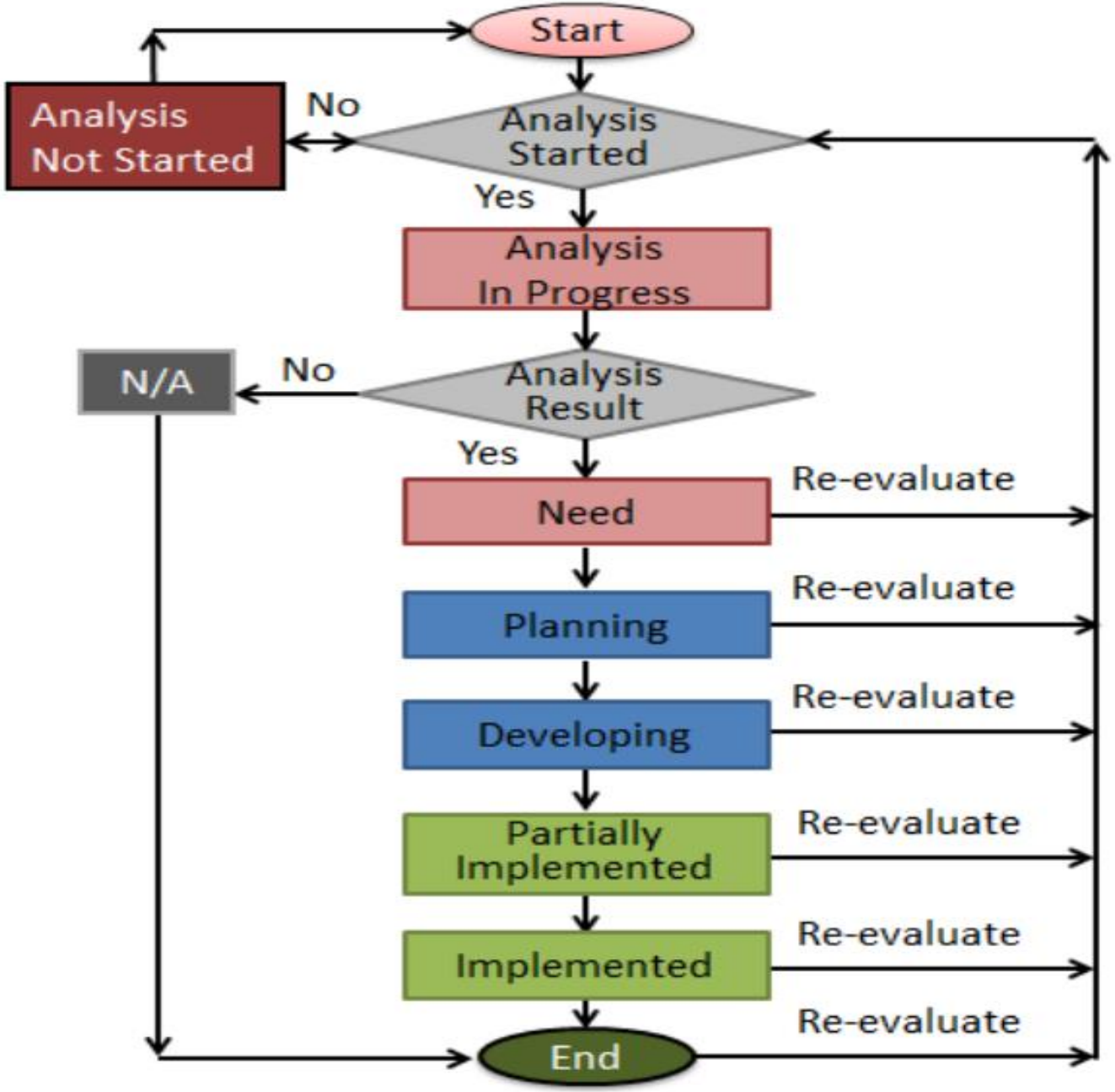
APAC Region

Appendix B - Main Planning Table Template

	Objectives					Priorities and targets			Reference
Block	ASBU modules and elements Enablers	Performance Improvement Area	Applicable or not in [Region] (Yes/No)	Regional planning elements	Enablers	Priority allocated in [Region]	Target(s) in [Region]	Indicator(s) / Metric(s)	Supporting Planning Document (ANRF, other)

SAMPLE

EUR/NAT Region - 2022



SAM Region - 2023

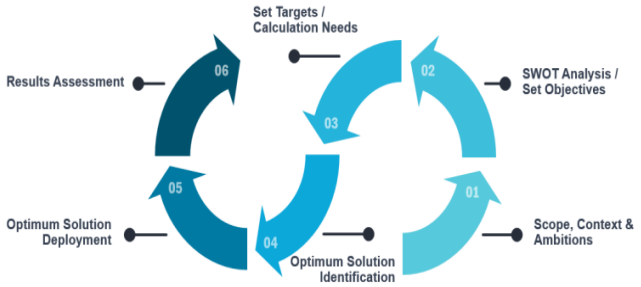


Figure 1 Six-step performance management process

- Table GEN I-1 — List of Flight Information Regions (FIR)/Upper Information Regions (UIR) in the Region
- Table ATM I-1 — Flight Information Regions (FIR)/Upper Flight Information Regions (UIR) of the Region
- Table SAR I-1 — Search and Rescue Regions (SRR) of the Region
- Table AOP I-1 — International aerodromes required in the Region
- Table PMP III CAR/SAM - 1 – List of CTA/TMA in the Region

CAR/SAM ANP, VOLUME III

PART II – PERFORMANCE MANAGEMENT PLANNING AND ANS IMPLEMENTATION (PMP)

1. STEP 1: DEFINE SCOPE, CONTEXT AND SET AMBITIONS

STEP 2: KNOW YOUR SYSTEM – SWOT ANALYSIS AND REGIONAL OBJECTIVES

STEP 3: QUANTIFY OBJECTIVES, SET TARGETS AND CALCULATE NEEDS

STEP 4: SELECT SOLUTIONS

STEP 5: IMPLEMENT SOLUTIONS

STEP 6: ASSESS ACHIEVEMENTS

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The SWOTs in the CAR/SAM Regions can be found in Table **PMP III-1**

11 Key Performance Areas	STRENGHTS	WEAKNESS	OPPORTUNITIES	THREADS
Capacity	○ Robust regional infrastructure, implementation experience and harmonized services ○	○ Gaps in plan implementation (ANS, CNS, Technology, Training, budgets) ○ Limited human talent management policies (hiring, training and retention of sufficient and competent human resources) ○	○ Greater collaboration in Technology, ICAO Technical Cooperation, innovation-research-development (I+R+D), multilateral financing, training/joint virtual meetings. ○ Trend towards the automation of processes and services with a focus on innovation, sustainability and harmonization ○ The low transitory demand allows improving activities, focusing on innovation and better preparation to generate resilience (administration, procedures, ATM, etc.). ○ Timely availability of ICAO technical documentation in the official languages. New GANP - ASBU four layers and indicators. ○ Put civil aviation as a development engine on the State and Regional agenda.	○ Negative impact on aviation due to political, environmental or economic changes (fuel, etc.) ○ New disruptions that may negatively affect aviation (natural disasters, climate change, outbreaks, war/conflict, cyber attacks, economic downturn)

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Objectives within **Table PMP III-2** to be pursued by the States within the Region

(1) KPA s	(2) Focus Areas	(3) Performance Objectives	(4) Remarks
Efficiency	Flight time & distance	Apply en-route speed reduction if traffic is already airborne	
Efficiency	Flight time & distance	Avoid taxi-out additional time resulting from adverse conditions	
Efficiency	Flight time & distance	Avoid taxi-in additional time resulting from adverse conditions	
Efficiency	Flight time & distance	Overcome route selection inefficiencies associated with route network design	
Efficiency	Flight time & distance	Facilitate direct routing of portions of the flight (if this does not cause network problems)	
Capacity	Capacity, throughput & utilization	Improve what's needed to reduce longitudinal separation minima	***PBN implementation in progress. PBCS when required***

The ICAO KPIs associated to the performance objectives in the CAR/SAM Regions are in **Table PMP III- 3**

(1) KPA & Focus area	(2) Performance objectives	(3) KPI s	(4) Remarks
Efficiency Flight time & distance	Apply en-route speed reduction if traffic is already airborne	KPI08	
Efficiency Flight time & distance	Avoid taxi-out additional time resulting from adverse conditions	KPI02	
Efficiency Flight time & distance	Avoid taxi-in additional time resulting from adverse conditions	KPI13	
Efficiency Flight time & distance	Overcome route selection inefficiencies associated with route network design	KPI04	
Efficiency Flight time & distance	Facilitate direct routing of portions of the flight (if this does not cause network problems)	KPI05	
Capacity Capacity, throughput & utilization	Improve what's needed to reduce longitudinal separation minima	KPI06	
Capacity Capacity, throughput & utilization	Overcome capacity limitations attributable to route network design	KPI06	

The targets and needs in **Table PMP III-5** have been agreed for the CAR/SAM Regions

(1) STATE	(2) FIR/CTA/TMA /AIRPORT	(3) KPIs											(4) Remarks
		KPI01 (Var 2A)	KPI02	KPI04	KPI05	KPI06	KPI08	KPI09	KPI10	KPI13	KPI14	KPI15 (Var 1)	
BRAZIL	SBGR	83,8%	3,7					34	26	1,8	54,6%	5,9	**BASELINE 2021 (average all flights > DEP+ARR in SBGR)**
	SBBR	90,5%	3,1					48	26	1,6	65,0%	5,5	**BASELINE 2021 (average all flights > DEP+ARR in SBBR)**
	SBGL	80,0%	3,0					30	6	1,5	64,1%	5,9	**BASELINE 2021**
	TMA SAO PAULO			++	++	--	3,9						**BASELINE 2021 (SBGR, SBKP, SBSP)**
	TMA BRASILIA			++	++	--	3,6						**BASELINE 2021 (SBBR)**

Once the optimum solution(s) has(ve) been identified, States should report them to ICAO and they are reflected in **Table PMP III-6**

(1) STATE	(2) FIR/CTA /TMA/AIRPORT	(3) ASBU Elements / Operational Improvements	(4) Dependencies and relations	(5) Start Year	(6) End Year	(7) Remarks
BRAZIL	SBGR SBBR SBGL	SURF-B0/1	----			KPI02, KPI13
	SBGR SBBR SBGL	APTA-B0/1	AMET-B0/1 AMET-B0/2 NAVS-B0/3			KPI10
	SBGR SBBR SBGL	APTA-B0/2	AMET-B0/1 AMET-B0/2			KPI10
	SBGR SBBR SBGL	*TBD*	*TBD*			KPI09
	SBGR SBBR SBGL	*TBD*	*TBD*			KPI01
	SBGR SBBR SBGL	*TBD*	*TBD*			KPI14
	SBGR SBBR SBGL	*TBD*	*TBD*			KPI15
	TMAs SAO PAULO, BRASILIA, RIO DE JANEIRO	RSEQ-B0/1	AMET-B0/1 AMET-B0/2 ACDM-B0/1 ACDM-B0/2			KPI08
	TMAs SAO PAULO, BRASILIA, RIO DE JANEIRO	FRTO-B1/2	APTA-B0/1 APTA-B1/1 SNET-B0/1			KPI06
	TMA SAO PAULO	RSEQ-B0/3	AMET-B0/1			KPI10
	FIR ATLANTICO	CSEP-B1/3	COMI-B0/3 COMI-B0/4 COMS-B0/1 COMS-B0/2 NAVS-B0/3			KPI06

Once the optimum solution(s) has(ve) been identified, States should report them to ICAO and they are reflected in **Table PMP III-6**

(1) STATE	(2) FIR/CTA /TMA/AIRPORT	(3) ASBU Elements / Operational Improvements	(4) Dependencies and relations	(5) Start Year	(6) End Year	(7) Remarks
BRAZIL	SBGR SBBR SBGL	SURF-B0/1	----			KPI02, KPI13
	SBGR SBBR SBGL	APTA-B0/1	AMET-B0/1 AMET-B0/2 NAVS-B0/3			KPI10
	SBGR SBBR SBGL	APTA-B0/2	AMET-B0/1 AMET-B0/2			KPI10
	SBGR SBBR SBGL	*TBD*	*TBD*			KPI09
	SBGR SBBR SBGL	*TBD*	*TBD*			KPI01
	SBGR SBBR SBGL	*TBD*	*TBD*			KPI14
	SBGR SBBR SBGL	*TBD*	*TBD*			KPI15
	TMAs SAO PAULO, BRASILIA, RIO DE JANEIRO	RSEQ-B0/1	AMET-B0/1 AMET-B0/2 ACDM-B0/1 ACDM-B0/2			KPI08
	TMAs SAO PAULO, BRASILIA, RIO DE JANEIRO	FRTO-B1/2	APTA-B0/1 APTA-B1/1 SNET-B0/1			KPI06
	TMA SAO PAULO	RSEQ-B0/3	AMET-B0/1			KPI10
	FIR ATLANTICO	CSEP-B1/3	COMI-B0/3 COMI-B0/4 COMS-B0/1 COMS-B0/2 NAVS-B0/3			KPI06

States are expected to report on the status on the implementation by updating **Table PMP III-7**

STATE	FIR/CTA /TMA /AIRPORT	ASBU Elements / Operational Improvements	Start Year	End Year	Implementation progress	Remarks

States should report on the benefits accrued from the implementation of the solutions in **Table PMP III-8**

STATE	FIR/CTA /TMA/AIRPORT	ASBU Elements/operational improvements	KPI s						Remarks

AFI Region

Table AOP III-1: ASBU applicable elements in AOP area

ASBU Modules	ASBU Elements	Purpose of elements	Maturity Level	Applicable (Yes or No)	Rationale for applicability	Enablers	Stakeholders
ACDM-B0	ACDM-B0/1 Airport CDM Information Sharing	To generate common situational awareness by sharing relevant surface operations data among the local stakeholders involved in aerodrome operations.	Ready for Implementation	Yes	The element forms the first step for Airport Stakeholder collaboration in Aerodrome Operations. It generates situational awareness for effective decision making and does not need automation.	Surface operation milestones procedures	• Airport operator • ANSP • Aircraft operator • Ground handling agent
						ACIS system	• Airport operator • ANSP • Aircraft operator • Ground handling agent
						Training requirements for ACIS	• Airport operator • ANSP • ATM network function • Aircraft operator • Ground handling agent
						ACIS Phraseology	• ANSP • Aircraft operator
	ACDM-B0/2 integration with ATM Network function	Airport CDM operations will be enriched by enhanced arrival information from the ATM network and, at the same time, network operations will benefit from more accurate departure information from CDM airports	Ready for Implementation	Yes		Procedures for turnaround integration	• Airport operator • ANSP • ATM network function • Aircraft operator
						Phraseology for turnaround integration	• Airport operator • ANSP
						A-CDM system/platform- ATFM system interconnectivity	• Airport operator • ANSP • ATM network function • Aircraft operator
						Training requirements for the integration of the turnaround	• Airport operator • ANSP • ATM network function • Aircraft operator • Ground handling agent

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Table AOP III-2: Collection of ASBU implementation data in AOP

ASBU Module	ASBU Element	Required Services/ Facilities	Implementation Status	Date planned	Date completed	Evidence of implementation Status	Comments
ACDM-B0	ACDM-B0/1 Airport CDM Information Sharing	ACIS Platform					
		A-CDM Procedures					
		Apron Management					
	ACDM-B0/2 Integration with ATM Network function	ATM-Aerodrome Coordination					
		Aerodrome Capacity Information					
		FUM- Flight Status Update Messages					

AFI Region

	ACDM-B0/1 Airport CDM Information Sharing			ACDM-B0/2 Integration with ATM Network function			
ESAF States	**ACIS System/Platform**	**ACDM Procedures**	**Apron Management**	**ATM-Aerodrome Coordination**	**Aerodrome Capacity**	**FUM-Flight Update Messages**	**Remarks**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Angola							
Botswana							
Burundi							
Comoros							
Djibouti							
Eritrea							
Eswatini							
Ethiopia							
Kenya							
Lesotho							
Madagascar							
Malawi							
Mauritius							
Mozambique							
Namibia							
Rwanda							
Seychelles							
Somalia							
South Africa							
South Sudan							
Uganda							
United Republic of Tanzania							
Zambia							
Zimbabwe							

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Thank You!

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