



**Agenda Item 2: Global and regional context**

**RLA/06/901 2026-2028 STRATEGIC APPROACH TOWARDS THE IMPLEMENTATION OF AIR NAVIGATION IMPROVEMENTS**

(Presented by the Secretariat)

**SUMMARY**

This paper analyses the strategic approach of Project RLA/06/901 “*Assistance for the implementation of a regional ATM system considering the ATM operational concept and the corresponding Communications, Navigation and Surveillance (CNS) technology support*”, comprising 11 States of the South American Region, for the planning and implementation of air navigation improvements in the SAM Region. The information provided does not include details of ongoing implementation for each thread and enhancement element, which is analysed under other SAM/IG and SAM/AIM and MET working papers.

It aligns to the Global Air Navigation Plan (GANP) concepts, and the CAR/SAM Regional Air Navigation Plan (RANP).

In addition, this paper is to be taken under consideration by the RLA/06/901 RCC/20 Coordination Meeting. The proposed approach should guide the activities of the RLA/06/901 project for the 2026 - 2028 triennium.

**References:**

- ICAO Business Plan, 2026-2028;
- SAM 2035 regional strategy; and
- RLA/06/901/N project document (PRODOC).

**1. Background**

1.1 This document analyses the strategic approach of the RLA/06/901 Project “*Assistance for the implementation of a regional ATM system considering the ATM operational concept and the corresponding Communications, Navigation and Surveillance (CNS) technology support*”, composed by 11 States of the South American Region, for the planning and implementation of air navigation improvements in the Region for the 2026 - 2028 triennium, in alignment with the concepts of the Global Air Navigation Plan (GANP<sup>1</sup>), and the CAR/SAM Regional Air Navigation Plan (RANP).

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1 GANP Portal link : <https://www4.icao.int/ganportal/>

1.2 The working body of the RLA/06/901 is the SAM/IG Regional Implementation Group for ATM/CNS issues, which receives the contribution of experts from the Airspace Study and Implementation Group (GESEA) and the CNS Interoperability Working Group (WG-Interop), established in 2019.

1.3 The SAM/IG, in turn, represents and involves the SAM States in the development of the projects of the CAR/SAM Regions Planning and Implementation Group (GREPECAS), within the framework of its conclusions and decisions. It thus contributes to the development of the CAR/SAM Regional Air Navigation Plan.

1.4 In addition, the Project assists the regional aeronautical meteorological service (MET), the aeronautical information management (AIM) and the aerodrome (AGA) implementation and planning groups, focusing on capacity optimisation, on surface operations efficiency and on strengthening infrastructure resilience, in line with the Region's strategic goals.

## 2. Analysis

### *Strategic goals for the improvement of air navigation in the South American Region*

2.1 Capacity (CAP): To ensure that the nominal airspace capacity of terminal control areas (TMAs) and approach procedures at international airports is tailored to demand.

2.2 Strategic Efficiency (EFFI): To reduce the gap between the efficiency of flight performance and the optimum trajectory desired by airspace users.

2.3 Safety (SFTY): To ensure safety by recording zero accidents related to the air navigation service.

2.4 Environment (ENVM) and Predictability (PRED) will be developed from 2026 in alignment with the GANP, 8th edition.

2.5 Resilience (RESI), defined within the context of Capacity (CAP), will be developed from 2026 in line with the GANP, 8th edition. The aerodrome area threads, described in Section 3.6, will initially address resilience improvements.

### *Implementation of the ASBU framework and NON-ASBU solutions*

2.6 In the SAM Region, the strategic goals for the above-described improvements support the activities of the ASBU (Aviation System Block Upgrade) framework implementation, as well as the Operational threads stipulated in the GANP. To improve reference and understanding of the threads and their elements, a link to the GANP portal has been included for each description.

2.7 Where required, NON-ASBU solutions are implemented in order to close gaps, or to achieve specific air navigation improvements in the Region.

2.8 For each operational thread or solution, the necessary Information Environment and CNS Platform technologies are described<sup>2</sup>.

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<sup>2</sup> Strictly speaking, the GANP also defines the Information Environment and the CNS Technology platform as "threads".

2.9 In some cases, the Information Environment and Technology components may be developed as part of the Basic Building Blocks (BBB), referring to ICAO Annexes SARPs and to requirements of RANP, Volumes I and II.

2.10 The SAM/IG and its contributory bodies have identified and developed “*complementary initiatives*” (hereafter referred to as “complement”) according to the specific needs of the Region, which are considered components of the BBB (see Section 4), and aim to support performance implementation, or to ensure its achievement.

### ***Metrics and Indicators***

2.11 The measurement and reporting of progress implementation (metrics) by States should be strengthened, in order to optimise the allocation of project resources, and to identify the specific needs of some States. These activities are carried out through the development of metrics (qualitative and quantitative data). The applicable metrics are indicated in the following paragraphs for each ASBU operational thread, or Non-ASBU solution.

2.12 The results of the implementation in terms of performance are measured with the GANP<sup>3</sup> key performance indicators (KPI). The applicable KPIs are indicated in the following paragraphs for each ASBU operational thread or Non-ASBU solution. To date, several KPI assistance and development initiatives are underway in the CAR and SAM regions, under the scope of GREPECAS, and ATFM/SG/3.

2.13 Complementarily, GANP indicators are being calculated and adopted in several SAM States, as part of the CAR/SAM Regional Air Navigation Plan (RANP), Volume III, data input, and/or to meet their aerodromes performance requirements.

## **3. Implementation of GANP ASBU operational threads and NON-ASBU solutions as well as the corresponding Information Environment and CNS Platform technologies**

Appendix A to this paper shows the scheme of interdependencies for the APTA thread (as a reference), within the framework of the strategy described above.

### **3.1 APTA threads – Improved arrival and take-off operations**

- Aligned with two strategic goals: CAP – EFFIC

#### **3.1.1 APTA<sup>4</sup> elements**

- a) [APTA-B0/1 PBN approaches \(with basic capabilities\)](#)
- b) [APTA-B0/2 PBN SID and STAR procedures \(with basic capabilities\)](#)
- c) [APTA-B0/4 CDO \(Basic\)](#)
- d) [APTA-B0/5 CCO \(Basic\)](#)

#### **3.1.2 Complement: IFPDS quality assurance**

- Quality assurance applied to Instrument Flight Procedure Design Services (IFPDS) products in accordance with ICAO Doc 8168 and ICAO Doc 9906.

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<sup>3</sup> GANP KPI link: <https://www4.icao.int/ganportal/ASBU/KPI>

<sup>4</sup> The texts and terms of the GANP (web site) are in English only.

## 3.1.3 Information environment

AMET - Aeronautical meteorological information

- a) [AMET B0/1: OBS](#)
- b) [AMET B0/2: FOREC](#)
- c) [AMET B0/3: CLIMAT](#)
- d) [AMET B0/4: DISSEMINAT](#)

DAIM - Digital aeronautical information management

- a) [DAIM B1/1: Quality Assurance](#)
- b) [DAIM B1/2: DIG AIP data sets](#)
- c) [DAIM B1/3: DIG TERRAIN data sets](#)
- d) [DAIM B1/4: DIG OBSTACLES data sets](#)
- e) [DAIM B1/5: DIG AD MAP data sets](#)
- f) [DAIM B1/6: DIG IFP data sets](#)

## 3.1.4 CNS technology platform

COMI - VHF air-ground communications infrastructure

- a) The VHF is considered a component of the basic building blocks (BBB) (see Section 4)
- b) [COMI-B2/1: Air -ground ATN/IPS](#)

NAVS – Navigation systems

- a) [NAVS-B0/4: Navigation minimal operating networks \(Nav. MON\)](#)

## 3.1.5 Metrics and indicators

- a) Percentage of international aerodromes runway thresholds implemented with PBN approach procedures.
- b) Percentage of international aerodromes runway thresholds implemented with PBN departures and/or arrivals.
- c) MET metrics:
  1. Number of States with QMS implemented and certified
  2. Number of States with implementation of OPMET message reporting greater than 90%.
  3. Number of FIRs with SIGMETs and Notices implemented
  4. Number of aerodromes with AWOS implemented and operational
  5. Number of States with climatological tables implemented and updated
  6. Number of States ready to exchange OPMET information in digital format (IWXXM)
- d) AIM metrics:
  1. Number of States with QMS/AIM implemented and updated.
  2. Numbers of States with e-AIP implemented
  3. Numbers of States with Digital Terrain Data implemented
  4. Numbers of aerodromes with Obstacle Data in digital format implemented.
  5. Numbers of States with implementation of NOTAM exchange in digital format implemented
  6. Numbers of States ready to exchange IM messages in the SWIM
- e) CNS metrics:
  1. Percentage of AMHS national and international links implemented and operational
  2. Percentage of functional bilateral AIDC links in the SAM Region
  3. Percentage of VoIP ATM links implemented (ED-137)

4. Number of ADS-B stations installed and connected to the national system

Key performance indicators (KPI)

- a) KPI10: Airport peak throughput
- b) KPI17: Level-off during climb
- c) KPI19: Level-off during descent

3.2 **FRTO threads – Improved operations through enhanced en-route trajectories**

- o Aligned with three strategic goals: CAP – EFFIC- SFTY

3.2.1 FRTO elements

- a) [FRTO-B0/1: Direct routing \(DCT\)](#)
- b) [FRTO-B0/2: Airspace planning and flexible use of airspace \(FUA\)](#)
- c) [FRTO-B0/3: Pre-validated and coordinated ATS routes to support flight and flow](#)
- d) [FRTO-B0/4: Basic conflict detection and conformance monitoring](#)
- e) [FRTO-B1/1: Free route airspace \(FRA\)](#)

3.2.2 Complement: ATM contingency plans management

- o Application of the global and regional framework for ATS Contingency Plans.

3.2.3 Information environment

AMET - Aeronautical meteorological information

- a) [AMET B0/1: OBS](#)
- b) [AMET B0/2: FOREC](#)
- c) [AMET B0/3: CLIMAT](#)
- d) [AMET B0/4: DISSEMINAT](#)

DAIM - Digital aeronautical information management

- a) [DAIM B1/1: Quality assurance](#)
- b) [DAIM B1/2: DIG AIP data sets](#)

FICE - Flight and Flow Information

- a) [FICE-B0/1: AIDC basic](#)

SWIM - System-wide information management

TBD (Block 2 elements)

3.2.4 **CNS technology platform**

COMI - VHF air-ground communications infrastructure

- a) The VHF is considered a component of the basic building blocks (BBB) (see Section 4)
- b) [COMI-B2/1: Air -ground ATN/IPS](#)

NAVS – Navigation systems

- a) ATS surveillance (MSSR or ASUR-B0/1: ADS-B) is considered a component of the basic building blocks (BBB) (see Section 4)
- b) [NAVS-B0/4: Navigation minimal operating networks \(Nav. MON\)](#)

COMI - Communications infrastructure

- a) [COMI-B0/7: AMHS - ATS Message Handling System](#)
- b) [COMI-B1/1: Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite \(ATN/IPS\)](#)

## 3.2.5 Metrics and indicators

Metrics – ASBU implementation report

- a) Percentage of FIRs/ACCs applying separation (DCT)
- b) Number of UPR routes implemented
- c) Percentage of states applying FUA procedures according to Doc 10088
- d) Percentage of ACCs with MTCDD implemented
- e) Percentage of AIDC connections planned and implemented
- f) Percentage of AMHS connections planned and implemented
- g) MET metrics:
  - 1. Number of States with QMS implemented and certified
  - 2. Number of States with implementation of OPMET message reporting greater than 90%.
  - 3. Number of FIRs with SIGMETs and Notices implemented
  - 4. Number of aerodromes with AWOS implemented and operational
  - 5. Number of States with climatological tables implemented and updated
  - 6. Number of States ready to exchange OPMET information in digital format (IWXXM)
- h) AIM metrics:
  - 1. Number of States with QMS/AIM implemented and updated
  - 2. Numbers of States with e-AIP implemented
  - 3. Numbers of States with Digital Terrain Data implemented
  - 4. Numbers of aerodromes with Obstacle Data in digital format implemented
  - 5. Numbers of States with implementation of NOTAM exchange in digital format implemented
  - 6. Numbers of States ready to exchange IM messages in the SWIM
- i) CNS metrics:
  - 1. Number of installed and operational ADS-B ground stations
  - 2. Percentage of States with ADS-B data integrated in their control centres
  - 3. Percentage of operational surveillance data links between States (including MLAT, ADS-B, radar)
  - 4. Percentage of States reporting surveillance performance based on coverage, latency and update metrics

Key performance indicators (KPI)

- a) KPI04: Filed flight plan en-route extension
- b) KPI05: Actual en-route extension
- c) KPI06: En-route airspace capacity
- d) KPI17: Level-off during climb
- e) KPI19: Level-off during descent

3.3 **Solution: Minimum longitudinal separation from aircraft in 10 NM<sup>5</sup> continental airspace**

- o Aligned with three strategic goals: CAP – EFFIC- SFTY

3.3.1 Non-ASBU solution (Based on AN-Conf/14 Recommendation 3.1/1)

- a) 10 NM minimum longitudinal separation across FIR boundaries for aircraft transfers in continental upper airspace (above FL245). Includes interfaces with CAR Region.

3.3.2 Complement: ATM contingency plans management

- o Application of the global and regional framework for ATS Contingency Plans

3.3.3 Information environment

FICE - Flight and Flow Information

SWIM - System-wide information management

- a) [FICE-B0/1: AIDC basic](#)

TBD (Block 2 elements)

3.3.4 CNS technology platform

COMI - VHF air-ground communications infrastructure

NAVS – Navigation systems

- a) The VHF is considered a component of the basic building blocks (BBB) (see Section 4)

- a) ATS surveillance (MSSR or ASUR-B0/1: ADS-B) is considered a component of the basic building blocks (BBB) (see Section 4)

- b) [COMI-B2/1: Air -ground ATN/IPS](#)

- b) [NAVS-B0/4: Navigation minimal operating networks \(Nav. MON\)](#)

COMI - air-ground communications infrastructure

- a) [COMI-B0/7: AMHS - ATS Message Handling System](#)

- b) [COMI-B1/1: Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite \(ATN/IPS\)](#)

3.3.5 Metrics and indicators  
Metrics –ASBU implementation report

<sup>5</sup> To date, SAM/IG is promoting the optimisation of 20 NM longitudinal separations in the continental airspace. The initiative to apply the 10 NM minimum separation will be reformulated by SAM/IG in line with AN-Conf/14 Recommendation and the Resolutions expected to be adopted by the ICAO 42<sup>nd</sup> Assembly in 2025.

- a) Percentage of FIR/ACCs applying 10 NM minimum longitudinal separation across FIR boundaries for aircraft transfers in continental upper airspace (above FL245)
- b) Percentage of AIDC connections planned and implemented
- c) Percentage of AMHS connections planned and implemented

Key performance indicators (KPI)

- a) KPI06: En-route airspace capacity
- b) KPI17: Level-off during ascent
- c) KPI19: Level-off during descent

### 3.4 **Solution: ATFM – Air traffic flow management<sup>6</sup>**

- o Aligned with two strategic goals: CAP – EFFIC

#### 3.4.1 Non ASBU solution (Based on ICAO Doc. 9971 and regional guidelines)

- a) Calculation of runway and ATC sector capacity. Monitoring of demand-capacity imbalances;
- b) Implementation of domestic ATFM service at airports/airspace affected by demand-capacity imbalances; and
- c) Implementation of ATFM crossborder service at regional and inter-regional level.

#### 3.4.2 Information environment

AMET - Aeronautical meteorological information

- a) [AMET B0/1: OBS](#)
- b) [AMET B0/2: FOREC](#)
- c) [AMET B0/3: CLIMAT](#)
- d) [AMET B0/4: DISSEMINAT](#)

DAIM - Digital aeronautical information management

- a) [DAIM B1/1: Quality assurance](#)
- b) [DAIM B1/2: DIG AIP data sets](#)

FICE - Flight and Flow Information

- a) [FICE-B0/1: AIDC basic](#)

SWIM - System-wide information management

TBD (Block 2 elements)

#### 3.4.3 CNS technology platform

COMI - Air-ground communications infrastructure

- a) [COMI-B0/7: AMHS - ATS Message Handling System](#)
- b) [COMI-B1/1: Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite \(ATN/IPS\)](#)

#### 3.4.4 Metrics and indicators

Metrics –ASBU implementation report

<sup>6</sup> The ATFM solution is based on a CAR/SAM development fostered by GREPECAS. The ASBU NOPS (Network operations) GANP thread is not directly applicable to the above-mentioned Regions.

- a) Percentage of FMUs implemented in ACCs, applying ATFM, Phase III.
- b) Percentage of ACCs with sector capacity calculations.
- c) Percentage of international aerodrome runways with declared capacity.
- d) Percentage of AIDC connections planned and implemented.
- e) Percentage of AMHS connections planned and implemented.
- f) MET metrics:
  - 1. Number of States with QMS implemented and certified
  - 2. Number of States with implementation of OPMET message reporting greater than 90%.
  - 3. Number of FIRs with SIGMETs and Notices implemented
  - 4. Number of aerodromes with AWOS implemented and operational
  - 5. Number of States with climatological tables implemented and updated
  - 6. Number of States ready to exchange OPMET information in digital format (IWXXM)
- g) AIM metrics:
  - 1. Number of States with QMS/AIM implemented and updated
  - 2. Numbers of States with e-AIP implemented
  - 3. Numbers of States with Digital Terrain Data implemented
  - 4. Numbers of aerodromes with Obstacle Data in digital format implemented
  - 5. Numbers of States with implementation of NOTAM exchange in digital format implemented
  - 6. Numbers of States ready to exchange IM messages in the SWIM
- h) CNS metrics:
  - 1. Percentage of States with ATN/IPS network operational or in testing phase.
  - 2. Number of States that have adopted ADS-B out as primary surveillance technology in non-radar areas.
  - 3. Percentage of States with active regional ADS-B interoperability.
  - 4. Percentage of States with ongoing projects to integrate satellite surveillance data (e.g. satellite ADS-B, WAM).

#### Key performance indicators (KPI)

*Note: For the purposes of ATFM implementation, the following KPIs are used in the SAM Region to analyse and understand the effect of ATS deficiencies or capacity gaps on the landside of an aerodrome, so that they can be mitigated by ATFM.*

- a) KPI01: Departure punctuality (SOBT vs AOBT)
- b) KPI14: Arrival punctuality (SIBT vs AIBT)
- c) KPI02: Taxi-out additional time
- d) KPI13: Taxi-in additional time
- e) KPI09: Airport peak capacity

### 3.5

#### **SURF thread – Aerodrome surface operations**

Aligned with three strategic goals: CAP – EFFIC – SFTY

### 3.5.1 SURF<sup>7</sup> elements

- a) [SURF-B0/1](#): Basic ATCO tools to manage traffic during ground operations, SMGCS (ICAO Annex 14, Volume I, Section 9.8).
- b) [SURF-B0/2](#): Comprehensive situational awareness of surface operations. Provision of surveillance information to identify and follow-up the position of aircraft and vehicles.
- c) [SURF-B0/3](#): Initial ATCO alerting service for Surface operations. The system monitors movements near the runway and generates alerts to the air traffic controller regarding possible conflicts or incursions.

### 3.5.2 Complement: Apron management (platform management service)

Implementation of apron management (Annex 14, Volume I, Section 9.5 - Apron management service) at aerodromes where it has been identified that such a service brings benefits outweighing implementation costs.

The surveillance information environment for an ATC-enhanced SMGCS also enables the implementation of the apron management service by the aerodrome operator, which brings safety benefits for aircraft ground handling operations and, also, improvements in the utilization of the implemented infrastructure, positively impacting operational efficiency and related indicators.

### 3.5.3 Information environment

No SURF B0/1, B0/2 and B0/3 blocks dependency with the information environment blocks.

### 3.5.4 CNS technology platform

ASUR – Surveillance systems

- a) [ASUR-B0/1 - Automatic Dependent Surveillance – Broadcast \(ADS-B\)](#)
- b) [ASUR-B0/2 - Multilateration cooperative surveillance systems \(MLAT\)](#)
- c) [ASUR-B0/3 - Cooperative Surveillance Radar Downlink of Aircraft Parameters \(SSR-DAPS\)](#)

### 3.5.5 Metrics and indicators

Metrics –ASBU implementation report

- a) Percentage of international aerodromes with SMGCS implemented (B0/1)
- b) Percentage of States that have assessed the need for implementation of enhanced SMGCS and apron management service at their aerodromes
- c) Percentage of implementation of enhanced SMGCS at aerodromes where the need was identified
- d) Percentage of implementation of apron management service at aerodromes where the need was identified

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<sup>7</sup> In the future implementation of the ACDM thread, cross-dependencies with the SURF thread will be established.

Key performance indicators (KPI)

- a) KPI02: Taxi-out additional time
- b) KPI13: Taxi-in additional time
- c) KPI20: Number of aircraft accidents
- d) KPI21: Number of runway incursions

**3.6 Solution: Airport planning and infrastructure resilience enhancing**

Aligned with three strategic goals: CAP – EFFI - RESI

**3.6.1 Non-ASBU solution (Based on Doc. 9184)**

Optimisation of airport infrastructure and procedures to improve capacity, efficiency and long-term resilience. This includes the development and updating of airport master plans, the implementation of procedures for low visibility procedures (LVP) and the development of adaptation plans for extreme events.

**3.6.2 Metrics and indicators**

Metrics –ASBU implementation report

- a) Percentage of international aerodromes with a Master Plan updated within the last five years
- b) Percentage of international aerodromes that have conducted a climate risk assessment
- c) Number of States with staff trained in airport infrastructure planning
- d) Percentage of States with developed/updated airport plans

Key performance indicators (KPI)

- a) KPI09: Airport peak capacity
- b) KPI10: Airport peak throughput

**4. Monitoring of basic building blocks (BBB)**

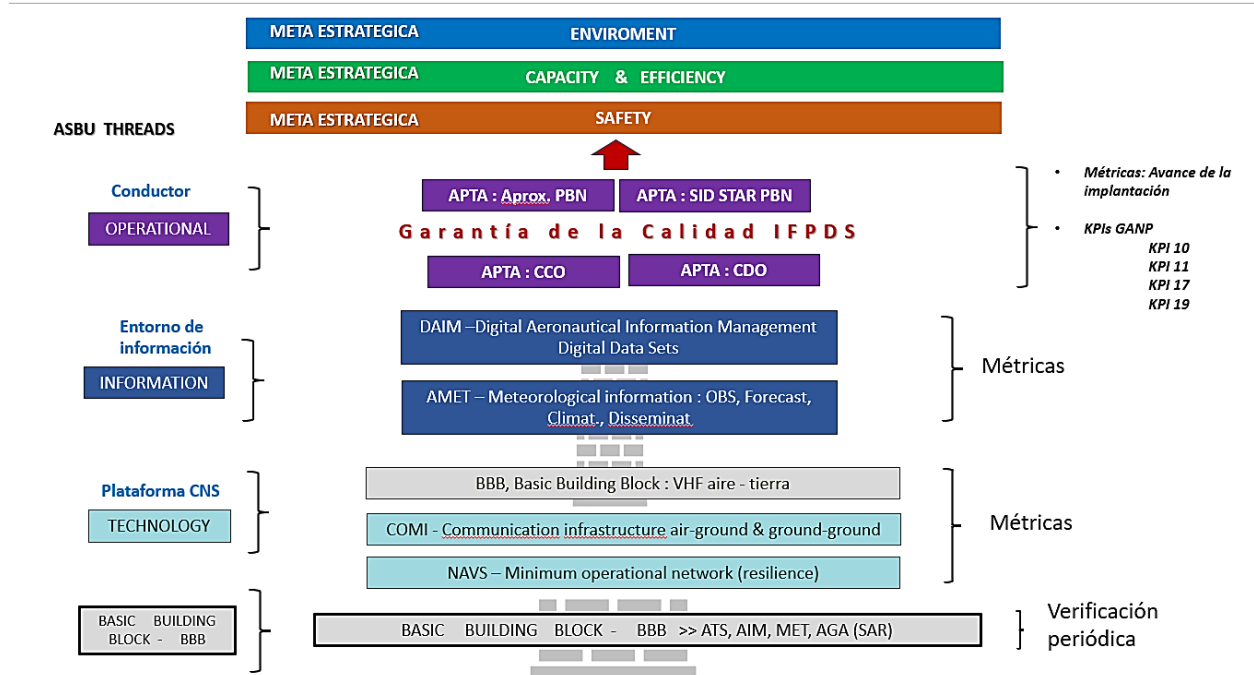
4.1 As of 2025 and in accordance with Conclusion GREPECAS/22-10, the BBBs in the GANP stipulated as a separate framework from the ASBU, are periodically verified for the ATM, AIM, MET, SAR and AGA services in the SAM Region.

**5. Action suggested**

5.1 The Meeting is invited to:

- a) Review the information provided in this working paper;
- b) If appropriate, validate the proposed strategic approach, for implementation for the 2026-2028 triennium;
- c) Provide feedback to the RLA/06/901 RCC/20 Coordination Meeting; and
- d) Any other action it may deem necessary.

APPENDIX A



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