ICAO International Civil Aviation Organization
North American, Central American and Caribbean Office

ICAO Workshop on the new version of the Global Air Navigation Plan (GANP)
Mexico City, Mexico, from 17 to 21 February 2020

Summary of Discussions

Date	From 17 to 21 February 2020
Location	NACC Regional Office
Opening Ceremony	The Workshop was attended by 44 delegates from 17 States/Territories, 1 International Organization and members from the Industry from the NAM/CAR Regions. The list of participants is shown in **Appendix A.**

1. References

1.1 Global Air Navigation Plan Sixth Edition (GANP 6th Ed.) ICAO Document 9750 https://www4.icao.int/ganpportal/

1.2 Reference framework of the Basic Building Blocks (BBB) https://www4.icao.int/ganpportal/BBB

1.3 Aviation System Block Upgrade (ASBU) Reference Framework https://www4.icao.int/ganpportal/ASBU

1.4 Electronic Air Navigation Plan (e-ANP) Volume I and II https://www.icao.int/NACC/Pages/namcar-eANPV1.aspx

1.5 Global Aviation Safety Plan (GASP) ICAO Document 1004

1.6 Global Aviation Security Plan (GASeP) ICAO Document 1004

1.7 State Letter Ref. *NACC81262* dated 13 December 2019, Invitation - ICAO Workshop on the new version of the Global Air Navigation Plan (GANP)

2. Objectives

2.1 In accordance, with the valid Resolutions of the 40th Session of the ICAO Assembly, particularly Resolution A40-1 "ICAO global planning for safety and air navigation", the objectives of the event were:

- Familiarise participants with the new version of the GANP 6th. Ed., the BBBs, the ASBU and the performance reference frameworks, as well as the correlation between the GANP and the GASP and the GASeP.
- Support the implementation of the GASP and the GANP in cooperation and coordination with all stakeholders.
- Present the GASP and the GANP as a framework for the elaboration and execution of regional, subregional and national plans, guaranteeing coherence, harmonization and coordination of efforts aimed at increasing safety, capacity and efficiency of the international civil aviation.
- Provide support to facilitate the coordinated implementation of the GASP and the GANP, avoiding duplication of efforts.

- Urge States and invite stakeholders to cooperate in the formulation and execution of regional, subregional, and national plans that are based on the framework of the GASP and GANP.
- Interact with the rapporteurs of the NAM/CAR Air Navigation Implementation Working Group (ANI/WG) to start discussions on the regional implementation strategy, to introduce improvements in the implementation mechanisms of Air Navigation Services (ANS) in the framework of the Systemic Assistance Program (SAP) of the ICAO NACC Regional Office.

3. Introduction

3.1 The Workshop on the GANP 6th Ed. had the participation of technical and operational personnel from civil aviation authorities and entities that provide air navigation services from 16 States in North America, Central America and the Caribbean, as well as the rapporteurs who lead the Task forces of the ANI/WG. The International Air Transport Association (IATA) and two members of the Industry also participated.

3.2 The Workshop provided information on the fundamentals of the GANP and the new provisions available through the web portal: https://www4.icao.int/ganpportal/. The tools for planning and implementing the GANP were mentioned, making reference to the multi-level structure, the modifications to the ASBU reference framework and the introduction of the BBB reference framework, analysing their impact on the current version of the CAR/SAM e-ANP.

3.3 The implementation of e-ANP Vol. III was discussed as a replacement for the Regional Performance-Based Air Navigation Implementation Plan (RPBANIP), and the need to tighten intraregional coordination mechanisms and strengthen collaborative work that allow continuous updating of documents.

3.4 The Workshop is the starting point of a series of activities aimed at introducing improvements in the ANS implementation mechanisms within the SAP of the ICAO NACC Regional Office.

4. Workshop Schedule and Activities

4.1 The workshop webpage is located at:

https://www.icao.int/NACC/Pages/meetings-2020-ganp.aspx

4.2 The Workshop was held from 9:00 am to 3:30 pm each day, to provide the ANI/WG rapporteurs the opportunity to hold additional sessions that took place on Tuesday, Wednesday and Thursday between 4:00 pm and 6:00 pm. On Friday, 21 February, the general session finished at 1:00 pm, and between 2:00 pm and 4:00 pm, an additional session of voluntary participation was offered.

4.3 From Monday 17 February to Wednesday 19 February, the guidance material of the Workshop was presented and question and answer sessions were conducted. On 20 and 21 February, the ANI/WG Chairperson led the sessions and developed practical exercises demonstrating the Air Navigation Systems Performance Assessment (AN-SPA) tool on the ICAO GANP website, through which participants were guided in the application of the six-step method presented by the Secretariat.

5. Topics Covered

Identification Number	Topic
5.1	Introduction to the Global Air Navigation Plan
5.2	Global Air Navigation Plan
5.3	Global Air Navigation Plan (GANP)/Reference Framework– ASBU
5.4	Basic Building Blocks (BBB) for AIM 1.0
5.5	Basic Building Blocks (BBB) for ATM/SAR
5.6	Basic Building Blocks (BBB) for AGA
5.7	Basic Building Blocks (BBB) for Meteorological Information
5.8	ASBU for Advanced Meteorological Information (AMET)
5.9	AIM within the 6th Edition of the GANP
5.10	ASBU Elements, CNS technology and other services
5.11	Impact of implementations in the Region
5.12	Air Navigation Implementation – Improvements at GREPECAS 2020
5.13	ASBU elements 5th Edition/2016 vs 6th Edition/2016 comparison
5.14	ICAO's Performance-Based Approach (PBA) for ANS
5.15	Six-step method –Performance management process
5.16	KPIs general description
5.17	Electronic Regional Air Navigation Plan (e-ANP)
5.18	GASeP and Roadmap in NAM, CAR and SAM
5.19	Global Aviation Safety Plan (GASP)

5.1 Introduction to the Global Air Navigation Plan

5.1.1 Under P/01, the Secretariat provided information on the results of the Second Global Air Navigation Industry Symposium (GANIS/2) and First Safety and Air Navigation Implementation Symposium (SANIS/1) that took place in Montréal, Canada from 11 to 15 December 2017, the Thirteenth Air Navigation Conference (AN-Conf/13) that took place in Montréal, Canada from 9 to 19 October 2018, and the 40th Session of the ICAO Assembly that took place in Montréal, Canada from 24 September to 4 October 2019; briefing the participants on the vision and overview of the Sixth Edition of the GANP, the improvements in air navigation performance through the reference frameworks of the ASBU and BBBs, air navigation roadmaps, the vision, performance ambitions and the latest developments in the ASBU and BBB frameworks.

5.1.2 The Secretariat introduced Assembly Resolutions A40-1: ICAO global planning for safety and air navigation, and A40-4: Consolidated statement of continuing ICAO policies and associated practices related specifically to air navigation, as the reference framework for the implementation of the global air navigation system and the role of Planning and implementation regional group (PIRGs), supporting the necessary transition in the regional planning process and emphasizing how aviation can best contribute to Regional and State socio-economic development.

5.2 Global Air Navigation Plan

5.2.1 Under P/02, the Secretariat presented the GANP Portal, ICAO Doc 9750 as the strategy to achieve a global interoperable air navigation system for all users during all phases of flight, which meets agreed levels of safety, provides for optimum economic operations, is environmentally sustainable and meets national security requirements. The GANP is evolving to serve as a worldwide reference to transform the air navigation system in an evolutionary manner, so that No Country or Stakeholder is left behind.

5.2.2 The GANP includes as a high level guidance the *Global Air Traffic Management Operational Concept* (ICAO Doc 9854 GATMOC) and the *Manual on Air Traffic Management System Requirements* (ICAO Doc 9882). The GANP also includes additional resources as the ASBU framework, guidance on the implementation as the *Manual on the Global Performance of the Air Navigation System* (ICAO Doc 9883) as resources to support the planning and implementation activities.

5.2.3 **Analysis**

Multi-level structure[1].

5.2.3.1 During its 39th session, the ICAO Assembly instructed the General Secretariat to promote, provide and effectively disseminate the GANP. Therefore, in order to better communicate with high-level administrators and technicians and to not leave any State or any stakeholder lagging behind, it is proposed that the sixth edition of the GANP have a multi-level structure designed for different recipients of the information.

5.2.3.2 This four-level structure is made up, as illustrated below, by the global level (which is comprised by two levels, the strategic and technical levels), the regional level and the national level. This structure will provide a framework for harmonizing regional, sub-regional and national plans.

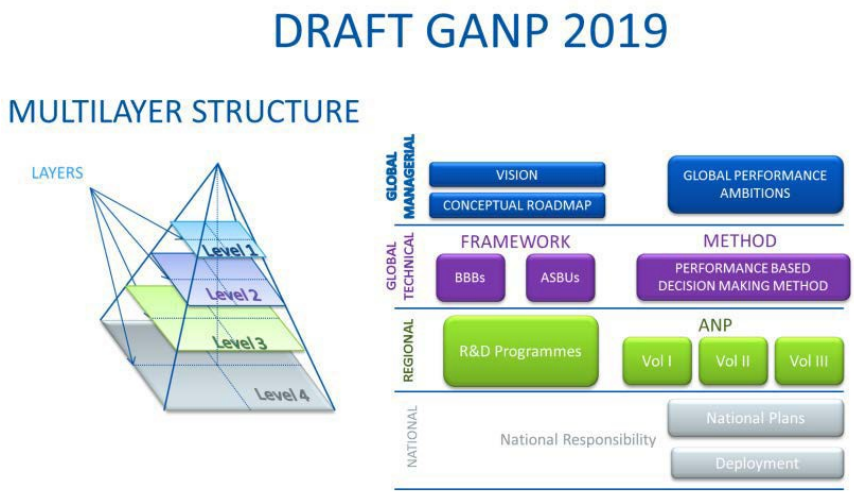

Image 1. *GANP Sixth Edition Multi-level structure.*

[1] https://www.icao.int/airnavigation/Documents/GANP_at_glance_flyer.pdf

5.2.3.3 The **global strategic level** is the one that will mark the high level strategic direction to guide decision makers, in order to evolve the global air navigation system. With this purpose, the global strategic level includes a common vision "performance ambitions" at a worldwide level, and a conceptual roadmap. The **global technical level** supports technical managers in planning the implementation of basic air navigation services and new operational improvements in a cost-effective manner.

5.2.3.4 The **regional level** will serve to meet regional and sub-regional needs in harmony with global objectives. Therefore, it will contain the ICAO air navigation plans (ANP) at the regional level and the consideration of other regional initiatives. The fourth **national level** is responsibility of the States, and it will focus on national planning.

5.2.3.5 In order to achieve the common vision reflected in the GANP, it is decisive that States, in coordination with the stakeholders, develop air navigation plans that constitute a strategic element of their national development plans and that are harmonized with regional and global plans. These air navigation plans will serve as reference documents for national investment in air navigation infrastructure.

5.2.3.6 In order for all stakeholders to have easy access to the vast amount of information contained in the multi-level structure of the GANP, ICAO has created the GANP Portal (currently in English only): https://www4.icao.int/ganpportal/ where different users can find the most important information that fits their specific context. This web-based platform will ensure the congruence of the GANP content for the different levels and will offer more complete information through a single interface.

The GANP vision

5.2.3.7 The GANP vision contains the ultimate objectives of the air navigation system, as well as the identification of the new difficulties and opportunities that may arise from technological and aviation trends. The evolution driven by this vision will result in a highly efficient global air navigation system, able to meet the aeronautical community's needs and the society's, in general, as well as that of the Air Traffic Management (ATM) community, in particular.

Ambitions of efficiency (Performance ambitions)

5.2.3.8 Supporting air transport sometimes requires making difficult decisions and the strong commitment of interested air navigation system stakeholders. In addition to the three fundamental principles of safety, aviation security, and environmental and economic sustainability, which are necessary elements to achieve aviation efficiency, for that reason there are several efficiency requirements that the air navigation system must meet to satisfy the society needs. Efficiency should be the engine that motivates the evolution of the system, and, for this reason, the sixth edition of the GANP proposes performance ambitions.

5.2.3.9 These ambitions will serve as a point of reference to call for action, will be catalysts for change and will help to set global priorities. Therefore, they should not be seen as goals to be closely and continuously monitored and for which reports of results would be presented. Expressed qualitatively, but concretely, these performance ambitions will be reached when specific efficiency objectives are achieved in each region subject to planning, taking into account the regional difficulties resulting from the relevant analyses.

5.2.3.10 The following table shows the performance ambitions associated to the 11 Key Performance Areas (KPAs) of Doc 9883 "*Manual on global performance of the air navigation system*".

SUMMARY OF THE GANP PERFORMANCE AMBITIONS "A high performing system by 2040 and beyond"	
KPA	**Ambition**
ACCESS AND EQUITY	No aviation community member excluded or treated unfairly.
CAPACITY	Nominal capacity easily scalable with demand.
	Disruptive events do not interrupt service provision and do not significantly affect the performance of the system.
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 CO_2 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	Zero ANS-related accidents and a significant (50%) reduction of ANS-related serious incidents.
SECURITY	Zero significant disruptions due to cyber incidents

Table 1. *Performance ambitions associated with the 11 KPAs of Doc 9883*

5.2.3.11 The GANP portal has included a Performance Objective Catalogue and has proposed an initial set of 19 indicators and their respective description associated to the eleven KPAs. See link: https://www4.icao.int/ganpportal/ASBU/PerformanceObjective

5.3 Global Air Navigation Plan (GANP)/Reference Framework– ASBU

5.3.1 Under P/03, the Secretariat explained the new version of the GANP. The GANP is an important planning tool for setting global priorities to drive the evolution of the global air navigation system and ensure that the vision of an integrated, harmonized, globally interoperable and seamless system becomes a reality. The GANP provides information in four different levels as previously mentioned:

1. Global Strategic
2. Global Technical
3. Regional
4. National

5.3.2 Specifically, with regards to the global technical level, this includes three technical frameworks, the (BBBs, the ASBUs and the performance frameworks, which includes performance objectives and Key Performance Indicators (KPI) and a performance dashboard.

5.3.3 The BBB framework describes the basis of any robust air navigation system. It is nothing new, but it corresponds to the identification of essential services that must be provided, by the States, for international civil aviation in accordance with ICAO Standards and Recommended Practices (SARPs). These essential services are defined in the areas of Aerodromes and ground aids (AGA), ATM, Search and Rescue (SAR), Aeronautical Meteorology (MET) and Information management (AIM). In addition to essential services, the BBB framework identifies the end users of these services, as well as the Communications, Navigation and Surveillance (CNS) infrastructure that are necessary to provide them.

5.3.4. The ASBU is a flexible global system engineering approach that allows all Member States to advance in their air navigation capacities based on their specific operational requirements.

5.3.5 The ASBU is integrated by (as illustrated below):

1. ASBU Thread: Key feature area of the air navigation system
2. ASBU Module: A group of elements from a thread
3. ASBU Element: A specific operational improvement
4. ASBU Enabler: Component (standards, procedures, training, technology)
5. ASBU Block: Specific concept of operations. Deadline for an element to be available for implementation

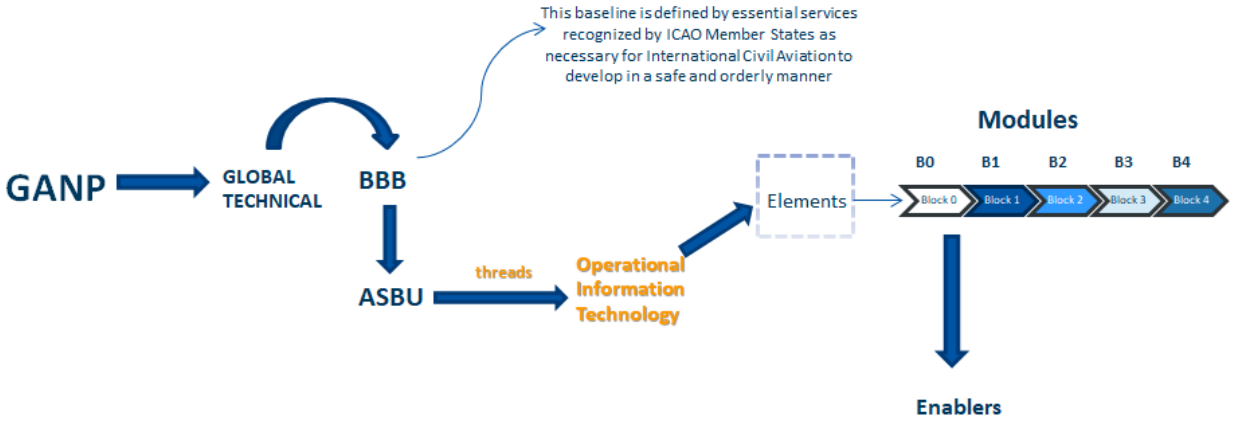

Image 2. *Elements integrating the ASBU.*

5.4 Basic Building Blocks (BBB) for AIM 1.0

5.4.1 Under P/04, the Secretariat presented information related to the BBBs in the AIM 1.0 framework, which describes the basis of a robust information and data system for air navigation, where the BBBs are essential for services and information and data products to be provided for international civil aviation in accordance with Annexes 15 and 4 of ICAO SARPs. These essential services are: AGA, ATM, SAR, MET and the **Aeronautical Information Management (AIM)**.

5.4.2 States must apply BBBs implementation for AIM 1.0 through their National Air Navigation Plans as a strategic side of their aviation planning national framework, as shown in the image below:

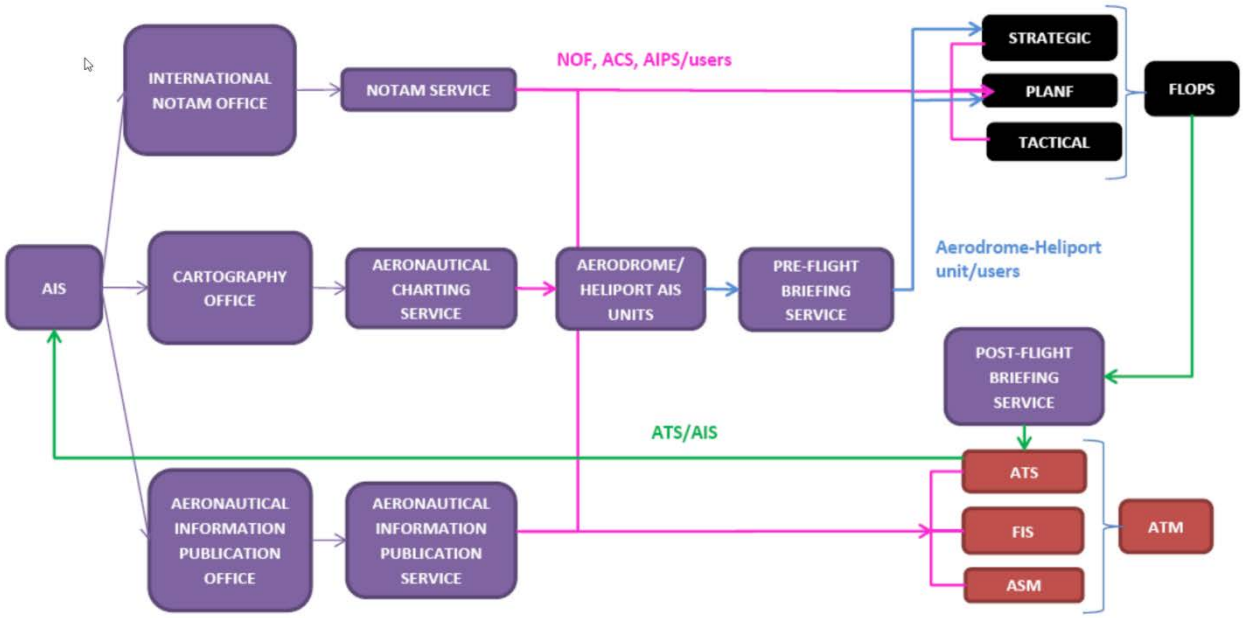

Image 3. *Basic Building Blocks for AIM*

5.5 Basic Building Blocks (BBB) for ATM/SAR

5.5.1 P/05 Basic Building Block (BBB) ATM/SAR provided a description of the air traffic services, their objectives, division and process for determination, as a reference for the establishment of the Global ATM Operational Concept. The presentation also emphasized the importance of information management and related services as a key requirement for ATM. A brief introduction to the Global Aeronautical Distress and Safety System (GADSS) was also included, to then review the BBB Framework for ATM and SAR. The main challenges for the implementation of the BBBs in the region were also addressed.

5.6 Basic Building Blocks (BBB) for AGA

5.6.1. In the aerodromes field, under P/09, the Secretariat presented the BBBs as the identification of the essential services to be provided for the international civil aviation in accordance with ICAO SARPs. It was mentioned that these essential services are defined in various areas such as AGA, ATM, SAR, MET and AIM; in addition, the BBB's framework identifies the recipients of these services and includes the CNS infrastructure necessary to provide such services. It was mentioned that the BBBs framework would be updated every two years, considering amendments to ICAO requirements.

5.6.2 The basic modules and their elements were then presented in Aerodrome Operations (AO). The three modules consist of design, certification and operations at aerodromes with their respective elements as essential requirements that comply with ICAO SARPs, as well as the support provided to ATM, MET, aircraft operators, ground vehicle operators, Rescue and Fire Fighting Services (RFFS) and Aeronautical information services (AIS/AIM).

5.6.3 Afterwards, it was mentioned that an ASBU element is a specific change in operations designed to improve the behaviour of the air navigation system under specific operational conditions.

5.6.4 ASBU facilitators are a new concept in the updated ASBU framework. They are the required components (standards, procedures, training, technology, etc.) to implement an element.

5.6.5 ASBU threads are categorized into three groups:

- Operational: Airport Collaborative Decision Making (A-CDM), Airport Accessibility (APTA), Network Operations (NOPS), etc.
- Information: SWIM, Advanced Meteorological Information (AMET), Digital AIM (DAIM), FICE, etc.
- Technological: COMS, COMI, NAVS, Alternative Surveillance (ASUR) (previous roadmaps)

5.6.6 For aerodromes, the corresponding elements were presented:

- ACDM-B0/1 Aerodrome CDM Information Sharing (ACIS)
- ACDM-B0/2 Integration to the ATM network
- ACDM-B1/1 Airport Operations Plan (AOP)
- ACDM-B1/2 Aerodrome Operations Centre (APOC)
- ACDM-B2/1 Total Aerodrome Management (TAM)
- ACDM-B3/1 Full integration of ACDM and TAM into Trajectory-Based Operations (TBO)

5.7 Basic Building Blocks (BBB) for Meteorological Information

5.7.1 Through P/08, the Secretariat presented the BBBs based on the components of the Meteorological Service for International Air Navigation provided by the Aerodrome Meteorological Offices, the Meteorological Watch Offices and the Regional or Global Centres.

5.7.2 The fundamentals of the BBBs for MET were explained in detail, associating them with each of the SARPs in Annex 3 and with the guidance material as a reference for implementation; the need for each Civil Aviation Authority to review its regulatory framework was emphasized, to ensure that the provisions have been promulgated or that the procedure for identification and notification of differences to facilitate safety oversight activities has been provided.

5.7.3 Reference was made to the status of Air Navigation Deficiencies as presented in the GREPECAS Air Navigation Deficiencies Database (GANDD) and the verification mechanisms implemented within the Systemic Assistance Program (SAP) framework for the deficiencies resolution, motivating States and Territories to stimulate the exchange of information.

5.8 ASBU for Advanced Meteorological Information (AMET)

5.8.1 Under P/15, the Secretariat explained the evolution of the ASBU Reference framework in the search for the provision of a seamless weather service at a global level and its evolution from a product-based service on to a service based on data and information.

5.8.2 It was explained how aeronautical meteorology continues to be a key facilitator for the implementation of a harmonized ATM system, interoperable worldwide, in particular through the domain of the System wide information management (SWIM), and the participants were informed about the implementation of the ICAO Weather Information Exchange Model (IWXXM) specifying the implementation schedule.

5.9 AIM within the 6th Edition of the GANP

5.9.1 With P/12, the Secretariat presented information related to AIM in the Sixth edition of the Global Air Navigation Plan, where it was indicated that the BBB framework is contained in the global technical level, as the technical basis of the Air Navigation areas and, in the particular case of AIM, it is also contained in the ASBU framework, for the scalable implementation of operational improvements and the performance framework associated with a catalogue of performance objectives and KPIs, and all this within the framework of a performance method for the AIM implementation planning.

5.9.2 The BBBs refer to the basic AIS services and the provision of aeronautical information in a standardized presentation, based on point to point exchanges. For AIM 1.0, the improved aeronautical information is based on enhanced data quality to support PBN, on-board navigation systems based on autonomous data systems and automation on the ground, including the exchange and processing of digital information, allowing for safer and more efficient information management.

5.9.3 And, finally, ASBU Block 2 will be the guide towards a full AIM 2.0 environment, which includes the dissemination of aeronautical information in a SWIM-enabled environment, user-defined products and the decommissioning of traditional aeronautical information systems and their current distribution, which will be complemented by a new information and data system required to support operations in the airspace (upper, lower, terminal control area [TMA], etc.) or the concept of Unmanned aircraft systems traffic management (UTM).

5.10 ASBU Elements, CNS technology and other services

5.10.1 Under P/07, the Secretariat explained the thread about CNS technologies and services, according to the four different modules that integrate this ASBU area:

1. Communication infrastructure (COMI)
2. Air traffic services (ATS) Communication service (COMS)
3. Navigation systems (NAVS)
4. Surveillance System (ASUR)

5.10.2 According to the evaluation done by the ICAO NACC Regional Office CNS area, the following elements are important to be development by the CAR Region:

1. COMI-B1/1: Ground-Ground Aeronautical Telecommunication Network/Internet Protocol Suite (ATN/IPS) technology, under development by MEVA Phase IV project.
2. COMS: Controller-pilot data link communication (CPDLC) and Automatic dependent surveillance-contract (ADS-C) Implementation, in progress.
3. NAVS: it is necessary to do an assessment about regional needs.
4. ASURV: Automatic dependent surveillance - broadcast (ADS-B) implementation is a regional goal under development.

5.10.3 Other ASBU elements under CNS area:

1. Flight and Flow Information for a Collaborative Environment (FF-ICE); under development by Air Traffic Services Inter-facility Data Communication (AIDC)/Flight plan (FPL) Task Force.
2. It is necessary to have a regional agreement about Airborne Collision Avoidance System (ACAS); under the Surveillance Task Force's activities.

5.11 Impact of implementations in the Region

5.11.1 With P/13, the International Air Transport Association (IATA) presented the regional perspective on the importance of coordinated multi-sectoral efforts by States, including the Air navigation services providers (ANSP), so that investment in the implementation of the elements of the ASBU is adequate and responds to regional and state needs; the IATA called for reducing unnecessary investment, avoiding the expenditure of resources on non-applicable technology and taking better advantage of the currently installed technology, in order to promote the growth of the industry taking into account its direct contribution to the Gross Domestic Product (GDP) of the State.

5.12 Air Navigation Implementation – Improvements at GREPECAS 2020

5.12.1 Under P/11, the Secretariat informed about the GREPECAS improvements for 2020 on the implementation in air navigation, through the presentation of the GREPECAS Work plan aligned to the new version of the GANP 6th Ed., which is included within the next triennium of ICAO and its strategic objectives and global goals.

5.12.2 Said plan envisages supporting the Caribbean (CAR) and South American (SAM) States in their compliance with the Regional ANP, in accordance with the ICAO SARPs, prioritizing safety and reducing deficiencies, while also maintaining the regional leadership and joint work of CAR and SAM, reflecting the performance of the Working Groups, benefiting the States and the actors of the civil aviation system.

5.12.3 In addition, it seeks to link the needs of the CAR and SAM Member States, with the implementation projects of the Region towards 2021, with the training of human resources, increasing the participation of States in ICAO meetings (including GREPECAS and Regional Aviation Safety Group–Pan America [RASG-PA]) and related programmes/projects, as well as improving the coordination between States and the need to increase resources to help and support those States that require it.

5.12.4 Finally, it seeks to improve the effective implementation of the CAR/ SAM ANP in the execution of the National Air Navigation Plans with ICAO ASBU modules (Performance-Based Navigation [PBN], Continuous descent operation [CDO], Continuous Climb Operations [CCO], FICE, Digital Aeronautical Information Management [D-AIM] and AMET), as well as improve the implementation of AIDC, ADS-B and Controller-Pilot Data Link Communications (CPDLC), in addition to better the understanding of ATFM and SWIM and identify its benefits, and also identify the strategy to resolve ANS deficiencies and accelerate Aerodrome certification.

5.13 ASBU elements 5th Edition/2016 vs 6th Edition/2016 comparison

5.13.1 Under P/19, the ASBU Task Force (TF) rapporteur presented the current status of each States' National Air Navigation Plan preparation; amongst 22 State/Territories that are expected to prepare their ANP, 17 of them have done so (https://www.icao.int/NACC/Pages/regional-group-ASBUb.aspx). The database was set to produce the implementation status of each element and groups of elements based on airport centric or State centric criteria. These NANPs were based on the ASBU framework for Global Harmonization issued in July 2016. The ASBU TF will develop new template that incorporates the ASBU framework changes introduced by the 6th edition of the GANP.

5.13.2 The presentation also included the high level changes brought by this 6th edition of the GANP and a detailed comparison of the ASBU Elements between the Fifth and the Sixth edition.

5.14 ICAO's Performance-Based Approach (PBA) for ANS

5.14.1 P/06 "ICAO Performance-Based Approach for Air Navigation Services", introduced the subject of Performance Based Approach (PBA) for the provision of air navigation services, based on ICAO guidance material about the Global Performance System for Air Navigation. The PBA is based on the following principles:

- Strong focus on desired/required results through adoption of performance objectives and targets;
- Informed decision-making, driven by the desired/required results; and
- Reliance on facts and data for decision-making.

5.14.2 The presentation explained the main advantages of the PBA and the key elements that will ensure its successful transition.

5.15 Six-step method –Performance management process

5.15.1 Under P/16, the Secretariat explained the six-step method under the Global Air Navigation Plan. The six- step method includes:

Step 1. Scope, context and general ambitions and expectations; incorporation of the Global Strategic Level; performance ambitions, objective, ICAO Key Performance Areas (KPA) and design criteria.

Step 2. SWOT Analysis/objectives establishment; need to develop an operational analysis (baseline performance) according to data collection, process and the analysis and monitoring of current operations.

Step 3. Targets establishment/calculation of needs; identified performance objectives and priorities.

Step 4. Optimum solutions identification; decision making.

Step 5. Optimum solutions deployment; development of an aviation project according to the previous steps.

Step 6. Results assessment; continuous performance assessment, implementation progress monitoring and review of actual performance achieved.

5.16 KPIs general description

5.16.1 Through P/17, the Secretariat presented an overview of the 19 KPIs included in the performance reference framework, which had been available in previous editions of the GANP and are now readily available on the GANP website.

5.16.2 KPIs were defined as quantitative means of measuring past or current performance, as well as expected future performance, actual performance of the air navigation system, and they are a mechanism for verifying progress in achieving established performance objectives, as well as their usefulness to determine performance objectives. The link between KPIs and the Performance Objective Catalogue was explained.

5.16.3 Similarly, it was explained that the KPIs have been parameterized through the following elements: Definition, Measurement Units, Operations Measured, Variants, Objects Characterized, Utility of the KPI, Parameters, Data Requirement, Data Feed Providers, Formula/Algorithm, References and examples of use.

5.16.4 States or the Region could determine additional KPIs, as long as their structuring is guaranteed in accordance with the parameterization elements described above.

5.17 Electronic Regional Air Navigation Plan (e-ANP)

5.17.1 With P/18, the Secretariat presented the CAR/SAM Electronic Regional Air Navigation Plan (e-ANP), Volumes I and II; likewise, the Secretariat informed the participants that, for standardization purposes, ICAO Headquarters is working on a template for global application for Volume III of the Regional Air Navigation Plans. In this sense, after the approval of the template, maximum effort should be made to harmonize regional and intra-regional requirements in order to lay the foundation for the future Volume III of the CAR/SAM Regional Air Navigation Plan, and that, this, later serves as the basis for the National Air Navigation Plans (NANP) of the States. Additionally, participants were reminded that, in accordance with Recommendation AN/Conf-13 1.1/1 letter h), the template for NANPs is under development, so it was recommended, when finalized, to use said template with the objective to normalize NANPs.

5.17.2 The Secretariat recalled conclusion PPRC/05/10 Development of Volume III of the CAR/SAM eANP in preparation of national air navigation plans and recalled the need to continue developing the necessary actions to achieve compliance.

<table>
<tr><td colspan="3">DRAFT CONCLUSION
PPRC/5/10 DEVELOPMENT OF VOLUME III OF THE CAR/SAM GANP IN PREPARATION OF NATIONAL AIR NAVIGATION PLANS</td></tr>
<tr><td colspan="2">What:
That, in Coordination with the NACC and SAM Regional Offices,

a) the States support the Secretariat in the preparation of Vol. III of the CAR/SAM e-ANP and the revision of Vols. I and II of the aforementioned document to align it to the GANP - Sixth Edition, considering the catalogue of KPI contained in the GANP;

b) the States, in coordination with the NACC and SAM Regional Offices, after completing the preparation and revision of the three CAR/SAM e-ANP Volumes, elaborate or, if applicable, update their NANP, in order to align them to the GANP initiatives, including the requirements of all the areas that involve air navigation services;

c) the States forward the developed or updated NANP to the ICAO NACC and SAM Regional Offices by the second semester of 2021;

d) ICAO process the approval of Vol. III of the CAR/SAM e-ANP by the third quarter of 2020;

e) ICAO, once Vol. III is approved, replace the Regional Air Navigation Plans based on performance by Vol. III of the CAR/SAM e-ANP, and present it to the PPRC/6; and

f) ICAO provide technical support to the States that request it for the development of their NANP and supervise the delivery of said plans to the ICAO NACC and SAM Regional Offices.</td><td>Expected impact:
☐ Political / Global
☒ Inter-regional
☐ Economic
☐ Environmental
☒ Operational/Technical</td></tr>
<tr><td colspan="3">Why: In order to align the Regional Air Navigation Plan (e-ANP CAR/SAM) to the GANP and support the preparation and updating of the National Air Navigation Plans.</td></tr>
<tr><td colspan="2">When: By 2021</td><td>Status: ☒ Valid / ☐ Superseded / ☐ Completed</td></tr>
<tr><td colspan="2">Who: ☒ States ☒ ICAO ☐ Other:</td><td></td></tr>
</table>

5.18 GASeP and Roadmap in NAM, CAR and SAM

5.18.1 Under P/14 the Secretariat presented the Global Aviation Security Plan (GASeP) and the Regional Roadmap for North America (NAM), CAR and SAM Regions. The GASeP is structured in five key priorities divided into 32 priority actions and 94 specific tasks. These key priorities are:

- Enhance risk awareness and response;
- Develop security culture and human capability;
- Improve technological resources and promote innovation;
- Improve oversight and quality assurance; and,
- Increase cooperation and support.

5.18.2 Global targets (measured through the Universal Security Audit Programme – Continuous Monitoring Approach ([USAP-CMA] audits) were also established as follows:

By Year	Percentage of States	Achieved Effective Implementation (EI) Rate
2020	**80%**	**65%**
2023	**90%**	**80%**
2030	**100%**	**90%**

Table 2. *USAP-CMA EFFECTIVE Implementation (EI) percentages*

5.18.3 The ICAO- Latin American Commission of Civil Aviation (LACAC) NAM/CAR/SAM Aviation Security and Facilitation Regional Group is the forum where the progress on the GASeP implementation is tracked and it is currently working in developing the GASeP indicators

5.19 Global Aviation Safety Plan (GASP)

5.19.1 Under P/10, the Secretariat presented information on the GASP.

5.19.2 The GASP is an ICAO strategy for the continuous improvement of aviation safety and aims to continually reduce aviation-related fatalities, and the risk of fatalities, through the development of a harmonized safety strategy and the implementation of aviation safety plans at the regional and national levels.

5.19.3 ICAO has been working collaboratively with States and other key stakeholders to develop the 2020-2022 edition of the GASP, which sets forth ICAO's Safety Strategy for the next decade. The 2020-2022 edition of the GASP was approved at the 40th session of the ICAO Assembly.

5.19.4 The GASP establishes provisions for:

- A global strategy for safety improvement
- A framework for regional and national plans
- The promotion of effort harmonization and coordination

5.19.5 The GASP provides a collaborative framework for States, regions and the industry to support the management of organizational challenges and safety risks.

5.19.6 The Global Aviation Safety Roadmap is an action plan developed to assist the aviation community in achieving the GASP goals. It provides a structured and common reference framework for all relevant stakeholders, in order to develop and implement national and regional aviation safety plans by presenting a series of Safety Enhancement Initiatives (SEI) linked to the GASP goals and targets. The use of the Global Aviation Safety Roadmap as the basis for national and regional safety planning enhances coordination, thus reducing inconsistencies and duplication of efforts.

6. Accomplishments/Recommendations

6.1 The Workshop allowed the interaction among the Secretariat, the States represented, the Chairperson of the ANI/WG and the Rapporteurs of the ADS/B, AIDC, AIM, SAR, ASBU and PBN TFs. The material presented during the Workshop and the work dynamics indicated in sections 4.2 and 4.3 allowed an agreement to be reached on the following recommendations:

6.2 After reviewing the ASBU blocks and elements of the new version of the GANP, the Meeting considered necessary to use a systematic process to decide the updated ASBU elements applicable to each ANS area and its subsequent integration into the regional planning and implementation structure for air navigation.

6.3 The best way forward to take full advantage of the new GANP proposed scheme is to apply a performance-based approach. A performance-based approach is results-oriented, helping decision makers set priorities and determine appropriate trade-offs that support optimum resource allocation while maintaining an acceptable level of safety performance and promoting transparency and accountability among stakeholders. ICAO has advocated for a globally harmonized performance management process based on six well-defined steps presented during the Workshop.

6.4 The goal of this cyclic six-step method is to identify optimum solutions based on operational requirements and performance needs so that the expectations of the aviation community can be met by enhancing the performance of the air navigation system, and optimizing allocation and use of the available resources. This performance management process is the basis to develop national and regional air navigation plans adapted to their specific operational requirements and performance needs.

6.5 The Rapporteurs' meeting, supported by participants in the Workshop, stressed the importance to rely on an objective methodology for decision-making that eliminate, to some extent, the solution-based approach; therefore it was considered that the ICAO AN-SPA would be the right tool to guide the application of the six-step method at local and regional levels.

6.6 The Rapporteurs' meeting ran several scenarios in cooperation with participants in order to tailor recommendations regarding the practical use of the AN-SPA; **Appendix B** includes an example of the report.

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APPENDIX / APÉNDICE A

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STEP 1 — Define Scope, Context & Ambitions

STEP 2 — Know your System and Identify Objectives

STEP 3 — Quantify Objectives, Set Targets and Calculate Needs

STEP 4 — Select Solutions

STEP 5 — Implement Solutions

STEP 6 — Assess Achievement

RETURN TO AN-SPA HOME PAGE (/GANPPORTAL/ANSPA/REPORTS)

DEFINE SCOPE, CONTEXT & GENERAL AMBITIONS AND EXPECTATIONS

GEOGRAPHICAL SCOPE

TIME HORIZON

ICAO REGION

EN-ROUTE SHORT TERM CARSAM

CARSAM REGION DATA

ICAO

SELECTED KEY PERFORMANCE AREAS

/

IDENTIFY OBJECTIVES

Once you know your operational environment, it is important to set objectives. Please find hereafter a proposed list of performance objectives from the ICAO Performance Objective Catalogue based on the answers provided to the questions. Please confirm your selection of objectives and if necessary select/deselect other performance objectives from the catalogue.

- Efficiency
  - Flight time & distance
  - Vertical flight efficiency
    - Vertical flight efficiency during the climb phase
      - Reduce vertical flight inefficiency during the climb phase
        - Reduce climb inefficiency attributable to aircraft operator choices (operating practice)
        - Reduce climb inefficiency attributable to altitude constraints imposed by ATM
          - Reduce permanent (airspace and departure procedure design) and semi-permanent (ATFCM measures) altitude constraints (level capping) along the climb portion of traffic flows, in terminal and en-route airspace
          - Reduce tactical altitude constraints during climb imposed by ATM
            - Reduce level-off instructions during climb issued by ATCOs for conflict resolution purposes

- Vertical flight efficiency during the cruise phase
  - Reduce vertical flight inefficiency during the cruise phase
    - Reduce cruise level inefficiency attributable to aircraft operator choices/needs
    - Reduce cruise level inefficiency attributable to altitude constraints imposed by ATM
      - Reduce permanent (airspace and route network design) and semi-permanent (ATFCM measures) altitude constraints (level capping) on city-pairs
      - Reduce tactical altitude constraints during cruise imposed by ATM
        - Reduce level restrictions during cruise issued by ATCOs for conflict resolution purposes
        - Increase acceptance of pilot requests for higher cruise level
- Vertical flight efficiency during the descent phase
  - Reduce vertical flight inefficiency during the descent phase
    - Reduce descent inefficiency attributable to aircraft operator choices (operating practice)
    - Reduce descent inefficiency associated with inability to land at first attempt
    - Reduce descent inefficiency attributable to altitude constraints imposed by ATM
      - Reduce permanent (airspace and approach procedure design) and semi-permanent (ATFCM measures) altitude constraints along the descent portion of traffic flows, in en-route and terminal airspace
      - Reduce tactical altitude constraints during descent imposed by ATM
        - Reduce level-off instructions during descent issued by ATCOs for conflict resolution purposes
    - Optimise choice of Top of Descent (ToD)

- Optimise descent after ToD has been chosen and executed ⊗
- Fuel burn !
  - Fuel burn !
    - Reduce total fuel burn of aviation !
      - Reduce number of flights ⊗
      - Reduce fuel burn per flight !
        - Reduce fuel burn per flight under unimpeded conditions ✓
          - Reduce average city-pair distance per flight ✓
          - Reduce average fuel flow per flight ✓
            - Improve fuel efficiency of airborne fleet ✓
              - Use smaller aircraft which consume less fuel ✓
              - Replace fleet by more fuel efficient aircraft ✓
                - Use aircraft with better aerodynamic characteristics ✓
                - Use aircraft with lower empty weight (e.g. lighter materials and design) ✓
                - Use aircraft with more efficient engines ✓
              - Retrofit aircraft with fuel saving options (e.g. winglets) ✓
              - Keep aircraft in good operating condition (e.g. clean, correct rigging) ✓
              - Use more aircraft flying on alternative energy sources (e.g. biofuel, electric, hybrid) ✓

- Reduce take-off mass
  - Reduce fuel reserve
    - Avoid unnecessary fuel reserve
    - Reduce weight of equipment and supplies (e.g. potable water)
    - Reduce payload
  - Apply more fuel efficient aircraft operating procedures in each flight phase
    - Reduce or eliminate APU fuel consumption during turn-around (e.g. use ground power supply)
    - Reduce or eliminate fuel flow during taxi-out (e.g. single engine taxi, electric taxi, TaxiBot, engine shutdown during long holds)
    - Use more fuel-efficient cost index during flight
    - Reduce or eliminate fuel flow during taxi-in (e.g. single engine taxi, electric taxi, TaxiBot)
- Reduce fuel burn impact of impeded conditions
  - Reduce additional fuel burn during taxi-out
    - Improve taxi-out additional time
  - Reduce additional fuel burn during climb phase
    - Improve level-off during climb
  - Reduce additional fuel burn during en-route
    - Improve actual en-route extension

- Improve level capping during cruise ✓
- Reduce additional fuel burn during descent phase ✓
  - Improve level-off during descent ✓
- Reduce additional fuel burn during taxi-in ✓
  - Improve taxi-in additional time ✓
- Reduce additional fuel burn attributable to extra weight of contingency fuel ✓
  - Improve flight time variability ✓

- Capacity !
  - Capacity, throughput & utilization !
    - Airport/terminal airspace throughput and capacity ✗
    - Airport capacity utilisation ✗
    - En-route airspace capacity !
      - Optimise en-route airspace capacity !
        - Introduce or improve capabilities that allow temporary capacity reduction (with associated reduction of cost) during times that little capacity is needed !
          - Apply flexible capacity management at facility level ✓
            - Improve flexibility of sector configuration management ✓
          - Apply flexible capacity management at multi-facility level ✓

- Develop capability to temporarily (e.g. at night) reduce the number of facilities serving a given airspace (facilities taking over the airspace of other facilities, e.g. virtual center)

- Introduce or improve capabilities that improve resilience against loss of capacity during scheduled or unscheduled loss of ATC service provision capability

- Introduce or improve capabilities that improve resilience against unnecessary or excessive closure of airspace for safety reasons (e.g. due to ash cloud, weather, conflict zones etc.)

▾ Increase en-route airspace capacity when needed

▾ Increase planned capacity (the maximum configuration capacity established as part of [multi-year] ATM planning)

- Establish/improve capability to develop a capacity planning scenario with assumptions for future traffic levels, based on traffic forecast

▸ Solve issues preventing the implementation of capacity planning scenarios

▾ Optimise declared capacity (capacity monitoring values and sector configurations to be used on the day of operation, available during the strategic and pre-tactical process, called expected capacity)

▾ Determine capacity up to the time horizon of the strategic process

▾ Establish/refine expected demand

▾ Establish/refine the traffic scenario at city-pair level

- Establish/refine the traffic scenario at city-pair level, taking into account airline schedules and known future events

▾ Establish/refine the traffic scenario at airspace level

- Establish/refine the traffic scenario at city-pair level, taking into account the city-pair traffic scenario, known future airspace events (airspace changes and events driving the need for rerouting or capping of flows), and the routing scenario

▾ Identify capacity delivery constraints

- Derive the constraint baseline from the planned capacity (the maximum configuration capacity established as part of [multi-year] ATM planning)
- Modulate this baseline by taking into account known future ANS events and resource planning

▼ Establish declared capacity to be used as input for the pre-tactical process

- Establish declared capacity to be used as input for the pre-tactical process, taking into account the traffic scenario at airspace level
- Establish declared capacity to be used as input for the pre-tactical process, taking into account capacity delivery constraints
- Establish declared capacity to be used as input for the pre-tactical process, taking into account strategic DCB measures

▼ Determine capacity for the time frame covered by the pre-tactical process (ending the day before the day of operation)

- Establish pre-tactical traffic scenario
- Identify pre-tactical capacity delivery constraints

▼ Establish declared & expected capacity to be used on the day of operation

- Decide on capacity monitoring values to be used on the day of operation
- Decide on sector configurations to be used on the day of operation

▼ Optimise actual capacity (capacity monitoring values and sector configurations actually used on the day of operation)

▶ Cope with traffic variations resulting in hotspots with higher than anticipated demand

▼ Cope with unexpected conditions/events causing a capacity reduction or even a closure of airspace

▼ Reduce capacity monitoring values

- Take tactical ATFM measures ✓

▼ Capacity shortfall & associated delay !

▶ Demand/capacity imbalance at airports and/or associated terminal airspace ✗

▼ Demand/capacity imbalance in en-route airspace !

▼ Mitigate demand/capacity imbalance in en-route airspace !

▶ Address demand/capacity imbalance risks identified at the strategic [multi-year] ATM planning stage ✗

▶ Address demand/capacity imbalance risks identified at the strategic [seasonal] ATFM stage ✗

▶ Address demand/capacity imbalance risks identified at the pre-tactical ATFM stage ✗

▼ Address demand/capacity imbalance handled at the tactical ATFM stage (on the day of operations) !

▼ Establish/improve the capability to continuously assess the impact of ATFM measures and to adjust them, in a collaborative manner, using the information received from the various stakeholders ✓

- Ensure that the measures taken during the strategic and pre-tactical phases actually address the demand/capacity imbalances ✓
- Ensure that the measures applied are absolutely necessary and that unnecessary measures are avoided ✓
- Ensure that the measures are applied taking due account of equity and overall system optimization ✓

▶ Establish/improve the capability to use opportunities to mitigate disturbances ✗

▶ Establish/improve the capability to tactically manage demand in response to unforeseen weather, closed airspace and capacity shortage (enhance the toolbox of TMIs – Traffic Management Initiatives) ✗

▶ Predictability ✗

- Safety
  - Maintain or improve safety
    - Maintain or improve safety in the air
      - Improve mid-air collision avoidance (safety net)
      - Reduce number of vertical & lateral navigation errors during flight (cases of non-conformance with clearance)
      - Improve separation provision (at a planning horizon > 2 minutes)
      - Improve early detection of conflicting ATC Clearances (CATC) (en-route / departure / approach)
      - Reduce unauthorized penetration of airspace risk
      - Reduce controlled flight into terrain (CFIT) and obstacle collision risk
      - Avoid flight encounters with hazardous conditions
        - Avoid hazardous weather
        - Avoid volcanic ash
        - Avoid en-route wake vortex encounters
        - Avoid exposure to hazardous space weather
    - Maintain or improve safety on the runway
      - Improve runway collision avoidance (safety net)
      - Reduce number of runway incursions

- Avoid incorrect entries of aircraft or vehicles onto the runway protected area (without or contrary to ATC clearance or due to incorrect ATC clearance) ✓
- Avoid incorrect presence of vacating aircraft or vehicles onto the runway protected area) ✓
- Avoid incorrect runway crossings by aircraft or vehicles (without or contrary to ATC clearance or due to incorrect ATC clearance) ✓
- Avoid incorrect spacing between successive arriving or arriving and departing or departing and arriving aircraft ✓
- Avoid landings without ATC clearance ✓
- Avoid landings on wrong runway at right airport ✓
- Avoid landings at wrong airport ✓
- Avoid take-offs without ATC clearance) ✓

- Improve early detection of conflicting ATC Clearances (CATC) related to runway usage ✓
- Reduce number of runway excursions ✓

▾ Maintain or improve safety during surface movement ✓

- Improve collision avoidance during taxi operations (safety net) ✓
- Reduce number of taxi errors (cases of non-conformance with clearance) ✓
- Reduce number of flights attempting to land/takeoff on/from taxiways ✓
- Improve early detection of conflicting ATC Clearances (CATC) related to taxi operations ✓

- Maintain or improve safety of very low level operations (≤500ft) ✗
- Maintain or improve safety of high altitude operations (>FL600) ✗

- Security
- Environment
  - Maintain or improve environmental sustainability of aviation
- Cost effectiveness
- Interoperability
- Access and equity
- Participation by the ATM community
- Flexibility

QUANTIFY OBJECTIVES

You can't manage what you can't measure. The way to ensure that objectives are specific and measurable is by defining **indicators**. Indicators are the means to quantitatively express performance as well as actual progress in achieving performance objectives. Indicators need to be defined carefully:

- Since indicators support objectives, they should not be defined without having a specific performance objective in mind.
- Indicators are not often directly measures. They are calculated from supporting metrics according to clearly defined formulas. This leads to a requirement for cost data collection and flight **data collection**. If there is a problem with data availability to calculate these supporting metrics:
  - Set up the appropriate data reporting flows and/ or modelling activities, to ensure all supporting metrics are populated with data as required to calculate the indicator(s) associated with the objective; or
  - If this is not possible, aim for a different kind of performance improvement, by choosing a different performance objective, as constrained by data availability.

In order to facilitate this task, ICAO has defined a series of KPIs. Please find hereafter the **ICAO KPIs** associated to the performance objectives you have selected. Please remember that the only way of knowing your operational environment and identifying the existence of a problem is by collecting, processing and analyzing data, please **collect the data and calculate the following indicators** as explained hereafter. The value of these indicators would be your performance **baseline**.

KPI02	Taxi-out additional time
KPI05	Actual en-route extension
KPI06	En-route airspace capacity
KPI13	Taxi-in additional time
KPI16	Additional fuel burn
KPI17	Level-off during climb

KPI18	Level capping during cruise	

KPI19	Level-off during descent	

SET TARGETS AND CALCULATE NEEDS

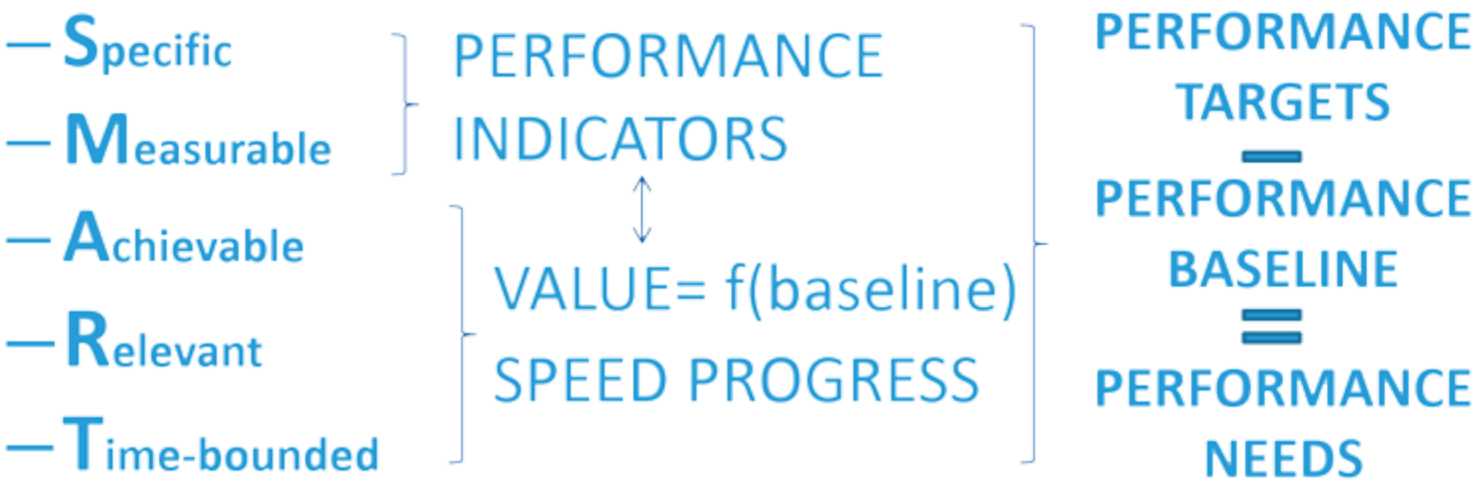
Performance targets are closely associated with performance indicators, they represent the values of performance indicators that need to be reached or exceeded to consider a performance objective as being fully achieved.

To understand how challenging it is to reach your target, you should know your performance baseline. The difference between the **baseline** and the target is called the **needs/performance gap**.

The time available to achieve performance objectives is always limited. Therefore, targets should always be time-bounded.

The target and the time available to reach the target determine the **required speed of progress** for the performance objective. Care should be taken to set target so that the required speed of progress is realistic.

Please set your targets by giving SMART values to your indicators and remember that, in the air navigation system, appropriate processes need to be in place to collaboratively agree on performance objectives, performance indicators and the values of performance targets. Then, calculate your performance needs.



SELECT SOLUTIONS

Now is the time to select solutions to exploit opportunities and resolve issues. As a result of our SWOT analysis, a qualitative inventory of present and future opportunities and issues that may require attention are already available. The list now needs to be analyzed in a performance oriented way, to assess/ quantify the impact of drivers, constraints, impediments, etc. on the objectives under consideration. To what extent, when and under which conditions do these contribute to or prevent the required performance improvements.

Based on the input provided, these are the operational improvements (ASBU elements) within the ASBU framework that will potentially help you improve the selected objectives/KPIs in the operational environment under analysis. Please expand the information of each potential solution and read it carefully. Please pay attention to the enablers required for the implementation of each operational improvement and the stakeholders involved in their deployment.

Please note that the ASBUs are a list of potential solutions and therefore it might happen that the optimum solution for the operational environment under analysis is not within this list.

☑ Functional Description ☑ Enablers ☑ Deployment Applicability ☑ Performance Impact Assessment

B0

FRTO-B0/4	Basic conflict detection and conformance monitoring	Operational
NOPS-B0/2	Collaborative Network Flight Updates	Operational
OPFL-B0/1	In Trail Procedure (ITP)	Operational
SNET-B0/1	Short Term Conflict Alert (STCA)	Operational
SNET-B0/2	Minimum Safe Altitude Warning (MSAW)	Operational
SNET-B0/3	Area Proximity Warning (APW)	Operational
SNET-B0/4	Approach Path Monitoring (APM)	Operational
SURF-B0/1	Basic ATCO tools to manage traffic during ground operations	Operational
SURF-B0/2	Comprehensive situational awareness of surface operations	Operational
SURF-B0/3	Initial ATCO alerting service for surface operations	Operational

B1

ACAS-B1/1	ACAS Improvements	Operational
CSEP-B1/1	Basic airborne situational awareness during flight operations (AIRB)	Operational
CSEP-B1/2	Visual Separation on Approach (VSA)	Operational
FRTO-B1/4	Dynamic sectorization	Operational
FRTO-B1/5	Enhanced Conflict Detection Tools and Conformance Monitoring	Operational
OPFL-B1/1	Climb and Descend Procedure (CDP)	Operational
RATS-B1/1	Remotely Operated Aerodrome Air Traffic Services	Operational
SNET-B1/1	Enhanced STCA with aircraft parameters	Operational
SNET-B1/2	Enhanced STCA in complex TMAs	Operational

SURF-B1/1	Advanced features using visual aids to support traffic management during ground operations	Operational
SURF-B1/2	Comprehensive pilot situational awareness on the airport surface	Operational
SURF-B1/3	Enhanced ATCO alerting service for surface operations	Operational
SURF-B1/5	Enhanced vision systems for taxi operations	Operational

Once we have a list of potential solutions, it is important to do a safety assessment and an environmental impact assessment to analyze the feasibility of implementing that specific solution in the operational environment under analysis. ICAO has developed the following guidance to help you perform a safety assessment and an environmental impact assessment:

Safety assessment:

The 4th edition of the *Safety Management Manual* (SMM), was updated and published in October 2018 to provide supporting guidance for Amendment 1 to Annex 19 – *Safety Management*, including:

- Upgraded provisions for the protection of safety data, safety information and related sources;
- Integration of the 8 critical elements into the State Safety Programme (SSP) components; and
- Enhanced provisions for Safety Management System (SMS).

It also provides expanded guidance on the scope of Annex 19 its applicability, including discretionary SMS applicability, as well as the development of safety intelligence. In addition, to address the needs of the diverse aviation community implementing safety management and following a recommendation stemming from the 2nd High-level Safety Conference (HLSC/2015), the Safety Management Implementation (SMI) public website (www.icao.int/SMI (https://www.icao.int/SMI)) has been launched to complement the SMM. The SMI website serves as a repository for the

sharing of practical examples, tools and educational material which are being collected, validated and posted on an ongoing basis to support the effective implementation of SSP and SMS. An e-book version of the SMM in all ICAO languages is also available on the website.

Environmental impact assessment guidance:

This guidance identifies high-level principles that facilitate the robust definition and application of specific assessment approaches, methodologies and their respective metrics. The focus of these principles is on changes that relate to aircraft and ATM operational initiatives and may involve all phases of flight (e.g. Gate-to-Gate). The general principles of this guidance can be applicable to air navigation aspects arising from infrastructure proposals and major changes to airspace capacity or throughput, as well as operational changes. While the boundaries of an air navigation services environmental analysis are based on the needs of the study, for the purposes of this guidance material “air navigation services environmental assessment” is to be interpreted in the broadest possible sense and refers to impacts arising from changes to where, when, and how aircraft are operated.

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Once the feasibility study has been done, we will still need to do a cost-benefit analysis to identify the optimum solution/s. ICAO has developed some guidance and a tool to assist you on this task:

Cost-benefit analysis:

Guidance:

This guidance takes into account the wide range of different circumstances faced by air navigation services providers. It is based on international policies and principles on air navigation services cost-recovery that States have developed through ICAO and describes procedures and practices that are in conformity with these policies and principles.

https://store.icao.int/catalogsearch/result/?category_id=2&q=9161 (https://store.icao.int/catalogsearch/result/?category_id=2&q=9161)

CBA Tool:

https://data.icao.int/cba (https://data.icao.int/cba)

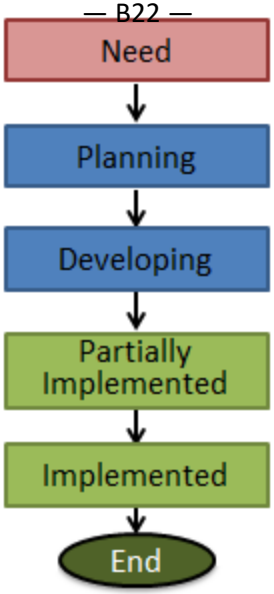
IMPLEMENT SOLUTIONS

Once the optimum solution/s has/have been identified, it is the moment to start the **execution phase** of the performance management process. This is where the changes and improvements that you decided were the optimum solution for your 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, ...)**.

Depending on the mature and magnitude of the change, this could mean:

- In the case of small-scale changes or day-to day management:
  - Assigning management responsibility for the implementation to an individual;
  - Assigning responsibility and accountability for reaching a performance target to an individual or organization
- In the case of major or multi-year changes:
  - Refining the roadmap of selected solutions into a detailed implementation plan, followed by the launching of implementation projects
  - Ensure that each individual implementation project is operated in accordance with the performance-based approach. This means launching and executing the performance management process at the level of individual projects. Each project derives its scope, context and expectations (see Step 1 of the process) from the overall implementation plan.

  This can imply to overcome high level political challenges, find funding and resources or look for external technical support.



ASSESS ACHIEVEMENT

And last but not least! Once the project is implemented, it is time to assess the benefits from the implementation! This means measuring the performance of the operational environment under analysis once the solution/s has/have been deployed.

The purpose of this step is to **continuously** keep track of performance and **monitor** whether performance gaps are being closed as planned and expected.

First and foremost, this implies **data collection** to populate the supporting metrics with the data needed to calculate the performance indicators. The indicators are then compared with the targets defined during Step 3 to draw conclusions on the speed of progress in achieving the objectives.

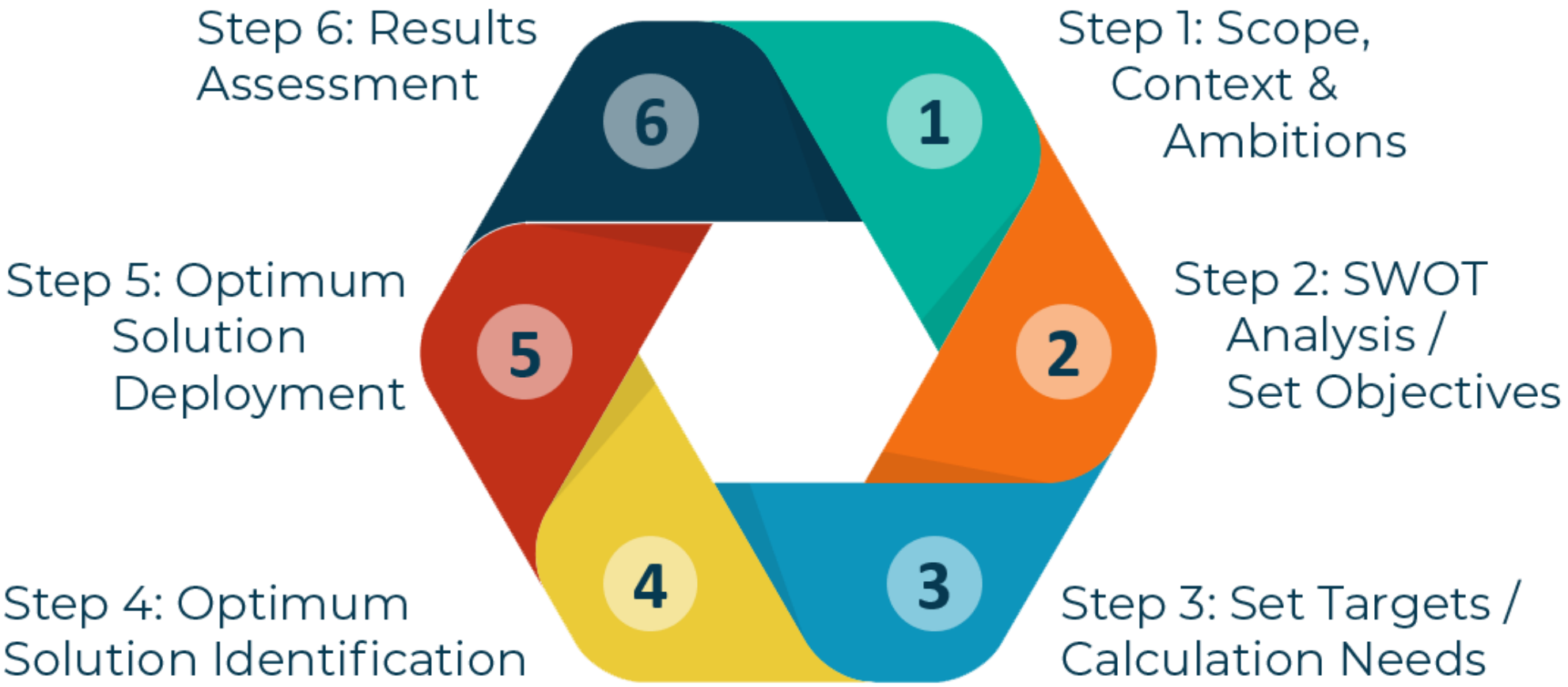
This step also includes **monitoring progress** of the implementation projects, particularly in those cases where the implementation of solutions takes several years, as well as checking periodically whether all assumptions are still valid and the planned performance of the solutions is still meeting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

With regard to **the review of actually achieved performance**, the output of this step is simply an updated list of performance gaps and their causes. In practice, the scope of the activity is often interpreted as being much wider and includes recommendations to mitigate the gaps.

This is then called **performance monitoring and review**, which in addition to this step, includes step 1, 2 and 3.

For the purpose of organizing performance monitoring and review, the task can be broken down into five separate activities:

- Data collection
- Data publication
- Data analysis
- Formulation of conclusions; and
- Formulation of recommendations.



An integral part of the performance review process is the formulation of recommendations. **These should be derived from the conclusions and also be included in the performance review report.**

Recommendations should focus on how to meet ATM community expectations through agreed upon performance objectives, performance indicators and performance targets. When an evaluation indicates inconsistency between ATM community expectations and performance objectives, performance indicators and performance targets, recommendations may include:

- the need to set or change performance objectives;
- the need to (re-)define performance indicators; and
- the need to set or change performance targets.

Recommendations will typically fall into the following categories (non-exhaustive list):

- the need to improve performance data collection;
- suggested initiatives aimed at closing identified performance gaps;
- suggestions to accelerate or delay performance improvements based on anticipated evolution of traffic demand and predicted performance indicator trends; and
- suggestions to accelerate or delay performance improvements based on anticipated evolution of traffic demand and predicted performance indicator trends; and
- setting up task forces, defining action plans, etc., with a view to beginning the implementation process.

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