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PPT/03

***Introduction to CAR/SAM KPAs for the Volume III of the
Regional Air Navigation Plan – CAR/SAM ANP***

Luis Sánchez

*MET/ENV Regional Officer
ICAO NACC Regional Office*

Eddian Méndez

*ATM/SAR Regional Officer
ICAO NACC Regional Office*

**CAR/SAM Regional Workshop for the Preparation of Vol. III of the Regional Air
Navigation Plan**

Online from 9 to 12 May 2022





Objectives

- Review the PBA concept and define KPAs to be incorporated in the CAR/SAM ANP Volume III.



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Performance Based Approach: Step by Step

- ✈ Step 2: Identify opportunities, issues and set (new) objectives
 - ✈ Step 2.1: Develop a list of present and future opportunities and issues that require performance management attention
 - ✈ Step 2.2: Focus efforts by defining and prioritizing performance objectives as needed



Performance Based Approach: Step by Step

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PERFORMANCE AMBITIONS

- ✈ In addition to the fundamental aviation principles of ***safety, security and economic and environmental sustainability***, there are several consequential performance requirements that the air navigation system must meet to fulfil the ever-growing expectations of society in general and, in particular, the aviation community.
- ✈ Based on what we know about the future and its opportunities and challenges, the air navigation system should provide for certain performance ambitions.



PERFORMANCE AMBITIONS

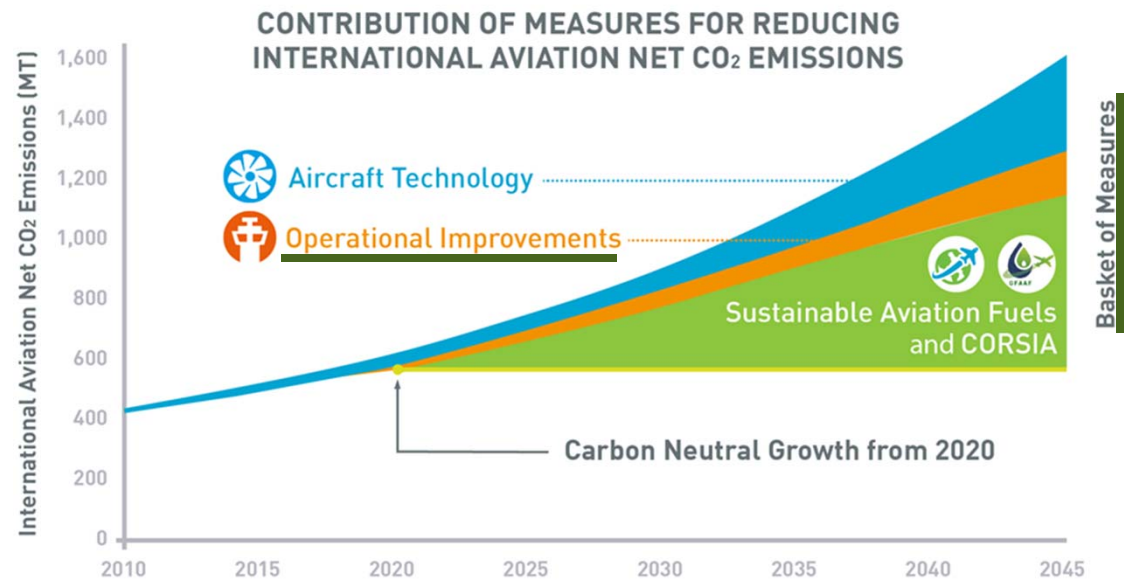
Sixth Edition of the GANP- 2019

- ✈ Safety
- ✈ Access and equity
- ✈ Participation by the ATM community
- ✈ Cost-effectiveness
- ✈ Capacity and Resilience
- ✈ Predictability
- ✈ Global Interoperability
- ✈ Security
- ✈ Flexibility
- ✈ Efficiency
- ✈ Environment



Environment ICAO's Global Aspirational Goals

- 2% fuel efficiency improvement per year
- Carbon neutral growth (CNG) from 2020 onwards
- Ongoing work on the feasibility of a long-term global aspirational goal (LTAG) for international aviation





Environment – States’ Action Plans on CO2 Emissions reduction activities

- Measure to establish a long-term strategy on climate change for the international aviation sector, involving all stakeholders at the national level
- work together to:
 - define a quantified baseline scenario,
 - select the appropriate emission mitigation measures from the ICAO basket of measures and
 - calculate the expected results of implementing those measures

PLAN DE ACCIÓN SOBRE REDUCCIÓN EMISIONES DE CO₂

b) Medidas Operacionales y Navegación Aérea (ATM) (DRWG 4)

Aumento de la eficiencia de la planificación de la ATM, las operaciones en tierra, las operaciones de terminales (salida, aproximación y llegada), las operaciones en ruta, el diseño y la utilización del espacio aéreo y las capacidades de navegación aérea de las aeronaves:

1. Adquisición de un Software para optimizar el diseño de procedimientos terminales de aproximación por instrumentos con guía vertical, el diseño de llegadas normalizadas con descenso continuo (CDO) y Salidas normalizadas con ascenso continuo (CCO).
2. Gestionar la realización de un levantamiento topográfico del terreno y obstáculos, que sirva de base para el diseño más óptimo de los procedimientos terminales de vuelo por instrumentos.
3. Gestionar el recurso humano que efectúe un muestreo estadístico sobre la utilización de los procedimientos terminales basados en la PBN por parte de los operadores aéreos nacionales y su impacto en la reducción del consumo de combustible y emisiones de CO₂.
4. Determinar/Calcular el posible impacto que genera los procedimientos de navegación.

Dominican Republic State action Plan



Performance ambitions/objectives

✈ First level of priority

- ✈ Capacity
- ✈ Participation by the Air Traffic Management (ATM) community
- ✈ Safety
- ✈ Security

* Example of the CAR
Region for reference

✈ Second level of priority

- ✈ Efficiency
- ✈ Flexibility
- ✈ Interoperability

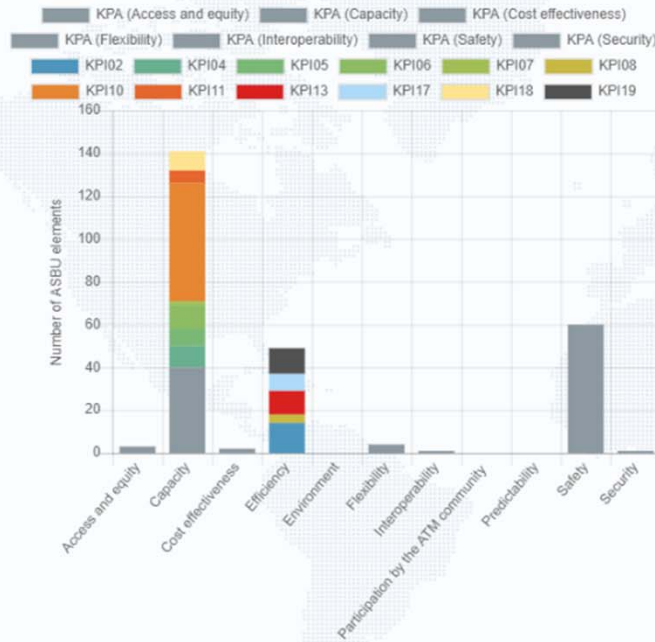


- ✈ Please note that for each performance ambitions a set of KPIs must be selected.
- ✈ The GANP provides reference for performance objectives and KPIs.
- ✈ Adding new KPAs requires additional work to provide reference for new KPIs (*including the link to the ASBU framework*)



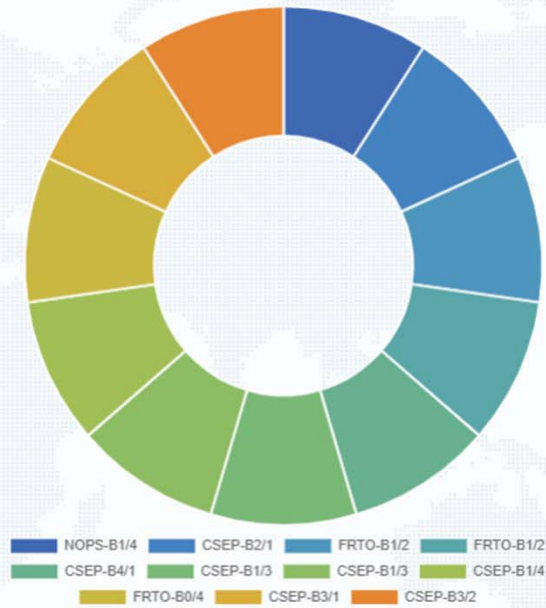
PERFORMANCE DASHBOARD

KPA Dashboard



KPI Dashboard

KPI06: En-route airspace capacity





FRT0

FRT0-B1/2	Required Navigation Performance (RNP) routes	Operational
Main Purpose	<p>RNP routes should be deployed within en-route airspace where Free Route Airspace (FRA) is not planned or if FRA is deployed the RNP routes should ensure the connectivity between FRA and TMAs.</p> <p>The objective is to provide consistent navigation using the most appropriate PBN type, infrastructure and navigation applications.</p>	
New Capabilities	<p>Performance-based navigation (PBN) specifications allow aircraft to fly a specific path between two 3D-defined points in space. The new capability refers to the Implementation of PBN/RNP routes within en-route airspace.</p>	
Description	<p>With the introduction of a RNP navigation specification, the advantages gained from RNAV will be further enhanced by on-board performance monitoring and alerting and the execution of more predictable aircraft behavior.</p> <p>Design of optimized routes which may include closely spaced parallel routes, Fixed Radius Transition (FRT) and Tactical Parallel Offset (TPO) functionality in en-route, supported by infrastructure and system improvements to support PBN routes.</p> <p>The adequate navigation infrastructure is required. GNSS or DME ground infrastructure needs to be optimised to support RNP operations and main reversionary capability in case of GNSS outages.</p> <p>PBN requires a full digital chain, to critical data quality levels, for aeronautical data provided to the airborne systems. The system improvements for controller support tools which might be required are covered by other FRT0 elements (MTCD, monitoring aids) or other threads (Safety Nets).</p>	
Maturity Level	Standardization	
Human Factor Considerations	<ol style="list-style-type: none">1. Does it imply a change in task by a user or affected others? Yes2. Does it imply processing of new information by the user? Yes3. Does it imply the use of new equipment? Yes4. Does it imply a change to levels of automation? Yes	



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PLANNING LAYERS

Pre-tactical Tactical-Pre ops Tactical-During ops

OPERATIONS

En-route

DEPENDENCIES AND RELATIONS

Type of Dependencies	ASBU Element
Relation-operational need	APTA-BQ/1 - PBN Approaches (with basic capabilities)
Relation-operational need	APTA-BI/1 - PBN Approaches (with advanced capabilities)
Relation-operational need	SNET-BQ/1 - Short Term Conflict Alert (STCA)

ENABLERS

Enabler Category	Enabler Type	Enabler Name	Description / References	Stakeholders	Year
Regulatory provisions	Operational Approval	Operational approval to provide RNP Routes	Provide appropriate terrestrial navigation infrastructure to support RNP operations - ground based stations Reference: ICAO Docs, 9613 (Ed 5 - ... read more	CAA ICAO	2019
Operational procedures	Design and operations	Procedures to design the RNP routes	Design and use of operational procedures Reference: EUROCONTROL European Route Network Improvement Plan (ERNIP) - Part I: European Airspace Des... read more	ANSP	2019
Airborne system capability	Aircraft system	Install appropriate RNP equipment	Equip aircraft eligible for RNP operations as defined in ICAO DOC 9613	Aircraft manufacturer Aircraft operator	2019
Ground system infrastructure	ATC systems	Adapt ATC ground system HMI for RNP routes	Upgrade HMI to provide presentation of PBN equipage to ATC	ANSP	2019
Training	-	Training requirements for RNP routes	Flight Crew Training: Train flight crews in RNP Provide training to staff prior to implementation ATCO Training: Train ATCOs in RNP Provide... read more	ANSP Aircraft operator	2019

DEPLOYMENT APPLICABILITY

Operational conditions:

The element will bring benefit in an en-route medium to high complexity traffic environment.

Main intended benefits:

Type	Operational description	Benefitting stakeholder(s)
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INTENDED PERFORMANCE IMPACT ON SPECIFIC KPAS AND KPIS

KPA	Focus Areas	Most specific performance objective(s) supported	KPI Impact	KPI
Capacity	Capacity, throughput & utilization	Overcome capacity limitations attributable to route network design	++	KPI06: En-route airspace capacity
Capacity	Capacity, throughput & utilization	Take advantage of increased navigation precision (airspace with PBN operations) to implement route networks and airspace structures with smaller lateral and vertical safety buffers	++	KPI06: En-route airspace capacity



Objectives quantification

✈ First level of priority

✈ Capacity

- ✈ KPI06 En-route airspace capacity
- ✈ KPI07 En-route Air Traffic Flow Management (ATFM) delay
- ✈ KPI09 Airport peak capacity

✈ Participation by the ATM Community

- ✈ KPI #– Improve stakeholder engagement, collaboration and coordination.

✈ Safety

- ✈ KPI#: Number of operational deviations per/number of operations.

✈ Security

- ✈ KPI#: number of events that interrupt or affect the provision of services/number of total events.
- ✈ KPI#: number of vulnerabilities identified and solved.
- ✈ KPI#: outage time of services caused by cyberattacks/assessed by impact.

* Example of the CAR Region for reference





Questions?



Answers





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