



Agenda Item 2: Global and regional context

**RECOMMENDATIONS FOR GREPECAS UPDATES TO VOLUME III OF THE CAR/SAM
REGIONAL AIR NAVIGATION PLAN (RANP)**

(Presented by the United States)

SUMMARY

This paper reviews the application of the Performance Based Approach (PBA) in the CAR/SAM Region and the progress made on using Volume III of the CAR/SAM Regional Air Navigation Plan (RANP) in facilitating the PBA. It continues building on recommendations made by the United States and IATA in WP6.6 for GREPECAS/23. It reviews Vol. III of the CAR/SAM RANP with a recommendation to simplify the initial use to practical first steps.

The paper recommends enhancing the role of the Ad-hoc Group for the Development of KPIs of GANP (GADHOC) as a mechanism for updating Volume III of the CAR/SAM RANP in facilitating GANP KPIs and tying performance metrics for member state's current operational and data capabilities. This could be done in close collaboration with task forces facilitating Operational Improvements (OIs) in the region.

Examples of KPI use for US traffic that interfaces with the CAR/SAM region are provided in **Appendix A**.

Data availability will continue to be an issue for the region. For this reason, the paper recommends ICAO sponsor projects that capture data from a State's Air Traffic Flow Management (ATFM) System, ATC Automation System or Billing System and/or obtain the key event times provided by Aircraft Communications Addressing and Reporting Systems (ACARS) from a commercial source.

References:

- ICAO Doc. 9883, Manual on Global Performance of the Air Navigation System
- CAR/SAM/ANP-VOLIII/2 Presentation: Industry expectations for CAR/SAM Airspace ANS provision
- GREPECAS/23/WP6.6: Effective KPIs for Informing Operational Improvements
- GREPECAS/23/WP6.1: Development for KPIs Management

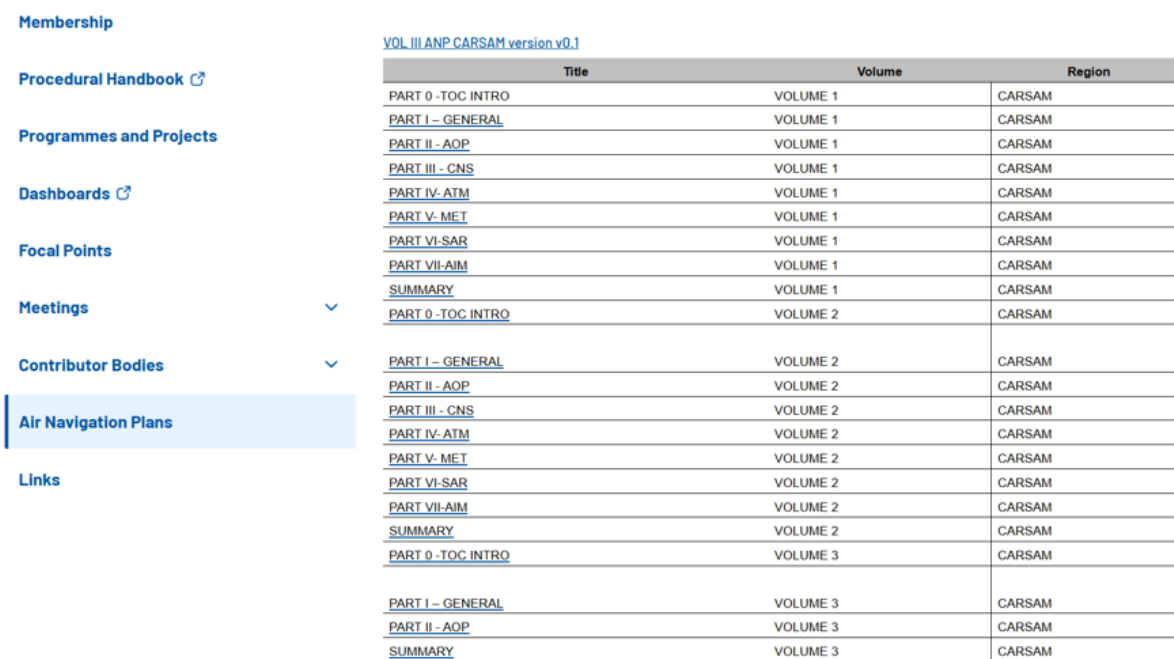
1. Background

1.1 For several years the CAR/SAM region has attempted to implement the standardized use of Key Performance Indicators (KPIs) across the CAR/SAM region. This effort has been slowed by implementation problems due in part to the cost of ATFM related data that is not always available and the usefulness of the metrics that organizations have been tasked with implementing as they relate to actual operational improvements. The purpose of this paper is to extend the recommendations from

GREPECAS/23 WP6.6 to simplify making the Performance Based Approach (PBA) easier to implement and recommend next steps for the Ad-hoc Group for applying KPIs and data analytics for maintaining Volume III of the CAR/SAM RANP.

1.2 ICAO Doc. 9883, “Manual on Global Performance of the Air Navigation System”, was published in 2009. It has not been revised, and the material is now over 16 years old. In that time, ICAO has produced a GANP Portal (www4.icao.int/ganportal) which has guidance on Key Performance Indicators (KPIs) and assistance in developing performance objectives and assigning KPIs to monitor progress. The manual itself is very comprehensive. However, its length can make it difficult to read. On one level, ICAO Doc 9883 can be simply summarized by the familiar ISO 9001, “Quality Management Systems – Requirements”. This ISO document adheres to the 4-Step approach of PBA that is abundantly addressed in literature. Namely, “Plan-Do-Check-Act”, where data analytics and metrics are key to all steps, especially the Planning phase and Check/Study/Review phases.

1.3 To implement PBA and the continuous improvement process, it would be useful for organizations to have a tool or document that lists the improvements in the planning or implementation phases and the metrics and data analytics that are being used to make informed decisions. ICAO has developed Volume III of the CAR/SAM RANP that has the potential to meet this objective. However, for the CAR/SAM Region, there has been little progress in achieving an effective and updated Volume III. Currently, it is discoverable at: <https://www.icao.int/GREPECAS/ealp-documents>. This website contains a hyperlink to, “VOL III ANP CARSAM version v0.1” in PDF format and links to other ANP documents that require permission to access, as shown in the figure below.



The screenshot shows the ICAO GREPECAS eANP Documents website. On the left is a sidebar menu with categories: Membership, Procedural Handbook, Programmes and Projects, Dashboards, Focal Points, Meetings, Contributor Bodies, Air Navigation Plans (highlighted), and Links. The main content area displays a table titled "VOL III ANP CARSAM version v0.1". The table has three columns: Title, Volume, and Region. It lists various parts of the document, including TOC INTRO, PART I - GENERAL, PART II - AOP, PART III - CNS, PART IV - ATM, PART V - MET, PART VI - SAR, PART VII - AIM, and a SUMMARY, each associated with a specific volume (1, 2, or 3) and the CARSAM region.

Title	Volume	Region
PART 0 -TOC INTRO	VOLUME 1	CARSAM
PART I – GENERAL	VOLUME 1	CARSAM
PART II - AOP	VOLUME 1	CARSAM
PART III - CNS	VOLUME 1	CARSAM
PART IV- ATM	VOLUME 1	CARSAM
PART V- MET	VOLUME 1	CARSAM
PART VI- SAR	VOLUME 1	CARSAM
PART VII- AIM	VOLUME 1	CARSAM
SUMMARY	VOLUME 1	CARSAM
PART 0 -TOC INTRO	VOLUME 2	CARSAM
PART I – GENERAL	VOLUME 2	CARSAM
PART II - AOP	VOLUME 2	CARSAM
PART III - CNS	VOLUME 2	CARSAM
PART IV- ATM	VOLUME 2	CARSAM
PART V- MET	VOLUME 2	CARSAM
PART VI- SAR	VOLUME 2	CARSAM
PART VII- AIM	VOLUME 2	CARSAM
SUMMARY	VOLUME 2	CARSAM
PART 0 -TOC INTRO	VOLUME 3	CARSAM
PART I – GENERAL	VOLUME 3	CARSAM
PART II - AOP	VOLUME 3	CARSAM
SUMMARY	VOLUME 3	CARSAM

Figure 1 - GREPECAS eANP Documents

1.4 At the time of this paper, the GREPECAS eANP documents require an ICAO sign-on with a registered email and password. FAA tested an email government email address that was already registered for access to the ICAO secure portal and assigned to the “ICAO GANP” group and could still not access the available links which seemed to still require additional permissions. Moving forward, this paper recommends that GREPECAS, and the ICAO NACC and SAM Secretariats agree to provide a workspace

for CAR/SAM members working on Volume III of the RANP and the ability to view the latest documents shown in Figure 1 above. Since Volume III of the RANP contains operational improvements (OIs) coupled with KPIs and/or data analytics informing the OI, the authorized members should consist of a Vol. III maintenance team comprised of select ATFM related task force members and select members of the KPI GADHOC. Final production of an update to this website could be overseen by the appropriate ICAO NACC and SAM Regional Officers and the GREPECAS President.

1.5 On June 13th, 2025, the NACC ATFM Task Force (now part of the AMCB TF) introduced recommendations for data that would allow the group to assess flight activity in the region that could inform or prioritize OIs. These are known in the NACC AMCB TF as Caribbean Performance Indicators or CARPIs. For Aerodromes, there is some overlap to a GANP KPI. The Task Force expands this flight activity monitoring to FIR's and Sectors. Use of the CARPIs as a starting place to enhance OIs in the CAR has the advantage of allowing groups to assess throughput with data that should be more readily accessible to States through their ATC/ATFM/Billing Systems.

1.6 Resources for producing all ICAO GANP KPI's will continue to be an issue for the region. PBA as described in ICAO Doc 9883 will continue to stagnate if a simpler process is not developed and States can see the value in archiving flight data that can be used for performance analysis resulting in OIs.

2. **Review of the current Vol. III of the CAR/SAM RANP**

2.1 For Volume III, after a comprehensive Strength-Weakness-Opportunity-Threat (SWOT) analysis, Volume III continues with Table PMP III-2 for identifying Performance Objectives using ICAO constructs of Key Performance Areas (KPA's) and Focus Areas. Table PMP III-3 duplicates PMP III-2 with a KPI column added. This is followed by PMP III-4 which looks to provide a single baseline number to a GANP KPI for a facility. The values provided go back to 2021. PMP III-5 then requests targets be developed for the GANP KPIs.

2.2 The sequence of PMP III-2 through PMP-III-5 has a logical flow, however, it guides a group down a labor-intensive path to be completed regardless of the situation. Following the existing processes, target setting would be arbitrary without more contextual information of what causal factors drive a metric, or consideration of the resources available for achieving a target. The existing process is very prescriptive in terms of choice of metric and the data analytics required to progress through the tables. For example, there is an objective to reduce taxi-out time resulting from adverse conditions. But how do you know the causal factor(s) that led to the adverse condition or the actual adverse condition that led to the delay? GREPECAS and ICAO should also consider if the prescriptive nature of the current one-format fits all reporting requests actually impedes the data analytics that would show the value of the KPI, and lead to an operational improvement.

2.3 To maximize the utility of KPIs and data analytics, this paper recommends beginning with a simple update to either Table III-3 (Objectives and KPIs) or Table PMP III-6 (Operational Improvements and KPIs) to reflect the current work in the region. As an example, the CAR/SAM region met in February of 2024 to review updates to Volume III. During that meeting, IATA presented a paper titled, "Industry expectations for CAR/SAM Airspace ANS provision" that listed their recommendations for OIs in the region (Presentation: ANPVOL3-P0-01-EN). The presentation made reference to:

- i) the Demand and Capacity Balancing Project,
- ii) implement Strategic Direct Routings,
- iii) examine bottlenecks in ARC Sectorization and well as many others.

2.4 The current Volume III, PMP-3 has performance objectives related to “Route Inefficiencies” and Airspace Capacity Limitations that have links to the IATA recommendations. However, it is not clear work advanced beyond high level statements since the document has not been updated. The multitude of tables require GREPECAS to go very broad across a multitude of KPIs, but the prescriptive nature impedes the group from going deeper into an understanding of what is needed to overcome the barrier to the operational improvement.

3. **Summary and Recommended Next Steps**

3.1 Volume III has proven difficult to implement, likely due to the large number of Table requirements and the attempt to create a one-size-fits all format for OIs, when not all OIs have an easy GANP KPI associated with them. The KPIs by themselves do not provide a causal factor and it can be difficult to justify the cost of data analytics without better links to the OI. There have been efforts to update the document, however the one posted on the GREPCAS site has not been modified for many years. The current Volume III contains many statements saying that all regions produce KPI’s the same way so ICAO can perform analysis across regions. This paper asks if this is realistic given the development history of Volume III of the CAR/SAM RANP and ICAOs workload. From the FAAs experience, calculating and reporting any KPI while not clearly associating it with a specific (or at least probabilistic) causal reason if of limited value.

3.2 ICAO HQ and GREPECAS (for the CAR/SAM region) should re-visit the intent of the GANP KPI Tables and related reporting requirements contained in RANPs and their implementation throughout all the Planning and Implementation Regional Groups (PIRGs). If PIRGs are not responding with globally harmonized KPI reporting, recognize that KPIs, data analytics and data informed decision making as described in ICAO Doc 9883 are still valuable. Simplified RANP Volume III components that improves a State’s and a Region’s ability to implement would be a good next step.

3.3 It will take resources to keep Volume III of the CAR/SAM RANP current. The current Volume 3 in 1.4 of the Introduction identifies GREPECAS as “responsible for managing and updating Volume 3 on a regular basis.” As this has proven difficult, the paper recommends GREPECAS make this a joint task item between the GADHOC, and regional implementation TFs tasked with driving the regional changes. The first step should be straightforward as it is simply transcribing the work items in the remit of the TFs to a Volume III table. The simplest table is PMP III-6 as it allows for project management linked to KPIs without immediately getting into setting targets. It allows for an assessment of the current GREPECAS tasks prior to developing a fully mature data analytics capability.

3.4 GANP KPIs by themselves do not suggest the reason for either the constraint or the Demand/Capacity imbalance that requires an investment in the aviation system. Equal attention should be given to this facet when considering additional KPIs or RANP Volume III reporting requirements. Any discussion of Targets such as in the PMP III-4 table should have additional data analytics that understand the constraint.

3.5 Data availability will continue to be an issue for the region. This paper recommends that if feasible, ICAO sponsor projects that improve the data availability for the region. This could include projects that obtain data from the ATFM, Air Traffic Control or Billing Systems. Flight Plans and actual trajectories would be very valuable in understanding airspace constraints in the region or the ability to perform predeparture or airborne reroute to improve throughput efficiency. Other sources could include the ACARS OOOI times used to produce the KPI results shown in this paper.

4. **Suggested actions**

4.1 This meeting is invited to:

- a) Direct ICAO NACC and SAM Regional Offices, and GREPECAS to improve procedures for updating and maintaining Volume III of the CAR/SAM RANP. This would include:
 - (1) Establishing an ICAO work environment where CAR/SAM task force and GADHOC members can provide updates to the RANP Volume III document prior to acceptance by GREPECAS. This could involve the establishment of an ICAO GREPECAS-GANP or CARSAM-GANP group where registered task group members contribute.
 - (2) Establishing coordination between task forces or States performing operational improvements, and those contributing KPI's and data analytics so they can jointly make updates to Volume III of the CAR/SAM RANP.
- b) Sponsor or encourage projects that provide States with the ability to collect data that is practical and economical for the purpose of providing data informed decision-making as called for in ICAO Doc 9883. This would include, but expand beyond, the KPIs identified in Volume III of the CAR/SAM RANP. Recommended projects include:
 - (1) Develop capabilities to obtain data directly from the States ATFM, ATC, or Billing Systems
 - (2) Sponsor acquisition of the key ACARS OOOI times.
- c) Encourage industry collaboration, including soliciting their assistance in the identification of stakeholder operational bottlenecks and establishing data pipelines between airlines and ANSP
- d) Initially focus on a simplified RANP Volume III as described in Paragraph 2.3 of this paper. Further KPI or data analytics would continue after peer review by the implementing task groups with participation from operators.

END

Appendix A: Examples of US Data Sources for Developing KPIs

A.1 The FAA relies on a developed process that captures data from its automation systems and supplements this with data purchased from data suppliers.

A.2 FAA purchases Gate-Out, Wheels-Off, Wheels-On, Gate-In (the OOOI times) information from a commercial vendor and these are used for several GANP KPIs including the punctuality measures (KPI01, KPI14), surface time measures (KPI02, KPI13), peak airport throughput (KPI10) and flight time variability (KPI15). It is a simple source that covers much of the GANP KPI framework. In Figure 2 below, the top US airports that interface with the CAR/SAM region are assessed using GANP KPI02. The US's CAR/SAM airports tend to be large metropolitan airports with high volume and congested airports. The graph in Figure 2 compares average time on surface for CAR/SAM traffic to non-CAR/SAM traffic operating at the same airport against an ideal un-impeded benchmark time. The timeframe of the comparison was a single high impact week that occurred the first week of June 2026.

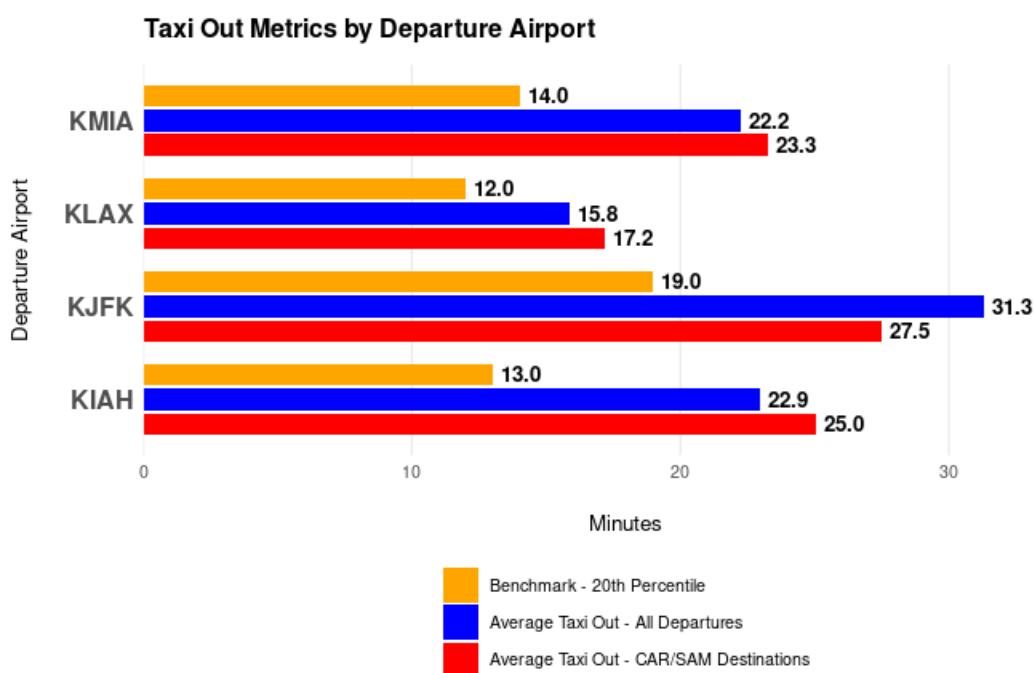


Figure 2 - Average Taxi-Out Time for US Traffic to CAR/SAM Region – First Week of June 2026

A.3 High amounts of surface delays or additional time (KPI02) will provide a reasonable first indicator of a demand/capacity imbalance and the need for assessing an operational improvement. The specific operational improvement will depend on the reason for the delay (Causal Reason or Causal Factor). For this reason, FAA supplements the recording of a delay or inefficiency with one of the Causal Factors defined in an existing FAA policy. Figure 3 below shows the causal factors impacting KPI02 include thunderstorms that resulted in route closures and heavy volume for the domestic airports that impact CAR/SAM flows. Minimizing these disruptions requires improved technology for facilitating pre-departure re-route options from closed to open routings and improved weather prediction tools. Winter disruptions are attributed to high traffic demand out of the US to the CAR/SAM region and de-icing conditions at the New York area airport (KJFK).

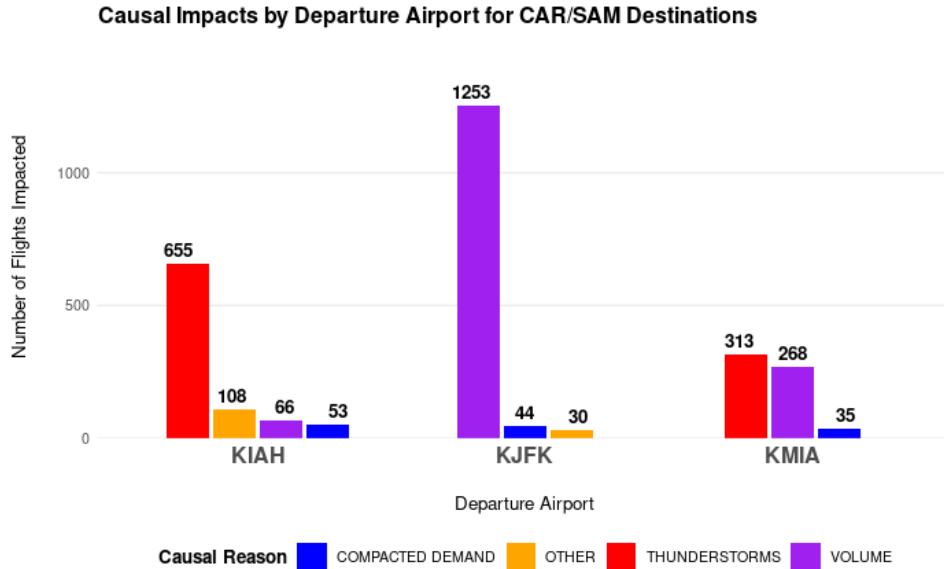


Figure 3 - Causal Impacts of Surface Delay by Airport and Number of Flights - First week of June 2026

A.4 Many of the KPIs the FAA uses rely on data collected and archived from its different automation systems. These systems are key for assessing airspace and airport constraints, since they allow data analytics and operational improvement teams can see the operator demand at the airport or the sector prior to the issuance of a Traffic Management Initiative (TMI). As traffic management systems and strategies emerge, it becomes clear that control times and re-route options not captured by current GANP KPIs play a large role. For this reason, the FAA has recommended ICAO approach performing analytics for OIs in a more flexible manner and not over prescribe the KPIs without assessing the full data analytics that are possible.
