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WORKING PAPER

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Guatemala City, Guatemala, September 21-25, 2026

Agenda Item 4: **Regional integration of the Global Air Navigation Plan (GANP) Version 8 and performance-based planning**

GANP Airspace Utilisation KPIs – CADENA Example

(Presented by the United States and Jamaica)

EXECUTIVE SUMMARY

This paper reviews the KPIs in the GANP that would be used to assess demand/capacity imbalances and inform the CAR/SAM operational tasks groups. Overall, the GANP KPIs focus on surface metrics. Airspace KPIs can be difficult without automation links to a State's Air Traffic Flow Management (ATFM) System. The paper describes several examples of airspace KPIs used in the United States including those using data generated for the Regional Data Exchange. The Regional Data Exchange provides demand projections for flights tracked in the US ATFM System. The data can be used to identify hourly demand seen in this system and how often and when this demand occurs. The data sources are provided by multiple states and processed by the US ATFM system.

Action:	See Section 4 for Suggested Actions
Strategic Objectives:	• Every Flight is Safe and Secure • Aviation Delivers Seamless, Accessible, and Reliable Mobility for All
References:	• https://ganpportal.icao.int/ASBU/KPI • ICAO Doc. 9750, Global Air Navigation Plan (GANP) • ICAO Doc. 9883, Manual on Global Performance of the Air Navigation System • Vol. III of the CAR/SAM Regional Air Navigation Plan (RANP)

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 to the usefulness of the metrics that organizations have been tasked with implementing as they relate to actual operational improvements. Some of the more useful metrics involve airspace constraints.

1.2 The US assesses airspace constraints using the Flight Plan Trajectories from its ATFM Traffic Flow Management System (TFMS) to determine flight demand at different assigned points in its airspace system. These can be evaluated at the FIR/ACC level, sector level, at an airport, waypoint, fix, or any region of airspace a Flow Management Unit (FMU) specialist defines using a Flow Evaluation Area (FEA) tool.

1.3 A continuing difficulty for the region is data availability to support either the prescribed GANP KPIs or data analytics that directly relate to operational improvements in the region. At present, FAA understands that ICAO is considering projects that would overcome this barrier through projects that would automate data capture directly from an ANSPs ATFM, ATC, or Billing system.

1.4 This paper reviews GANP KPIs that can be used to assess airspace constraints and provides examples of US airspace metrics used to evaluate current traffic flow management and the transformation to a modernized system that started in 2026. It provides an example of an airspace demand KPI using data from the CADENA Caribbean data exchange. This demonstrates how links to Traffic Management systems can be used to support data analytics for the ICAO Performance Based Approach as described in ICAO Doc. 9883 and Volume III of the CAR/SAM Regional Air Navigation Plan.

2. Summary of GANP and Airspace KPIs

2.1 ICAO lists 24 KPIs on its Global Air Navigation Plan portal located at: https://ganpportal.icao.int/ASBU/KPI. 19 KPIs are focused on efficiency, 4 on safety, and 1 on noise impact. For Airport capacity and throughout, multiple related KPIs are prescribed including: KPI09 (Optimal Capacity), KPI10 (Max Observed Throughput), and KPI11 (Capacity Efficiency) which assesses throughput against demand. The framework for airspace is different with just KPI06 providing a "maximum volume" under "normal" conditions. The example given is for en-route sectors.

2.2 FAA performance assessment allows for airspace demand/capacity assessments using the same framework as KPI09-KPI11 described for airports. Whereas KPI06 singles out Sectors, the same concept can be used for other airspace elements such as fixes, waypoints, and FIRs. In addition, FMU Specialists can define a specific region of airspace known as a Flow Evaluation Area (FEA), depending on the operational improvement being assessed.

2.3 The ICAO KPIs were not written to allow for this type of flexibility. There is an effort to include a host of prescribed "variants" within a KPI definition. However, the prescriptive nature hinders the flexibility required for data analytics and the ICAO numbering of KPI's will need consideration if a decision is made to add officially prescribed metrics related to KPI06, like the airport level KPI09-KPI11 framework described in Section 2.1 above. To cover the different airspace demand/capacity imbalances, the ICAO GANP KPIs would need to grow in several orders of complexity.

2.4 GANP KPIs by themselves do not provide a causal factor for the reason a KPI may be below its expected target or its best achieved value. Equal attention and resources should be given to data analytics of the metrics produced. It would likely be more advantageous to have fewer KPIs with causal factors assessed, than more KPIs and less understanding of what influences the measure.

3. Summary of the Regional Data Exchange

3.1 Much of FAA Performance Analysis has a focus on how Demand/Capacity imbalances are identified and subsequently managed through Traffic Management Measures (TMM). As implied in Section 2.1, there are overlaps among several GANP KPIs that measure Surface Delays (KPI02), Airport Level Capacity, and Throughput Efficiency measures of KPI09-KPI11. These concepts are extended to airspace demand and capacity with a focus at the Sector, FIR and airspace element level. Users can designate any region of airspace as a FEA to obtain the relevant airspace KPIs. To calculate demand, the FAA relies on the trajectory predictions made by TFMS using the following inputs: schedule data, flight operator updates to the baseline schedule data (including trajectory data), flight plan data, and airborne position reports.

3.2 In support of improving operational efficiency in the Caribbean region, the FAA has developed FEAs for Mexico, Cuba, The Dominican Republic, Jamaica, and COSESNA (See Figure 1 below). These FEAs correspond to Sectors and/or FIRs depending on the need of the ANSP. The FAA TFMS will then produce demand for these FEAs that include the FEA Entry and Exit times. Projected Active Flights by UTC hour are provided three times a day for each of the areas shown in Figure 1.

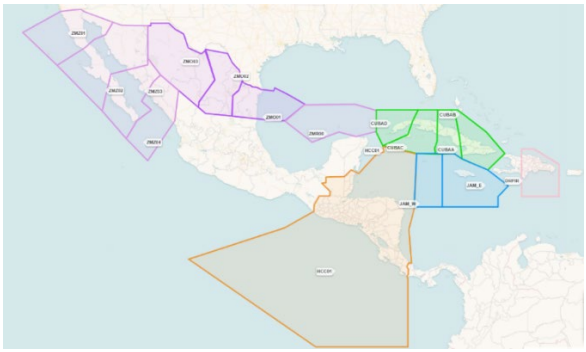

Figure 1- US Flow Evaluation Areas for CADENA Data Exchange

Figure 2- Actual Flight Trajectories for Jamaica East and West Sectors

1.1 This regional demand example shows what is possible when ANSP's and States take advantage of the capabilities provided through data exchange. At present, US TFMS has access to all flight schedules for the region, along with flight plan and position reporting data for US, Mexico, Canada, COSESNA, and UK airspace (see Figure 3). Piarco has also shared their data in the past, though currently that data flow has been interrupted. Appendix 1 shows the flight coverage for the Jamaica FIR for both US and non-US traffic Flows.

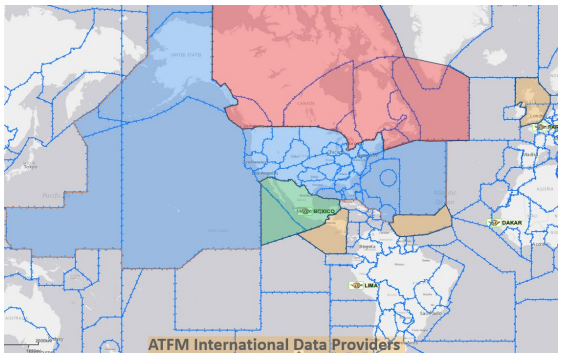

Figure 3 - Providers of Data

For a complete, comprehensive solution, additional States/ANSPs could become data providers and allow the FAA system to build and track the trajectories. Alternatively, the region could build a consolidated repository for schedules, flight plans, and actual trajectory data.

3.4 The US TFMS data source does have limitations. The data provided is for schedules, flight plans, and airborne trajectories known to the system as depicted in Figure 3. In Figure 2 above, actual trajectories can be seen for overflights through Jamaica and Cuban airspace. For flights arriving to Jamaica airports, the actual trajectories are limited to US, Canada, Mexico and COCESNA airspace.

3.5 One possible avenue to increase the data set is to have additional States/ANSPs provide their flight plan and position reports to the FAA's TFMS via System Wide Information Management (SWIM) platforms like COCESNA currently does. Additional data source from northern South America, or the Central Caribbean would fill in data gaps for traffic originating south of the current data sources.

3.6 For the CADENA Exchange, the US provides data, as described in 3.2, three times a day for the next 24 hours. As an example, the Jamaica Civil Aviation Authority, organizes the data by date and time and assesses the period between 1200 UTC and 2300 UTC, which typically represents the busiest period within the Kingston FIR. The data is then used to generate charts showing projected traffic demand for the Jamaica East and West enroute sectors, and Sangster International Airport (MKJS) (Figures 4 & Figure 5).

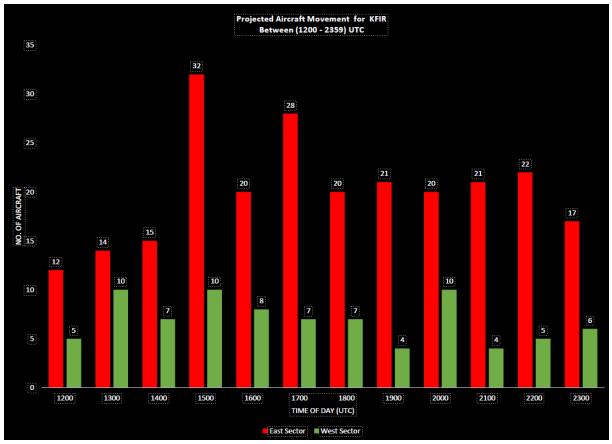

Figure 4 - Kingston ACC Sector Demand

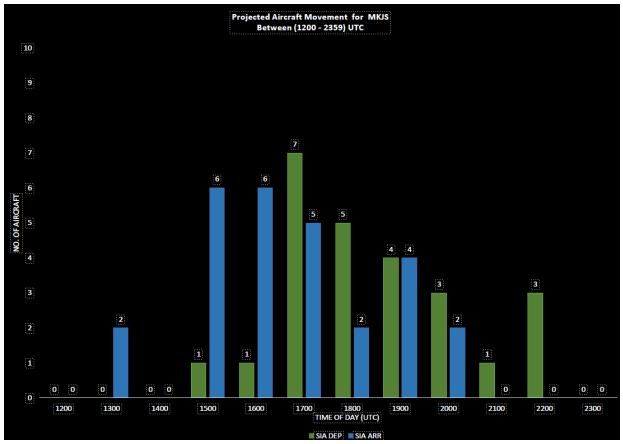

Figure 5 - Sangster International Airport

3.7 The traffic demand charts are distributed to operational stakeholders, including supervisory personnel, and provide an indication of expected traffic levels throughout the day. The information supports shift planning, resource allocation, and the scheduling of activities that may affect operational capability, such as equipment maintenance or training. In this way, Regional Demand Data (RDD) is transformed into a practical decision-support tool for daily operations. Figure 8 and Figure 9 in Appendix 2 show Average and Peak Active flights.

3.8 Jamaica is also examining the use of RDD, together with other operational data, to support sector capacity assessments and sectorisation planning. Continued analysis can identify recurring peak periods, traffic distribution across sectors, and seasonal or day-of-week demand patterns. These insights can support decisions related to sector configuration, staffing requirements, and the implementation of Traffic Management Measures (TMMs), where necessary.

3.9 The retention and analysis of RDD also supports longer-term performance assessment. Historical data can be used to establish traffic-demand baselines, identify trends in airspace utilization, and compare projected demand with actual traffic levels where available. When combined with capacity and operational performance data, this information can contribute to the development of airspace

utilization and demand-capacity indicators, supporting tactical, pre-tactical, and strategic ATFM decision-making.

4. Suggested Actions

4.1 Encourage States to develop procedures to obtain airspace utilization data directly from their automation systems. This could include the automation systems providing flight plan and position reports to SWIM.

4.2 Recommend ICAO develop or recognize Airspace Demand/Capacity/Throughput KPIs that can be obtained from Air Traffic Flow Management Systems and used to support operational improvements in the region. These would follow the framework of the current GANP for airports but would allow the flexibility to adapt to any airspace task work in the region.

4.3 Include training or briefing at future ICAO workshops on the region's current use of SWIM service publication or related work that automates a State's ability to obtain performance data directly from automation systems.

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APPENDIX 1

Geographic coverage of Flights

Figure 6 below shows the major US traffic flows that cross Jamaica airspace.

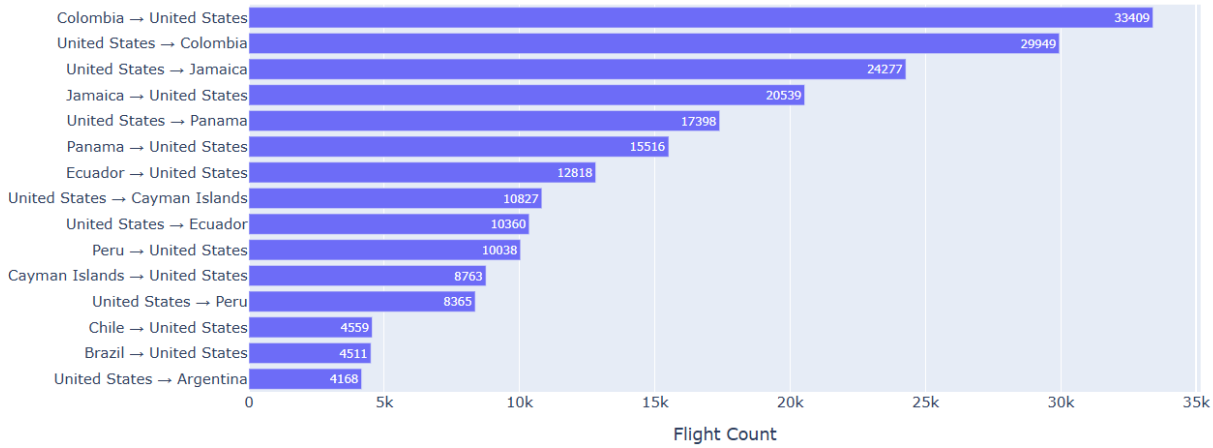

Figure 6 - US Traffic Flows through Jamaica FIR

Through International data providers, the data also contains flights from non-US traffic flows. The largest non-US traffic flows are shown in Figure 7 below.

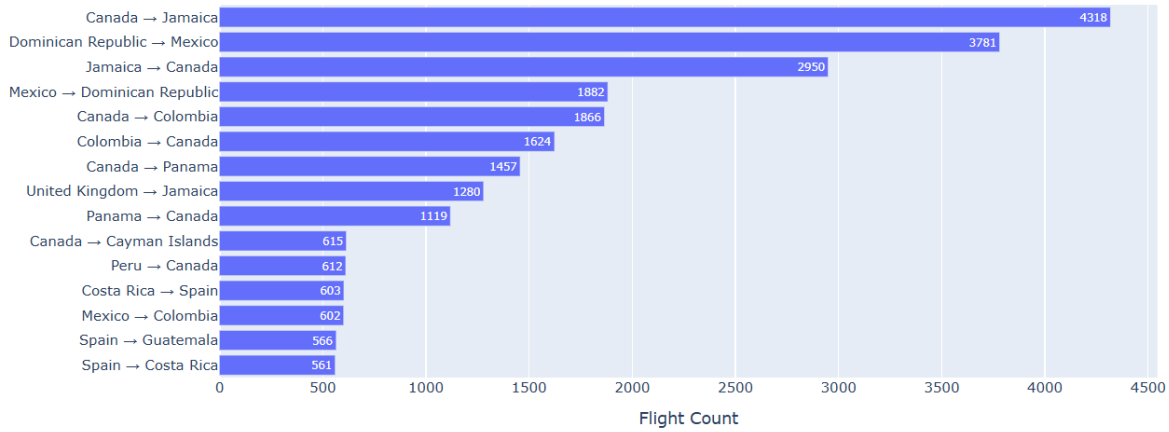

Figure 7 - Non-US Traffic Flows through Jamaica FIR

APPENDIX 2

Jamaica Airspace Demand KPIs using CADENA Data Examples

Figure 8 below shows average flights per hour for Jamaica East and Jamaica West. For the time period January 2025 to June 2026, average active flights peak at over 50 for the 16-17 UTC hour.

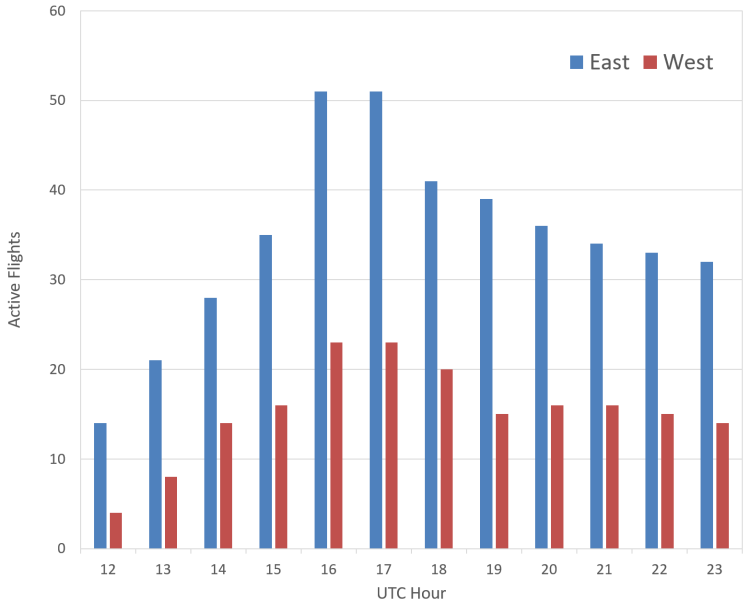

Figure 8 - Jamaica FIR Average Active Flights in Sector

Figure 9 shows the active flights for UTC hour 17 from June 1, 2025 to June 30 2026. The 90th percentile peak level traffic value is also shown for reference. Peak Traffic for the East of 61 is nearly double that for the West at 30 active flights.

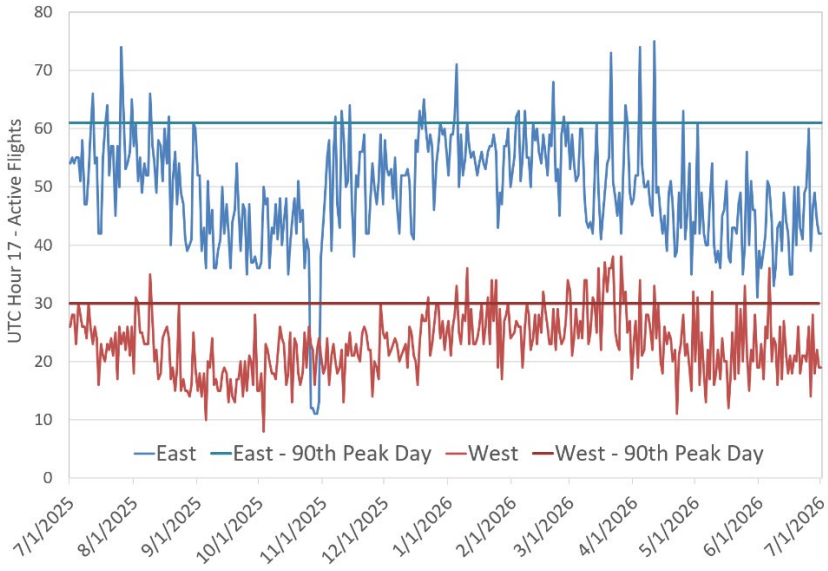

Figure 9 - UTC Hour 17 Active Flights

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