



**Twenty-first Meeting of the CAR/SAM Regional Planning and Implementation Group  
(GREPECAS/21)**

Santo Domingo, Dominican Republic, 15 to 17 November 2023

**Agenda Item 3: Global and Regional Developments  
3.3 CAR/SAM Air Navigation Services (ANS) Implementation Level**

**ATFM STRATEGY FOR CAR/SAM REGIONS**

(Presented by IATA)

**EXECUTIVE SUMMARY**

The objective of this working paper is to provide a follow-up on the proposals presented during GREPECAS/20, as well as to present proposals regarding the CAR/SAM ATFM Implementation Strategy, including prioritization of the implementation of cross-border ATFM procedures to enhance traffic flow efficiency in the CAR/SAM Regions.

<b>Action:</b>	Suggested Actions are included in Section 3
<i>Strategic Objectives:</i>	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Air Navigation Capacity and Efficiency</li> <li>• Economic Development of Air Transport</li> <li>• Environmental Protection</li> </ul>
<i>References:</i>	<ul style="list-style-type: none"> <li>• ICAO DOC. 9971</li> <li>• Global Air Navigation Plan</li> </ul>

**1. Introduction**

1.1. During GREPECAS/20, IATA presented a proposal to implement an ATFM tactical coordination mechanism for responses (H24) in situations of contingencies or unforeseen events in one or more Flight Information Region (FIR), which cause significant airspace impact. The proposal focused on evaluating alternatives that can reduce or eliminate impacts, based on alternative routes, exclusion of certain flights from restrictive measures, relaxation of restrictive measures, etc. A process was suggested that allows its activation by States, ANSP and users of airspace, including stakeholder coordination processes, and agreements on ATFM measures. The Meeting took note of this matter and in collaboration with IATA and CANSO, agreed to study and formulate a CAR/SAM initiative for the development of an ATFM Tactical Coordination Mechanism. The result of this activity should be presented at the GREPECAS/21 Meeting.

1.2. In the Seventeenth Meeting of the SAM Civil Aviation Authorities (RAAC/17), IATA presented the group with a working paper concerning ATFM Strategy for SAM Region. Through this paper, IATA outlined its strategic vision for the implementation of the ATFM service for the SAM Region including the need to include certain ATFM mechanisms to facilitate coordination in cases of degradations affecting ATS capacity. CANSO endorsed the paper and expressed support by the CADENA initiative. The States outlined the studies and initiatives being developed by the working groups, including the implementation of the cross-boundary ATFM working processes and the development of an ATFM Portal. It was emphasized that ATFM implementation must be interoperable and requires a collaborative, joint work environment between States, ANSPs, airlines and industry.

1.3. IATA presented a working paper to SAMIG29 (WP 2.10) similar to the one presented to RAAC/17 with the objective of proposing of an ATFM implementation strategy for the SAM Region. Based on the aforementioned working paper, the meeting concluded that, taking into consideration the requirements established in Doc 9971, there are airspaces in the SAM Region with an inadequate design, mostly related to sectorization and ATC capacity. This problem prevents the use of optimal flight paths due to the need to establish flight restrictions, either laterally (use of longer routes) or vertically (use of flight level restrictions), to match demand to the capacity of very large ATC sectors, including those responsible for sequencing aircraft for major airports and to effectively manage both climbing and descending aircraft.

1.4. Likewise, IATA presented WP 44 to NACC/DCA/11, with the same objective of proposing an ATFM Implementation Strategy for the NAM/CAR Regions. In this regard, the meeting formulated the following conclusion:

CONCLUSION NACC/DCA/11/5		SUPPORT AIR TRAFFIC FLOW MANAGEMENT (ATFM) AND AIRSPACE OPTIMIZATION INITIATIVES	
<b>That:</b> With the objective of supporting the efficient and sustainable growth of air traffic, based on the optimized use of the airspaces of the CAR Region,  a) the NACC/WG Airspace Organization Task Force (AO/TF) consider the Direct Routing Implementation Process, in accordance with guidance provided by the Global Air Navigation Plan, as well as include this initiative in the CAR/SAM Air Navigation Plan;  b) States actively participate in the implementation of ATFM, in accordance with AO/TF activities;  c) NACC States prioritize investment in the ATFM implementation, including allocation and training of human resources, to improve capacity and efficiency, as well as to make optimal use of the installed ATC and airports infrastructure;  d) The AO/TF to review the five-year goals proposed by IATA as part of the CAR/SAM Regions' efforts toward the achievement of net zero CO2 emissions by 2050.  e) The NACC/WG update the CAR/SAM Air Navigation Plan, to include goals and activities related to air navigation infrastructure and operational efficiencies that will contribute with the Long-Term Aspirational Goal (LTAG) to achieve net zero CO2 emissions by 2050.)		<b>Expected impact:</b> <input type="checkbox"/> Political / Global <input checked="" type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input checked="" type="checkbox"/> Environmental <input checked="" type="checkbox"/> Operational/Technical	
<b>Why:</b> To allow sustainable growth of air traffic and compliance with environmental LTAG.			
<b>When:</b> NACC/DCA/12		<b>Status:</b> <input checked="" type="checkbox"/> Valid / <input type="checkbox"/> Superseded / <input type="checkbox"/> Completed	
<b>Who:</b> <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> ICAO <input type="checkbox"/> Other:			

## 2. Discussion

2.1. Collectively, this working paper mentions stated that in accordance with the ICAO Doc. 9971 - Manual on Collaborative Air Traffic Flow Management (ATFM), “A methodology to balance demand and capacity should be developed in order to minimize the effects of ATM system constraints. This can be accomplished through the application of an “ATFM planning and management” process. In this initiative, interactive capacity and airspace planning process, airport operators, ANSPs, AUs, military authorities and other stakeholders work together to improve the performance of the ATM system.” The process contains three equally important phases: ATM planning, ATFM execution and post-operations analysis.

2.2. The relationship between an implementation of an ATFM planning and management process and the quality of service provided by a State/ANSP is clear. This process will allow among other benefits, correct allocation of financial resources, timely implementation of required capacity to meet growing demand, an optimal use of the installed ATC and airport capacity, increase situational awareness of all stakeholders, timely/effective measures to mitigate contingencies.

## 2.3. ATM Planning

2.3.1. Also, in accordance with the Doc 9971, “Three elements of ATM planning must feed the ATFM system: traffic forecast, performance targets, and the general output of ATM planning. The ATM planning phase is therefore a preparatory one. Measures taken in this step include:

- a) reviewing airspace design (route structure and ATS sectors) and airspace utilization policies to look for potential capacity improvements;
- b) reviewing the technical infrastructure to assess the possibility of improving capacity. This is typically accomplished by upgrading various ATM support tools or enabling navigation, communication, or surveillance infrastructure;
- c) reviewing and updating ATM procedures induced by changes to airspace design and technical infrastructure;
- d) reviewing staffing practices to evaluate the potential for matching staffing resources with workload and the eventual need for adjustments in staffing levels; and
- f) reviewing the training that has been developed and delivered to ATFM stakeholders”

2.3.2. Taking into consideration the requirements established in the DOC. 9971 mentioned above, there are airspaces in the CAR/SAM Region with an inappropriate design, mostly related to sectorization and ATC capacity. This issue prevents the use of optimum flight trajectories due to the need to establish flight restrictions, either laterally (use of longer routes) or vertically (use of flight level restrictions), to adjust the demand to the capacity of very large ATC sectors, including those responsible for sequencing aircraft for major airports and for controlling aircraft in the process of climbing and descending.

2.3.3. Regarding CNS infrastructure, the need for improving ATS surveillance and VHF coverage in some key airspace(s) in the region would support reduced longitudinal separation and increase of the airspace capacity, as well as prevent technical issues that has led to development of potentially unnecessary contingency procedures.

2.3.4. Adjustments in staffing levels is an issue in at least one State in the CAR/SAM Region and must be monitored and assessed to facilitate sustainable ATM and service delivery levels to meet future traffic demand.

## 2.4. ATFM execution

### 2.4.1. Strategic Phase

2.4.1.1. As per Doc 9971, the strategic phase includes:

- a) a continuous data collection and interpretation process involving a systematic and regular review of procedures and measures;
- b) a process to review available capacity; and
- c) a series of steps to be taken if imbalances are identified. They should aim to maximize and optimize the available capacity to cope with projected demand and, therefore, achieve performance targets.

2.4.1.2 Most CAR/SAM States have not implemented the ATFM Strategic Phase which marginalizes airlines users and ATC ability to form strategic plans. Currently, situations arise whereby ATC has been obliged to apply improvised/non-standard measures to cope with a demand or a capacity issue that they did not expect.

## 2.4.2. Pre-tactical Phase

2.4.2.1. Doc 9971 establishes that the main objective of the pre-tactical phase is to optimize capacity through an effective organization of resources (e.g., sector configuration management, use of alternate flight procedures). The work methodology is based on a CDM processes established between the stakeholders (e.g., flow management unit (FMU), airspace managers, AUs).

2.4.2.2. The tasks to be performed during this phase may include the following:

- a) determining the capacity available in the various areas, based on the particular situation that day;
- b) determining or estimating the demand;
- c) studying the airspace or the flows expected to be affected, the aerodrome expected to be saturated, calculating the acceptance rates to be applied according to system capacity;
- d) conducting a comparative demand/capacity analysis;
- e) preparing a summary of ATFM measures to be proposed and submitting them to the ATFM community for collaborative analysis and discussion; and
- f) at an agreed-upon number of hours before operations, conducting a last review consultation involving the affected ATS units and the relevant stakeholders, to fine-tune and determine which ATFM measures should be published through the corresponding ATFM messaging system.

2.4.2.3. It should be recognized that some CAR/SAM Regions States are making all possible efforts to elaborate the ATFM Daily Plan (ADP), which should contain the information mentioned in 2.4.2.2. However, this information normally does not reach out most of the stakeholders, including airlines and airports, as well as typically does not include the expected ATFM measures to be applied in some situations.

## 2.4.3. Tactical Phase

2.4.3.1. In accordance with Doc 9971, in the ATFM tactical phase, solutions and measures are adopted on the day of the operation. Traffic flows and capacities are managed in real time. The ADP is amended taking due account of any event likely to affect it.

2.4.3.2. The tactical phase aims to ensure that:

- a) the measures taken during the strategic and pre-tactical phases actually address the demand/capacity imbalances;
- b) the measures applied are absolutely necessary, and unnecessary measures are avoided/eliminated;
- c) capacity is maximized without jeopardizing safety; and
- d) the measures are applied taking due account of equity and overall system optimization.

2.4.3.3. In the CAR/SAM Region, one of the main challenges to apply the ATFM tactical phase are contingency situations and/or unexpected events that cause significant impact to the ANPSs and/or airspace users. Nevertheless, it is necessary to adopt a tactical coordination mechanism, with a prompt response mechanism, with a view to evaluating alternatives that can reduce or eliminate operational impacts.

2.4.3.4. Tactical coordination mechanisms should be established through the adoption of a process that allows their activation by States, ANSPs and/or airspace users. The process should be based on the possibility of using teleconferences involving the States, ANSPs and airspace users involved, who could make quick and effective decisions, based on the agreements reached in the calls.

2.4.3.5. It is essential to differentiate the activation of the ATS Contingency Plan, which must be done through the processes established in the plan and the discussion of alternative measures, which could be established within the scope of the ATFM tactical coordination mechanism.

2.4.3.6. For the establishment of the ATFM tactical coordination mechanism, it will be necessary to develop and update a list of ATFM or ATC points of contact (for States that do not have H24 ATFM units), which can be triggered H24 to participate in calls of the Tactical ATFM Coordination Mechanism. These points of contact must have the power to make operational decisions, reached by agreements during the calls, and implement them immediately.

2.4.3.7. The success of the ATFM tactical coordination mechanism requires the participation of all CAR/SAM States, taking into consideration that ATS contingencies and unexpected events typically involve several FIRs and ATC facilities.

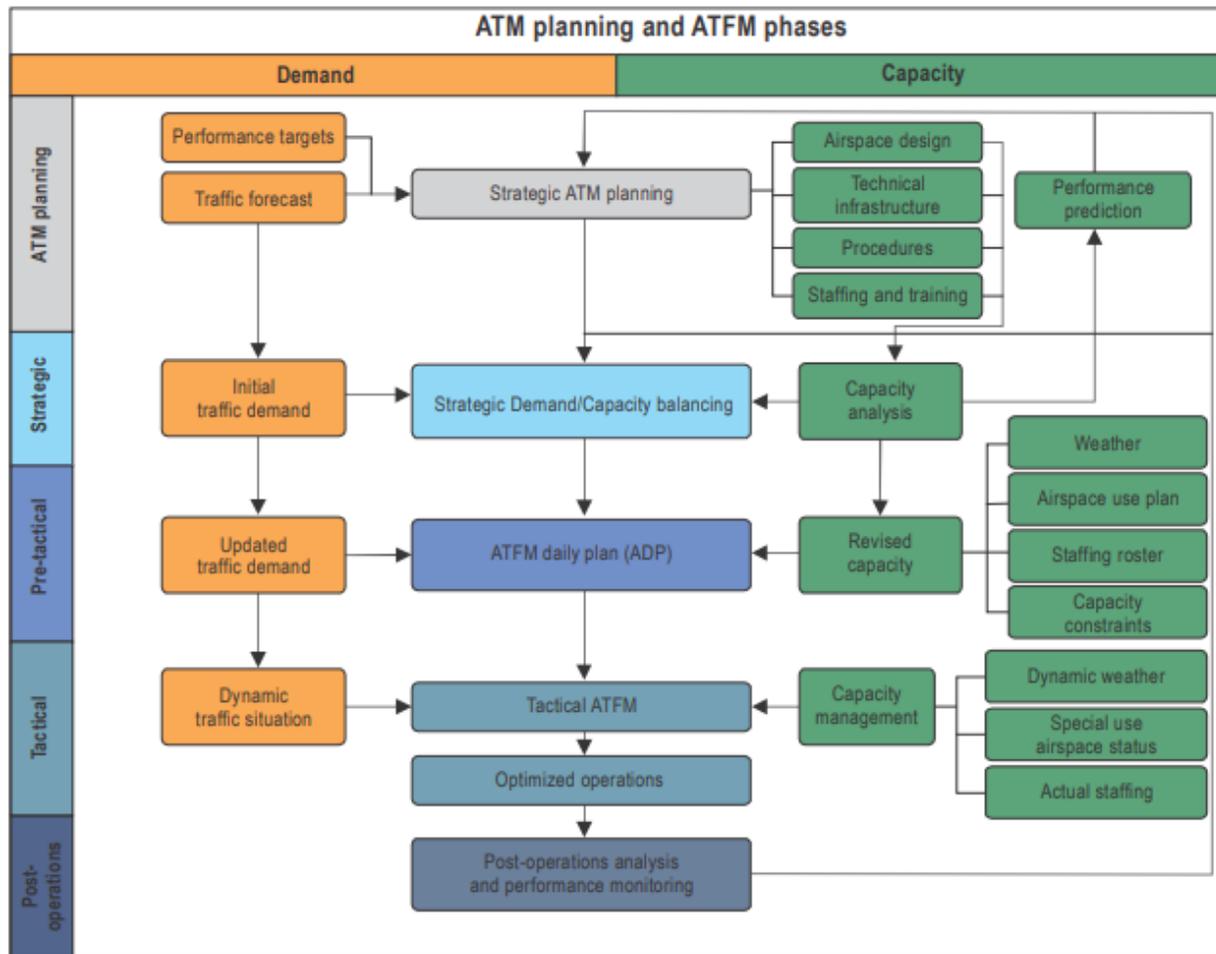
2.4.3.8. As an example, a coordination mechanism was activated by CADENA on March 02, 2023, to face an issue related to radar coverage loss in the Panama FIR, due to the loss of the communication link between Puerto Cabezas Radar and ACC Panama. Even though the mechanism had properly worked, with participation of all involved ATC facilities and a substantial number of airspace users, the speed of the decision-making process should be improved to avoid unnecessary impact on airspace users. In this case, it seems that there were at least two main reasons slowing down the decision-making process: (1) the lack of decision-making authority of the participants concerning the best procedures to be applied and (2) the lack of pre-coordinated procedures for the case of losing the mentioned radar (ATM planning).

2.4.3.9. The tactical coordination mechanism should evolve to a cross-border ATFM procedures to enhance traffic flow efficiency in CAR/SAM Region, which will allow the application of optimized processes on a routine basis that would materially increase capacity and efficiency of the ATC system.

#### 2.4.4. Post-operations analysis

2.4.4.1. As Doc9971 refers, during this phase, an analytical process is carried out to measure, investigate and report on operational processes and activities. This process is the cornerstone in developing best practices and/or lessons learned that will further improve the operational processes and activities. It should cover all ATFM domains and all the external units relevant to an ATFM service.

2.4.4.2. Post-operations analysis is a key element to provide feedback to the ATM Planning phase, allowing timely planning and implementation of new projects to face bottlenecks and to cope with projected air traffic demand. It is important to note that the information provided by post-operations analysis must be data driven and based on key performance indicators. The figure below from Doc 9971 summarizes the ATFM planning and management process.



## 2.5. Five Years Goals

### 2.5.1. Short term (2023/2024)

- Prioritize investment on ATFM implementation, including allocation and training of human resources.
- Implement an ATFM tactical coordination mechanism in CAR/SAM Regions and corresponding evolution to a cross-border ATFM procedures to enhance traffic flow efficiency in CAR/SAM Regions.
- Implement/Improve and disseminate the ATFM Daily Plan to all stakeholders.
- Review ATC sectorization to identify present and future bottlenecks.
- Implement Post-operations analysis process based on agreed key performance indicators.

### 2.5.2. Medium term (2025-2027)

- Implement a full ATFM service, including ATM Planning and ATFM Execution (Strategic, Pre-tactical, Tactical, and post-operations phases).

### 3. Suggested Action

3.1. The Meeting is invited to:

- a) Take note of the information provided in this working paper.
- b) Urge ICAO to lead the implementation of ATFM in CAR/SAM Regions, in accordance with guidance provided by the Annex 11, Doc 4444 and Doc 9971, as well as to include this initiative in the Regional Air Navigation Plan, as a contribution to comply with the portion related to infrastructure and operational efficiencies to the Long-Term Aspirational Goal (LTAG) to achieve net zero CO<sub>2</sub> emissions by 2050.
- c) Urge CAR/SAM States to implement an ATFM tactical coordination mechanism in CAR/SAM Regions and corresponding evolution to a cross-border ATFM procedures to enhance traffic flow efficiency in CAR/SAM Regions.
- d) Urge CAR/SAM States to prioritize investment in the ATFM Implementation, including allocation and training of human resources, to improve capacity and efficiency, as well as to make optimal use of the installed ATC and Airports infrastructure.
- e) Urge CAR/SAM States to adopt the five years goals proposed in the item 2.5 of this working paper as part of the CAR/SAM Regions efforts toward the achievement of net zero CO<sub>2</sub> emissions by 2050.

— END —