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WORKING PAPER

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**Automatic Dependent Surveillance – Broadcast OUT Implementation Meeting for the
NAM/CAR Regions (ADS-B/OUT/M)**
Ottawa, Canada, 21-23 August 2019

Agenda Item 5: Other Business

NEW VERSION OF THE GLOBAL AIR NAVIGATION PLAN AND NAM/CAR CHALLENGES

(Presented by the Secretariat)

EXECUTIVE SUMMARY

This Working Paper provides information on the new version of Doc 9750, Global Air Navigation Plan and information on surveillance for the assessment of the Surveillance Task Force that is part of the ANI/WG.

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|------------------------------|---|
| Action: | Suggested actions are presented in Section 5. |
| <i>Strategic Objectives:</i> | <ul style="list-style-type: none">• Safety• Air Navigation Capacity and Efficiency |
| <i>References:</i> | <ul style="list-style-type: none">• https://www4.icao.int/ganportal/• https://www4.icao.int/ganportal/ASBU/PerformanceObjective |

1. Introduction

1.1 The new version of the Global Air Navigation Plan (GANP) is expected to be approved in the 40th ICAO Assembly to be held in ICAO Headquarters from 24 September to 4 October.

1.2 The new version of the GANP boosts the evolution of the global air navigation system to comply with the growing expectations of the aviation community. The GANP provides a series of operational enhancements to increase capacity, efficiency, predictability and flexibility to warranty the interoperability of the systems and the harmonization of the procedures.

1.3 The GANP explains the different responsibilities of each stakeholder (States, Organizations, airports community, Air Navigation Service Providers, users, industry, among others to assure an interoperable and harmonized aviation system.

1.4 The Basic Building Block (BBB) is also introduced, that describe the base of any robust air navigation system, identify essential services that must provide each State in air navigation services, airport services, air traffic management, search and rescue, meteorology and information management, and CNS aeronautic infrastructure assets.

1.5 GANP Sixth Edition has a multilayer structure comprehends two global levels; global (global strategic planning) and technical (ASBU), as well as the regional (Regional Air Navigation Plan) and national (National Air Navigation Plan).

1.6 The main concept was updated in the frame of the Aviation System Block Upgrade (ASBU). ASBU pillars are classified in three groups:

1. Operative subprocesses: ACDM, APTA, NOPS
2. Information topics: SWIM, AMET, DAIM, FICE
3. Technological topics: COMS, COMI, NAVS, ASUR (previous roadmaps)

1.7 The ICAO six-step method is established. Steps 1 and 2 help to know the system, its strengths, weaknesses, opportunities and threats, as well as how it functions, acting to establish objectives. Based on these objectives, they can be established in step 3 and 4, and potential solutions can be identified to achieve objectives on weaknesses and threats of a system. Once a group of potential solutions has been identified, a cost-benefit analysis, an assessment on the environment impact and on security and human factor has to be done to identify an optimal solution.

1.8 In the framework of the GANP performance, a list of key performance indicators (KPI), linked with relevant objectives of the performance objectives catalogue, is provided to establish objectives through the quantification of objectives. A list of possible solutions to be considered as part of Step 4 is the ASBU framework, with its functional description, enhancements and its benefits of associated performance.

1.9 Step 5 manages a coordinated deployment of the solution agreed by all the stakeholders, dependant on the previous steps. Finally, Step 6 consists on monitoring and reviewing of the system after a complete implementation of the solution.

1.10 Additionally, ICAO requests the States to incorporate to their Air Navigation Plans anything related to the ICAO Global Aviation Safety Plan (GASP) and the Global Aviation Security Plan (GASeP). In the case of the GASP, safety is critic when air navigation operational enhancements are planned, in line with the GANP, to determine if these enhancements can be implemented safely. A risk assessment provides information to identify dangers that can suffer from, for example:

- a) any planned modification in the use of the airspace;
- b) the introduction of new technologies or procedures; or
- c) as a result of the dismantling of older navigation aids.

1.11 In addition to the challenges related with safety and its risks, the GASP supports the implementation of the GANP as it requires an adequate infrastructure to support the provision of essential services described in the BBB. The BBB framework describes the spinal cord of any robust air navigation system, defining the essential air navigation services that should be provided by the international civil aviation in accordance with ICAO Standards and Recommended Practices (SARPs) and the ICAO Procedures for air navigation services (PANS).

2. Discussion

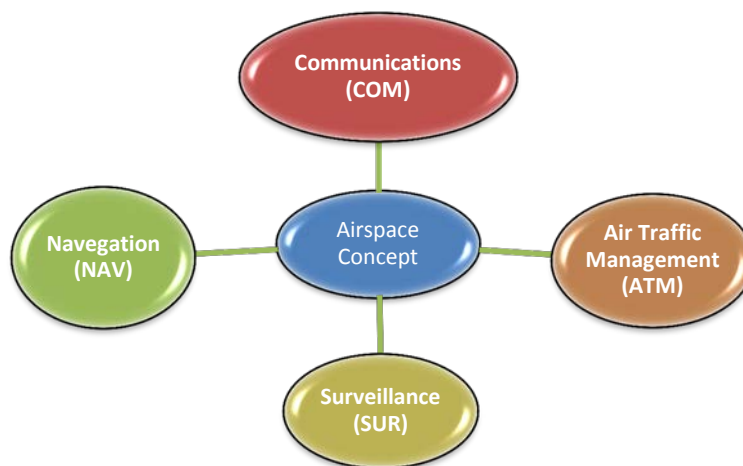
2.1 As a result of the ANI/WG/04 Meeting held in Miami, United States, in August 2018, it was concluded that the States have been making investments in CNS infrastructure and that despite of the increased capacities none operational benefit has been reached. Hence, it was requested to define three regional objectives that can be used to reach the operational benefits regionally.

2.2 The ANI/WG/05 Meeting held in Mexico City in May 2019, approved de following operational objectives to be developed regionally:

1. Efficiency/capacity: Operational longitudinal separation reduction in the region.
2. Predictability/efficiency: standardization of the aeronautical message information (AIM/SWIM).
3. Environment: CO2 emission reduction.

2.3 One of the actions that have been developed in the recent years is the establishment of PBN routes, which have made more efficient some airspace areas in the States, but standardized regional procedures have not been implemented, in spite of having the CNS infrastructure to do it.

2.4 Within an airspace concept, the PBN requirements are affected by communications, ATS surveillance and ATM services; NAVAID infrastructure and required functional capacities to comply with the ATM application. PBN requirements also depend on some grade of redundancy to warranty an adequate continuity of functionality

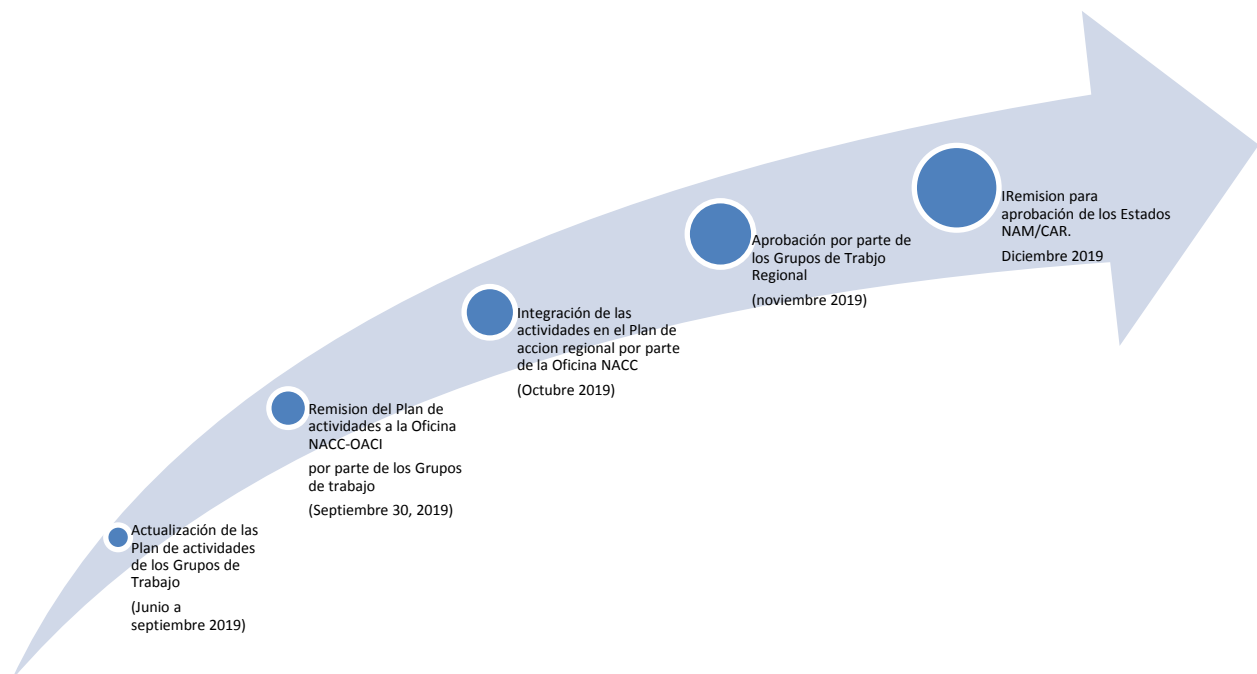


2.5 Surveillance infrastructure contributes directly to comply with the regional objective number 1, regarding efficiency and the increase of capacity of operational management regionally.

2.6 Currently, under the new ANI/WG structure, regional task forces have committed to support the following activities:

1. Aligning the activities to be developed under their responsibility to contribute reaching the three regional objectives.
2. Sending their updated working plans to the ICAO NACC Regional Office by 30 September 2019.

2.7 Once the working plans are received, the ICAO NACC Regional Office will integrate them in one plan, with dates and responsible personnel, and according to the results of the ICAO 40th Assembly this plan will be updated.



3. Activities to be analysed by the Surveillance Task Force

3.1 Today more than ever, the region needs to carry out jointly work among all the related parties and obtain benefit from this and of the agreements that can be reached on CNS and ATM standardization to support the regional growth.

3.2 With the approval of the new GANP version in the next ICAO Assembly the responsibilities of the States, air traffic providers, users, industry and Regional Offices will be updated.

3.3 However, there are identified challenges, national and regional operative requirements with expired implementation dates, without the compliance of these implementation requirements met to date. Among them we can underline the following:

3.3.1 Safety alarms:

3.3.2 Air Safety alarms:

1. Airborne collision avoidance system (ACAS) implementation, Traffic Alert and Collision Avoidance System/Traffic Collision and Avoidance System (TCAS), Version 7.1. Requires an analysis to agree harmonized implementation and standardization regionally. Even though some States have indicated that have implemented it.

3.3.3 Ground safety alarms:

1. Ground safety alarms are an integral part of the ATM system. They are used primarily based in ATS surveillance data, providing warning gaps to information control personnel to assess a situation and the proper actions to be done. In this regard, counting with the information from the States on management capacity of the ATM systems regarding safety is required.
2. **Appendix A** to this Working Paper provides information on the GANP requirements linked to these implementations.

3.4 The Secretariat, through the 2017 Surveillance Meeting in Lima, Perú, and having ratified the request in the ANI/WG/04 Meeting, requested to the States sending to the ICAO NACC Regional Office the information of their surveillance infrastructure. To date, the following information is available:

| No | States | Surveillance Infrastructure |
|----|-----------------------------|-----------------------------|
| 1 | Cuba | Complete |
| 6 | Central America and COCESNA | Complete |
| 1 | United States | Complete |
| 1 | Mexico | Sent but incomplete |
| 1 | Trinidad and Tobago | Complete |

3.5 Ten of the 22 NAM/CAR States have completed this requirement, hence, it is necessary the pending States to send this information as soon as possible. This information is necessary to ratify:

1. Regional coverage area
2. Surveillance information overlapping areas and the possibility to boost surveillance data sharing among the States
3. Identify areas in the region where surveillances data is lacking and support implementation studies of the satellite ADS-B
4. Support the development of the Regional Airspace Concept and the PBN implementation

5. Support the development of the surveillance data management applications that ICAO Headquarters is creating to support management in the States.

3.6 Although a new GANP version is expected to be in force immediately after the ICAO 40th Assembly next October, it will be necessary the States to make an analysis of the minimum infrastructure they should have, included the surveillance infrastructure.

3.7 Finally, the new GANP version requires an analysis of the ASBU requirements, regarding the implementation objectives of the different blocks, new capacities and the consideration to take into account for its implementation. **Appendixes B and C** to this Working Paper provide information correspondent to the directly related ADS-B implementations or other surveillance systems.

4. Recommendation

4.1 It is recommended that the NAM/CAR Surveillance Task Force, part of the ANI/WG, includes within its tasks (September 2019 to August 2020) the following activities:

1. Development of a document that includes the considerations and requirements to achieve harmonized implementation of the TCAS Version 7.1 and to achieve the operational and safety benefits of its implementation.
2. Coordinate the collection of the management capacity information of the safety alarms of the different ATM systems and make the necessary recommendations to the States that are going to modernize or buy new ATM systems.
3. Coordinate with the States that have not delivered their surveillance infrastructure its prompt delivery and establish mechanisms that assure updated information.
4. Coordinate the assessment by the States of the raised surveillance requirements according to the BBB.
5. Once the new GANP version is approved, coordinate the analysis of the ASBU implementation, which is supported by the ADS-B or other surveillance system.

4.2 It must be taken into account that the success of any project to be developed is based in the involvement of all the stakeholders, therefore, to assure the success of the activities management it must be warranted that the States and their air traffic providers, users (airlines) and industry are integrated.

5. Suggested actions

5.1 The Meeting is invited to:

- a) review the information provided in this Working Paper;
- b) adopt, as part of the working plan of the Surveillance Task Force, activities indicates in Section 4 of this Working Paper; and
- c) any required other actions.

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