

- scenario);
- b. justifying investment/securing funding;
- c. designing technical specifications for public tenders;
- d. achieving interoperability, harmonization, and project scalability;
- e. coordinating effectively with industry before, during, and after implementation.

1.3 These asymmetries result in fragmented initiatives and, in many cases, the squandering of resources on even unviable projects. In other words, States must assume technical responsibilities with varying levels of preparedness, budgetary capacity, and operational experience, which has often led to technically and economically inefficient implementations.

2. Analysis

2.1 Need for a Single Regional Technical Tool

2.1.1 A common-use Regional Technical Reference Manual would serve as a structured guide to facilitate:

- a. capacity planning in line with ASBU technologies contained in RANP Volume III;
- b. technical harmonization and interoperability among States and regions;
- c. prioritization of investments based on measurable operational benefits;
- d. progressive evolution toward a seamless air navigation system.

2.1.2 Content highlights would include:

- a. reference to regulatory requirements (interoperability or technological compatibility standards, safety, efficiency, availability, and sustainability parameters, etc.);
- b. minimum required technological elements for implementation;
- c. standard format model for technical specifications;
- d. reference models or architectures;
- e. criteria for technical evaluation and validation.

2.1.3 This tool would also respond to ICAO's principle of "no country left behind," providing clear and practical guidance even to States with limited capacities.

2.2 Expected Benefits

- a. Standardization of technical criteria in tenders, projects, and technology transitions;
- b. Cost reduction through regional synergies and common specifications;
- c. Strengthening of dialogue with industry by having a shared base of functional expectations;
- d. Transparency and traceability of technical decisions at the national and regional levels.

2.3 Suggested Contents of the Manual

The Manual could also include:

- a. minimum and recommended technical requirements by operational environment;
- b. model templates for Terms of Reference (ToR) in national projects;
- c. technical-economic evaluation guides for investment decisions;
- d. successful case studies and lessons learned from various regions;
- e. technical justification and empirical evidence.

2.4 Additional Considerations

2.4.1 The Manual should be developed under the coordination of the Secretariat, with the participation of expert groups from States, other regional/interregional bodies, and industry.

2.4.2 Its publication as a non-binding but referential document would allow States to adapt its content to local realities, respecting State sovereignty in investment and implementation decisions.

2.4.3 Its periodic update could align with ASBU block reviews and GANP/RANP evolution, maintaining its technical and operational relevance.

2.4.4 Currently, there is no technical manual that compiles in a single document the minimum technical foundations necessary to guide the scalable and harmonized implementation of ATM technologies at national and regional levels.

2.4.5 Valuable references exist in other regions, such as the SESAR Deployment Programme in Europe and the NextGen Implementation Plan in the United States, which have developed documents with:

- a. reference architectures with a modular approach;
- b. data interfaces and technical interoperability (e.g., SWIM, FIXM, AIXM, IWXXM);
- c. cybersecurity and information management recommendations;
- d. functional roadmaps for phased implementation;
- e. technical governance models.

2.4.6 The systematization and adaptation of these experiences would allow the meeting to propose a Technical Reference Manual for ATM Evolution, aligned with GANP/RANP, ASBU blocks, and current challenges in integrating new technologies and airspace users. This document would be highly useful to avoid fragmented system implementations and reduce risky or suboptimal investments.

2.5 Conclusion

The development of a ATM Regional Technical Reference Manual represents an opportunity to reinforce coherence, efficiency, and sustainability in the modernization of the national, regional, and global air navigation system. A shared technical foundation would enhance the capacity of States to make informed, cost-effective decisions aligned with ICAO's and States' strategic goals—thereby improving aviation safety, interoperability, and efficiency.

2.6 Suggested Actions

The Meeting is invited to:

- a. approve this working paper;
- b. request the Secretariat to initiate the assessment work for the development of a Regional Technical Reference Manual for GANP Implementation;
- c. invite States, air navigation service providers, industry, and regional organizations to actively participate in its drafting;
- d. assess the inclusion of the Manual as a strategic tool within the ASBU implementation framework for the region;
- e. promote its use in national planning, tendering, and monitoring processes related to air navigation projects;
- f. propose the establishment of an Ad-Hoc Working Group, under the coordination of the SAM

Regional Office, to begin drafting the Manual with the participation of SAM States and other stakeholders, establishing a tentative schedule, initial contents, and a technical review process.

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