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FOURTEENTH AIR NAVIGATION CONFERENCE

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Agenda Item 3: Air Navigation System Performance Improvement
3.3: Eighth Edition of the Global Air Navigation Plan (GANP)

SAUDI NATIONAL AIR NAVIGATION PLAN (SNAP)

(Presented by Saudi Arabia)

EXECUTIVE SUMMARY

This paper presents information on the Saudi National Air Navigation Plan (SNAP), the master plan for the evolution and modernization of air navigation systems and services over the coming 15 years.

The SNAP is defined based on the Assembly Resolution A41-6, the *Global Air Navigation Plan* (GANP, Doc 9750), and the performance-based approach (PBA) as described in the ICAO Doc 9883, *Manual on Global Performance of the Air Navigation System*. The plan describes the vision, objectives, and series of progressive innovative operational and technological improvements, initiatives, and delivery plans for air navigation services (ANS) modernization. The initiatives and proposed solutions were subject to business cases covering possible options for the deployment with an analysis of the benefits, costs, and risks compared, with an explanation of how it would be best implemented.

1. INTRODUCTION

1.1 Under the implementation of the National Transformation Program (NTP) aiming to develop the necessary infrastructure and services for the achievement of the Kingdom of Saudi Arabia's Vision 2030 goals, the General Authority of Civil Aviation (GACA) took the initiative to set a national air navigation plan known as Saudi National Air Navigation Plan (SNAP). This plan is a strategic document that addresses and bridges gaps in the knowledge, skills and attitudes (KSAs) air navigation infrastructure and services, tackles the upcoming air navigation challenges, and sets initiatives with a roadmap for ANS modernization.

1.2 The SNAP is defined based on the Assembly Resolution A41-6, the *Global Air Navigation Plan* (GANP, Doc 9750), and the performance-based approach (PBA) as described in the ICAO Doc 9883. The plan describes the vision, objectives, and series of progressive innovative operational and technological improvements, initiatives, and delivery plans for ANS modernization. The initiatives and proposed solutions were subject to business cases covering possible options for the deployment with an analysis of the benefits, costs, and risks compared, with an explanation of how it would be best implemented.

2. THE DEVELOPMENT OF SNAP AND ITS STRUCTURE

2.1 The development of SNAP started with the establishment of a dedicated multidisciplinary working group (WG) in the field of ANS and the identification of all relevant stakeholders. The first activity of the WG was the development of the SNAP project framework and the definition of objectives. The retained objectives for SNAP can be summarized as follows:

a) support the implementation of GACA Civil Aviation Strategic Objectives;

b) ensure continuous improvements of safety during the deployment of operational improvements over the coming 15 years;

c) support the increase of capacity and efficiency covering the whole ANS network;

d) ensure progressive and smooth Integration of new entrants (e.g. unmanned aircraft systems (UAS), remotely piloted aircraft systems (RPAS), and Space launches);

e) satisfy military and security needs to access airspace and ANS and to appropriately respond to any threats;

f) strength and continuous improvement of system resilience for ANS network against disruption or cybersecurity threats;

g) apply environmental sustainability as an overarching objective for SNAP;

h) enable digital transformation of ANS infrastructure systems, forested by new technology and increased automation, data-rich, and cyber-secure connections;

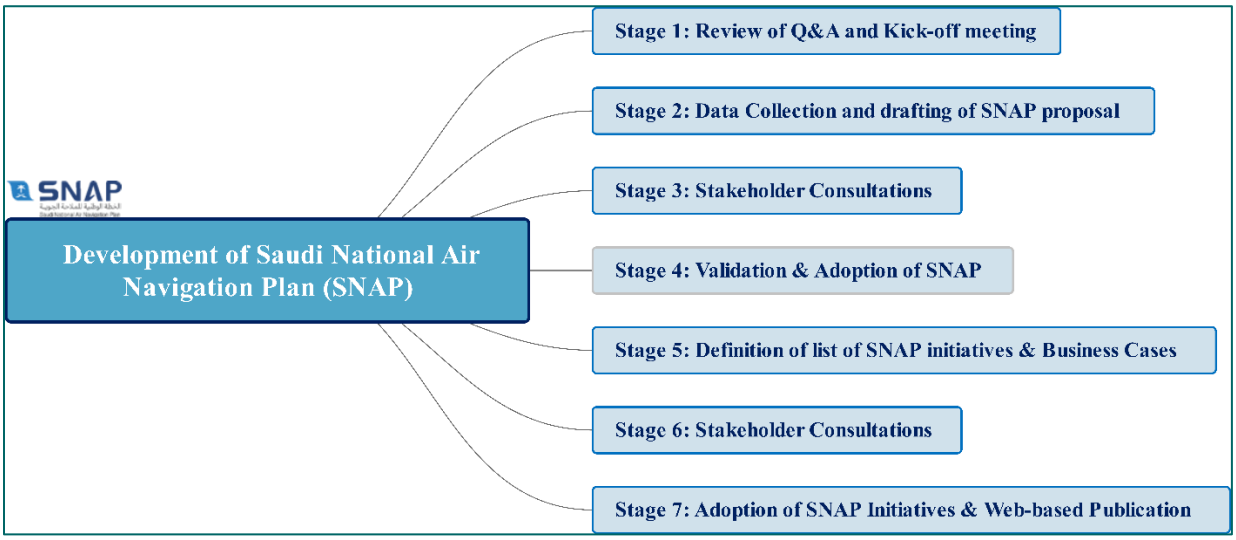
i) develop a regulatory framework supporting innovation and ANS modernization, considering alignment with regional and international standards and requirements;

j) serve as the primary forum for stakeholders' collaboration, cooperation, and interaction; and

k) support the capacity-building process in the KSA by reskilling and upskilling ANS personnel as an overarching objective for SNAP.

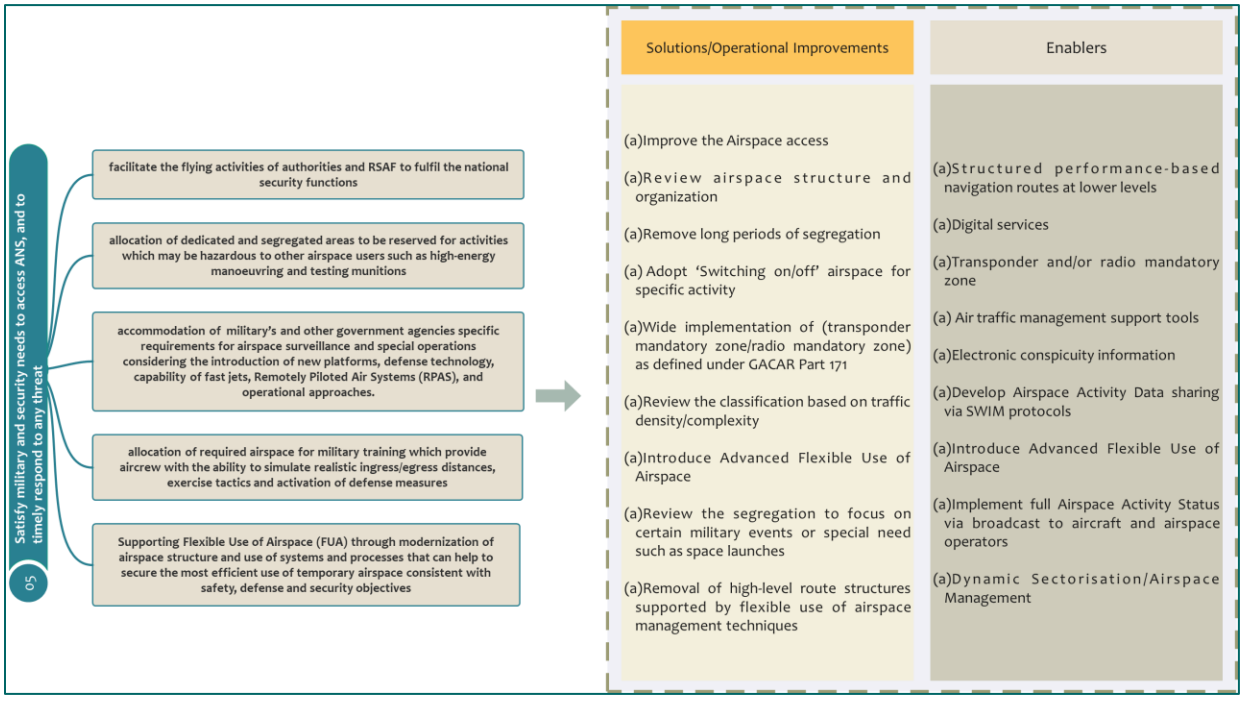
2.2 The SNAP project is arranged in seven stages, aimed at incrementally building up the contents while ensuring alignment with the GANP and the stakeholders' engagement throughout the development of the plan[1]. These stages cover all the activities related to ANS strategy, governance, operational improvements over time, deployment roadmaps, and performance monitoring and reporting.

[1] *Under the regional consultation, SNAP was presented during the First Meeting of the RANP/NANP Task Force (RANP/NANP TF/1) held in the ICAO MID Office, Egypt from 19 – 22 February 2024. The participants, including the ICAO Secretariat, were invited to provide feedback and inputs on the SNAP contents and development process. The material presented during this meeting can be found under this link: https://www.icao.int/MID/Pages/2024/RANP-NANP%20TF1.aspx.*

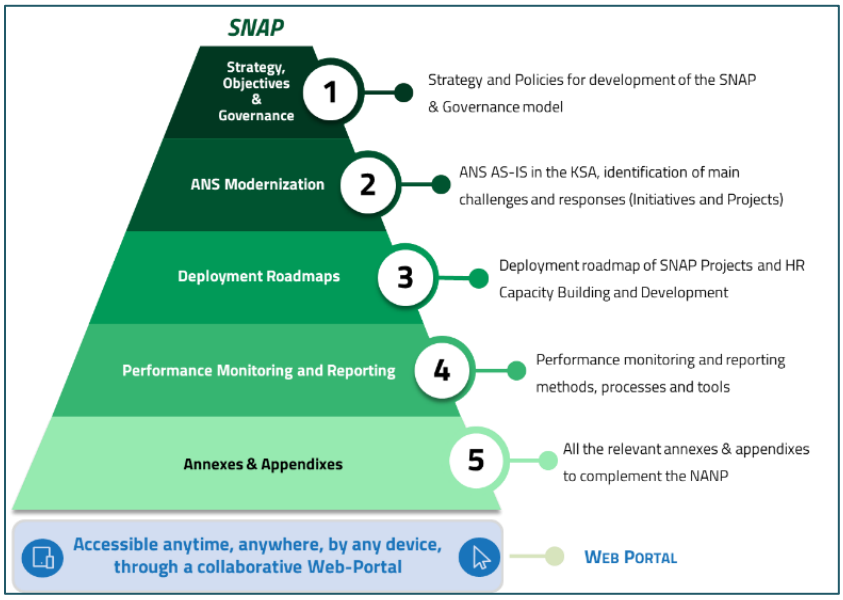


2.3 The seven stages were divided into 27 work streams covering all aspects, starting with an as-is analysis of the ANS network, identification of operational improvements and upgrades, links to GANP ABSU elements, consultation of stakeholders, development of business cases, and design of web-based platform hosting SNAP and all associated monitoring and reporting activities. This platform is designated as eSNAP. The details on SNAP's work streams, activities, and deliverables are attached to this paper.

2.4 To identify the list of operational improvements under SNAP, each objective was divided into sub-objectives with an exploration of all possible solutions to achieve each sub-objective, including the associated technical and operational enablers, as illustrated below.



2.5 An iterative process was applied until the SNAP contents were defined. The final structure retained for SNAP consists of five layers, as shown in the following illustration.



2.6 To deliver SNAP objectives for the modernization of ANS in KSA, 27 projects, grouped into six initiatives, were identified as follows:

a) **enhance the airports and TMAs operations** with six projects related to airport collaborative decision making (A-CDM), advanced surface movement guidance and control systems (A-SMGCS), time-based separation (TBS), RECAT, arrival management (AMAN)/departure management (DMAN), and simultaneous operations;

b) **flight trajectory optimization** with three projects related to time-based operations, air traffic flow management, performance-based navigation;

c) **virtualization of air traffic management (ATM) infrastructures** with three projects related to remote aerodrome control tower (TWRs), remote tower centres, virtualization and remote ATS facilities;

d) **airspace organization and management** with five projects related to Multi-Sector planner, dynamic sectorization, free route, flexible use of airspace, and flight information service;

e) **New Entrants' operations and integration** with three projects related to very low-level operations, higher airspace operations, and RPAS; and

f) **digitalization of services provision** with seven projects related to artificial intelligence (AI)-based tools, conflict resolution assistant (CORA), enhancement of data link applications, system-wide information management (SWIM), digital aeronautical information service (AIS) and meteorological (MET), ground-based surveillance and electronic conspicuity, and satellite communication (SATCOM).

2.7 Each project is detailed in the SNAP with a dedicated "project card" capturing the key information related to the operating environment, owner and supporting stakeholders, phases of the flight, interdependencies, technical and operational enablers, mapping against Aviation System Block Upgrade (ASBU) elements, regulatory framework and specifications, assumptions, risks, expected benefits, KPAs and KPIs, and implementation roadmap. Each SNAP project is supported by a "business case", which proposes possible implementation scenarios (based on the expected costs, risks, and benefits) and identifies the scenario to be effectively implemented.

2.8 To ensure the availability of qualified staff for operational and technical improvements, a capacity-building framework is set to identify training programs and associated roadmaps to meet the challenges of ANS modernization. This framework identifies the new ANS jobs, competencies, qualifications related to SNAP, training needs, and educational programs required to meet the requirements and ensure the timely introduction of planned improvements.

2.9 Within SNAP, two types of monitoring and reporting are defined to keep track of the overall implementation and effectiveness of the activities:

a) Progress monitoring: monitoring the overall SNAP implementation, namely the aggregated progress of the whole set of 27 projects, through project management KPIs (actual per cent progress – planned per cent progress).

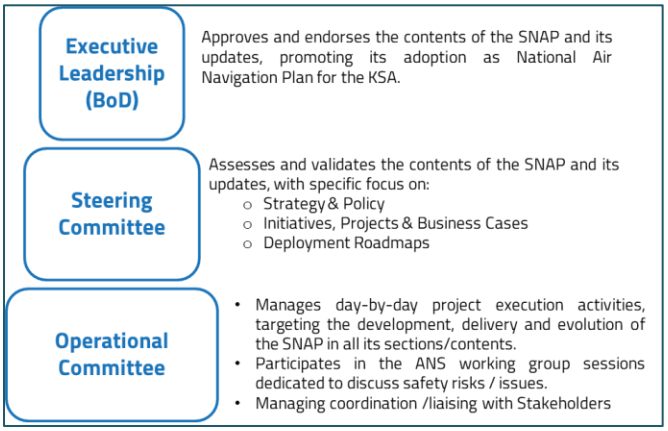
b) Performance monitoring: monitoring the performance variation generated by the SNAP projects through the ICAO-proposed performance KPIs.

2.10 The entire monitoring and reporting cycle is taking place through the SNAP web portal. The owners of the different projects, through an ad-hoc SNAP unit, is able to:

a) upload data and reports related to projects' progress while such projects are still in the execution phase; and

b) upload data and reports related to the performance variation generated after the projects' execution and calculated against the established historical baseline.

2.11 To manage and maintain the SNAP, a three-level governance structure was defined to ensure the quality and consistency of its contents and updates over time. The governance model is structured as follows:



3. CONCLUSION

3.1 SNAP's development is a cooperative and iterative process that has involved all stakeholders. It is based on the ICAO Doc 9750 and the ASBUs using the PBA described in ICAO Doc 9883. The plan has identified solutions that enhance collaboration between stakeholders, including aircraft operators and ANS providers, implement initial SWIM, and introduce network capacity and demand balancing measures.

3.2 SNAP is expected to deliver efficient services and infrastructure through ANS/ATM data exchange, the progressive introduction of free-route operations, the integration of advanced airport performance management into the ATM network, and the provision of initial UAS services. The plan defines projects for virtualization and dynamic airspace configuration and management, supported by the gradual introduction of higher levels of automation, with full integration of KSA airports into ANS/ATM at the network level and the management of routine UAS operations.

3.3 The integration between manned and unmanned operations supported by advanced technologies with full air-ground system integration, distributed data services, and high levels of connectivity is one of the main objectives of the SNAP.

3.4 By the end of 2024, the SNAP will be accessible online through an eSNAP application with a homepage designed as an access point to the key portal areas. Each element of the homepage is interactive, allowing access to the related web pages. The layered structure of the SNAP described in paragraph 2.5 of this paper will be selectable, leading the user to the associated SNAP contents.

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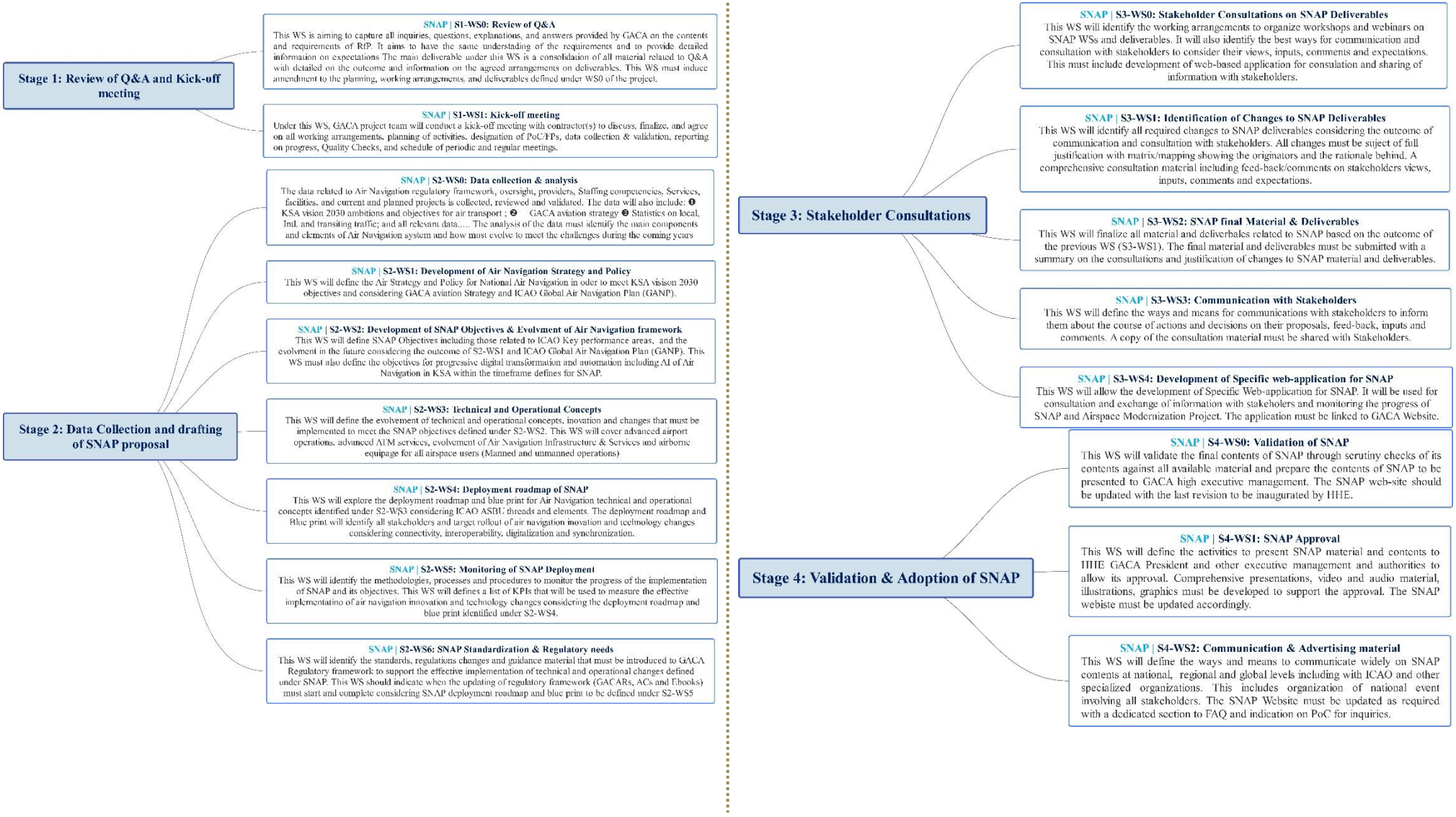
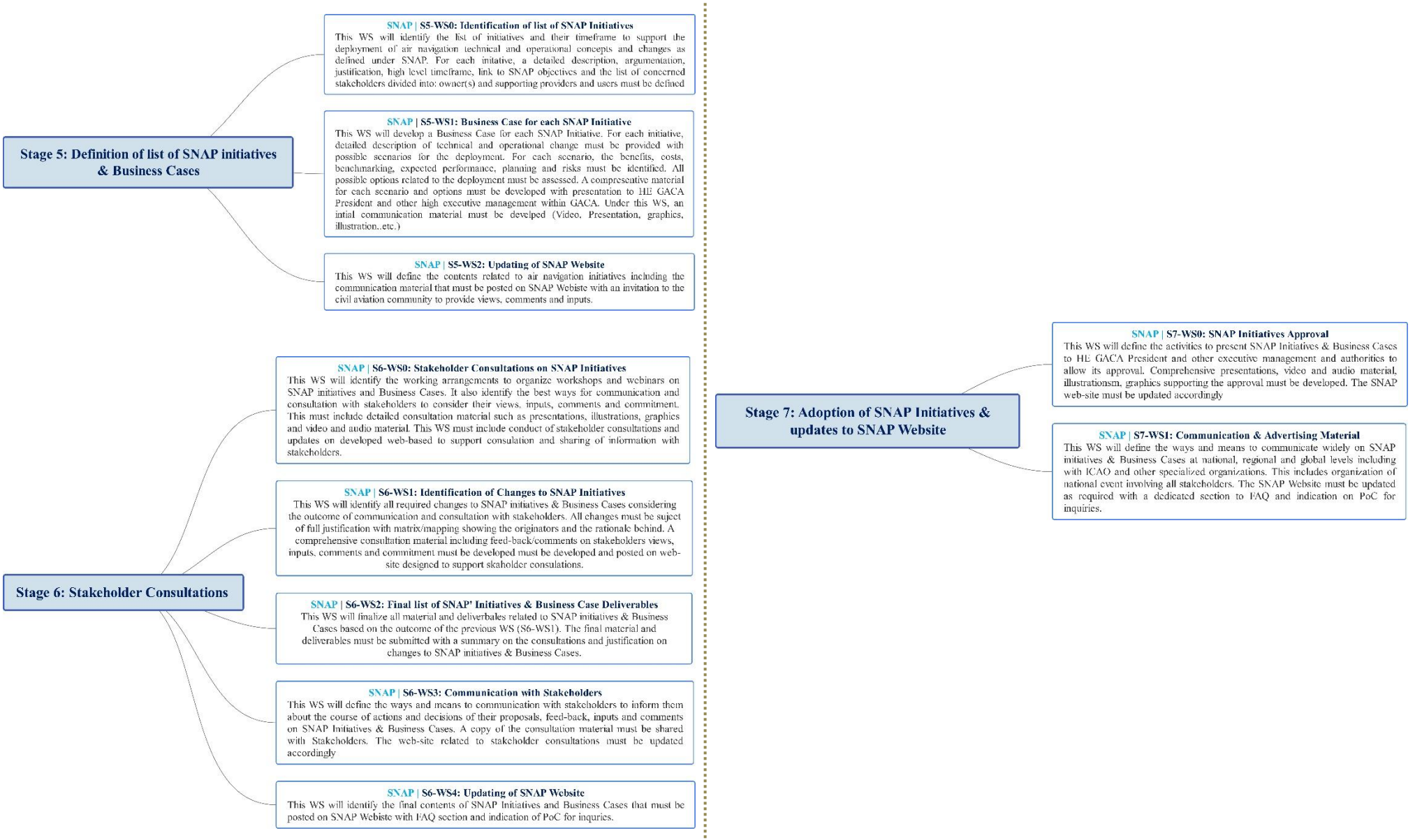
APPENDIX

ILLUSTRATIONS ON SNAP WORK STREAMS RELATED TO THE ACTIVITIES AND DELIVERABLES




Stage 5: Definition of list of SNAP initiatives & Business Cases
SNAP | S5-WS0: Identification of list of SNAP Initiatives
This WS will identify the list of initiatives and their timeframe to support the deployment of air navigation technical and operational concepts and changes as defined under SNAP. For each initative, a detailed description, argumentation, justification, high level timeframe, link to SNAP objectives and the list of concerned stakeholders divided into: owner(s) and supporting providers and users must be defined
SNAP | S5-WS1: Business Case for each SNAP Initiative
This WS will develop a Business Case for each SNAP Initiative. For each initiative, detailed description of technical and operational change must be provided with possible scenarios for the deployment. For each scenario, the benefits, costs, benchmarking, expected performance, planning and risks must be identified. All possible options related to the deployment must be assessed. A compresentive material for each scenario and options must be developed with presentation to HE GACA President and other high executive management within GACA. Under this WS, an intial communication material must be develped (Video, Presentation, graphics, illustration..etc.)
SNAP | S5-WS2: Updating of SNAP Website
This WS will define the contents related to air navigation initiatives including the communication material that must be posted on SNAP Webiste with an invitation to the civil aviation community to provide views, comments and inputs.
Stage 6: Stakeholder Consultations
SNAP | S6-WS0: Stakeholder Consultations on SNAP Initiatives
This WS will identify the working arrangements to organize workshops and webinars on SNAP initiatives and Business Cases. It also identify the best ways for communication and consultation with stakeholders to consider their views, inputs, comments and commitment. This must include detailed consultation material such as presentations, illustrations, graphics and video and audio material. This WS must include conduct of stakeholder consultations and updates on developed web-based to support consulation and sharing of information with stakeholders.
SNAP | S6-WS1: Identification of Changes to SNAP Initiatives
This WS will identify all required changes to SNAP initiatives & Business Cases considering the outcome of communication and consultation with stakeholders. All changes must be suject of full justification with matrix/mapping showing the originators and the rationale behind. A comprehensive consultation material including feed-back/comments on stakeholders views, inputs, comments and commitment must be developed must be developed and posted on web-site designed to support skaholder consulations.
SNAP | S6-WS2: Final list of SNAP' Initiatives & Business Case Deliverables
This WS will finalize all material and deliverbales related to SNAP initiatives & Business Cases based on the outcome of the previous WS (S6-WS1). The final material and deliverables must be submitted with a summary on the consultations and justification on changes to SNAP initiatives & Business Cases.
SNAP | S6-WS3: Communication with Stakeholders
This WS will define the ways and means to communication with stakeholders to inform them about the course of actions and decisions of their proposals, feed-back, inputs and comments on SNAP Initiatives & Business Cases. A copy of the consultation material must be shared with Stakeholders. The web-site related to stakeholder consultations must be updated accordingly
SNAP | S6-WS4: Updating of SNAP Website
This WS will identify the final contents of SNAP Initiatives and Business Cases that must be posted on SNAP Webiste with FAQ section and indication of PoC for inquries.
Stage 7: Adoption of SNAP Initiatives & updates to SNAP Website
SNAP | S7-WS0: SNAP Initiatives Approval
This WS will define the activities to present SNAP Initiatives & Business Cases to HE GACA President and other executive management and authorities to allow its approval. Comprehensive presentations, video and audio material, illustrationsm, graphics supporting the approval must be developed. The SNAP web-site must be updated accordingly
SNAP | S7-WS1: Communication & Advertising Material
This WS will define the ways and means to communicate widely on SNAP initiatives & Business Cases at national, regional and global levels including with ICAO and other specialized organizations. This includes organization of national event involving all stakeholders. The SNAP Website must be updated as required with a dedicated section to FAQ and indication on PoC for inquiries.

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