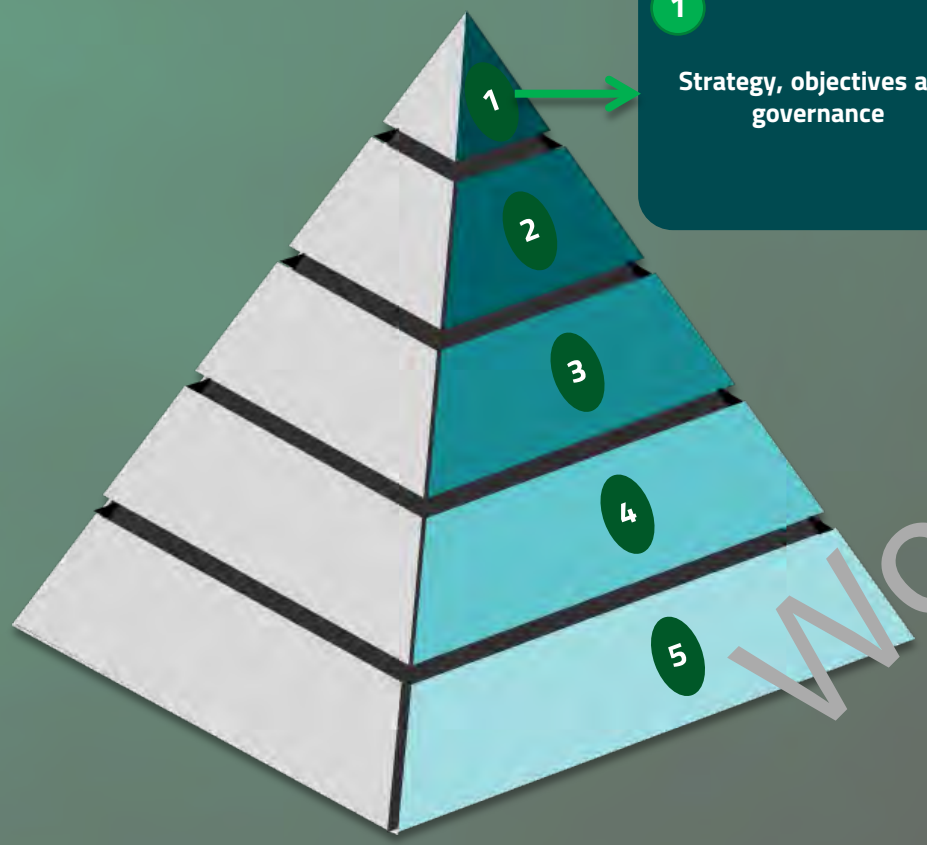
SNAP Layer 1

SNAP Layered Structure



1 Strategy, objectives and governance

This layer covers the vision and objectives that drive the SNAP as well as the performance ambitions and methods used to identify priorities with links to Global and MID-Region Air Navigation Plans. A special part is dedicated to the Governance structure and the innovation cycle aimed at keeping the SNAP aligned and updated over time.

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LAYER 1

1. STRATEGY, OBJECTIVES AND GOVERNANCE

- 1.1 Overview on the hierarchy among KSA Vision 2030, VRPs, sector strategies, Operators and Service Providers strategies and SNAP
- 1.2 KSA Vision 2030 and its impact on the aviation sector
- 1.3 The GACA ANS Strategy
- 1.4 The GACA Airspace Policy
- 1.5 The need for Saudi National Air Navigation Plan (SNAP)
  - 1.5.1 The increase of air traffic demand
  - 1.5.2 The emergence of new entrants and airspace users
  - 1.5.3 Integration and interoperability between ANS providers and stakeholders
- 1.6 ANS Network and Dependencies
- 1.7 SNAP Objectives and ambitions
- 1.8 SNAP Governance and development process
  - 1.8.1 SNAP Governance
  - 1.8.2 Methodology for SNAP development and validation
- 1.9 Methodology for SNAP Stakeholder Consultation
- 1.10 ICAO Alignment
  - 1.10.1 GANP - Global Strategic Level
  - 1.10.2 GANP - Global Technical Level
    - 1.10.2.1 GANP - Global Technical Level: BBB framework
    - 1.10.2.2 GANP - Global Technical Level: ASBU framework
    - 1.10.2.3 GANP - Global Technical Level: ICAO ASBU threads and elements
  - 1.10.3 GANP - Regional Level: Middle-East (MID) Regional Air Navigation Plan (RANP)
  - 1.10.4 GANP - National Level: National Air Navigation Plan (NANP)

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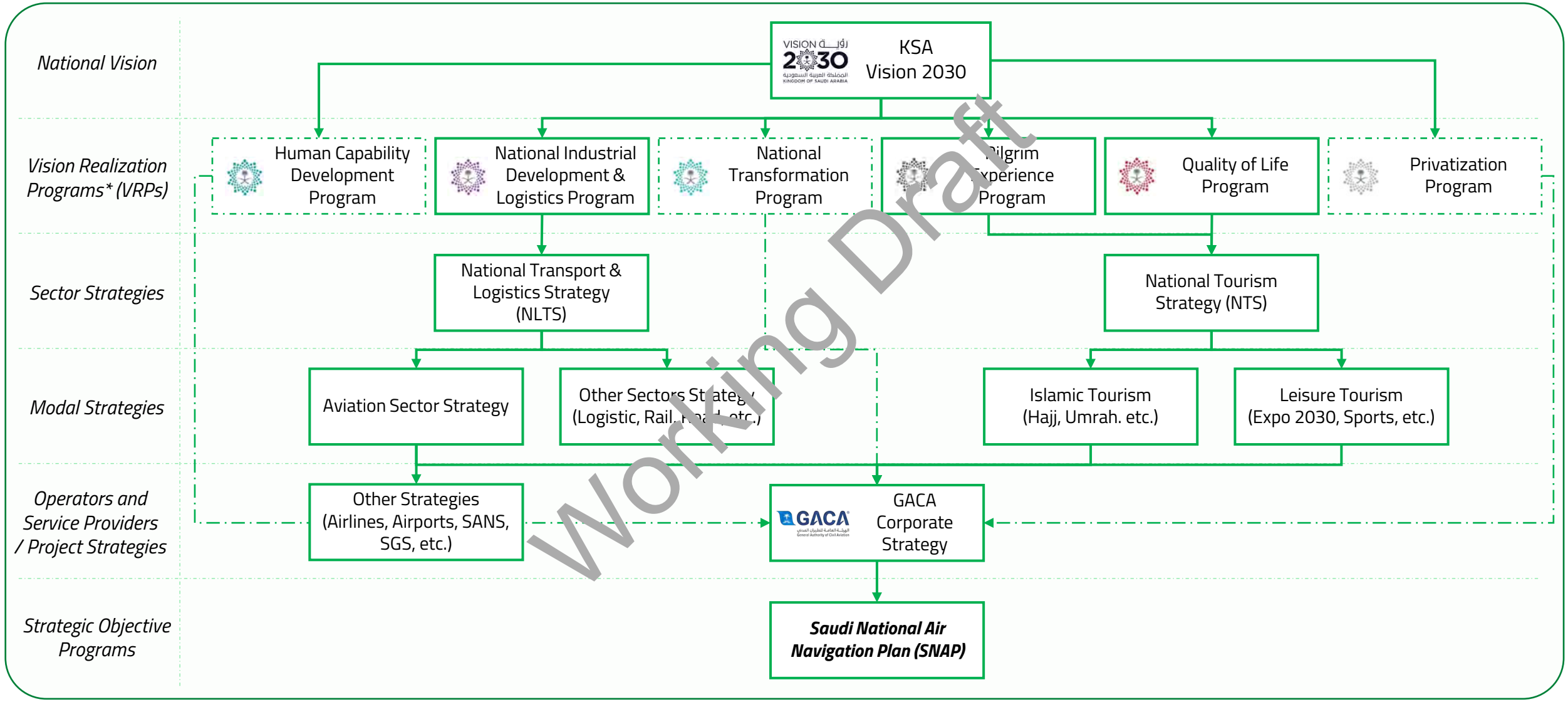
1. STRATEGY, OBJECTIVES AND GOVERNANCE

LEGENDA — Major Link to SNAP — Softer Link to SNAP

1.1 Overview on the hierarchy among KSA Vision 2030, VRPs, sector strategies, company strategies and SNAP



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*not all the VRPs have been represented, but just the ones that have connection with GACA Strategy and SNAP

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.2 KSA Vision 2030 and its impact on the aviation sector (1/2)

The **KSA Vision 2030** is a strategic blueprint through which Saudi Arabia has embarked on an **ambitious programme of social and cultural renovation, economic modernization and diversification** based on – inter alia – detachment from fossil fuels, introduction of new business models and environmental sustainability.

The Vision 2030 mainly impacts the following 5 dimensions within the aviation sector.

THE IMPACT OF KSA VISION 2030 ON THE AVIATION SECTOR

Infrastructure development:

The Vision 2030 aims to transform the country into a global logistics hub by developing world-class transportation infrastructures. This includes expanding and upgrading airports, increasing air traffic capacity, and enhancing air navigation systems to ensure efficient and safe operations.

Privatization and liberalization:

The Vision 2030 aims to privatize and liberalize several sectors, including aviation. This includes allowing more private sector participation in the provision of air navigation services, which can lead to increased efficiency, innovation, and competitiveness.

International connectivity:

As part of the economic diversification efforts, Saudi Arabia aims to increase its connectivity with other regions and become a major transportation hub. This requires improving the air navigation services and systems to handle increased air traffic, provide seamless connections, and enhance the overall sector's efficiency.

Human capital development:

Vision 2030 emphasizes the development of a highly skilled workforce to support economic diversification. The aviation sector makes no exception, and there will be a strong focus on training and developing professionals in air navigation services. This will ensure that the industry has the necessary expertise to manage the increased air traffic and implement advanced technologies.

Technological advancements:

The Saudi Air Navigation System is expected to witness significant technological advancements as part of Vision 2030. This includes the adoption of advanced navigation technologies such as satellite-based systems and the implementation of cutting-edge air traffic management systems. These advancements will enhance safety, reduce delays, and improve overall efficiency.

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.2 KSA Vision 2030 and its impact on the aviation sector (2/2)

The **ANS modernization** contributes to the achievement of the **long-term goals and ambitions** set in the KSA Vision 2030 **through the following 8 dimensions**:

Economic Diversification and Sustainability:

Vision 2030 foresees diversification in the economy, moving away from oil dependency. Modern air navigation supports this by enhancing the efficiency and capacity of air transport, which is vital for business and tourism. Making Saudi Arabia more accessible to international markets and tourists will boost sectors like tourism, hospitality, and trade.

Environmental Goals:

Modern air navigation systems are more efficient and can reduce flight times and fuel consumption, contributing to lower carbon emissions. This supports Vision 2030's environmental sustainability goals.

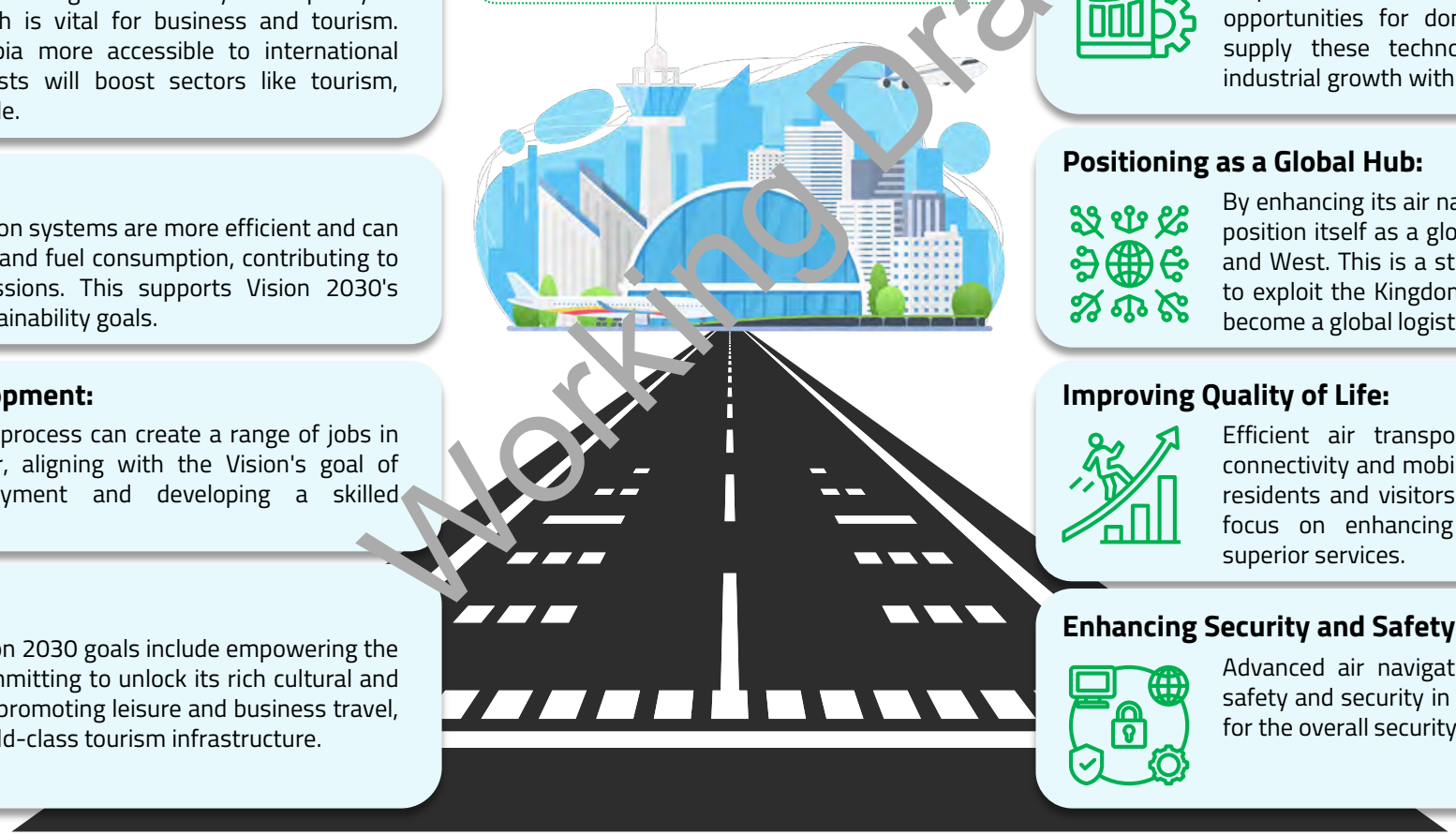
Job Creation and Skill Development:

The modernization process can create a range of jobs in the aviation sector, aligning with the Vision's goal of reducing unemployment and developing a skilled workforce.

Touristic development:

The kingdom's Vision 2030 goals include empowering the tourism sector, committing to unlock its rich cultural and historical treasure, promoting leisure and business travel, and fostering a world-class tourism infrastructure.

THE CONTRIBUTION OF ANS MODERNIZATION TO THE ACHIEVEMENT OF KSA VISION 2030 GOALS



Technological and Industrial Development:

Upgrading air navigation involves the adoption of cutting-edge technologies. This aligns with Vision 2030's emphasis on technological advancement. It also creates opportunities for domestic industries to develop and supply these technologies, fostering innovation and industrial growth within the country.

Positioning as a Global Hub:

By enhancing its air navigation systems, Saudi Arabia can position itself as a global aviation "hub", connecting East and West. This is a strategic goal of Vision 2030, aiming to exploit the Kingdom's unique geographical position to become a global logistics hub.

Improving Quality of Life:

Efficient air transport services contribute to better connectivity and mobility, improving the quality of life for residents and visitors. This is in line with Vision 2030's focus on enhancing living standards and providing superior services.

Enhancing Security and Safety:

Advanced air navigation systems also mean improved safety and security in the aviation sector, which is crucial for the overall security framework of the country.

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.3 The GACA ANS Strategy (1/2)

The Kingdom of Saudi Arabia is right at the **crossroads of important international trade routes**, between three continents: Asia, Europe and Africa. As part of its global 2030 vision, the Kingdom aims to maximize the benefits from its **strategic geographic position**, leveraging on it to become a **global hub** for passenger and cargo transit. To reach this goal, KSA needs to modernize its Air Navigation Services (ANS), in terms of Air Traffic Services; Communication, Navigation and Surveillance services; Meteorological Services for Air Navigation; Aeronautical Information Services; modernization of facilities.

Moreover, KSA needs to boost the **growth of national air carriers** and attract foreign ones, through new strategic **partnerships** that could also help the Saudi economy grow and its companies increase exports. Size and complexity of the Saudi civil aviation sector are expected to triple by the end of the next decade, thus **reforming and modernizing** the aviation industry is pivotal to achieve KSA's goals and ambitions. The **General Authority for Civil Aviation (GACA)** has therefore envisaged a **strategy**, founded on 8 pillars, to make the aviation sector more efficient, resilient, safe, inclusive and environment-friendly.

NETWORK AND HUBS

- Extend KSA connectivity to 250+ destinations across 29 airports
- Riyadh & Jeddah as connecting hubs both for long-haul flights and air cargo

CARRIERS

- Increase national carriers' global market shares
- Regulatory reforms to help increase competition and growth of new carriers

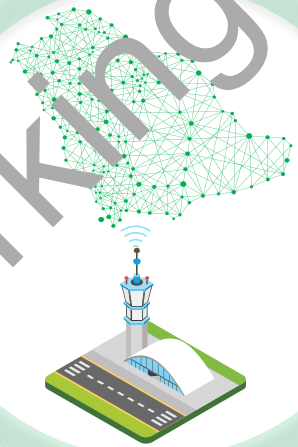
SERVICES

- Reforms to enhance fair competition & regulate pricing
- Regulatory frameworks for international & domestic operators

AIRFREIGHT CAPACITY

- Increase air cargo volume to 4.5M tons

THE 8 PILLARS OF GACA STRATEGY



SAFETY AND SECURITY

- Advanced adaptive Safety Management System (SMS)
- Collaboration with international organizations for global safety standards compliance

HUMAN CAPITAL

- Specialized training programs for aviation professionals
- Local talent retention & attraction of high-skilled workforce at national and global levels

ENVIRONMENTAL SUSTAINABILITY

- Increase efficiency and sustainability with disruptive changes and new technologies
- Initiatives to reduce carbon emissions and noise

AIRPORTS CAPACITY

- Triple annual passenger traffic to 330M

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.3 The GACA ANS Strategy (2/2)

The "Environmental Sustainability" pillar of **GACA Corporate Strategy** has set two strategic objectives: to **decarbonize the Kingdom's aviation sector** and to **improve its environmental performance**. To further boost the realization of its strategy, GACA guidance led to the creation of the **Civil Aviation Environmental Sustainability Program** (CAESP), with the aim of developing an **environmental sustainability plan**, a **decarbonization plan** and **environmental regulations** for the civil aviation sector.

In a similar manner, among the main principles surrounding the SNAP initiatives, the **reduction of environment impact** stands as an overarching one. The remarkable growth in air traffic drives the **SNAP** towards the need of defining and prioritizing **solutions to gradually address the level of CO2 emissions**, **reduce noise** and **improve air quality at airports and around them**. SNAP is therefore strictly intertwined with CAESP and its objectives**.**

KSA has pledged to become **Net Zero by 2060**.

The national **projects and decarbonization initiatives included in CAESP** are expected to **reduce GHG Emission by 33%** (from ~60 to ~40 Mln Ton of CO2/ca) and to generate **economic benefits equal to 728 Mn** SAR saving **over the next decade.**

-21
Mn Tons eqCO2 by 2032

+728
Mn SAR by 2032

SNAP will tackle GHG emissions through the following three main strategic means

TECHNOLOGICAL IMPROVEMENTS

Ex. More efficient engines

OPERATIONAL IMPROVEMENTS

Ex. Instrument Flight Procedures (IFPs) optimization

LOW-CARBON FUELS USAGE

Ex. Bio-fuels

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

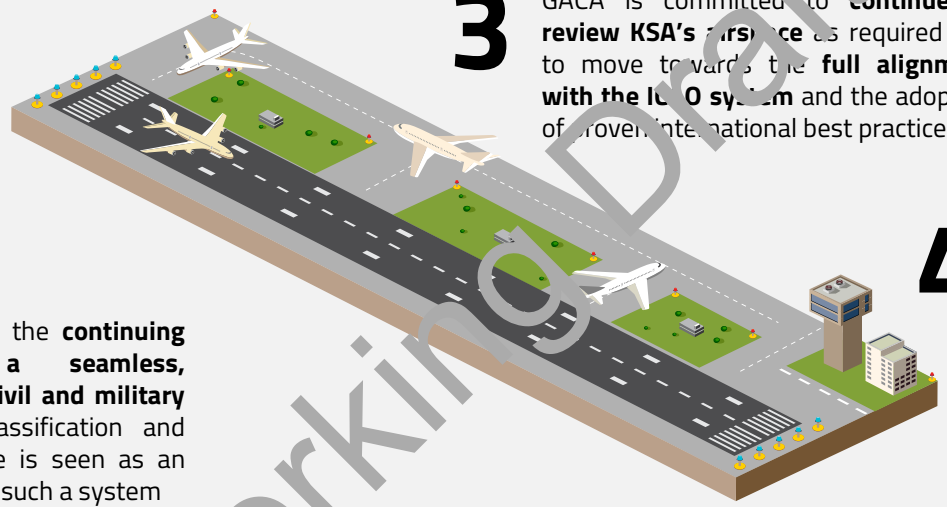
1.4 The GACA Airspace Policy (1/7)

The Airspace Policy **provides guidance to GACA on the administration and regulation of airspace** as a national asset. In addition, it **provides guidance to the Service Providers and Stakeholders on the principles governing airspace flying rules, management, designation, classification and changes**.

General Objectives

1 GACA considers **the safety of air transport services and aircraft operations as the priority in airspace administration,** and it is committed to respond quickly to emerging changes in risk levels for air transport and aircraft operations. Airspace administration must also seek to deliver good safety outcomes to all aviation stakeholders and users

2 GACA is committed to the **continuing development of a seamless, harmonised national civil and military ATM system**. The classification and designation of airspace is seen as an essential component of such a system



3 GACA is committed to **continue to review KSA's airspace** as required and to move towards the **full alignment with the ICAO system** and the adoption of proven international best practices

4 In continuing to develop safe, efficient and appropriate airspace arrangements, GACA is committed to **consider the operations of new entrants** (e.g. Unmanned Aircraft Systems, remotely piloted aircraft systems and very high-altitude aircrafts) in consultation with industry Stakeholders. More specifically, GACA supports the gradual integration of low-level flying/UAS operations and promotes research and development associated with these activities

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Apart from the abovementioned general objectives, GACA has developed **specific policy principles** for each of the following areas/domains:

1. Airspace Strategy
2. Airspace Administration and Use
3. Airspace Classes used in KSA Airspace
4. Prohibited, Restricted and Danger Areas
5. Civil Aerodromes Airspace
6. Airspace Reporting
7. Low-level Flying Airspace
8. Operation and management of Unmanned Aviation
9. Civil and Military Cooperation
10. Cooperation with Certified Air Navigation Service Providers

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.4 The GACA Airspace Policy (2/7)

Policy for Airspace Strategy

GACA is committed to:

- **Carry out its responsibilities as the airspace Regulator** in accordance with civil aviation basic law and relevant GACA Regulations promulgated since 2016.
- **Adopt international best practices in airspace administration**. When determining Saudi's future airspace needs, for instance, GACA's airspace strategy follows a risk-based approach, engendering evidence-based decision making and supported by robust data collection and analysis.
- **Ensure the maximum level of transparency** so that the aviation users and stakeholders have clear insight into the way in which airspace administrative decisions will be developed, taken and implemented, including industry and stakeholders' consultation. The strategy, however, does recognize that there might be times when urgent decisions are required to meet safety imperatives and security needs.
- **Ensure proactivity and consistency** with the review requirements of the basic law and GACA Regulations associated with Airspace.
- **Conduct and leverage on airspace risk reviews** to determine the adoption of a particular class of airspace.

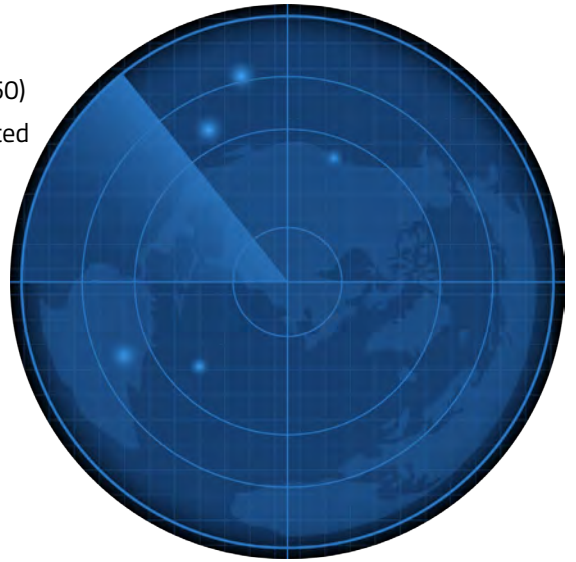
Policy for Airspace Administration and Use

GACA is committed to:

- Follow the indications and guidelines provided in ICAO's **Global Aviation Safety Plan** (GASP – Doc 10004) and **Global Air Navigation Plan** (GANP – ICAO Doc 9750)
- Ensure **compliance with ICAO airspace classifications system** (Class A to G airspace) in airspace administration, including the designation of Prohibited, Restricted and Danger areas.
- Ensure **effective cooperation between GACA, Ministry of Defense and certified air navigation service providers**.
- Ensure **enforcement of systematic consultation** of stakeholders and users for all airspace changes.

In addition to the mandatory considerations set out in KSA Civil aviation law and regulations, the following principles must be applied in the administration and regulation of KSA airspace:

- It **must** be in the best interests of KSA
- It **must** consider the current and future needs of stakeholders, which includes civil and military aviation
- It **must** consider cost implications for all airspace users
- It **must** consider adopting proven international best practice airspace systems adapted to benefit KSA's aviation environment
- It **must** leverage on advances in technology wherever practicable



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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.4 The GACA Airspace Policy (3/7)

Policy for Airspace Classes used in KSA Airspace

Airspace administration in KSA is aligned with the ICAO-prescribed airspace classes and associated levels of service as set out in **Annex 11 to the Convention on International Civil Aviation** (Chicago Convention, 1944) and reported below:

- **Class A**: only IFR (instrument flight rules) flights are permitted. All flights are provided with an Air Traffic Control (ATC) service and are separated from each other.
- **Class B**: IFR and VFR (visual flight rules) flights are permitted. All flights are provided with ATC service and are separated from each other.
- **Class C**: IFR and VFR flights are permitted. IFR flights are provided with an ATC service and are separated from both other IFR and VFR flights. VFR flights are provided with an ATC service for separation from IFR flights and traffic information on other VFR flights.
- **Class D**: IFR and VFR flights are permitted, and all flights are provided with an ATC service. IFR flights are separated from other IFR flights and Special VFR (SVFR) flights and are provided with traffic information on all VFR flights. VFR flights are provided with traffic information on all other flights. VFR receives traffic information on all other aircrafts but are not provided with a separation service by ATC. SVFR are separated from SVFR when visibility is less than visual meteorological conditions. All flights are separated during take-off and landing.
- **Class E**: IFR and VFR flights are permitted. IFR flights are provided with an ATC service and are separated from other IFR flights and receive traffic information on VFR flights as far as is practicable. VFR flights are provided with a flight information service, which includes traffic information, as far as is practicable.
- **Class F**: IFR and VFR flights are permitted. All participating IFR flights receive an air traffic advisory service, and all flights receive a flight information service if requested.
- **Class G**: IFR and VFR flights are permitted. IFR and VFR flights receive a flight information service.

- **Differences to the ICAO classes of airspace in KSA are notified to ICAO and listed in the KSA Aeronautical Information Publication (AIP) – Part GEN. Section 1.7.**
- **Class F is not used at present in KSA airspace**. However, based on factors such as the number and type of aircraft movements, the President may require the certified ATS provider to conduct a site-specific aeronautical study to determine the class of airspace including Class F and level of air traffic service that must apply within the class of airspace. All aeronautical studies must be carried out using methodologies and criteria acceptable to the President

- Under GACA regulation Part 171, **a certified ATS Provider is responsible for determining the type of classification to be deployed within its area of responsibility**. GACA must approve and authorize the publication of any changes to the classification of a volume of airspace and corresponding information. The certified ATS provider must ensure that the details of each designation and classification of airspace is inserted in an air navigation register and then published in KSA AIP in a timely and accurate manner.
- GACA has responsibility for the regulation of the design and management of changes for the whole KSA airspace. **GACA shall ensure that design principles and guidance material for airspace architecture are maintained and available to proponents of an airspace change**.

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.4 The GACA Airspace Policy (4/7)

Policy for designation of Prohibited, Restricted and Danger Areas

KSA has adopted the ICAO designations described in **Annex 15, Chapter 2**, of the Chicago Convention for Prohibited, Restricted and Danger Areas. The declaration of these areas and the circumstances in which they can be declared are as follows:

- **Prohibited Area** – An area of KSA territory of defined dimensions (which may extend to a volume of airspace) over which the flight of aircrafts is prohibited. A certified ATS provider must not declare an area to be a Prohibited Area unless such designation is necessary due to military reasons. For each area designated as a Prohibited Area, moreover, the certified ATS Provider must specify the administering authority and ensure that the designation is published in KSA AIP in accordance with the requirements of GACAR Part 171 & 175.
- **Restricted Area or Military Operating Area** – An area of KSA territory of defined dimensions (which may extend to a volume of airspace) over which the flight of aircrafts is restricted in accordance with certain specified conditions. A certified ATS provider must not declare an area to be a Restricted Area unless such designation is necessary to segregate military activities from other traffic. The certified ATS provider must identify the type of activity for designated military operating area and specify the administering authority.
- **Danger Area** – An area of KSA territory of defined dimensions (which may extend to a volume of airspace) within or over which activities dangerous to the flight of aircrafts may exist at specified times. A certified ATS provider must not declare an area to be a Danger Area unless an activity that represents a potential danger to aircrafts flying within or over the area exists. The certified ATS provider must specify the nature of the danger for which each danger area is designated and identify the administering authority.

Policy for Civil Aerodromes Airspace

GACA is committed to:

- Ensure that **appropriate levels of airspace classification and air traffic service** at civil aerodromes served by air transport services are reflecting the final outcomes of the associated **risk assessment reviews**.
- Ensure that certified ATS provider or the aviation stakeholders can implement **additional risk mitigation measures**.

Policy for Airspace Reporting

GACA is committed to **provide advice on the major initiatives and priorities** related to airspace and air navigation plan. The reporting process is subject to an advisory circular.

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

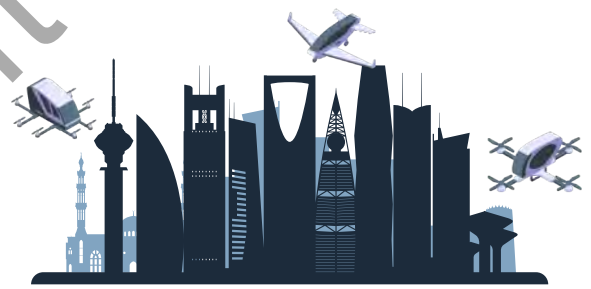
1.4 The GACA Airspace Policy (5/7)

Policy for Low-level Flying Airspace

GACA policy on low-level flying airspace **covers the whole Jeddah FIR from the surface to 2,000 ft,** mainly in **class G airspace**, except for certain specifically designated areas and for Low-Level Flying Flows and Routing (LLFRRs). Responsibility for low-level flying policy, governance and management is delegated to Air Navigation Safety department.

As general policy for low-level flying operations (LLFOs), GACA adopted the following principles:

- Issuance of a **regulatory framework** covering all known flying activities with detailed requirements to ensure safe operations and protect persons and properties on the ground
- Full **alignment of GACA regulation with the relevant SARPs** defined by ICAO
- **Adaptation of rules and requirements issued by leading States** in the management of low-level flying operations
- Coordination with the concerned parties to **identify sensitive areas, locations, and facilities that must be protected** from low-level flying operations, including aerodromes
- Adoption of **minimum altitudes, daylight hours, VFR rules, Visual Meteorological Conditions (VMC)** and **avoidance of interference with operations and traffic patterns** at any airport, heliport, or seaplane as main requirements to authorize LLFOs and support safe activities
- Adoption of **requirements for avoidance of regulated areas and special use airspace** for all LLFOs unless the operator/pilot has permission from the using or controlling agency
- Adoption of the principle of defining **Low-Level Flying Zones (LLFZ*) for specific and recurrent low-level flying activities** (e.g. training) and **Low-level Flying Flows and Routing (LLFFRs**)** as means of traffic segregation and conflict resolution measures in systematic coordination with concerned government agencies and consultation with stakeholders
- Supporting the growth of LLFOs based on **data-driven solutions** and **integration of Artificial Intelligence (AI)** for the management of activities
- Supporting LLFOs as means for **pilot/operator initial, recurrent, and transition training**, and for the development and maintaining pilot/operator low-flying skills and competencies
- **Designation of the leading certified ATS provider as main operator** for managing technical and operational arrangements and agreements for LLFOs



- Adoption of specific requirements to support the **publication of accurate aeronautical information and charts** on LLFZ and LLFFRs as defined and agreed with stakeholders
- Supporting the **development of VFR and other charts** through coordination with specialized governmental agencies such as the General Authority for Survey and Geospatial Information (GEOSA)
- Adopting **risk-based approach** to approve and authorize LLFOs with requirements on substantial operational testing and trials
- Adoption of an **integrated approach for approving and authorising LLFOs** which combines airworthiness, technical, and operational requirements through setting of specific specialized committee;
- **Organizing annual event and gathering of specialized agencies and organizations** on LLFOs to enhance the regulatory and oversight framework and introduce improvements
- Adopting the **certification of operators/providers** associated with LLFOs as the main mean for ensuring compliance with the safety requirements and setting of sustainable organization for these operations

(*) The LLFZ are Dedicated Flying Zones (DFZ), allocated for specific use (e.g. helicopter training, UAS VLOS activities) and are managed under specific and local arrangements between the designated certified ATS provider and the responsible of the flying activities (i.e Aviation Recreation Organizations such as flight school, aero club, etc.). These arrangements are established within class G airspace.
(**) The LLFFRs are established in uncontrolled (Class G) and controlled airspace (other classes) to allow safe low-level flying operations and ensure proper deconflict of traffic. A segregation between traffic flow must be established considering the departing and arrival locations.

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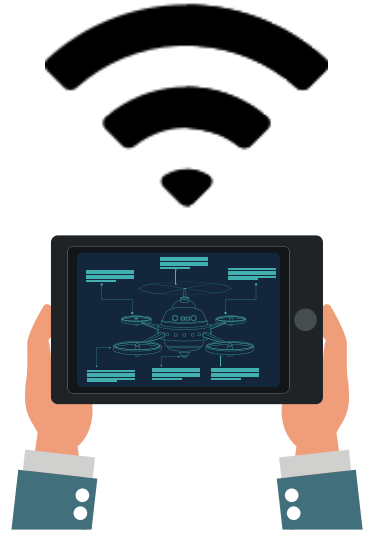
1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.4 The GACA Airspace Policy (6/7)

Policy for Operation and Management of Unmanned Aviation

As general policy for the operation and management of Unmanned Aviation, GACA adopted the following principles:

- **Safety is the first consideration** to authorize operations of unmanned aircrafts in KSA airspace
- **Registration of unmanned aircrafts and the issuance of licenses** to remote pilots by GACA is the basis to safely operate unmanned aircrafts in KSA airspace
- The operation and management of unmanned aircrafts in KSA airspace must be conducted by **certified service providers and operators** (*Not applicable for sUAS*)
- The progressive integration of UAS into ATM environment must be achieved through a **phased approach methodology based on case studies and lessons learned**
- UAS operations in the airspace must be **aligned with the on-going national, regional and international initiatives**
- The airspace organization/structure, and the deployment of facilities/systems should support safe access, operation, and integration of Unmanned aircraft, including those used for **Advanced Air Mobility**
- The airspace management must facilitate safe operation of unmanned aircraft at low altitudes:
    - Within airspace around **experimental sites** dedicated to testing operations, systems and equipment
    - Supporting **trials** for the development of Unmanned Traffic Management (UTM) airspace controlled by UTM Service Providers/GACA
- The design and establishment of airspace reserved for operation of unmanned aircrafts must be based on an **airspace risk assessment** conducted by certified providers (e.g. SANS and/or the UTMSP) and **operational risk assessments** conducted by UAS operators, given the need to mitigate the risks both in-flight and on the ground
- The development of UTM airspace should follow a **phased approach** starting with the operation of **small civil UAS** (sUAS, less than 25 kg), with UTMSPs mitigating the risks in-flight and on the ground while segregating and de-conflicting the sUAs flights from manned aircraft and other unmanned aircraft operations
- **Unmanned aircrafts operating Beyond Visual Line of Sight (BVLOS) must be integrated within KSA airspace as long-term objective**. Initially, however, only operations in segregated, restricted or reserved airspace, including setting of 'BVLOS corridors', must be authorized
- When needed, **UAS operations might be restricted or prohibited** in order to address risks associated with safety, privacy, protection of personal data, security or environmental issues
- UAS operations must consider airspace access and restrictions defined by **GEOSA** and **terrain and obstacles hazards**
- Manned and unmanned aircraft operating in UTM airspace must be equipped by regulated **electronic conspicuity devices** that meet approved specifications in ensure proper identification and tracking.
- For certain UAS operations outside segregated airspace, UTM service providers and operators must:
    - have **direct means of communications** to exchange flight planning, information, instruction and acknowledgement before, during, and after flights
    - comply with **Geospatial security requirements**.
- The requirements of UTM airspace must be **aligned with regional and international regulatory frameworks** to support opportunities for harmonization and interoperability between KSA national systems, allowing all operators to easily conduct UAS operations within a national UTM ecosystem.



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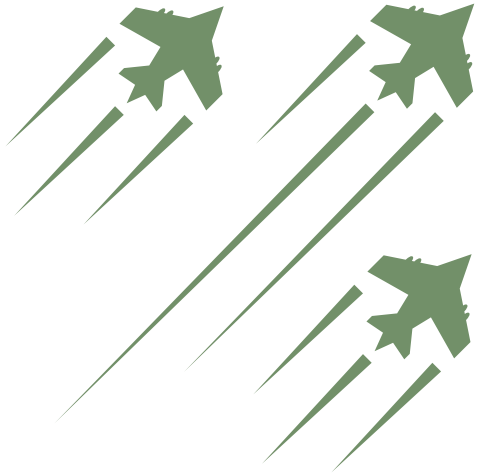
1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.4 The GACA Airspace Policy (7/7)

Policy for Civil-Military coordination

GACA is committed to:

- Facilitate **arrangements** for better coordination and harmonization of civil and military airspace requirements through **Joint Civil-Military Committees**
- Support the **daily tactical coordination** between Civil and military which should be conducted between operational ATS units



Policy for Cooperation with Certified Air Navigation Service Providers

GACA is committed to:

- **Work closely with certified air navigation service providers** to ensure that:
  - the needs of all airspace users are properly considered
  - the provision of ATM services is properly coordinated
  - the administration of Saudi airspace is both safe and efficient

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.5 The need for Saudi Air Navigation Plan (SNAP) | 1.5.1 The increase of air traffic demand

GACA forecasts that the number of air passengers in Saudi Arabia will increase to 330 million annually by 2030, up from about 95 million in 2023. According to the **International Air Transport Association (IATA)**, moreover, air passenger demand in Saudi Arabia is expected to grow at an average annual rate of 6.6% between 2023 and 2037. This growth is driven by factors such as rising middle-class income, tourism, and the expansion of Saudi Arabian airlines. Moreover, the recent awarding of the World Expo 2030 is expected to further boost air traffic growth rates in the coming years.

SAUDI AIR TRAFFIC SCENARIO

2023	2030	
700.000	2.250.000	*Flight per year*
134 Avg	147 Avg	*Average passenger per flight*
95 Mln	330 Mln	*Passengers per year*

As air traffic increases, it becomes crucial to:

Ensure efficient and safe management of the airspace, also considering the integration of new technologies.

Address the issues connected with airports and airspace capacity.

Mitigate the increasing risk of operational irregularities, and ANS incidents.

Tackle the environmental concerns considering ICAO requirements, guidance, and global best practices.

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.5 The need for Saudi Air Navigation Plan (SNAP) | 1.5.1 The increase of air traffic demand

SNAP TO HANDLE THE INCREASED AIR TRAFFIC DEMAND

- It provides a framework for the management of air traffic, including procedures, routes and infrastructure development to optimize the use of airspace
- It helps in effectively managing the capacity by analysing current and projected traffic demand, identifying bottlenecks and implementing measures to optimize capacity utilization
- It incorporates ANS safety regulations, standards, and procedures to minimize risks and continuously improve safety
- It defines operational developments and deployment priorities required to meet short, medium and long terms ANS-related needs and achieve the targets of KSA Vision 2030
- It ensures that air traffic control systems, communication networks and navigation facilities are capable of handling the growing demand and maintaining the highest safety standards
- It provides concrete steps and roadmaps for the integration of ANS technological advancements
- It establishes precise rules for cooperation and coordination among various stakeholders, including civil aviation authorities, air traffic control providers, airlines, airports, and other relevant entities
- It includes strategies to mitigate environmental impacts by promoting fuel-efficient flight trajectories, implementing noise abatement procedures, and supporting the development of sustainable aviation alternatives

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.5 The need for Saudi Air Navigation Plan (SNAP) | 1.5.2 The emergence of new entrants and airspace users

Over the past decade, the market for **unmanned aircraft systems (UAS-Drones)** has seen rapid technological and commercial expansion. Starting in 2021, initiatives are being taken to expand advanced air mobility (AAM). For instance, the NEOM company has made a 175 million USD investment in Volocopter with the aim of promoting and creating an urban air mobility (UAM) ecosystem. In close collaboration with GACA, NEOM and Volocopter have been implementing a national test bed for Saudi Arabia to enable the integration of eVTOLs with zero-emission for future urban mobility.

In order to address the phenomenon of the **emergence of new operators and users of airspace**, it becomes crucial to:

Define rules and procedures aimed at ensuring an effective integration of new entrants in the airspace while guaranteeing optimization in terms of interoperability, communications, data sharing, and safety in operations

Envisage a new reorganization of the airspace

Introduce a set of innovative, safe, silent, sustainable and economical means for moving goods and people, taking into due account the overall accessibility to the local transport system from a multimodal perspective

Tackle the environmental concerns considering ICAO requirements, guidance, and global best practices.

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.5 The need for Saudi Air Navigation Plan (SNAP) | 1.5.2 The emergence of new entrants and airspace users

SNAP TO SUPPORT NEW ENTRANTS AND AIRSPACE USERS

- It contains the methodology for developing a framework of ANS services and technologies aimed at supporting the emergence of new airspace users and operators
- It defines regulations and procedures for the deployment of a management system of new users and operators in the airspace, such as, for example, the U-space system developed in Europe (U-Space is the set of services aimed at regulating the safe and efficient access of UAS to the airspace) whose objective is to guarantee the integration between manned and UAS vehicles
- It defines the methodology for analyzing the demand for services and operations related to the emergence of new operators and users of the airspace, evaluating current and forecasted demand, defining ANS service and system performance KPIs
- It identifies possible critical issues by defining a Risk Assessment process (such as the Specific Operations Risk Assessment – SORA - process used in Europe) to define the risks relating to the activity of new operators and users of airspace)
- It defines the technological solutions aimed at managing integrated traffic between UAS and traditional aircraft in the same airspace and defines the methodology for determining a roadmap for complete integration in the same airspace
- It facilitates the integration of research activities, leveraging – inter alia – on the European experience that led to the definition of U-Space (SESAR), defining the necessary infrastructure, training requirements and operating procedures. Furthermore, it defines the methodology for the introduction and deployment of new technologies, their integration into the ATM system and their implementation. It proposes and defines the technological standards suitable for carrying out support operations for air-ground systems.
- It encourages coordination between GACA, various stakeholders, new operators and users of the airspace, ANSPs, airlines, airports and other stakeholders. It also promotes and defines the methods of discussion among the interested parties, defining collaboration methods to address shared challenges, modify and/or integrate existing or new operational practices and optimally manage the available resources.

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.5 The need for Saudi Air Navigation Plan (SNAP) | 1.5.3 Integration and interoperability between ANS providers and stakeholders

The full **integration and interoperability among ANS providers and stakeholders** is pivotal for the efficient and safe operation of ANS**.** Such integration requires:

A well-defined regulatory framework that outlines the roles and responsibilities of ANS providers and stakeholders

Enhanced communication, coordination and collaborative relationships with stakeholders to be achieved through regular consultation, meetings, workshops, and forums

The set-up of common goals, objectives, KPAs and KPIs as ANS providers and stakeholders should have a shared vision on the desired outcomes

Involvement of all stakeholders in decision-making process related to the provision of air navigation services

Enhanced quality and automation of data and information sharing

The embracement of a continuous improvement and innovation culture

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1.5 The need for Saudi Air Navigation Plan (SNAP) | 1.5.3 Integration and interoperability between ANS providers and stakeholders

SNAP TO SUPPORT THE INTEGRATION AND INTEROPERABILITY BETWEEN ANS PROVIDERS AND STAKEHOLDERS

- It triggers collaborative decision-making between ANS providers and stakeholders through a collaborative process where, all relevant parties participate in discussions, negotiation, and decision-making processes. This approach helps to have similar understanding, finding common ground and consensus and resulting in an effective and efficient pla...
- It ensures a coordinated and unified approach towards the management and operation of Air Navigation Services.
- It gathers the needs and capacities of each ANS provider and stakeholder, making easier the allocation of resources (infrastructure, equipment, and financial resources) efficiently.
- It enables the harmonization of the different procedures, systems and technologies used by diverse stakeholders and ANS providers, ensuring that they work seamlessly together
- It acts as a blueprint that brings together all ANS providers and stakeholders under a common framework.
- It facilitates the development of common standards, protocols, and common operating procedures.
- It provides a framework for defining ANS safety policies, implementing risk mitigation measures, and establishing safety and performance indicators

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.6 ANS Network and dependencies

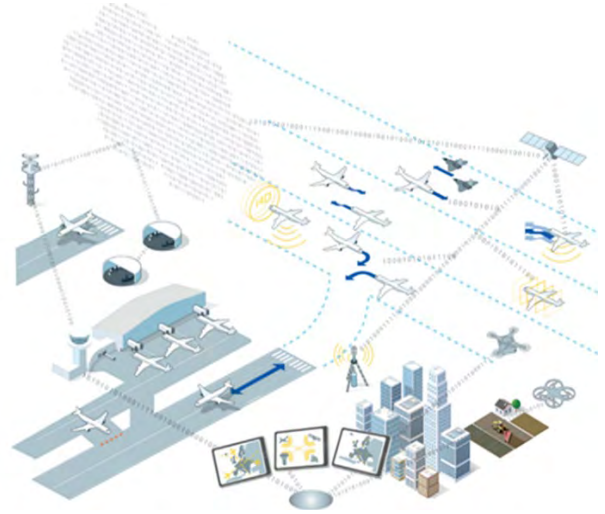
The modernization of the ANS network allows to overcome the limitations of the current ANS Network. Several topics need to be addressed, in relation to the growth of demand, stakeholders involved and technologies in use, such as:

A. **Increase ANS network situational awareness and better dynamic management of demand and capacity balancing**

B. **Improve planning** by integrating data from all KSA airports

C. **Increase the capacity of the airspace** to respond to user needs and traffic growth, which will be increasingly diversified

D. **Decrease latency times relating to the exchange of information** on airports and ANS network, resulting in improved operational performance



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ADVANTAGES OF THE UPGRADE AND MODERNIZATION OF THE ANS NETWORK STRUCTURE

Evolution of ATM operational **capacity**	Improvement in **interoperability** through the exchange of aeronautical information supported by System-Wide Information Management communications (**SWIM**)	Management of complete traffic flows in the network in a more **collaborative** and **dynamic way**, involving **airspace users**
Greater **performance** of ANS systems	Increase in safety related to **UAS operations**	Significant increase in levels of **automation** and **modularity**, exploiting modern technology through data-rich and IT-secure connectivity
Improvement in the **performance** of Air Navigation Services (ANS)	Resilient and fully scalable **capability of handling growing air traffic** with a variety of manned and unmanned operators in all classes of KSA airspace in a safe and sustainable manner	Integration of all **KSA airports** into the ANS network
Greater level of **automation**, better **connectivity** between ANS systems and sites	**Integration** of all ATM /ANS systems	Improvement, through technologies and procedures, of the traffic **capacity of runways**, safety networks and more accurate navigation and route monitoring tools
Deployment of **remoting** and **virtualizing** the provision of **ATS services**	**Service-oriented software architecture** for dynamic and shared airspace management and remote provision of ATS	**Integration** of **UAS** and **RPAS** together with **manned aircraft**

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.7 SNAP Objectives and Ambitions

The Saudi National Air Navigation Plan's (SNAP) is the **main planning and reference document** for Air Navigation Services **modernisation** in KSA.

As such, the SNAP defines the **development and deployment priorities** to **meet** the civil aviation sector **needs** and achieve its **targets**.

OBJECTIVES & AMBITIONS

SNAP

OBJECTIVES

Capacity building and Development

- *Support to the implementation of GACA Civil Aviation Strategic Objectives*
- *Continuous improvements of safety during the reference periods*
- *Continuous increase of Capacity and Efficiency covering the whole ANS network*
- *Progressive and smooth Integration of new entrants (e.g. UAS, RPAS, and Space launches)*
- *Military and Security needs satisfaction to access ANS, and properly respond to any threats*
- *Improvement of system resilience for ANS network against disruption or threats*
- *Application of Environmental Sustainability principles*
- *Definition of an ANS interoperable, collaborative network, and integrated infrastructure for accurate operational information*
- *Development of regulatory framework supporting innovation and ANS modernization considering alignment with regional and international standards*
- *Enabling of digital transformation of ANS infrastructure systems, forested by new technologies, automation, increased connectivity*

AMBITIONS

SNAP's main **role** is to define ANS modernization in KSA, to support the achievement of KSA ambitions in the aviation sector:

- Deploy a new generation of operational and technological solutions
- Enhance human performance through specialized training and skills development programs.
- Increase connectivity and integration at national, regional and international scale
- Reduce environmental footprint of the entire sector in line with global efforts for environmental sustainability

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.8 SNAP Governance and development process | 1.8.1 SNAP Governance

For the SNAP to maintain its relevance over time as a strategic reference for the ANS modernization in the KSA, a but effective **governance structure is defined,** with the final aim of ensuring a continuous development, update and implementation of its contents. **The SNAP governance is thought to (i) validate & publish the first Edition of the SNAP through the selection and evaluation** of the initiatives/projects targeting ANS modernization in line with KSA civil aviation strategic objectives and guidelines defined by ICAO; **(ii) preside the innovation process** including the management of the change requests for SNAP contents' update; **(iii) manage the reporting process** aiming at keeping all relevant stakeholders engaged and/or informed regarding the overall SNAP implementation status.

SNAP Governance Structure		*Members*	*Description*
Tier 1	**SNAP Board of Directors**	• **GACA BoD Chairman (Chair)** • GACA Board of Directors • GACA President	This is the highest level of the Governance structure. Its responsibilities can be summarized as follows: **i. Endorsing the contents of the SNAP and its updates, promoting its adoption as National Air Navigation Plan.** **ii. Communicating** top-down **any change in the Civil Aviation strategic priorities.**
Tier 2	**SNAP Steering Committee**	• **GACA Executive VP (Chair)** • GACA other VPs and Executives • SANS CEO • SMEs	This is the second level of the Governance structure. Its responsibilities can be summarized as follows: **i. Validating and approving the contents of the SNAP**, before its submission to the Board of Directors. **ii. Validating and approving any update of the SNAP**, emerging from a change request approved by the GACA Executive Committee. **iii. Informing the SNAP Governance regarding any strategic guideline to be applied top-down to the SNAP** (i.e. due to changes in civil aviation strategic priorities coming from the Ministry of Transportation or the evolution of regulations & policies). **iv. Reporting, at least quarterly and on-demand, to the SNAP Board of Directors** about the overall SNAP implementation progress.
Tier 3	**SNAP Executive Committee**	• **GACA ANS GM (Chair)** • GACA General Managers. • SNAP Director • ANSP Representative	This is the third level of the Governance structure. Its responsibilities can be summarized as follows: **i. Selecting the final subset of Projects to be included in the SNAP**, among those proposed by the SNAP Operational Committee. This will be achieved through the evaluation of the Business Case(s). **ii. Overseeing the overall SNAP implementation** and the supporting of internal processes and tools to monitor risks, issues, mitigation actions, policy and regulatory evolutions/amendments. **iii. Reporting, at least quarterly and on-demand, to the SNAP Steering Committee** about the overall SNAP implementation progress.
Tier 4	**SNAP Operational Committee**	• **SNAP Director (Chair)** • SNAP Initiative PMs • Stakeholder Representatives	This is the lowest level of the Governance structure. Its responsibilities can be summarized as follows: **i. Collecting the Projects to be proposed to the Executive Committee for the inclusion in the SNAP**, supported by Business Cases evaluating different scenarios and described following a pre-defined set of information (i.e. project name & description, OIS and technical enablers, ASBU Thread & Elements, benefits, KPIs, key activities, timeline, risks & mitigations, interdependencies, etc.). **ii. Orchestrating a "peer review" on each initiative or change request proposed by the stakeholders**, to validate the data provided. **iii. Collecting, reviewing and validating the request for changes to the SNAP** and presentingthe proposal for changes to the Executive Committee for approval. **iv. Reporting monthly on the implementation of the subset of Projects** (approved by the Steering Committee and formally included in the SNAP) and presenting updated data regarding the project status progress, and performance KPIs. **v. Participating, through a SNAP delegation led by the SNAP Director, in the ANS Working group sessions dedicated to discuss safety risks / issues and identify mitigation actions**, thus ensuring the consistent sharing of information between SNAP and NASP.

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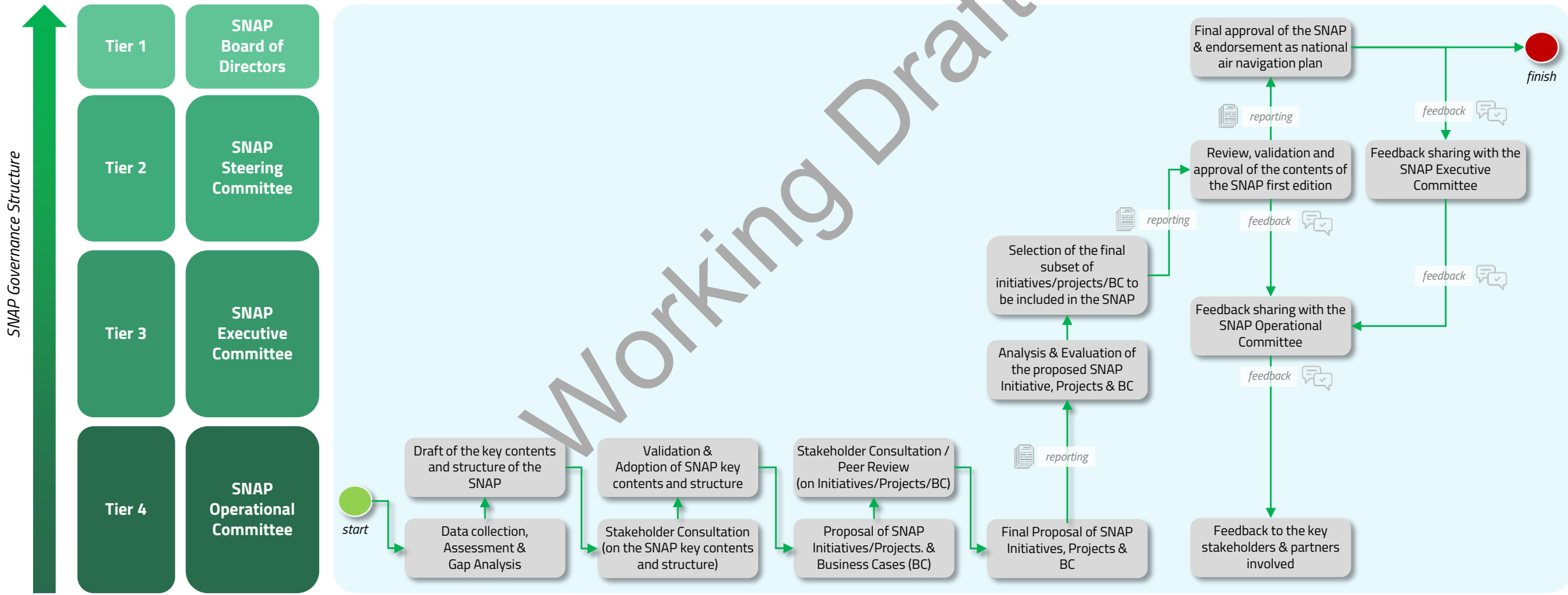
1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.8 SNAP Governance and development process | 1.8.2 Methodology for SNAP development and validation

The **initial development and validation of SNAP** fall under the **responsibility** of the **SNAP governance** structure identified under section 1.8.1, as well as the monitoring and reporting about the SNAP implementation status. Throughout the activities targeting the preparation of the SNAP, the stakeholders' consultations represent a key step of the process and an important gate to ensure communication and consensus regarding the content of the roadmap for the ANS modernization in KSA. **The methodology applied for the development and validation of the SNAP** follows a structured approach, encompassing clear roles & responsibilities, processes, and formal check-points to discuss, share and approve the contents/initiatives proposed for the Deployment Roadmap.



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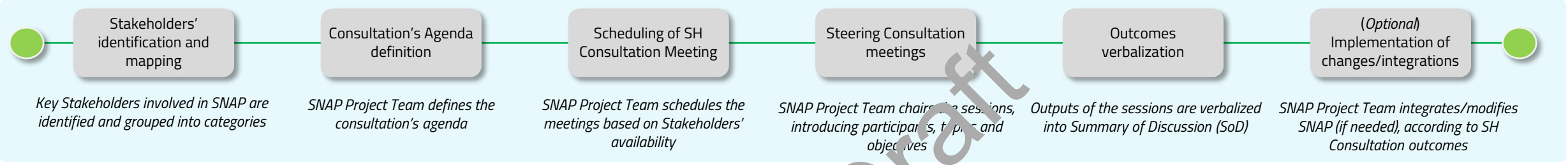
1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.9 Methodology for SNAP Stakeholders' Consultation

The general methodology adopted within SNAP to perform Stakeholders' Consultation is provided below:



To ensure inclusiveness and pave the way for future SNAP effective implementation, GACA coordinates the content and structure of the Plan with the following categories of Stakeholders:

- Airport Operators
- Airspace Users
- Air Navigation Service Provider
- Meteorological Services Provider
- Manufacturer
- Military
- KSA Space Agency
- Telco Service Provider

In the process of **SNAP first drafting**, Stakeholders are engaged indirectly through their participation in the organizational structure Tier 3 and Tier 4 of the SNAP governance (§1.7.1). Stakeholders are also directly involved in SNAP structure and content definition throughout **two rounds** of consultations, characterized by different objectives and agendas

	ROUND 1	ROUND 2
Agenda	• Present SNAP Multilayered structure • Present SNAP Layer 1 and its core elements (strategy, policy, objectives and governance)	• Present SNAP Layer 2 (Initiatives and Projects for ANS modernization) • Present Business Cases for each identified Project
Objectives	• Make the Stakeholders aware of GACA strategic directions to modernize KSA ANS. • Collecting inputs, opinions, views, and comments on SNAP strategy, policy, objectives and governance • Acquire insights and information on Stakeholders Business and/or Master Plans	• Collecting inputs and feedback on Projects' key activities and timelines • Obtain validation of proposed Business cases and define the preferred implementing scenario for Projects
Participants	• All stakeholder categories' representatives	• All stakeholder categories based on the Communication Plan. In particular, representatives of Stakeholders that are "Owner" or "Sponsor" of Projects are invited to discuss the Project Cards/BC relevant to them

In the process of **SNAP updating/upgrading** after the initial SNAP release, Stakeholders will be engaged for embracing new information or updates, thus fine-tuning the SNAP document. In such update exercise, the Web based app represents the main tool for such a task as it allows a **permanent involvement of stakeholders** by giving them the chance to always submit requests for changes to SNAP contents. The processes governing **(I) the future update/maintenance of SNAP contents, (II) the continuous involvement of stakeholders and (III) the promotion of SNAP contents and material will be described in Layer 5 Annex X.** Moreover, Stakeholders owning project execution responsibility will be required to share data with GACA to guarantee a continuous monitoring of SNAP initiatives (*please refer to Layer 4 §4.4 SNAP Monitoring | 4.4.1 Process: Key Elements*.

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1.10 ICAO alignment | GANP - Overview

PURPOSE

- The GANP is paramount for **setting global priorities** to drive the evolution of the global air navigation system and ensure that the vision of an **integrated, harmonized, globally interoperable and seamless system** becomes a reality
- The GANP provides a series of **operational improvements** to increase capacity, efficiency, predictability and flexibility while **ensuring interoperability** of systems and harmonization of procedures
- It is also a **key enabler** for the achievement of **ICAO's Strategic Objectives**

OBJECTIVES

- The development and achievement of a fully harmonized global air navigation system builds on agreed **performance-based standards with interoperable and scalable systems**, meeting the ever-growing **traffic trends** and **expectations of aviation stakeholders**
- It **accommodates all airspace users' operations** in a safe, secure and cost-effective manner, while **reducing aviation's environmental impact**
- It has a strong focus on desired or required **results**, it relies on **facts and data** and supports collaborative and justified **decision-making processes**

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GLOBAL STRATEGIC — Defines the strategic direction for decision-makers with respect to global air navigation system evolution beyond 2040, offering vision, performance goals, and conceptual roadmap

GLOBAL TECHNICAL — Supports technical managers with respect to planning the development and implementation of ANS, based on two technical frameworks: the basic building blocks (BBBs) and the Aviation System Block Upgrades (ASBUs)

REGIONAL — Addresses regional and subregional performance and operational needs, differences, constraints and opportunities through the ICAO Regional Air Navigation Plans in line with global strategic and technical levels

NATIONAL — Provides the National Air Navigation Plan template based on States and relevant Stakeholders needs, following the regional and global plans

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VISION

- Pursue a **high-performing global air navigation system**, coping with **ultimate objectives** of the air navigation system, emerging **challenges** and **opportunities** stemming from aviation and technological innovations

PERFORMANCE AMBITIONS

- Fulfil and strengthen the air navigation system **level of performance** required by the aviation community with respect to ICAO's Key Performance Areas (KPAs) target ambitions

CONCEPTUAL ROADMAP

- Achieve the target vision and performance ambitions based on a conceptual roadmap in order to **transform the air navigation system** at all levels (global, regional and national)

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.10 ICAO alignment | 1.10.2 GANP - Global Technical Level

The Global Technical Level of the GANP provides a path to the safe, orderly and efficient evolution through **two technical frameworks**:

Basic Building Blocks (BBB)

Presents the **essential air navigation services to be provided** to be compliant with ICAO standards, the **end users** and the **assets needed**

Aviation System Block Upgrades (ASBU)

Outlines the framework for **modernizing and harmonizing the global air navigation system** to improve the efficiencies of the global aviation system and ensure international interoperability

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.10 ICAO alignment | 1.10.2.1 GANP - Global Technical Level: BBB framework

The Basic Building Block (BBB) framework forms the **baseline of a resilient air navigation system**, outlining **essential services in alignment with ICAO Standards**. These services encompass aerodromes, air traffic management, search and rescue, meteorology and aeronautical information. The BBB framework not only identifies these services but also **pinpoints end users and necessary assets** (such as the CNS infrastructure)

BBB Framework Services

Meteorological information

Air Traffic Management

Aeronautical Information

Aerodrome Operations

Search and Rescue

Main features of the BBB framework

Strategic Implementation: States are urged to strategically integrate BBB implementation into their national air navigation plans. This strategic alignment within the broader national aviation planning framework is pivotal for achieving seamless services, fostering interoperability, and harmonising procedures.

Enhancing Global Connectivity: By adhering to the BBB framework, States contribute to the deployment of interoperable systems, facilitating global connectivity and reinforcing harmonized procedures essential for the modernization of air navigation services.

Foundation of ASBU Framework: BBB serves as the baseline of the ASBU framework, representing not merely an evolutionary step but the fundamental underpinning of the entire structure.

Continuous Improvement: The BBB framework emphasises a continuous improvement approach, enabling adaptation to evolving aviation needs and technological advancements, ensuring long-term resilience in air navigation capabilities.

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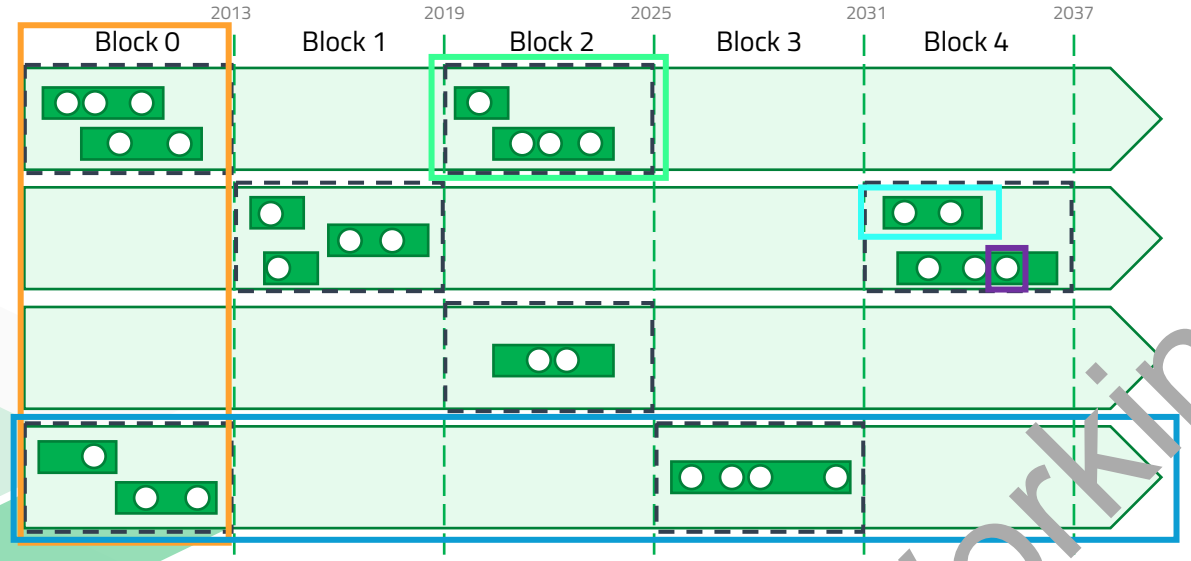
1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.10 ICAO alignment | 1.10.2.2 GANP - Global Technical Level: ASBU framework

As part of the GANP, the ASBU framework is a strategic initiative developed by ICAO to modernise and harmonise global air navigation systems, presenting a comprehensive roadmap that outlines the **evolution and enhancement of air navigation capabilities over specific timeframes**



Block - is made up of modules that, when combined, enable significant improvements and benefits within a defined time frame. Five blocks viz. Block 0, Block 1, Block 2, Block 3, each with a 6 years timespan commenced in 2013). It is recognized that Blocks 0 and 1 represent the most mature of the modules. Blocks 2 and 3 provide the necessary vision to ensure that earlier implementations are on the path to the future.

Thread - describes the evolution of a given capability through the successive block upgrades, from basic to more advanced capability and associated performance, while representing key aspects of the global ATM concept (ASBU threads are categorized in 3 groups: **Operational, information and Technology threads)**

Module - a deployable package based on performance or capability. It offers a clear operational benefit, supported by procedures, technology, regulation/standards as necessary. A module will be also characterized by the operating environment within which it may be applied.

Element - a specific change in operations designed to improve the performance of the air navigation system under specified operational conditions.

Enabler - components (standards, procedures, training, technology, etc.) required to implement an element. (Some of the enablers can be elements in other threads).

Aiming at implementing ASBU operational improvements, different **level of prioritization** has been identified by ICAO based on the following rationale:

- **Priority 1** - critical upgrade assignment based on whether the implementation of an element could bring most benefit to the region or regional upgrade by States and is essential to achieve the service level required globally
- **Priority 2** - recommended upgrade for those elements which would bring benefits to the region, but are encouraged to implement earlier if beneficial
- **Priority 3** - assigned to those elements which may not be universally implemented and considered as "Optional" for States.

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.10 ICAO alignment | 1.10.2.3 GANP - Global Technical Level: ICAO ASBU threads and elements

Following the guidelines provided in ICAO's RANP/NANP TF/1-WP/12 APPENDIX B, the ASBU threads and elements can be distinguished in **three different functional categories:** Information, Operational and Technology. Such categories, and all the ASBU elements included in them, will become pivotal components of the future ANS in KSA through SNAP.

ASBU THREADS

INFORMATION

This category covers the deployment of new air traffic navigation systems and tools, with enhanced automation to improve connectivity into the network and increase information-sharing on flights and traffic flows.

- ✓ **AMET** Meteorological Information
- ✓ Digital Aeronautical Information Management (**DAIM**)
- ✓ Flight and Flow Information for a Collaborative Environment (**FF-ICE**)
- ✓ System Wide Information Management (**SWIM**)

SNAP will ensure that timely and consistent decisions are made on a network and flight-centric basis through information exchanges among airspace users, air traffic management systems and aerodrome operations. New entrants such as UAS, and new users of high-altitude airspace, and Space operations will all contribute to this dynamic decision-making process.

OPERATIONAL

This category covers the evolution of ground, operators, and users' capabilities and airspace management with a focus on high-altitude and low/urban airspace operations over the long term.

- ✓ Airborne Collision Avoidance System (**ACAS**)
- ✓ Airport Collaborative Decision Making (**A-CDM**)
- ✓ **APTA** Improve arrival and departure operations
- ✓ **CSEP** Cooperative separation
- ✓ **FRTO** Improved ops through enhanced en-route trajectories
- ✓ Global Aeronautical Distress and Safety System (**GADS**)
- ✓ Network operations (**NOPS**)
- ✓ **OPFL** Improved access to optimum flight levels in oceanic and remote airspace
- ✓ Digital Aerodrome Air Traffic Services (**DATS**)
- ✓ Improved traffic flow through runway sequencing (**RSEQ**)
- ✓ Ground-based safety nets (**SNET**)
- ✓ Surface operations (**SURF**)
- ✓ Trajectory-based operations (**TBO**)
- ✓ Wake Turbulence Separation (**WAKE**)

Within SNAP the modernization of the air navigation system is built on the notion of management by trajectory, empowered by access to timely and accurate shared information, which should improve trajectories for manned and unmanned operations.

TECHNOLOGY

This category covers the deployment of new technologies for Communications, Navigation and Surveillance infrastructure to support space-based operations and to provide robust contingency arrangements by using combination of ground-based infrastructure and multifrequency, multi-constellation capabilities which will strength the resilience against any vulnerabilities or threats

- ✓ **ASUR** Surveillance systems
- ✓ Communication Infrastructure (**COMI**)
- ✓ Air Traffic Services communication service (**COMS**)
- ✓ Navigation systems (**NAVS**)

ANS modernization will be enabled in KSA by a progressive increase in automation, advancements in technology and the use of standardized, interoperable ground and air systems in an integrated infrastructure. In long-term, the ANS infrastructure will be able to interface with non-aviation transportation systems to achieve an efficient, multimodal transport system.

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.10 ICAO alignment | 1.10.3 GANP - Regional Level: Middle-East (MID) Regional Air Navigation Plan (RANP)

Responding to ICAO Assembly's Resolution, Regions are required to actively **develop their respective Regional Air Navigation Strategy**, aligning planning and implementation activities with globally-harmonized objectives. PIRGs (Planning and Implementation Regional Groups) are tasked with developing and maintaining regional air navigation plans, aligning them with agreed global and regional planning frameworks.

OBJECTIVES

1. To develop a **strategy** that serves as a **regional-level** framework, adherent with the principles outlined in the GANP
2. To establish **priorities**, **targets**, and **indicators** aligning with global objectives while considering operational needs
3. To encourage the Region striving to **harmonise** and **enhance air navigation capabilities** within its geographic scope through a collaborative approach

FOCUS - MID REGION AIR NAVIGATION PLAN

- The **MIDANPIRG** (Middle East Air Navigation Planning And Implementation Regional Group) developed the **MID Region Air Navigation Strategy** on the basis of the GANP 7TH edition and the ASBU framework.
- Such document aims at **increasing capacity, improving efficiency, enhancing safety** and **minimizing the occurrence of adverse environmental effects** of civil aviation activities.
- The implementation of the ASBU Block 0 Elements in the MID Region started **before 2013** and **is continuing**. For the short and medium term, the MID Region priorities include identified ASBU Elements from Block 0 and Block 1
- The level of **ASBU Elements priority** presented in the MID ANP is based on the following rules:
  - Priority 1 ASBU Element: Elements that have the highest contribution to the improvement of air navigation safety and/or efficiency in the MID Region.
  - Priority 2 ASBU Element: Elements recommended for implementation based on identified operational needs and benefits by States

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1. STRATEGY, OBJECTIVES AND GOVERNANCE

1.10 ICAO alignment | 1.10.4 GANP - National Level: National Air Navigation Plan (NANP)

Along with the Regional Level, National Levels of the GANP **ensure consistency** from the initial development of operational improvements to final implementation, providing a common basis for **short and medium-term implementation planning**

OBJECTIVES

1 To plan the **modernization** of national air navigation system based on a thorough **understanding of user system requirements**, **traffic** density and complexity, and with respect to the **level of sophistication** required for the provision of necessary services. Therefore, accurate forecasting of civil aviation activity is crucial, assessing trends in aircraft movements, passenger and freight traffic volumes within States and regions.

2 Sustain the **validity of planned investments** in new systems on the basis of empirical data and information

3 Ensure an **integrated strategic approach at State level**, stressing the linkage between different national plans (e.g., ensure alignment with State's overarching national development plan), emphasising the importance of air transport for the economic development of the State, thus **mobilising public and private resources** and **partnerships** for the implementation of the plan and to strengthen the civil aviation sector

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Based on the building blocks (ASBUs) of the GANP, KSA has defined evolutionary steps for ANS modernization through initiatives, workstreams, and development plans that are consolidated into the present document (**SNAP**). The ANS modernization solutions, tailored to KSA specific needs, were identified using a collaborative process with partners at national, regional and global levels.

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Layer 2
ANS Modernization

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