



International Civil Aviation Organization

WORKING PAPER

A42-WP/537

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11/8/25

(Information paper)

English only

ASSEMBLY — 42ND SESSION

TECHNICAL COMMISSION

Agenda Item 23: Global Aviation Safety and Air Navigation Plans

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 *Manual on Global Performance of the Air Navigation System* (Doc 9883). The plan describes the vision, objectives, and a 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 implemented.

<i>Strategic Goals:</i>	This working paper relates to <i>Every Flight is Safe and Secure, and Aviation Delivers Seamless, Accessible, and Reliable Mobility for All</i> .
<i>Financial implications:</i>	Activities to be undertaken within existing budgetary allocations.
<i>References:</i>	Doc 10184, <i>Assembly Resolutions in Force</i> Doc 9750, <i>ICAO Global Air Navigation Plan</i> (GANP) <i>Report of the Second Meeting of the Regional Air Navigation Plan/National Air Navigation Plan Task Force</i> (RANP/NANP TF/2) - Cairo, Egypt, 17 – 19 February 2025

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 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 Saudi Arabia's air navigation infrastructure and services, tackles the upcoming air navigation challenges, and sets initiatives with a roadmap for air navigation services (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 *Manual on Global Performance of the Air Navigation System* (Doc 9883). The plan describes the vision, objectives, and a 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 implemented.

2. THE DEVELOPMENT OF SNAP & ITS STRUCTURE

2.1 The details on the development of the Saudi National Air Navigation Plan (SNAP) are described in the attached PowerPoint Presentation to this paper. This presentation provides an overview on the SNAP, the methodology used for its development, its structure, and the relationship between the SNAP and the National Aviation Safety Plan (NASP).

3. CONCLUSION

3.1 As explained in the attached presentation, SNAP's development is a cooperative and iterative process that involves all stakeholders. It is based on the GANP and the Aviation System Block Upgrades using the PBA described in Doc 9883. The plan has identified solutions that enhance collaboration between stakeholders, including aircraft operators and ANS providers, implement initial system-wide information management, and introduce network capacity and demand balancing measures.

3.2 SNAP is expected to deliver efficient services and infrastructure through ANS/air traffic management (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 unmanned aircraft systems (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 Saudi Arabia 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 The Assembly is invited to take note of the information provided in this paper and encourage States to share information, through ICAO, on their National Air Navigation Plans (NANPs).

APPENDIX

**POWERPOINT PRESENTATION ON THE SAUDI NATIONAL AIR NAVIGATION PLAN
(SNAP)**

(See next page)



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Saudi National Air Navigation Plan (SNAP)
(Presented by Saudi Arabia)



CONTENT

- OVERVIEW
- WHAT IS the SNAP?
- SNAP METHODOLOGY
- SNAP INITIATIVES
- RELATION BETWEEN SNAP & NASP

➤ ACTION BY THE ASSEMBLY

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➔ ➤ OVERVIEW

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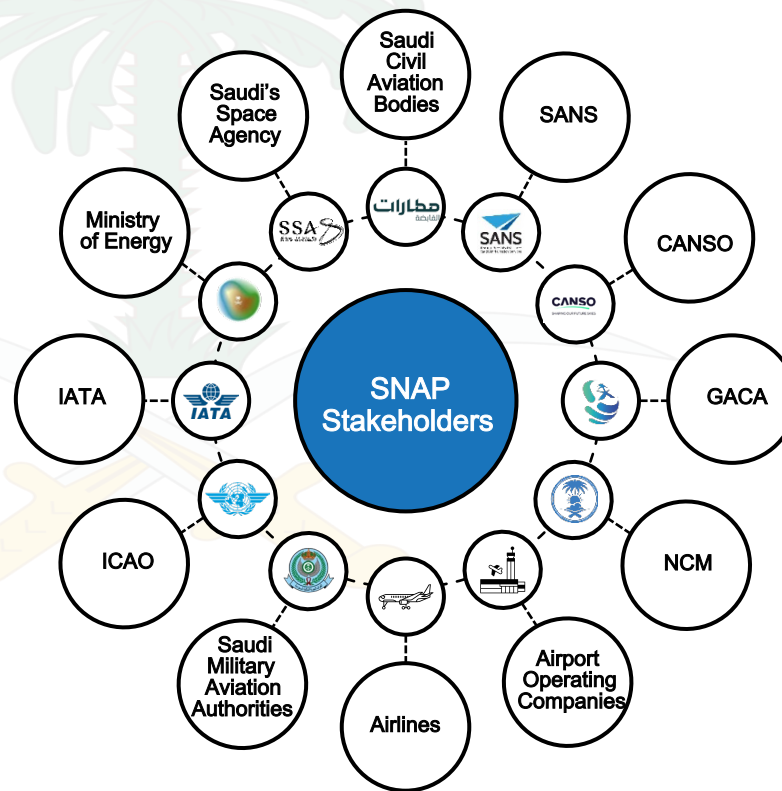


July 2023 ...

The SNAP journey started with the creation of a **comprehensive team-mix of professionals** with international expertise and technical know-how in the field of ANS. Moreover, a **large base of stakeholders** was identified.



20+
Professionals & SME
involved in the SNAP Development



38+
Stakeholders
contribute to the development of the SNAP



29+
Meetings & Workshops
with national, regional and international
stakeholders

After being mapped, Stakeholders were grouped according to their levels of engagement and influence on the SNAP, and then consulted with the intent of capturing and including their feedback into the process

INFLUENCE

ENGAGEMENT

STAKEHOLDERS MAPPING

		INTERNAL	EXTERNAL	CONSULTANTS
		 GACA الهيئة العامة للطيران المدني General Authority of Civil Aviation	National, Regional and International organizations	Firms/Organizations
HIGH	Contribute directly to SNAP	 Human Capital Project  SSP& NASP Projects	 SANS  DACO شركة مطارات الدمام Dammam Airports Company  مطارات الرياض riyadh airports  المطارات TIBAH Airports  NEOM NEOM Airport  Red Sea Global	 enav  الأفق الأزرق للإتصالات و تقنية المعلومات BLUE HORIZON ICT
MEDIUM	Contribute indirectly to SNAP	 Cyber-security Department  AAM Project  IT Department  Seamless Operations	 صندوق الاستثمارات العامة  المركز الوطني للأرصاد National Center for Meteorology المملكة العربية السعودية  السعودية Saudia  طيران أديل flyadeal  طيران الرياض RIYADH AIR  SSA وكالة الفضاء السعودية SAUDI SPACE AGENCY	 JERAISY مجموعة الجريسي JERAISY GROUP  ALG
LOW	Informed about SNAP	 CAESP برنامج المسؤولية الاجتماعية للشركات Saudi Civil Aviation Environmental Sustainability Program  Data Protection Officer	 NEOM NEOM UTMWG  SANS SANS UTM  BOEING BOEING UTM  aramco  الأكاديمية السعودية للطيران المدني Saudi Academy of Civil Aviation  وزارة النقل والخدمات اللوجستية Ministry of Transport and Logistic Services  وزارة الطاقة MINISTRY OF ENERGY  THC THE HELICOPTER COMPANY شركة هليكوبتر السعودية  GEOSA الهيئة العامة للمساحة والحدود والبيانات الجغرافية General Authority for Survey and Geospatial Information  IATA	International Organizations  ICAO  CANSO SHAPING OUR FUTURE SKIES  IATA

The SNAP journey continued with the study of a set of strategic and technical documentation and with the execution of a **SWOT analysis** on the current Air Navigation System in KSA

OVERVIEW



 **100+**

Analysed documents

The Statute of the General Authority, the GACA Civil Aviation Strategy, the State Safety Programme (SSP), The KSA Space Agency Strategy, the MID Regional Air Navigation Strategy, ICAO MID Air Navigation Plans Documents, Advanced Air Mobility RoadMap..etc



 **8**

Domains tackled by the SWOT analysis

CNS & Technologies, ATFM & Flexible Use of Airspace, Human Resources, Search & Rescue Operations, Air Navigation Services Operations, Airspace & Instrument Flight Procedure Design Assessment, AIM and MET services, Regulatory Framework

Present & Future Challenges



Management of the Airspace Capacity

Airspace concept redefinition & introduction of solutions to increase capacity and accommodate the growing traffic demand



Infrastructure modernization & scale-up

Rationalization of ground infrastructure & conventional NAVAIDs to cut maintenance costs while maintaining adequate levels of efficiency and safety.



Integration of new airspace users

Lower Airspace VTOLs, UAS, etc.
Higher Airspace Supersonic flights, Balloons, etc.

Given the ambitions set by the KSA Vision 2030, the SWOT analysis showed that the actual ANS will face Challenges in the efficiency while handling the expected increase in air traffic . This was eventually confirmed by the outcome of the Fast Time Simulations.



330 MPax



4.5 million of tons in cargo



2.7M movements/year per APT

NATIONAL AVIATION SECTOR STRATEGIC AMBITIONS

FAST TIME SIMULATION EVIDENCE

OVERVIEW

		JEDDAH WEST 37							
		N Flights	2024	2025	2026	2027	2028	2029	2030
Hours	flights/h								
0	28		32.76	35.56	38.36	41.72	45.36	49.84	55.44
1	24		28.08	30.48	32.88	35.76	38.88	42.72	47.52
2	22		25.74	27.94	30.14	32.78	35.64	39.16	43.56
3	18		21.06	22.86	24.66	26.82	29.16	32.04	35.64
4	24		28.08	30.48	32.88	35.76	38.88	42.72	47.52
5	23		26.91	29.21	31.51	34.27	37.26	40.94	45.54
6	22		25.74	27.94	30.14	32.78	35.64	39.16	43.56
7	34		39.78	43.18	46.58	50.66	55.08	60.52	67.32
8	29		33.93	36.83	39.73	43.21	46.98	51.62	57.42
9	28		32.76	35.56	38.36	41.72	45.36	49.84	55.44
10	33		38.61	41.91	45.21	49.17	53.46	58.74	65.34
11	28		32.76	35.56	38.36	41.72	45.36	49.84	55.44
12	35		40.95	44.45	47.95	52.15	56.7	62.3	69.3
13	25		29.25	31.75	34.25	37.25	40.5	44.5	49.5
14	28		32.76	35.56	38.36	41.72	45.36	49.84	55.44
15	29		33.93	36.83	39.73	43.21	46.98	51.62	57.42
16	25		29.25	31.75	34.25	37.25	40.5	44.5	49.5
17	30		35.1	38.1	41.1	44.7			
18	30		35.1	38.1	41.1	44.7			
19	31		36.27	39.37	42.47	46.19			
20	21		24.57	26.67	28.77	31.29			
21	21		24.57	26.67	28.77	31.29			
22	29		33.93	36.83	39.73	43.21	46.98	51.62	57.42
23	28		32.76	35.56	38.36	41.72	45.36	49.84	55.44

Legenda
37 - 40
41 - 45
46 - 50
> 51

JEDDAH TMA 34			
Hours	2024	2025	2026
0	37.44	40.64	43.84
1	26.91	29.21	31.51
2	46.8	50.8	54.8
3	46.8	50.8	54.8
4	40.95	44.45	47.95
5	49.14	53.34	57.54
6	37.44	40.64	43.84
7	51.48	55.88	60.28
8	54.99	59.69	64.39
9	42.12	45.72	49.32
10	53.82	58.42	63.02
11	49.14	53.34	57.54
12	43.29	46.99	50.69
13	45.63	49.53	53.43
14	54.99	59.69	64.39
15	58.5	63.5	68.5
16	53.82	58.42	63.02
22	45.63	49.53	53.43
23	42.12	45.72	49.32

Legenda
34 - 37
38 - 41
42 - 46
> 47

RIYADH TMA 37				
Hours	flights/h	2024	2025	2026
0	21	24.57	26.67	28.77
1	19	22.23	24.13	26.03
2	24	28.08	30.48	32.88
3	30	35.1	38.1	41.1
4	26	30.42	33.02	35.62
5	28	32.76	35.56	38.36
6	24	28.08	30.48	32.88
7	33	38.61	41.91	45.21
8	37	43.29	46.99	50.69
9	24	28.08	30.48	32.88
10	38	44.46	48.26	52.06
11	40	46.8	50.8	54.8
12	32	37.44	40.64	43.84
13	38	44.46	48.26	52.06
14	35	40.95	44.45	47.95
15	43	50.31	54.61	58.91
16	39	45.63	49.53	53.43
17	38	44.46	48.26	52.06
18	28	32.76	35.56	38.36
19	34	39.78	43.18	46.58
20	42	49.14	53.34	57.54
21	26	30.42	33.02	35.62
22	28	32.76	35.56	38.36
23	26	30.42	33.02	35.62

Legenda
34 - 37
38 - 41
42 - 46
> 47

Hence, we must act now to make sure the ANS is ready to manage the change!

JEDDAH WEST sector is expected to reach the Capacity by the end of 2025

JEDDAH TMA sector is expected to reach the Capacity as early as 2024

RIYADH TMA sector is expected to reach the Capacity as of 2025

In addition to addressing the airspace capacity issue, the SNAP will provide the Aviation Sector with additional benefits in different **Key Performance Areas (KPA)**.

OVERVIEW

KPA	Indicator	Baseline (2023)	Benchmark
TRAFFIC VOLUME	KPI06 IFR Mov./Y	850,000	N/A (KSA Target is 2.7 Million flights by 2030)
OPS EFFICIENCY	KPI02 Additional Taxi-out time KPI13 Additional Taxi-in time	+ 6 minutes/ flight* + 14 minutes/ flight*	State 1 + 1.2 Minutes** + 2.6 minutes** State 2 + 10.3 Minutes + 1.2 Minutes State 3 + 4.1 Minutes + 1.2 Minutes + 5,3 Minutes + 4,2 Minutes
PREDICTABILITY	KPI01 Departure Punctuality KPI14 Arrival Punctuality	81%(of flights)* 25%(of flights)*	State 1 68%(of flights) 51%(of flights) State 2 60%(of flights) 50%(of flights) State 3 + 65%(of flights) + 71%(of flights) + 69%(of flights) + 60%(of flights)
ENVIRON. SUSTAINABILITY	FUEL BURNT Avg. Co2 Emission Tons/ flight (gate to gate)	13	5 to 10%reduction

Above, the baselines were calculated for an exemplificative sample of KPAs and then benchmarked against some middle East states and Europe.

NOTE:

(*) Such data represent the average outcome considering what is detectable at the 4 main Saudi airports (Riyadh, Jeddah, Dammam and Madina)

(**) Only some busy Regional airports are considered for benchmarking purposes

After the baselines' calculations and the benchmark activity's completion, **performance ambitions were set for the selected KPAs**

KPA	Indicator	Baseline (2023)	Ambition/Target (2030)
TRAFFIC VOLUME	KPI06 IFR Mov./Y	850,000	3-fold increase 2.7 M Mov./Y
OPS EFFICIENCY	KPI02 Additional Taxi-out time KPI13 Additional Taxi-in time	+ 6 minutes/ flight* + 14 minutes/ flight*	+66% +2 minutes/ flight + 5 minutes/ flight
PREDICTABILITY	KPI01 Departure Punctuality KPI14 Arrival Punctuality	81%(of flights)* 25%(of flights)*	+55% 90%of departing flights 50%of arriving flights
ENVIRON. SUSTAINABILITY	FUEL BURNT Avg. Co2 Emission Tons/ flight (gate to gate)	13	+5% to10% 12,49 (5%) 11,83 (10%)

NOTE:

(*) Such data represent the average outcome considering what is detectable at the 4 main Saudi airports (Riyadh, Jeddah, Dammam and Madina)



➤ WHAT IS SNAP



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be presented orally
during the meeting

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WHAT IS SNAP?

The **Saudi National Air Navigation Plan (SNAP)** is a strategic initiative launched by GACA to meet the **objectives of the Vision 2030** and address the **challenges in KSA's Air Navigation System (ANS)** in the next 15 years.

- SNAP aims to raise the level of **capacity, operational efficiency, safety, flexibility**, and **environmental sustainability** in Saudi Arabia air navigation, aligning with the nation's vision for sustainable growth and modernization.
- Structured into **five layers**, SNAP encompasses comprehensive **data collection, stakeholder consultations, selection and prioritization of strategic initiatives and projects** to upscale the airspace and air navigation infrastructure/services.

WHAT IS SNAP?

The SNAP is a strategic “living” plan that emerges as a crucial endeavour to **address and bridge gaps** in the KSA's aviation infrastructure and management systems and **tackle the upcoming aviation challenges**

What SNAP will be used for?

- To serve as the **primary forum for stakeholders' collaboration and interaction**
- To position the KSA at the **forefront of advanced operations and technologies' adoption**
- To ensure **ICAO global obligations compliance** fostering international cooperation and secure operations
- To support the **capacity building process** in the KSA by reskilling and upskilling ANS personnel
- To accommodate the **operating and regulatory environment for new airspace entrants**

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➔ ➤ SNAP METHODOLOGY

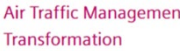
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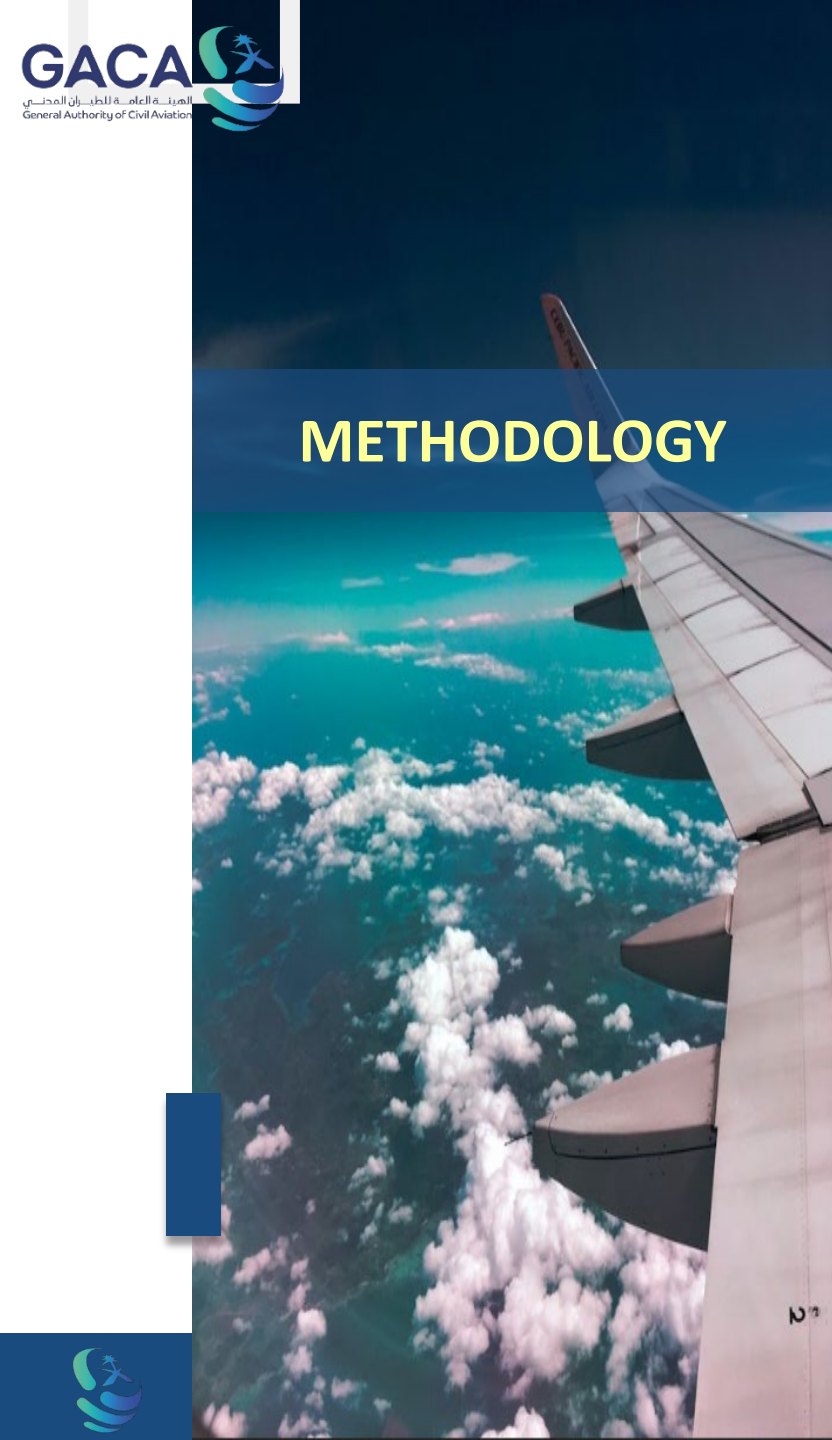




BENCHMARKING

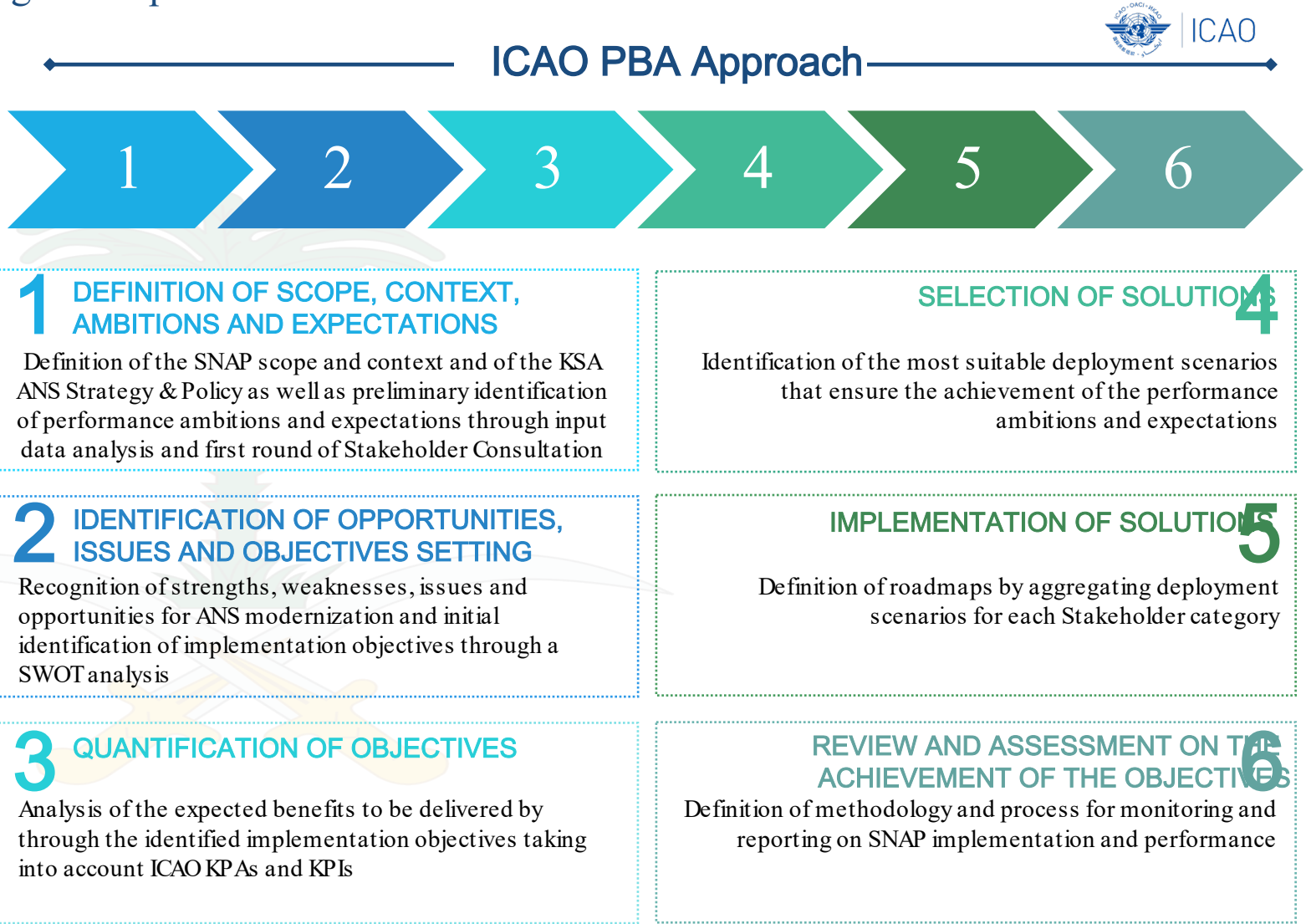
Some main international leading States and organizations were taken as a benchmark

ORGANIZATION	REFERENCE	STATUS	TIMEFRAME	CRITERIA SCOPE	TRAFFIC COMPLEXITY
 GACA الهيئة العامة للطيران المدني General Authority of Civil Aviation	SNAP Saudi National Air Navigation Plan	Under Development	2025 - 2040	Align with ICAO GANP framework & national needs	High
 ICAO	 ICAO GANP PORTAL <u>Global Air Navigation Plan</u>	(7 th Edition)	2013 - 2033	Gate to gate ops. (GANP)	N.A
 Federal Aviation Administration	 NextGEN <u>Next Generation Transportation System (NextGen)</u>	Issued	Recurring	Contribute to ICAO GANP framework.	High
 sesar JOINT UNDERTAKING	 EUROPEAN ATM MASTER PLAN <u>SESAR European ATM Master Plan</u>	Issued	Until 2035	Contribute to ICAO GANP framework.	High
	 <u>Airspace Modernization Strategy 2023–2040</u>	Issued	Until 2040	Align with ICAO GANP framework	High
	 <u>Air Traffic Management Transformation</u> <u>Development of an ATM Centre of Excellence</u>	Under Development	Until 2025	Align with ICAO GANP framework	Medium
	 <u>OneSky Australia program</u> <u>Transformation of ATM in Australia over 20 Years</u>	Issued	Until 2038	Align with ICAO GANP framework	Medium
	 <u>Kuwait NANP presented at ICAO MID 2024 RANP/ NANP TF</u>	Issued	2023-2028	Align with ICAO GANP framework	Medium
	 <u>UAE's NANP Progress</u> First Meeting of the RANP/NANP Task Force (RANP/NANP TF-1) <u>UAE NANP presented at ICAO MID 2024 RANP/ NANP TF</u>	Under Development	Until 2033	Align with ICAO GANP framework	Medium
Other MID Region States		Not started	N.A.	ICAO MID (RANP)	N.A



METHODOLOGY

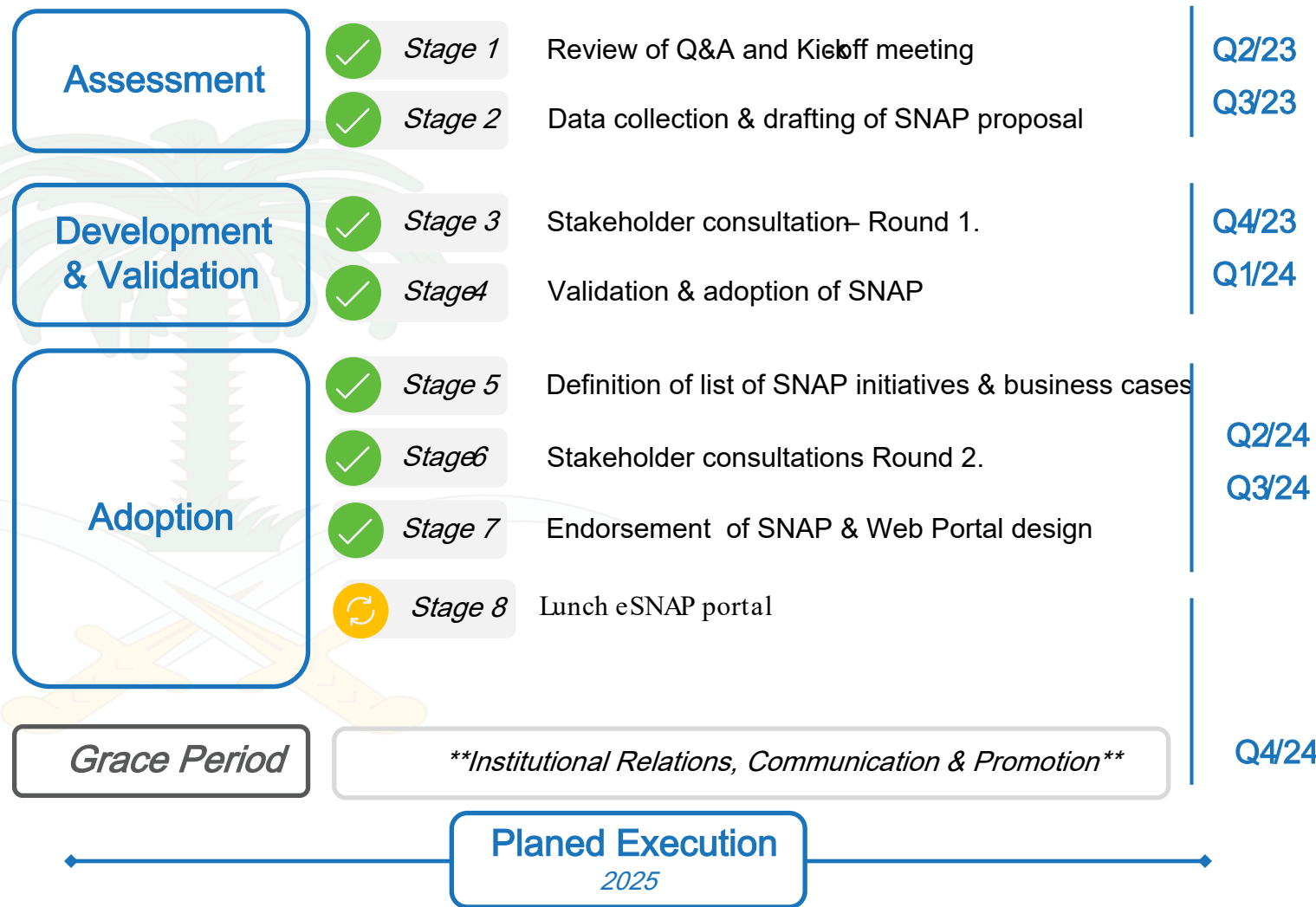
The SNAP is developed leveraging on the **Performance Based Approach (PBA)** a best practice identified in the **ICAODoc 9883** and articulated in 6 logical steps.

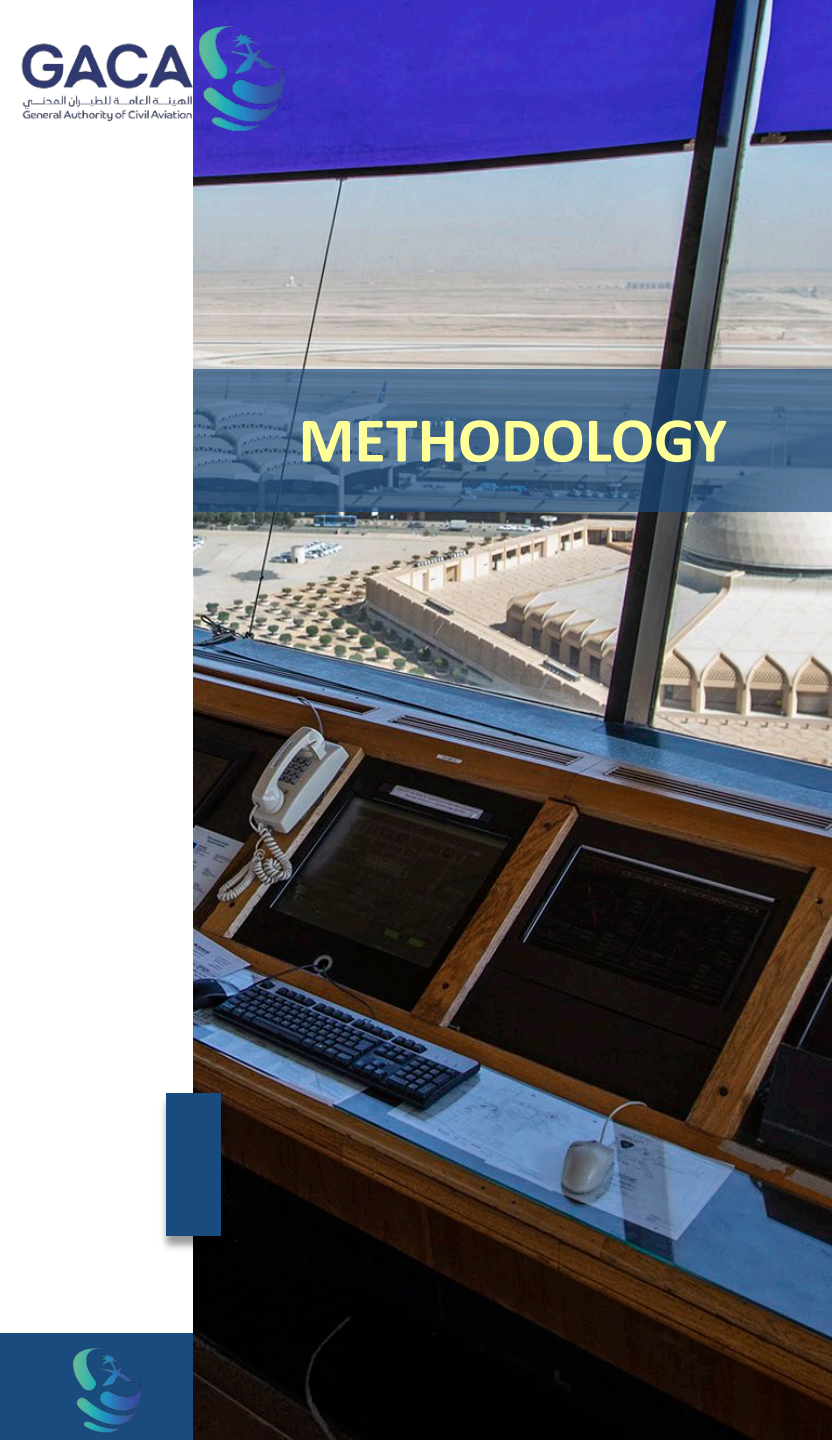


METHODOLOGY

The SNAP project is arranged into **3 phases and 8 stages**.

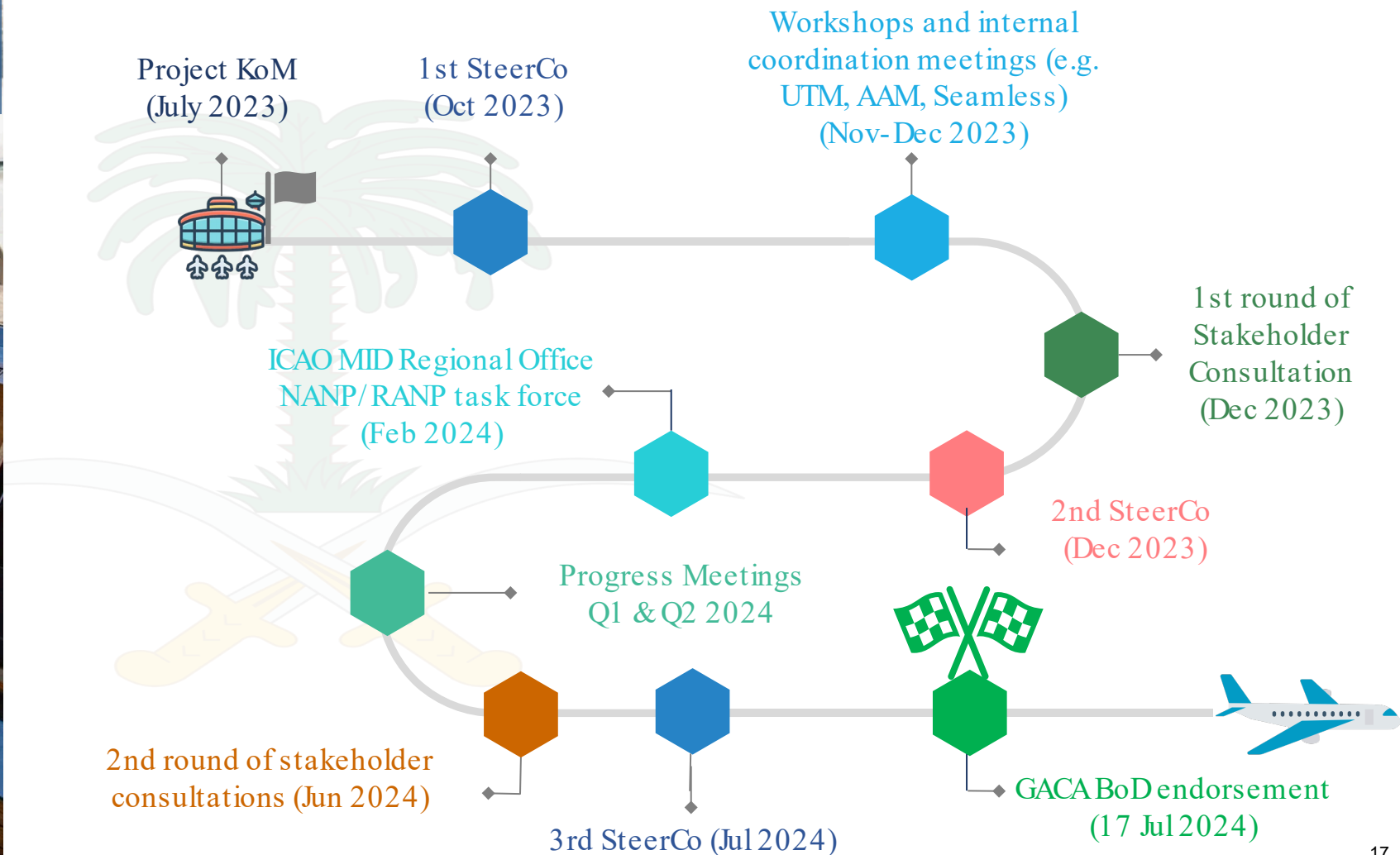
The delivery of the **first version of the SNAP** and its adoption as the official Air Navigation Plan of Saudi Arabia is expected by end of July 2024.





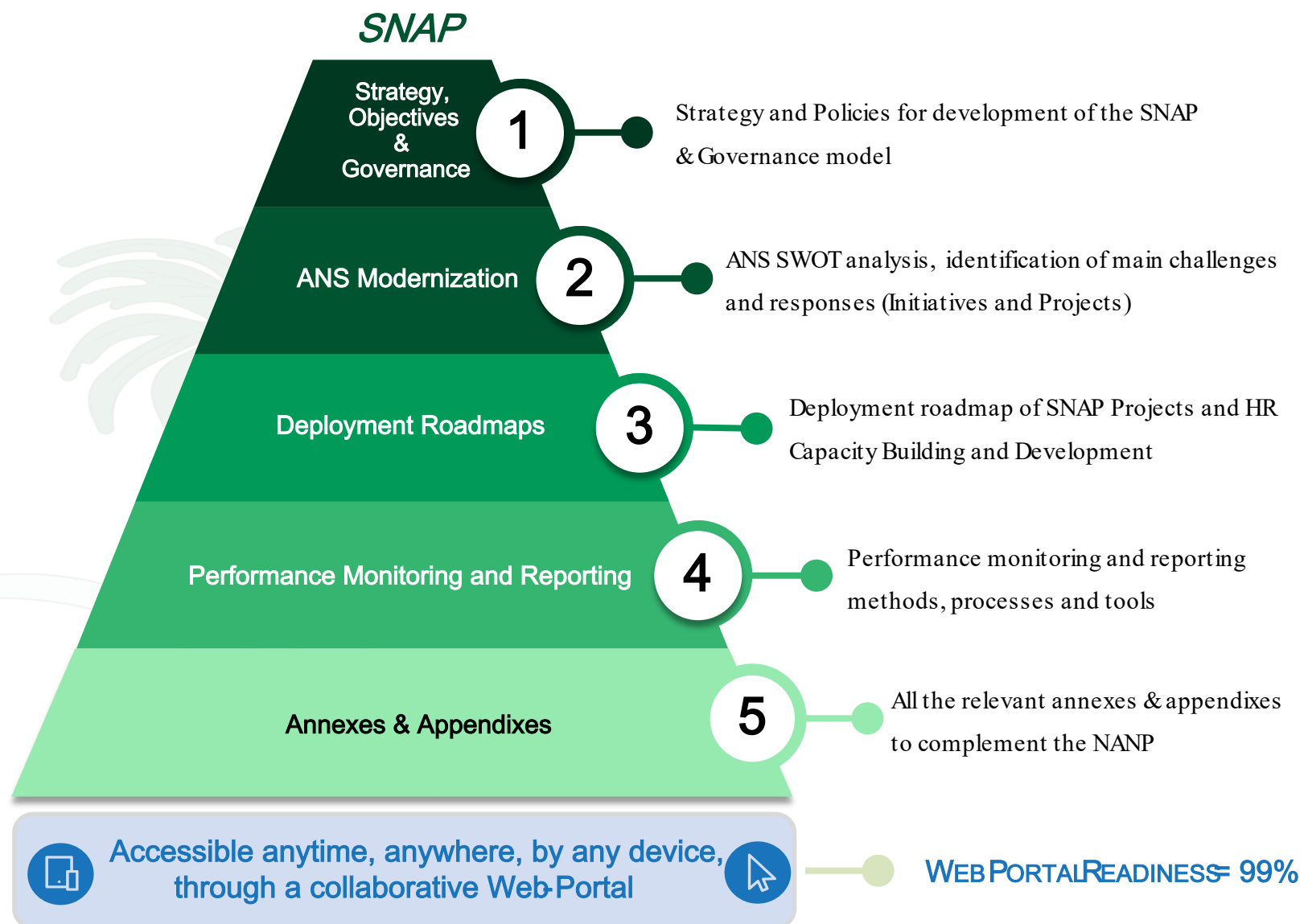
METHODOLOGY

To get to where we are, the SNAP has gone through a multitude of **workshops, stakeholders' consultation sessions** and **progress meetings** with the GACA management. Below, an overview on the main project's milestones is illustrated:



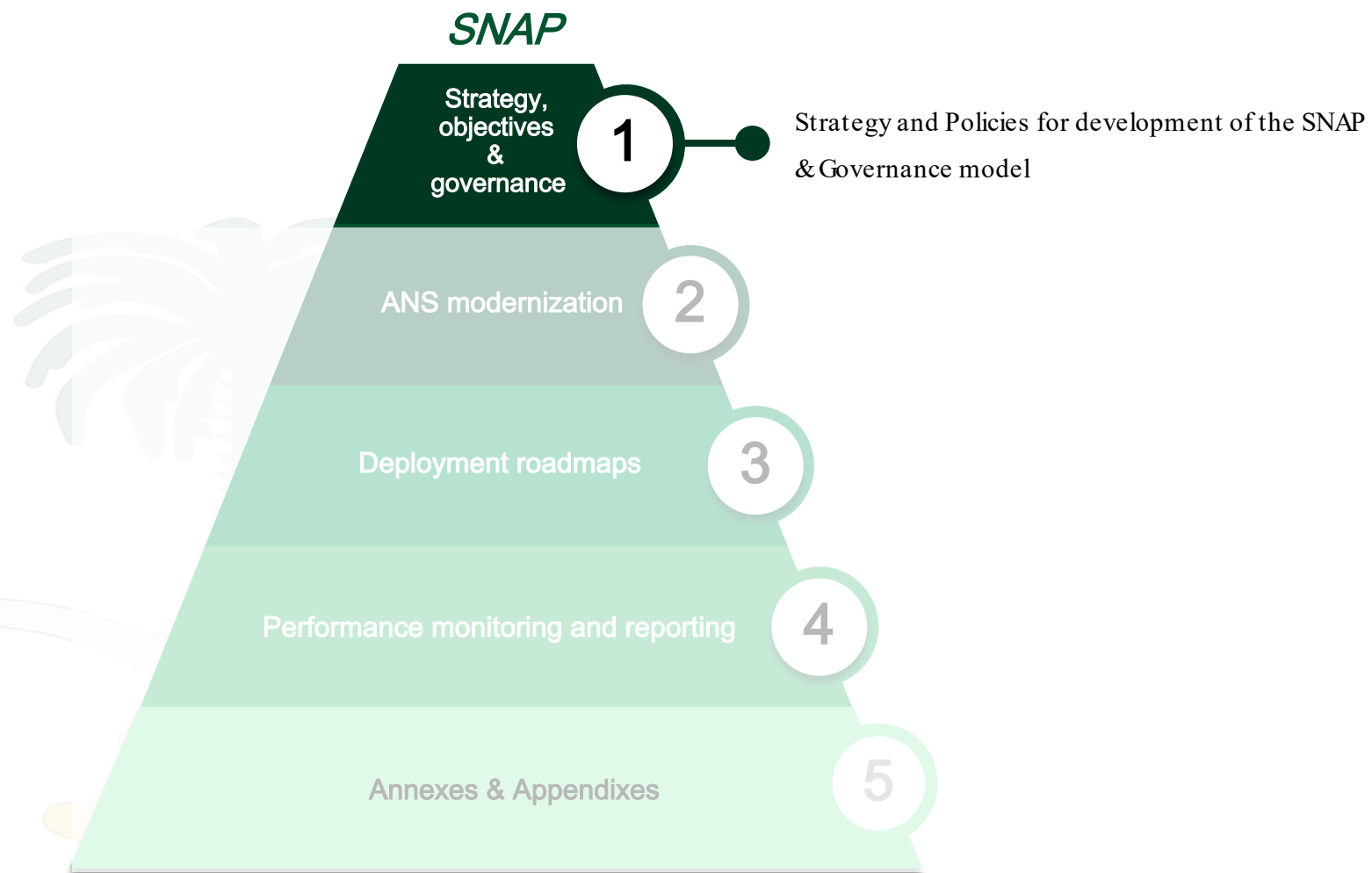
MULTILAYERS STRUCTURE

SNAP consists of a **5-layered structure** (ICAO compliant)

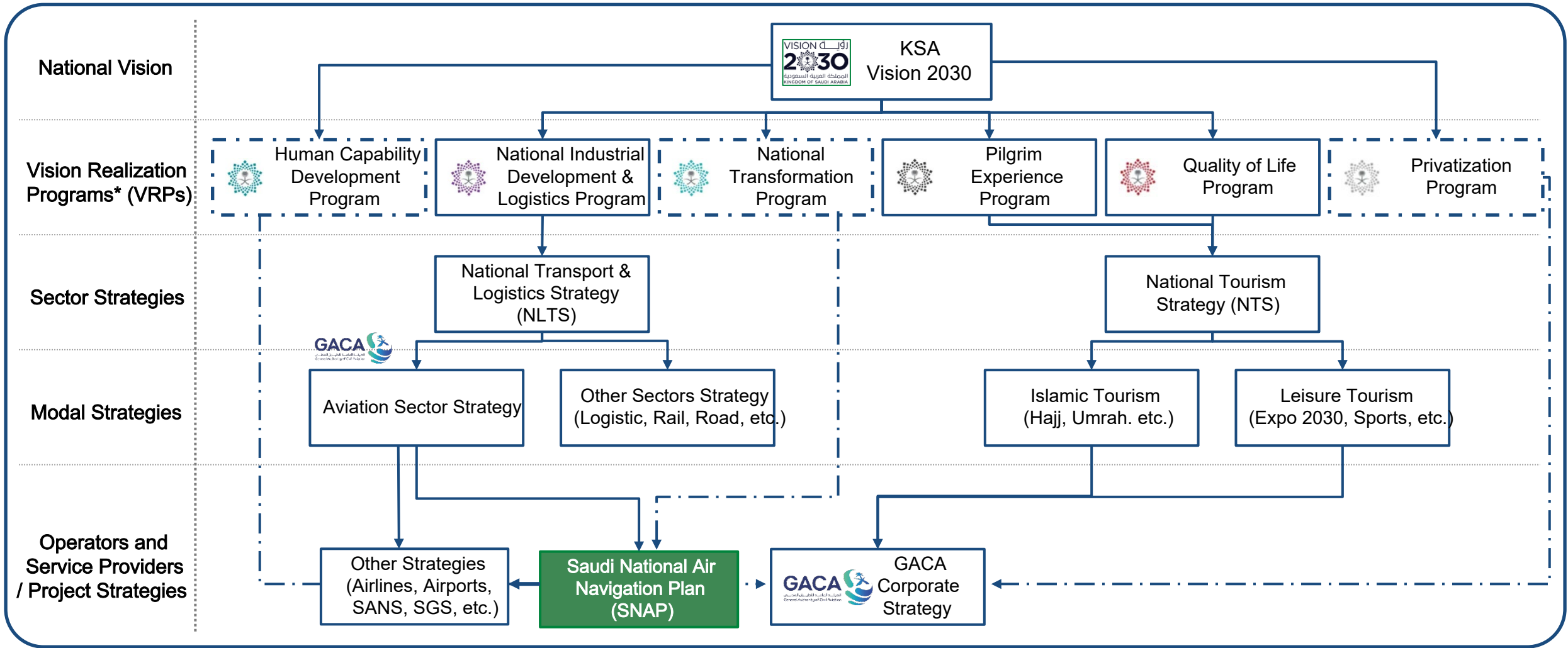


LAYER 1

SNAP consists of a **5-layered structure** (ICAO compliant)



The SNAP is framed within the National Vision embedded in the reference document **KSA Vision 2030**.



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

LEGENDA Major Link to SNAP Softer Link to SNAP

The **GACAVision & Mission for ANS modernization** constitute the backbone of the SNAP strategy. Three alternative options were presented to the Steering Committee. Option 1 was eventually endorsed.

SNAP VISION

GACAVision for ANS modernization: to contribute to make KSA the **leading aviation market in the Middle East**, through modernization, innovation and digitalization of Air Nav services that support the transformation of the Kingdom in a **regional hub for tourism, trade and logistics**.



A NATIONAL AIR NAVIGATION PLAN WILL ALLOW THE KSA TO
UNLEASH THE FULL POTENTIAL OF ITS AIRSPACE...
"AN INTANGIBLE ASSET TO FOSTER A TANGIBLE GROWTH"

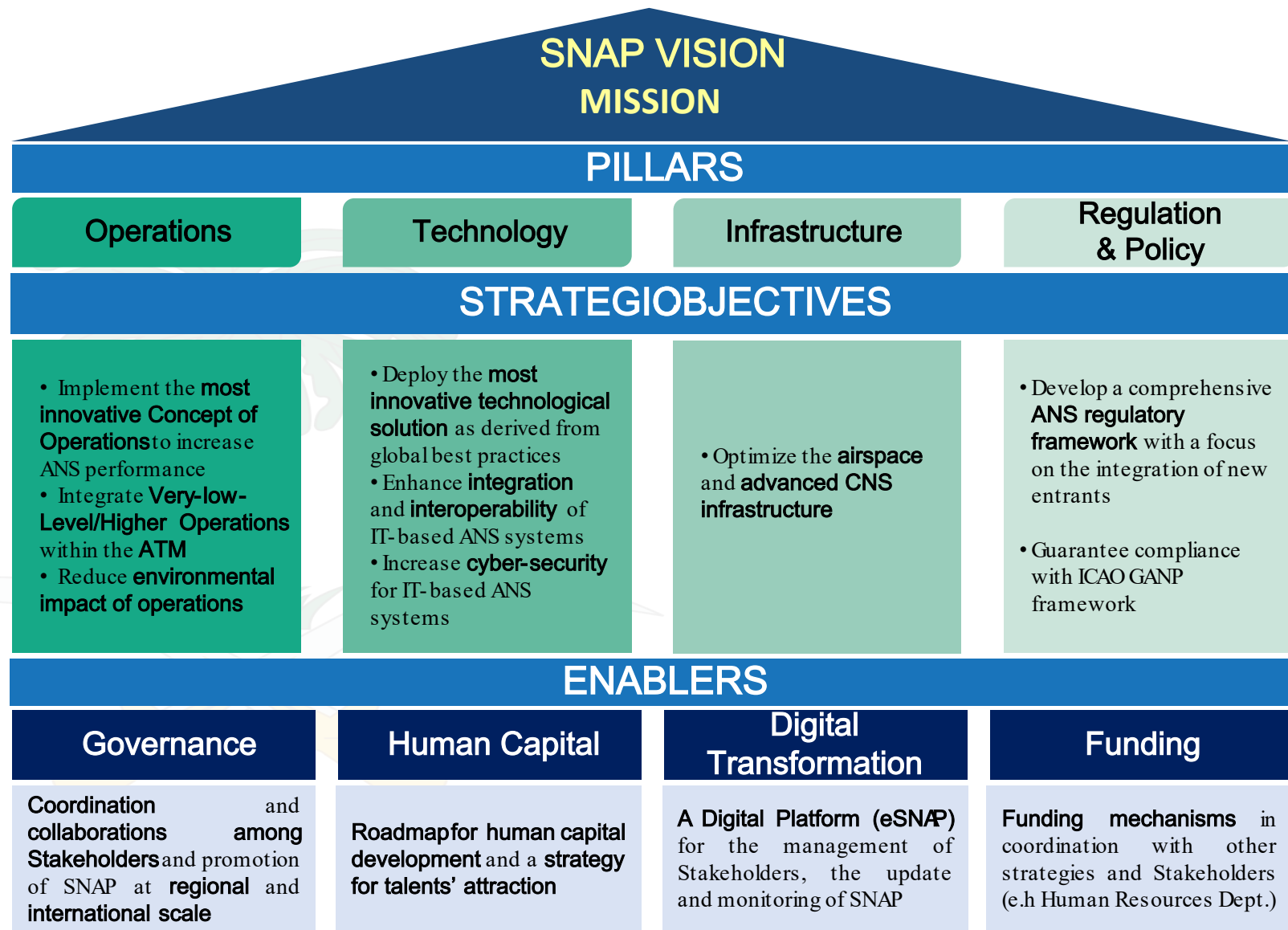
SNAP MISSION

GACAMission for ANS modernization: to provide Civil Aviation Stakeholders with guidelines and tools to focus efforts and investments towards a common target: **safe, efficient and sustainable Air Nav services** powered by **cutting-edge infrastructure**.



STRATEGIC OBJECTIVES

Based on the Vision and Mission set for the ANS sector, **4 pillars** with related **strategic objectives** have been defined, powered by **4 enablers**.



SNAP Ref: 1.7 SNAP Objectives and ambitions

Based on the GACAVision and Mission for ANSmodernization, a total of **11 Main Objectives** and **5 ambitions** have been defined. Each objectiveis also dividedin a set of sub-objectivesthat canbe consultedin Layer5 (§ 5.3 SNAPSub-objectives)

OBJECTIVES & AMBITIONS

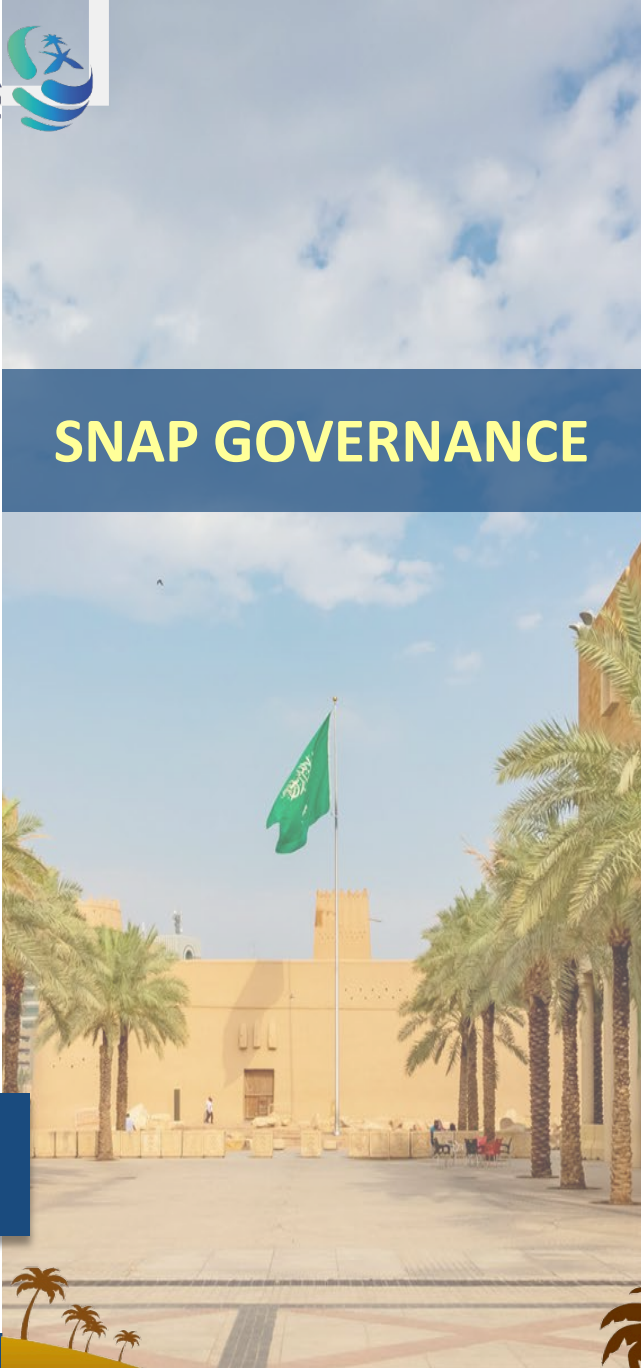
SNAPOBJECTIVES IS TO ..

- 11 Capacity building and development
- 1 Enable**the achievement of KSA Aviation Sector Strategy Objectives
 - 2 Ensure**the respect ofadequate standardsof Safety
 - 3 Implement**a new generation of ATM Ops and Tech solutions to enableincrease in Capacity, Efficiency, Predictability and Env. Sustainability
 - 4 Secure**progressive and smoothintegrationof new entrants (e.g. UAS, RPAS, and Space launches)
 - 5 Ease**Military and Civil cooperation in the management of the airspace and access to ANS services
 - 6 Improve**ANS network system resilience against disruption or threats (e.g.threats)
 - 7 Ensure**application of Environmental Sustainability principles
 - 8 Define**interoperableANS, collaborative network and integrated CNS infrastructure for accurate operational information
 - 9 Develop**regulatory framework supporting innovation and ANS modernization aligning with regional and international standards
 - 10 Activate**digital transformation of ANS infrastructure systems, fostered by new technologies, automationbased connectivity

SNAPAMBITIONS

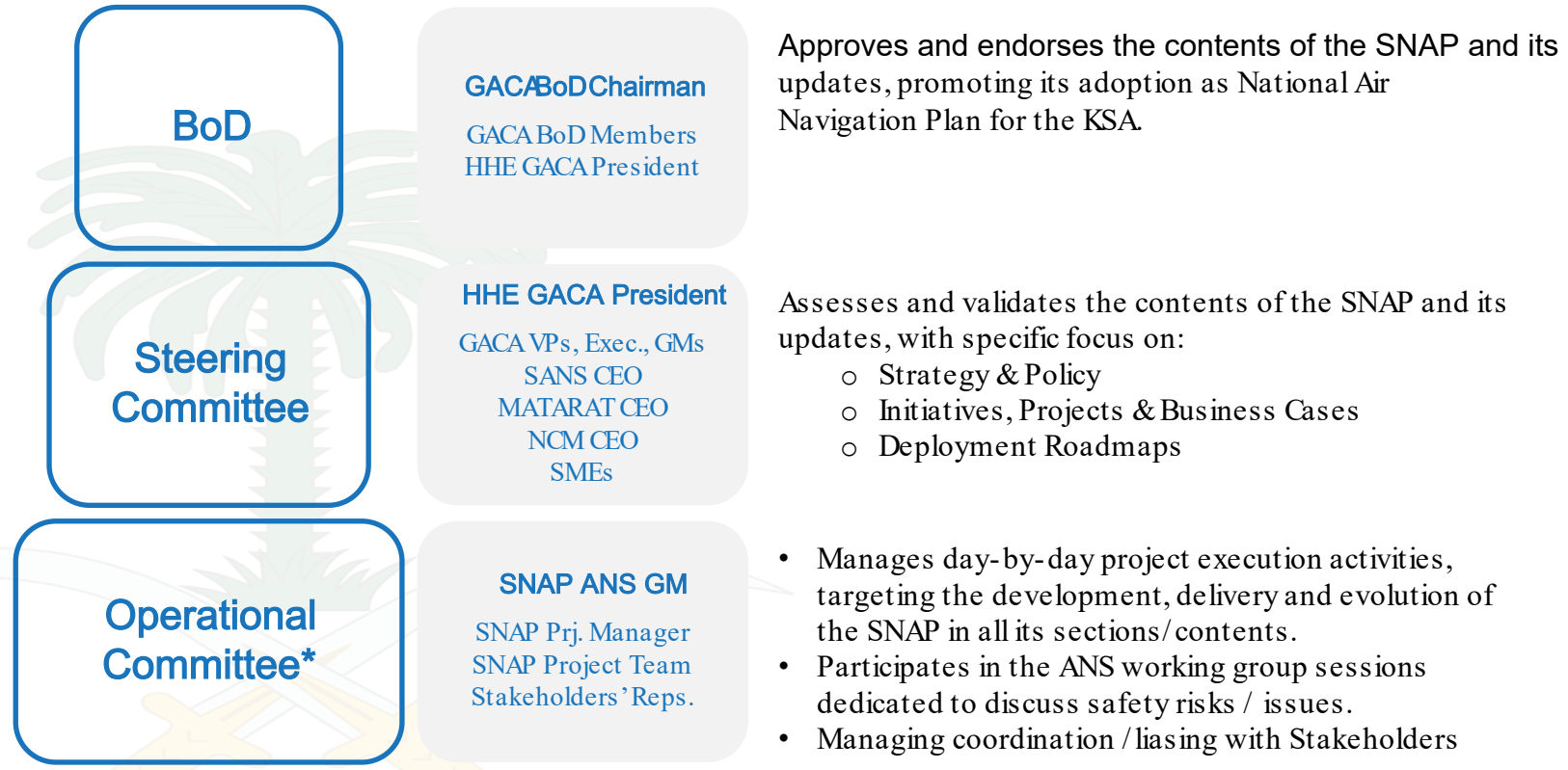
- To serve as the **primary forum/arena for the Civil Aviation Stakeholders’ collaboration and interaction** in KSA
- To represent the **strategic reference for other Stakeholders’ strategies**(e.g. airport operators, airlines, etc.)
- To attract **new talents** to the ANS sector
- To promote **ANS global interoperability**at national, regional and international arenas.
- To contribute to **the reduction of the environmental footprint of the entire aviation sector** in line with the CAESP program.

SNAP SUBSIDIARY OBJECTIVES (Refer to the Master Doc)



SNAP GOVERNANCE

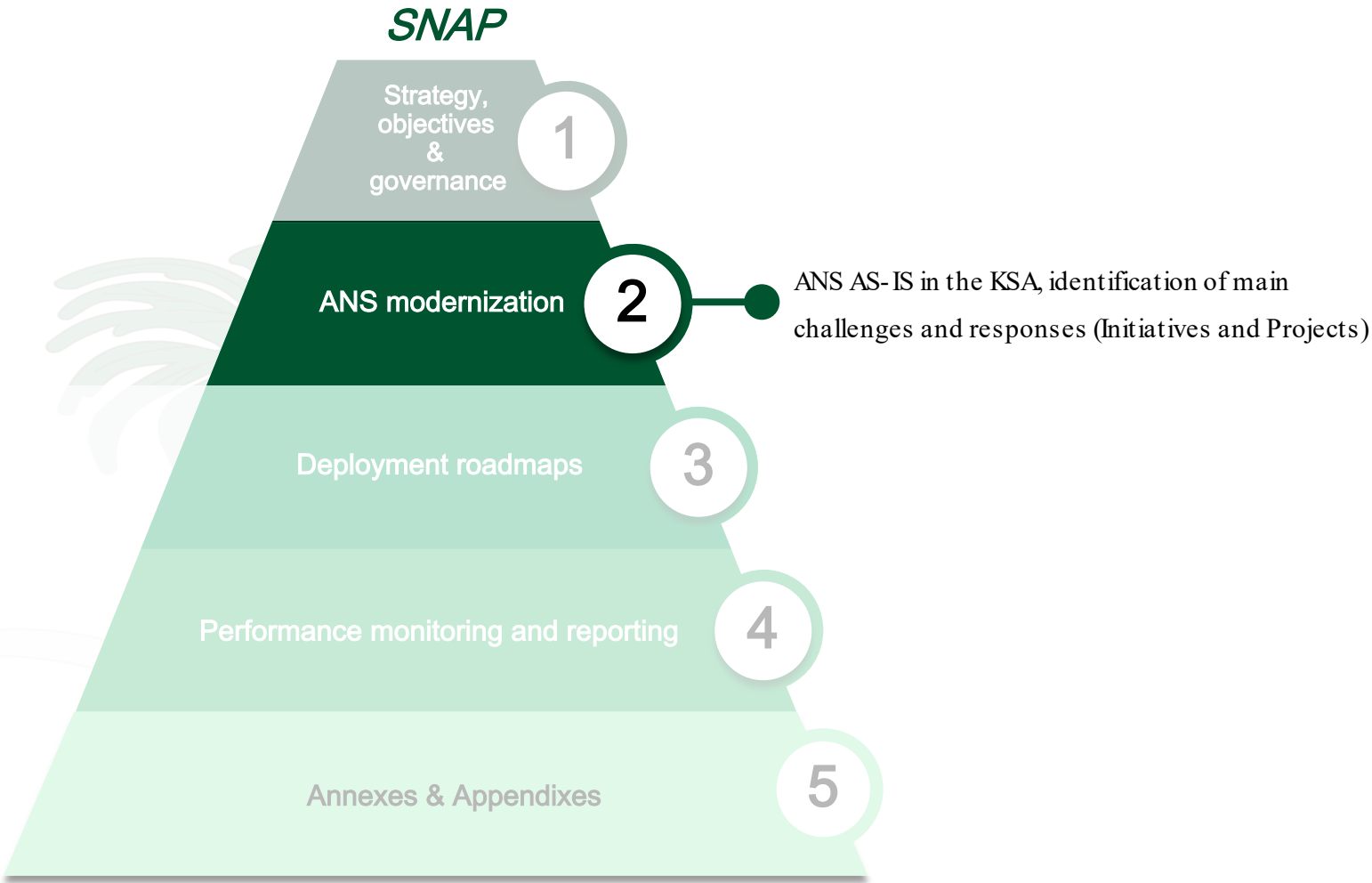
To manage and maintain the SNAP, a **3-level governance structure** was defined to ensure **quality** and **consistency** of its contents and its **update** over time.

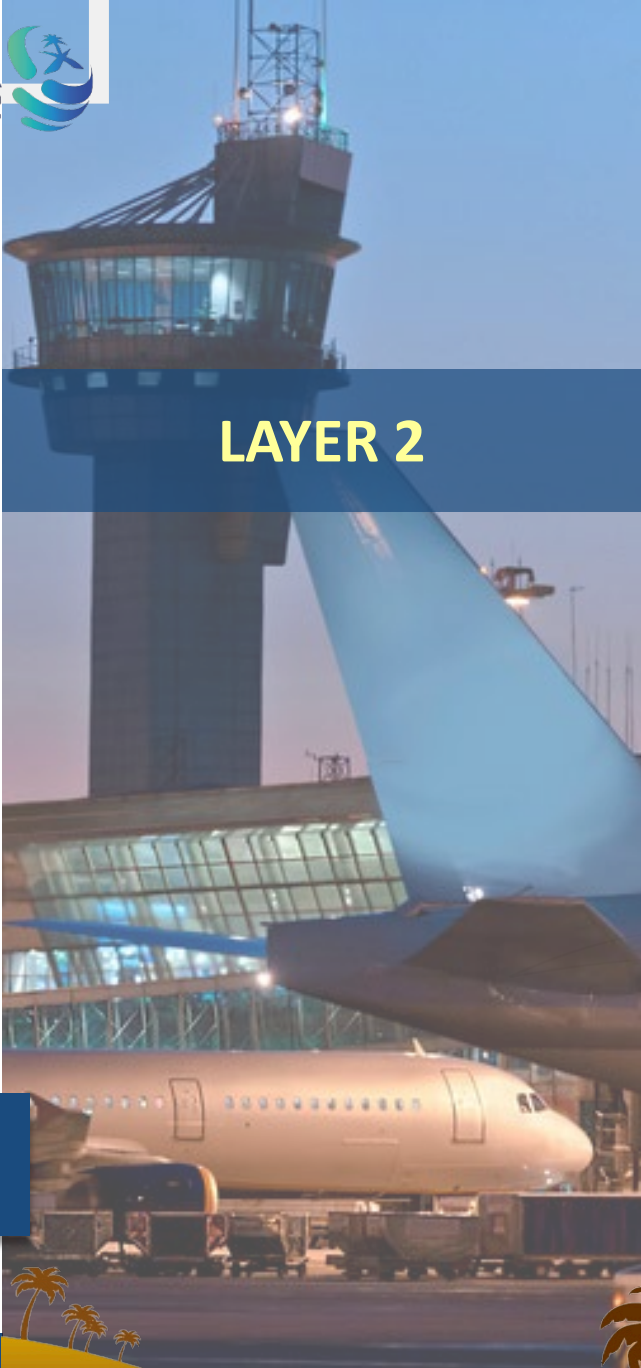


(*) A dedicated **SNAP Unit** within GACA is to be created and funded to manage the future relationship with stakeholders, run and update the SNAP Web Portal, coordinate the monitoring of the SNAP projects' progress and performance.

LAYER 2

SNAP consists of a **5-layered structure** (ICAO compliant)





LAYER 2

To respond to the identified challenges and modernize the actual ANS framework, the SNAP identified **6 Initiatives**, comprising **27 Projects**.

SNAP Initiatives & Projects

ENHANCE THE AIRPORT & TMA OPERATIONS

- A-CDM
- A-SMGCS
- TBS
- RECAT
- AMANDMAN
- SIM OPS*

FLIGHT TRAJECTORY OPTIMIZATION

- TIMEBASED OPS
- AIR TRAFFIC FLOW MNGMT*
- PERFORMANCE BASED NAV

VIRTUALIZATION OF INFRASTRUCTURES

- REMOTE TWRs*
- REMOTE TOWER CENTRE*
- VIRT. & REMOTE ATS FACILITIES

AIRSPACE ORGANIZATION & MANAGEMENT

- MULTISECTOR PLANNER
- DYNAMIC SECTORIZATION
- FREE ROUTE
- FLEXIBLE USE of AIRSPACE
- FLIGHT INFORMATION SERVICE

NEW ENTRANTS' OPERATIONS AND INTEGRATION

- VERY LOW LEVEL OPS
- HIGHER AIRSPACE OPS
- RPAS

DIGITALISATION OF SERVICES PROVISION

- AI-BASED TOOLS
- CORA
- DATA LINK*
- SWIM
- DIG. AIS & MET*
- ENHANCED SURV. *
- SATCOM

Please note that not all Projects have the same level of priority and that for some Projects (*) implementations have already been funded and started on a local basis.

Further detail on Initiatives and related Projects

Estimated costs, expected benefits and funding sources of the SNAP Initiatives are outlined:

SNAP Initiatives

Initiatives' expected costs

Initiatives' expected benefits

Funding sources

ENHANCE THE AIRPORT & TMA OPERATIONS

~120 M\$

**CAPACITY: 20% of the target
 OPS EFFICIENCY: 50% of the target
 PREDICTABILITY: 30% of the target
 ENVIRON SUSTAIN: 20% of the target**

FLIGHT TRAJECTORY OPTIMIZATION

~60 M\$

**CAPACITY: 3% of the target
 OPS EFFICIENCY: 10% of the target
 PREDICTABILITY: 30% of the target
 ENVIRON SUSTAIN: 20% of the target**

VIRTUALIZATION OF INFRASTRUCTURES

~50 M\$

**CAPACITY: 0% of the target
 OPS EFFICIENCY: 20% of the target
 PREDICTABILITY: 0% of the target
 ENVIRON SUSTAIN: 10% of the target**

AIRSPACE ORGANIZATION & MANAGEMENT

~60 M\$

**CAPACITY: 35% of the target
 OPS EFFICIENCY: 10% of the target
 PREDICTABILITY: 30% of the target
 ENVIRON SUSTAIN: 20% of the target**

NEW ENTRANTS' OPERATIONS AND INTEGRATION

~10 M\$

**CAPACITY: 0% of the target
 OPS EFFICIENCY: 0% of the target
 PREDICTABILITY: 0% of the target
 ENVIRON SUSTAIN: 10% of the target**

DIGITALISATION OF SERVICES PROVISION

~200 M\$

**CAPACITY: 10% of the target
 OPS EFFICIENCY: 10% of the target
 PREDICTABILITY: 0% of the target
 ENVIRON SUSTAIN: 10% of the target**



~500 M\$

(this amount must be deducted of the costs of the already funded, ongoing implementations)



Industry / Private companies



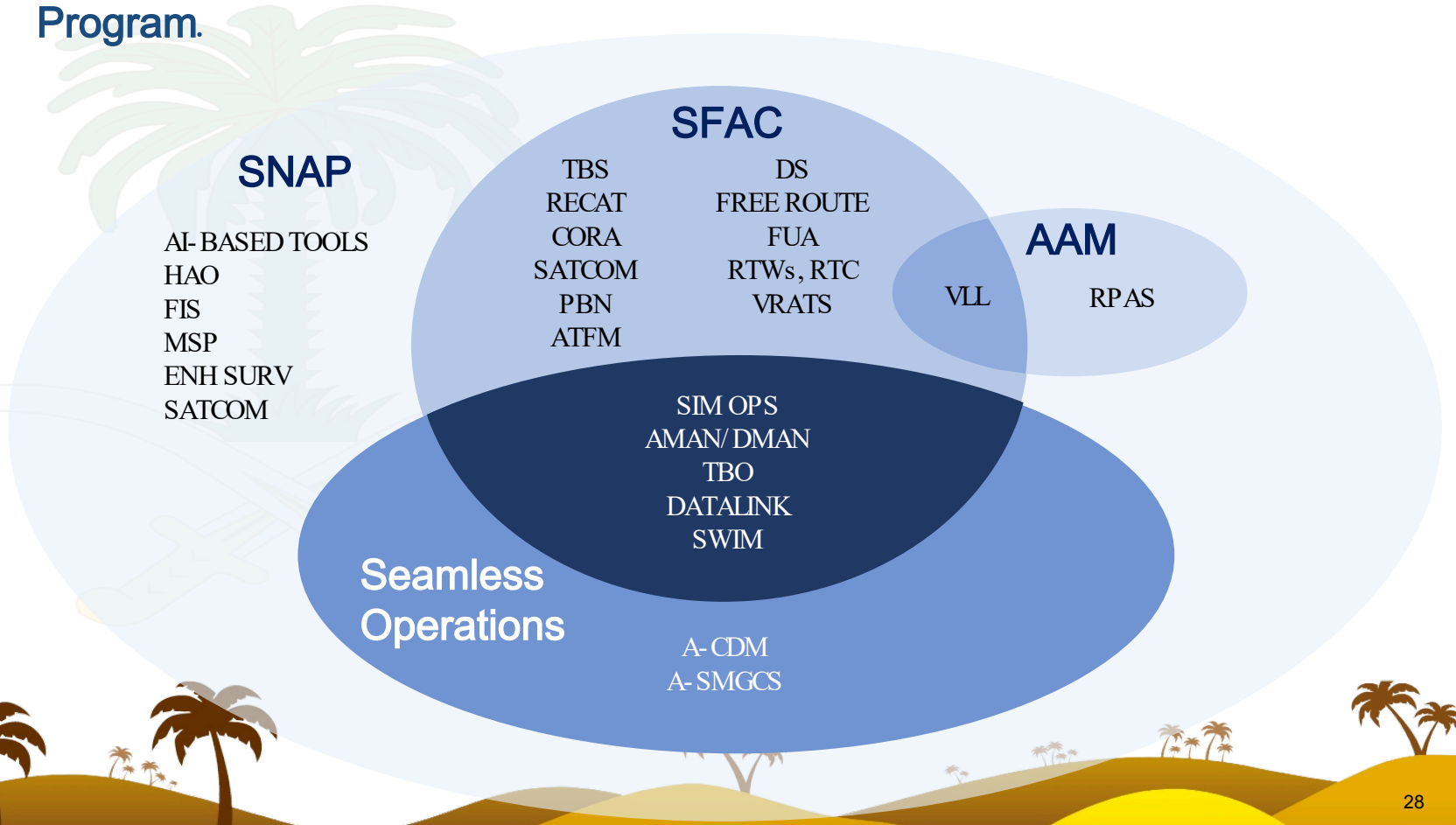
Government Funds



SNAP PROJECTS

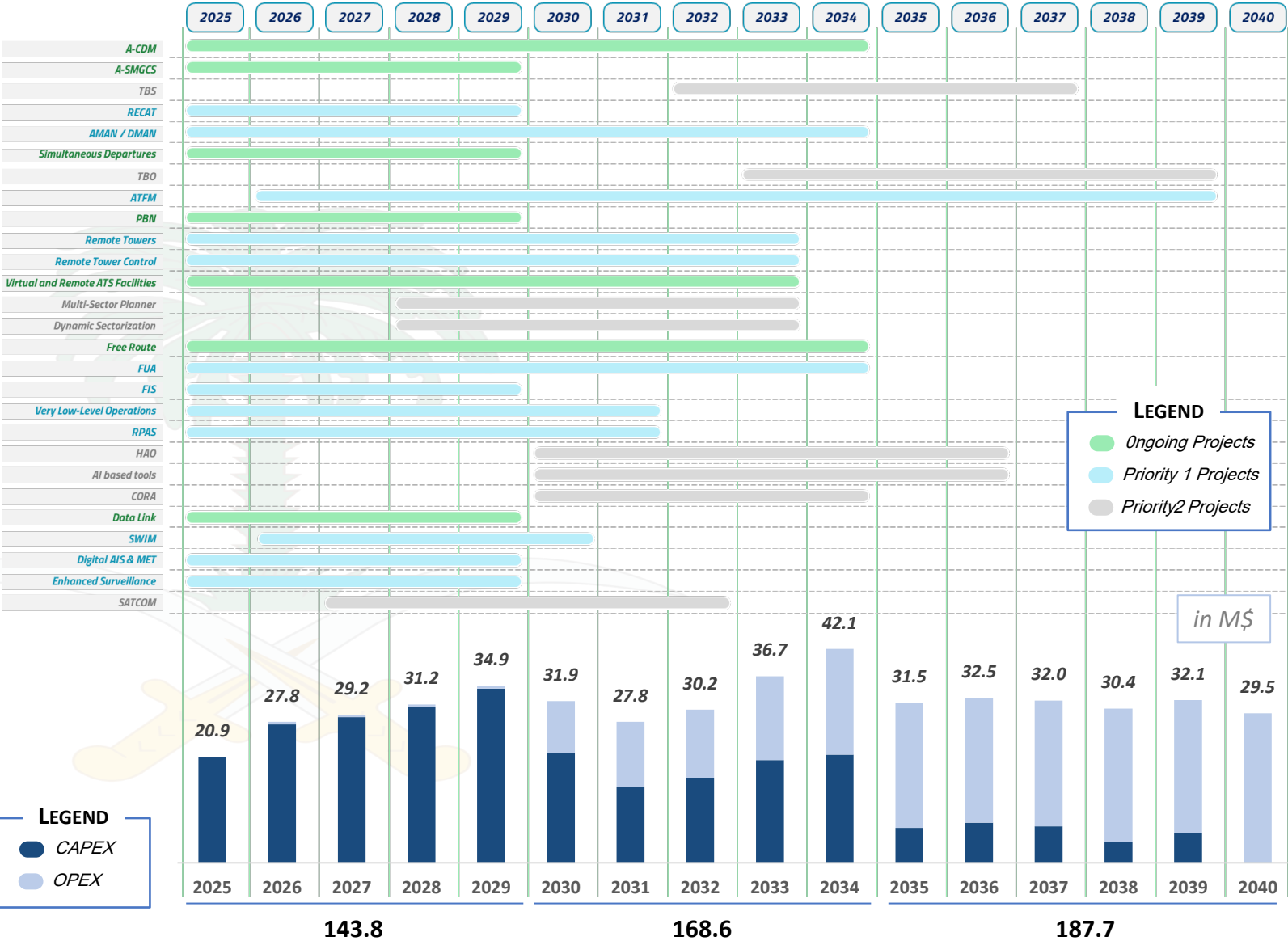
Since the SNAP is promoting what is necessary to deal with the increased demand in air traffic, and considering the increase in revenues that will be generated through the SNAP, **the industry should sustain the necessary investments.**

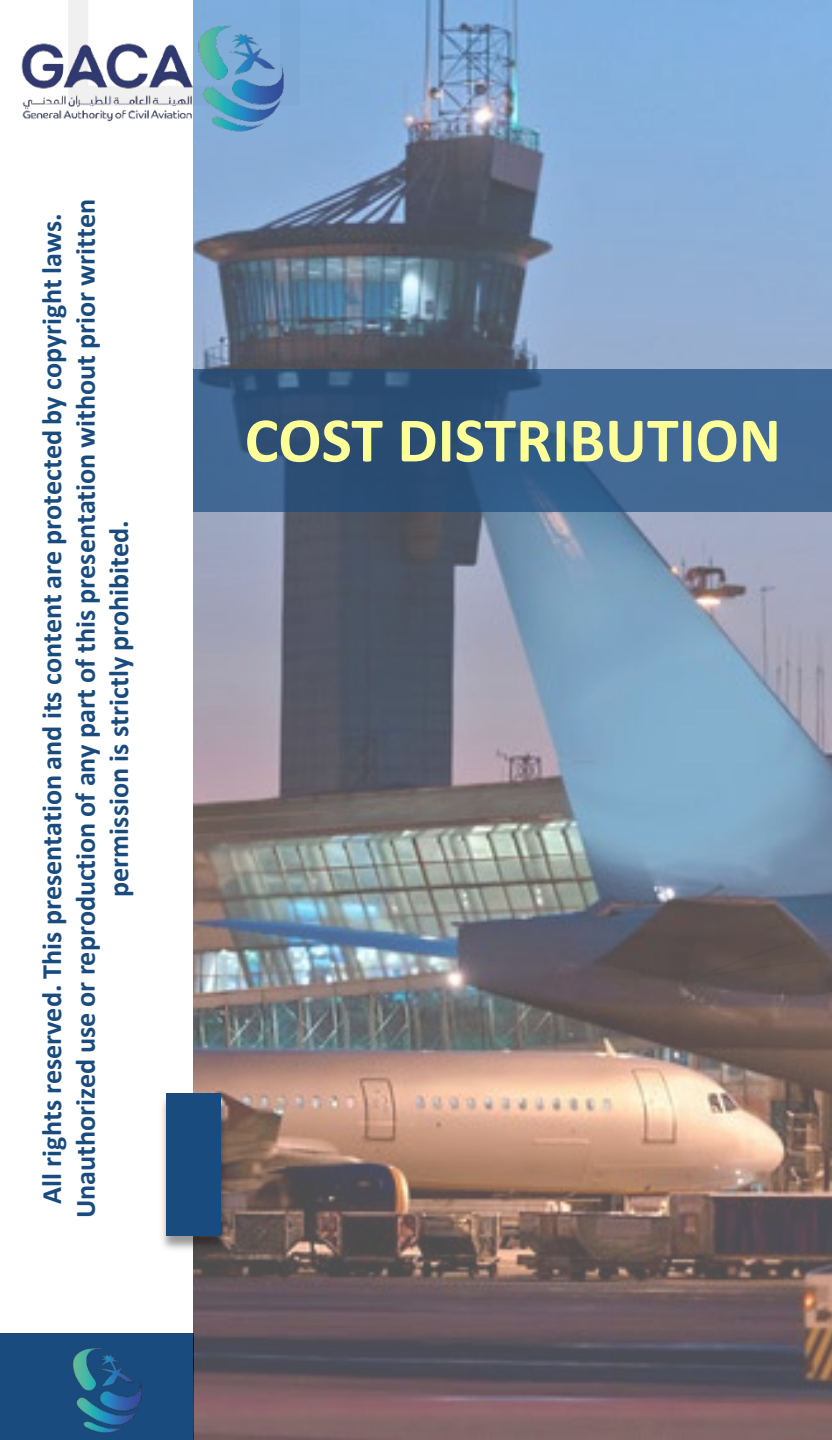
Moreover, many projects identified under SNAP already fall within the scope of other initiatives, for which a source of public funding has already been identified in the **National Industrial Development and Logistic Program.**



CAPEX/OPEX

In the tables below, the SNAP Projects timelines and the distribution of the costs (CAPEX/OPEX) during the SNAP timeframe are reported.





COST DISTRIBUTION

In the chart below, the distribution of the yearly costs for each stakeholder category is reported.





SNAP PROJECT JOB CARD

Each Project is detailed in the SNAP with a dedicated “Project Card” containing the following key information :

PROJECT DESCRIPTION	REFERENCE PERIOD	OPERATING ENVIRONMENT
OWNER (SPONSOR)	STAKEHOLDERS INVOLVED	PHASES OF THE FLIGHT
INTERDEPENDENCIES W/ OTHER PROJECTS	REGULATORY FRAMEWORK	ASSUMPTIONS
RISKS	OPERATIONAL IMPROVEMENT STEPS	TECHNICAL & OPS. ENABLERS
ICAO ASBU MAPPING	EXPECTED BENEFITS, KPAs & KPIs	IMPLEMENTATION TIMELINE

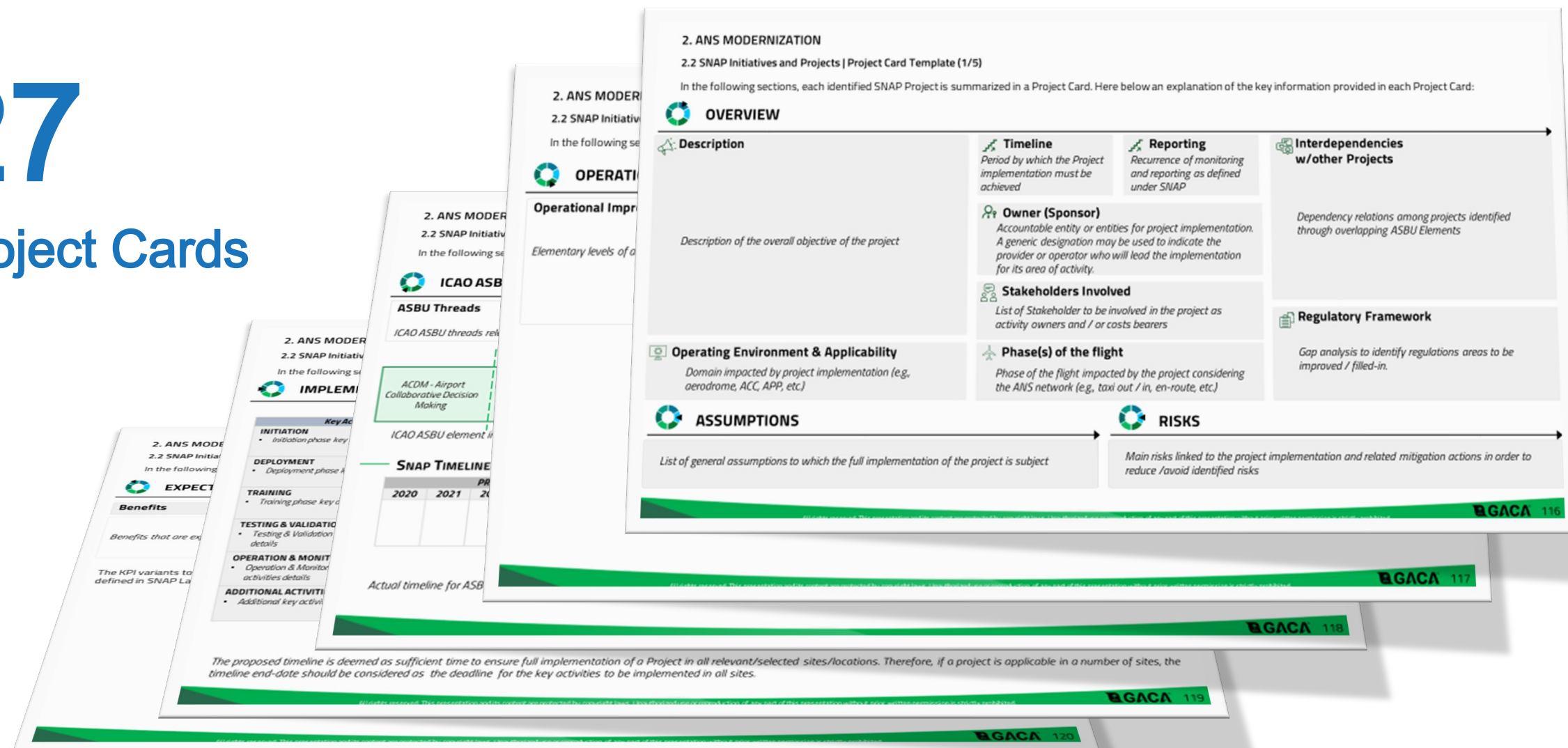
Each project is backed-up by “**Business Cases**” whose function is to rank different possible implementation scenarios (based on the expected **costs, risks and benefits**) and identify the scenario to be effectively implemented.



The Project Cards are synthetic representation of each Project's content

27

Project Cards



The Business Cases are synthetic representation of each Project's scenario costs, benefits and risks

+60

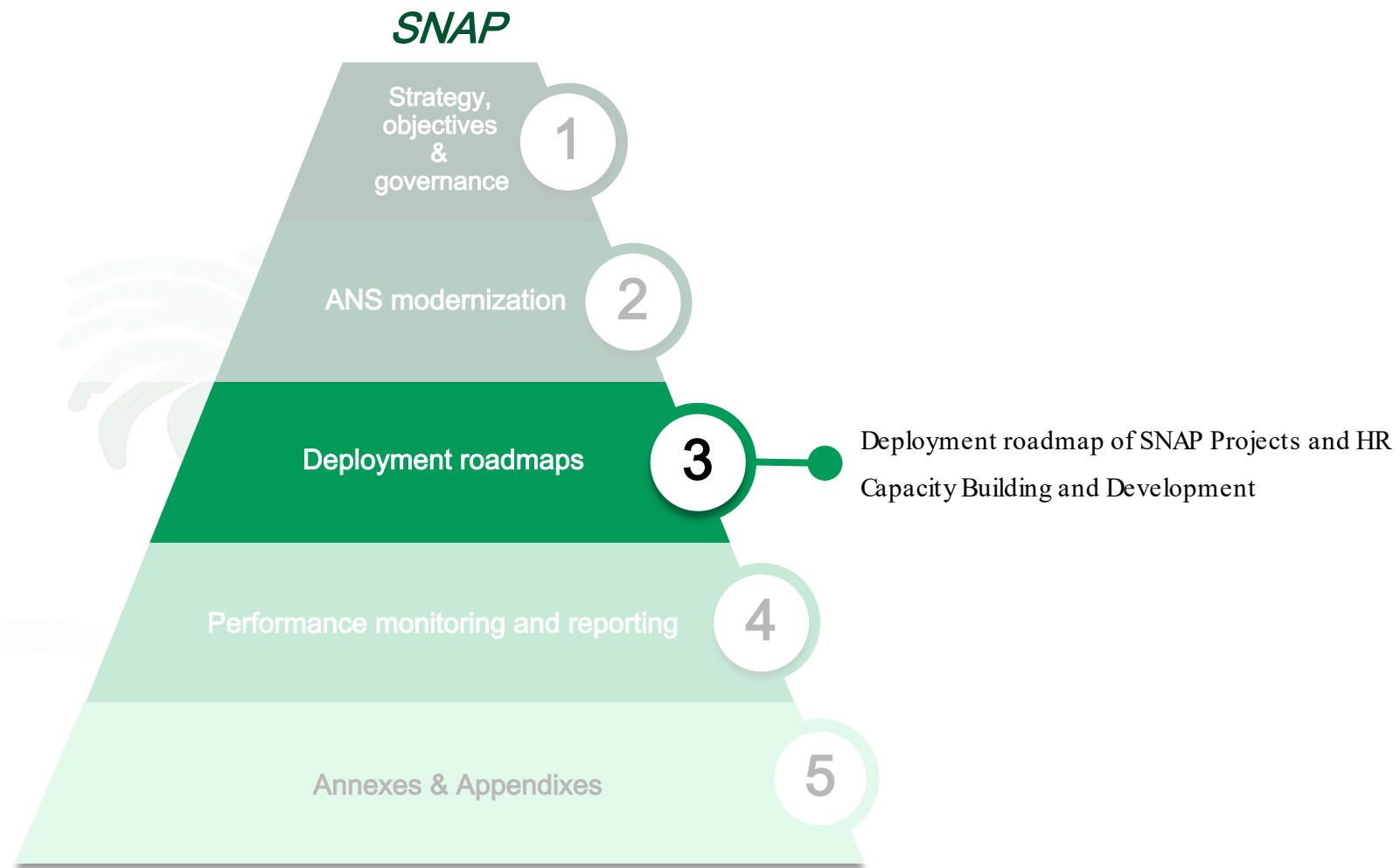
Business Cases

(avg. 2 scenarios per project)



LAYER 3

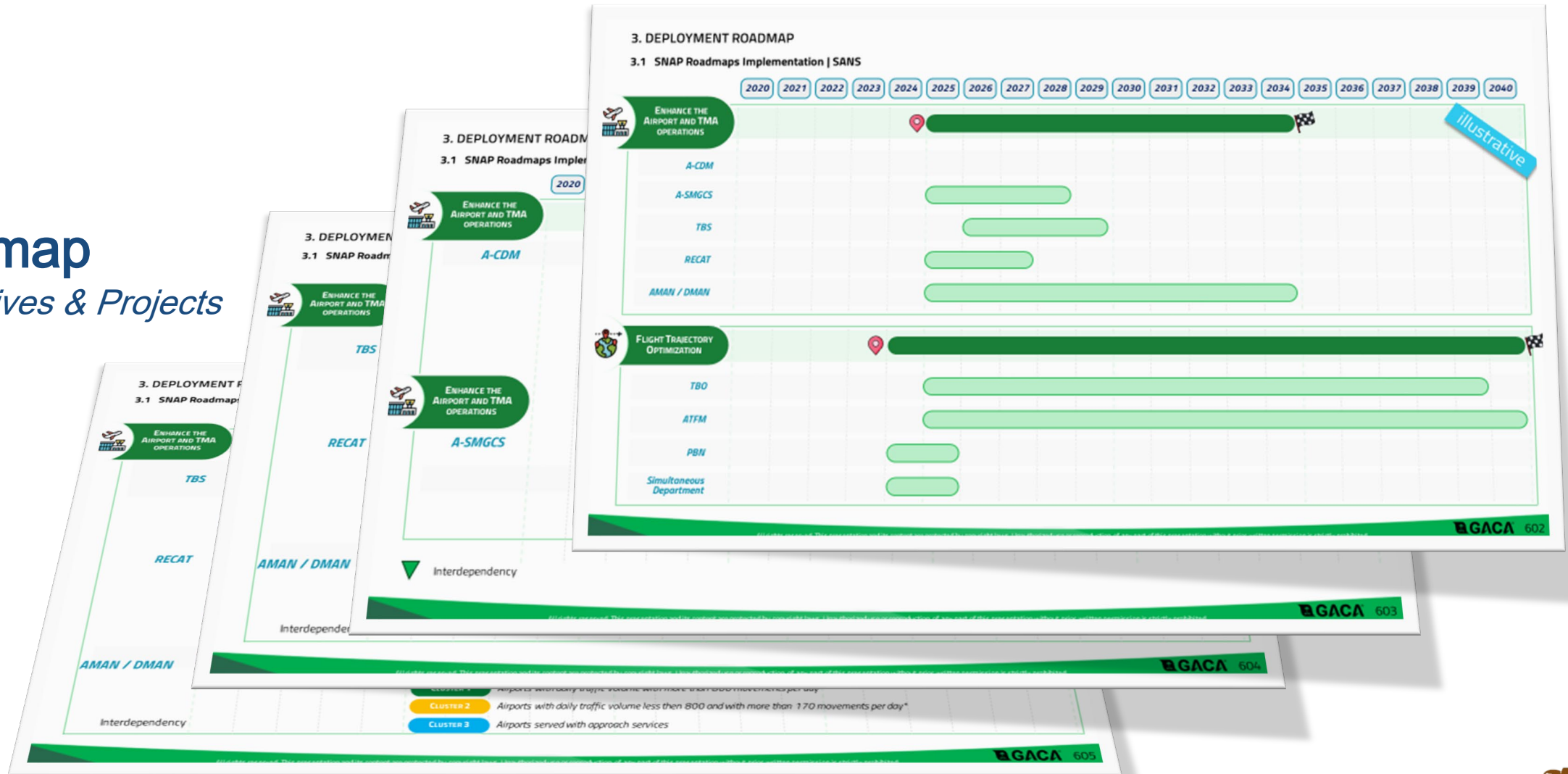
SNAP consists of a **5-layered structure** (ICAO compliant)



The Implementation Roadmaps are graphic representation of each Project's deployment timeline

1

Roadmap for Initiatives & Projects

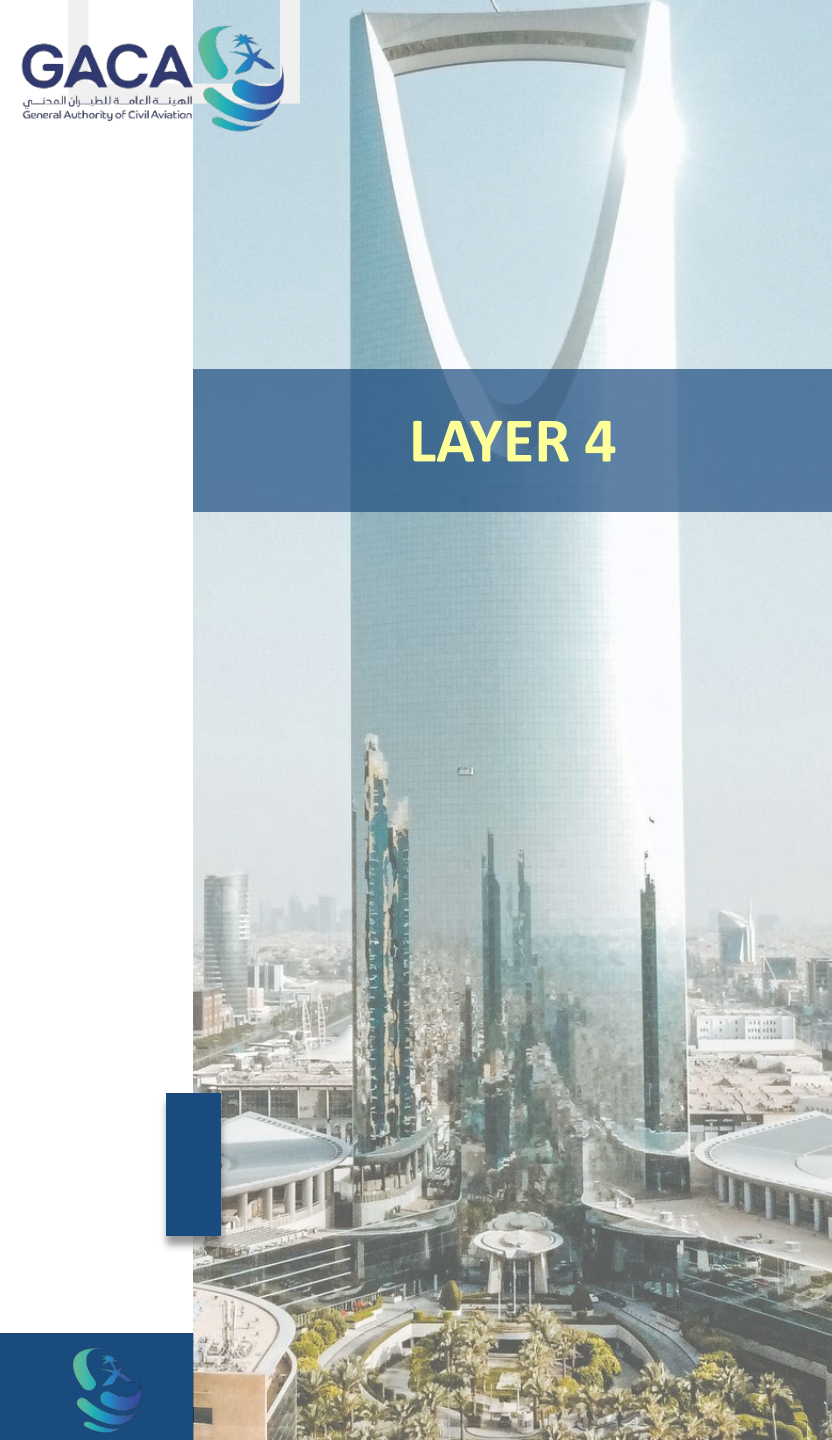


Capacity Building section encompasses Training Programs and associated roadmaps to meet the challenges of ANS modernization

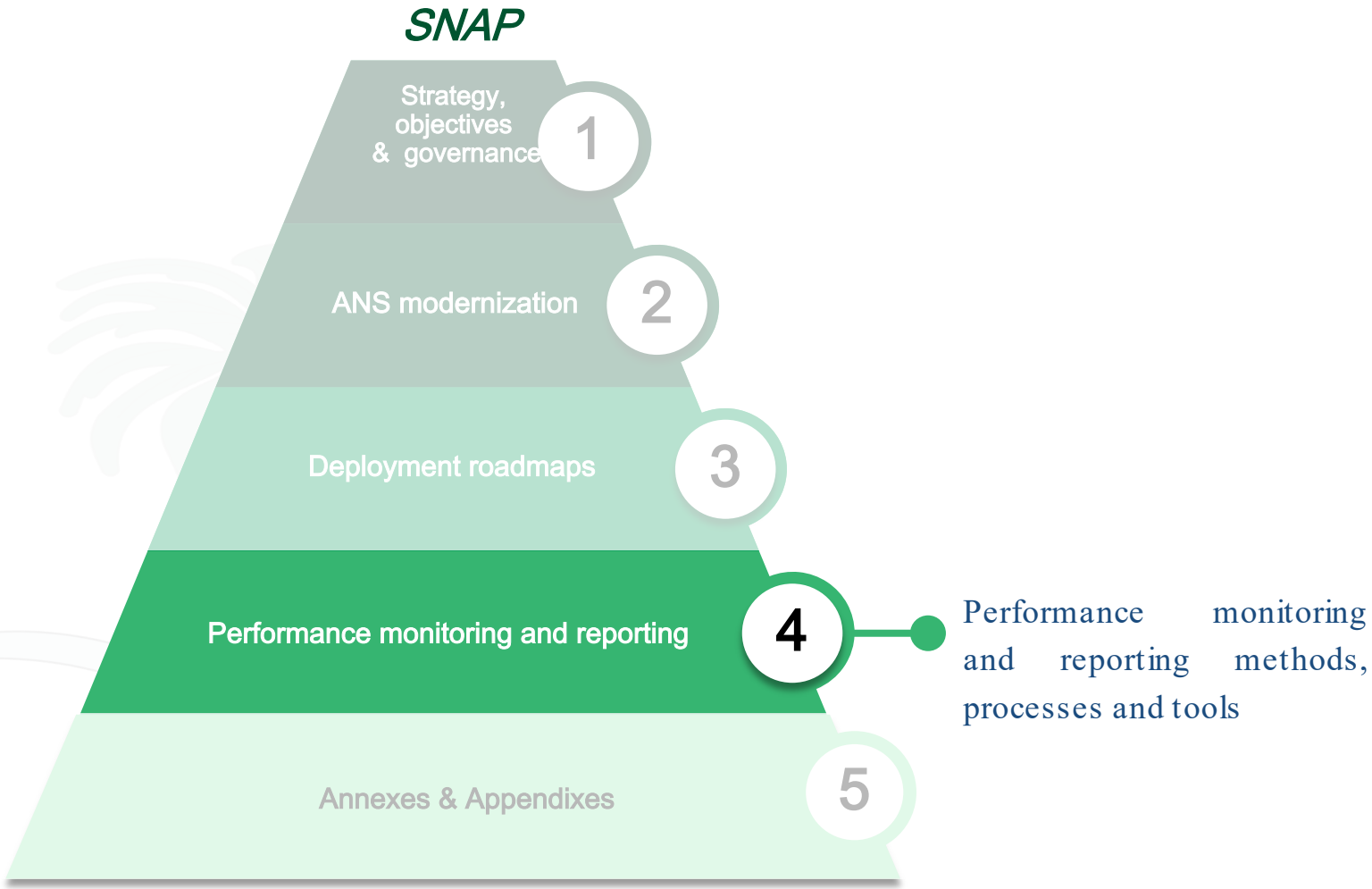
1

Capacity Building Roadmap & Training Programs





SNAP consists of a 5-layered structure (ICAO compliant)





LAYER 4

Within SNAP, two types of **Monitoring & Reporting** are envisaged to keep track of the overall implementation and effectiveness of the activities :

1

Progress Monitoring: monitoring the **overall SNAP implementation**, namely the aggregated progress of the whole set of 27 Projects, through project management KPIs (actual %progress – planned %progress)

2

Performance Monitoring: monitoring the **performance variation** generated by the SNAP Projects, through the ICAO-proposed performance KPIs

The entire **Monitoring & reporting cycle** will take place through the **SNAPWeb Portal**. The owners of the different Projects, through an ad-hoc SNAP Unit, will be able to:

- upload data and reports related to Projects' progresses while such Projects are still in the execution phase;
- upload data and reports related the performance variation generated after the Projects' execution and calculated against the established historical baseline.

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be presented orally
during the meeting

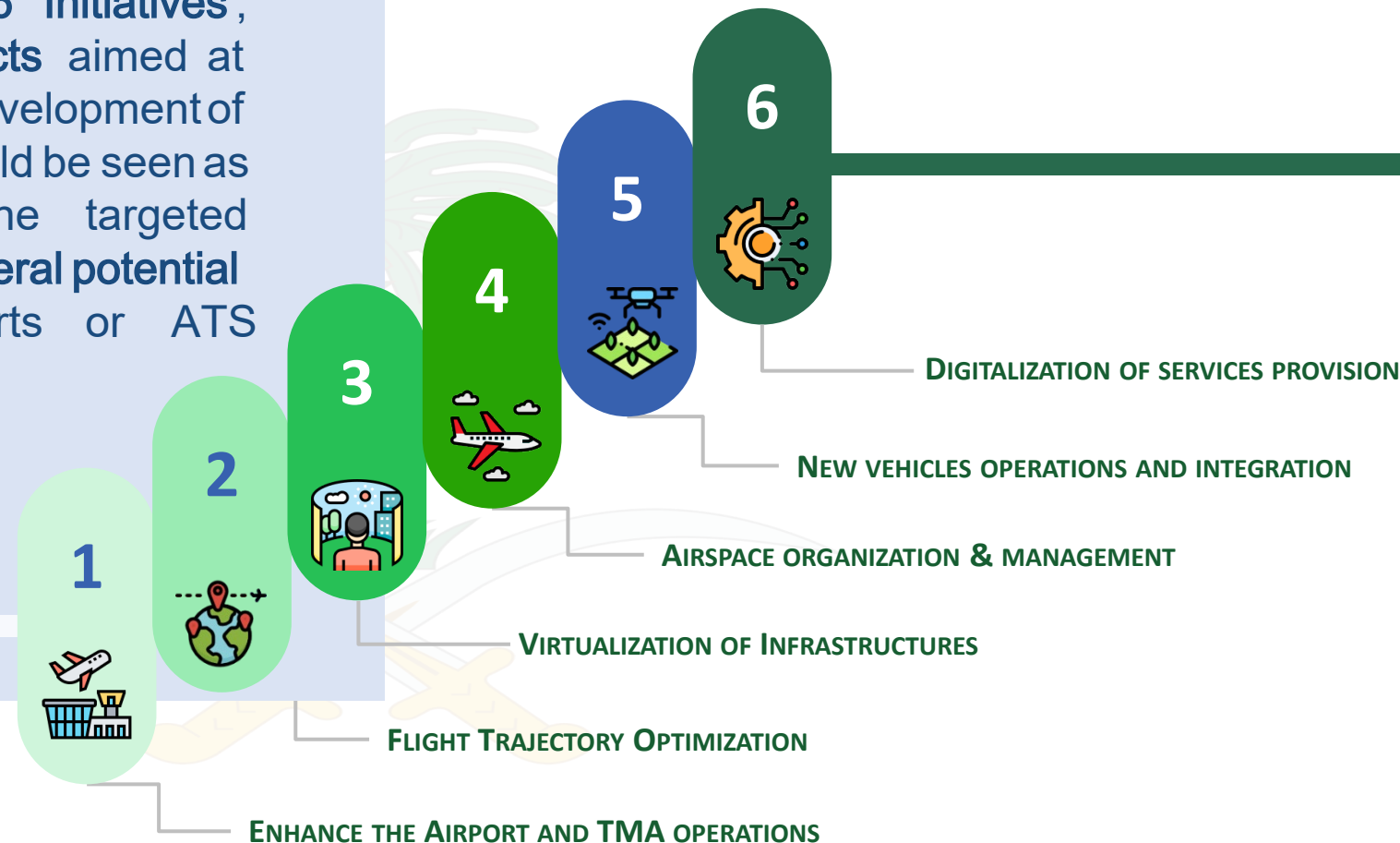
➔ ➤ SNAP INITIATIVES

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SNAP Initiatives and Projects | Overview

The SNAP is structured on **6 Initiatives**, comprising a list of **27 projects** aimed at fostering the comprehensive development of the KSAANS. Each Project should be seen as a framework to achieve the targeted objectives and is **subject to several potential local implementation** (airports or ATS facilities).



Layer (2) ANS MODERNIZATION

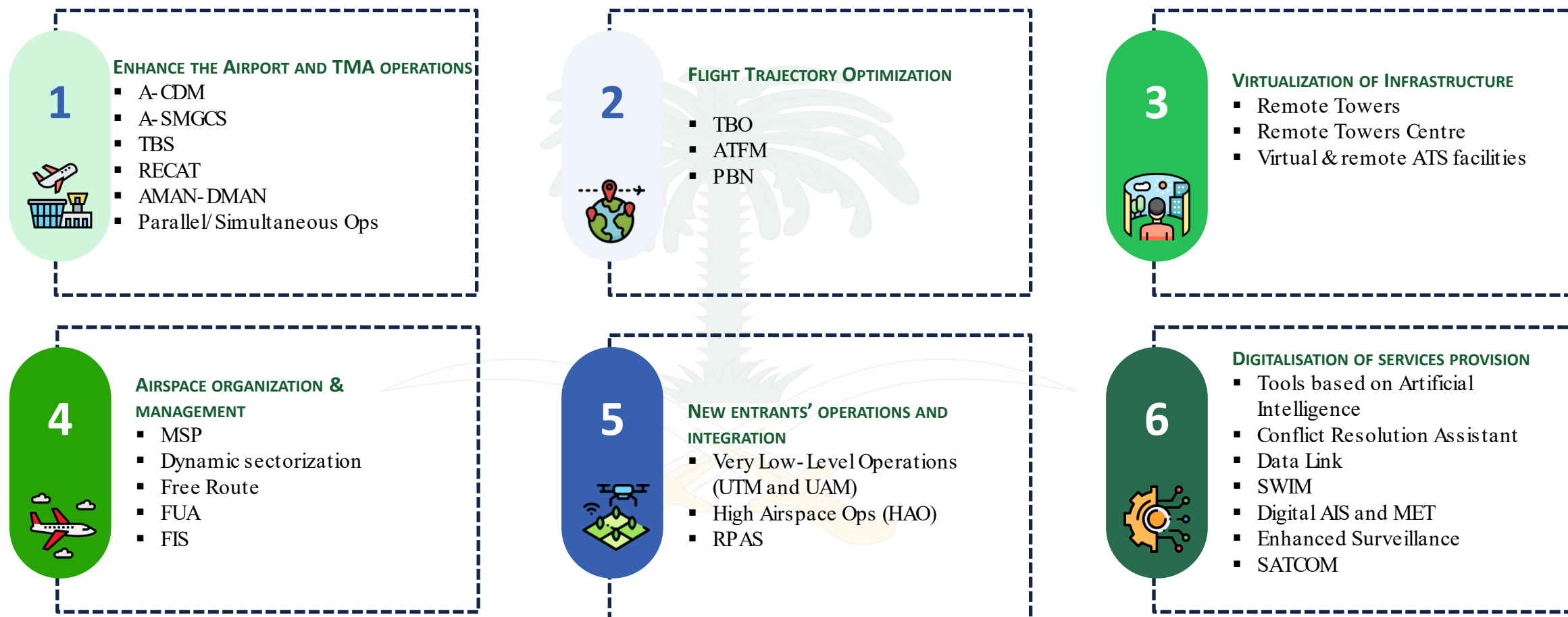
SNAP Ref: 2.2 SNAP Initiatives and Projects | Overview (3/4)

Each initiative pursues at least 2 SNAP Objectives. The link between the initiative and the SNAP Objectives is outlined below:

SNAP OBJECTIVES									
Capacity building and development	1	Enable	the achievement of KSA Aviation Sector Strategy Objectives	I1	I2	I3	I4	I5	I6
	2	Ensure	the respect of adequate standards of Safety	I1	I2	I3	I4	I5	I6
	3	Implement	a new generation of ATM Ops and Tech solutions to enable increase in Capacity, Efficiency, Predictability and Envy	I1	I2	I3	I4	I5	I6
	4	Secure	progressive and smooth integration of new entrants (e.g. UAS, RPAS, and Space launches)	I1	I2	I3	I4	I5	I6
	5	Ease	Military and Civil cooperation in the management of the airspace and access to ANS services	I1	I2	I3	I4	I5	I6
	6	Improve	ANS network system resilience against disruption or threats (e.g. threats)	I1	I2	I3	I4	I5	I6
	7	Ensure	application of Environmental Sustainability principles	I1	I2	I3	I4	I5	I6
	8	Define	interoperable ANS, collaborative network and integrated CNS infrastructure for accurate operational information	I1	I2	I3	I4	I5	I6
	9	Develop	regulatory framework supporting innovation and ANS modernization aligning with regional and international standards	I1	I2	I3	I4	I5	I6
	10	Activate	digital transformation of ANS infrastructure systems, fostered by new technologies, automation and increased connectivity	I1	I2	I3	I4	I5	I6
LEGENDA		I1 - ENHANCE THE AIRPORT & TMA OPERATIONS	I2 - FLIGHT TRAJECTORY OPTIMIZATION	I3 - VIRTUALIZATION OF INFRASTRUCTURES	I4 - AIRSPACE ORGANIZATION & MANAGEMENT	I5 - NEW ENTRANTS' OPERATIONS AND INTEGRAT	I6 - DIGITALISATION OF SERVICES PROVISION		

Layer (2) ANS MODERNIZATION

below the map of the Projects that will be activated starting from 2025 across the six initiatives is provided:



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be presented orally
during the meeting

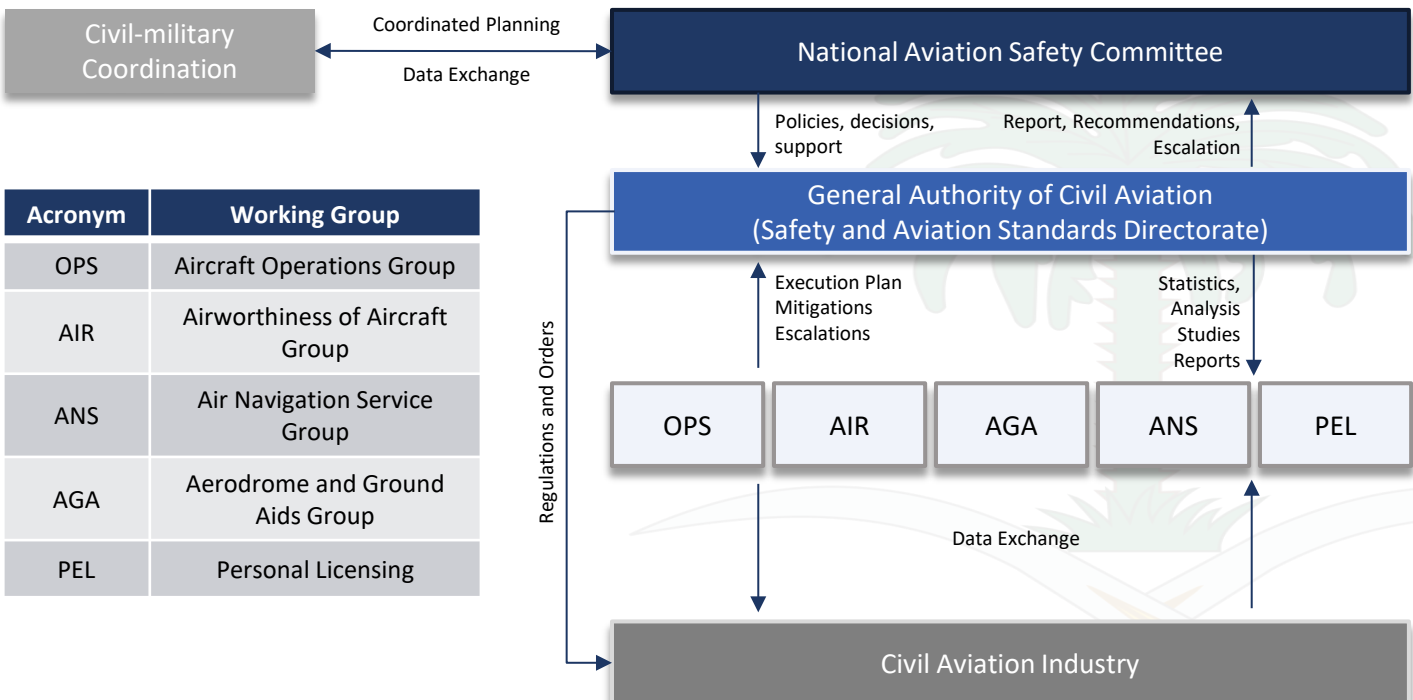
➔ ➤ RELATION BETWEEN SNAP & NASP

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SNAP Ref: 2.1 KSA Air Navigation Framework 2.1.3 The State Safety Programme (1/2)

ICAO Annex 19 to High Level Safety Conference Doc 9335 requires each Member State to establish and maintain a **State Safety Programme (SSP)** – an integrated set of regulations and activities aimed at improving safety – that is uniquely developed to reflect the size and complexity of a State’s aviation system. The **SSP is a key reference** that allows a State to apply safety management principles throughout its certified and regulated entities, allowing safety oversight authorities and service providers to interact and resolve safety concerns more effectively. The overall management of KSA SSP and the delivery of KSA aviation safety strategy is the responsibility of GACA based on the outcomes of the KSA SSP National Aviation Safety Committee (NASC).

KSA AVIATION SAFETY MANAGEMENT ORGANIZATION



The NASC acts as a **forum for senior officials** from the key aviation safety entities, including aviation military bodies, to discuss, set, and approve **KSA SSP aviation safety strategy, policy, and governance**. Within the NASC framework, the **National Transportation Safety Centre (NTSC)** is the government body responsible for instituting inquiries into aircraft accidents, incidents and serious incidents and carrying out respective investigations.

GACA is the government authority responsible to regulate, manage and oversee KSA’s civil aviation activities. It is responsible for **ensuring the respect of safety standards in daily operations**, for **data collection and analysis**, for the **execution of plans and mitigation of risks**.

Reporting to the NASC is a multitude of **permanent and/or ad hoc working groups (SSP-WGs)**. The SSP-WGs, composed of the Head of the Safety Aviation Standards Directorate (Chair), KSA aviation industry members, Subject Matter Experts (SMEs), and others as deemed necessary, are responsible for **reviewing safety data, trends, and SSP implementation plans; providing NASC with high level recommendations and mitigation actions; providing interim (quarterly) and final (semi-annual) reports to NASC**, including proposals for decision-making, resources allocation, safety promotions plan, and conflict resolutions; **define and review the Organizational Sector Safety Risk Profile**.

The Civil Aviation Industry is responsible for the **correct implementation of Regulations, guidance and Risk mitigation plans**.

DATA COLLECTION AND ANALYSIS

KSA SSP has established aviation **Safety Data Collection and Processing System (SDCPS)** for capturing, storing, aggregating, and allowing for the analysis of safety data and information. Main sources of data are represented by **Mandatory Reporting, Voluntary Reporting, Audit and Inspection, Safety Investigations, Enforcement Investigations and International & Regional Safety Reports**.

SSP SAFETY OBJECTIVES, SPIs, SPTs AND ALoSP

KSA SSP safety objectives are high-level statements of safety attainments or targets to be achieved. They can be **process-based**, namely established in terms of safe behaviours expected from technical and operational personnel or actions taken by the organization for safety risk management; **result-based**, namely, they can cover actions and trends concerning containment of operational and technical occurrences. KSA SSP safety objectives guide the development of safety performance indicators (SPIs), safety performance targets (SPTs) and the subsequent establishment of KSA SSP acceptable level of safety performance (ALoSP). Collaborative efforts among key stakeholders are essential to the identification of appropriate SPIs, to the achievement of SPTs and to the maintenance of ALoSP.

SSP STATE SAFETY PERFORMANCE INDICATORS

KSA SSP has adopted the ICAO-tiered approach for developing aviation safety performance indicators:

- A first set of high-level safety performance indicators - Tier1 - have been identified as markers for monitoring KSA's aviation safety performance. These reactive **lagging indicators** consist of measures of adverse safety outcomes (accidents and serious incidents) according to operational sector and relative to the level of activity within that sector (exposure). They are also referred to as "outcome-based SPIs" and are normally (but not always) the negative outcomes the organization is aiming to avoid;
- Tier-2 indicators are high probability/low severity indicators that measure processes and inputs being implemented to improve or maintain safety. These **leading indicators**, also known as precursor events or "activity or process SPIs" as they monitor and measure conditions that have the potential to lead to or contribute to a specific outcome;
- Tier-3 indicators are **indicators of regulatory gaps**. Such indicators are determined by GACA regulatory management system and the ICAO USOAP CMA audit findings on regulatory gaps.



SNAP Ref: 2.1 KSA Air Navigation Framework | 2.1.4 The KSA National Safety Aviation Plan (NASP)



Developed in consultation with national operators and key aviation stakeholders, **the KSA National Aviation Safety Plan (NASP)** is the **master planning document** containing the strategic direction of KSA for the management of aviation safety in the short, medium and long term. The first edition of KSA **NASP** presents the national strategy and roadmap of actions for **enhancing aviation safety for the period from 2023 to 2025**. The plan establishes Saudi Arabia **Safety Goals, Targets (SPTs)* and Indicators (SPIs)*** and identifies **Safety Enhancement Initiatives (SEIs)***, namely specific actions that Saudi Arabia intends to undertake to improve State safety performance, based on Saudi Arabia's operating environment risks but consistently with ICAO GASP and the Middle East Regional Aviation Safety Plan (MID-RASP).

KSA NASP complements KSA SSP to effectively manage aviation safety and ensure highest level of safety performance. GACA is responsible for the development, implementation, monitoring and maintenance of KSA **NASP**, in collaboration with SSP stakeholders and with the national aviation industry. KSA **NASP** is subject to **on-going maintenance** and **recurrent updates** in alignment with the review, development and publication processes of GASP, RASP and KSA SSP.



KSA NASP AVIATION SAFETY GOALS, INDICATORS AND TARGETS

The KSA **NASP** goals, targets and indicators stem from the aviation challenges and priorities identified in the GASP (e.g Global Organizational Challenges, Global Operational Safety Risks, Emerging Issues, Regional and National Priorities). Saudi Arabia safety goals, as well as targets and indicators, are subject to possible updates, which will be reflected in the **NASP** future editions.



KSA NASP AVIATION SAFETY ENHANCEMENT INITIATIVES

KSA **NASP** includes Safety Enhancement Initiatives (SEIs) that address national operational safety risks, derived from lesson learned from occurrences and from a data-driven approach. These SEIs may include actions such as **rule-making, policy development, targeted safety oversight activities, safety data analysis and safety promotion**. In order to support Saudi Arabia in achieving KSA **NASP** safety goals and acceptable levels of safety performance, two action roadmaps of KSA SEIs – Operational (OPS) and Organizational (ORG) – have been designed. Such roadmaps are subject to possible updates in the **NASP** future editions.



THE OPS ROADMAP

The OPS Roadmap details Saudi Arabia's SEIs to meet global, regional and national goals related to the continuous reduction of operational safety risks, including risk management activities associated with ICAO High-Risk Categories (e.g Controlled Flight Into Terrain; Loss of Control in Flight; Mid-Air Collision; Runway Excursion; Runway Incursion).



KSA NASP ACCEPTABLE LEVEL OF SAFETY PERFORMANCE

Each safety goal contributes to an overall acceptable level of safety performance for Saudi Arabia. Saudi Arabia's acceptable level of safety performance, namely the general output of Saudi Arabia's safety goals is the following: *"No accidents involving commercial air transport that result in serious injuries or fatalities, no serious injuries to third parties as a result of aviation activities and improving safety performance across all sectors."*



THE ORG ROADMAP

The ORG roadmap details Saudi Arabia's SEIs associated with Saudi Arabia's safety oversight capabilities and the implementation of KSA SSP, including industry's SMS implementation.

*Focus on SPTs, SPIs, and SEIs



SNAP Ref: 2.1 KSA Air Navigation Framework | 2.1.5 The relationship between SSP, NASP and SNAP



Under Global Air Navigation Plan (GANP, Doc 9750) 7th edition, ICAO is moving a first step in aligning the GANP and the Global Aviation Safety Plan (GASP, Doc 10004) by means of a common Safety Key Performance Area and Key Performance Indicators. Moreover, the **Assembly Resolution A41-6** - "ICAO global planning for safety and air navigation" - **calls upon each State to develop and implement a national aviation safety plan (NASP)** in line with the GASP goals, targets and the global high-risk categories of occurrences (G-HRCs). It also invites other Stakeholders to cooperate in the development and implementation of aligned national plans - NANP and **NASP** - based on the GANP and GASP frameworks.



THE RELATIONSHIP BETWEEN KSA SSP AND KSA NASP

KSA SSP allows KSA to manage its aviation activities in a coherent and proactive manner, measure the safety performance of its civil aviation system, monitor the implementation of KSA **NASP**'s SEIs and address national safety issues.

Through safety data analysis aspects of the SSP, KSA can use its hazard identification and safety risk management process as a source of safety intelligence to identify hazards and safety deficiencies and determine national operational safety risks and organizational challenges for inclusion in the KSA **NASP**. Therefore, **KSA SSP represents the primary source of safety information for the KSA NASP**.

On the other hand, **KSA NASP is one of the key documents produced as part of KSA's SSP documentation**. It is the means by which KSA defines and drives the implementation of SEIs determined through SSP processes and drawn from the ICAO Global Aviation Safety Roadmap (Doc 10161) and the MID RASP. **It also allows KSA to determine initiatives to strengthen KSA SSP** or otherwise needed to achieve its safety objectives.



THE RELATIONSHIP BETWEEN KSA SSP / NASP AND SNAP

Given its role as main reference document for the modernization of the KSA air navigation system in the next 15 years and considering the ICAO-derived need to ensure alignment between the national air navigation plan and the national aviation safety plan, **a governance model** is established to share information, manage and report the safety risks emerged in the SNAP implementation*.



THE IMPACT OF SNAP ON SSP IMPLEMENTATION

- KSA ANS stakeholders can benefit from the contents of SNAP to **promptly acquire essential basic information** on KSA aviation safety strategy, goals, indicators, targets and performance levels;
- SNAP represents a key platform that allows ANS stakeholders to **interact and discuss of safety-related concern** through concrete Initiatives and Projects to be implemented in the country;
- **The National Aviation Safety Committee (NASC) can leverage on SNAP communicative function and on the SNAP web-app in its endeavour for promoting a "safety culture"** across the entire KSA aviation industry facilitating the sharing of safety information among service providers.

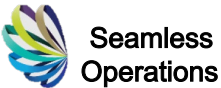


THE IMPACT OF SNAP ON **NASP** IMPLEMENTATION

- **SNAP contributes directly to the effective achievement of safety goals** by ensuring, for instance, the implementation of required air navigation systems (i.e. Remote TRWs, ADS-B, etc.). For each Project considered within SNAP, moreover, safety studies and assessments are included among the key activities to be performed;
- **SNAP contributes to the monitoring of the overall safety performance in KSA** through the ICAO KPIs associated with the Safety KPA.

*see §4.3 Safety Management Considerations: Organizational chart, roles and responsibilities

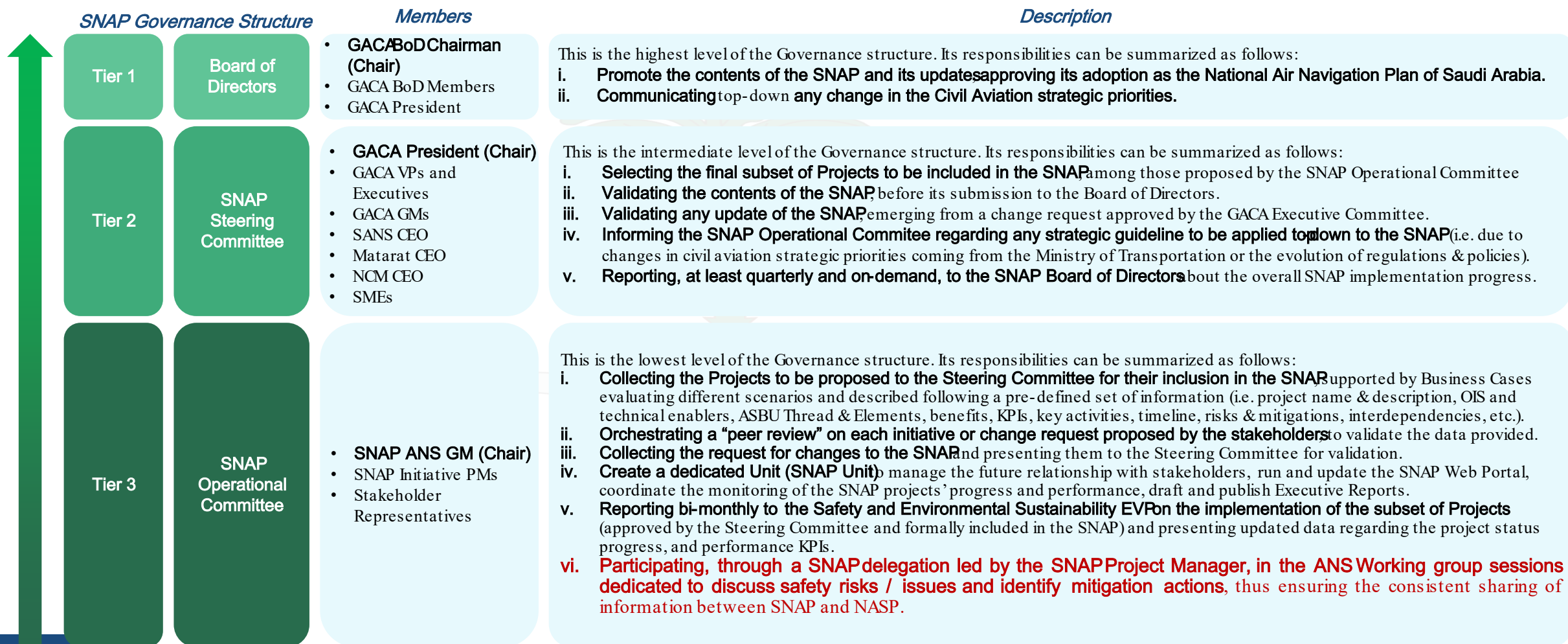
Where is the SSP & NASP located in the Stakeholder's Map?

INFLUENCE ENGAGEMENT		INTERNAL	EXTERNAL	CONSULTANTS
		 GACA الهيئة العامة للطيران المدني General Authority of Civil Aviation	National, Regional and International organizations	Firms/Organizations
HIGH	Contribute directly to SNAP	 Human Capital Project  SSP & NASP	  مطار الرياض riyadh airports      Jeddah Airports 	Contracted companies  
MEDIUM	Contribute indirectly to SNAP	 Cyber-security Department  AAM Project  IT Department 	       	Review & Validation support  ALG
LOW	Informed about SNAP	  Data Protection Officer	        	International Organizations   

SNAP Ref: 1.10 SNAP Governance and development process | 1.10.1 SNAP Governance



The SNAP Convergence is well constructed to be aligned with SSP & NASP by setting some responsibilities to achieve the common national objectives



SNAP Ref: 4.3 Safety Management Considerations: Organizational chart, roles and responsibilities



Given the need to establish an information sharing mechanism between SNAP and **NASP*** and considering also the mission assigned to the different SSP Working groups, **the SSP ANS Safety WG is identified as the appropriate forum to discuss safety-related risks/issues (emerging from the SNAP projects) and related changes and upgrades.** Below, the key people involved in the information sharing mechanism are outlined alongside their roles and responsibilities:

ORGANIZATIONAL CHART



ROLES AND RESPONSIBILITIES



- Chairing the group by setting objectives, moderating the discussion and liaising with stakeholders.
- Validating the identified mitigation solutions and driving the decision-making process.



- Coordinating safety information collection from SNAP Initiative/projects Project Managers/Focal Points.
- Selecting major safety risks and issues common among local implementations of a Project and reporting them to the ANS Safety WG.
- Supporting the identification of mitigation solutions.



- Representatives from Aviation Safety & Standards Directorate.
- KSA aviation industry members.
- Subject Matter Experts (SMEs).
- Others (as deemed necessary).

- Reviewing safety data, trends, and SSP implementation plans affecting ANS.
- Reviewing other SSP and NASP-implementation related sources of information.
- Providing National Aviation Safety Committee (NASC) with high level recommendations and mitigation actions to mitigate the risks identified in the ANS field.
- Providing interim (quarterly) and final (every half-year) reports to NASC, including proposals for decision-making, resources allocation, safety promotions plan, and conflict resolutions.
- Define and review the Organizational Sector Safety Risk Profile.

* see §2.1 KSA Air Navigation Framework | 2.1.5. The relationship between SSP/NASP and SNAP.



2

Ensure the respect of adequate standards of Safety

High standard of safety must be the first priority during the deployment of SNAP' initiatives

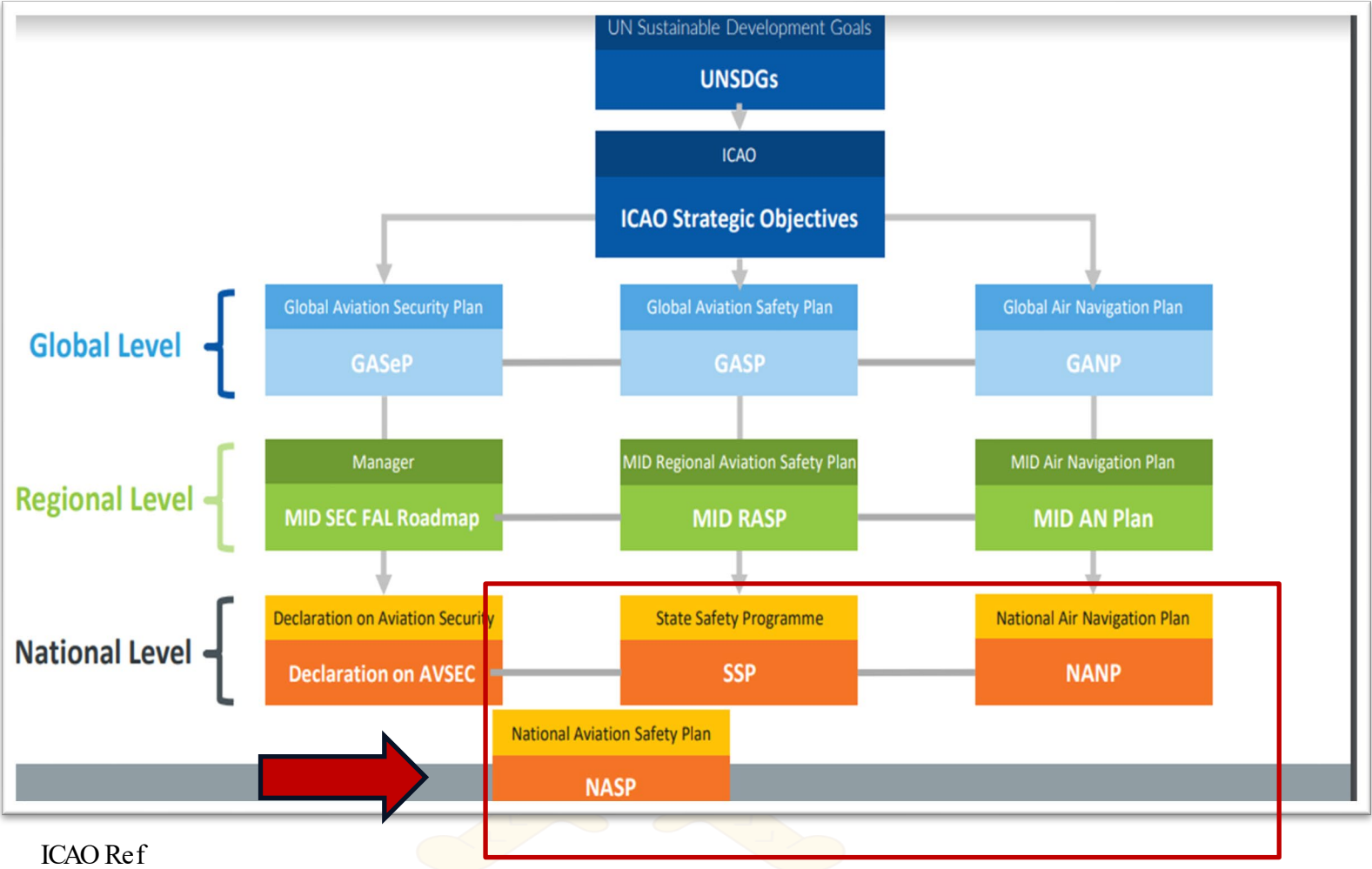
Maintain high standard of safety during the deployment of technical and operational solutions and delivery elements

Identify safety improvements during the deployment of SNAP' initiatives and introduction of change

Support the achievement of safety targets, performance, and risk reduction identified under the National Aviation Safety Plan

Ensure continuous improvement of ANSP safety management as defined under

Systematic use of innovative Safety Risk Assessment methodologies to identify risks, and threat.



ICAO Ref

SUMMARY OF THE GANP PERFORMANCE AMBITIONS

“A high performing system by 2040 and beyond”

KPA	Ambition
ACCESS AND EQUITY	No aviation community member excluded or treated unfairly.
CAPACITY	Nominal capacity easily scalable with demand.
	Disruptive events do not interrupt service provision and do not significantly affect the performance of the system.
COST-EFFECTIVENESS	No increase of total direct ANS cost while maintaining the safety and quality of service.
	Significant increase of ANS productivity, irrespective of demand.
EFFICIENCY	Reduction of the gap between the flight efficiency achieved and the desired optimum trajectory of airspace users.
ENVIRONMENT	ANS-induced inefficiencies to be progressively removed to contribute to the global ICAO aspirational goals for CO ₂ emissions.
	To benefit from achieved flight efficiency gains.
FLEXIBILITY	To absorb required changes to individual business and operational trajectories.
INTEROPERABILITY	Essential at an operational and technical level.
PARTICIPATION BY THE ATM COMMUNITY	Pre-agreed level of participation to make the maximum shared use of the air navigation resources.
PREDICTABILITY	No increase in ANS delivery variability including asset availability.
SAFETY	Zero ANS-related accidents and a significant (50%) reduction of ANS-related serious incidents.
SECURITY	Zero significant disruptions due to cyber incidents



International Civil Aviation Organization

WORKING PAPER

A42-WP/537

TE/207

11/8/25

(Information paper)

English only

ASSEMBLY— 42ND SESSION

TECHNICAL COMMISSION

ACTION BY THE ASSEMBLY

The Assembly is invited to take note of the structure and contents of the Saudi National Air Navigation Plan.



For more information, you can communicate with the SNAP Unit using the following email address snap@gaca.gov.sa

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