



AAM Early Operations preparations

Advanced Air Mobility Conference 2024 – Brazil

By Khaled Alharthi

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Khaled Alharthi Bio

Advisor to EVP Strategy & Business Intelligence at General Authority of Civil Aviation

Khaled Alharthi is an Advisor to EVP Strategy and Business Intelligence Sector at GACA with more than 20 years of experience in Aviation Sector. His background is graduate and postgraduate level studies in the aviation field as well as his working experience in Airspace Operations (ATC), Airports Planning and Development, Aviation Strategic Projects such as General Aviation, Advanced Air Mobility, Project Manager of Air Taxi Proof of Concept in Makkah City (Hajj Season), Airport Traffic Forecast and Network Development, GACA Business Intelligence Program, etc.

He is:

- Member of ICAO Aviation Data and Analysis Panel
- Member of ICAO Aviation Competitiveness Working Group".
- Member of Drafting Group of "MID REGION AIR TRANSPORT STRATEGIC PLAN 2025-2040"
- Member of "International Logistics Constraints on E-commerce (ILC)" ICAO Working Group.
- Member of ICAO "The Multi-disciplinary Working Group on Long-term Traffic Forecasts (MDWG-LTF)".



kmalharthi@gaca.gov.sa



Advanced Air Mobility (AAM) holds significant promise for all societies

In the Kingdom of Saudi Arabia (KSA), it is also an enabler of the national VISION 2030

Enhanced mobility



AAM will enable **ultra safe air transport services** where **conventional aviation** is not possible (e.g., urban and rural communities, medical centers)

Economic development



As KSA strives to diversify its economy, unlocking the **Low-Altitude economy** will provide **thousands of jobs**, significant **GDP contribution** and **investment attraction**

Environmental protection



AAM aircraft will operate with lower emissions

AAM will support these three national objectives in line with VISION 2030 pillars: Ambitious Nation, Thriving Economy and Vibrant Society

Accordingly, the Kingdom has set an ambitious strategy for AAM, developed and led by GACA

VISION



BECOME A GLOBAL LEADER IN AAM

STRATEGIC OBJECTIVES



Ensure KSA's leading position in start of commercial operations

Secure world-class fleet, infrastructure and services to serve AAM demand

Promote manufacturing localization of AAM aircraft

Develop required capabilities for AAM sector

ENABLERS



Organization & Governance



Technology



Infrastructure



Human Capability



Public Acceptance



Funding



















Regulations

- KSA has developed an ambitious roadmap, with targeted initiatives for each enabler, to achieve its strategic objectives
- Initiatives include, among other, airspace planning and infrastructure development to enable AAM operations

Agreements at international scale are fundamental to activate a sector as multidisciplinary as AAM

In KSA, the sector is gaining significant traction with several recent agreements

Selection – not exhaustive

 	 	 	 	 	 	 	 
<p>In 2020, JIMCO participated in a SAR ~3bn funding round for Joby</p>	<p>In 2021 NEOM and Volocopter formed a JV to develop the world's 1st AAM ecosystem in</p>	<p>In March 2022 THC and Airbus signed a MoU to introduce UAM in KSA</p>	<p>In October 2022 Saudia signed an MoU to acquire 100 eVTOLs from Lilium.</p> <p><i>- To be assessed following Liliums filing for bankruptcy-</i></p>	<p>In November 2023, Flynas and EVE signed an MoU to offer AAM services in Riyadh and Jeddah</p>	<p>In February 2024, Front End and Ehang, showcased their AAM plan in KSA</p>	<p>In February 2024, AutoFlight confirmed its cooperation with Mobily on AAM</p>	<p>In May 2024, Mukamalah and Joby signed an MoU for eVTOLs acquisition</p>

Additionally, educational and research institutions in KSA are also contributing to AAM development

Key AAM research & development activities



جامعة الملك فهد للبترول والمعادن
King Fahd University of Petroleum & Minerals

- KFUPM is **developing and testing its own UAS** for logistics operations
- It has published multiple **research papers** e.g, use of drones in road accident management, obstacle avoidance for load carrying multi agent UAS system, and design of UAS parachutes
- It has also attained numerous **patents** in the field, e.g., adaptive control method for unmanned vehicle with slung load



KACST
مدينة الملك عبدالعزيز
للعلوم والتقنية

- KACST is working closely with both the public and the private sector, **developing and testing UAS** for logistics and other use cases
- It has a 10-year partnership with UAVOS on UAS, which has already resulted in development of a UAS - Saker 1B MALE, which is a long endurance, BVLOS capable UAS
- Now, the partners are looking to develop a new and improved variant of the UAS



جامعة الامير سلطان
PRINCE SULTAN
UNIVERSITY

- PSU has a **strong focus on human capital development**, specifically for aviation, as it is **setting up an aviation college**
- Its RIOTU¹ lab has developed a **UAS delivery and fleet management system**, supporting autonomous package deliveries



جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

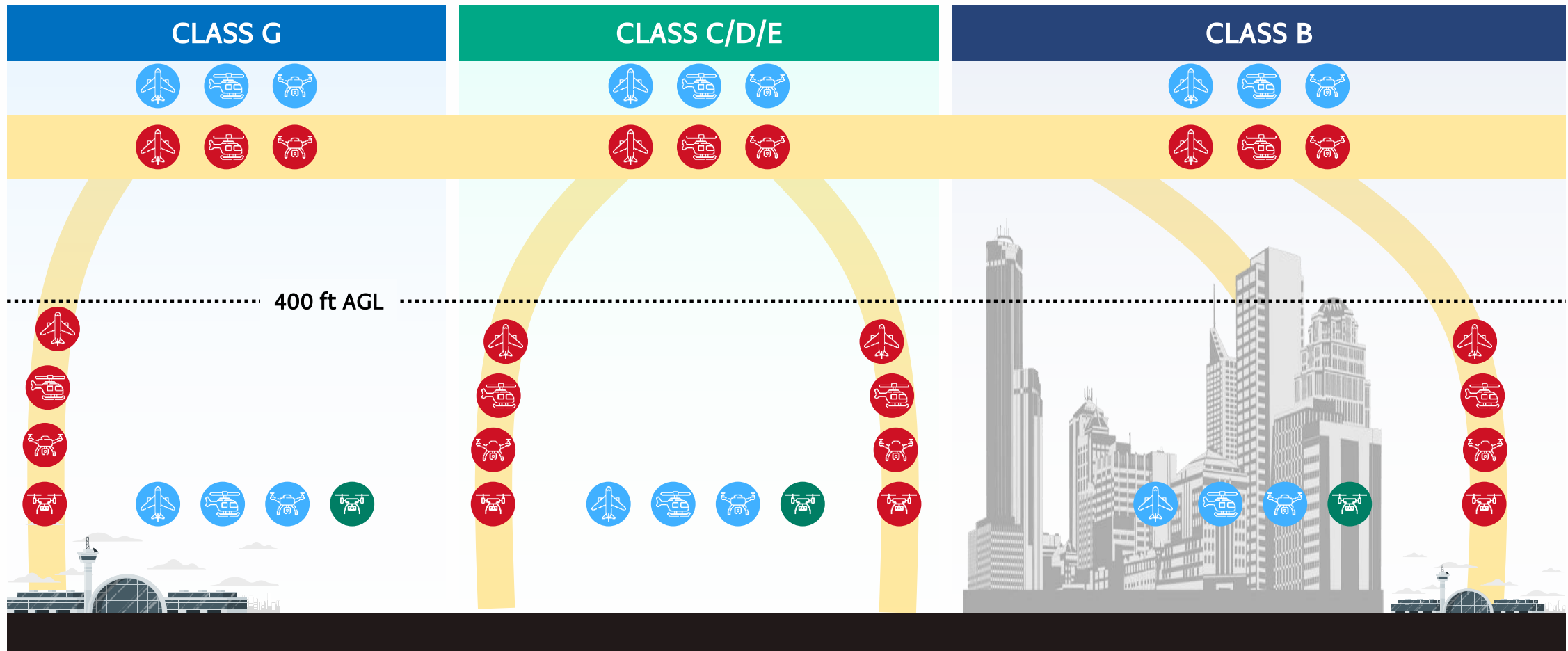
- KAUST has funded a **drone in a box start-up** called **Firnas Aero**, which offer UAS inspection, mapping, and monitoring services to client across the Kingdom
- The university has also developed **non-intrusive sensors** to measure UAS flight parameters and **improve maneuverability and control**. It is **awaiting a patent** for this technology

Illustrative



UATM is one of the key areas of work, as AAM operations need corridors at low altitudes, interfering with traditional airspace aviation that requires an enhanced ATM system

Example of Airspace Aviation



Several multiple flight demonstrations have also been carried, aiding the development of AAM ConOps across KSA

Recent AAM flight tests

Non-Exhaustive



Hajj Medical UAS Delivery Test
Makkah, July 2022



Ministry of Health, SPL, and GACA successfully carried out trials to transport blood units using UAS during the Hajj



NEOM Air Taxi Flight Test
NEOM Experience Center, May 2023



GACA enabled the first successful flight test of an air taxi eVTOL in the country, in collaboration with NEOM and Volocopter



Makkah Air Taxi Proof of Concept
Makkah, June 2024



Deep dive ahead
GACA carried out the air taxi proof of concept for pilgrims in Makkah and holy sites, with the EHang 216S eVTOL

The air taxi proof of concept in Makkah and holy sites highlighted key AAM integration challenges, especially in restricted airspace

Hajj air taxi PoC - lessons learnt summary



- **Widespread engagement** with the public sector, incl. municipal, security, and transport entities is required
- Consider the **AAM aircraft configuration** when selecting an aircraft, as not all may be suitable for operation profile.
- A **hybrid (on-ground/remote) site assessment** is advisable using geospatial data to assess the terrain and its obstacles. The results are later validated with an on-ground presence.
- Early engagement with **communication sector entities** is key to determine the right network and SIM cards for **aircraft that use LTE/4G services**.
- **Rapid procurement capability** is essential for a successful PoC, especially in areas **without purpose-built infrastructure**
- The **battery charger and power supply requirements** must be defined and arranged in advance.
- Before a flight demonstration, **enough testing time should be allocated** to test multiple maneuvers and allow sufficient time for cooling and charging the batteries.
- When choosing **flight windows**, account for **aircraft limitations**, such as temperature and precipitation, as some aircraft cannot operate in **high temperatures and rain**.

Project Team photo with the EVP of Aviation Safety and environmental Sustainability and HE. GACA President



Thank you

شكراً لكم

If you have further questions about AAM developments in Saudi Arabia, please scan the QR code below or write to

aaminquiries@gaca.gov.sa



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General Authority of Civil Aviation

KSAGACA | gaca.gov.sa
8001168888

