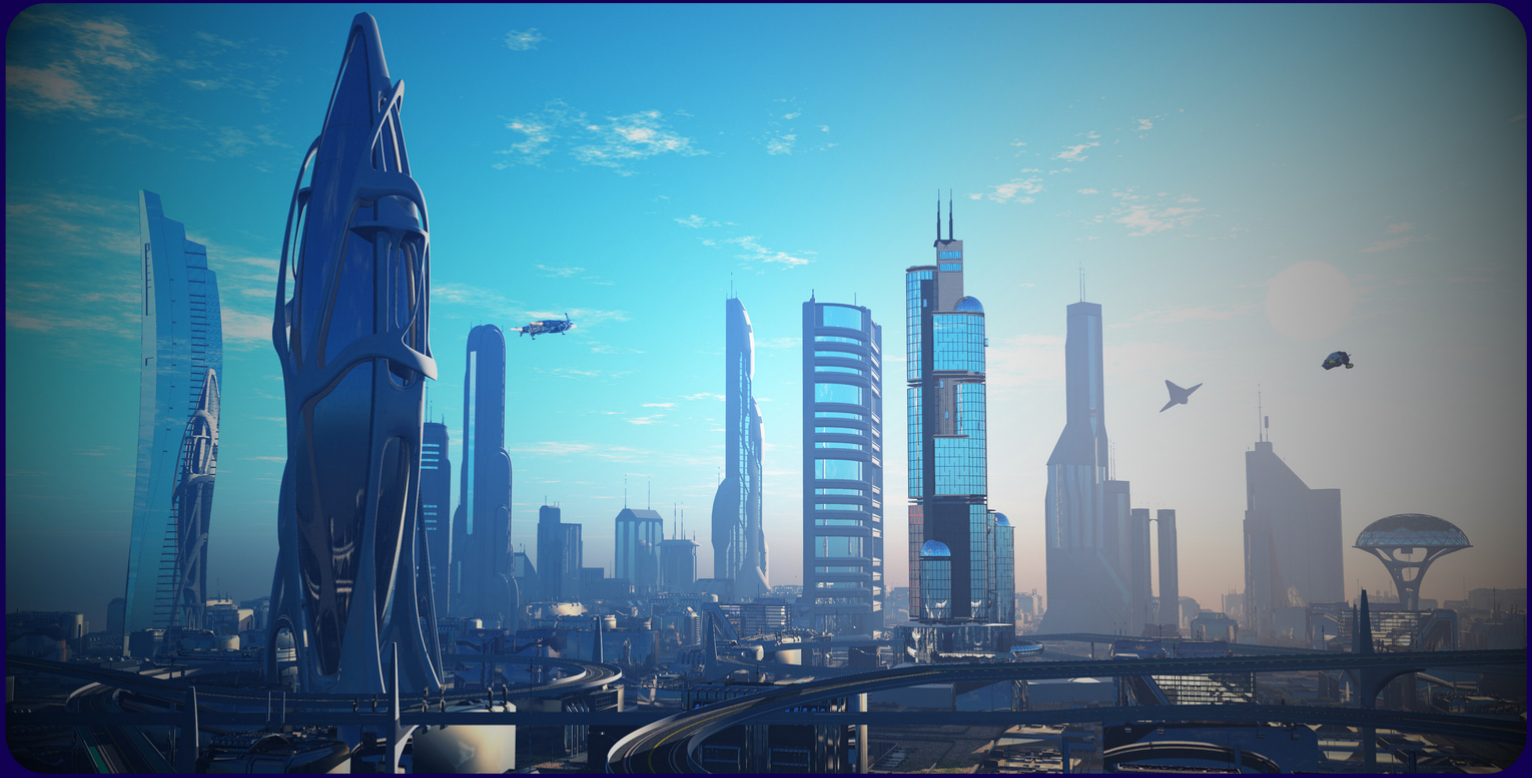




THE FUTURE OF AVIATION SERIES

UAE PAVES THE WAY FOR ADVANCED AIR MOBILITY OPERATIONS



In the race to be the first aviation ecosystem in the world to operate a network of electrical Vertical Take-Off and Landing aircraft (**eVTOL**), on 12 February 2023 at the World Government Summit, His Highness Sheikh Mohammed bin Rashid al Maktoum, Vice President of the UAE and Ruler of Dubai announced his approval of the design of four air taxi stations with a target launch of eVTOL operations by 2026.

Dubai is one of several ambitious global cities striving to integrate these new age Advanced Air Mobility (**AAM**) aircraft technologies into the current aviation ecosystem.

Most recently, on 15 October 2023, Abu Dhabi signalled its clear intent to be a leader in the development and investment in AAM and the autonomous vehicle industry with the launch of the Smart and Autonomous Vehicle Industries (**SAVI**) cluster at Masdar City. California-based eVTOL start-up Joby Aviation has already announced its intention to join SAVI.

CITIES OF THE SKY

With a push for carbon neutral travel and the continued, rapid advancements in AAM, eVTOL and Unmanned Aerial Vehicle (**UAV**) aircraft technology; the demand for new engine and battery systems, equipment, composite materials, infrastructure, networks and operational capabilities, has risen in all major industrialised cities of the world.



The shared vision is that the AAM (or Urban Air Mobility (**UAM**)) ecosystems will facilitate new and faster modes of inner and intercity transport for passengers and improve logistics, security and emergency services. With seemingly endless capabilities, it is of no surprise therefore that the current AAM market value is estimated by industry experts at approximately USD 9 billion and is predicted to rise to up to USD 45 billion by 2030. A joint study from Deloitte and the Aerospace Industries Association (**AIA**) forecasts the market value will reach USD 115 billion by 2035.

CITIES OF THE SKY

Key to the development of these ecosystems is the establishment of AAM related infrastructure capable of sustaining this new mode of transport and its associated risks, including the design, certification and operation of vertiports.

As with all innovative technology, markets and environments; innovation shall dictate the regulation and no operations can safely commence without first having a robust framework of aviation safety regulation in place.



The rapid growth of advanced air mobility presents opportunities in reducing carbon emissions, decreased congestion, and entry to inaccessible markets, achievable through vision, planning and close collaboration with our stakeholders in the aviation industry.



Saif Mohammed Al Suwaidi, GCAA Director-General



With this, on 1 September 2023, the UAE's aviation regulator, the General Civil Aviation Authority (**GCAA**) issued one of the world's first national vertiports regulations, the "Civil Aviation Regulation – Heliports (Onshore & Offshore), Vertiports (Onshore)" (**CAR-HVD**).

The new vertiport regulations therefore represent a huge stride for the UAE in the global race for an AAM ecosystem capable of developing fully integrated inner and intercity AAM operations.

DEVELOPING REGULATION

The primary regulatory focus in the AAM space has been the competition between the numerous eVTOL start-ups to become the first to receive “*type certification*” from its aviation regulator, typically either from the US Federal Aviation Administration (**FAA**) or the European Aviation Safety Agency (**EASA**).



However, type certification for eVTOL aircraft is one of a number of regulatory building blocks required to develop the AAM ecosystem which also requires certification of:

- eVTOL production,
- airworthiness systems,
- operation (such as an air operator’s certificate);
- maintenance;
- air traffic design and management; and
- vertiport design, construction and operation.

The UAE’s journey to develop a regulatory environment to support the operation and development of emerging technologies in aviation started in 2015. Since then, there have been various regulations issued, amended and in some cases, withdrawn.

In late November 2022, the UAE issued Law No.26 of 2022 “*Regulation concerning the civil use of unmanned aircraft and related activities*” which created the overarching Federal law to ensure harmonisation of regulations at the Emirate level.

EMERGING TECHNOLOGY REGULATION

Under the GCAA's newly created CAR XII "*Emerging Technologies*" section within the UAE Civil Aviation Regulations, the following regulations are currently in force:

Doc Ref	Title	Issue Date
Advanced Air Mobility		
CAR-UAM	Urban Air Mobility Operations - Issue 1	19.07.20
CAR-AutoUAS	Passenger Carrying Autonomous Unmanned Aerial System (UAS) Experimental Operations - Issue 1	16.09.18
Unmanned Air Systems		
CAR-UAC	Unmanned Aircraft Commercial and Governmental Operations – Issue 2	02.02.23
CAR-UAD	Unmanned Aircraft Demonstration Operations – Issue 2	28.02.23
CAR-UAEV	Unmanned Aircraft Event Operations - Issue 2	03.02.23
CAR-UAEX	Unmanned Aircraft Experimentation Operations - Issue 2	28.02.23
CAR-UAR	Unmanned Aircraft Recreation Flight - Issue 2	03.02.23

VERTIPOINT REGULATION

As many of the 400 plus most prominent eVTOL manufacturers aim to launch their products for certification by 2024 and a global network for AAM operations is widely envisaged to be in place by 2030, the focus of aviation regulators and lawmakers across the globe has been on producing a framework of regulation to control the design, certification and operation of vertiports to promote safe and efficient AAM operations.

The proactive development of a regulatory framework for vertiports establishes a foundation within the UAE to ensure safe and seamless operation of urban air mobility.

Saif Mohammed Al Suwaidi, GCAA Director-General

With the issue of CAR-HVD in September 2023 (following public consultation that started in December 2022) the UAE's GCAA established the regulatory framework for the design, certification and operation of heliports (Parts I and II) and vertiports (Part III).

The provisions of Part I of CAR-HVD supersedes the GCAA's previous Acceptable Means of Compliance (**AMCs**) guidance materials, **AMC70** and **AMC71** on heliports and builds on guidance from the **ICAO Heliport Manual Doc 9261**.

Requirements contained in Part I apply to all operators of onshore heliports and contains the minimum requirements to achieve an acceptable level of safety to allow operators to obtain a Heliport Certificate or a Landing Area Acceptance with Part II applying to offshore heliports.

Part III applies to vertiports and in many respects mirrors the provisions of Part I (onshore heliports) with a few exceptions.

OPERATING VERTIPOINTS

Under CAR-HVD, to develop and operate a vertiport, the following steps must first be completed:

- **Design Acceptance:** Prior to construction of a vertiport, the operator shall apply to the GCAA for design acceptance in accordance with Appendix III-E of CAR-HVD which shall include design drawings and a design report;
- **Vertiport Certificate:** This is a certificate issued by the GCAA permitting the operation of the vertiport. Application process involves:
 1. Providing the GCAA with all written policies, procedures and other information required for the operation of a vertiport;
 2. Obtaining security clearances;
 3. Nominating responsible persons in the positions of Vertiport Account Manager and Vertiport Operations Post Holder.

The Regulations are also to be read in conjunction with the GCAA's other Civil Aviation Regulations, including **CAR Part IV** (CAR AIR OPS), **CAR Part IX** (Aerodromes), **Part XI** (Aerodrome Emergency Services, Facilities and Equipment) and other relevant GCAA publications.

The Regulations are also said to ensure compliance with UAE Civil Aviation Law and Civil Aviation Regulations and to conform with the international standards of **ICAO's Annex 14** Volume II (Heliports).

WHAT IS A VERTIPORT?

Whilst CAR-HVD defines vertiports as any area of land, water or structure intended for the landing, take-off and movement of VTOL aircraft, they can be more fully described as landing facilities which encompass all sizes of operations from 'vertistops' (single vehicle landing locations, the smallest and least complex structures within the AAM infrastructure ecosystem with little or no support services offered) to 'vertihubs' (the largest structures within physical AAM infrastructure ecosystems).



Vertiport Design Concept - Credit Foster & Partners

Vertiports can be standalone buildings in high-traffic areas, with a number of active landing areas as well as further space for parking, maintenance, and storage of air vehicles, potentially offering a range of other services to passengers or simply helipad-type structures atop inner-city high-rise buildings.

WHAT IS A VERTIPORT?

The requirements for appropriate facilities for the operation of eVTOL aircraft, whilst similar to helicopters, is unique given the advanced operating systems, battery power, proposed high frequency of passengers and fly by wire for these aircraft to land, park, re-fuel/re-charge, operate out of and collect passengers or pay-loads from.



Vertiport Design Concept - Credit Foster & Partners

eVTOL aircraft will need to be certified and integrated safely into both air traffic channels and the wider metropolitan areas home to the general public.

As aerodromes, airports and heliports did for traditional air travel, vertiports therefore hold the key to the growth and integration of the AAM industry within our cities.

THE VIEW FROM DUBAI

In addition, to the regulations issued by the GCAA at the Federal level, the Dubai Government has also progressively established an AAM legal framework with the release of Dubai's **Law No.4 of 2020 Regulating Unmanned Aircraft in the Emirate of Dubai** (Law No.4) setting out the framework for future AAM/UAM regulation.

Law No. 4 was released to accompany Dubai's '**Sky Dome**' Project aimed to develop a virtual airspace infrastructure within the emirate. With Law No.4 and the Sky Dome Project, Dubai, for the first time placed specific roles and responsibilities on 4 main government entities to drive the progression of an emirate level AAM ecosystem, assigning the Dubai Civil Aviation Authority (**DCAA**) as the "*regulator*", the Dubai Air Navigation Services (**DANS**) as the "*sky controller*", Dubai Aviation Engineering Projects (**DAEP**) as the "*developer*" and the Dubai Police as the "*law enforcer*".



X2 Test Flight - Credit Gulf Today

The future opportunities under the Sky Dome Project were seen in full view in October of 2022 with the 90 minute test flight of Chinese manufacturer Xpeng's twin seat eVTOL vehicle 'X2'. The carbon zero 'flying car' took off from Dubai's Skydive Dubai, flying low-altitude reaching speeds of 130 kilometres per hour in city conditions.

UAE VERTIPOINTS INBOUND

The UAE has clear ambitions to be a world leader in autonomous vehicles and eVTOL development, operations and investment.

In 2022, worldwide AAM infrastructure developer Vports signed a strategic partnership with the UAE's GCAA and the **Mohammed bin Rashid Aerospace Hub** (MBRAH) to construct the world's first AAM integrator world centre at Dubai South.

the GCAA's strategic plan is to build a sustainable and innovative cluster for the Advanced Air Mobility ecosystem to thrive and grow this new entrant mode of air transportation globally from a hub right here in Dubai

Saif Mohammed Al Suwaidi, GCAA Director-General

The 25 year agreement (with the option of extending to 50) promises to establish the UAE as the leading global AAM hub with construction of the hub expected to begin in 2023 and operations to commence in 2024.

Importantly, as part of the agreement, VPorts have committed to partner with private investors to deliver a network of AAM infrastructure across the UAE, which by 2030 will extend to all major industrial areas of the emirate including Dubai South, Ras Al-Khaimah, Sharjah, Jebel Ali and the UAE's capital, Abu Dhabi.

UAE VERTIPOINTS INBOUND

With the His Highness, the Ruler of Dubai's recent announcement approving the design of four air taxi stations with a target launch of eVTOL operations by 2026, the ambitious plans are set to make Dubai the world's first city with a fully developed network of vertiports.



Said to provide a *"smooth end-to-end passenger journey"*, the announcement video for the plans envisages each air taxi accommodating up to five people including the pilot and capable of reaching a range of over 240km with a top speed of 300kph providing truly feasible inter emirate transport and the potential to connect Dubai to Abu Dhabi in half an hour.

In June 2023, prior to the implementation of CAR-HVD, Vports announced that it had initiated the certification process for its first vertiport in the UAE with construction to start in 2024.



COMMENT

The UAE has wasted no time in the global race for integrated AAM ecosystems by preparing its cities for operations.

However, there is a worldwide industry recognition that the development of AAM ecosystems and the operations within them will bring additional and enhanced risks to those posed in traditional civil aviation airspace and at conventional aerodromes and heliports across the world.

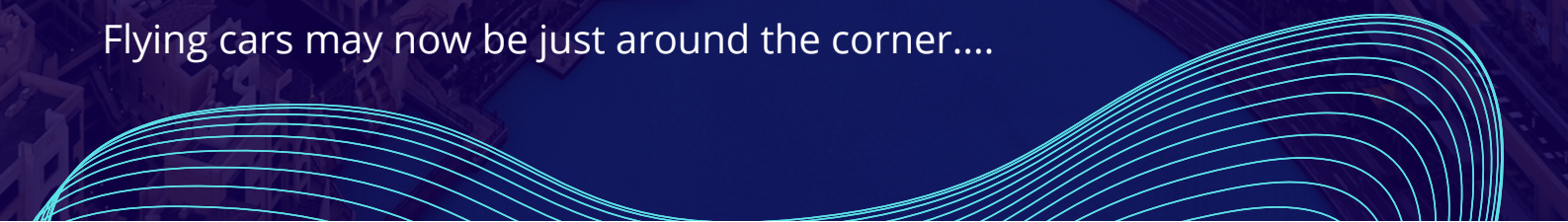
An increase in volume of operations, proximity to the general public, integration into the surrounding metropolitan environment and the rate of technological innovation involved in the infrastructure, aircraft and systems in the AAM sphere represent just some of the additional considerations regulators face.

Now that the GCAA's CAR-HVD is in force, the certification process for vertiports is supported by a regulatory framework, which remains untested. The speed of certification and ultimate live operation of a vertiport will likely take some time as aviation regulators continue to attempt to balance aviation safety with emerging technologies and infrastructure.

Nevertheless, the GCAA has set a sound precedent with its existing regulations on the design, certification and operation of aerodromes and heliports and those specific to AAM regulation.

This, together with collaboration from key stakeholders and industry experts, will ensure that the new vertiport regulations represent a step closer to AAM operations in the UAE and further advance the country's reputation as one of the world's most innovative and technically advanced nations.

Flying cars may now be just around the corner....



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