PionAirLaw
NEW LEGAL ROUTES FOR AIRLINES

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FUTURISTIC FLIGHTS? AIR TAXIS ARE SET TO REVOLUTIONIZE THE AVIATION INDUSTRY AS WE KNOW IT

Among the many challenges on the horizon for the airline industry, the implementation of eVTOLs[1] (also known as aerotaxis) stands out prominently. These innovative vehicles promise to enhance efficiency, safety, and passenger experience by establishing a third dimension of transport. This advancement will help decongest cities, reduce infrastructure investment costs, and promote sustainability, between other benefits.

In this newsletter, we will explore the implementation of these air taxis, their integration into Urban Air Mobility (UAM)[2], their near future, and how to develop appropriate regulations to address the associated risks and challenges.

EXPLORING THE NEW ERA OF AVIATION: WHAT ARE UAVS, UAS, VTOL AND EVTOL?

In the last decade, the aviation industry has undergone an unprecedented revolution, with advanced technologies giving rise to a new generation of aircraft that are transforming our understanding of air transport and urban mobility. In this context, terms like UAV, UAS, VTOL and eVTOL[3] have become part of our everyday vocabulary. But what do these acronyms truly mean? How are they interconnected, and what role do they play in the future of air transport? Moreover, what is their role within UAM?

Firstly, it is important to understand the relationship between UAVs and UAS. A UAV, or Unmanned Aerial Vehicle, is commonly known as a drone and can be controlled remotely by a pilot or autonomously through a computer program; essentially, it refers to the aircraft itself. In contrast, a UAS, or Unmanned Aircraft System, refers to the entire system required for the operation of an UAV. This includes the aircraft, the ground control station, and the communication link.

On the other hand, eVTOLs, or air taxis, have emerged thanks to technological innovations that enable vertical takeoffs and landings powered by electric energy. These advancements are poised to address major challenges in aviation, such as air traffic congestion and urban pollution[4].

Thus, the interoperability between UAVs, UAS, VTOLs, and eVTOLs is enhancing air traffic management in densely populated urban areas. At the same time, technological advances are improving the efficiency and reliability of eVTOLs, contributing significantly to more effective urban air mobility solutions.

However, this necessitates the development of infrastructure like vertiports and the implementation of appropriate regulations, such as those being developed by the European Union. This technological convergence will facilitate the integration of these systems into UAM, enabling fast, safe, and sustainable transport. Consequently, it will reduce road congestion and pollution, transforming the landscape of urban mobility.

THE IMMINENT ARRIVAL OF EVTOLS IN AIRSPACE: LEGISLATIVE DEVELOPMENTS

The integration of eVTOLs into the airspace requires a suitable legislative framework to ensure their safe and efficient operation alongside conventional aircraft. In May 2023, the US government convened a team comprising NASA, Transportation Security Administration (TSA), FAA, and Federal Communications Commission (FCC) to craft a national strategy for UAM. Working in collaboration with NASA, the FAA updated its airspace plan to incorporate air taxis, leveraging existing infrastructure and establishing air corridors linking airports with urban centers. Furthermore, the FAA outlined a plan to integrate air taxis and Advanced Air Mobility (AAM) into the national airspace by 2028.

In Europe, Delegated Regulation (EU) 2019/945[5] and Implementing Regulation (EU) 2019/947[6], issued in March and May 2019 respectively, set forth standards governing the design, manufacturing, and operational use of UAS. These regulations oversee the marketing and operational practices of UAS within the framework of the Single European Sky. Key provisions encompass UAS class marking, remote identification requirements, and delineation of risk categories. Additionally, the regulations establish procedures for identifying and registering UAS operators and pilots.

[1] eVTOL (Electrical Vertical Take-Off and Landing), defines aircraft that are capable of vertical take-off and landing using electrical power.
[2] NASA defines UAM as a safe and efficient system for air transport of passengers and cargo in urban areas, including small package delivery and other UAS services, with on-board or ground-piloted operations. This definition is complemented by the Federal Aviation Administration (FAA), stating that UAM is an extension of Advanced Air Mobility (AAM), but focuses exclusively on the movement of people and cargo in metropolitan and urban areas.
[3] UAV (Unmanned Aerial Vehicle) defines any aircraft that can fly unmanned; UAS (Unmanned Aerial System) is defined as the system used for the flight of an Unmanned Aerial Vehicle, i.e. the flight system of a UAV; VTOL (Vertical Take-Off And Landing) defines the aircraft that is capable of vertical gliding, take-off and landing.
[4] The origin of VTOLs can be traced back to Nikola Tesla, who patented the first VTOL aircraft in 1928. Throughout the 19th and 20th centuries and the early 2000s, significant advances in VTOL were made, initially for military purposes, such as the Focke-Wulf Triebflügel in 1944 and the BAE Sea Harrier in 1980. Subsequently, UAVs with navigation and obstacle avoidance were developed, and finally, eVTOL prototypes for autonomous passengers were introduced.
[5] Comission Delegated Regulation EU) 2019/945 of 12nd March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems.
[6] Commission Implementing Regulation (EU) 2019/947 of 24th May 2019 on the rules and procedures for the operation of unmanned aircraft.

Additionally, to further facilitate the integration of UAS into European airspace, U-Space was established. This initiative defines a geographical area designated by the Member States of the European Union to coordinate and regulate the safe and efficient access of UAS to airspace. Its objective is to harmonize UAS operations with manned aviation, ensuring real and secure airspace access in a coordinated manner.

Thus, the U-Space regulatory framework comprises three Regulations: (i) Implementing Regulation (EU) 2021/664[7], which delineates rules and procedures ensuring the safety of UAS operations within U-Space airspace, alongside service provisions; (ii) Implementing Regulation (EU) 2021/665[8], outlining requirements for air traffic service providers in coordinating with U-Space service providers and single common information service providers; and (iii) Implementing Regulation (EU) 2021/666[9], guaranteeing the safe coexistence of manned aircraft without air traffic control service alongside unmanned aircraft in U-Space airspace, emphasizing essential communication with U-Space Service Providers (USSPs).

Consequently, with the implementation of this new concept, UAS can utilize U-Space Services. These digital and automated services, offered by USSPs, enable safe, efficient, and secure access to U-Space airspace.

Among these services, there is a network identification service tasked with identifying and providing positional information for all UAS within the airspace. Geo-awareness services offer operational condition details and airspace restrictions specific to U-Space. Additionally, the UAS flight authorization service manages approvals for UAS operations, ensuring conflict-free activities within the same U-Space volume among various drones and UAS zones, together with other functionalities.

Moreover, within the European Union, several projects have tested the safe integration of UAM into U-Space airspace. For instance, the Corus-Xuam project, led by the Belgian company Unifly, conducted demonstrations in various high-risk urban, suburban, and interurban environments. These demonstrations showcased simultaneous operations of eVTOLs, manned aircraft, and UAVs. The operations demonstrated advanced forms of interaction facilitated by the exchange of digital data supported by U-Space services, yielding positive results. This success provides a glimpse into the potential for efficient U-Space operations alongside other airspace stakeholders.

However, the regulations discussed this far do not encompass all necessary aspects to ensure the safe and efficient integration of eVTOLs into the European airspace. Therefore, on 30th June 2022, EASA issued the "Notice of Proposed Amendment 2022-06"[10] for public consultation. This proposal aims to regulate the movement of UAS in UAM, focusing on enabling safe operations of manned VTOL-capable aircraft within the Single European Sky. It seeks to establish secure conditions for UAS and eVTOL aircraft operations in U-Space while harmonizing the regulatory framework across all EU Member States.

Following the public consultation, EASA issued "Opinion No 03/2023"[11] , drafting the final text of the regulation and submitting it to the European Commission for adoption. This Opinion proposes amendments to the existing EU aviation regulations, together with the establishment of new subjects to be addressed, including (i) the initial airworthiness of UAS subject to certification; (ii) the continuing airworthiness of UAS subject to certification and operated in the specific category; and (iii) the operational requirements applicable to manned VTOL-capable aircraft.

Therefore, through these amendments, EASA aimed to establish a consistent and elevated standard of safety for UAS. This initiative enabled the European Union, through collaboration between the U-Space regulatory framework and EASA's proposal, to pioneer legislation concerning the initial airworthiness of UAS. Specifically, this legislation is embodied in Delegated Regulation (EU) 2024/1108[12], slated for implementation from 1st May 2025.

The primary goal of this Regulation, complemented by Implementing Regulation (EU) 2019/945, is to guarantee the complete safety of this new form of transportation. It establishes EU-wide requirements for airworthiness certification and procedures for UAS, addressing both physical integrity and digital security risks that could impact their safe operation. Moreover, for passenger transport, particularly in the certified high-risk category, it is imperative that EASA certifies eVTOLs before their operation in Europe.

Similarly, in Spain, Royal Decree 517/2024 of 4th June[13] came into effect on 25th June of the same year, introducing modifications regarding UAV operations in Spanish sovereign airspace. These include changes to the training of remote pilots in the "specific" category under operational authorization, adjustments to the legal framework governing civil Non-EASA activities involving UAS, and reductions in minimum insurance requirements for certain operational categories, among other updates. As a result, non-EASA[14] operations, previously regulated by Royal Decree 1036/2017 of 15th December[15], are now aligned with European UAS regulations, with exceptions, and must comply with the provisions set forth in Royal Decree 517/2024.

Therefore, as evidenced, legislative advancements in the regulation of air taxis and their integration into the European airspace are ongoing and conspicuous. This evolving regulatory landscape reflects the dynamic nature of the challenges and opportunities in this domain.

[7] Commission Implementing Regulation (EU) 2021/664 of 22nd April 2021 on a regulatory framework for U-Space.
[8] Commission Implementing Regulation (EU) 2021/665 of 22nd April 2021 amending Implementing Regulation (EU) 2017/373 as regards requirements for providers of air traffic management/air navigation services and other air traffic management network functions in designated U-space airspace in controlled airspace.
[9] Commission Implementing Regulation (EU) 2021/666 of 22nd April 2021 amending Regulation (EU) No 923/2012 as regards requirements for manned aviation operating in U-space airspace.
[10] For further reference, we refer to the Notice of Proposed Amendment 2022-06 in accordance with Article 6 of MB Decision No 1-2022, published by EASA.
[11] Available at the following link.
[12] Commission Delegated Regulation (EU) 2024/1108 of 13th March 2024 amending Regulation (EU) No 748/2012 as regards initial airworthiness of unmanned aircraft systems subject to certification.
[13] Royal Decree 517/2024 of 4th June developing the legal regime for the civil use of unmanned aircraft systems (UAS), and amending various regulations on import control of certain products with respect to the applicable product safety standards; civil air demonstrations; firefighting and search and rescue and airworthiness requirements and licensing requirements for other aeronautical activities; registration of civil aircraft; electromagnetic compatibility of electrical and electronic equipment; air regulations and licensing requirements for other aeronautical activities; fire-fighting and search and rescue and airworthiness and licensing requirements for other aeronautical activities; civil aircraft registration; electromagnetic compatibility of electrical and electronic equipment; air regulations and common operating rules for air navigation services and procedures; and civil aviation occurrence reporting.
[14] According to Regulation (EU) 2018/1139 of the European Parliament and of the Council, Article 2.3, letter (a), non-EASA activities or services include military, customs, police, search and rescue, firefighting, border control, coastguard, or similar activities or services, under the control and responsibility of a Member State, undertaken in the public interest by or on behalf of a body vested with public. authority.
[15] Royal Decree 1036/2017, of 15th December, regulating the civil use of remotely piloted aircraft, and amending Royal Decree 552/2014, of 27th June, which develops the Air Regulations and common operational provisions for air navigation services and procedures, and Royal Decree 57/2002, of 18th January, approving the Air Traffic. Regulations.

LATEST INNOVATIONS IN AIR TAXIS AND DRONE FLIGHTS

Finally, we could not conclude this newsletter without mentioning some of the most cutting-edge eVTOLs equipped with the latest technologies, such as Ehang's EH216-S[16] air taxi. Ehang, a leader in autonomous aerial vehicles, achieved a significant milestone in October 2023 when it received the first official airworthiness certification from the Civil Aviation Administration of China (CAAC), allowing it to transport passengers within the country. Following this certification, Ehang conducted its inaugural commercial flight in Anhui province in December of the same year, marking a pioneering achievement globally. However, it's important to note that this certification is currently applicable only in China, since in Europe and the United States, certification for eVTOLs is anticipated between 2025 and 2026.

In March 2024, Autoflight's eVTOL Prosperity achieved a significant milestone by completing the world's first flight between two of China's most populous cities, Shenzhen and Zhuhai. This demonstration highlighted the feasibility of establishing efficient and sustainable air routes that integrate seamlessly with manned aviation and commercial air traffic.

In the United States, prior to the commercial flight of the EH216-S, Joby Aviation conducted a demonstration flight in New York in November 2023 with its eVTOL[17]. This achievement, notable for its very low noise levels, led to Joby Aviation obtaining FAA Part 135 certification, paving the way for scheduled commercial flights starting in 2025. Similarly, on 5th June, 2024, the FAA granted the same certification to Archer Air for its Midnight air taxi, enabling commercial operations in the United States from 2025 onward and potentially expanding to the United Arab Emirates, New Delhi, Mumbai, and Bangalore by 2026.

However, Europe and Spain are also making strides in this field. During the Olympic Games in Paris, the VoloCity air taxi[18] by Volocopter is scheduled to fly over the skies of Paris. It will operate from landing strips located at various venues and will be monitored by a network of digital sensors.

Furthermore, in Spain, Crisalion Mobility and iJet Aviation forged an agreement in June 2024 to advance UAM in Malaga, featuring the Integrity air taxi[19]. Similarly, in other Spanish cities like Jaén, various air taxis developed by Umiles Next and Tecnalia underwent testing in October 2023, with plans for imminent integration into the European airspace.

These advancements indicate that the era of air taxis is on the horizon, poised to revolutionize global urban mobility, and we must be ready to embrace this new reality.

CONCLUSIONS: INNOVATION AND FUTURISM YES. BUT ALSO REGULATED AND SAFE

If "Blade Runner" (1982) envisioned a sky filled with "highways" and airborne vehicles by 2019, just a few years after that prediction, we can confidently say we have arrived. We are now in a phase of profound transformation that requires rigorous attention, particularly concerning eVTOLs and their integration into UAM.

In the legislative area, the European Union has taken a leading role with the establishment of U-Space and the regulations crafted by the European Commission and the European Parliament, in partnership with EASA. This pioneering framework ensures safety and facilitates the integration of advanced technologies.

However, there is still much progress to be made. It is essential to evaluate the practical impact of integrating air taxis into urban areas and the recently enacted legislation. Moreover, despite significant advancements, major global powers like Europe and the United States have yet to establish an international regulatory framework, hindering the cross-border operation of eVTOLs. Therefore, we believe that collaboration among authorities, industry, and other stakeholders will be crucial in ensuring a safe and efficient future for the deployment of air taxis in airspace.

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Sandra Pineda Caro
Azahara García Durán

[16] Drone vehicle with a capacity for two passengers and a small volume (6.05 metres long and 1.93 metres high), high mobility (maximum speed of 130 kilometres per hour), and low noise levels. Prior to certification, they performed more than 40,000 flight tests.
[17] Designed to carry up to 4 people, it has a range of 160 km/h and a top speed of 320 km/h, having reached a noise level of 45 and 65 decibels, equivalent to a normal conversation.
[18] It reaches a maximum speed of 110 km/h, with a height of 2.5 metres. This air taxi has more than 1,500 test flights under its belt and is awaiting TC type certification from EASA.
[19] Capable of carrying 6 passengers and speeds of up to 180 km/h, a range of 130 km and a maximum payload of 400 kg.