

INFORMED INSURANCE
SEPTEMBER 2024

WHERE IS THE UK'S PLACE IN THE FUTURE OF THE SKIES? THE PRACTICAL IMPLICATIONS OF A VTOL TAKEOVER



DAC BEACHCROFT

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Vertical Take-Off and Landing aircraft (VTOL), and in particular electric-powered VTOL (eVTOL), have been described as a greener and cheaper mode of transportation that will revolutionise our skies. With a myriad of uses, they offer a level of convenience never before experienced by passengers.

The socio-economic benefit of Advanced Air Mobility to the world economy is forecast to be worth US\$1.5 trillion by 2040 (Morgan Stanley, 2019). In the UK alone, it is estimated to be worth £1 billion -£2 billion and Deloitte (in 2021) forecast that by 2035 the industry in the US would be worth US\$115 billion. It is potentially the most exciting development in the aviation industry in decades, with huge opportunities for the UK in particular. However, there is stiff competition from the US, China and France, to name but a few, who all hope to lead the way in the development of these aircraft.

Players involved include well-known names such as Uber, Boeing (via its wholly owned subsidiary, Wisk) and United Airlines (in partnership with newer entrant Archer Aviation). Joby Aviation (one of whose investors is Delta Air Lines) is arguably the furthest along the certification process outside China. However, to date only the Chinese company EHang has obtained certification and completed its first passenger-carrying eVTOL flights.

According to Nelson Wang, Head of the China Desk at DAC Beachcroft:

“China has the advantage of being able to quickly direct both policies and public / private investment towards strategic industries for growth. This is evident from the various orders EHang received from Chinese government-related entities (often entities in the tourism industry) for its EH216-S model, which is also getting traction outside China. It is interesting that one can now purchase EH216-S from Taobao, a leading Chinese online shopping platform, for CNY 2.39m (the overseas price being higher, at US\$ 410k). Cost aside, the quick certification and commercialisation of Chinese VTOL means the UK might need to act more swiftly in supporting its own entrepreneurs and capturing the global market share.”

Clear regulatory and certification frameworks are fundamental steps in the development and growth of the technology but public acceptance will also be key to unlocking the potential of this fledgling yet fast developing industry. There is a framework of sorts from existing aviation law but it needs to be adapted to fully support the development of this new technology.

Potential obstacles

Investment in VTOL technology and the aircraft themselves (whether powered by electric, hydrogen or electric/hydrogen hybrid engines) is significant but this will need to be reflected in infrastructure to ensure safety and operational viability. Without vertiports, clear operating parameters (including air traffic management) or enough trained pilots to operate VTOL (either remotely or in person), the industry will struggle to develop and reach its full potential.

Safety has, and always will be, the foundation stone of the aviation industry. A robust regulatory and certification framework already exists for the larger aviation industry but how will this be adapted – or is it even possible – for VTOL/eVTOL? When and how will an average passenger be comfortable travelling in such way?

While many are excited by the opportunities and benefits VTOL can bring, others are more hesitant. Practical questions around proximity of flight to our homes/offices, noise pollution, privacy, the need for designated flight routes, and data collection will continue to arise. Travellers and the general public will need to be convinced that the new technology is safe and suitable.

“For operational efficiency and ESG reasons, the major engine manufacturers believe there needs to be some form of electrification across their operations and some are already using battery power when planes are on the ground. It’s a natural evolution for original equipment manufacturers (OEMs) as they look to diversify their product line, while new entrants are focusing solely on this solution,” says Marcel Chad, Chairman of Aviation at specialist insurance broker, Price Forbes.

The danger of lithium battery fires on aircraft are well documented. They are notoriously difficult to extinguish, requiring significant resources and time.

Accessibility for all is often at the forefront of any presentation about VTOL, and affordability is also another sizeable challenge for the emerging market to thrive. Key players suggest that eVTOL in particular will be commonplace and booking a slot will be done via an app on our phones. Yet in practical terms, how will passengers who require special assistance or the carriage of mobility aids be able to access these new aircraft? There will, rightly, be a need (and demand) to ensure that the rights and protections under the Equality Act 2010 and regulations governing passengers with reduced mobility are upheld despite clear challenges where aircraft are unmanned or have no crew onboard.

Until enough VTOL are in operation, the reality is that they will only be accessible to extremely wealthy individuals who can afford the initial high prices.

The existing and developing regulatory landscape

The UK has always led the way when it comes to aviation regulation. When it was part of the EU it was a well-accepted position that the UK was often the driving force behind the regulations, and other jurisdictions around the world have used the EU model as the basis for their own regulatory and legal framework. It is critical that the regulatory and certification framework in the UK, EU and USA keep pace with the developing VTOL technology and other competing markets. Certain regulatory hurdles must be fulfilled before VTOL can fly commercially: they must obtain type certification, product certification and operational authorisation from their regulators before they are able to operate.

Regulatory bodies like the Civil Aviation Authority (CAA), Federal Aviation Administration (FAA) and European Union Aviation Safety Agency (EASA) have been developing specific certification criteria for VTOL. Initially both EASA and the FAA classified VTOL as fixed wing aircraft, as such in the US falling within FAA Part 23 standards, for example. The FAA now classify VTOL as a special class of powered lift aircraft. EASA has proposed a Special Condition for VTOL (SC-VTOL) framework, which addresses the specific needs of VTOL aircraft, focusing on design and airworthiness requirements tailored to these new technologies. In the UK, the CAA considers certification for VTOL on a case by case basis with reference to the EASA guidelines.

In June 2024 EASA and the FAA, in an important step forward, announced that they were working together for standardisation and increased harmonisation in the certification of VTOL. In February 2024, the UK government published its first consultation paper on autonomy in relation to VTOL and drones. The consultation stage closed on 28 June 2024 and the next stage is policy development.

The development of new legislation in the UK is robust. Existing and proposed new legislation will be thoroughly considered and vigorously analysed, and new legislation could take a couple of years to be prepared. When you are dealing with rapidly developing technology, this can be problematic.

In addition to the focus on individual states' domestic legislation and certification requirements, amendments will also be necessary to ensure that states remain compliant with existing international Convention obligations. For example, Article 8 of the Chicago Convention requires special authorisation for unpiloted flights over a contracting State. Amendments will also need to be made to key Conventions such as the Chicago Convention and the Montreal Convention. Annex 14 of the Chicago Convention (Aerodromes) currently includes two volumes. Volume I related to Aerodrome design and operations, Volume II relating to heliports. Vertiports are an entirely new construct and will likely require their own standards and recommendations.

The Montreal Convention 1999, which governs liability for personal injury (including death), baggage and cargo will also need review. One example is the varying levels of liability depending on whether baggage is checked or unchecked. On a VTOL, without a traditional cargo hold, will baggage be checked or not? Similarly, who will check cargo, and how, to ensure that regulations relating to dangerous or live cargo are complied with?

Communication between pilots, other aircraft and ground stations is key to ensuring safe operations. For pilotless VTOL, authorities will need to ensure that, despite removing the pilot's visual observances, at least the same threshold of safety is maintained. Other issues regarding unmanned flight will also need to be resolved. As matters currently stand, the Air Navigation Order 2016 details the duties and responsibilities of the Pilot in Command (PIC) of the aircraft.

The PIC is required to 'ensure' that each passenger occupies a seat and has their safety belt on. They also have the authority to refuse carriage to passengers deemed to be a risk to safety, for example anyone drunk or disorderly. In practical terms, a remote PIC will struggle to take such steps. If there is not a pilot or crew member on board an eVTOL, who will deal with a passenger intent on opening the aircraft door or getting drunk, and how? While the Law Commission's consultation paper suggests that it should be the operator's responsibility (via crew on the ground) to prevent disruptive or inebriated passengers to board where they pose a risk to the aircraft or to others, in practical terms is this possible?

Further without any 'human element' to decipher safety risks or passenger disruptions, there is a risk of discrimination against individuals based on race, religion or medical conditions, potentially leading to operator liability. Behaviour that does not align with an individual passenger's own concepts of 'normal', combined with lack of knowledge or understanding, could escalate already sensitive situations with disastrous consequences.

Looking to the future: implications for insurers

Much is being done at both a national and international level to facilitate the growth of the exciting and far reaching opportunities that VTOL present. Will it keep up with the rate at which the technology is currently developing?

According to Partner Vladimir Rostan d'Ancezune, Head of DAC Beachcroft France, and Lawyer Louis-Axel Batiste, developments in France continue apace:

“Volocopter (who is based in Germany and was supposed to conduct flights in and out of Paris during the recent Paris Olympics) is aiming at getting VoloCity certified by the end of 2024. To make sure the infrastructure is available, Volocopter has developed a partnership with Aéroports de Paris, which in mid-August inaugurated the first commercial vertiport next to the Palace of Versailles, with baggage control, charging stations and parking for aircraft. This is a marked change to the usual distinct separation in the traditional airline industry and has liability implications. VTOL are designed to fly in areas of high density and the multiplication of commercial routes will certainly create new operational challenges and therefore new risks.”

Several manufacturers of VTOL, including Archer Aviation and Joby Aviation, intend to operate as both manufacturers and operators. Insurers will need to consider this carefully when analysing their risk as this exposure to increased liability (fewer parties for a claim to be presented to) may well impact insurance premiums.

According to Chad, “The existing manufacturers may find the insurance challenge easier to solve, given their existing premium scale, than a start-up without premium history. With new entrants deploying new technology, it’s more challenging for the market to assess an appropriate premium or to price at a level that makes commercial sense to the new manufacturer.

“The large manufacturers will already be paying many millions of dollars to insure their existing operations. If this new technology introduces losses, they can potentially absorb this within the synergies of their existing pricing model. A new firm with much smaller initial premiums may find this more challenging. The key is ensuring the product is priced in such a way that it gives insurers the necessary comfort to provide cover while not being commercially unviable for the newer firm.”

Insurers have demonstrated their willingness to support the VTOL industry, with SkyRisks launching its capacity for risks in 2023. Certainty as to liability, which will come with a defined and industry-specific regulatory and legal framework, will greatly assist insurers to analyse their risk efficiently.

"If clients, including operators, can't get insurance at an economically viable rate, then that will have implications on the development and implementation of the product itself. The existing OEMs have an important role to play in this as they have the scale, the reach and the connections, while at the same time the principle of insurance is based on spread and diversification so new clients will be welcomed by the insurance industry," says Chad. "If you are an insurer, you are here to support the aviation industry. If you do not support them, you do not have a value proposition to offer."

In the UK, we have incredibly talented technicians, a number of companies developing the technology and we have one of the best civil aviation authorities in the world. The opportunity for the UK to lead the industry exists, the question is - will it be taken?

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