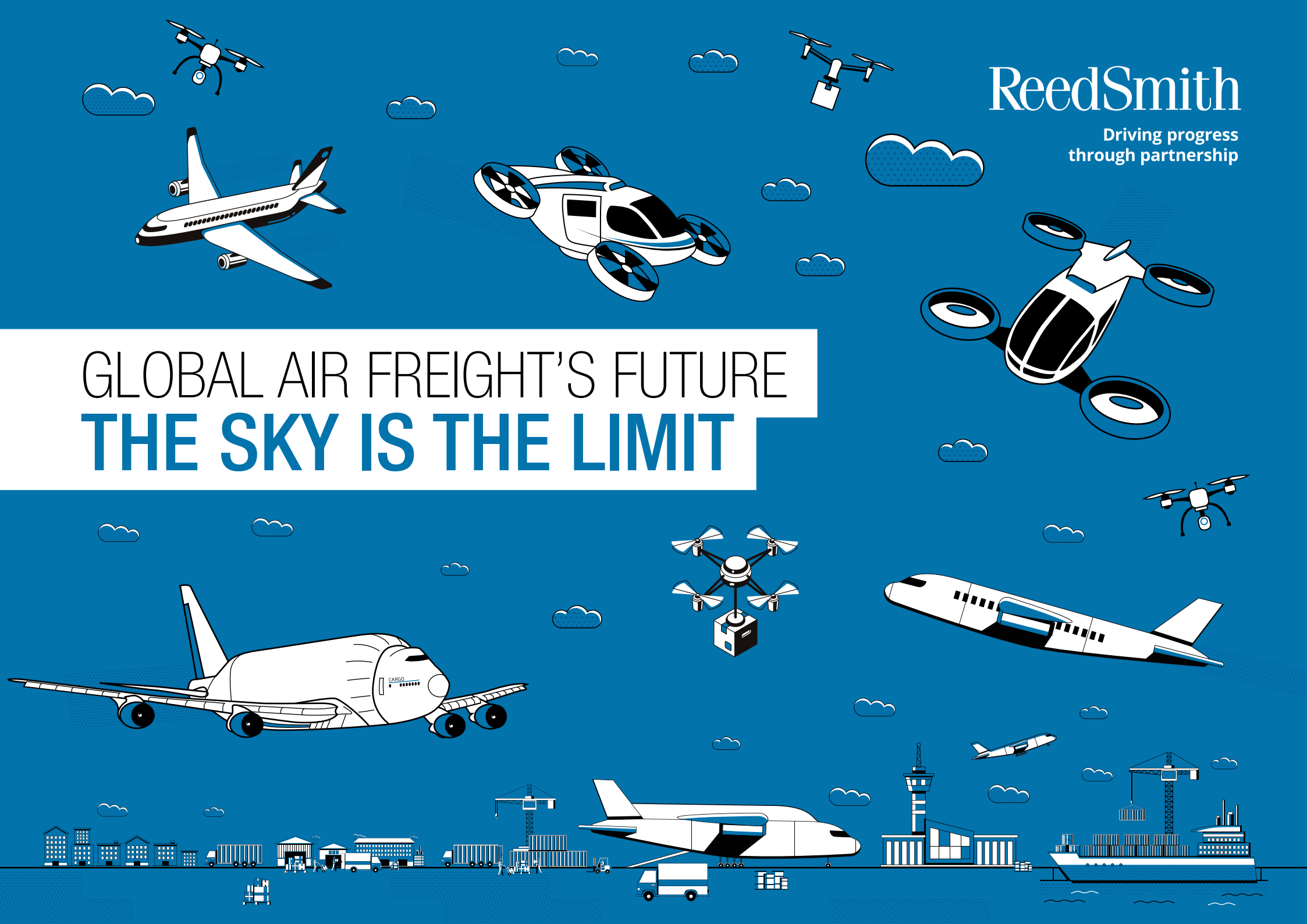


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GLOBAL AIR FREIGHT'S FUTURE **THE SKY IS THE LIMIT**





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LOOKING FORWARD TO TOMORROW'S WORLD

INTRODUCTION

by Richard Hakes & Oliver Beiersdorf





Aviation brings people together. It allows us to have adventures, to visit friends and family and to build business relationships. It delivers products to our doorsteps and medicine to our hospitals. It brings remote communities closer. As our global economy grows ever more linked, aviation is at the heart of our collective economic growth. From Icarus to da Vinci, the Montgolfier brothers to the Wright Brothers, Amelia Earhart to Sir Frank Whittle, aviation has seemingly always captured the human imagination. However, the last 50 years have seen it move from the realms of romance and glamour, as we have become able to take for granted our ability to hop on a flight, or to look up and see white contrails marking paths through blue skies. The silent and empty airspace during the worst days of the COVID-19 pandemic gave us all a stark reminder that our ability to fly should not be taken for granted.

Aviation's vital role in the economy

Aviation supports 65 million jobs and enables the best part of \$3 trillion in global GDP annually. To understand the breadth and scope of the industry and its role, it is worth reminding ourselves that if the industry were a country, it would still rank among the largest economies in the world.

Unsurprisingly given people's enjoyment of flying and the economic significance of the industry, the effect of the pandemic has been stark, and goes far beyond the absence of aircraft overhead. No other industry has been hit harder, but we in the Reed Smith global aviation team are looking excitedly at the opportunities that the restart will provide – both for the people and businesses worst affected by the fallout from the pandemic, but also for the aviation industry as a whole to reconfigure itself and to emerge from the crisis stronger than before. How can we continue to connect the people and economies of the world, long into the future, but with a much smaller footprint?

The pandemic-driven boom in cargo

After losing two years of air passenger growth to the pandemic, the industry has seen the freighter market as a rare bright spot, fueled by the boom in online shopping, supply chain disruptions, and a drop in passenger flights. The shortage of belly cargo capacity in passenger aircraft sent freight rates soaring, delayed retirements of some aircraft models, had lessors rushing to convert passenger aircraft into freighters, and led to operators making unusual decisions, such as flying Boeing 737 narrowbody freighters from Europe to Asia. Shipping delays have only added to the surge in demand, and soaring shipping prices have made air freight look more affordable. A pandemic-driven boom in air cargo is providing a backdrop for Airbus and Boeing to launch new large freighters, but longer-term trends will determine whether either succeeds, including a rapid recovery in passenger flights, companies shifting to source goods from closer to home, the growing number of passenger aircraft being converted into freighters, and the speed and strength of the wider economic recovery. There are, at least, indicators that some of the pandemic-driven boon to air freight will continue, and environmental trends are also working in favor of new, more fuel-efficient freighters.

Disruption to operating models

As arguably the most global of industries, the aviation industry faces numerous external demands – from geopolitics to technological innovation, demographic shifts to environmental concerns. Disruption to existing airline models may come from energy breakthroughs, online collaboration, alternative modes of transport, big data, new manufacturing tools, and beyond. The prevalent effect that new technology has had on air freight cannot be overstated, and like many aspects of our lives, the industry is on the verge of vast digital change, driven primarily by shifts in consumer and supplier demands. Companies are expected to deliver packages faster – and with more accuracy – while keeping costs to a new competitive low. Technology is helping in several different ways, from robotics and automation, to augmented reality, drones and electronic vertical take-off and landing aircraft (eVTOLs). The alternative environment offered by the metaverse provides an opportunity to, among other things, interact and transact in a new ways – for example, by buying a digital depiction of a product in a virtual store, which can then be physically delivered. How long will it be before queues outside shops are replaced by a demand for carefully choreographed, fuel-efficient pilotless eVTOLs or drones to deliver products to our doorsteps? Against this backdrop, the drone and eVTOL package delivery market is projected to grow from \$2.1 billion in 2023 to \$27.4 billion in 2030. “Flying cars” might attract more headlines, but cargo eVTOL aircraft and drones might ultimately prove to be the best use of this technology, particularly in a world where technology is simultaneously reducing our need to travel.

Reshaping freight aviation

Aviation has always had to maintain itself at the pinnacle of innovation, and understanding the new landscape in which airlines find themselves is critical to ensuring it can grow sustainably in the future, and maximize its potential to deliver the economic and social benefits that greater connectivity brings. Pink Floyd’s “Learning to Fly”, written by David Gilmour, himself a pilot, describes a fledgling aviator learning to fly. This anthem is also a terrific metaphor for embarking on a new endeavor. As the world of aviation faces the dawn of a new era of possibility and responsibility, it is more relevant to our global connectivity and development today than it has ever been. To that end, we are grateful to have the opportunity with this publication to make a small contribution toward the thinking around developments in, and the future of, air freight and freighter aircraft. We hope that you find it a useful summary of some of the commercial and legal issues affecting our industry, the wider supply chain and, indeed, how we buy goods, travel and interact with one another. If nothing else, we hope that this sparks in others some of the excitement that those of us in the Reed Smith aviation team share for the future of our industry, and what its advancements can offer to society as a whole.

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LOOKING FORWARD TO TOMORROW'S WORLD SURGE IN DEMAND FOR AIR FREIGHT RAISES AVIATION'S OUTLOOK, BUT FOR HOW LONG?

by Chris Jackson

Takeaways

- Material growth of the global freighter fleet is necessary to meet demand
- Growth of e-commerce and emerging market economies are key drivers
- Environmental issues will have an increasing impact on the air freight industry



The air cargo industry has proven itself to be remarkably resilient to the impact of the COVID-19 pandemic. Indeed, the pandemic has shone a spotlight on the air cargo industry and its critical importance to the aviation industry as a whole and the global economy more generally. Many players in the industry who previously paid little attention to air cargo are now looking to it as a long-term opportunity to diversify and invest in a growing sector.

COVID-19 reduced demand for passenger flights but stimulated air freight demand

COVID-19's impact on the aviation industry is well documented. At the peak of the pandemic in May 2020, the weekly flight frequency for global passenger airlines declined by about 70 percent (as compared with data for May 2019).

Before the pandemic, much of the world's air cargo (around 54 percent) was transported in the hold of passenger aircraft (so-called 'belly cargo'). Accordingly, and with such a large proportion of the global passenger aircraft fleet not being operated, the air cargo industry has been significantly impacted.

Although cargo operators and freight forwarders have continued to operate freighter aircraft, many of these aircraft are hub-focused and cannot access the same extensive route network as commercial passenger aircraft. As a result, the air cargo industry has also lost the convenience and efficiency offered by transportation via belly cargo.

Coupled with the decline in air cargo capacity, the pandemic has itself precipitated an increase in the volume of cargo requiring transportation. The rapid transportation of pharmaceuticals, medical equipment, personal protective equipment, etc., has been critical in the global fight against the pandemic. However, this spike in demand for air cargo capacity will (hopefully) be relatively short-lived; although there is every likelihood that similar humanitarian crises will occur in the future.

Another important factor to bear in mind when considering the demand for air cargo capacity is the growth of e-commerce. The pandemic is believed to have hastened the global transition to e-commerce (by as many as five years, according to IBM) and thereby increased the volume of goods requiring transportation. This is likely to have a long-term impact on the air cargo industry.

E-consumers expect speed, predictability of delivery times, and visibility. In the context of cross-border e-commerce, this means that air cargo logistics providers are very well positioned to take advantage of this growing sector of the market.

As a result of present circumstances, many airlines have redeployed their passenger aircraft as “freighters”. This has enabled those airlines to take advantage of the buoyant air cargo market to mitigate the massive losses caused by the drop in passenger ticket sales. Unlike the conversion of a passenger aircraft to a freighter, the conversion to a ‘freighter’ is comparatively low cost and offers the airline the flexibility of converting the aircraft back to passenger configuration as demand returns.

A white paper issued by IATA in March 2019 (The Cargo Facility of the Future), forecasted an annual increase in the air cargo market of around 4 percent in the next 20 years. However, in a post-COVID world, this forecast would seem conservative. Even as the impact of the pandemic subsides, air cargo demand remains strong and we have every reason to believe that this will continue for the foreseeable future.

The bottom line is that with the continued growth in the volume of global air freight, and as ‘freighter’ aircraft are returned to passenger-carrying duties, the air cargo market desperately requires increased capacity. Unfortunately, slots for passenger-to-freighter conversions, and the delivery of new freighter aircraft, can’t currently keep up with demand.

The importance of air freight in supply chain logistics

With the growth of e-commerce, expedited shipping has become crucial to growing global trade. While only 2 percent to 3 percent of global trade moves by air, that small percentage represents around 35 percent of global trade by value.





The primary benefits of air cargo are speed and reliability.

Speed

With vastly reduced shipping times for air cargo compared to popular alternatives, such as trucks and ships, companies around the world have access to supplies that were once impossible for them to access due to time and/or price constraints.

This has allowed them to reduce prices and make their goods more accessible to the general population. Companies have therefore been able to boost profits by taking advantage of these competitive prices, not only allowing for cheaper consumer goods but also offering more opportunities to enter other lucrative industries.

Coupled with the economic benefit to companies outlined above, the modern consumer has also benefitted from the growth of air cargo. E-commerce has increased the necessity for speed and convenience. The modern consumer expects their purchased products to be delivered almost instantaneously (if not the next day or overnight, within a couple of days) and air cargo is often the only way of achieving this.

Reliability

Air cargo is the safest mode of transport, with accidents resulting in the loss of cargo happening far less than with transportation via road or sea.

Airlines have secure handling measures in place to ensure staff or third parties do not interfere with cargo. In conjunction with technological advances in cargo handling such as freight tracking, air cargo provides a safe and secure mode of transport for goods and products.

The speed and reliability that air cargo offers means that this will remain the preferred mode of transportation for time-sensitive, higher-value goods. It's no surprise, therefore, that air cargo is overwhelmingly used for the transportation of equipment, consumer electronics, pharmaceuticals, healthcare products, and retail products.

Trends changing the shape of the air freight industry

The COVID-19 pandemic

As noted above, the COVID-19 pandemic has given rise to a material reduction in air cargo capacity. As a consequence, shipping rates have risen. The use of “preighters” and the increase in passenger-to-freighter conversions, as well as the increase in production of freighter aircraft by the manufacturers, are easing capacity constraints. However, shipping rates likely will remain volatile in the short-to-medium term (at least until the global passenger fleet – and particularly wide-body aircraft – return to the skies).

Economic growth of the emerging markets and e-commerce

The rapid economic growth of the emerging markets (particularly China), and e-commerce more generally, is another major factor giving rise to the constraints in air cargo capacity. Unlike the impact of the COVID-19 pandemic on the air cargo sector, this is a longer-term issue that will need to be addressed through growth in the global fleet of freighter aircraft.

Supply chain diversification and the increase in regional air cargo

More companies are seeking to diversify their supply chains to reduce cost, mitigate risk, and, ultimately, simplify supply chain management. In particular, with rising labor costs in countries like China, together with increases in shipping rates, the economic benefits of offshoring manufacturing make less commercial sense than they once did. This, combined with the modern consumer’s desire for higher quality products and short lead times, has increased the prevalence of onshoring and nearshoring. Consequently, many U.S. businesses, for example, have transferred manufacturing from China to places like Mexico and Canada. As a result of this, regional air cargo traffic is expected to increase.

Omni-channel logistics

Omni-channel logistics enables businesses to tailor how their products are purchased and delivered to meet the needs of the modern consumer. Consumers expect to find the products they want both in store and online, to use technology to make purchases, and to have their purchases delivered to their doorstep within a couple of days. Accordingly, airlines are seeing a need to look beyond traditional airport-to-airport service. Now, airlines and other stakeholders see opportunities in providing seamless end-to-end services. For example, in the United States, Amazon is expanding its Amazon Air Services and combining it with its ground transport services.

The use of cargo drones

For logistics companies, the first and last mile constitute the most expensive and least efficient part of a delivery. Typically, this requires significant manpower, vehicle numbers, and time. Further, goods are increasingly required in remote areas with limited airport facilities, which presents further challenges for logistics companies.

These issues have therefore contributed to the rapid progress of drone technology. Wing, the cargo drone specialist owned by Google parent Alphabet, achieved a breakthrough in this respect in April 2019. It was awarded the first-ever U.S. Federal Aviation Administration air carrier certificate licensing unlimited commercial deliveries using cargo drones. The license made no restrictions on flights over crowds or urban areas – the first time this had been granted outside a pilot project.



Environmental considerations

All sectors of the aviation industry are under scrutiny from an environmental perspective, but particularly the air cargo sector because it has historically used older, more polluting aircraft. Further to this, transport by air cargo causes far more environmental harm, including greenhouse gas emissions, than other modes of transport. Air freight produces immensely more CO₂ equivalent emissions per ton-kilometer than transport by rail or sea. Accordingly, many air cargo carriers are now looking into the use of sustainable aviation fuels and investment in more efficient aircraft and carbon offsets. It is inevitable that the air cargo industry will look to become greener, which will change the make-up of the global air cargo fleet.

The future of air freight in the context of the aviation industry

According to Boeing's World Air Cargo Forecast (2020-2039), the global world freighter fleet will grow by more than 70 percent over the next 20 years. Boeing predicts that by 2039, 2,610 freighters will be delivered, with approximately half replacing retiring aircraft and the remainder needed to meet projected traffic growth. More than one-third of these deliveries will be new wide-body cargo aircraft; nearly two-thirds of the deliveries will be conversions from passenger aircraft.

The majority of those aircraft deliveries will require some form of financing. Accordingly, in addition to the opportunities that the growth of the air cargo market presents to airlines, logistics companies, manufacturers, and MROs, there will be increased opportunities for the finance and leasing community to get in on the action.

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LOOKING FORWARD TO TOMORROW'S WORLD TOMORROW'S FREIGHTER FLEET WILL BE NEWER AND CLEANER

by Chris Jackson

Takeaways

- There is increased investment in newer, more fuel-efficient aircraft
- The most significant growth of the freighter fleet is expected in emerging market regions
- Use of drones by logistics companies is increasing



The global air freighter fleet has grown significantly since the COVID-19 pandemic struck. As noted above, this has been driven in part by the very rapid decrease in belly cargo capacity, which reached its nadir in April 2020. Since then, global passenger aircraft use has increased gradually but remains below pre-pandemic levels.

In terms of aircraft types, the air freighter market has been gradually adopting more modern aircraft types (such as the Boeing 737-800 and Airbus A321-200) and phasing out older aircraft (such as the Boeing 737-300 and McDonnell MD-10).

However, some older aircraft types (such as the Boeing 747-400) have been reactivated to cater to the increased demand caused by the COVID-19 pandemic, although this is likely to be a relatively short-term solution (until demand settles post-COVID and newer aircraft become available).

The following tables show the make-up of the current global air freighter fleet. The data below has been obtained from IBA and is current as of February 2021.

Narrowbodies

A321-200	B737-300	B737-400	B737-700	B737-800	B757-200	MD-82SF	MD-83SF
2	103	148	6	51	298	5	12

- Since May 2020, all aircraft fleets have increased with the exception of the Boeing 737-700 and McDonnell Douglas MD-10.
- The Boeing 737-800 fleet has grown most significantly since May 2020 (by 243 percent).

Mid-size wide-bodies

A300	A300-600	A310-300	A330	B767-200	Boeing 767-300	MD-82SF	MD-83SF
4	156	3	74	53	315	4	15

- Since May 2020, all aircraft fleets have increased with the exception of the Airbus A310-300 and McDonnell Douglas MD-10.
- The Airbus A330 fleet has grown most significantly since May 2020 (by 176 percent).

Large wide-bodies

B747-100	B747-400	B747-8F	B777F	MD-11F
3	200	90	203	105

- Since May 2020, all aircraft fleets have increased with the exception of the Boeing 747-100.

Relevant new technology and environmental considerations

With the ever-increasing focus on the environment, the air cargo industry is having to look closely at its carbon footprint and ways to reduce its environmental harm. The following technologies are ways in which the industry is looking to achieve this.

Sustainable aviation fuel

Sustainable aviation fuel (SAF) is produced from sustainable feedstocks and is very similar in its chemistry to traditional fossil jet fuel. It helps reduce carbon emissions over the life cycle of the fuel compared to the traditional jet fuel it replaces.

Some typical feedstocks used are cooking oil and other non-palm waste oils from animals or plants and solid waste from homes and businesses, such as packaging, paper, textiles, and food scraps that would otherwise go to landfill or incineration. Other potential sources include forestry waste, such as waste wood, and energy crops, including fast-growing plants and algae.

By using SAF, air freight operators can reduce their carbon footprint and also demonstrate good leadership and responsibility towards a more sustainable future.

While SAF adoption has been hampered by high prices compared with conventional jet fuel, it seems probable that this price gap will gradually narrow as countries incentivize investment in the development of SAF and its use by operators (through grants and tax exemptions).

More efficient flight routing

Airlines and air freight operators are now looking at technology to set more efficient flight paths in order to reduce environmental harm and cut delays.

In particular, studies have shown that by exploiting the jet stream, the “air distance” between two points on the globe can be significantly reduced (even if the ground distance between those points is longer), thereby reducing fuel burn and CO₂ emissions.

Similarly, the negative environmental consequences of condensation trails (or contrails) left by aircraft can be reduced by flight plans that avoid the atmospheric conditions in which contrails form. This can be achieved by small altitude changes, which would not significantly increase the amount of fuel used (or, therefore, CO₂ emissions).

More efficient aircraft

As has already been noted, the air cargo industry has historically used older, more polluting aircraft. However, the air cargo operators themselves are increasingly motivated to use newer aircraft in order to minimize environmental harm and reduce costs.

One of the consequences of the COVID-19 pandemic is that there has been a surplus of aircraft not utilized (following repossessions, for example) and, as a result of this, (i) the “feedstock” of newer passenger aircraft has increased, and (ii) the purchase price for those aircraft has significantly reduced (particularly for certain aircraft types, such as the Airbus A330).

The inevitable consequence of this has been an accelerated adoption of newer, more fuel-efficient, aircraft types.

In the longer term, perhaps we will see the air cargo industry using technology currently in development, such as open rotor engines, hybrid-electric propulsion, and/or electric propulsion.



Lightweight unit load devices

Unit load device (ULD) manufacturers are now offering lightweight pallets and containers for the consolidated carriage of loose shipments. The reduced weight helps save fuel.

In some cases, lighter ULDs could allow more packages to be shipped at once if the limiting factor was weight. While this wouldn't decrease fuel use for that flight, it would still result in increased efficiency as more cargo per plane could be transported.

Carbon offsets

Many companies are setting ambitious environmental goals to be achieved in a short timeframe. Carbon offsets can help the air cargo industry bridge the gap as it researches and implements new techniques to improve the efficiency and sustainability of direct operations.

Carbon offset is an investment in something that pulls carbon dioxide out of the atmosphere to compensate for emissions in another area. One of the most popular carbon offset investments is tree planting. Depending on the location, conditions, and the type of tree, there will be a certain amount of carbon tree planting is expected to sequester. Generally, it takes about 15 trees to offset 1 ton of carbon.

Organizations and initiatives like the Carbon Offsetting and Reduction Scheme for International Aviation are tracking the emissions of different SAFs throughout their entire life cycles and making sure that carbon offsets are not counted twice. There are also regulations around what counts as an offset.

Regional variations in the global freighter fleet

Regional air cargo market shares have changed significantly during the past two decades. According to Boeing, airlines based in the Asia-Pacific region, Europe, and North America have accounted for over 80 percent of the world's air cargo traffic for that entire period. In 1999, airlines based in the Asia-Pacific region had the largest share at 34 percent, while airlines based in North America had a 31 percent share of the world's air cargo traffic.

Since 2000, however, carriers based in the Middle East have leveraged their geographic position at the crossroad between Africa, the Asia-Pacific region, and Europe. Middle Eastern carriers quickly expanded their wide-body passenger and freighter fleets, which allowed them to increase their share of world air cargo traffic from 4 percent in 1999 to 13 percent in 2019. In 2019, airlines based in the Asia-Pacific region, Europe, North America, and the Middle East accounted for over 90 percent of all world air cargo traffic.

North America, Asia Pacific, and Europe collectively make up around 75 percent of the global freighter fleet. The North American air freighter fleet is currently the largest in the world, by some margin. However, with the rapid economic growth of the Asia-Pacific region, it's expected that, within the next 20 years, the Asia-Pacific fleet will more than triple, bringing it close to parity with the North American fleet in terms of size.

With the exception of Russia and Central Asia, Boeing forecasts that all geographic regions are expected to see an increase in freighter fleet size during the course of the next 20 years.

The growing use of drones and unmanned air vehicles

For logistics companies, the first and last mile constitute the most expensive and least efficient part of a delivery. Typically, this requires significant manpower, vehicle numbers, and time. Further, goods are increasingly required in remote areas with limited airport facilities, which presents further challenges for logistics companies.

These issues have therefore contributed to the rapid progress of drone technology. Wing, the cargo drone specialist owned by Google parent Alphabet, achieved a breakthrough in this respect in April 2019. It was awarded the first-ever U.S. Federal Aviation Administration air carrier certificate licensing unlimited commercial deliveries using cargo drones. The license made no restrictions on flights over crowds or urban areas – the first time this had been granted outside a pilot project.

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LOOKING FORWARD TO TOMORROW'S WORLD CARRYING THE LOAD: THE USE OF PASSENGER AIRCRAFT TO HAUL CARGO DURING THE COVID-19 PANDEMIC

by Rohan Soni

Takeaways

- Airlines and operators have been carrying freight instead of passengers during the COVID-19 pandemic to maximize their revenues
- As passengers return to the skies and aircraft return to passenger service, airlines must focus on maintaining high cargo revenue in tandem with passenger flights
- Some airlines are using the conversion process as an opportunity to refit, overhaul and upgrade aircraft



A vast number of airlines and other aircraft operators found that the COVID-19 pandemic took away a key source of income – passenger travel. With most global borders closing and individuals more concerned than ever about embarking on international leisure and business travel, the sharp decrease in passenger numbers meant operators needed to look at alternative revenue streams to stay afloat. The obvious and most common solution was to carry freight, which required minimal human intervention and, with no passengers on board, there was minimal risk of spreading the virus. Some operators were already prepared for this, having pre-existing freight operations and divisions, while others quickly adapted (by passenger-to-freight conversions), or just improvised (by carrying cargo in the main cabins of passenger aircraft). So, with the gradual return of passengers to the skies, how is the cargo carrying capacity impacted? And going forward, how can airlines and operators maintain a “hybrid” model to sustain revenues from more than one earnings stream?

Why do aircraft operators carry freight as well as passengers?

As with any business model, it is important to diversify revenue streams where possible, to ensure that if any one revenue stream is impaired, the other income streams can continue unaffected, to minimize (or eliminate entirely) any losses. Although passenger travel is usually the most profitable part of an airline's business model, freight is also a useful “dual” revenue generation tool. Aircraft have cargo storage space in the “belly” of the airframe – part of this space is used for luggage storage for passengers, and the rest is used to carry cargo. The benefit of doing this on passenger planes is that often the route is direct, so cargo arrives at its intended destination much quicker (as opposed to freighter aircraft, which have multiple stops, much like a bus route).

A large passenger aircraft, such as the Boeing 777-300, can carry up to 21,000 kg of cargo, in addition to a full load of up to 442 passengers (in a two-class configuration). The cargo capacity is therefore useful to add to the revenue of each flight. The aviation industry made over \$128 billion in carried cargo in 2020, with that figure set to rise to over \$152 billion in 2021. There has always been a hybrid model to aviation – airlines use a combination of passenger revenue and cargo revenue to maximize their profitability, as passenger travel alone has quite slim profit margins (after the payment of taxes, fuel costs, salaries for staff, consumables like food and beverage, and ownership and maintenance costs). The profit for passenger travel alone is slim, often less than \$20 per seat. So, airlines often enter into more profitable freight contracts with postal services or international shipping companies. A major U.S. postal service, for example, leases space on over 15,000 aircraft per day. From a holistic point of view, each aircraft would fly to its destination regardless, so filling the empty “belly” of the aircraft with cargo makes logical sense to maximize profits. And on the plus side, pallets of goods don't need to be fed and watered every two hours!

Conversion of passenger aircraft

From March 2020 onwards, airlines found themselves with a sharp decrease in passenger numbers and a fleet of aircraft that was burning money in hangar, maintenance, and insurance costs, along with a myriad of other business expenses to stay afloat. With strict regulations, international borders closing, and an overarching newfound fear of traveling, airlines were forced to turn their attentions to cargo (even if they had not previously needed to do so).

There were two schools of thought to capitalize on cargo revenue during this period. The first was that the COVID-19 pandemic would be short-lived and that cargo could be flown on top of seats and in empty spaces in aisles and overhead lockers. The second was to bite the bullet and undertake a P2F conversion project to remove all seats, in-flight entertainment (IFE), and passenger service provisions to create a pseudo-freighter aircraft. During the pandemic, Korean Air, for example, flew over 10,000 cargo flights on passenger planes. The primary function of freight aircraft during the initial period of the pandemic was to carry medicines, PPE, food provisions, and other essentials to people who were left without certain essential supplies. As the pandemic progressed, air freight assisted to alleviate the pressure on the global shipping industry. Once vaccines were developed and able to be transported, passenger aircraft were used to transport these quickly. However, there was a logistical challenge to overcome – keeping the vaccines cold enough. The Pfizer vaccine, for example, needed to be stored at minus 70 degrees Celsius, which required specially insulated cargo boxes with dry ice to keep them cold enough. As a by-product, dry ice produces emissions of CO₂, which, in turn, is limited in quantity as to how much can be carried on each aircraft.

In order to store as much cargo as possible, many airlines made quick work of stripping all passenger “luxuries” (including seats, IFE systems, and even some of the catering facilities) out of their cabins. Reducing the cabin weight and bulk meant more cargo could fit into the interior of the cabin and more load could be taken. It is important to note that pilots for cargo aircraft require different certifications than pilots carrying passengers only – a consequential effect of the shift to cargo was that a number of passenger pilots were laid off from their roles, whereas those with additional cargo-carrying certifications were more in demand and required to continue flying during the pandemic shift in air transport.





The shift back to passenger travel

From mid-2021, various governments began to ease their border guidelines and the ability for individuals to travel by air. Of course, the easing of restrictions came with additional requirements (such as pre- and post-testing, quarantine in the arrival jurisdiction, and the use of face masks during travel). For airlines, it meant their fully or partially grounded fleet was able to operate again, with a gradual reintroduction to various routes and travel corridors.



Photo: HAECO

So, what happened to all the aircraft that were carrying cargo? Well, for those airlines and operators who opted to keep their aircraft as they were (with seats installed et al), this transition back to passenger flight was a fairly easy one – cleaning procedures and restoration of the aircraft to be suitable for passenger travel once again.

However, those operators who maximized their cargo revenue during the period where passengers could not fly and stripped their aircraft back to their bones to increase cargo load space had a bit more work to do. Some airlines used the opportunity (of both minimal passenger service and having stripped interiors) to upgrade interiors, make appropriate MRO repairs, modernize IFE and Wi-Fi systems, and so on.

Going forward, the “hybrid” model of cargo and passenger travel can be implemented through cargo innovations which we have been forced to think about during the course of the pandemic. For example, a Lithuanian company called Colibri Aero has developed cargo boxes that can be fitted in situ in a cabin, in conjunction with passenger seats. In the future, this kind of hybrid model may quickly allow airlines to use unsold seats for cargo instead in order to maximize profitability on routes with a lower passenger load percentage. This is perhaps a more attractive proposition for low-cost carriers rather than those airlines aiming at a more “premium” target audience.

Conclusion

There is much to be said about the relative profitability of cargo transportation as opposed to passenger traffic. However, the COVID-19 pandemic has caused airlines and operators to think differently about having multiple revenue streams and using their assets to their greatest advantage to maintain and, indeed, capitalize on increased profitability. As passengers begin to return to the skies, airlines will need to rethink, at a global level, which routes and jurisdictions are most profitable for passenger transport and how they can use a hybrid model to increase revenues on emptier journeys. The world is back on its way to opening up, and the hybrid cargo and passenger model may just help some airlines and operators to stay afloat.

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LOOKING FORWARD TO TOMORROW'S WORLD THE CURRENT CHALLENGES OF PASSENGER-TO-FREIGHTER CONVERSIONS

by Simon Spells & Ethan Tan

Takeaways

- Demand for freight is here to stay
- Feedstock availability does not appear to be an issue currently
- Freight pricing will remain buoyant due to the limited supply and low conversion rate of freighters



Demand in the freighter sector has sparked interest from lessors; airlines; maintenance, repair, and overhaul (MRO) service providers; investors; funds; and other financial institutions. Many are keen to invest to hedge their existing passenger aircraft exposure, create new business lines around it, and/or build out their existing expertise (in the case of MROs/conversion specialists) to increase capacity and the range of conversion programs on offer. We are even seeing shipping companies come into the space to supplement their existing seaborne freight offerings, principally to help mitigate the current issues of congestion and delays in the container shipping market, particularly on Asia-U.S. routes where there are no land-based alternatives.

Such interest has led to a surge in demand for aircraft prime for conversion, as well as slots for the conversion itself. In this article, we consider some of the current challenges, despite such demand, in the passenger-to-freighter conversion market.

Sourcing of feedstock aircraft and conversion slots availability

Feedstock

Boeing's World Air Cargo Forecast (the latest version of which covers the period 2020-2039, released in November 2020) states that "accelerated e-commerce adoption because of COVID-19 looks likely to extend express market growth trends".

Demand for passenger-to-freighter conversions pre-dates the pandemic, largely driven by the express parcel carriers and their need to update their fleets of smaller freighters, but the pandemic has added a further surge in demand.

Boeing predicts the cargo market as a whole will grow at an annual rate of 4 percent over the next 20 years, resulting in the requirement for a freighter fleet 60 percent larger than we have today. Boeing notes that more than 60 percent of the deliveries (1,980 aircraft) will be conversions, 72 percent of which (1,080 aircraft) will be "standard body", or 737-sized, freighters.

[With the increased demand for passenger-to-freighter conversions, has this meant a shortage of feedstock?](#)

There have been reports of aircraft, thought to be long retired, being brought back into service for conversion. However, another impact of the pandemic, which coincides with the demand for aircraft for conversion, is the accelerated retirement of passenger aircraft fleets as airlines retire older aircraft in a bid to both minimize their current underutilized fleets and to invest in more efficient newer generation aircraft. As such, there appears to be a demand/supply equilibrium currently in terms of aircraft available for conversion.

Slot availability issues

The bottleneck in the supply of passenger-to-freighter aircraft comes at the conversion stage, with the availability of slots at most major conversion facilities booked up until 2024, and in some instances until 2026.

Conversion facilities are being extended and new facilities set up, however, these initiatives take time:

- Boeing will expand its conversion business by setting up a passenger-to-freight facility in Costa Rica. The facility is set to come online at some point in 2022.
- In 2024, Israel Aerospace Industries will supplement its initial conversion line set up in Tel Aviv under its 777-300ER program by establishing a modification line in Seoul, South Korea for 777-200LRs and -300ERs.
- Elbe Flugzeugwerke continues to increase its capabilities. By 2024, it will increase its current capacity to the point that it will be able to produce approximately 60 converted aircraft per year – approximately 30 conversions each of the A330 and the new A321 narrow-body – up from the 19 conversions it expects to carry out this year. It also expects to establish production lines in China and the United States for the A330 reconfiguration in 2022.

Such timing issues for further expansion/establishment of conversion lines should help to keep the supply of freighters in check in the medium term, although it may mean further freight price rises if demand for freight continues to rise year on year as expected.

Staffing issues

Sourcing and recruiting qualified personnel is also an issue for the conversion facilities, particularly in current times with restrictions on travel and countries around the world devising their own strategies for living with COVID-19.

Conversion process

Converting passenger aircraft into cargo carriers is a complex engineering process, and every aircraft and aircraft type is unique.

The process takes several months and involves the following processes:

Full strip out of the cabin	Galleys, seats, overhead lockers, toilets, in-flight bars, etc.
New loading door	The door is usually cut at the front of the fuselage, requiring new reinforced frames to be fitted. Completed in stages, this is one of the most technical parts of the process.
New cabin floor	A new, reinforced floor is fitted to the cabin to ensure it is strong enough to bear cargo loads, as well as ensuring that the floor space is maximized.
Testing, testing, testing	A battery of tests and inspections is required throughout the process before certification.

The conversion process is complex, and participants need to be very clear on how best to work with the conversion facility to optimize their aircraft. Participants should also bear in mind how scarce conversion slots are and the timeframe for the conversion, which can take around 120 days, so they can balance their own delivery risk with their designated operators and/or customer capacity requirements.

Conclusion

There are multiple threats to the global economy at the moment, including surging inflation, monetary tightening, and new COVID-19 variants, but absent an unexpected economic downturn, it is likely that the demand for freight, freighters, and passenger-to-freighter conversions will continue to grow in the coming years. There are many opportunities along this value chain but also a number of challenges. Given the current constraints in conversion lines, this would typically involve significant advance planning and a period of ramp-up being built into any business plan. Nevertheless, we expect that air cargo, and the ancillary services relating to it, will increasingly become an integral part of the aviation industry and a complementary piece to the usual passenger services.



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LOOKING FORWARD TO TOMORROW'S WORLD MANAGING THE WIDER SUPPLY CHAIN: THE LOGISTICS CHALLENGE

by Jeb Clulow & Matthew Knowles

Takeaways

- Freight and logistics markets have been upended by the COVID-19 pandemic
- Disruption has included widespread container congestion, changing consumption patterns, and Suez Canal closure in March 2021
- Much of the passenger aircraft fleet, responsible for nearly half of all global air freight, has been grounded



For a long time, logistics have been taken for granted. Users have relied on the efficiencies of logistics providers to run lean inventories with “just in time” ordering. They have also counted on them being inexpensive. Additionally, in the past, consumption patterns were more predictable. The pandemic has upended all of this. For many clients, this has brought logistics and logistics contracts into the spotlight.

Starting with the third factor, consumption patterns have changed totally, and that has wrong-footed retailers. For example, following the closing of UK gyms in 2020, John Lewis launched Peloton concessions in nine of their stores. However, their regular logistics provisions were unable to keep pace with demand, forcing them to resort to more expensive air freight (reportedly more than 10 times the ordinary cost).

Due to COVID-19, changes in consumption patterns, and the closure of the Suez Canal in March 2021, the containership industry has been significantly affected. Containers have ended up in the wrong countries and there have been huge delays for containerships in places like Long Beach in the United States and Ningbo-Zhoushan in China. A record 100 ships of all types were at anchor or in holding outside the ports of Los Angeles and Long Beach, with 70 of them being containerships, including the [16,000 TEU CMA CGM Alexander von Humboldt](#) and [CMA CGM Jules Verne](#). In China, 154 containerships awaited loading off the ports of Shanghai and Ningbo, with delays arising from heavy export volumes, Typhoon Chanthu, and a two-week shutdown in August to quarantine dockworkers.

Consequently, ocean freight rates have seen as much as an eight-fold increase.

The position with air freight also has challenges. Almost all passenger aircraft carry freight, which accounts for approximately half of global air freight. With flying significantly reduced (there are still only 6,000 of 25,000 aircraft operating), that freight component has generally been unavailable.

We have helped clients to formulate solutions, such as:

- a. Avoiding ocean transport from East Coast America to West Coast America via the Panama Canal by rerouting cargo by truck over-land.
- b. Changing from ocean freight to air freight with a view to meeting specific pinch points in the retailer calendar, such as “Prime Day”.
- c. Revisiting and revising logistics contracts so they are fit for purpose where there is high price volatility and where delays are often the norm.
- d. Reselling excess capacity.

Issues that arise from moving from one mode to the other include considering the ongoing obligations to the carrier under the original mode contract (such as volume commitments), different transit times for the carriage, and coordinating multi-modal arrangements with the changed leg (such as replacing ocean with air freight).

In terms of the contracts themselves, the liability provisions have some similarity between ocean, air, and international transport by truck, with the air being the most generous for the cargo interest. Accordingly moving from ocean to air is generally advantageous, and it generally comes with an automatic add-on to cover any associated land leg.

Clients have also found themselves facing potential issues arising out of reselling excess capacity, including any risks arising under competition law, as well as managing the resold capacity.

Unlike with the Peloton bike, there is no one-size-fits-all solution for logistics issues in a pandemic. However, much can be done to alleviate pinch points in the logistics chain and to ensure contracts are appropriate to manage transportation risk.

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LOOKING FORWARD TO TOMORROW'S WORLD A BRIEF JUMP THROUGH THE JOURNEY OF VERTICAL FLIGHT, FROM BALLOONS TO eVTOLS

by Richard Hakes, Ashleigh Standen & Daniel Sahraee

Takeaways

- Advanced air mobility has the potential to bring about the next significant change in mobility, and many players have already developed and financed viable aircraft
- \$8 billion of capital has flowed into the development of electric vertical take-off and landing (eVTOL) aircraft over the last five years, with the cargo market expected to reach \$58 billion by 2035
- AAM feeds nicely into the current hot topic of ESG as this new form of transport will reduce the environmental impact by minimising emissions and noise pollution



When in 1784 Vincenzo Lunardi, the ‘Daredevil Aeronaut’, demonstrated a hydrogen balloon flight from the Artillery Ground of the Honourable Artillery Company in London, a short walk from Reed Smith’s London office, he found instant fame as he completed the first manned flight over England. Watched by other luminaries of the day, including the then Prince of Wales and, reportedly, a crowd of 200,000, he travelled as far as Hertfordshire, fuelling in the process a ballooning fad that gripped the nation. Lunardi travelled with a slightly under-inflated balloon (taking off prematurely because of the crowd’s impatience), a dog, a cat and a (caged) pigeon (although he did stop briefly to release the by-then rather airsick cat). By this stage the French had been ballooning for a year, but many of the attempts had been so heroically unsuccessful as to lead to significant scepticism for this new fad and many dismissed Lunardi’s experiment as merely an amusing entertainment. Not all of Lunardi’s experiment went according to plan: he had anticipated being able to row the balloon through the air and so had brought along a variety of oars with him to do so. Perhaps it is unsurprising against this backdrop that Lunardi’s efforts were met with a mixture of admiration, fear, amazement, pity, incredulity and disbelief.

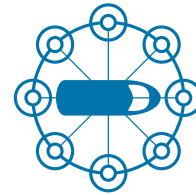
Today, like Lunardi’s crowd, the Prince of Wales, and the cat, we stand at the dawn of a new era of aviation. Advanced air mobility represents the next inflection point in aviation’s continual evolution. Despite our clear cultural affection for the vertical take-off – from balloons, to the Harrier jump jet, through to Elphaba’s broomstick and Superman – we have a hard time accepting that it could become part of our daily lives. Mention the prospect of delivery drones, unmanned aerial vehicles, or of hopping on an electric-powered flight to go to the pub and you are likely to be met with a look that says “dream on”. But, despite a lack of real awareness of this technology, AAM has the potential to bring about the next significant change in mobility and perhaps the global economy, promising to transform how people and cargo are moved. In the United States alone, [the AAM market is forecast to be worth \\$115 billion annually by 2035](#), creating more than 280,000 high-paying jobs.

The 'aircraft'

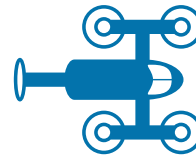
Developing out of small, unmanned (drone) aircraft a race is underway to develop larger electric vertical take-off and landing (eVTOL) aircraft, which will be capable of operating between places not currently or readily served by surface transportation or existing aviation.

Expected to eventually be unmanned and autonomous, eVTOL aircraft are runway independent, and incorporate non-traditional electric or hybrid propulsion. As anyone with an electric car will have realised, electric motors (and potentially, eventually, hydrogen fuel cells) and streamlined controls can greatly simplify a propulsion system and improve mechanical reliability, while in the process substantially reducing costs. This reduces the environmental impact by minimising emissions and noise pollution.

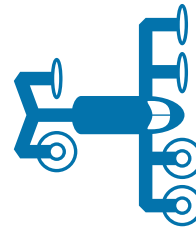
There are several configurations being developed in the eVTOL market. These include:



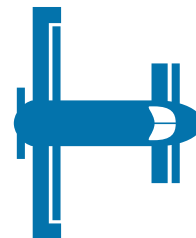
Multi-rotor – efficient to take off and land (but less so to cruise due to the lack of aerodynamic lift). These are slower and have the shortest range, but are easiest to certify.



Lift and cruise – a simple design and arguably the most reliable. These aircraft are expected to be easier to certify and easier to maintain, but are less efficient (due to the extra mass and drag coming from the lifting rotors) and so have a shorter range.



Tilt rotor – capable of higher speed and longer range, but more complex and thus more challenging to certify.



Vectored – efficient, long range but energy intensive and noisy (and may require new battery technology to be truly viable).



Market landscape

As Domhnal Slattery, chief executive of the aircraft leasing company [Avolon, told Reuters in an interview this year](#), “If you think about transportation strategically this is the next big frontier”. It is a frontier being explored by a combination of entrepreneurs, giants of aerospace and global logistics companies, like Airbus and Boeing (Aurora), Amazon Prime, DHL, a major U.S. postal company and even an online food ordering and delivery service.

Much like the early aeronauts and their balloon designs, at present there is no single dominant design or business model in the eVTOL market. Broadly, each of the key players is targeting certification before 2026, but there has to be real uncertainty around the timeline for those manufacturers that have no experience of certifying an aircraft, let alone the challenges of entering mass production.

However, there have been significant developments and commitments that give us an indication of what is possible. For example, [one of the top three global leasing companies has signed an order for up to 500 eVTOLs valued at \\$2 billion](#) with Vertical Aerospace, an eVTOL maker backed by investors including major airlines. Vertical reportedly has pre-orders for up to 1,000 eVTOL aircraft, along with a pre-order option from Virgin Atlantic, [all valued at up to \\$4 billion](#).

[The designer and manufacturer/developer Wisk](#) is noteworthy as it has achieved a number of ‘firsts’, in particular the first flight of an all-electric, autonomous eVTOL aircraft designed for passenger use in the United States. Boeing has invested in the company, and it is telling that while some companies building eVTOL aircraft are starting with a manned aircraft with the goal of later transitioning to an unmanned aircraft, Wisk is going straight to self-flying notwithstanding that will mean it is later to the market. Wisk has surpassed 1,500 test flights, entered a partnership with NASA, partnered with Boeing (Aurora), and built and flight-tested two new aircraft, bringing Wisk up to nine full-scale aircraft.

Germany’s [Lilium Jet](#) first flew its full-size, two-seat Eagle prototype in 2017, and a five-seat version in 2019. Lilium has already achieved more than 100 flights, and has more than 700 employees. A six- or seven-seat production version is planned for 2025 as a flying taxi, with a range of more than 150 miles.

Jody is intended to be a four-passenger commercial aircraft with a pilot, capable of travelling up to 150 miles, and Joby Aviation and the parent company of a leading American mobility provider have agreed to integrate their services (Joby will now transport passengers in the New York area to JFK airport), and the American mobility provider [must invest \\$125 million](#).

Archer is developing multiple models of eVTOL aircraft focused on improving mobility in cities. Its five-seat eVTOL aircraft is capable of carrying four passengers for up to 60 miles using today’s battery technologies. In February 2021, [Archer announced it would start an air taxi service in Los Angeles by 2024](#). Los Angeles is also one of United Airlines’ major hubs, so it should come as no surprise that United Airlines now has an agreement to work with Archer, contributing its expertise in airspace management to assist Archer with the development of battery-powered, short-haul aircraft, together with a commitment to a purchase agreement worth potentially in excess of \$1 billion to acquire a fleet of 200 eVTOLs, which are expected to give customers a quick, economical and low-carbon way to get to United’s hub airports and commute in dense urban environments within the next five years.

Brazilian aircraft manufacturer Embraer has designed, developed and certified close to 50 aircraft models, delivering over 8,000 aircraft to over 100 countries. Embraer formed EVE as a breakaway subsidiary from its EmbraerX technology incubator, having already signed letters of intent for over 1,000 aircraft, with the number still growing, which is arguably the largest order book in the market. For example, [Avantto, the largest operator of Embraer executive jets in Latin America, has signed a letter of intent with Eve](#) for 100 of its eVTOL aircraft, and Bristow, a Texas-based helicopter operator, has similarly placed a conditional order for up to 100 aircraft from Eve, with deliveries expected to start in 2026.



[CityAirbus NextGen](#) is an all-electric, four-seat 'lift and cruise' configuration eVTOL with an 80 km range and a cruise speed of 120 km/h, making it well-suited to flight operations in major cities, providing city commuting and an efficient air transport service between strategic locations in urban and suburban environments. Given their market position in commercial aviation, Airbus is, perhaps unsurprisingly, also focussed on a comprehensive approach that goes beyond just the aircraft to the rest of the ecosystem, including traffic management, routing, and noise mapping.

Attractive asset class

[Some \\$8 billion of capital has flowed into the development of eVTOL aircraft](#) over the last five years, with the average deal size growing from approximately \$20 million in 2019 to over \$300 million in 2021. It has been estimated that the global addressable market for eVTOLs will [reach \\$1 trillion in 2040](#), increasing to \$9 trillion by 2050, with applications including urban transportation, 'final mile' logistics, short-haul airline flights and defence. Indeed, by 2040, [830,000 eVTOL units are expected to be operating in the skies above the U.S. alone](#). KPMG examined 25 developed countries to gauge their readiness for the use of 'air taxis' in short-haul passenger transport and concluded that [eVTOLs will likely revolutionise urban mobility around the world in the coming decades](#).

[Market commentators consistently forecast a compound annual growth rate](#) of well over 10 percent for the urban air mobility (UAM) market in the near future. The drone package delivery market alone is projected to [grow from \\$2.1 billion in 2023 to \\$27.4 billion in 2030](#). By 2026, eVTOL air taxi developers Joby Aviation and Archer each predict annual revenue in excess of \$2 billion. Lillium and Archer have gone further with their predictions, with Lillium anticipating nearly \$6 billion in revenue in 2027 and Archer targeting more than \$12 billion by 2030. To put that into perspective, the world's leading helicopter manufacturer (Airbus Helicopters), which has a large certified product line and established support business, has [revenue of around \\$6.2 billion](#). In addition, [PitchBook forecasts](#) that the global air taxi passenger mobility market will grow from approximately \$1.5 billion in 2025 to more than \$150 billion by 2035.



SPAC to the future?

The eVTOL companies that secured significant investments prior to the COVID-19 pandemic typically [raised capital through seed, Series A, Series B and Series C funding rounds with external investors who were offered equity or part ownership in the company](#).

A growing number of companies across the AAM industry are looking to merge with a special purpose acquisition company (SPAC) that is already publicly traded to raise funds. Since late 2020, at least a half-dozen companies active in the AAM sector have announced, or it has been rumoured, that they intend to complete a business combination with a SPAC.

Archer was the first eVTOL developer to jump on the SPAC bandwagon, announcing its plans in early February 2021, followed not long after by [Lilium, which agreed to go public via a reverse merger with a SPAC, Qell Acquisition](#), founded by former General Motors executive Barry Engle. Joby, Archer, and Lilium are all part of a wave of technology start-ups going public through combinations with SPACs. Archer, Joby and Lilium alone had an aggregate post-money valuation in excess of \$13 billion.

Freight and cargo

AAM will bring cutting-edge, dual-use technologies that promise to provide affordable mobility for various commercial, civil, and defence purposes. Whether through the delivery of goods in urban environments, improving accessibility for remote population centers through passenger and cargo mobility, or providing an entirely new (and green?) passenger travel mode within a city, AAM can make these flights a part of daily life.

[The AAM cargo market is hotly tipped to grow and achieve scale before the passenger market](#), and is expected to reach \$58 billion by 2035. In some respects, cargo delivery – especially in less populated areas – is a much safer space in which to develop eVTOL technology, so that lessons learned in safety and reliability can then be applied to passenger services, such as air taxis, for which there is expected to be high demand in more populous urban centers. Such demand would generate high passenger load factors and revenue yields, it is hoped.

It is important to note that even though the technological factors driving passenger and cargo mobility are similar, the adoption curves will likely be different, primarily due to the uncertainties surrounding regulation and overall societal acceptance. Cargo mobility could have significantly greater near-term adoption than passenger mobility due to the lower psychological barriers and fewer regulatory hurdles related to safety. The primary driver for cargo AAM adoption and usage will likely be the level of autonomy, speed, and efficiency with which cargo eVTOLs can operate. Transporting people in autonomous eVTOL aircraft will then in due course build on the success of transporting cargo. From there, the technology will be able to facilitate missions beyond passenger and cargo mobility, including public safety operations, humanitarian relief, and infrastructure inspection.

Green dreams

It is all too apparent that aviation needs to be reimagined to align with the global environmental agenda. Twenty countries launched the International Aviation Climate Ambition Coalition (IACAC) at COP26 on 10 November 2021, committing to working with each other and through the International Civil Aviation Organization (ICAO) [“to reduce aviation CO₂ emissions at a rate consistent with efforts to limit the global average temperature increase to 1.5 degrees C”](#). A major focus of this commitment will be the development of more fuel-efficient aircraft, and less reliance on carbon derivative fuels.

As we emerge from the COVID-19 pandemic, air travel will be materially reshaped with airlines needing to embrace emerging technologies that decarbonise air travel. [NASA has expressed the view](#) that the advent of greener technology will make smaller, cleaner aircraft more affordable, and that it expects more passengers to take to the air for 50-500 mile journeys. The imperative to look for more sustainable forms of transport offers a springboard for the global aviation industry, an opportunity rather than a threat. [McKinsey has forecast](#) that this activity will center in underused regional airports rather than the big hubs, which is no surprise when in the United States, 90 percent of the population lives within 30 minutes of a regional airport (compared to 60 percent being within 30 minutes of a major airport). Even in Europe, 50 percent of people live within this 30 minute travel time. Overall, more affordable and greener air travel using less busy, more accessible airports will be a spur to air travel. This places AAM squarely at the forefront of a more sustainable aviation industry, accelerating the commercial roll-out of zero-emissions aircraft, enabled by eVTOLs. With its electric propulsion technology and new green fleet, coupled with an ability for point-to-point operations, AAM can advance progress toward zero-emission flight, enabling the aviation industry to lead in the creation of a more sustainable mode of transport.

Regulatory position

A self-flying aircraft is a new concept for everyone, including the regulators, and the complexities and costs associated with certifying eVTOLs make Lunardi's battles with rowing oars and airsick cats seem simple in comparison.

The European Aviation and Space Agency (EASA) has pioneered VTOL certification through the [issuance of a Special Condition](#) on 2 July 2019. In the preamble to the Special Condition, EASA summarises the problems many certification authorities currently face when attempting to draft type certification regulations: “[VTOLs have] the design characteristics of aeroplanes, rotorcraft or both” meaning that EASA was “not able to classify these new vehicles as being either a conventional aeroplane or a rotorcraft as covered by the existing certification specifications”.

Notwithstanding these challenges, EASA has developed certification requirements, which apply to “small VTOLs” with the Special Condition applying to aircraft with:

1. A passenger seating configuration of nine or fewer; and
2. A maximum certified take-off mass of 3,175 kg.

This is of course just a step in a process that will enable a regulatory framework for the safe operation and certification of VTOL aircraft in Europe. Elsewhere, the Civil Aviation Administration of China (CAAC) has announced that it will issue guidance on unmanned aerial vehicle airworthiness certification after consulting with five Chinese VTOL manufacturers. The extent to which the CAAC regulations will also cover manned VTOL operations is still under consideration.

There are significant differences in the certification requirements of EASA and the U.S. Federal Aviation Authority (FAA) and the ‘baseline FAA aircraft’ may require some limitations or changes to the design to gain EASA certification. Requirements from all regulators are being collated and considered, with provisions of mandatory modifications and Service Bulletins to be incorporated to remove any limitations in the future. Delays to EASA certification could have a wider impact, limiting global application.



Legal governance and legislative development

The legal issues surrounding UAM and eVTOLs are myriad and include:

- Risk allocation and liability for damage caused by accidents (as to which, see below)
- Contractual arrangements with end users (i.e., passengers or shippers)
- Cyber security and physical safety due to closer operating proximity to potentially malicious actors
- Environmental law applicable to noise and land uses
- Responsibility for inspection (particularly of unmanned eVTOLs)

Regulators must also consider the longevity of SPAC vehicles, the rigorous and costly certification process and whether current regimes are fit for purpose. In particular, the U.S. Securities and Exchange Commission (SEC) has warned that SPACs and the companies they combine with may face liability risks for projections they make during the combination process, despite the widespread impression that forward-looking statements made during the 'de-SPAC' transaction do not carry the same liability exposure as they would in a conventional initial public offering. In a statement published in April 2021, John Coates of the SEC commented that [“any simple claim about reduced liability exposure for SPAC participants is overstated at best, and potentially seriously misleading at worst”](#). He feared that “participants may not have thought through all the legal implications of these statements under the circumstances of these transactions”.

Insurance coverage

The liability regimes for the carriage of passengers and cargo on board traditional civil aircraft have developed since the origin of commercial flights in the 1920s. International efforts have led to the development of recognised legal regimes, such as the Warsaw Convention 1929 and the Montreal Convention 1999, with principles from both conventions regularly incorporated into national laws concerning domestic carriage. However, recent lessons learnt by the insurance community from developments in the UAV/drone market have demonstrated that traditional policy wordings (such as AVN1C) are probably not fit for purpose when it comes to insuring new technology, such as eVTOLs, and new insurance policy wordings will need to be developed.

While hull and physical damage coverage is likely to be similar to existing aviation coverage, liability will be different by virtue of eVTOLs operating at lower altitudes above densely populated areas. Operators' liability exposures could be significant in the event that an accident occurs in a busy urban environment, due to the potential to cause injury to not just passengers but also property and individuals on the ground or in nearby buildings. Whilst historically air crashes have thankfully been infrequent, with eVTOLs operating more like a road-going car, there is clearly an exponentially greater risk of accidents, and the associated costly claims. Can this be met with a traditional aircraft policy with new endorsements, or will it, as we assume, be a new policy and product altogether?

Manufacturers and operators will also need to consider how to apportion liability among themselves, as well as the risks that can be passed on to end users via their contractual ticketing arrangements. A careful balance will need to be struck because overly robust indemnity and liability wording could significantly undermine confidence in the industry and would no doubt be met with resistance from regulators and legislators (if not already fettered by consumer protection legislation). It seems likely that new laws will be required to deal with matters such as minimum liability requirements, which will be crucial to the development of a safe environment in which the industry can develop and generate revenue, while also overcoming a barrier to the public's adoption.

Closing thoughts

The vertical take-off has come a long way since Lunardi's flight in 1784.

Like the balloon, the jet engine and other technology before and since, it is anticipated that AAM will revolutionise air transportation in the coming years, and there is a pressing need to act now to understand the legislative, regulatory, and infrastructure needs of this emergent technology.

In the United Kingdom, the government has stated its intention for the UK to be a world leader in shaping the future of transport, passing the Air Traffic Management and Unmanned Aircraft Act 2021 in April 2021. Going further, in October 2021 the UK Civil Aviation Authority announced an industry consortium looking into eVTOL safety, with members including Virgin Atlantic, Joby, Vertical Aerospace and NATS (the primary provider of air traffic control services). In the United States, in November 2021, two new bills were passed in the United States, focussed on the AAM sector. In particular, the House of Representative's Advanced Air Mobility Coordination and Leadership Act calls for the development of an interagency working group to help the federal government develop a strategy to promote AAM. The bipartisan legislation is expected to help advance the sector in the expectation that AAM will provide additional transportation options, create jobs and advance environmental sustainability. A similar bill was passed by the Senate Committee on Commerce, Science and Transportation. Beyond aircraft certification, these bills reflect the ever-increasing recognition of this exciting emerging sector, which brings economic, infrastructure and workforce opportunities, but also potential physical and digital security risks that will need to be carefully identified and mitigated.

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BUSINESS CONTINUITY – ENSURING A SOLID BUSINESS MODEL THE BUOYANT AIR CARGO MARKET AND ITS IMPLICATIONS FOR AIRLINES AND INVESTORS

by Chris Jackson

Takeaways

- The pandemic is spurring demand for air freight services
- E-commerce and emerging market economies are contributing to the trend
- The waning of the pandemic may not signal an end to air cargo growth



While the impact of the COVID-19 pandemic on the air cargo sector can be seen as a bubble, the fundamentals of the air cargo sector need to be viewed in a much broader context – in particular, the evolution of e-commerce and the rapid economic growth of the emerging markets. The air cargo market is, without doubt, a growing sector within the aviation industry and is one that cannot be ignored.

The current growth in demand for freighter capacity is attributable to the following factors.

Reduced belly cargo capacity

The wide-scale lockdowns, border closures, and travel restrictions brought about by the COVID-19 pandemic have resulted in a dramatic decline in global passenger flights. At the peak of the pandemic in May 2020, the weekly flight frequency for global passenger airlines had fallen by about 70 percent (as compared with data for May 2019).

International passenger traffic remained weak during the first half of 2021, but signs are pointing toward some improvement as more people get vaccinated and international travel restrictions are gradually eased. However, the spread of the COVID-19 Delta variant has weakened consumer travel sentiment and significantly dampened the outlook for long-haul flights.

Domestic passenger traffic is recovering faster than international traffic. Major domestic markets started on a path to recovery in 2020, with the pace accelerating in 2021, especially in the United States, by far the biggest domestic market.

According to Boeing, passenger belly cargo typically accounts for 54 percent of world air cargo capacity. The massive drop in passenger flights resulting from the COVID-19 pandemic has therefore given rise to a corresponding increase in demand for freighter capacity.

As noted above, there is a clear divergence in the pace of recovery between domestic traffic on the one hand and international traffic (particularly long-haul) on the other. Consequently, demand for domestic freighter capacity will reduce faster than international freighter capacity.

According to Boeing's forecast, the aviation industry will recover to 2019 levels of traffic by the end of 2023 or early 2024, with long-haul international routes taking the longest to recover. The air freighter market will therefore see the effects of the COVID-19 pandemic for some time to come.

Increase in volume of air cargo

In addition to the reduction in belly cargo capacity, the COVID-19 pandemic itself has given rise to an increase in the volume of air cargo. The air freight industry has been an essential mode of transport for the pharmaceuticals, medical equipment, and personal protective equipment used in the global fight against COVID-19. This has further stretched the air freight industry but will (hopefully) be a relatively short-lived consequence of the pandemic. We see the following two reasons for this.

Economic growth in the emerging markets

The emerging markets are expected to lead global economic growth during the next 20 years, with South Asia, China, East Asia, and Africa all exceeding the global average GDP growth of around 2.5 percent.

GDP increases when there is a trade surplus (i.e., the total value of goods and services that domestic producers sell abroad exceeds the total value of foreign goods and services that domestic consumers buy). Accordingly, the logistics industry (of which air cargo is a key part) will be vital for those emerging market economies.

E-commerce

Over the last 20 years, there has been significant growth in e-commerce as a consequence of the evolution of internet-based technology. Businesses have endeavored to satisfy customer demand by establishing platforms that facilitate access to goods and rapid delivery times.

The air cargo industry is an essential component in the strategy for businesses looking to capitalize on the e-commerce boom and that need to transport goods between continents. Unlike maritime transport, air transport offers the benefits of speed and reliability.

The boom in e-commerce shows no sign of slowing down and is therefore likely to be a significant driver for the growth of the air cargo market for some time to come. Indeed, it has been cited that the pandemic has accelerated the global transition to e-commerce (by as much as five years, according to IBM) as more people shift to online work and shopping.

Is that growth sustainable?

In the short-to-medium term, we would expect to see a decline in the growth of demand for freighter capacity. The direct impact of the COVID-19 pandemic has created a bubble in demand which will deflate with a reduction in the volume of air cargo needed in the global fight against the pandemic and an increase in passenger flights (and, thereby, belly cargo capacity).

However, that bubble needs to be viewed in the context of other long-term factors (such as the boom in e-commerce and the rapid economic growth of the emerging markets). It will be those factors that drive demand for air freight capacity and, ultimately, the need to increase the global freighter fleet (particularly those serving the emerging markets).

Although growth in air cargo demand would seem inevitable, we would add a small note of caution. The trade conflict between the United States and China and recurring political and financial market instability in some emerging markets are some of the factors that might hamper the growth of air cargo demand, thereby, affecting the freighter aircraft demand.



Does the supply of new cargo aircraft meet demand?

As compared with other parts of the aviation industry, air cargo operators have performed well during the COVID-19 pandemic and it's therefore no surprise that investors have seen the air cargo sector as an answer to the question of what to do with unwanted or repossessed aircraft.

As things currently stand, there is an insufficient supply of new cargo aircraft to meet demand. Freighter conversion slots are in very high demand, particularly for some aircraft types (such as the Airbus A330). The wait times for the most popular conversion programs are up to four years.

This heightened demand has resulted in the cost of conversion programs increasing significantly. However, this increased cost has been offset, to some degree, by the fall in cost of the feedstock aircraft as a consequence of the COVID-19 pandemic and, specifically, the number of off-lease aircraft available for sale. This reduction in cost has also had the consequence that investors are now looking to convert younger aircraft, which will have a correspondingly longer life in cargo operations.

The use of “freighters” and the increase in passenger-to-freighter conversions, as well as the increase in production of freighter aircraft by the manufacturers, will have provided some easing of air cargo capacity constraints. However, as more passenger aircraft return to the skies and “belly cargo” capacity increases (particularly in relation to wide-body aircraft being operated on long-haul routes), it's expected that the air cargo market should normalize.

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BUSINESS CONTINUITY – ENSURING A SOLID BUSINESS MODEL FINANCING FREIGHTERS AND CONVERSIONS: NO LONGER A NICHE CONCERN

by Adam Longney & Ashleigh Standen



Takeaways

- The passenger-to-freighter conversion market is growing, with roughly 750 conversions projected over the next 20 years
- Major industry participants, including ST Engineering, Avolon and Fortress, are backing conversion projects
- Post COP26, financiers are under more scrutiny and green credentials could be brought into question



With the continued growth in demand for cargo capacity, there is an increasing need for financing and leasing freighter aircraft and passenger-to-freighter (P2F) conversions.

While financing P2F conversions, in particular, requires a slightly different analysis from more traditional aircraft financing products, the good news is that there is an expanding pool of investors and financiers with the expertise – and appetite – to support this growing segment of the market.

The case for cargo and conversions

In its [World Air Cargo Forecast 2020-2039](#), Boeing predicts that world air cargo traffic will grow at 4 percent per year over the next 20 years. Coupled with the increasing need for freighter capacity, Boeing projects that this will result in a 60 percent larger freighter fleet over that same period. In absolute numbers, that is an increase from 2,010 to 3,260 aircraft and, interestingly, [Boeing's view](#) is that more than 60 percent of the freighter aircraft to be delivered during that period, around 750 aircraft, will be P2F conversions.

If these forecasts prove to be correct, that translates into roughly 37 conversions per year over a 20-year period.

Out of the shadows and into the mainstream

While once viewed by some as a niche segment of the commercial aircraft financing and leasing market, freighter financing and leasing may be heading into the mainstream. A brief snapshot of recent high profile announcements illustrates this:

- [In July 2021, GECAS Cargo announced](#) the addition of a further six Boeing 737-800BCFs to its fleet, bringing its fleet of P2F-converted 737-800NGs in operation to more than 40.
- In October 2021, [Avolon announced that it had signed an agreement with Israel Aerospace Industries \(IAI\)](#) to become the launch customer for IAI's Airbus A330-300 freighter conversion program, taking 30 conversion slots between 2025 and 2028.

Fueled in part by the COVID-19 pandemic, and also by the growth of the e-commerce market and consumers' increased expectations of next day delivery, this reflects a pattern that we have seen over the last 12 months or so: an increase in interest in the freighter and P2F conversion market among investors, aircraft owners and operators, as aircraft owners and operators consider how best to optimize their fleets in light of continuing demand for air cargo capacity, the potential increase in availability of feedstock for conversion programs and travel restrictions affecting passenger flights.

The multimillion-dollar question

However, converting passenger aircraft is not a straightforward process. Technical and economic expertise is required to identify suitable candidate aircraft for conversion. The process of obtaining the necessary certifications to undertake the conversion is complex. There are important logistical considerations, such as whether there are sufficient conversion slots available at authorized conversion facilities. Alongside all of this is the significant question of cost and how the conversion can be financed.

According to [IBA](#), a narrowbody P2F conversion could cost in the region of \$4.2 million for a Boeing 737-800 and \$6.1 million for an Airbus A321-200. A widebody P2F conversion could cost in the region of \$14.7 million for a Boeing 767-300ER and \$18.4 million for an Airbus A330-300. Clearly, this is a significant investment.

Conversion risks

Beyond standard asset, debtor and jurisdictional risks, financing a P2F conversion brings into play considerations that are not ordinarily found in a typical aircraft financing. For example:

- Is the conversion program fully developed or a work in progress which remains subject to obtaining the necessary approvals, including the critical supplemental type certificate (STC)?
- What is the pathway to obtaining any outstanding approvals and the STC, and what happens if they cannot be obtained in the form expected, or at all?
- In the event of a default under the conversion contract, does the financier or another third party have step-in rights?
- What about the conversion contractor? What is their financial health and performance risk? If they fall down, who owns the intellectual property in the program and the STC, and can the financier access it?
- What is the contractor's track record? Do they have sufficient resources to fulfil the conversion contract on time and on budget, or have they overcommitted?

Environmental considerations and the availability of finance

In the post COP26 landscape, there will be more scrutiny than ever of the activities of businesses, financiers and investors. Aviation has received a significant amount of attention, both as an industry responsible for a proportion of the world's greenhouse gas emissions and as a critical component of the pandemic and post-pandemic supply chain.

There have been various sets of green lending frameworks and initiatives, such as the EU Taxonomy and the Chancery Lane drafting project, which are creating linguistic and drafting tools to help implement greener lending practices. A new category of financing, transition financing, has also emerged to help industries like aviation find funding to begin the re-fleeting and other projects which are needed to replace older equipment with newer, more efficient and environmentally friendlier equipment.

Nevertheless, the environmental impact of converting older, less efficient passenger aircraft into freighters may in some instances limit the pool of financiers and investors able and willing to fund such projects. In particular, financiers with regulators, investors or shareholders who are actively engaged in environmental issues may find it hard to justify financing P2F conversions of older, less efficient aircraft, instead of financing newer and more efficient aircraft or projects based on sustainable aviation fuel production or other green technologies.

An expanding, specialist financing market

In light of the points outlined above and the different market dynamics that typically affect cargo operations, it is perhaps not surprising that some of the more traditional aviation finance providers have tended to avoid financing cargo aircraft and P2F conversions.

The good news, however, is that there is a pool of financiers and investors with the required specialist asset and market knowledge who are prepared to invest in this segment of the market, and with the projected growth and resulting need for capital, that pool is expanding with new participants who have the appetite to finance these projects.

A small sample of the publicly announced deals in 2021 that reflect this appetite (in addition to those already mentioned above) include:

- The freighter aircraft leasing joint venture between ST Engineering and Temasek, [announced in May 2021](#).
- [The launch of Mammoth Freighters' Boeing 777 P2F conversion program](#), backed by a major American investment management firm, announced in September 2021.
- [The P2F facility provided by volofin Capital Management to KV Aviation](#) in January 2021 in respect of six Boeing 737-800s.
- The announcement in June 2021 that [Aero Capital Solutions had signed up to a further seven Boeing 737-800 conversions](#), in addition to the 14 it had already committed to.

While cargo and P2F conversion may remain a small segment of the overall commercial aircraft market, it is nonetheless a growing segment where there is an undeniable call for investment and financing and, based on what we have seen over the last 12 months or so, significant participants in the market look to be stepping up to answer that call.

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INSTRUMENT
POSITION
MARKING
TABLE

WARNING

AB | BC

DP | CD

BC | AB



BUSINESS CONTINUITY – ENSURING A SOLID BUSINESS MODEL LEASING CONSIDERATIONS FOR 'PREIGHTER' OPERATIONS

by Adam Longney



Takeaways

- The COVID-19 pandemic has caused airlines to adapt their operations, giving rise to the 'preighter'
- Technical, regulatory, and contractual considerations determine whether an airline can operate a passenger aircraft as a 'preighter'
- Significant lease modifications to account for 'preighter' operations seem unlikely



As COVID-19 grounded passenger flights, airlines responded to the resulting cargo capacity crunch by adapting their passenger aircraft to operate as “preighters”. However, while some fine-tuning of lease agreements may be seen in the future to allow for greater operational flexibility, significant lease modifications to account for ‘preighter’ operations seem unlikely.

The cargo capacity crunch

As COVID-19 travel restrictions forced airlines to ground many passenger flights, demand for cargo remained high.

However, because belly cargo (that is, cargo carried in the belly of a passenger aircraft) accounted for almost two-thirds of total international cargo capacity pre-pandemic, grounding passenger flights also had a significant impact on cargo capacity.

According to [IATA's Air Cargo Market Analysis, by March 2020](#), international belly cargo capacity had declined by 43.7 percent on a year-on-year basis. Even in June 2021, despite the first signs of international passenger travel restarting, international [belly cargo capacity was still 38.9 percent below June 2019 values](#).

Step up the ‘preighter’

In response to this capacity crunch, and in order to continue generating some cargo-driven revenues, airlines started adapting their operations by repurposing the passenger compartments of their passenger aircraft to carry more cargo.

And so, the ‘preighter’ was born.

Unlike a full conversion to cargo configuration, repurposing a passenger compartment to carry cargo in a ‘preighter’ is a temporary solution. Broadly speaking, this involves:

- Storing cargo on and between seats and in overhead bins;
- Storing cargo in specific seat containers or seat bags; or
- Removing the passenger seats and securing the cargo to the passenger compartment floor.

It's not as simple as it sounds

While this appears to provide a simple “quick fix” solution to increasing the cargo capacity of passenger aircraft, repurposing a passenger aircraft to become a ‘preighter’ does give rise to a number of considerations for both the airline and owner/lessor of the aircraft:

- Passenger aircraft are not certified to carry cargo on passenger seats, nor in cargo pallets and containers secured to the seat track (where the seats have been removed), so any reconfiguration to carry cargo in this way will require approval from the operator’s national aviation authority.
- If seats are removed for the purposes of carrying cargo on the passenger cabin floor, manufacturer approval must be obtained.
- Certain goods – including some dangerous goods and live animals – can be carried only in the underfloor cargo compartment (subject to the cargo compartment meeting the required standards), irrespective of any ‘preighter’-type modifications.
- Beyond these technical and regulatory considerations, contractual terms in lease agreements also may restrict an airline’s ability to use a passenger aircraft as a ‘preighter’.

What does the contract say?

Airlines that own unencumbered aircraft may have the option of using those aircraft as “preighters”, free from any constraints imposed by a lease agreement or financing arrangement. However, airlines whose fleets are largely made up of leased or encumbered aircraft will need to consider any contractual restrictions which may affect their ability to operate a passenger aircraft as a ‘preighter’.

Lease agreements will typically contain provisions intended to protect the lessor’s investment in the asset. Some of those provisions will be a contractual statement of what the airline is required to do under applicable law in any event – for example, the airline will be obliged to operate the aircraft in accordance with all applicable regulations and approvals – and those provisions will apply equally to passenger and cargo operations.

However, other provisions – such as those dealing with the nature and extent of modifications to the aircraft during the term of the lease, and the redelivery conditions – will be largely contractual matters agreed between the airline and its lessor, and it is these which may have a greater impact when the airline is determining whether it can modify or operate a leased aircraft as a ‘preighter’. For example, these provisions may restrict the removal of passenger seats and, in more extreme cases, they may contractually limit the airline’s ability to operate regular cargo-only flights using the aircraft.



Will 'preighter' operations be expressly addressed in the future?

Until the onset of the COVID-19 pandemic, in most lease agreements the provisions referred to above were unlikely to expressly refer to 'preighter' operations. Now, both lessors and airlines may be re-assessing whether any of these provisions need to be adjusted in the future to take into account potential freighter operations.

For example, where airlines have leases that would contractually restrict their ability to operate aircraft as "freighters", they may seek adjustments to those provisions to allow them greater flexibility to manage their fleet and operate the aircraft as "freighters" in times of disruption. After all, flying cargo is a way to generate revenues that are needed to pay rent. Airlines may also seek adjustments to provisions that could result in cost savings while the aircraft are operating as "freighters" – for example, by adjusting the insurance requirements to reflect the operation of cargo-only flights.

Conversely, lessors may look to address certain 'preighter'-specific concerns that would not normally be expressly covered in a typical lease agreement – for example, they may seek to include specific provisions dealing with the storage of seats removed as part of a permitted 'preighter' reconfiguration (while airlines may, of course, remove seats during the term of a lease for maintenance and other related reasons, the removal of all seats to allow the aircraft to be operated on a cargo-only basis was generally not considered part of the normal course of operations, at least until the COVID-19 pandemic), and they will undoubtedly consider the redelivery conditions with potential 'preighter' operations in mind.

All that said, it seems unlikely at this stage that we will see the wholesale revision of lease agreements on account of 'preighter' operations. Generally speaking, the asset protection and usage provisions of a typical lease will cater for most proposed 'preighter' operations, perhaps with some fine tuning required here and there; more extensive modifications are likely to continue to be dealt with on a case-by-case basis as the need arises. If anything is to come out of this crisis, it seems far more likely that there will be a renewed focus on how lease terms can be structured to accommodate the seasonal nature of many airlines' businesses and the gradual return to "normal".

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BUSINESS CONTINUITY – ENSURING A SOLID BUSINESS MODEL THE GROWTH OF JOINT VENTURES IN THE FREIGHTER MARKET: RISKS AND REWARDS

by Simon Spells & Manoj Purush



Takeaways

- Address difficult commercial and legal issues early on
- A lengthy memorandum of understanding is not always a bad thing and can help flush out issues sooner rather than later
- Get your advisors involved from the start and they can help identify key legal issues associated with the sector and the specific venture



With the growth of the freighter market, we are seeing a number of non-aviation industry players looking to invest and/or start new ventures with existing participants or participants within the same supply chain. This mismatch of financial capability and industry capability often requires participants to carefully discuss some of the more difficult questions relating to the new venture upfront. This article discusses the common issues an aviation industry participant needs to consider when making investments in or entering into a new line of business with a third party.

Freighter market focus and joint venture growth

The COVID-19 pandemic inflicted on the aviation industry is a hardship of a magnitude never seen before. Passenger travel has been largely curtailed since early 2020. Borders have been subject to multiple shutdowns and re-openings, and varying levels of restrictions, all of which have negatively impacted demand for passenger travel. The recent discussions on vaccination passports and on the opening of borders in Europe and the United States to vaccinated individuals suggest there is some semblance of demand for passenger travel returning in this part of the world. Other jurisdictions are struggling with opening up regionally. In Asia, the approach resembles a patchwork quilt of different levels of vaccination, and different stages of re-opening and/or semi or full lockdowns. Recent commentary on the forecast for moving “back to normal” suggests that passenger air travel will not return to pre-COVID-19 levels until at least 2024.

Throughout the COVID-19 pandemic, the increase in e-commerce and the need for movement of goods (including medical supplies) from one part of the world to another resulted in another area of aviation shining a bright light in an otherwise gloomy skyline: the air freight market.

Over the past decade or so, low cargo rates and the general unprofitability of the cargo business led to many airlines letting go of, or reducing, their cargo freighter fleets. Many are now changing their tune due to e-commerce sales rocketing after the COVID-19 pandemic started. This demand, combined with much of the global passenger fleet being grounded (which itself is responsible for the transportation of a significant amount of air cargo) led to a significant rise in cargo yields that has been sustained to date. Based on data from the Airline Analyst, only 21 airlines (down from 77 airlines in 2019) globally disclosed that their operating performance achieved positive operating profits for the third quarter of 2020, which is traditionally the industry’s most profitable quarter. Cargo revenue accounted for 49 percent of the total revenues, on average.

With e-commerce sales set to continue to rise, and commercial passenger flights predicted to a return only on a graduated basis for some time, the demand for freighter aircraft is forecast to remain high, supporting continued yield and profitability in the freighter sector.

Demand in the freighter sector has sparked interest from lessors, airlines, maintenance, repair, and overhaul (MRO) service providers, investors, funds, and other financial institutions. Many are keen to invest in the area to hedge their existing passenger aircraft exposure, create new business lines around it, and/or build out their existing expertise (in the case of MRO service providers and conversion specialists) to increase capacity and the range of conversion programs on offer. We are even seeing shipping companies come into the space to supplement their existing seaborne freight offerings, especially to help mitigate the current issues of congestion and delays in the container shipping market, particularly on Asia-U.S. routes where there are no land-based alternatives.

Such interest has led to a number of strategic partnerships and joint ventures over the past 24 months, with both new and established market participants entering or building out their freighter sector presence. Recent examples include:

- ST Engineering and Temasek entering into a joint venture to develop a freighter aircraft leasing portfolio.
- Hong Kong Aircraft Engineering Company Limited, an airframe maintenance and modification group, partnering with 321 Precision Conversions to provide heavy maintenance and structural modifications for its Airbus A321 P2F conversions.
- CMA CGM setting up CMA CGM Air Cargo.
- Titan Aviation and Bain Capital entering into a joint venture to develop a freighter aircraft leasing portfolio.

Collaborations often involve the meeting of partners with different industry knowledge and financial strengths. This “mismatch” between skill sets and/or financial powers can push the partners into discussions about strategies, objectives, and alignment before entering into such collaboration. There are certain salient questions that parties should consider before embarking on such a collaboration.

When structuring a new collaboration, business teams will typically meet and undertake discussions and commercial due diligence before deciding whether the collaboration will bring synergies and be financially profitable. This is paramount and is often the fundamental rider for undertaking a collaboration in the first place. However, in the midst of the urgency and excitement of embarking on a venture, parties risk failing to discuss some of the less convenient issues that should nevertheless be addressed. Our experience has shown that laying out this groundwork requires tact and sensitivity – of course, without dampening the spirit of collaboration!

Documenting some initial understandings is a common practice. In addition to this, it may be advisable to spend time addressing other issues at the start rather than during the later documentation stage.

Key considerations

1. **Long-term objective.** Each party should consider their long-term objective in entering into such a joint venture (the JV). Aviation industry players (the AVP) are often in it for the long term and may view the JV as a new line of business that will bring synergies to their existing business. On the other hand, for a financial institution or fund (the Fund), this would be deemed an investment in a sector that the fund believes has potential for growth and hence returns. The AVP should be mindful that the Fund may ultimately look to exit the JV and consider what would be an acceptable time frame for the AVP to exit. Should the parties agree to a lock-up period (or moratorium) during which both parties are not entitled to voluntarily exit the JV?



2. **Exit.** There are be a number of ways that parties might exit the JV. Some of the more common forms of exit and the challenges they may raise include:

a. **Trade sale.** One of the more common exit mechanisms is through a trade sale with a third party. This in itself raises a number of interesting issues. For example, should the sale to third parties be limited to parties that are not competitors of the AVP? While it may be more common to see multiple funds collaborating with each other, AVPs may be more sensitive to such collaboration. If such sensitivities do exist, what would be the best way to address them? Identify and list such competitors, knowing that the market may change in a few years, that a potential trade sale cannot involve. Alternatively, would it be easier to set out a list of names and the AVP's criteria for determining whether a party is a competitor? This may provide flexibility without compromising on principles, but could potentially lead to disagreements on the interpretation. From the Fund's perspective, this may severely impact the potential market and the liquidity of their shares.

Often, discussions around rights of first refusal (or rights of first offer), tag and drag rights all play into such discussions. The key consideration parties need to bear in mind is that while these clauses may work well in theory, a party without the relevant financial capability may find that it is unable to take advantage of such rights.

b. **Public markets.** An exit in this form may be through a traditional listing on a stock exchange, a back-door listing, or even securitization of the assets of the JV. Should parties agree upfront that if a certain internal rate of return is achieved through such a listing process, neither party is permitted to block such a listing?

3. **Control.** Who will have control of the JV? Will there be reserved matters? If so, will such reserved matters make it practicably difficult to run the JV? If there are disagreements or resolutions that cannot be passed because parties do not agree, should the parties consider such a scenario as a deadlock? What would be the deadlock resolution mechanism? Should parties be permitted to buy each other out? It could be argued that a persistent deadlock signals that parties' interests are not aligned and that, rather than having a JV that cannot run due to disagreements, parties should dissolve the JV. Of course, it could be argued that parties with deeper pockets will probably have a greater ability to benefit in such scenarios. However, what would this mean without the AVP's presence? Would the Fund have the necessary skill set to be able to run the JV? Or in this scenario, is the Fund in a more disadvantageous position – where it would need to exit but the AVP may not have the resources to fully exit the JV?

4. **Tax.** When considering forming a new JV, parties often consult tax advisors to determine the most tax-efficient structure for running the business and for extraction of profits. However, for parties based in different jurisdictions, this may raise different tax considerations. Something that works for one party may not necessarily work for the other.

5. **Future funding needs.** Will parties have an obligation to provide future funding to the JV? If there is no such obligation, future capital calls could potentially lead to the dilution of a shareholder who may not have sufficient capital to meet such equity funding calls. In such circumstances, parties may wish to negotiate a funding waterfall mechanism regarding how the JV will approach funding requirements. It is often agreed that funding through shareholder loans will take priority over funding via equity. But while this seems obvious, it is also important to consider the impact this may have on any tax treaties the JV structure relies on, as well as covenants under existing funding arrangements with third parties.



6. **Ancillary support.** It was mentioned above that the party with the deeper pockets typically stands to benefit from the various rights provided in JV documentation. However, the Fund should always bear in mind that the AVP has a much deeper understanding of the underlying business and, while the line of business may be new, a much greater capability to navigate the business through difficult times. Potentially disagreeing with the AVP and buying out the AVP means that the Fund will need to find new stewards of the business, and this is often not practical or pragmatic. As is often the case, there may be stand-alone agreements between the JV and the AVP. It is also important to consider how issues arising under those agreements will be dealt with by the JV.

Summary and key takeaways

When entering into a collaboration, it is critical that parties discuss upfront some of the less comfortable issues. Discussing and documenting these key issues upfront and getting your advisors involved from the start will not result in a duplication of work; rather, consider it time and money saved in the long run. A carefully negotiated memorandum of agreement may leave very little room for lawyers to raise new significant commercial points for parties to discuss. Some of these issues are difficult to resolve, and parties often take the gamble that they need to carry some of this risk and find a resolution if and when it arises.



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AVOIDING UNNECESSARY DISRUPTION CONTRACTUAL RISKS POSED BY PASSENGER-TO-FREIGHTER CONVERSIONS

by Justin deBettencourt

Takeaways

- Increased air cargo revenue has been a bright spot for the aviation industry during the COVID-19 pandemic
- As a result of the increase in air cargo demand and the drop-off in passenger demand, aircraft operators are increasingly converting passenger aircraft into freighters
- The conversion process should be approached carefully to make sure it does not violate lease documents and create contractual liability



Fall in passenger demand due to COVID-19

Over the past two years, COVID-19 has presented a significant challenge for the aviation industry as passenger demand has fallen in response to the worldwide pandemic. Although the introduction of vaccines suggested a brighter future for air travel, the recent rise of the Delta and Omicron variants of the coronavirus may dampen expectations of a robust increase in passenger demand. In the midst of this uncertainty, one of the few bright spots for the aviation industry during the pandemic has been an increase in air cargo revenue. According to estimates from the International Air Transport Association, air cargo will rise to 36 percent of carriers' revenue this year, up from 12 percent in 2019.

A switch to freight

To meet this increased demand and in response to the reduction in air passenger travel, passenger aircraft are being converted into freighters. For example, in May 2021, it was reported that Boeing was adding two production lines to convert Boeing 737-800s into freighters. Conversions can be temporary or permanent, and may include cabin removal, the installation of cargo loading systems, the plugging of windows, reinforcements and other modifications. In some instances, manufacturers have published service bulletins laying out possible cargo conversion solutions, such as Airbus with its A330 and A350 aircraft. However, there are legal risks posed by the passenger-to-freighter conversion process.

Contractual concerns

Aircraft operators seeking to convert passenger aircraft into freighters must ensure that the new contemplated use is permitted by the lease. In addition, the conversion process will require that modifications be made to the aircraft. A lessee must review the lease carefully to make sure that modifications are permitted. Aircraft lessees may also need the aircraft lessor's consent prior to making any modifications depending on the wording of the lease. Moreover, an aircraft lease agreement commonly requires the aircraft to be redelivered at the end of the lease in its initial configuration. Any modifications made to the aircraft as part of the passenger-to-freighter conversion process may have to be reversed unless the modifications are acceptable to the lessor. As a result, an aircraft lessee should engage the lessor early in the process to make sure the lessee avoids violating the lease and obtains any necessary consent.

If a passenger-to-freighter conversion occurs resulting in a violation of the lease, an aircraft lessor could pursue a claim for breach of contract. In the United States, such a claim is likely to be made under state law. While each state's law is different, in general, a lessor will only need to establish that a lease existed, the language of the lease was breached, and the lessor was damaged as a result. If a contractual violation is established, the lessor would still have to prove its damages at an arbitration or in a court and each state's law could approach the damages calculation differently.

Insurance and regulatory risks of conversion

Separate from contractual liability between a lessee and lessor, passenger-to-freighter conversions may also implicate insurance considerations as the policy for the aircraft may not permit the carriage of cargo, especially dangerous goods. Moreover, the financing arrangements for the aircraft could limit the ability to carry cargo. Therefore, if a lessor receives a request for consent to a passenger-to-freighter conversion, the lessor should review the financing documents to determine if a lender's consent to such a conversion is required before they can consent to the conversion process.

Moreover, depending on the conversion process used, and the cargo contemplated, there may also be regulatory challenges posed by the conversion process, especially for permanent modifications. Aircraft conversion programs are regulated by the FAA and other international regulatory agencies, such as EASA.

Rising tide of litigation

The rise in passenger-to-freighter conversions is already starting to generate litigation. For example, on May 25, 2021, Mammoth Freighters sued multiple defendants in federal court in California, alleging that the defendants stole valuable, confidential, and proprietary information belonging to Mammoth Freighters to develop a competing business converting large passenger aircraft into cargo freighters. As conversions increase in response to the increased air cargo demand, it is inevitable that litigation surrounding the conversions will increase as well.

As a result, before undertaking any conversion, an aircraft lessee should carefully review its lease to make sure the conversion, and the necessary modifications, are contemplated by the lease. A lessee should engage with the aircraft lessor early in the process to make sure the lessor is aware of the conversion contemplated and to obtain the consent of the lessor as required by the lease. Likewise, if a lessor receives a request from an aircraft lessee for the lessor's consent to a passenger-to-freighter conversion, the lessor should carefully review its insurance and financing documents to make sure the conversion is permitted. Although the increase in air cargo demand is a bright spot for the industry, aircraft lessees and lessors alike should make sure they carefully manage their risk during the conversion process.

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AVOIDING UNNECESSARY DISRUPTION

IMPACT OF COVID-19 ON CARGO-RELATED CLAIMS

by Jody Wood & Matthew Knowles

Takeaways

- Three kinds of cargo-related liability claims are increasing:
 1. Impending insolvency situations
 2. Ongoing issues with carrier flexibility
 3. A greater reliance on air freight
- Carriers are now turning to managing the revival of passenger travel



Following the outbreak of COVID-19 at the end of 2019, the world faced challenges not seen since the Great Influenza epidemic in 1918. Fast forward to 2020, and the impact of the COVID-19 pandemic has reached unprecedented levels, causing constrained capacity, disruption to services, and destabilized freight rates. This article will analyze how the air freight sector has survived, identifying possible behavioral changes of key players with respect to cargo-related liability claims as we emerge in a new era of cargo transportation.

The COVID-19 crisis impacted the aviation sector in strikingly different ways for passenger and air cargo sectors. The impending insolvency situation, ongoing issues with carrier flexibility, and greater reliance on air freight stand out as primary drivers of the increase of claims. These factors have shaped the number and nature of cargo claims over the past two or three years. As we near the end of 2021, we predict the focus will turn to managing a post-COVID transition and repositioning businesses to address the mounting revival of air passenger travel.

Impact of COVID-19 on the aviation industry

According to the International Air Transport Association (IATA), 2020 has been confirmed as the worst year on record for the airline industry. In a publication titled “IATA World Air Transport Statistics” (WATS), performance figures for 2020 reveal the damaging impact of the COVID-19 crisis on global air transport.

In summary, [total industry passenger revenues fell by 69 percent](#) and net losses totaled \$126.4 billion. Most damning of all, the decline in air passenger transportation in 2020 was the [largest single drop recorded](#) since global revenue passenger kilometers were first tracked in around 1950. Flowing from the fact that passenger aircraft are responsible for transporting almost half of all air cargo shipments, the air freight market worldwide has equally been affected by COVID-19.

Chart 1: CTK levels, actual and seasonally adjusted

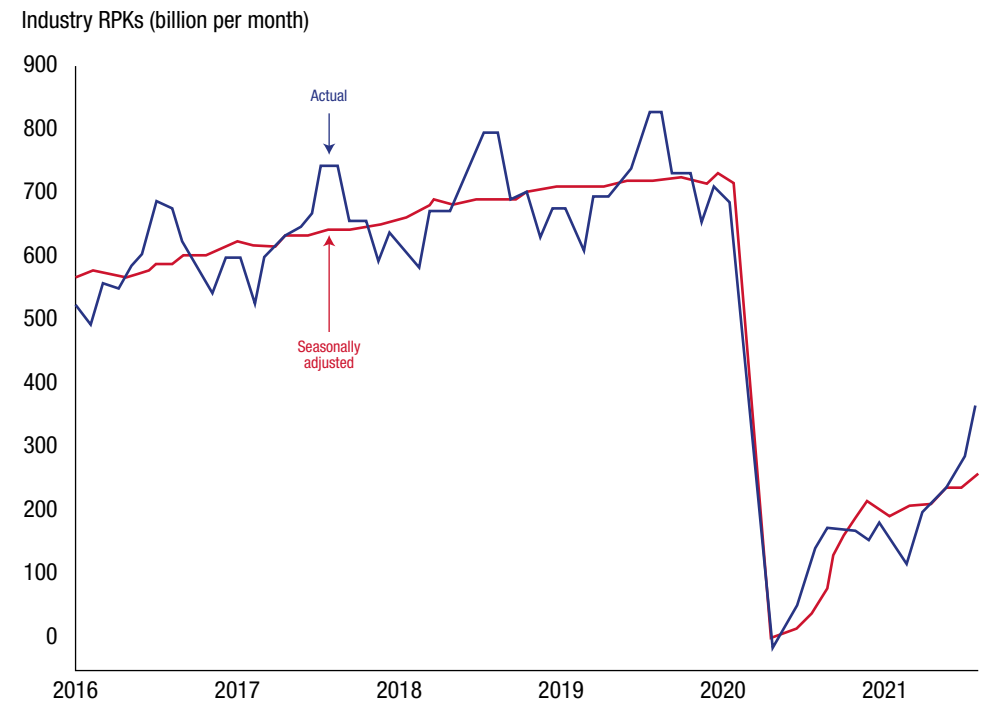


Sources: IATA Economics, IATA Monthly Statistics

Chart 1 (above), taken from the IATA Air Cargo Market Analysis July 2021, highlights the substantial fall of industry-wide cargo ton-kilometers (CTKs) in the first quarter of 2020. Remarkably, the seasonally adjusted metric in red (which evens out periodic swings) has rebounded strongly from May 2020, when strict lockdowns were lifted, with CTKs around 5 percent higher than the pre-crisis peak in August 2018.

In the passenger market, however, the situation is not as promising. Chart 2 (below) highlights a rebound of only 50 percent (approximately) compared to pre-COVID-19 levels. Closely tied to demand, the price for air cargo has equally been shaped by the crisis; see, for example, Chart 3 below. Pre-COVID-19, air cargo was around 12 times more expensive than ocean freight. While prices significantly rose in April 2020 during the early stages of the pandemic when supply declined, they have since fallen to competitive rates when compared with container shipping.

Chart 2: Global air passenger volumes (RPKs)

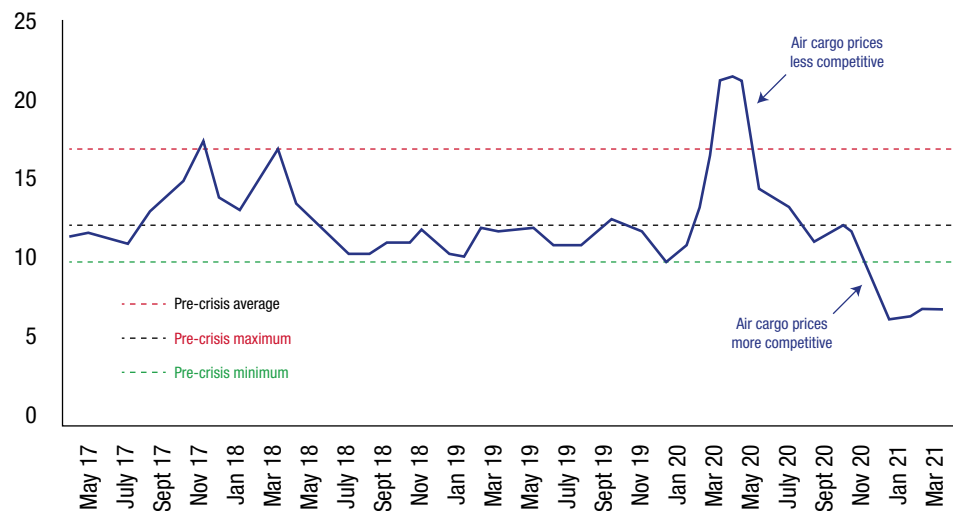


Sources: IATA Economics, IATA Monthly Statistics



Chart 3: Prices of air cargo and container shipping per kg of chargeable weight

Ratio of chargeable weight rates per kg for air cargo and container



Sources: Boeing, IATA CargoIS, Freightos Baltic Index

Cargo claims for air freight

Freight claims in the aviation industry typically arise due to one of four possible scenarios: (1) physical damage to shipments whether noticed before or after delivery; (2) shipments delivered short; (3) refusal in part or in whole (wrong freight, product damage, or late shipment); and (4) shipments lost by the carrier.

Importantly, the liability for any possible damage or loss to a shipment depends on the contractual position between the shipper, carrier, and receiver. By way of example, the carrier (that is, the airline) will likely have an insurance policy that provides cover under Institute Cargo Clauses (Air), determining what risks of loss of or damage to cargo are covered. More significantly, the Air Waybill (AWB), an air cargo document that constitutes the contract of carriage between shipper and carrier (airline), will also include provisions with respect to risk and liability.

At the start of 2019, [the Electronic Air Waybill Resolution 672 \(MeA\)](#) (e-AWB) became the default contract of carriage for all air cargo shipments on enabled trade lanes. The e-AWB removed the requirement for a paper AWB and sets out the respective liabilities between the parties at article 9.

Impact of the COVID-19 pandemic on cargo claims

Impending insolvency

With COVID-19 profoundly affecting airline companies, largely due to travel restrictions, numerous bankruptcies have ensued with some airlines ceasing operations altogether. The impending threat of insolvency appears to have triggered a mindset shift in the aviation sector. Market participants are placing greater focus on every revenue stream available and seeking to increase their reliance on claims, most notably freight forwarders, importers, and exporters. Motivated financially, such parties are no longer willing to neglect claims in a scenario where “every penny counts”, doing all they can to keep their businesses afloat.

Falling outside the scope of this article in a strict sense, it is important to note that beyond cargo claims there has been an increase in claims of a different nature. These have included abandoned cargo claims, repairs and maintenance claims, and claims against additional and unexpected fees. It is clear that post-COVID-19, if such a term can be applied to the situation we find ourselves in today, akin to the global supply chain, the aviation sector has emerged more mindful of finances and pursuing claims in a more productive and frequent fashion.

Ongoing issues – carrier flexibility

Significant difficulties have also arisen for freight forwarders and consolidators on account of carrier flexibility. Cirum, a global leader in aviation and travel data and analytics, reveals that dynamic carrier schedules, which were often set months in advance and never changed, are changing regularly. Looking at passenger flights alone, March 2021 saw 24 percent of all flights had to be rescheduled.

Freight forwarders and consolidators who are unable to track changes in the schedule, equipment, and route are at risk of disruption and therefore at risk of an increase in cargo-related claims. Any liability arising from the delay or damage to cargo (from the delay) will quickly negate any profitability of operations. Nevertheless, Cirum emphasizes that sector participants may be able to avoid risk and disruption altogether by tracking such changes, adapting quickly, and finding efficiencies.





Greater reliance on air freight

Finally, the increase in cargo claims may simply be due to a greater reliance on air freight. When considering why shippers are looking to air freight, there are two interesting conclusions that can be drawn. One reason might be that due to the congestion of ports, which has reached all-time highs, in comparison to airports, where there has been a significant fall in passenger demand, [air cargo does not experience the same delays](#). For many years air freight has been a preferred method of transportation for shippers of perishables. However, alternative shippers are likely to utilize air transport in the current market, not just due to its speed but also its increased reliability.

Another large issue is the [container shortage hurting the global supply chain](#). Subsequently, air cargo does not use containers, making it more available and desirable to shippers. This is evidenced further by the surge in passenger-airliner freight ('freighter') operations that are keeping passenger aircraft in operation and meeting the increased air freight demand.

Regardless of the exact reason for the shift from sea to air, COVID-19 has significantly affected the entire global supply chain. The aviation sector, however, has been instrumental not only in the transportation of medicines and medical equipment but in keeping global supply chains functioning by transporting food, basic necessities, and other essential commodities. It will be interesting to see how the sector shifts as the disruption is resolved. However, with no end in sight, this is unlikely to be any time soon.

Conclusion

Despite continued supply chain disruption (most notably at sea), the sector has bounced back from the pandemic-related crisis in a short space of time. Leaving a trail of disruption and an increase in cargo-related liability claims, the crisis will continue to play out, with such claims likely to continue for some time. It is difficult to point to a single factor responsible for the increase, however, (1) the impending insolvency situation, (2) ongoing issues with carrier flexibility, or (3) a greater reliance on air freight, or any combination of these factors, have largely shaped the number and nature of cargo claims over the past two or three years. Despite the increase, the aviation sector has been essential for the supply of essential goods, and participants have been flexible, imaginative, and considered in their approach. As we near the end of 2021, we predict that the focus will now turn to managing a post-COVID transition and the complications of the ever-increasing revival of air passenger travel.



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AVOIDING UNNECESSARY DISRUPTION LESSORS NOT FRUSTRATED BY 'HELL OR HIGH WATER' CLAUSES

by Jody Wood & Emily Balment

Takeaways

- Recent case law upholds unconditional rent payment clauses in dry aircraft leases
- Courts have confirmed that a lease will not be frustrated as a result of the COVID-19 pandemic, an aircraft arrest, or the Boeing MAX-8 grounding
- However, judges may be willing to grant a stay of execution on a summary judgment against a lessee if there are exceptional circumstances



Under a dry aircraft lease (namely a long-term lease where the aircraft is handed over to the lessee, without crew, for its own purpose), the lessee undertakes all risks and responsibilities in relation to operation and maintenance of the aircraft, while the lessor's obligations are limited to warranting the lessee's quiet enjoyment. Such leases typically contain 'hell or high water' rent payment clauses, effectively meaning the lessee must pay rent on an unconditional basis.

Three recent High Court cases have tested the robustness of these clauses, with the lessees arguing that the COVID-19 pandemic, the arrest of an aircraft by national authorities, or the grounding of the Boeing MAX-8s frustrated the leases, bringing their rent payment obligations to an end.

To establish frustration, a party must demonstrate that, without default, its obligations are incapable of being performed, since performance of the contract has been rendered radically different from the [initial obligations undertaken \(*The Sea Angel* \[2007\] 2 Lloyd's Rep 517\)](#). Clearly, the doctrine of frustration would not apply where the issue causing performance to be radically different was captured by, say, a force majeure clause. The cases serve to illustrate that hell or high water clauses continue to be seemingly enforceable, with the court concluding in each case that frustration was not available and that the lessee remained responsible for payment of the rent.

A summary of each case is below.

Salam Air v. Latam Airlines

In this case, the lessee (Salam Air, an Oman-based company) failed to meet its rent obligations under three aircraft leases with Latam Airlines in light of the COVID-19 pandemic and the Omani authorities' decision to prohibit all air passenger flights to and from Oman in March 2020.

The lessor sought to call upon standby letters of credit (an alternative to the deposit of three months' rent). The lessee sought an injunction preventing the lessor from doing so, arguing the decision of the Omani authorities frustrated the purpose of the aircraft leases, namely, to allow the lessee to operate short-haul flights from Muscat.

In refusing to grant the injunction, the judge reasoned:

1. A six-year dry aircraft lease is a challenging environment in which to establish frustration as from the lessor's perspective, it does not matter how frequently the lessee uses the aircraft, if at all, or with what level of occupancy. The lessor was still able to perform its obligation to provide the lessee with quiet possession of the aircraft, and the lessee to perform its obligation to pay the rent.
2. Under the doctrine of "frustration of purpose", it must be demonstrated that both parties had a common purpose at the foundation of the contract which is now impossible to perform. There was nothing in the lease to suggest that the lessee's use of the aircraft for short-haul flights from Muscat was a shared purpose of both parties, as opposed to a matter with which the lessee alone was concerned. The corollary of this was that the obligation to pay rent in almost any conceivable circumstance lent support to the proposition that the lessee would not be free of its obligation to pay rent merely in light of aircraft restrictions in Oman and the COVID-19 pandemic ([2020] EWHC 2414 (Comm)).

Iris Helicopter Leasing Ltd v. Elitaliana Srl

In the context of a summary judgment application, the Commercial Court rejected the lessee's argument that a lease had been frustrated after the aircraft (a helicopter) was detained by the Italian authorities for over a year and a half as a result of unpaid import taxes. The lessee argued that the Italian authorities had been acting unlawfully as there was no basis on which the taxes were payable.

The judge, granting summary judgment, held that the lease had not been frustrated. Placing particular emphasis on the hell or high water rent provision, the judge held that finding in favor of the lessee would effectively reallocate risk to the lessor. The risk (i.e., the obligation to pay rent when the aircraft was unavailable) had clearly been assumed by the lessee. In this case, the lease also addressed the question of seizure of the aircraft and of liability in relation to import taxes (*[2021] EWHC 2459 (Comm)*).

Wilmington Trust SP Services (Dublin) Ltd v. Spicejet Ltd

The lessee (SpiceJet), represented by Reed Smith's London aviation team, who at the hearing obtained a stay of execution of the summary judgment, leased three aircraft under 10-year dry leases from the claimant lessor (one Boeing 737-800 and two Boeing 737-MAX-8s). SpiceJet defaulted under its rent obligations as a result of both the COVID-19 travel restrictions and the grounding of Boeing MAX-8s from the beginning of 2019 (following crashes of similar aircraft as a result of design defects, making it illegal to operate the MAX-8 aircraft). The claimant lessor consequently applied for summary judgment.

SpiceJet put forward a number of defenses, including title to sue, illegality, and breach of an implied term under the Supply of Goods and Services Act 1982. However, it is the defense of frustration in relation to the grounding of the MAX-8 aircraft which we examine below.

SpiceJet argued that the common purpose of the leases was the provision of the aircraft for commercial use, which had been frustrated by the grounding of the aircraft. The lessor argued, *inter alia*, that the common purpose was the hire of the aircraft in return for the payment of rent and how the lessee operated the aircraft was not relevant to the commercial purpose. The judge disagreed with the lessors, noting that the terms of the lease restricted sub-leases to commercial carriers and operators.

The judge was also prepared to assume (although not deciding the point) that the hell or high water clause did not operate to exclude the possibility of frustration in this instance. While the judge accepted the general risk of the aircraft being grounded due to any prohibition on use or defect in airworthiness was foreseen by the parties and allocated to SpiceJet, here the grounding was related to defective design of the aircraft (and not simply government regulations or matters of maintenance).

Nonetheless, the judge concluded that, given the lessee had assumed the entire commercial risk of operating the aircraft, if the total loss of the aircraft did not absolve the lessee of its obligation to pay rent, then a temporary prohibition on use (amounting to 10 percent of the term of the lease) was unlikely to do so. However, the judge explicitly noted she was not saying such leases could never be frustrated and that if the prohibition on use were permanent it "might be a different matter" (*[2021] EWHC 1117 (Comm)*).

Conclusion

As can be seen from the Wilmington judgment, the judge did not rule out the possibility of frustration. However consistent with previous authority, the judgment confirms, to quote the Court of Appeal's decision in *The Sea Angel [2007]*, "the doctrine is not to be lightly invoked".



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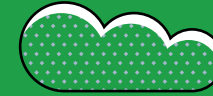
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NAVIGATING THE GIVEN EXTERNAL CONSIDERATIONS CORSA: ENVIRONMENTAL IMPLICATIONS AND COMPLIANCE CHALLENGES

by Adam Hedley & Amber Davies

Takeaways

- Demand for carbon credits to meet CORSIA obligations will increase annually in line with the growth trajectory of the aviation industry
- Competition for CORSIA-compliant carbon offsets is expected to increase as national and corporate carbon reduction initiatives start to make an impact
- Fuel price volatility is expected to have more impact on international aviation than carbon offsetting costs; however, offsetting costs will inevitably need to be pushed onto customers, creating additional price pressures
- Sustainable aviation fuels will help reduce carbon emissions, but may not be sufficiently developed to negate the need for the CORSIA past its projected end date of 2035



The Carbon Offsetting and Reduction Scheme for International Aviation

The CORSIA is a global scheme to address carbon emissions from air travel, running from 2021 to 2035. It complements a broader package of measures to help the International Civil Aviation Organisation (ICAO) achieve its goal to make all growth in international flights carbon-neutral from 2020 onwards. The CORSIA is a market-based mechanism that relies on the use of emissions units (carbon credits) from the voluntary carbon market to offset the amount of CO₂ emissions that cannot be reduced through technological and operational improvements, and sustainable aviation fuels (SAFs).

The CORSIA, implemented in phases, compares the total CO₂ emissions for a year against a baseline. From 2021, any CO₂ emissions from flights that exceed the baseline will have to be offset by operators governed by the scheme.

Phase	Timeframe	Participation
Pilot	2021 to 2023	Voluntary (i.e., at the discretion of the member states)
First	2024 to 2026	Voluntary (i.e., at the discretion of the member states)
Second	2027 to 2035	Mandatory (except for exempt states)

Approved carbon offsets under the CORSIA

Only certain approved types of carbon credits that meet the strict ICAO emissions unit criteria can be used to meet the compliance obligations under the CORSIA. So far, ICAO has approved credits issued under the following voluntary carbon market programs for the pilot phase:

- American Carbon Registry
- China GHG Voluntary Emission Reduction Program
- Clean Development Mechanism
- Climate Action Reserve
- The Gold Standard
- Verified Carbon Standard

According to ICAO, the pilot and first phases will be identical, save for how the offsetting requirement for operators is determined. While this implies that the approved list of eligible carbon credits will not expand ahead of the first phase, ICAO is required to review the CORSIA every three years, beginning in 2022. The review will consider its impact on aviation growth and recommend, as necessary, adjustments to the scheme. This may result in changes to the existing list of approved offset programs.

Current and future demand for carbon offsets

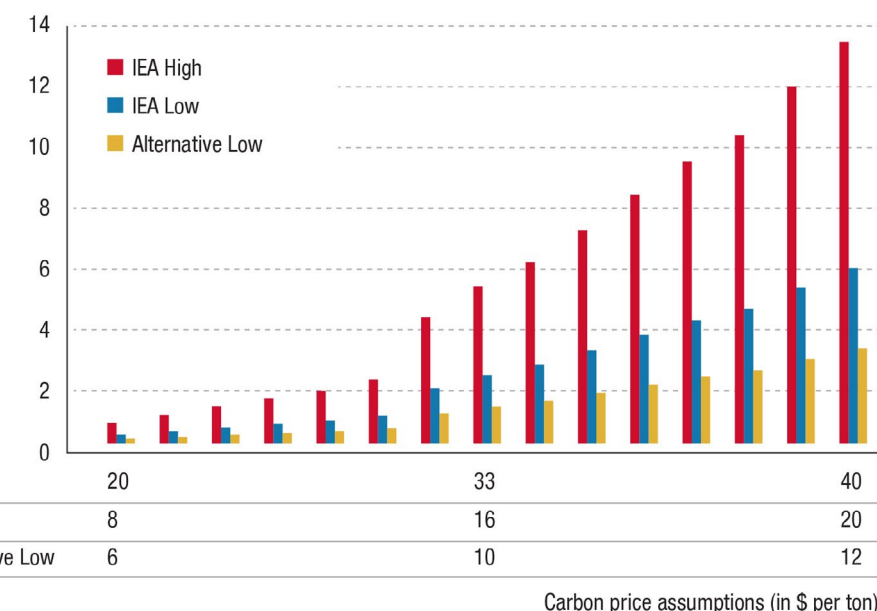
There is a projected demand for around 1.6 billion carbon credits under the CORSIA over its current lifetime. Currently, there is sufficient supply of carbon offsets on the market to meet demand, as fewer credits will be required to be surrendered in the early phases of the scheme. However, demand for credits will increase every year in line with aviation growth, due to the nature of the carbon-neutral growth objective.

Prices for carbon offsets on average stand at just \$3 to \$5 per metric ton of CO₂ at present, reflecting a well-supplied market. However, prices are starting to increase across both the regulated and voluntary carbon markets as other drivers of demand start to make an impact, most notably, the Paris Agreement commitments and market mechanisms under Article 6. These are expected to become operational shortly and to significantly increase demand for carbon offsets. Currently, it is not clear how the Paris Agreement commitments and mechanisms will interact with the voluntary carbon market, but they create a potential threat to the supply of carbon credits to the CORSIA. There has also been a huge increase in demand for credits from the private sector, as businesses pursue carbon neutrality and ESG goals that will need to be met, in part, through acquiring offsets. The demand for offsets from CORSIA-obligated aviation operators has been significantly lower than was originally forecast, partly as a result of the pandemic. The sector's emissions fell sharply in 2020 due to widespread travel restrictions, which has effectively pushed expected demand for credits back by a few years. ICAO has responded by adjusting the scheme's pilot phase – the emissions baseline is now based on 2019 emissions only, rather than the average of both 2019 and 2020. However, the surplus will not last forever, as demand grows in the wake of COVID-19.

Compliance with the CORSIA

The ICAO estimated the costs from CORSIA offsetting, assuming carbon prices range from a low of \$6 to \$12, to a high of \$20 to \$40, per metric ton of CO₂. The analysis shows that the cost of carbon offsetting for operators could range from approximately 0.4 percent to 1.4 percent of total ICAO forecast revenues from international aviation in 2035.

Cost from offsetting requirements (in billion \$)



The low estimate is based on the CAEP's "optimistic" CO₂ scenario and IEA's low carbon price forecast. The high estimate is based on CAEP's "less optimistic" CO₂ scenario and IEA's high carbon price forecast. [Source](#)



According to a cost analysis conducted by IATA, the costs from CORSIA offsetting are expected to have less impact on aviation than fuel price volatility. The estimated offsetting cost in 2030 is equivalent to a \$2.60 rise in jet fuel price per barrel. This in turn means that an extra \$10 per barrel on the price of jet fuel would cost the industry about four times the estimated cost of offsets in 2030. Over the past 10 years, the standard deviation of jet fuel price annually has been up to \$40 per barrel, meaning that airlines have coped with oil price volatility of more than 15 times the size of the projected offsetting cost in 2030.

Many airlines already offer some form of point-of-sale carbon offsetting option for customers, but that practice is not consistent and is much less prevalent in the air freight sector. The reality is that the air freight offsetting cost will need to be pushed onto customers, and however small the additional cost in percentage terms, it will create additional price pressures in the industry.

Will SAFs negate the need for the CORSIA post-2035?

The CORSIA's projected end date is 2035. However, a special review will be conducted by the end of 2032 to consider terminating, extending or improving the scheme. UK authorities have expressed concern that the "medium-term" nature of the CORSIA is not enough to ensure that aviation contributes to the global temperature goals of the Paris Agreement. As such, the UK government is negotiating with ICAO to agree a long-term emissions reduction goal for aviation, and to align the CORSIA to this goal, by its 2022 Assembly. Furthermore, various UK, EU and global climate change targets and policies tend to extend further than the CORSIA's projected end date. This may suggest that 2035 is not a realistic end date and, as such, ICAO should take a longer-term approach.

ICAO recognizes SAFs as an important long-term tool for reducing emissions. It has imposed a number of obligations on member states to accelerate the development and deployment of SAFs, with a significant proportion of conventional aviation fuels to be substituted with SAFs by 2050.

The use of SAFs in achieving climate goals is supported by both the EU and UK. In 2020, the European Commission published the Sustainable and Smart Mobility Strategy, with the objective of increasing the uptake of SAFs. As with the 2050 ICAO Vision for Sustainable Aviation Fuels, the strategy is based on a number of key milestones which continue up until 2050. The UK government recently proposed a Sustainable Aviation Fuels Mandate as part of the UK's wider de-carbonization strategy. Under the proposed mandate, jet fuel suppliers will be required to blend an increasing proportion of SAFs into aviation fuel from 2025. In addition, the consultation paper describes SAFs as key to the de-carbonization of the aviation sector beyond 2050.

While it is clear that SAFs will go some way to helping the sector reduce emissions, longer-term climate targets imply that they will not be sufficiently developed or deployed to negate the need for the CORSIA past 2035.

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NAVIGATING THE GIVEN EXTERNAL CONSIDERATIONS COMMERCIAL DRONE DELIVERY: A SOLUTION TO LAST-MILE LOGISTICS

by Catriona Henderson & Matt Warner

Takeaways

- Drone technology offers unique long-term logistical benefits when properly integrated
- Opportunities for cost savings and greater efficiency, but less environmental impact are unmatched by other disruptive innovations
- The regulatory and technological hurdles, however, can only be overcome with progressive strategies and expert industry knowledge



While the drone industry is far from maturity, the good news is that the freight and logistics sector, due to its unique symbiosis with drone technology, is in a privileged position at the forefront of the integration of unmanned aerial systems (UAS), helping to determine what shape the industry will take when it comes of age. A focus on the nexus between law, logistics and economics highlights the short-term hurdles that can be overcome, and long-term opportunities that can only be realized, with strategic planning and expert industry knowledge.

Commercial prospects: The benefits and drawbacks of drone logistics

Relief from last-mile costs

Last-mile logistics connects regional distribution centers, or “transportation hubs”, to the final destination. It caters for the movement of individual packages to specific locations and necessitates significant flexibility and a large fleet size to fulfill this task. It is therefore no surprise that the last mile accounts for 53 percent of the total costs of shipping globally. Of that, a considerable chunk can be attributed to the labor costs in developed markets as a result of last-mile logistics. This is only exacerbated in rural areas where the sparse population increases inefficiencies and loss in productivity while consumers maintain the same demands and expectations as those in urban areas.

A study in 2016 carried out a cost analysis of Amazon Prime’s drone delivery scheme, with predictions that, compared to a U.S. postage company delivery van in a mid-sized U.S. city, drone delivery could slash costs by one-third on the busiest days of the year, with the emphasis placed on labor cost savings. However, considerable technological hurdles have yet to be overcome before autonomous drone flights using “detect-and-avoid” software are possible, and until then we would merely be replacing delivery drivers with remote pilots. As a result of the lack of safe and developed technology, the typical regulatory position places further, complex limits on the beyond visual line of sight (BVLoS) operation of drones, hindering the range of these delivery systems almost to a point of uselessness. Until technological progress can stimulate regulatory confidence in autonomous drones, the fantasy of a dramatic reduction in labor costs will remain just that – a fantasy.

It is clear that commercial drones have the potential to carve out a new model of profitability by slashing costs, with some studies estimating a five to 10 year horizon for this technology to become viable. However, one must be cautious not to place too much emphasis on these so far fantastical promises without considering the technological and legal hurdles yet to be navigated. On the flipside, neglecting a long-term strategy could leave companies in the dust of their competitors and prove fatal.

Market demand for faster delivery

Next-day delivery is fast becoming the industry standard and same-day delivery is also becoming more widespread. 25 percent of people would pay significant premiums for next- or same-day delivery. This is intensifying pressure on the logistics market to adopt increasingly faster delivery systems to remain competitive. Drones look to be a viable option – for example, Amazon’s sandbox drone scheme in the UK was able to deliver a package in 13 minutes in rural Cambridgeshire.

The urgent demand for faster delivery extends beyond the commercial sector into the public sphere. The COVID-19 pandemic illustrated the need for a more efficient system of transporting key medical supplies, especially between rural hospitals that lack the infrastructure for fast transport. The NHS in the UK, for example, responded to this in the remote Scottish Highlands by partnering with Skyport to enable two hospitals to exchange urgent medical supplies by drone – this would have been impossible by land, even using the fastest means of delivery possible.

A common thread amongst this is one of the most fundamental problems facing regulators and operators currently. The rural-urban divide reflects key safety concerns regarding drones and their ability to integrate within our technological ecosystem without causing unnecessary harm or disruption. As a result, current regulatory limitations in the United Kingdom, European Union and United States restrict how close drones can fly to people. This limits the possibility of introducing drones into urban areas in the near future and so significantly diminishes the usefulness of this technology. Close legal and commercial attention must be paid to the integration of enabling technologies such as traffic management systems in order to maintain safeguards without stifling innovation.

Environmental benefits for urban freight logistics

Cities make up 70 percent of the world's greenhouse gas emissions, with 5.5 percent of total emissions caused by the transport sector. The environmental impact of logistics is most concentrated in urban areas as a result of not just direct emissions from large fleets but the knock-on, indirect effect of increased fleet sizes on congestion, which is exponentially damaging. With this in mind, it is clear that the logistics sector needs to go further than just using more efficient or electric vehicles and look to disruptive innovations to alleviate their contribution to the sector's indirect impact on the environment.

It does not take much to appreciate that using the low-altitude airspace, free of the threat of further congestion, appears to be the most feasible means of alleviating the pressure on urban infrastructure and thus the environment. Other methods, which have not been mentioned in this article, including robot delivery and collection points, fail to address the greater pressures placed on the highway infrastructure by increasing the volume of vehicles already on the road with that of delivery robots and the need to travel to collection points, likely in some sort of road vehicle. Drones provide the best long-term solution

to the infrastructure issues associated with urban sprawl, which will only worsen as the populations of megacities and large cities continue to grow. Drones, most of which are battery-powered, also alleviate the direct impact on the environment by reducing the fuel consumption of logistics companies.

What must be addressed are the current limitations to this seemingly obvious solution. Primarily, and somewhat ironically, one of the major limitations to alleviating the stress on road infrastructure in cities is the lack of infrastructure for drones. Urban development strategies have largely operated independently from the development of disruptive innovations like drones and have yet to construct charging stations and other infrastructure necessary to integrate drone delivery. With that in mind, it is essential for innovators and urban planners to develop long-term strategies to properly integrate widespread drone delivery.

Drone logistics is worth the investment

Drone technologies are far from maturity but to ignore them in their infancy would be to potentially miss out on the most important and ground-breaking technologies of the early twenty-first century for those in logistics and beyond. There is a significant lack of regulatory confidence in current drone technology, but this can be offset in the long term by innovations that could safely integrate drones into everyday life. Drone integrated airfreight poses a real opportunity to revolutionize the ability to generate profit, meet customer demand and alleviate pressure on the traditional road network used in last-mile logistics for urban delivery, which is only causing more and more harm to the environment.



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NAVIGATING THE GIVEN EXTERNAL CONSIDERATIONS INCREASING REGULATORY ENFORCEMENT OF EU CROSS-BORDER E-COMMERCE

by Yves Melin, Philippe Heeren & Emma McGrory

Takeaways

- Currently, regulatory compliance of products sold through cross-border e-commerce is honored in the breach and enforcement of customs duties and VAT is patchy
- Customs authorities and regulators in the EU and UK are determined to ensure enforcement and restore the competitiveness of domestic businesses
- Increasingly, customs authorities are looking at carriers when it comes to enforcement at the border and liability for non-compliance
- Increasingly, carriers are required to know what products they are transporting



The rise of cross-border e-commerce is increasingly coming up against legal and societal concerns, chiefly the protection of consumers and restoration of competitiveness for domestic producers and retailers. This manifests in two areas in particular:

1. More aggressive enforcement of customs and VAT collection, including against transport companies when other debtors are not within reach, which is regularly the case in cross-border e-commerce; and
2. A new focus on trying to overcome the difficulties inherent in enforcing regulatory compliance of imported e-commerce goods. Logistics service providers are increasingly the target of these enforcement actions, in the expectation that they know, or should know, what they are transporting.

Cross-border e-commerce poses unique enforcement challenges

E-commerce continues to grow at a dizzying pace. Already representing almost \$3 trillion, e-commerce sales are expected to increase by another 47 percent by 2025 according to the World Economic Forum and Statista. Cross-border e-commerce, whereby goods sold online cross a customs border, represents an important share of these sales. A high-risk share.

Unlike other e-commerce sales, cross-border e-commerce involves importing goods and placing them on a foreign market for the first time. Enforcement authorities expect that every item sold online should be fully compliant. This applies both to items shipped in bulk, and wholesale, before being retailed in the EU from fulfilment centers (B2B2C) and to items shipped directly to consumers from another customs territory (B2C). The importer, or declarant in EU parlance, is required by law to know what is in each box and to be able to demonstrate compliance, at the time of importation and for at least three years afterwards. However, compliance levels are very low. Up to 75 percent of items online could be breaching product safety rules. Additionally, not enough is being done to ensure that the right customs duty and VAT are paid.



Latest legal developments in cross-border e-commerce

Lawmakers around the globe are tooling up. Here, we look in particular at the situation in the EU and United Kingdom.

The European Union

With effect from July 1, 2021, the EU thoroughly reworked the legal framework for the taxation of cross-border e-commerce shipments. The traditional VAT exemption for low-value goods was abolished and replaced by a system whereby VAT on any shipment, no matter how small the value, becomes due and payable at the time of the online order. The subsequent import of the goods is then exempt from VAT. Only direct shipments from a country outside of the EU can qualify for this (as yet) optional Import One-Stop Shop (IOSS) system. Online marketplaces play an important role under IOSS, as they qualify as a deemed supplier. The alternative Special Arrangement system allows VAT to be collected by the person presenting the goods to customs, which is particularly relevant for postal operators. By allowing the declaration of low-value goods with a so-called “super reduced data set”, the EU has limited the burden associated with customs formalities for these two optional systems applicable to low-value consignments. Yet, these simplified formalities still create a greater burden compared to the oral declarations that were possible before July 1, 2021.

The Market Surveillance Regulation entered into force on July 1, 2021 to streamline and coordinate EU-wide product compliance and surveillance procedures for imported products, with rules specifically making fulfilment service providers liable for compliance. EU legislators aim to close an enforcement gap, as the importer is now often a final consumer (the party the product regulations aim to protect) and not a distributor or an importing business.



The EU is increasingly focusing on how products are manufactured outside of its borders. A rapidly growing number of mandatory supply chain due diligence schemes are being adopted, or discussed, by the EU, requiring manufacturers and traders to be able to demonstrate that the products they import were made without breaching minimum labor laws, human rights and environmental standards. There are already a number of laws for specific products such as conflict minerals and timber. This set of rules, based on a standard set by the OECD, is being expanded to include other products, including raw materials for batteries, soft commodities, etc.

Cross-border e-commerce is changing rapidly. Shipments from Chinese warehouses straight to EU doorsteps are growing. Since the UK left the EU's customs union on January 1, 2021, all online sales from Great Britain became cross-border e-commerce. This pressure is causing the EU to look for further reforms. The optional VAT tax system is likely to become mandatory. The exemption from import duties for shipments under €150 is also being discussed, and could disappear. More generally, the European Commission is starting consultations with stakeholders on adapting the Union Customs Code to capture new trade flows, with e-commerce being the main priority. Further changes are expected.

The United Kingdom

The UK also recently reworked its VAT legislation. The changes to the cross-border e-commerce rules for Great Britain are broadly similar to those introduced in the EU. However, the changes came into effect on January 1, 2021 (six months prior to the corresponding EU changes) and are mandatory rather than optional, unlike in the EU. In light of these changes, non-UK sellers and online marketplaces should keep an eye on whether they are required to register for UK VAT going forward.

For now, we wait to see if the UK will follow the EU in adopting other changes.

Enforcement trends: Know what is in the box

As a market participant, it is quite a task to monitor all these changes and ensure their proper application, but if goods are not brought into the market correctly this can lead to serious trouble. Customs and other supervisory checks can lead to disruption to the flow of goods. Additional taxes may be due on import if a misdeclaration is found. Also, due to an investigation, goods may not be released, resulting in mandatory modifications, or even destruction, along with possible non-compliance sanctions.

Who is responsible? Naturally, the importer is looked at first. After all, the importer should know the goods in question, or at least have direct access to the relevant information. In practice, however, we find that importers are not always prepared and aware of the applicable regulations, and sometimes they are not established in the EU.

Enforcement authorities often look at other persons in the supply chain, alongside the importer. The Market Surveillance Regulation designates fulfilment service providers as responsible for compliance with product regulations. Customs regulations go a lot further.

The person declaring the goods on entry is responsible for accuracy and completeness. This includes the entry summary declaration, which is the carrier's responsibility. Where the declaration is incorrect or incomplete, the person in question will be liable for the consequences. In Belgium, especially in a maritime smuggling context, the customs authorities are looking at the carrier when it comes to tax liability. When goods are smuggled, the carrier has not submitted a correct or complete entry declaration. To escape liability, the carrier must demonstrate that it could not have known about the non-compliance. This, in turn, requires demonstrating that adequate compliance procedures were in place, so that the fraud or non-compliance could not reasonably have been detected. We see a similar trend in other EU member states to look at the carrier as the liable party.

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