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# Passenger-to-freighter conversions

**What's driving the demand today and will it last, or will brand-new freighter variants of commercial aircraft families become the go-to option?**

By David Dundas

From the very early days of aviation, conversion of aircraft for freight use has existed. As an example, in 1919, the American Railway Express attempted to fly 1,100 pounds of freight from Chicago to Washington, D.C. using a converted bomber. However, it was after the end of the Second World War that such conversions gathered pace when a massive surplus of military aircraft like the Douglas C-47 (the military version of DC-3) and C-54s were converted into commercial freighters to fill the need for cargo capacity. Conversions continued for the subsequent decades, with a demand for air freight increasing as a direct result of eCommerce. This was particularly noticeable when the Covid-19 pandemic struck in 2020 when larger aircraft were placed on the conversion 'menu', including the Boeing 777-300ER and Airbus A321.

In order to find out more about the current state of the market for freighter

conversions and the hurdles faced, we approached both Aeronautical Engineers Inc. and the Vallair Group to get their invaluable take on things.

## **What structural changes in global air cargo demand have made passenger-to-freighter conversions increasingly attractive in recent years?**

There are several ways of looking at this, as the situation differs between narrow-bodies and wide-bodies. Pascal Parant, Chief Commercial & Marketing Officer at Vallair Group breaks it down as follows: "In the current narrow-body market, lessors and operators have a strong interest in keeping aircraft in passenger configuration. Demand remains extremely high due to persistent supply chain disruptions, engine reliability issues on CEOs, strong passenger demand, and comparatively weaker cargo demand. Several A321 and 737-800 P2F aircraft are currently grounded. In some cases, leasing the engines alone can

generate more revenue than leasing the entire aircraft. Narrow-body cargo demand is also softened by highly efficient logistics networks based on road and trucking — one only needs to look at the number of Amazon trucks on highways. On the wide-body side, apart from the 777F, there are currently no immediate new-production solutions available. This will change with the arrival of the A350F, although engine reliability will remain an important question. Demand driven by e-commerce and long-haul international cargo remains solid. Wide-body freighters are not readily available on the market and prices are extremely high. As a result, whatever can be converted will be — primarily 777-300ERs and A330s. Demand exists, capital is available, but suitable conversion candidates are increasingly difficult to find." Beyond the above, Robert T. Convey, SVP Sales & Marketing, Aeronautical Engineers Inc. (AEI), feels that "Perhaps the largest structural change that affected the narrow-



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Aeronautical Engineers Inc

body conversion space in recent years was COVID. This had the dual effect of grounding passenger aircraft while at the same time increasing demand for regional freight. With COVID now well behind us we are seeing the effects of oversupply and a softening of narrow-body conversion demand."

#### **How do you see the long-term role of converted freighters versus new-build freighters in the global cargo fleet?**

Here Robert Convey makes it clear that "AEI focuses exclusively on narrow-body freighters for which there are no OEM new build options. The primary reason for this is the low utilisation of the narrow-body freighter which does not support the high cost of a new build freighter," while Pascal Parant doesn't mince words when tells us that: "There are simply not enough new-build freighters being produced to meet demand, and lease rates are extremely high

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— above US\$1.2 million per month for a 777F. Consequently, converted freighters will continue to play a major role for many years. The main risk factor is potential CO<sub>2</sub> taxation affecting older aircraft types."

#### **What criteria determine whether a specific aircraft type is a good candidate for P2F conversion?**

It is fair to say that key factors include age, remaining time before entering ageing programmes, fuel efficiency, and most importantly payload-range capability. The lighter the aircraft, the greater the payload and operational efficiency. Conversion programme maturity and slot availability are also critical. Pascal Parant goes on to say that "For narrow-bodies, the market is saturated and limited — the 737 and A321 remain the only realistic options. However, demand is not fully there yet. The day a major operator selects the A321P2F as a true 757 replacement, the market dynamic will change significantly. Until then, the narrow-body cargo market will remain relatively soft. For wide-bodies, the A330 is currently the 'flavour of the year.' The next milestone will be the certification of

the 777-300ER P2F. Availability of suitable feedstock will again be the limiting factor, as the 777X is not yet certified and airlines are retaining their passenger aircraft until they gain confidence in transitioning to newer types." Robert Convey makes one clear identifier when he tells us: "The primary driving feature of feedstock for a narrow-body freighter is its ability to carry a standard 88" x 125" container/pallet. These Unit Load Devices or ULD's are used around the world and if your proposed aircraft type is not able to transport these ULD's it will have limited success in the market. Of course price, availability and serviceability come into play when selecting an aircraft to convert but I would suggest the aforementioned is more important."

#### **What role do lessors play in shaping conversion programmes and launch decisions?**

According to Pascal Parant, "It largely depends on the lessor's profile. Some are active in P2F programmes, while others prefer to monetise their assets at lease expiration and leave cargo conversion to specialists. In my view, GECAS was



instrumental in the launch of the 777-300ER P2F programme. Today, AerCap continues to play a major role. Conversion allows full utilisation of the aircraft's remaining economic life, but long-term return on investment must be secured." Meanwhile, Robert Convey is very succinct in his answer as he advises that: "Historically narrow-body freighter have been converted equally between operators and lessors. Both sectors are needed to ensure the success of a conversion programme."

**From an engineering perspective, what are the most complex aspects of converting a passenger aircraft into a freighter?**

For Robert Convey at Aeronautical Engineers Inc. there is only one major challenge as he suggests that "Without a doubt the design and installation of the cargo door and accompanying surround structure presents engineers with the most challenges. It is critical that these components are designed properly and with durability in mind." Pascal Parant at Vallair Group is very much in agreement with Convey in terms of the cargo door, but he identifies two additional challenges as he tells us that: "It essentially comes down to three main elements: the cargo door, reinforced floor structure, and PDUs (Power Drive Units). Cargo loads are fundamentally different from passenger loads. Pressure forces on the cargo door are enormous, and all structural and load-distribution aspects must be carefully engineered." He then adds that "These conversions are true engineering achievements."

**What lessons have you learned from early conversion programmes that have influenced your current designs?**

As far as Robert Convey is concerned, "AEI's philosophy of continual

improvement means that we are always bettering our current products. These improvements are then incorporated into the next generation of freighter which ensures our customers that the best solutions are always front and centre. Specific improvements include Cargo Door Sequencing valves, LED lights in on the main deck, new floor beams and the latest in smoke detector technology." Pascal Parant, on the other hand, adopts a cautionary approach when advising that: "The most important lesson is to conduct thorough due diligence when selecting engineering partners. A poor choice can bring a programme to its knees."

**How does the total cost of ownership of a converted freighter compare with that of a new-build freighter?**

Pascal Parant certainly makes it clear that a newly built fit-for-purpose freighter is almost a different beast as "A new-build freighter provides warranties, zero-time status at delivery, and proven maturity — particularly in the case of the 777F. The acquisition price is high, but the aircraft can operate for more than 30 years. For converted aircraft, total cost includes acquisition, heavy maintenance, and conversion. The main risk is airframe ageing. Older aircraft are more exposed to corrosion, and entry into ageing programmes can add approximately US\$1.5–3 million on narrow-bodies." Both Pascal Parant and Robert Convey are in agreement that narrow-body freighters also typically fly fewer hours than passenger aircraft, and while Parant sees this resulting in lower maintenance reserve accumulation, Convey feels that this doesn't support the purchase of a new-build, narrow-body freighter.

**What are the main bottlenecks in scaling up P2F conversion capacity today?**

For Pascal Parant, the principal problem is getting all relevant factors to align, both with narrow-body and wide-body conversions. As he makes very clear, "It is rare that the three key factors align simultaneously: availability of suitable feedstock, conversion slots, and a strong cargo market. For narrow-bodies: limited suitable aircraft, available slots, but a softer cargo market. For wide-bodies: shortage of suitable aircraft, available slots, and a strong cargo market. China's performance in A330 conversions is remarkable — they have the scale, resources, and workforce. In the Western world, the shortage of skilled technicians is likely the biggest constraint." Beyond this, Robert Convey sees three additional areas where there are holdups and shortages: "Supply chain delays, escalating costs and a grave labour shortage are equal challenges when trying to scale a P2F programme."

**Which aircraft types do you believe will dominate the P2F market over the next 10–15 years?**

We decided to end this article with a relatively straightforward question, and we received two very straightforward answers in return. "In our sector the B737-800SF will hands down be the leading narrowbody freighter around the world," Robert Convey confirms, while Pascal Parant has his eye on three different aircraft, telling us that: "A330s and 777-300ERFs will dominate, and I remain convinced that the A321 will soon find its market — it is only a matter of time, perhaps within the next two years."



Pascal Parant, Chief Commercial & Marketing Officer, Vallair Group

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