

Cargo Conversion Candidate Aircraft

How to spot the winners and losers

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In my *Jetrader* article last year, the principal question posed was: Are freighter conversions good investments? To summarize, the “four Cs” were found to be necessary for success—Candidate aircraft, Conversion capacity, Customers and Cash. Provided an aircraft type was in demand at a time when conversion capacity was available and the aircraft owner had the financial resources, the ingredients existed to extend the useful life of a passenger aircraft and earn a compensatory return on the additional investment. In this article I will examine in more detail the aircraft attributes necessary to be a successful conversion candidate. Which aircraft types are winners and why? An understanding of these attributes allows the owner/lessor to make the appropriate strategic decisions for the “end of life” period for their asset types.

Evolving Freighter Market Requirements – Since the development of the air freight market in the 1950s, the requirements for cargo aircraft have changed to reflect changes in the market. With apologies to commercial aviation historians, commercial air cargo truly came of age with the advent of the 747 freighter. As the transition to a global economy began, the 747 was ideally suited to carry large amounts of high-value goods on intercontinental routes. Prior to the 747, if an international shipper had a large volume shipment, their choices were limited to the narrow confines of a DC8 and 707 or much slower oceanic container ships. A regularly scheduled main deck 747 flying on key Atlantic and Pacific routes provided a financial benefit to the customer

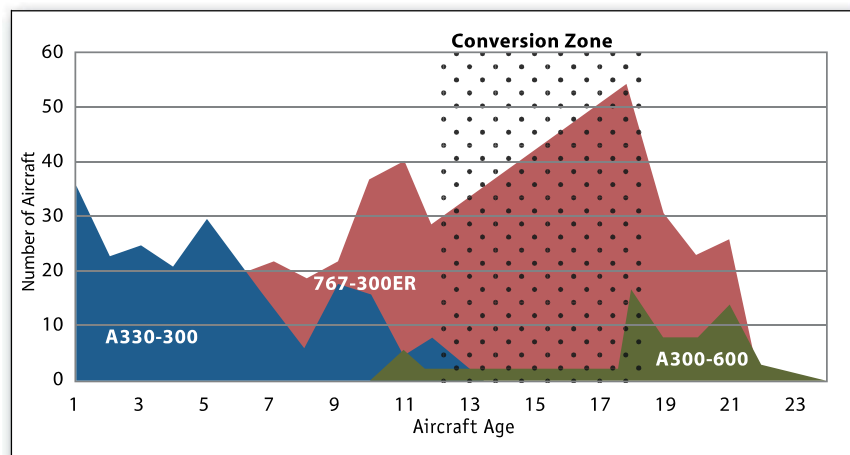
through a significant reduction in transit time (hence inventory costs), frequent and more reliable schedules, and the ability to build larger shipments that took advantage of the 747’s 10-foot high main deck. Subsequently, as the 747 passenger fleet aged, operators were attracted to the compelling economics of freighter conversion.

In 1978, FedEx launched overnight U.S. domestic door-to-door envelope and small package service with full-sized aircraft and single handedly created a requirement for narrowbody short-haul freighters, particularly the Boeing 727. FedEx’s success was made possible by its revolutionary Memphis-based hub and spoke system combined with the 727’s speed and volumetric capacity. UPS followed suit in the early ‘80s and eventually several hundred 727 freighters, mostly ex-passenger aircraft, were placed in service.

As FedEx’s domestic market grew rapidly, so did their need for larger volume, longer range aircraft, hence their introduction of the DC10-10, a regional widebody freighter in 1981. The DC10 had superior operating economics and technical characteristics than any other widebody available, and FedEx eventually opted for the DC10-30 for its international routes.

Until the mid-90s the 747, DC10 and 727 converted freighters dominated the market. The venerable DC8 and, to a lesser degree the 707, primarily fulfilled niche requirements for long, thin routes and high density, lower value cargo (e.g. auto parts). Three distinctly different market segments had now developed—the **long-haul intercontinental** market served with the 747, DC10-30 and MD11 and very recently the 777; the **regional widebody** market for high volume, medium range routes served

Regional Widebody Feedstock Age Distribution



by the DC10-10 and subsequently the A310/A300 and 767; and the short range, lower volume **narrowbody** routes handled with the 727, 737 and most recently the 757. Today these aircraft types represent almost 2,000 aircraft or 86 percent of all jet freighters flying today.

In the future, the narrowbody market segment will be significantly smaller due to improvements in road and rail networks and changes in integrators' product mix. The demand for overnight letters has been largely replaced by internet-driven technology, while an explosion of direct shipping (e.g. Amazon) of consumer goods has taken its place. These combined network and demand changes have resulted in higher volume regional widebodies replacing the narrowbody as the backbone of the express operator fleets. In addition, high growth rates in South Asia and China, where geographical and infrastructure constraints hinder ground transport, further fuel the growing need for regional widebodies. The end result is a future market dominated by the growth of the regional widebody segment.

Fleet Age Profile – The age distribution of the passenger fleet type is of critical importance in determining whether the type has the right attributes to be a conversion candidate. What proportion of the fleet type is in the primary conversion age zone of 12-18 years? Are there more aircraft older than 18 years than younger than 12 years? Given the importance of the regional widebody market, the fleet age profiles of the three principal aircraft types are evaluated and depicted in the chart on Page 20. The distribution of fleet populations shows three distinct patterns and provides an indicator of the relative strength of each type. The older A300-600, although still a productive freighter, is becoming less attractive as a conversion as it moves out of the "conversion zone." Conversely, the bulk of the 767-300 fleet (47 percent) is within the conversion zone, while the bulk of the A330-300 fleet is still too young to consider for conversion.

Fleet Fragmentation – Fleet uniformity is an important concept with several attributes that needs detailed evaluation to determine if a sufficient number of compatible units exist to warrant a productive conversion program. Uniformity is measured by several metrics including operator concentration, engine types and variants, aircraft

Freighter Conversion Attribute Scorecard					
	Cargo Market Requirements	Age Profile	Fleet Fragmentation	Pax Popularity	Feedstock Pricing
MD80/90	●	STOP	✓	✓	✓
B737 Classic	✓	✓	✓	✓	✓
B757	✓	✓	●	●	●
B767-200	STOP	STOP	STOP	●	✓
B767-300ER	✓	●	STOP	●	●
B747-400	✓	✓	●	✓	✓
B777	✓	✓	●	✓	STOP
A300-600	●	●	✓	✓	✓
A330-300	✓	✓	✓	✓	✓

weight variants, and other type specific differences. Fleet diversity translates into higher cost and reduces the ability to assemble a block of conversion candidates cost-effectively. Airframe weight increases and engine variant standardization can both require expensive "paper changes" from the manufacturer or worse, physical modification. For example, the 767-300ER has three engines types with 11 variants, while the A300-600 has two engine types and four variants. An operator considering the 767 must evaluate creating a fleet among different engine variant aircraft blocks as well as the cost to standardize to a single desired variant.

Passenger Aircraft Popularity – Success as a passenger aircraft type may or may not translate into success as a freighter. A successful passenger aircraft type will have a broad and deep customer base of well-established operators. This base should have a predictable retirement pattern and the current passenger operators should be potential post-conversion customers. A predictable retirement pattern requires a viable replacement option in order for the aircraft type to achieve sufficient availability and the right price point as the bulk of the fleet passes through the "Conversion Zone." For example, the 767-300ER, a very popular passenger aircraft with good freighter attributes, is experiencing an elongated retirement profile due in part to the delay of its likely replacement—the 787. At an age when the aircraft type would be considered a good conversion candidate, lease rates and values have remained firm as carriers

retain aircraft awaiting replacement aircraft. This prolonged fleet turnover is even more pronounced due to an unprecedented global recession resulting in almost 80 otherwise suitable conversion candidates aging beyond the optimal conversion zone.

Feedstock Pricing – Market pricing is closely related to popularity, but also is a function of the commercial aircraft market cycle. Used aircraft prices, which are tied to general economic cycles, bottom out about every eight to 10 years. The rate and amount of decline from peak to trough as well as market recovery characteristics differ by aircraft type due to differences in markets served, fleet age, replacement orders and production status. For example, 737 Classic pricing has fallen dramatically because it is out of production, has viable replacement options and the markets it serves have been particularly hard hit by the recession. Combined with other favorable attributes, the 737 Classic represents a very good conversion candidate, tempered only by a declining narrowbody freighter market share.

The decision to convert an aircraft to freighter use is often a case of choosing between the lesser of two or more evils. In the current environment, freighter lease rates require feedstock pricing to be close to aircraft scrap value, making the choice even more difficult. Quantifying an aircraft type's key attributes will help in making a sound economic decision. The table above illustrates a general evaluation of the attributes of current potential feedstock types. An informed investment decision will require a deeper dive into each attribute. ▲