

NEW-GENERATION AIRCRAFT:

AN INDUSTRY DISRUPTOR DELIVERING REAL BENEFITS



MANAGING AIRLINES IS A CHALLENGING JOB

High fixed costs, sensitivity to macro-economic changes and vulnerability to competitive dynamics make guiding an airline challenging, even in the best of times. Adding to the challenge are complex decisions on aircraft orders. These decisions require the commitment of billions of dollars in a single order. These same aircraft stay in the fleet for 15-20 years and lock in capital funding costs, fuel consumption rates and long-term maintenance cost rates.

Given these sensitivities and long-term commitments, the decision an airline management group makes as to quantity and types of aircraft to acquire, often is one of its most important and strategic decisions. It will weigh on the cost structure for more than a decade and, when combined with the decisions of other competing airlines, will impact the supply and demand balance of the industry.

The introduction of new-generation aircraft that offer improved performance and new capabilities presents fleet managers, executive management and boards of directors with added complexity. Technological advances are fueling much needed operating cost savings, which drop to operators' bottom lines.

The capabilities and resulting successful commercialization of these new-generation aircraft are also creating powerful disruptive forces worldwide. For example, the greater choice of aircraft sizes, range and fuel efficiencies are creating deployment options that did not exist five years ago. Additionally, the uptick in aircraft deliveries, particularly in widebody models, which are associated with the success of the new platforms, is causing significant near-term impact on supply and demand balances in various regional sectors.

Looking ahead, airlines must be thoughtful in planning their capital expenditures and look holistically at all of the impacts of a new aircraft order before making major new commitments.

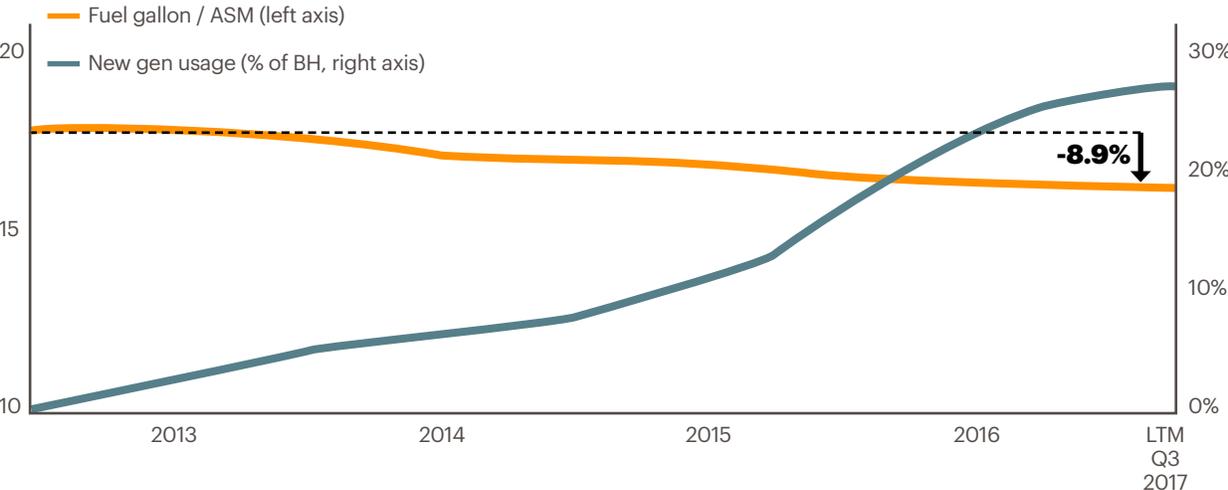
NEW-GENERATION WIDE-BODIES HAVE DELIVERED ON THEIR PROMISE

Given the drive for industry profitability, new-generation widebody aircraft are increasing penetration and delivering measurable benefits to airlines. New-generation widebodies now account for more than 750 active aircraft, which is 18 percent of the global widebody passenger fleet.¹

Starting in 2013, a noticeable decline has begun in the amount of fuel gallons consumed for each available seat mile flown by US airlines on Trans-Pacific flights. This timeframe coincides with the start of new-generation widebody use on these missions, which now account for nearly 27 percent of aircraft hours flown for US carriers (from a base of zero percent in 2013). Overall fuel burn per available seat mile has fallen nearly nine percent (see Figure 1), a fact that can largely be explained by the use of the new technology equipment.

The fuel savings on this subset of global widebody capacity accounts for more than 130 million gallons per year. As new-generation widebodies take over an even greater share of capacity, these benefits will accrue across the industry.

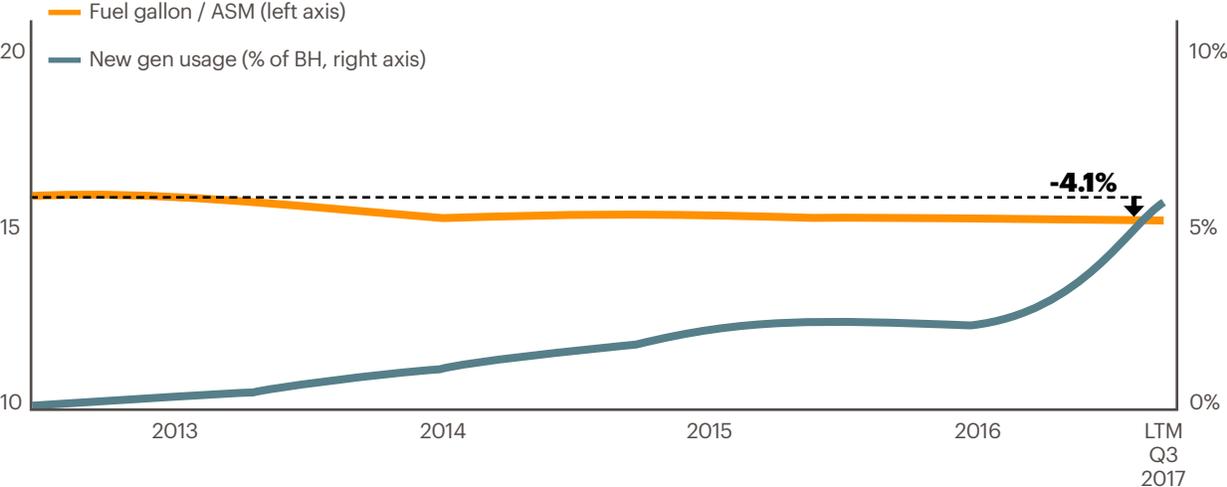
Figure 1. Fuel burn vs. new-generation widebody penetration (US carriers Trans-Pacific)



Source: U.S. Department of Transportation Form 41, Innovata

Similar improvements can be seen in Trans-Atlantic markets, though here the new-generation fleet accounts for around 6 percent of overall flying, a fact that will change significantly in coming years.

Figure 2.
 Fuel burn vs. new-generation widebody penetration (US carriers Trans-Atlantic)



Source: U.S. Department of Transportation Form 41, Innovata

Airlines that operate both new and older generation widebody aircraft tend to use the new-generation aircraft more, as they offer greater capability and more efficient operating costs. In fact, airlines that have new-generation widebodies in their fleets operate those aircraft two hours more each day than the older generation aircraft they continue to hold.²

A secondary benefit of these new-generation widebodies is they allow airlines the ability to open a greater range of new, long-haul, non-stop markets to serve customers (see Figure 3).

The trend began when Boeing introduced its 787 in 2004 and Airbus followed with its A350 in 2005. After working through early development issues and some modifications to original designs, these new-generation aircraft entered service in 2011 and 2015, respectively.

The decision to invest in these platforms was partly driven by steep ramp up in fuel costs experienced in the early 2000s. Airframe manufacturers were developing the use of new composite materials designed to take weight out of the aircraft, while engine manufacturers were successfully developing higher thrust, more efficient engines.

To put this in perspective, flying a 7,000-nautical mile mission once required operating an aircraft that has a maximum takeoff weight (MTOW) of 910,000 pounds. Today, airlines have the choice to operate an aircraft as light as 560,000 pounds, a close to 40 percent reduction. This improved efficiency has corresponding economic benefits in terms of fuel burn, and other weight or engine thrust related costs, such as significantly lower engine maintenance expense.

Figure 3.
 Technical comparison of older and new-generation widebodies

	OLD-GENERATION WIDEBODIES 747-400ER	NEW-GENERATION WIDEBODIES	
		787-9 	A350-900 
MTOW (LBS)	910,000	-38%	-32%
MAX RANGE (NMI)	7,670	0%	6%
MAX THRUST, ALL ENGINES COMBINED (LBF)	253,200	-44%	-33%
SINGLE CLASS SEATS (EXIT LIMIT)	660	-36%	n/a

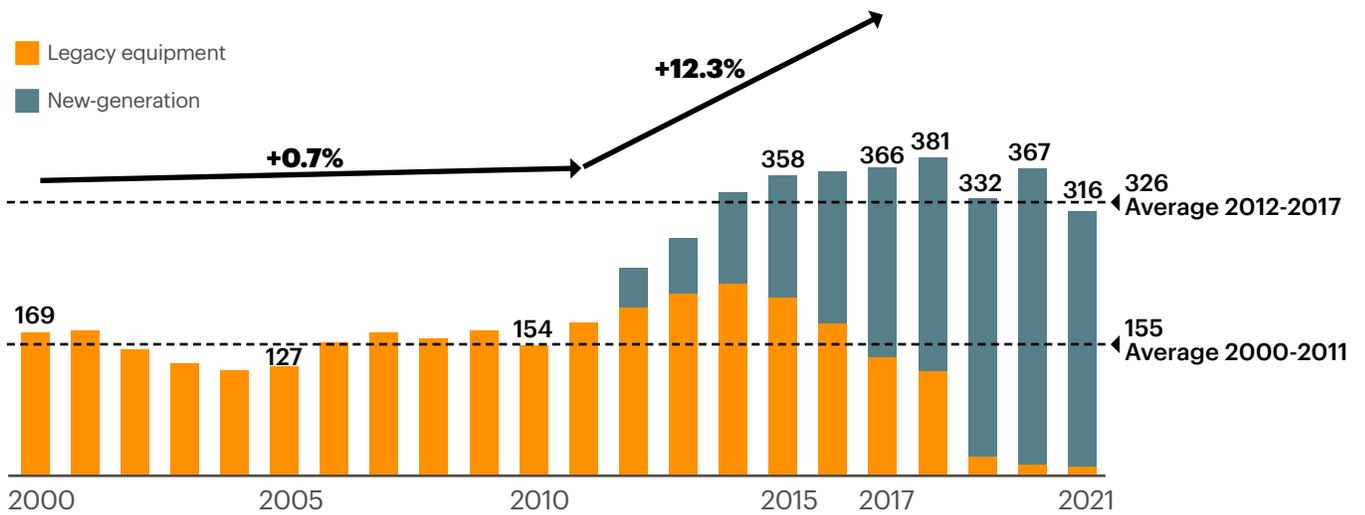
% relative change for new gen versus B747

Source: OEM aircraft characteristics

RAMPING UP TO MEET THE NEED

Considering the collective benefits, response from the airline community to these new products has been overwhelming. In order to satisfy that growing demand, airframe manufacturers have ramped up production rates and deliveries of new-generation widebody aircraft, hitting all-time highs. With strong order books, new aircraft deliveries are expected to remain at elevated levels for the remainder of this decade (see Figure 4).

Figure 4. Widebody aircraft deliveries and order backlogs (2000-2021)



Source: ASCEND. Notes: New generation includes 787, A350, A330neo, 777X

DEPLOYMENT OF NEW-GENERATION WIDEBODY AIRCRAFT

Since 2012, more than 150 new widebody city pairs have been added using primarily new-generation aircraft, such as Tokyo—San Diego, Boston—Doha, Helsinki—San Francisco. Airlines have opened 25 new city pairs of over 6,500 miles since 2016.³ Many of these pairs would not have been economically viable with older generation widebodies due to passenger and/or cargo payload restrictions on older model widebody aircraft.

WHAT IS ON THE HORIZON

Having succeeded in stimulating increased demand for new aircraft, the engine and airframe manufacturers are continuing to invest in new developments. In 2018, we will see the A350-1000 and A330neo enter the market and Boeing is targeting 2019 for the introduction of its 777x. Boeing is also testing demand for a “New Mid-market Airplane (NMA)” designed to fly medium-haul missions, in part because of the significant success of Airbus’ A321neo. The advent of a single aisle aircraft capable of significant deployment over Trans-Atlantic routes and similar missions offers yet another dimension to the developments witnessed over the last five years.

The surge in new aircraft deliveries, both widebody and narrowbody aircraft, is impacting other sensitive elements of the industry. Residual values of older generation aircraft, important to airlines as well as aircraft lessors and the financial community, are negatively affected by the step change in operating efficiency. The increased pace of new aircraft deliveries is affecting supply and demand balances and there is evidence that yields on long-haul routes are falling in part due to increased global capacity outstripping natural demand, at least in the near-term.

Coupled to the long lead time between order and delivery, the challenge for airlines contemplating new capital commitments is more complex. Cost and revenue benefits associated with the new aircraft are in flux in ways that are only partially controllable by individual airlines. Fear of being left behind in the race to modernize aircraft fleets is an ever-present concern.

INVESTING WISELY

Given the benefits of widebody aircraft, coupled with the impact on supply and demand, airlines must be thoughtful and look holistically at all decisions to spend capital. Making the right decision can sustain or break the pattern of a low-performing cost structure.

Airlines can more strategically embark upon fleet investment decisions:

- 1 STUDY LONG-TERM MARKET DYNAMICS:**
Airline management groups need more than ever to do in-depth analyses, ideally using modeling tools available in the marketplace, to scrutinizing long-term supply and demand trends in their markets.
- 2 UNDERTAKE LONGER-TERM NETWORK PLANNING:**
There is no substitute for doing detailed long-term modeling of likely optimal network design for each airline based upon its business models, products, natural catchment areas and competitive position. All of this serves as a solid foundation for going forward with the appropriate new aircraft order.
- 3 OPTIMIZE FLEET DECISIONS:**
Using long-term market dynamics and longer-term network plans, coupled with modern fleet optimization tools to understand tradeoffs between model types, quantities and capacity growth under varying macro assumptions.
- 4 MANAGE CAPITAL COMMITMENTS:**
Carefully plan capital commitments around new fleets, and build in flexibility with respect to timing and quantity of deliveries.
- 5 DIGITAL PLATFORM IMPLICATIONS:**
Digital platforms that are rolling out for front-end customer-facing distribution platforms, operational digital platforms and back office digital platforms are all likely to have implications for airline management groups as they evaluate how to capitalize on new aircraft deliveries.

The changes that these new developments are bringing to the airline industry are dynamic. The major engine and airframe manufacturers are not standing still. Additional variants are either set to deliver or are now on the drawing board. The industry is also working through how to launch new models of aircraft at a faster pace which impacts a diverse cross-section of the industry including maintenance teams, financial investors and commercial teams tasked with keeping an eye on supply and demand.

With all the change happening, it is best to weigh all options when investing in aircraft. Airlines that already have their new aircraft orders in place will need to dynamically and proactively manage their fleet commitments given the likely disruptor effect of this new generation of equipment when placed into service. However, with careful planning, airlines will benefit from the positive disruption of new-generation aircraft, while balancing supply and demand for the industry.

REFERENCES

- ¹ ASCEND, January 2018
- ² Innovata, ASCEND. Notes: Only considers average daily utilization of airlines with both new generation and legacy aircraft in their fleet
- ³ U.S. Department of Transportation Form 41, Innovata (considers markets not served in 2015)

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