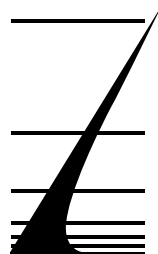


# The Market for Large Commercial Jet Transports

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Product Code #F611

A Special Focused Market Segment Analysis by:



**FORECAST** INTERNATIONAL



# Analysis 1

## The Market for Large Commercial Jet Transports

### 2009-2018

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## PROGRAMS

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The following reports are included in this section: (**Note:** a single report may cover several programs.)

Airbus A319/320/321  
Airbus A330  
Airbus A340  
Airbus A350 XWB  
Airbus A380  
Antonov/Aviastar An-124/225  
Boeing 737  
Boeing 747  
Boeing 767  
Boeing 777  
Boeing 787  
Ilyushin Il-96  
Tupolev/Aviastar Tu-204  
Yakovlev Yak-42/MS-21



## Introduction

The airline industry's return in 2007 to net profitability proved to be shortlived as air carriers once again posted huge losses in 2008. Slumping air traffic and a deep economic recession battered the industry during the year. Preliminary data indicate that the world's airlines posted a net loss of some \$8.5 billion in 2008.

This dismal performance was no surprise. Indeed, 2008 was already shaping up to be a bad year for airlines even prior to the economy turning sharply downward in the fall. International air passenger traffic had already slowed considerably during the first three quarters of 2008, and fell off even more in the final three months of the year. The slowdown in air cargo traffic was even more pronounced.

What all this means is that, having suffered through six consecutive years of net losses (2001-2006), the airline industry was able to enjoy only one year of black ink (2007) before profits again disappeared. Not all regions were affected to the same extent in 2008, and, in fact, European carriers actually posted a profit for the year. Nevertheless, the year was a bad one, and set the stage for more troubles in 2009 and probably 2010 as well.

In response to this challenging business environment, airlines are engaging in a variety of tactics, including capacity control, cost reductions, consolidation activity (mergers and alliances), exploitation of ancillary revenue streams, and adjustments to business models. The success, or lack thereof, of all these various moves will help determine the competitive landscape of the airline industry for years to come.

It is up to Airbus and Boeing to respond to the needs of this beleaguered and changing industry. The immediate challenge for the two airliner manufacturing giants is to manage their shrinking, but still robust, order backlogs by adjusting build rates in order to better reflect market demand. Already, both companies have revised production plans for a number of models, and more such revisions are certainly on the way.

In addition, Airbus and Boeing each have new aircraft in the development pipeline that are slated to enter service within the next several years. For the longer term, both companies have critical decisions to make as to the timing of new products and (in a not-unrelated consideration) the technology brought to bear by these products. The most important such decision will concern new narrowbody aircraft to replace the Airbus A320 and Boeing 737 families.

All of these trends and market factors, and many others, are examined in this analysis. Ten-year production forecasts are included in this study for 12 families of

large commercial transports. These forecasts are broken out by model and by engine. Combined, the 12 families account for more than 30 individual aircraft models. The forecasts are calculated in terms of unit production as well as dollar value of production. Manufacturer market shares are also calculated, using the aircraft forecasts as a basis.

As always, Forecast International divides large commercial jet transports into two classes: light/medium transports and heavy transports. This is done for methodological reasons. These two general classes are then further broken down into seating classes, which helps facilitate market evaluation and product comparison.

The light/medium transport and heavy transport categories are as follows:

### LIGHT/MEDIUM COMMERCIAL JET TRANSPORTS

Airbus A319  
Airbus A320  
Boeing 737  
Tupolev Tu-204

All of the aircraft in the light/medium class are narrowbody airliners. Light/medium transports are acquired in large numbers by low-fare carriers and mainline airlines. Unit production in the light/medium class will significantly outpace production of heavy transports over the next 10 years.

Competition is quite heated in the light/medium sector between the Airbus A320 single-aisle family and the Boeing 737 series. Both families are expected to remain in production throughout the forecast period, as service entry of replacement models will likely not occur until sometime after 2018. Both Airbus and Boeing have begun tentative efforts toward designing successor models, but neither is in any rush to launch such a product despite occasional calls from various airlines for an all-new narrowbody.

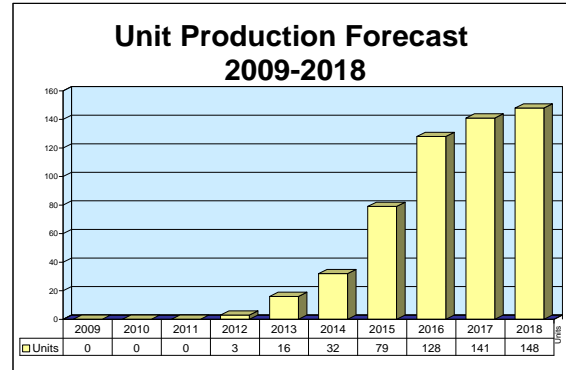
Besides the A319 and the A320, Airbus' A320 family also includes the A318 and the A321. We believe that the A318 is best categorized as a regional jet and, thus, we do not include it in our analysis of the large commercial jet transport market. The A321, as discussed below, is categorized in this study as a heavy  
**Continued...**



# Airbus A350 XWB

## Outlook

- Planned in-service date is mid-2013
- The XWB family includes three basic models
- High-density configuration is now available
- The XWB targets both the Boeing 787 and the Boeing 777



## Orientation

**Description.** Family of twin-turbofan-engine, widebody commercial transport aircraft.

**Application.** Long-range, medium-capacity, scheduled and non-scheduled passenger and cargo transportation.

**Sponsor.** The A350 XWB is sponsored by Airbus.

**Status.** Development

**Price Range.** A350-800, \$205.9-\$211.5 million; A350-900, \$238.2-\$242.9 million; A350-1000, \$267.0-\$272.2 million. All in 2008 U.S. dollars.

**Total Produced.** Not applicable.

## Contractors

### Prime

<b>Airbus France</b>	<a href="http://www.airbus.com">http://www.airbus.com</a> , 316 Route de Bayonne, Toulouse, 31060 France, Tel: + 33 5 61 93 55 55, Prime
----------------------	--

### Subcontractor

<b>Alliant Techsystems Inc (ATK)</b>	<a href="http://www.atk.com">http://www.atk.com</a> , 7480 Flying Cloud Dr, Minneapolis, MN 55344 United States, Tel: + 1 (952) 391-3000, Fax: + 1 (952) 351-3009, Email: <a href="mailto:atk.corporate@atk.com">atk.corporate@atk.com</a> (Composite Aft Fan Case)
<b>B/E Aerospace Inc</b>	<a href="http://www.beaerospace.com">http://www.beaerospace.com</a> , 1400 Corporate Center Way, Wellington, FL 33414 United States, Tel: + 1 (336) 767-2000, Ext: 1440, Fax: + 1 (336) 744-1009 (Passenger and Crew Oxygen Systems; Galley System)
<b>Cobham Avionics and Surveillance Division</b>	<a href="http://www.cobham.com">http://www.cobham.com</a> , Brook Rd, Wimborne, BH21 2BJ Dorset, United Kingdom, Tel: + 44 1202 882020, Fax: + 44 1202 840853 (Radio and Audio Integrated Management System)
<b>Diehl Aerospace GmbH</b>	<a href="http://www.diehl-aerospace.de">http://www.diehl-aerospace.de</a> , Alte Nussdorfer Strasse 23, Überlingen, 88662 Germany, Tel: + 49 7551 89 02, Fax: + 49 7551 89 6001 (Cabin and Cargo Lighting; Common Remote Data Concentrator; Door and Slide Control System)
<b>ECE</b>	<a href="http://www.ece.zodiac.com">http://www.ece.zodiac.com</a> , 129 Blvd Davout, BP 113, Paris, F-75960 France, Tel: + 33 1 56 06 10 00, Fax: + 33 1 56 06 10 10 (Electrical Power Distribution System)

## Airbus A350 XWB

<b>Eaton Aerospace</b>	<a href="http://www.aerospace.eaton.com">http://www.aerospace.eaton.com</a> , 3 Park Plaza, Suite 1200, Irvine, CA 92614 United States, Tel: + 1 (949) 253-2117, Fax: + 1 (949) 253-2111 (Main Engine Fuel Pump; Engine Build-Up Subsystems)
<b>GE - Aviation, Systems Division, Mechanical</b>	<a href="http://www.geaviationsystems.com">http://www.geaviationsystems.com</a> , Kings Ave, Hamble-Le-Rice, S031 4NF Hampshire, United Kingdom, Tel: + 44 2380 453371, Fax: + 44 2380 744042 (Wing Trailing Edge Subassemblies and Components)
<b>GKN Aerospace</b>	<a href="http://www.gknaerospace.com">http://www.gknaerospace.com</a> , Ipsley House, Ipsley Church Ln, Redditch, B98 0TL Worcestershire, United Kingdom, Tel: + 44 1527 517 715, Fax: + 44 1527 517 700 (Wing Trailing Edge; Composite Wing Spar)
<b>Goodrich Aerostructures</b>	<a href="http://www.aerostructures.goodrich.com">http://www.aerostructures.goodrich.com</a> , 850 Lagoon Dr, Chula Vista, CA 91912-0878 United States, Tel: + 1 (619) 691-4111, Fax: + 1 (619) 691-3030 (Nacelle & Thrust Reverser System)
<b>Goodrich Aircraft Wheels &amp; Brakes</b>	<a href="http://www.wheelsandbrakes.goodrich.com">http://www.wheelsandbrakes.goodrich.com</a> , 101 Waco St, Troy, OH 45373 United States, Tel: + 1 (937) 339-3811, Fax: + 1 (937) 440-3286 (Wheels and Brakes)
<b>Goodrich Sensors and Integrated Systems</b>	<a href="http://www.goodrich.com">http://www.goodrich.com</a> , 14300 Judicial Rd, Burnsville, MN 55306-4000 United States, Tel: + 1 (952) 892-4000, Fax: + 1 (952) 892-4800 (Air Data System; Ice Detection System)
<b>Hamilton Sundstrand Electric Systems</b>	<a href="http://www.hamiltonsundstrand.com">http://www.hamiltonsundstrand.com</a> , 4747 Harrison Ave, Rockford, IL 61125 United States, Tel: + 1 (815) 226-6000 (Electric Power Generation System; Ram Air Turbine)
<b>Hexcel Corp</b>	<a href="http://www.hexcel.com">http://www.hexcel.com</a> , Two Stamford Plaza, 16th Fl, 281 Tresser Blvd, Stamford, CT 06901 United States, Tel: + 1 (203) 969-0666, Fax: + 1 (203) 358-3977 (Carbon Fiber Composite Materials)
<b>Honeywell Aerospace, Air Transport &amp; Regional</b>	<a href="http://www.honeywell.com/sites/aero/">http://www.honeywell.com/sites/aero/</a> , 2111 N 19th Ave, Phoenix, AZ 85027 United States, Tel: + 1 (602) 436-2311 (Flight Management System; Aircraft Environment Surveillance System)
<b>Honeywell Aerospace, Engines, Systems &amp; Services</b>	<a href="http://www.honeywell.com/sites/aero/">http://www.honeywell.com/sites/aero/</a> , 111 S 34th St, Phoenix, AZ 85034-2892 United States, Tel: + 1 (602) 231-1000, Fax: + 1 (602) 231-5713 (HGT1700 Auxiliary Power Unit)
<b>Honeywell Aerospace</b>	<a href="http://www51.honeywell.com/aero/">http://www51.honeywell.com/aero/</a> , 1944 E Sky Harbor Circle, Phoenix, AZ 85034 United States, Tel: + 1 (602) 231-1000, Fax: + 1 (602) 365-2075 (Air Management System)
<b>Kidde Aerospace</b>	<a href="http://www.kiddeaerospace.com">http://www.kiddeaerospace.com</a> , 4200 Airport Dr NW, Wilson, NC 27896-9643 United States, Tel: + 1 (252) 237-7004, Fax: + 1 (252) 246-7181 (Overheat Detection System)
<b>Liebherr-Aerospace Lindenberg GmbH</b>	<a href="http://www.liebherr.com">http://www.liebherr.com</a> , Postfach 1363, Pfaenderstr 50, Lindenberg, D-88161 Germany, Tel: + 49 8381 460, Fax: + 49 8381 464377, Email: <a href="mailto:info@lli.liebherr.com">info@lli.liebherr.com</a> (Nose Landing Gear; Slat Actuator)
<b>Meggitt Safety Systems Inc</b>	<a href="http://www.meggittsafety.com/">http://www.meggittsafety.com/</a> , 1915 Voyager Ave, Simi Valley, CA 93063-3349 United States, Tel: + 1 (805) 584-4100, Fax: + 1 (805) 578-3400, Email: <a href="mailto:MSSI-Marketing@meggitt.com">MSSI-Marketing@meggitt.com</a> (Fire Protection System)
<b>Messier-Bugatti</b>	<a href="http://www.messier-bugatti.com">http://www.messier-bugatti.com</a> , Zone Aéronautique Louis Breguet, BP40, Velizy-Villacoublay, 78140 France, Tel: + 33 1 4629 8100, Fax: + 33 1 4629 8700 (Electronic and Hydraulic Landing and Braking Control Systems)
<b>Messier-Dowty International</b>	<a href="http://www.messier-dowty.com">http://www.messier-dowty.com</a> , Zone Aéronautique Louis Breguet, BP 10, Velizy-Villacoublay, 78140 France, Tel: + 33 1 46 29 18 00, Fax: + 33 1 46 29 18 03 (Main Landing Gear)
<b>Mitsubishi Heavy Industries (MHI) Ltd</b>	<a href="http://www.mhi.co.jp">http://www.mhi.co.jp</a> , 16-5 Konan 2-chome, Minato-ku, Tokyo, 108-8215 Japan, Tel: + 81 3 6716 3111, Fax: + 81 3 6716 5800 (Engine Combustion System Components; Low-Pressure Turbine Blades)
<b>Moog Inc</b>	<a href="http://www.moog.com">http://www.moog.com</a> , Jamison Rd, East Aurora, NY 14052 United States, Tel: + 1 (716) 652-2000, Fax: + 1 (716) 687-4457 (Primary Flight Control Actuation System; Trailing Edge Actuation System)
<b>Parker Aerospace Air &amp; Fuel Division</b>	<a href="http://www.parker.com/">http://www.parker.com/</a> , 16666 Von Karman Ave, Irvine, CA 92606-4917 United States, Tel: + 1 (949) 833-3000, Fax: + 1 (949) 851-3341, Email: <a href="mailto:AFDMarketing@Parker.com">AFDMarketing@Parker.com</a> (Fuel Tank Inerting System; Fluid Mechanical Equipment)
<b>Parker Aerospace Electronic Systems Division</b>	<a href="http://www.parker.com">http://www.parker.com</a> , 300 Marcus Blvd, PO Box 9400, Smithtown, NY 11787-9400 United States, Tel: + 1 (631) 231-3737, Fax: + 1 (631) 434-8152, Email: <a href="mailto:esdmarket@parker.com">esdmarket@parker.com</a> (Fuel Measurement System; Fuel Management System)

## Airbus A350 XWB

<b>Parker Aerospace Hydraulic Systems Division</b>	<a href="http://www.parker.com/ag/">http://www.parker.com/ag/</a> , 2220 Palmer Ave, Kalamazoo, MI 49001-4165 United States, Tel: + 1 (269) 384-3400 (Hydraulic Power Generation and Distribution System)
<b>Parker Aerospace Nichols Airborne Division, Elyria Facility</b>	<a href="http://www.parker.com/ag/">http://www.parker.com/ag/</a> , 711 Taylor St, PO Box 4032, Elyria, OH 44036 United States, Tel: + 1 (440) 284-6300, Fax: + 1 (440) 322-6094 (Engine Feed and Transfer Fuel Pumps)
<b>Rockwell Collins Inc</b>	<a href="http://www.rockwellcollins.com">http://www.rockwellcollins.com</a> , 400 Collins Rd NE, Cedar Rapids, IA 52498-0001 United States, Tel: + 1 (319) 295-1000, Fax: + 1 (319) 295-5429 (Communication Global Work Package; Trimmable Horizontal Stabilizer Actuator; Avionics Full Duplex Switched Ethernet Network; Digital Low Range Altimeter; Multi-Mode Receiver; ADF-900 Automatic Direction Finder; DME-2100 Distance Measuring Equipment; VOR-900 VHF Omnidirectional Radio Receiver; Information Management Onboard System)
<b>Rolls-Royce plc</b>	<a href="http://www.rolls-royce.com">http://www.rolls-royce.com</a> , 65 Buckingham Gate, London, SW1E 6AT United Kingdom, Tel: + 44 20 7222 9020, Fax: + 44 20 7227 9178 (Trent XWB Turbofan Engine)
<b>Saft</b>	<a href="http://www.saftbatteries.com">http://www.saftbatteries.com</a> , 12, rue Sadi Carrot, Bagnolet, 93170 France, Tel: + 33 1 49 93 1918, Fax: + 33 1 49 93 1950 (Battery)
<b>Sagem Défense Sécurité SA</b>	<a href="http://www.sagem-ds.com">http://www.sagem-ds.com</a> , Le Ponant de Paris, 27, rue Leblanc, Paris, 75512 France, Tel: + 33 1 58 11 78 00, Fax: + 33 1 58 11 78 50 (Flight Data Acquisition and Security System)
<b>Sirio Panel SpA</b>	<a href="http://www.siriopanel.it">http://www.siriopanel.it</a> , Loc. Levanella Becorpi, Montevarchi, 52025 Italy, Tel: + 39 055 913671, Fax: + 39 055 9180463 (Cockpit Lighting System; Avionics Interface Control Unit)
<b>Spirit AeroSystems</b>	<a href="http://www.spiritaero.com">http://www.spiritaero.com</a> , 3801 S Oliver St, PO Box 780008, Wichita, KS 67278 United States, Tel: + 1 (316) 526-9000, Fax: + 1 (316) 526-1845, Email: <a href="mailto:communications@spiritaero.com">communications@spiritaero.com</a> (Lower Composite Center Fuselage Frame Section)
<b>Spirit AeroSystems ( Europe ) Ltd</b>	<a href="http://www.spiritaero.com">http://www.spiritaero.com</a> , Prestwick Airport, Prestwick, KA9 2RW Scotland, United Kingdom, Tel: + 44 1292 479 888, Fax: + 44 1292 479 703 (Wing Leading Edge)
<b>Thales Aerospace</b>	<a href="http://www.thalesgroup.com/aerospace/">http://www.thalesgroup.com/aerospace/</a> , 45, rue de Villiers, Neuilly Sur Seine, 92526 France, Tel: + 33 1 57 77 80 00, Fax: + 33 1 57 77 86 59 (Integrated Modular Avionics Suite; Interactive Control and Display Systems; Air Data and Inertial Reference Unit; Head-Up Display)

## Technical Data

### (A350-800/900/1000)

**Design Features.** The A350 XWB (Xtra Wide Body) is a new, clean-sheet-design family of commercial airliners. The XWB's fuselage is a double-lobe ovoid design, with a cross section of 5.9 meters (232 in). The lower section is sized to accommodate two side-by-side LD-3 containers. The XWB is equipped with fly-by-wire flight controls.

In response to customer input, Airbus revised the design of the A350 XWB airframe in the fall of 2007,

switching from metallic fuselage frames to carbonfiber. The aircraft wing is composed largely of carbonfiber with some metallic ribs, and is swept 33 degrees and has raised tips.

The A350 XWB will be powered by two Rolls-Royce TrentXWB engines delivering 74,000-92,000 lbst each. The aircraft also may eventually be marketed with alternative engines.

	<u>Metric</u>	<u>U.S.</u>
<b>Dimensions</b>		
Length	60.68/67.03/74.02 m	199.08/219.92/242.83 ft
Height	17.15/17.12/17.15 m	56.25/56.17/56.25 ft
Wingspan	64.75 m	212.43 ft
Wing area	443 sq m	4,769 sq ft
<b>Weight</b>		
Maximum TOW	248,000/268,000/298,000 kg	546,737/590,829/656,966 lb

## Airbus A350 XWB

		<u>Metric</u>	<u>U.S.</u>
<b>Performance</b>			
Typical cruise speed		Mach 0.85	Mach 0.85
Range with maximum passengers		15,400/15,000/14,800 km	8,300/8,100/8,000 nm
<b>Propulsion</b>			
A350-800	(2)	Rolls-Royce TrentXWB-74 turbofan engines rated 329.2 kN (74,000 lbst) each.	
A350-900	(2)	Rolls-Royce TrentXWB-83 turbofan engines rated 369.2 kN (83,000 lbst.) each.	
A350-1000	(2)	Rolls-Royce TrentXWB-92 turbofan engines rated 409.2 kN (92,000 lbst) each.	
<b>Seating</b>			
A350-800		270 passengers in three-class configuration.	
A350-900		314 passengers in three-class configuration.	
A350-1000		350 passengers in three-class configuration.	

## Variants/Upgrades

**A350-800.** The A350-800 will seat 270 passengers in a three-class configuration, and have a range of 8,300 nautical miles. Service entry is planned for mid-2014.

**A350-900.** The A350-900 will be the first A350 XWB version to enter service, with deliveries planned to begin in mid-2013. It will accommodate 314 passengers in three classes, and fly up to 8,100 nautical miles.

Besides the basic passenger model, the A350-900 will also be available in two other versions: an ultra-long-range model called the A350-900R and a freighter version dubbed the A350-900F. Service entry of the

-900R is planned for 2016, while service entry of the -900F is targeted for 2017. The two models will incorporate the engines and the structure of the A350-1000. The -900R will be able to carry approximately 310 passengers over a range of 9,500 nautical miles. The -900F has a payload of 90,000 kilograms (198,413 lb), which it can carry over ranges in excess of 5,000 nautical miles.

**A350-1000.** The A350-1000 is slated to enter service in late 2015. This model will seat 350 passengers in three classes. Range is 8,000 nautical miles.

## Program Review

**Background.** Airbus initially announced the A350 in 2004 as a derivative of the A330. It was the European firm's response to Boeing's new 787 Dreamliner. The latter aircraft had been chalking up orders at (for Airbus) an alarming rate, leaving Airbus with little option but to launch either an improved spin-off of an existing model or an all-new design. At first, the company chose the former approach.

The A350 was originally slated to become available in 2010, two years after the then-planned service entry of the 787. The order book grew slowly; however, and it soon became clear that the market favored the new Boeing type.

Since it was first announced, the A350 design underwent progressive changes. Initially conceived as a close derivative of the A330 but with longer range, subdued airline response led Airbus to rethink the design concept. The A350 eventually became much

more of a new design, though it was still clearly a member of the A330/A340 family.

### *Back to the Drawing Board*

Following some very public criticism of the A350 from potential customers in early 2006, Airbus went back to the drawing board. In July 2006, Airbus announced the A350 XWB, an all-new design. Compared to the previous A350 design, the XWB has a fuselage widened by 12 inches, new engines in the 74,000-92,000 lbst range, and other changes. Maximum cruise speed was boosted to Mach 0.85.

However, as initially proposed, the A350 XWB design also received some criticism. At first, Airbus had adopted a hybrid design approach to the XWB fuselage structure with carbonfiber fuselage panels attached to aluminum frames. The company felt that this

## Airbus A350 XWB

configuration would save weight as well as help with electrical conductivity.

This approach, though, was questioned by two potential A350 XWB customers: International Lease Finance Corp (ILFC) Chairman Steven Udvar-Hazy and Emirates President Tim Clark. Udvar-Hazy believed that the hybrid design would result in higher maintenance costs compared to an all-composite fuselage, and the ILFC chief began pressing Airbus to change the design.

In September 2007, Airbus revised the A350 XWB design, switching from aluminum frames to carbonfiber fuselage frames. The company also reshaped the nose section of the XWB; the nose section will be constructed of aluminum lithium.

### *Three-Year Slippage*

The A350 XWB was formally launched in November 2006. Service entry of the XWB is planned for 2013. If met, this translates into about a three-year delay from the originally planned in-service date of 2010.

## Related News

**Construction Begins on Final Assembly Line** – In January 2009, Airbus began construction work on the final assembly line for the A350 XWB. The 74,000-square-meter factory, located in Toulouse, France, will house the first stages of final assembly for the aircraft, which includes the joining of the fuselage and the wings. Aircraft testing and cabin equipping will then be completed in the nearby A330/340 facility.

The new, EUR140 million (\$180 million) A350 XWB facility will provide work for more than 1,000 people when fully operational. (Airbus, 1/09)

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## Funding

Development cost of the A350 XWB is estimated at EUR10 billion (\$13 billion). Airbus hopes that risk-sharing suppliers will take on EUR1.8 billion (\$2.3 billion) of the development cost.

## Contracts/Orders & Options

(As of February 2009)

Operator	Designation	Quantity	Phase
Aer Lingus	A350-900	6	On Order
Aeroflot Russian Airlines	A350-800	18	On Order
Aeroflot Russian Airlines	A350-900	4	On Order
Afriqiyah Airways	A350-800	6	On Order
Air One	A350-800	12	On Order
Air One	A350-800	12	Option
ALAFCO Aviation Lease & Finance Company KSCC	A350-800	12	On Order
Asiana Airlines	A350-1000	10	On Order
Asiana Airlines	A350-800	10	On Order
Asiana Airlines	A350-800	10	Option
Asiana Airlines	A350-900	10	On Order
BAA Jet Management Ltd	A350-900 Prestige	2	On Order

## Airbus A350 XWB

Operator	Designation	Quantity	Phase
Bangkok Airways	A350-800	4	On Order
China Airlines	A350-900	14	On Order
China Airlines	A350-900	6	Option
CIT Leasing	A350-800	5	On Order
CIT Leasing	A350-900	2	On Order
DAE Capital	A350-900	30	On Order
Emirates	A350-1000	20	On Order
Emirates	A350-900	50	On Order
Emirates	A350-900	50	Option
Etihad Airways	A350-1000	25	On Order
Finnair	A350-900	11	On Order
Finnair	A350-900	4	Option
Hawaiian Airlines	A350-800	6	On Order
Hawaiian Airlines	A350-800	6	Option
International Lease Finance Corp (ILFC)	A350-800	12	On Order
International Lease Finance Corp (ILFC)	A350-900	8	On Order
Kingfisher Airlines	A350-800	5	On Order
Libyan Airlines	A350-800	4	On Order
MAZ Aviation	A350-800 Prestige	1	On Order
MAZ Aviation	A350-900 Prestige	5	On Order
Pegasus Aviation	A350-800	2	On Order
Qatar Airways	A350-1000	20	On Order
Qatar Airways	A350-800	20	On Order
Qatar Airways	A350-900	40	On Order
Singapore Airlines	A350-900	20	On Order
Singapore Airlines	A350-900	20	Option
Synergy Aerospace	A350-800	10	On Order
Synergy Aerospace	A350-800	10	Option
TAM Linhas Aereas	A350-800	12	On Order
TAM Linhas Aereas	A350-900	10	On Order
TAP Portugal	A350-800	12	On Order
TAP Portugal	A350-800	3	Option
Tunisair	A350-800	3	On Order
US Airways	A350-800	18	On Order
US Airways	A350-900	4	On Order
Vietnam Airlines	A350-900	10	On Order
Yemenia – Yemen Airways	A350-800	10	On Order

## Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Nov	2004	EADS grants Airbus tentative approval to begin marketing the A350
Oct	2005	Formal launch of initial A350
Jul	2006	New A350 XWB announced
Nov	2006	Formal launch of A350 XWB
Dec	2008	Detailed definition of A350-900 frozen
Early	2012	Planned first flight
Mid-	2013	Planned service entry of A350 XWB

## Forecast Rationale

As 2008 drew to a close, Airbus froze the detailed definition of the A350-900. Definition freezes for the -800 and -1000 variants are scheduled to occur in 2009 and 2010, respectively. Further progress in the XWB program came in January 2009 when Airbus began construction work on a new facility in Toulouse that will house the XWB final assembly line.

Airbus had to tweak the design of all three XWB variants in June 2008 after the firm discovered that the A350-900 exceeded its empty weight target by 2,200 kilograms (4,850 lb). In order to compensate for this increase, Airbus raised the maximum takeoff weight of each of the three variants by 3,000 kilograms (6,614 lb). The company believes that this action will not impact payload/range performance.

Also in mid-2008, Airbus began marketing the XWB with a 10-abreast, high-density seating configuration. (The XWB's standard seating layout in economy class is nine-abreast.) The new high-density configuration will allow the XWB to more closely match the seating capacity of Boeing's 777. Airbus so far has not specified exactly how many seats each XWB version would accommodate with the 10-abreast layout. However, the anticipated certification limit for the XWB is 440 seats, or 475 seats if an optional additional passenger door is installed on each side of the aircraft.

Airbus has also begun marketing a new version of the XWB featuring a 30,000-kilogram (66,138-lb) decrease in maximum takeoff weight. The lower weight is not achieved by structural changes, but rather by revised paperwork and cockpit placards. Use of the new version should result in airlines incurring lower charges. Airbus is also making available on the XWB an engine de-rate of up to 40 percent.

### *Order Book Continues to Grow*

By early February 2009, the order book for the A350 XWB had grown to 483 firm orders. This total

included orders for 182 A350-800s, 226 A350-900s, and 75 A350-1000s. The swift accumulation of orders since Airbus launched the XWB clean-sheet design underscores the correctness of the decision to scrap the original A330-derived model and return to the drawing board to come up with an all-new aircraft.

### *Spanning Two Segments*

Staying with the original A330-based model would have relegated Airbus to a distant second place behind Boeing in the mid-size airliner market and likely in the greater widebody market as well. With the all-new XWB, though, Airbus is doing much more than simply playing catch-up to Boeing in the mid-size arena. The XWB aggressively targets a wide swath of the Boeing widebody product line.

Airbus has positioned the XWB family to cover much of the capacity/range spectrum that is represented in the Boeing product line by aircraft ranging from the 787 to the 777. While the XWB certainly competes for sales against the 787, arguably only the A350-800 version is a true direct competitor to the new Boeing airliner. The -800 takes on all three current 787 models: the 787-3, the 787-8, and the 787-9.

On the other hand, the A350-900 and the A350-1000 have the Boeing 777 (or at least certain models within the 777 series) in their sights. The inclusion of the -900 and the -1000 in the XWB family poses a real competitive threat to the popular Boeing twinjet. Indeed, they constitute Airbus' first direct challenge to the 777.

The A350-900 is targeted at the replacement market for A340s, MD-11s, and early 777s. It competes for sales against the 777-200ER and, to some extent, the 787-9. Availability of the A350-900 already appears to be impacting 777-200ER sales. In 2008, Airbus recorded 87 orders for the A350-900, while Boeing garnered only 13 orders for the 777-200ER. In order to maintain

## Airbus A350 XWB

market share in this niche, Boeing could feel forced to launch a stretched version of the 787.

Meanwhile, the A350-1000 competes for sales against the 777-300ER. Thirty-five orders were placed for A350-1000s in 2008, while 37 777-300ERs were ordered during the year. As these figures indicate, the competition between the A350-1000 and the 777-300ER should be a much closer race than between the A350-900 and the 777-200ER. With design definition of the A350-1000 not expected to be finalized until sometime in 2010, Boeing may wait a while until it decides whether, and how, it will respond. The U.S. company might choose to only make incremental improvements to the 777-300ER or, if sales of the A350-1000 really take off, it could launch a new 777 variant.

Airbus is also developing two specialized variants of the A350-900. The A350-900R ultra-long-range version is targeted for service entry in 2016, while the A350-900F freighter is scheduled to enter service in 2017. The -900R will compete for sales with the 777-200LR. The -900F will compete against the 777 Freighter.

### Program Schedule

Despite the highly publicized delays in service entry of the 787, the new Boeing airliner still retains a significant schedule advantage over the A350 XWB. The XWB's planned service entry date of mid-2013 is still more than three years after that of the 787, a time lag that would only increase should Airbus itself run into schedule delays.

Indeed, the 787's timing advantage is actually more pronounced when one considers that only the A350-900 is slated to enter service in mid-2013. As mentioned above, the -900 is actually more of a 777 competitor and, at most, competes only with the 787-9 member of the 787 family. The real 787 competition in the XWB series comes from the A350-800 model, and that model is only scheduled to enter service in mid-2014.

### Prestige VIP Model

Airbus markets a VIP version of the XWB called the A350 XWB Prestige. Its availability expands the potential customer base for the XWB family. As of February 2009, Airbus had eight orders for the A350 XWB Prestige. Though they will be relatively small in number, sales of the Prestige will supplement those of the other A350 models.

### Second Engine?

The A350 XWB is currently marketed with the Rolls-Royce TrentXWB as the sole engine choice. The Rolls engine is slated to power all three versions of the XWB. Airbus wants to market the XWB with a choice of engines. Lack of a second engine choice could result in Airbus losing a handful of sales.

General Electric has proposed a variant of its GENx engine for the A350-800 and the A350-900 but not for the A350-1000. Airbus, however, is reluctant to agree to such an arrangement. Discussions with the GE/Pratt & Whitney joint venture Engine Alliance about providing a version of the GP7200 engine for the XWB have also produced no results.

## Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program	High Confidence					Good Confidence			Speculative			Total
	Thru 2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
<b>Airbus France</b>												
<b>A350 -1000 &lt;&gt; Trent XWB</b>	0	0	0	0	0	0	1	2	10	18	24	55
<b>A350 -800 &lt;&gt; Trent XWB</b>	0	0	0	0	0	1	7	34	47	55	59	203
<b>A350 -900 &lt;&gt; Trent XWB</b>	0	0	0	0	3	15	24	43	71	68	65	289
<b>Subtotal</b>	0	0	0	0	3	16	32	79	128	141	148	547
<b>Total</b>	0	0	0	0	3	16	32	79	128	141	148	547

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