

Boeing Commercial Airplanes  
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## Boeing Commercial Airplanes

**Overview** - Boeing Commercial Airplanes (BCA) is the world leader in commercial aviation because of its complete focus on airplane operators and the passengers they serve. Boeing products and services deliver superior design, efficiency and support to airline customers and allow passengers to fly where they want to go, when they want to go.

By working together with supplier partners from around the world, Boeing has delivered more than 15,000 airplanes to customers worldwide including airlines, leasing companies, governments and private firms. But customers who choose Boeing acquire more than great airplanes - they also gain access to the industry's most complete selection of aviation support products and services.

**Organization** - Boeing Commercial Airplanes, with headquarters in Renton, Wash., is under the leadership of President and Chief Executive Officer Scott Carson. It is organized into three primary business units – **787 Program, Airplane Programs** and **Commercial Aviation Services** – as well as providing **Airplane Trading** services. Commercial Airplanes is also a vital presence and a good corporate citizen in the communities where its employees live and work around the world.

### 787 Program

The **787 Dreamliner** is a family of new, super-efficient airplanes that will bring big-jet comfort and economics to the midsize market. The Boeing 787 will incorporate advanced materials, systems and engines to provide unprecedented performance levels, including a 20 percent improvement in fuel performance on a per-passenger basis. This efficiency will mean improved environmental performance.

The 787-8 Dreamliner will carry 210-250 passengers about 7,650 to 8,200 nautical miles (14,200 to 15,200 kilometers) and the 787-9 will carry 250 to 290 passengers from 8,000 to 8,500 nautical miles (14,800 to 15,750 km).

Both models will be in tri-class configurations. A third 787 family member, the 787-3 Dreamliner, will accommodate between 290 and 330 passengers in a two-class configuration and be optimized for routes of 3,050 nautical miles (5,650 km).

Boeing has selected General Electric and Rolls-Royce to develop engines for the new airplane. The Boeing board of directors granted authority to offer the 787 for sale in late 2003 and program launch occurred in April 2004 with a record order from All Nippon Airways. Entry into service is expected in 2008.

### **Airplane Programs**

Boeing offers an unequalled product line, providing significant value for Boeing customers, with airplane models to serve every passenger market from 110 seats to approximately 500 seats, as well as the most complete line of freighters.

**The 737** – the world's best-selling commercial airliner – is the most advanced family of single-aisle airplanes on the market today. The 737 is offered in four sizes:

The 737-600 can carry 110 to 132 passengers; the 737-700 accommodates 126 to 149; the 737-800 can seat 162 to 189; and the largest model, the 737-900ER, is capable of carrying up to 220 passengers. A convertible freighter version and an extended-range version of the 737-700 also are available.

While these new airplanes retain the characteristics that made earlier 737 models so popular – reliable, simple and economical to operate – they underwent dramatic revisions including a brand-new wing design, improved fuel capacity and increased aerodynamic efficiency, leading to increased range and speed.

The 737 family's range is approximately 3,200 nautical miles (5,926 kilometers), an increase of up to 900 nautical miles (1,667 kilometers) over earlier 737 models. This allows U.S. transcontinental flights and increases 737 route capabilities throughout the world. The 737 family also can cruise at a maximum altitude of 41,000 feet (12,497 meters) compared with 37,000 feet (11,278 meters) for earlier models. The popular twinjets are powered by new CFM56-7 engines produced by CFMI, a joint venture of General Electric Co. of the United States and Snecma of France. The engines meet community noise restrictions well below Stage 4 levels.

The advanced wing design provides an economical cruise speed of 0.785 Mach (937 kilometers/hour), compared with 0.745 Mach (889 km/h) for earlier 737 models,

with sprint capability of 0.82 Mach (978 km/h). Advanced-technology Blended Winglets are offered on the 737-700, 737-700ER, 737-800, 737-900ER and Boeing Business Jet (based on the 737-700 and 737-800). Performance benefits include fuel burn reductions of up to 3.5 percent and increased range.

Drawing inspiration from the 777, the 737 passenger cabin is updated with contoured walls and ceilings to create a spacious feeling and greater stowage capacity. In the flight deck, large liquid-crystal displays are complemented by industry-leading display and flight-management software that reduces flight delays and enhances safety and flight-crew efficiency: Vertical Situation Display, which shows the current and predicted flight path of the airplane and indicates potential conflicts with terrain, and the Head-Up Display (HUD), which provides “eye-level” flight and safety information.

**The 747** is the most recognized commercial airplane in the world. From its first flight in 1969, the 747 has been a continually evolving airplane family.

The 747-400 flies 416 passengers in three-class comfort about 7,260 nautical miles (13,450 kilometers). The 747-400ER (extended range), offers customers 410 nautical miles (760 kilometers) more range, or 35,000 pounds (15,876 kilograms) more payload. This derivative features the award-winning Boeing Signature Interior, first introduced on the 777. The 747-400ER, also available in a freighter version, increases the 747-400's takeoff weight from 875,000 pounds (396,900 kilograms) to 910,000 pounds (412,770 kilograms). Both 747-400ER models entered service in October 2002.

The 747 freighter fleet provides almost half the total worldwide freighter cargo lift capability. The 747-400 Freighter carries twice as much cargo twice the distance of its nearest competitor. With its capacity, extended range and improved fuel efficiency, the 747-400 offers the lowest operating costs per seat of any commercial jetliner and the lowest ton-mile cost of any commercial freighter.

In November 2005, Boeing launched the **747-8**, with Cargolux and Nippon Cargo Airlines. The 747-8 family includes the 747-8 Intercontinental passenger airplane and the 747-8 Freighter. Both offer airlines the lowest operating costs and best economics of any large passenger or freighter airplane.

This latest family of 747 jetliners meets airline requirements for a passenger airplane that serves the 400- to 500-seat market between the 555-seat Airbus A380 and

the 365-seat Boeing 777-300 Extended Range airplanes, and a freighter that continues the leadership of the 747 Freighter family in the world cargo market.

The 747-8 Intercontinental is 15 percent more fuel-efficient than the 747-400, 10 percent more fuel-efficient than the A380 and offers guaranteed QC2 departures.

With a maximum structural payload capacity of 154 tons (140 tonnes), the 747-8 Freighter offers 16 percent more revenue cargo volume than the 747-400F with slightly greater range. The additional 4,225 ft<sup>3</sup> (121 m<sup>3</sup>) of volume means the airplane can accommodate four additional main-deck pallets and three additional lower-hold pallets. The 747-8 Freighter enables operators to choose between carrying greater revenue payload – up to an additional 22 tons (20 tonnes) – and flying up to 1,400 nmi farther in markets where cargo density requirements are lower. The airplane upholds its predecessor's legendary efficiency, with equivalent trip costs and 14 percent lower ton-mile costs than the 747-400F. The 747-8F will enjoy the lowest ton-mile costs of any freighter, giving operators unmatched profit potential.

Compared one-on-one, the 747-8 Freighter has no competitors. The 747-8 Freighter's empty weight is 90 tons (82 tonnes) lighter than the A380 freighter. This results in a 24 percent lower fuel burn per ton, which translates into 20 percent lower trip costs and 23 percent lower ton-mile costs than the A380F.

The 747-8 is the right size for the large airplane market, lowering risk for airlines in a highly variable operating environment. Entry into service is scheduled for 2009.

**The 767** is a mid-sized, widebody twinjet. It is the most widely used airplane across the Atlantic, and is available in three passenger models: the 767-200ER (extended range), with seating for 224 passengers in two classes or 181 passengers in a three-class configuration, with a range of up to 6,600 nautical miles (12,220 kilometers); the 767-300ER, with seating for 269 in two classes and 218 in three classes with a range of 6,105 nautical miles (11,305 kilometers); and the 767-400ER that provides seating for 304 passengers in two classes and 245 in three classes with a range of 5,645 nautical miles (10,450 kilometers). Boeing now offers a new Boeing Signature Interior on all 767 passenger models.

The Boeing 767 family also includes a 767-300 Freighter with 16,034 cubic feet (454 cubic meters) of cargo volume and a range of 3,270 nautical miles (6,056 kilometers). The 767 Freighter is the only 60-ton freighter with international capability.

**The 777** family of airplanes is the established leader in the 300 to 400-seat market segment and is preferred by airlines, passengers and investors around the world. The 777 offers one of the most spacious and comfortable cabin interiors ever developed, industry-leading reliability, and unmatched twin-engine economics.

The 777 – the world’s largest twinjet – is available in six models: the 777-200; the 777-200ER (Extended Range); a larger 777-300; new longer-range models the 777-300ER and the 777-200LR Worldliner – the world’s longest range commercial airplane; and the Boeing 777 Freighter.

The 777 seats from 301 up to 368 passengers in a three-class configuration with a range of 5,210 nautical miles (9,649 km) for the 777-200; 5,955 nautical miles (11,029 km) for the 777-300; 7,730 nautical miles (14,316 km) for the 777-200ER; 7,888 nautical miles (14,594 km) for the 777-300ER and; 9,420 nautical miles (17,446 km) for the 777-200LR (Longer Range).

Highlighting the ability of the 777 to provide nonstop passenger service, the 777-200LR set a world record for distance traveled nonstop by a commercial jetliner of 11,664 nautical miles (21,601 km) when it landed at London Heathrow airport after traveling eastbound from Hong Kong on Nov. 10, 2005. The 777-200LR is capable of connecting virtually any two cities nonstop around the globe.

Because the 777 design responds to market needs and customer preferences, the result is an airplane offering cabin spaciousness and flexibility found in no other jetliner – along with many features to enhance reliability and productivity – all with lower operating costs. The 777 provides the most payload and range capability and growth potential in the medium-sized airplane category.

**Government, Military and VIP Airplanes** – The qualities that make Boeing jetliners the airplanes of choice for airlines around the world also are important in the airplane selection processes of governments, military organizations and specialized commercial operations. In addition to the Boeing Business Jet, Boeing Commercial Airplanes also offers its full range of models for these applications. Many of these are offered in partnership with the Boeing Integrated Defense Systems business unit.

For airborne reconnaissance, the 737 airplane serves as the platform for Airborne Early Warning & Control, and the 767 provides the platform for the Airborne Warning and Control System, or AWACS, aircraft.

Boeing has long been the industry leader in providing refueling capability to the world's air forces with the KC-135 (the first derivative of the Boeing 367-80 prototype) and the KC-10 (a DC-10 derivative). Today, the 767 is the platform for a new tanker that has been selected by Japan and Italy and is under consideration for purchase by the U.S. Air Force.

Boeing also offers its full commercial airplane product line as "Special Purpose Airplanes," available for configuration to customer-selected specifications. Whether outfitted as a mobile base of operations for government and military officials or as a fully equipped office complex for the chief business executive, Boeing jetliners offer high reliability, excellent capability, low operating costs and worldwide technical support.

**The Boeing Business Jet**, designed for corporate and VIP applications, is a special, high-performance derivative of the 737-700. The addition of auxiliary fuel tanks provides owners with a business jet platform having a range capability of 6,200 nautical miles (11,482 km).

In this era of increased international commerce and attendant travel demands for entrepreneurs and government heads of state, comfort and productive flying time are critical. Boeing and General Electric formed a joint venture – Boeing Business Jets – in 1996 to produce the BBJ with nearly three times the cabin space of traditional long-range business jets at a comparable price. The BBJ can fly from Paris to Los Angeles – or even farther – nonstop.

The versatility of the airplane allows owners to create a unique environment tailored to their specific needs and seating requirements, whether it's for eight or 100 passengers; for private use, corporate, charter or government transport.

The BBJ 2, announced in 1999, is based on the 737-800. It has 25 percent more interior space than the BBJ and twice the luggage space. Production of the first BBJ 2 began in September 2000, with entry into service in February 2002. The BBJ 3, launched in 2006, is based on the 737-900ER. The jet provides 35 percent more interior space than the BBJ and 89 percent more luggage space. The first BBJ 3 is expected to enter service in 2009.

In addition to the BBJ airplane family, Boeing also offers VIP versions of the 747-8, 767, 777 and 787.

More than 89 BBJs are currently in service, with approximately 32 percent based in North America and 68 percent based in Europe, Asia/Pacific, Africa, Latin America and the Middle East.

**Boeing Fabrication** is the largest consolidated operation in the world dedicated to manufacturing airplane parts, assemblies and tools, and is the largest supplier to Commercial Airplanes. Employing approximately 13,000 people, Boeing Fabrication has manufacturing operations in Auburn, Frederickson and Everett, Wash.; Portland, Ore.; Salt Lake City, Utah; Oak Ridge, Tenn.; Winnipeg, Canada; as well as Fisherman's Bend (Melbourne) and Bankstown (Sydney), Australia.

Manufacturing millions of components per year used in production, modification and spares support for all of the company's commercial jetliners, Boeing Fabrication is responsible for delivery and integration of work that requires complex, critical, emergent and unique specialty production focused on precision machining, electrical and interior systems, and advanced primary and secondary composite structures.

Boeing Fabrication's strategic role for Commercial Airplanes is to provide high-leverage best-value parts, assemblies, kitting, and delivery solutions that help ensure readiness for current production and future airplane product development. Fabrication also helps develop, support and leverage collaborative relationships with key global partners, serving as a back-stop to the supply base and integrator of large-scale systems prior to delivery to airplane final assembly. A vital asset within the Boeing Production System, Fabrication works together with its Airplane Programs and Commercial Aviation Services customers to align major commodity value streams and increase quality and productivity from design through post-delivery support.

### **Commercial Aviation Services**

Boeing Commercial Aviation Services is committed to the success of the air transport industry, a commitment backed by an unmatched legacy and capability.

Established by Boeing 70 years ago, the forerunner of Commercial Aviation Services set the standard for delivering the fundamentals of aviation support - spares, training, maintenance documents, and technical advice. Today, the organization has

greatly expanded its role and offers the broadest range of support products and services in the industry.

Commercial Aviation Services is a highly customer-focused organization, providing integrated solutions, products and services to improve fleet utilization, reduce costs, leverage leading-edge information management, and ensure passenger well-being. We help airplane operators achieve those benefits through our capabilities in five key areas: customer support, material management, maintenance and engineering services, fleet enhancements and modifications, and flight operations support.

**Global Customer Support** - Aviation is a global, round-the-clock business. Boeing has developed a worldwide infrastructure to support airline schedules, resolve technical difficulties, provide quick access to technical information and deliver vital products and services when and where they're needed.

At the forefront of the Boeing global support team are the company's 330 field service representatives and associates in 65 countries. Highly qualified and experienced, they help customers keep their Boeing fleets in safe and profitable service, provide timely on-site technical advice, and help ensure a smooth introduction of new Boeing jetliners.

Service engineers and other technical experts staff the Boeing Commercial Airplanes Operations Center, which provides around-the-clock comprehensive airplane support services for urgent airline structures, systems, materials and maintenance issues. When an airplane is out of service because of damage or a major technical problem, our incident recovery and repair service is ready to dispatch expert help anywhere in the world. We also offer global facilities to provide fast and convenient access to support products and services. Eight spare parts distribution centers, 23 flight training facilities, and nine component repair centers offer unsurpassed support.

To further improve fleet support, Commercial Aviation Services operates *MyBoeingFleet.com*, the air transport industry's most successful business-to-business web portal. Customers can access the portal as a single point of contact for obtaining virtually all the information they need to maintain and operate their Boeing fleets.

**Material Management** - Boeing operates the aviation industry's most comprehensive spare-parts sales and distribution network, maintaining inventory for about 500,000 different types of parts to support the worldwide fleet.

Distribution centers in Seattle, Los Angeles, Atlanta, Singapore, Beijing, London, Dubai and Amsterdam serve customers worldwide. An advanced mainframe computer system links the centers, providing up-to-the-minute inventory control. Boeing processes about 1.8 million spare-parts shipments annually. For speed and convenience, customers may place orders and track shipments through the Boeing PART Page web site, which is linked to the *MyBoeingFleet* portal.

To further improve logistics support, Boeing offers services for the repair, overhaul and exchange of avionic and hardware components. The innovative Integrated Materials Management (IMM) program relieves airlines of the burden of purchasing, inventory management and logistics of expendable aircraft parts.

In September 2006, Boeing completed its purchase of Aviall, one of the world's largest providers of new aviation parts and aftermarket services. Aviall is a perfect fit for the Boeing strategy of providing supply-chain management solutions that help our airline and military customers operate more efficiently and productively.

**Maintenance and Engineering Services** - Commercial Aviation Services develops, manages and delivers the vast amount of technical information needed for fleet maintenance and engineering support. Boeing has helped lead the industry in converting to all-digital formats, improving accuracy and reducing storage needs. This digitized information is available on *MyBoeingFleet*.

Boeing has pioneered digital tools to help speed airplane troubleshooting as well as manage maintenance. Airplane Health Management, for example, is an integrated family of information products and services that collects, monitors and analyzes airplane data on in-service airplanes, allowing for faster repairs and, in many cases, the ability to predict faults and prevent equipment failures before they occur. Boeing is taking the next step by integrating its maintenance and engineering tools with its flight operations tools to help operators achieve high levels of performance and operation.

**Fleet Enhancements and Modifications** - With full access to the engineering data used to design Boeing and Douglas jetliners, we can help airlines modify aircraft configurations, enhance fleet performance and improve cabin amenities.

Our modification engineering staff can oversee passenger-to-freighter conversions by providing design, engineering and project management expertise while partnering with some of the industry's best-known modification centers. With expertise in large-scale systems integration, we offer avionics upgrade programs that include engineering, design, parts and integrated manuals as well as customer support.

**Flight Operations Support** - Commercial Aviation Services provides full support for airline flight operations, including innovative information-management solutions and a global training network.

Offerings include flight technical publications such as flight manuals, dispatch deviation guides, master minimum equipment lists, and other related documents, many of which are available through *MyBoeingFleet*. Flight operations engineering support is another vital function we provide, along with simulator data support.

We have taken a leading role in harnessing digital technology for improved flight deck management. Commercial Aviation Services is a key player in Boeing's overall effort to e-enable the air transport system, working to integrate and manage all the information generated in the air transport enterprise. Our solutions will help pilots, maintenance crews and airline operations centers share vast stores of information seamlessly and in real time. Boeing subsidiary Jeppesen, world leader in air navigational charts, is a major contributor to this project.

Boeing operates the world's largest airline training network through its wholly owned subsidiary known as Alteon. Alteon combines the Boeing Training Center with 22 other facilities around the globe. These assets include advanced computer-based training systems and more than 70 full-flight simulators.

Alteon offers initial and recurrent training on Boeing and non-Boeing airplanes in the 100-seat-and-above airliner market. Course offerings cover a wide range of flight and maintenance training, as well as safety training for cabin crews.

**Integrated Business Solutions - 787 GoldCare** - As customers adopt multiple Boeing services to maximize operational efficiency, Boeing offers the capability to integrate offerings in order to best fit customers' needs.

For the 787 Dreamliner, Boeing offers GoldCare, a set of comprehensive and flexible airline business solutions to simplify customer operations and reduce cost at a predictable price linked to airplane usage. GoldCare services include Integrated Materials Management, and Engineering and Maintenance planning and control.

### **Other Commercial Airplanes highlights**

**Boeing Aircraft Trading** – Since 1997, with the establishment of Boeing Aircraft Trading, Boeing is the world's leader in previously operated aircraft. Boeing Aircraft Trading sells and leases Boeing-owned aircraft acquired through trades, lease returns and other mechanisms, as well as aircraft from the secondary market that meet Boeing's high standards, to serve operators who must expand their fleet immediately or who are not currently in a position to purchase brand-new equipment.

Every airplane offered by Boeing Aircraft Trading is fully backed by Boeing and has met its high standards of quality and reliability. Boeing Aircraft Trading will not sell or lease any airplane without a complete service record to ensure that the airplane has been properly maintained according to the manufacturer's specifications and service bulletins, and that it carries only authorized, documented parts.

**Boeing corporate citizenship** – Boeing is a vital corporate citizen, committed to improving the quality of life in communities worldwide. Outside the U.S., our focus is on health and human services and primary and secondary education. In the U.S., our focus is education - early learning through 12th grade, as well as higher education; health and human services; arts and culture; and civic and environmental issues.

Boeing and its employees contribute tens of millions of dollars each year in corporate charitable investments, participation in volunteer programs, gift matching programs, and the Employees Community Fund of The Boeing Company, the world's largest employee-owned charitable organization of its kind.

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Contact: Boeing Airplane Programs Communications, 206-766-2910

## Major Boeing Commercial Airplanes Facilities

### Renton, Wash.

**Commercial Airplanes Headquarters**  
**Single-Aisle (final assembly)**  
737  
Boeing Business Jet

### Seattle, Wash.

**Commercial Aviation Services**  
Global Customer Support  
Spares and Logistics Support  
Maintenance & Engineering Services  
Fleet Enhancements & Modifications  
Flight Operations Support

### Everett, Wash.

**Twin-Aisle (final assembly)**  
787  
747  
767  
777

### Auburn, Frederickson, Everett, Wash.

#### Portland, Ore.

#### Salt Lake City, Utah

#### Oak Ridge, Tenn.

#### Winnipeg, Canada

#### Melbourne, Sydney, Australia

#### **Boeing Fabrication**

Emergent operations; complex precision machining; specialty production focused on advanced metal structures; tubes, ducts and reservoirs; integrated aero structures; electrical systems; interiors; composites; spares.