

Building the Boeing 787

Boeing's newest commercial jet aircraft, the wide-body 787 jet, is a bold bet on the future of both airline travel and plane making. Designed to fly long-haul point-to-point routes, the 250-seat 787 is made largely of composite materials, such as carbon fibers, rather than traditional materials such as aluminum. Some 80 percent of the 787 by volume is composite materials, making the plane 20 percent lighter than a traditional aircraft of the same size, which translates into a big saving in jet fuel consumption and costs. The 787 is also packed full of other design innovations, including larger windows, greater headroom, and state-of-the-art electronics on the flight deck and in the passenger compartment.

To reduce the risks associated with this technological gamble, Boeing decided to outsource an unprecedented 70 percent of the content of the 787 to other manufacturers, most of them based in other nations. In contrast, 50 percent of the Boeing 777 was outsourced, 30 percent of the 767, and only 5 percent of the 707. The idea was that in return for a share of the work, partners would contribute to the estimated \$8 billion in development costs for the 787. In addition, by outsourcing, Boeing believed it could tap into the expertise of the most efficient producers, wherever in the world they might be located, thereby driving down the costs of making the plane. Furthermore, Boeing believed that outsourcing some work to foreign countries would help it to garner sales in those countries. Boeing's role in the entire process was to design the plane, market and sell it, and undertake final assembly in its plant in Everett, Washington. Boeing also believed that by outsourcing the design of so many components, it could cut down the time to develop this aircraft to four years from the six that is normal in the industry.

Some 17 partners in 10 countries were selected to produce major parts of the aircraft. The rear fuselage was to be made by Vought Aircraft Industries in South Carolina; Alenia Aeronautical of Italy was to make the middle fuselage sections and horizontal tailpieces. Three Japanese companies, Fuji, Kawasaki, and Mitsubishi, were to produce the wings. The nose section was to be made by Toronto-based Onex Corporation. All of these bulky pieces were to be shipped to Everett for final assembly aboard a fleet of three modified Boeing 747 freighters called Dreamlifters.

Until late 2007, the strategy seemed to be working remarkably well. Boeing had booked orders for over 770 aircraft, worth more than \$100 billion, making the 787 the most successful aircraft launch in the history of commercial aviation. But behind the scenes, cracks were appearing in Boeing's globally dispersed supply chain. In mid-2007, Boeing admitted the 787 might be a few

months late due to problems with the supply of special fasteners for the fuselage. As it turned out, the problems were much more serious. By early 2008 Boeing was admitting to a delay of up to 12 months in the delivery of the first 787, an additional \$2 billion in development costs, and the possibility of having to pay millions in penalty clause payments for late delivery to its leading customers.

The core issue was that several key partners had not been able to meet Boeing's delivery schedules. To make composite parts, for example, Italy's Alenia had to build a new factory, but the site that it chose was a 300-year-old olive grove, and it faced months of haggling with local authorities and had to agree to replant the trees elsewhere before it could break ground. To compound problems, its first fuselage sections delivered to Boeing did not meet the required quality standards. Then when parts did arrive at Everett, Boeing found that many components had not been installed in the fuselages (as required), and that assembly instructions were available only in Italian. Other problems arose because several partners outsourced mission-critical design work to other enterprises. Vought, for example, outsourced the design and building of floor pieces for which it was responsible to an Israeli company. In turn, the Israeli company had trouble meeting Boeing's exacting quality standards. However, because it was reporting to Vought, not Boeing, executives at Boeing did not learn of this until it had already become a serious bottleneck. Upon learning of the issue, Boeing rapidly dispatched engineers to Israel to work with the company, but by now several months had been lost. Boeing also subsequently acquired Vought in 2009, bringing the supplier in-house.

Despite all of these issues, Boeing remains committed to its outsourcing program. However, the company has learned that if it is going to outsource work to foreign suppliers, much closer management oversight and coordination is required to make it work. The company has also indicated that as valuable as outsourcing can be, it probably went too far with the 787. Going forward, Boeing has signaled that it will not outsource key components that are seen as a source of Boeing's competitive advantage (wings, in particular, are often mentioned as a component that may not be outsourced for future aircraft models).¹

Case Discussion Questions

1. What are the benefits to Boeing of outsourcing so much work on the 787 to foreign suppliers? What are the potential risks? Do the benefits outweigh the risk?
2. In 2007 and 2008 Boeing ran into several publicized issues with regard to its management of a globally