Corporate Focus

**Boeing Vows On-Time Dreamliner**

--Some Suppliers Insist All Must Go Right to Meet May Delivery Target

By J. Lynn Lunsford
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Boeing Co.'s top leaders say it is possible to overcome a nearly four-month delay in the 787 Dreamliner program and deliver the first jet on time in May. Industry observers and a number of the plane's suppliers say it would be the aerospace equivalent of hitting a hole in one on a golf course.

After running into a critical shortage of aerospace fasteners to hold the airplane together, Boeing was forced to delay the first flight of the Dreamliner from August to what now looks like sometime in mid-November to mid-December. Company officials surprised many people in the aerospace industry -- including some of Boeing's suppliers -- when they said two weeks ago that they nevertheless still plan to deliver the first airplane on time.

Suppliers say Boeing can still make the deadline. But that would mean everything goes right -- a rare occurrence in the process of developing a new aircraft.

"We looked at each other and said, 'Are they kidding?'" said a senior Boeing supplier who listened in on the conference call in which Boeing broke the news to Wall Street analysts and reporters.

Boeing still must install hundreds of parts, including the pilots' controls and instruments, into the first airplane. Suppliers such as Honeywell International Inc. must finish writing their portions of the more than six million lines of computer code that will run everything on the plane from the flight controls to the electronic window shades.

After that, a complex web of electrical wiring and computer equipment must be checked to see that all of the various systems on the airplane work in unison. This milestone, known as power-on, isn't expected to occur before mid-October, according to people familiar with the situation.

That leaves roughly four to eight weeks for safety engineers to work out the bugs and declare the plane safe for its first flight. This task took three months during the 1990s when Boeing was preparing for the first flight of the 777.

Although Boeing says its production troubles are limited to the first few airplanes, it is critical for the company to get the program on track as soon as possible. Significant delays in the first steps could ripple through the rest of the 787's schedule, potentially jeopardizing the scheduled delivery of 112 airplanes by the end of 2009.

The schedule is so tight that Boeing officials say they need to have about 42 airplanes mostly ready for delivery by the time the test-flight program is completed. If that doesn't happen, delays could cascade through the production schedule for as long as two years, potentially
undermining Boeing’s credibility with its customers and exposing it to costly penalty payments for missed deliveries.

"We're down to the program having to go by the book," Boeing Chairman and Chief Executive Jim McNerney said while answering questions last week during a Morgan Stanley analysts conference in California. Boeing officials said they plan to provide an update of their progress in late October and will have a better idea then about whether the feat is still possible.

Indeed, Boeing is entering one of the most complicated parts of the airplane's development, in which something as simple as a stubborn piece of measuring equipment can keep a test-flight airplane grounded for days.

Most of the components have been tested for hundreds of hours in laboratories, but flight tests almost always bring out surprises. "That's why they call it 'flight test,'" said Mike Bair, the Boeing vice president in charge of the Dreamliner development program, during a briefing in July.

Mr. Bair said Boeing is spending much of its attention on getting the production system ready to churn out multiple airplanes "because that's what's important: delivering airplanes."

According to people familiar with the program, suppliers at factories in Italy, Japan and the U.S. continue to experience chronic parts shortages that have slowed the completion of another six flight-test airplanes that must be finished no later than late January or early February. Boeing said it rescheduled delivery deadlines so that suppliers would gain an additional 45 days to get the flight-test airplanes into shape.

Boeing confirmed it also has sent hundreds of engineers to help smaller third-tier suppliers in places such as Israel meet the demand for components such as vertical frames that the larger suppliers need to complete their sections of the plane's fuselage.

The Dreamliner, with more than 700 orders from 48 airlines, has been the hottest-selling wide-body jet in the world since Boeing began taking orders for it in 2004. Made largely of carbon-fiber composites, the airplane is being advertised as more fuel efficient, more comfortable and easier to maintain than any commercial airplane in its class.

According to interviews with several suppliers, Boeing was as much as eight months late delivering detailed specifications to the companies that were expected to do the bulk of the manufacturing of the airplane and its systems. Boeing officials acknowledge that they contributed to the initial delays, but they said "recovery plans" had largely eliminated those setbacks.

Vought Aircraft Industries of Dallas, which had problems in the summer, said it is "making steady improvements with Boeing's help and support." General Electric Co.'s Systems division said that the main computer system it is delivering "supports the current aircraft schedule," even though it had to add more processing power than originally anticipated.

John Plueger, president and chief operating officer for Los Angeles-based International Lease Finance Corp., said he isn't that concerned about a modest delay. "Nobody's going to care if the plane turns out to be two or three months late as long as it does everything Boeing has promised," he said. With more than 70 planes on order, ILFC, a unit of American International Group Inc., is the largest Dreamliner client.
A spokesman for Japan’s All Nippon Airways Co., which ordered 50 Dreamliners and is scheduled to take the first delivery in May, said that while the airline is still planning for an on-time delivery, "a delay wouldn't affect us that much" because it is scheduled to replace an existing fleet of Boeing 767s. "We'd just keep flying the 767s until the plane was ready," he said.
Boeing, in Embarrassing Setback, Says 787 Dreamliner Will Be Delayed

By J. Lynn Lunsford
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Boeing Co. reversed itself after weeks of promising its new widebody jet would be delivered on time, saying the ambitious project now faces a delay of at least six months.

The setback for the 787 Dreamliner marks a blow for Boeing's plan to revamp how it builds airplanes by having suppliers take on a greater role in design and manufacturing. Executives were forced to apologize for breaking their commitments to customers. They said the first airplane would be delivered in late November or early December of next year instead of May. Boeing shares fell 2.7%.

The delay, which Boeing attributed to shortages of key materials and slow deliveries by suppliers, damages the company's prestige and could hurt the bottom line if airlines can't receive their big orders on time and demand penalty payments. The snafus are particularly embarrassing because Boeing had picked up business from rival Airbus after the European plane maker had to postpone its own highly anticipated new models.

"Every one of [Boeing's] customers will be watching this program much more closely for signs of trouble," said John Plueger, president of leasing giant International Lease Finance Corp., a big Boeing customer.

Many airlines are relying on the 787 for fleet expansion, and now will have a tougher time expanding their schedules. Frequent fliers will be spending more time on aging jets as they await the new amenities airlines are planning to include in their Dreamliners.

The delay irked the airlines that have flocked to buy the 787, and poses the most serious setback for Boeing Chief Executive Jim McNerney since he took the reins in 2005. Mr. McNerney, who cut his teeth in aviation as an executive at General Electric Co.'s jet engine business, acknowledged the challenges but said: "We remain confident in the design of the 787, and in the fundamental innovation and technologies that underpin it."

In planning for the 787, Boeing remade its production process to rely heavily on major suppliers as risk-sharing partners. In return for investing more upfront and taking on a share of the development costs, suppliers have been given major sections of the airplane to build. The wing sections are made in Japan, while factories in Italy, South Carolina and Wichita, Kan., assemble the bulk of the fuselage. The parts are flown aboard modified 747 cargo planes to Everett, Wash., for final assembly.

Boeing says that when the system is up and running, it will eventually be able to snap together Dreamliners in as little as three days, in a manner not unlike how plastic model airplanes are assembled.

Boeing officials say the system has reduced the company's upfront development costs by billions of dollars. The downside, they acknowledge, is that Boeing has less control over the
day-to-day progress of the Dreamliner program than it has had for any new airliner in its history.

Boeing's setback is something of a vindication for European rival Airbus, which has been pilloried for concealing manufacturing snafus that forced the giant A380 jetliner to be delayed by two years. Airbus is scheduled to deliver the first A380 next week to Singapore Airlines. It is a double-decker plane that can seat more than 550 passengers and is designed for long routes.

Boeing says the problems with the 787 are different from those with the A380 because they don't point to a fundamental flaw in its design, but rather involve difficulties in the supply chain. Airbus's production system for its new midsize A350, which will compete with the Dreamliner, is modeled along the same lines as Boeing's Dreamliner plan because of the financial benefits.

Amid Airbus's problems with the A380, Boeing made the Dreamliner the hottest-selling widebody jet in the world. Since 2004 Boeing has received 710 orders from 50 airlines for the plane, which will carry between 225 and 300 passengers. The A350, which was delayed as Airbus struggled with the A380, isn't expected to hit the market until 2013 or later.

Boeing is advertising the Dreamliner as more fuel-efficient and easier to maintain. It says passengers will benefit too. Because the airplane is being built largely of carbon-fiber composites, which are stronger than aluminum, the windows on the 787 will be larger than on conventional jetliners. Also, since composites don't corrode, airlines will be able to raise the humidity of cabin air and make long flights more comfortable, Boeing says.

Boeing said it isn't changing financial guidance and still expects to deliver 109 airplanes by the end of 2009, just three shy of its earlier projection.

About 15 customers will be affected by the delays, starting with Japan's All Nippon Airways, which was scheduled to get the first Dreamliner. ANA said in a statement that officials "regret that the delivery of the 787 will be delayed and we hope to keep the impact of the delay to a minimum." ANA plans to use the Dreamliner to replace its fleet of older Boeing 767s.

Mr. Plueger of ILFC, which is a unit of American International Group Inc., said Boeing's delay "causes you to ratchet up a notch your healthy skepticism." ILFC is the largest customer for the 787 with 74 airplanes on order. Mr. Plueger said ILFC, which has been a launch customer on virtually all of Boeing's and Airbus's major new airplanes, decided early on not to take delivery until early 2010 because of concerns about delays.

Boeing's announcement came as little surprise to many in the aerospace industry. Since summer, the industry has been beset by a shortage in titanium and aluminum fasteners used to hold airplanes together. Boeing's problems were exacerbated because suppliers are working with composite materials instead of the more-familiar aluminum.

Boeing first announced that the Dreamliner program was running behind schedule on Sept. 5, but officials said then they still thought they could deliver the first airplanes on time.

Officials said yesterday that the first Dreamliner -- which was covered in a shiny coat and unveiled on July 8 before a crowd of more than 15,000 invited guests -- was in shambles beneath the surface.

The plane, held together by thousands of temporary fasteners, had to be largely disassembled after the ceremonies. Suppliers hadn't preinstalled wiring or other major components needed to
make the system work smoothly. Once engineers got inside, it became evident that it would take more time to put the plane back together than anticipated. Mr. McNerney said Boeing officials decided to pull the plug on the old delivery schedule earlier this week during a regularly scheduled meeting to discuss the airplane’s progress.

From the outset, Boeing has said the new supplier system adds a certain amount of risk. For more than a year, teams of Boeing experts have lived on the road, troubleshooting problems at farflung factories and making sure they have enough raw materials to do their work.

Yesterday, Mr. McNerney said the delays reflected a "slowing up in the supply chain, rather than a fatal flaw in the supply chain."

In some cases, such as with a factory that was erected in Charleston, S.C., by Italy's Alenia Aeronautica SpA and Vought Aircraft Industries Inc. of Dallas, relatively inexperienced workers were hired from the local area to begin building an airplane that is technically more advanced than any commercial airplane in history.

"If there's a lesson learned, you'd start earlier and do a little more training with our people there," said Scott Carson, chief executive of Boeing's Commercial Airplanes unit. Mr. Carson said there are still "growing pains at the front end" of the program.

A Vought spokeswoman declined to discuss specifics of the company's work for Boeing. She said Vought can meet Boeing's new schedule.

Yesterday, Boeing officials said they expect to have about 40 Dreamliners completed and on the ramp when the Federal Aviation Administration declares the airplane ready for delivery. The maiden flight, originally scheduled for two months ago, will wait until the spring of next year.

Unlike the previous schedule, Mr. Carson said, the new delivery schedule has a margin built in for unexpected problems that might arise during flight testing, which gives Boeing "much more confidence in our ability to deliver this plane" on time.
Yet another 787 delay puts Boeing's credibility at risk; Some say executives are being unrealistic about ambitious goals

Dan Reed
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Boeing calls its much-anticipated new 787 the Dreamliner, but the hot-selling, revolutionary jet looks more like a public relations nightmare after Tuesday's decision to delay the first flight for the fifth time.

The company's shares fell 6.5% to $43.87 Tuesday after Boeing said a design weakness discovered recently will force an indefinite delay of the first flight while engineers evaluate and test possible fixes.

The stock had been rising for most of the past month as investors bid up the price, encouraged by top Boeing executives' repeated vows that the plane would fly by next Tuesday, the last day of the second quarter.

Those expectations were dashed on a conference call Tuesday morning when Scott Carson, head of Boeing's Commercial Airplanes division, told analysts and reporters that a problem first noticed in ground testing last month proved to be a bigger issue than initially thought.

"We're all anxious to see this airplane fly," Carson said. But, "It's important that it flies when it's ready to fly."

That's a big turnaround from Carson's assertion a week earlier at the Paris Air Show that he was certain the 787 could fly before July 1 but that Boeing decided not to rush its ground-testing program just so the Dreamliner could put in an appearance at the prestigious biennial air show.

Carson isn't the only Boeing executive who had pumped up expectations. Boeing CEO James McNerney vowed publicly early this year that the 787 would fly before the end of the second quarter and repeated that vow as recently as last month.

This new delay in the 787 program reinforces a perception that Boeing's management either is unrealistic in setting ambitious production goals or is incapable of meeting those goals as it tries to develop a plane that could change the economics of air travel more than any plane since the introduction of commercial jets in the late 1950s. In cutting by 20% the amount of fuel needed to fly international routes -- and emissions by a corresponding amount -- the 787 could reduce airline operating costs and, in theory, the prices passengers pay.

But creating such a breakthrough aircraft has proved to be a bigger challenge than Boeing officials expected, and that's damaging the company's reputation and credibility. Not only is Boeing creating a plane in which half of its structural weight comes from composite materials instead of conventional aluminum, it is attempting to radically change the way planes are made.
Conventional planes are built on an assembly line, where pieces supplied by subcontractors are attached using hundreds of thousands of rivets. With the 787, Boeing has turned subcontractors into "risk-sharing partners" that assemble large sections of the plane or components all over the world. Those big sections are then shipped to Boeing's final assembly line in Everett, Wash., where they are pieced together using a new technique that requires fewer than 10,000 holes to be drilled into the plane, compared with hundreds of thousands in other models. Eventually, once workers get the hang of it, Boeing officials say, the final assembly of pieces built elsewhere should take just three days.

The first timetable

The original plan was for the 787 to make its maiden flight in 2007 and to enter service in 2008. But vexing manufacturing problems, a management shake-up and a strike have all taken a toll. The most recent schedule had the 787 on what many experts said was an unrealistically short timetable: the first flight by the end of this month with first delivery in March 2010 to Japan's All Nippon Airways.

Now, it'll be several weeks before Boeing officials announce yet another new schedule.

It's not clear yet that the 787's first flight will happen this summer. There's no indication as to how long it will take to come up with a way to reinforce 18 small spots on each side of the plane where the fuselage meets the wings. Those spots -- each less than 2 inches and located where the top of the wing joins the fuselage -- will have to be reinforced before the aircraft can go through its flight-testing program. Ground testing, including high-speed-taxiing tests, will continue while engineers address the side-body problem.

Tuesday's announcement came as a shock to analysts and investors, many of whom had believed Boeing officials' recent assertions that this time the company would achieve, at a minimum, its goal of getting the 787 into the air by June 30.

Aerospace manufacturing analyst Richard Aboulafia of the Teal Group in Fairfax, Va., said his level of surprise registers at "somewhere between very and extremely."

"I knew there'd be further delays in the program, but not preflight," he said. "Their flight-test schedule and delivery schedule looked way too ambitious. But it looked like they had a clear path to first flight. So I'm shocked by this."

Others who follow the industry were more annoyed than shocked because of what they said was Boeing's lack of credibility on the 787 program schedule even before this latest delay.

"Boeing has this habit of saying, 'Everything is fine, everything is fine, everything is fine,' until it isn't," said Seattle-based aviation consultant and blogger Scott Hamilton. "When you don't have any credibility, how much lower can it go?"

On July 8, 2007 -- 7-8-07 in calendar shorthand -- when the 787 made its public debut at its high-profile official rollout, Boeing officials insisted that it would be ready for its scheduled first flight late that summer, Hamilton recalls. But, "Everybody who was there at the rollout, from the representatives of the airlines buying it to people from all the suppliers, knew that it was just a model airplane ..." he said.
Aboulafia, who is widely followed within the aviation and investment communities, said the latest setback is "pretty serious," because "this has broader implications for the whole U.S. aerospace business."

"Boeing can still recover," he added. "But they have to be extremely proactive now about what they're going to do, how they're going to do it and when they're going to do it. And then they're actually going to have to do it. But this is getting close to the nightmare stage. People are going to start calling this plane the 'Bad Dream-liner.'"

The 787 is the hottest-selling commercial jetliner ever, but the production delays and the global recession have whittled down its order book. Boeing says 56 airlines have placed 866 orders for Dreamliners, 44 fewer than it claimed at one point last year. Plus, some carriers have deferred deliveries of some or all of their 787s to slow their growth and capital spending during what is expected to be a prolonged period of weak demand.

The 787 costs about $200 million on average, not counting its massive twin engines.

In addition to the 787's efficiency, Boeing promises it will be the most passenger-friendly commercial jet, with more headroom, fresher air in the cabin, better lighting and more carry-on-storage space than conventional airliners, plus state-of-the-art passenger entertainment and communications systems.

A planned replacement

The 787 is planned as a replacement for aging Boeing 767s and Airbus A300s and for the more-modern-but-less-efficient A330. Those planes are used on international routes where demand won't support the use of larger-capacity planes such as the Boeing 747 and 777 or the Airbus A380.

Eventually, the 787 will come in three different sizes, flying 210 to 330 passengers up to 8,200 nautical miles, a range made for serving routes such as Los Angeles-Bangkok and New York-Hong Kong, rather than domestic U.S. routes.

Northwest Airlines was the 787's North American launch customer, but Northwest was acquired last year by Delta, which has not yet confirmed its intent to acquire 787s. Spokeswoman Betsy Talton said Delta officials were in negotiations with Boeing about those orders before Tuesday's announcement. That leaves Continental as the only U.S. airline with a firm order for 787s.

"We're disappointed" by Boeing's latest delay, spokeswoman Julie King said Tuesday. "But we're committed to the 787. We still believe it will be a game-changer whenever it arrives on the scene."

QUESTIONS:
1.) Describe how the airlines, suppliers, and outsourced vendors affect Boeing's development of the 787, citing how changes in one affect the other.

2.) Critique Boeing's project management strategy for the 787 Dreamliner. What do you see as the major characteristics? What works well? What doesn't? What changes need to be made for future projects?