

Frontiers

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KEEPING PROMISES

After a third year of more than 1,000 orders, how does Commercial Airplanes plan to deliver? Look inside for an interview with BCA leader Scott Carson

**ALSO INSIDE:
PEOPLE POWER**
Human Resources offers many services that help support Boeing's business needs. Page 18

CENTER PULLOUT SECTION
'CHALLENGE'
Ergonomics for the 787. Boeing's plans to address work-force needs. The future of Information & Technology. Boeing Engineering, Operations & Technology teams are handling projects in these areas and many more.
AFTER PAGE 26



A PARTNERSHIP THAT'S ALWAYS MISSION-READY.

The partnership between Saudi Arabia and Boeing has thrived for more than 60 years by continually creating opportunities that enhance the strength and prosperity of the kingdom. The success of Alsalam Aircraft Company is one of many examples. With its 2,800 employees performing maintenance and modifications on both civilian and military aircraft, Alsalam reflects the commitment and benefit of our shared vision and trust.

 **BOEING**

This Integrated Defense Systems partnership ad for Saudi Arabia features Boeing's work with Alsalam as proof that the company is committed to not only maintaining aircraft, but to building a stronger Saudi Arabia. The ad reinforces Boeing's ongoing commitment with Saudi Arabia by highlighting the breadth, nature and benefits of the partnership. An Arabic-language version of this ad will appear in key Saudi trade publications.



ON THE COVER: The 737 final assembly line, in Renton, Wash.
Photo by Jim Coley

Frontiers



GAIL HANUSA PHOTO

COVER STORY **PROMISES KEPT** 14

Commercial Airplanes is about to record its third straight year of 1,000-plus orders. Now comes the task of fulfilling the promises—including keeping the 787 (above) on schedule. Scott Carson, BCA president and CEO, discusses topics such as the business unit’s record demand, its challenges and its need to strengthen relationships with employees and customers.

THE NEXT ‘CHALLENGE’

How is the 787 program integrating ergonomics into the design and the build process of the Dreamliner? What’s behind a simple yet powerful process that identifies and leverages opportunities on development programs? Read about these topics and more in *Challenge*, the pullout supplement for technologists and manufacturing employees. [After Page 26](#)

CENTER PULLOUT



18 Long Beach, Calif.-based Vanessa Wilkins is part of the Boeing Human Resources team. The organization is working to support Boeing's business needs by melding a people-focused, "high-touch" vision with the efficiencies of a high-tech approach.

It's personal

18 Boeing Human Resources offers a tremendous array of services to help support the company's business needs. Here's a look at how some of these services are helping employees, programs and Boeing—and profiles of some HR teammates.

This 'baby' grows up

28 Seven thousand orders. Forty years, since the first production delivery. With numbers like that, the Boeing 737—nicknamed "the baby Boeing" when it was unveiled in 1965—has done more than exceed its initial expectations. It's become the world's most popular commercial jet transport.

Spend some Quality time

30 Product and Process Surveillance, a new Commercial Airplanes approach to quality that focuses on correct processes, is helping the business unit reduce deviations in a product from requirements or standards—and simultaneously get leaner.

'Best for the mission'

33 Integrated Defense Systems representatives aren't the only ones talking about how the Boeing KC-767 tanker best meets the needs of the U.S. Air Force. Also expressing their support for the Boeing solution are U.S. congressmen and senators, and those with a technical background.

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'Flagship for compassion'

34 The C-17 Globemaster III can be converted quickly into a high-tech, flying intensive care unit that transports wounded troops. Indeed, the C-17 is part of the reason why aeromedical evacuation operations have a survival rate today of 96 percent for wounded troops who can be airlifted to a hospital.

With them, in the air

36 Aviation Training International Limited, a Boeing–AgustaWestland joint venture company, is making sure that pilots and ground crews for the British Army's Apache AH MK1 attack helicopter are getting the training they need to succeed. The importance of this task isn't lost on ATIL instructors.

Looking at Italy

38 In Italy, Boeing recently has signed a research-related memorandum of understanding and facilitated a partnership between a university in the United States and one in Italy. These instances show how Boeing is working with top technology providers around the world—and is helping strengthen a nation's aerospace industry in support of Boeing's cross-enterprise efforts.



RON BOOKOUT PHOTO

34 Purple Heart recipients, officials with the 172nd Airlift Wing of the U.S. Air Force, Boeing Global Mobility Systems vice president and general manager Dave Bowman and elected U.S. officials unveil the signage on a C-17 designated the "Spirit of the Purple Heart."



IDRA PHOTO PRODUZIONI PHOTO

38 Leonardo Lecce (right), a professor at Italy's University of Naples Federico II, works with Igor Bovio (left) and Benedetta Capano in a lab where the students are using a scanning laser vibrometer. A Boeing-supported master's degree program at this school is helping bolster students' systems-engineering skills.

Frontiers

Publisher: Tom Downey
Editorial director: Jo Anne Davis

EDITORIAL TEAM

Editor:
 Paul Proctor: (312) 544-2938

Managing editor:
 Junu Kim: (312) 544-2939

Designer:
 Rick Moore: (314) 233-5758

Commercial Airplanes editor:
 Dick Schleh: (206) 766-2124

Integrated Defense Systems editor:
 Diane Stratman: (562) 797-1443

Engineering, Operations and Technology editor:
 William Cole: (314) 232-2186

Shared Services editor:
 Mick Boroughs: (206) 919-7584

Human Resources and Administration editor:
 Robert Sterling: (314) 232-5881

Copy editor:
 Walter Polt: (312) 544-2954

ONLINE PRODUCTION

Production manager:
 Alma Dayawon: (312) 544-2936

Web designer:
 Michael Craddock: (312) 544-2931

Graphic artists:
 Rick Moore: (314) 233-5758
 Cal Romaneschi: (312) 544-2930

Web developers:
 Lynn Hesby: (312) 544-2934
 Keith Ward: (312) 544-2935

Information technology consultant:
 Tina Skelley: (312) 544-2323

How to contact us:

E-mail:
 BoeingFrontiers@boeing.com

Mailing address:
 Boeing Frontiers
 MC: 5003-0983
 100 N. Riverside Plaza
 Chicago, IL 60606

Phone:
 (312) 544-2954

Fax:
 (312) 544-2078

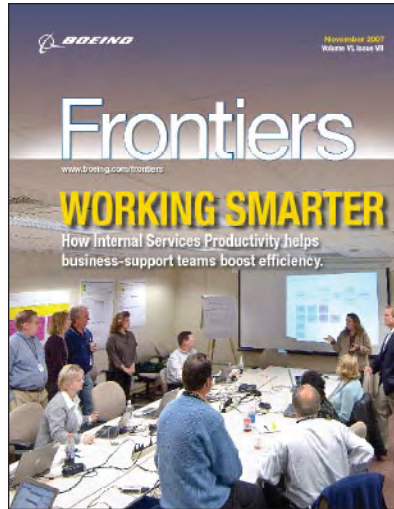
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 www.boeing.com/frontiers

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 Boeing Frontiers, MC 3T-12
 P.O. Box 3707
 Seattle, WA 98124-2207

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 P.O. Box 3707, Seattle, WA 98124-2207
 (Present addressees, include label)

“In this Nintendo, Xbox and Playstation generation, we have almost completely lost the roots of innovation.”

—Steve Dame, Everett, Wash.



RFID remembered

I was very interested in the September 2007 article on radio frequency identification and unique item identification technology. I recall a time in about 1969 when a Boeing employee thought up the basic idea.

A “new” microelectronics group at the Kent (Wash.) Space Center took the idea and built a prototype. It was about the size of a deck of cards and, in one concept, was used to obtain trailer identification as trucks drove by. The base unit would “shine” an RF beam on the passing trailer. The unpowered RFID unit would use the beam’s energy to produce electricity and then transmit a unique trailer ID number to the nearby base station.

The rest of the story is that the Boeing patent office decided that Boeing was not

interested in the idea and told the employee he could patent it on his own, if he wished. I don’t know if he ever pursued the patent.

—Tom Blakney
 Maple Valley, Wash.

Surplus benefits

I’m responding to the November letter from Bob Stevens about the closure of the Boeing surplus store. After reading Ken Botham’s response, I felt it did not address the essence of Stevens’ letter.

I got the impression that Boeing has rationalized its way into this closure by confusing the issue of Lean operations with the benefit of community service that the store provided. In this Nintendo, Xbox and Playstation generation, we have almost completely lost the roots of innovation—which is to provide the basic inspiring, wide-eyed response you get from kids and adults who stand in front of bins of tools and materials that the common household never gets to see, touch, feel or use.

The point Stevens was trying to make is that inspiration comes from the basic simple hands-on browsing that the store has provided. This is not something you can do on Google or Internet Explorer.

—Steve Dame
 Everett, Wash.

Letters guidelines

Boeing Frontiers provides its letters page for readers to state their opinions. The page is intended to encourage an exchange of ideas and information that stimulates dialogue on issues or events in the company or the aerospace industry.

The opinions may not necessarily reflect those of The Boeing Company. Letters must include name, organization and a telephone number for verification purposes. Letters may be edited for grammar, syntax and size.

CALENDAR OF EVENTS

- Jan. 16–17:** 3rd Annual Indian Airline Engineering & Maintenance Conference. Mumbai, India. See www.aviationindustrygroup.com/index.cfm?pg=268
- Feb. 12–13:** Aviation Week Defense Technology and Requirements. Washington, D.C. See www.aviationweek.com/conferences/dtarmain.htm
- Feb. 16–19:** Defexpo India 2008. This marks the fifth version of this biennial defense exposition in India. New Delhi. See www.defexpoindia08.com
- Feb. 19–24:** Singapore Airshow. Singapore. See www.singaporeairshow.com.sg
- Feb. 25–28:** Satellite 2008. Washington, D.C. See www.satellitetoday.com/satellite2008
- March 9–11:** ISTAT (International Society of Transport Aircraft Trading) 25th Annual Conference. Orlando, Fla. See www.istat.org
- March 31–April 6:** FIDAE. This biennial Latin American aerospace exposition will convene for the 15th time. Santiago, Chile. See www.fidae.cl
- April 1–3:** Aircraft Interiors Expo. Hamburg, Germany. See www.aircraftinteriors-expo.com

Boeing Frontiers assembles the above listings for the convenience of its readers only, and they do not constitute an endorsement by The Boeing Company. Times, dates and subject matter are subject to change or cancellation. If you have any items you wish *Frontiers* to consider for the Calendar, please e-mail them to boeingfrontiers@boeing.com, or send them by regular mail to *Boeing Frontiers* magazine, 100 N. Riverside, MC: 5003-0983, Chicago, IL 60606-1596.

SNAPSHOT

A PACKAGE DEAL UPS recently staged an air-to-air film and photo shoot for promotional purposes using four Boeing freighter models—757, 767, DC-8 and MD-11. In this shot, UPS 757 and 767 Freighters fly in formation over the Pacific Ocean near Santa Barbara, Calif. UPS has 75 757-200 Package Freighters and 32 767-300 Freighters. The company has ordered another 27 of the 767 Freighters, with delivery to begin in 2009. In addition, UPS operates two 747-400Fs and has six 747-400s and two 747-400 Boeing Converted Freighters on order.

PHOTO COURTESY UPS.



QUOTABLE

It's more fuel-efficient and cheaper for airlines, and it seems to be the right size, too."

—Richard Tortoriello, an analyst for Standard & Poor's Equity Research, about the Boeing 787 Dreamliner, in the Nov. 24 *New York Times*

This is a way to quickly and cheaply clear these things away."

—Gary Fitzmire, vice president and program director, Directed Energy Systems, on the Laser Avenger, in the Nov. 8 *Huntsville (Ala.) Times*. Boeing is working on the Laser Avenger, designed to neutralize improvised explosive devices and unexploded ordnance that threaten U.S. and allied soldiers in combat

When the dollar reverts, as it has a tendency to do, you suddenly end up with a very competitive European industry."

—Pierre Chao, a senior fellow at the Center for Strategic and International Studies in Washington, about the low U.S. dollar's long-term effect on the competitiveness of European companies, in the Nov. 19 issue of *Aviation Week & Space Technology*.

IAM PROMOTIONS

No promotions listed for periods ending Oct. 26 and Nov. 2, 9, 16, 23 and 30

ETHICS QUESTIONS?

You can reach the Office of Ethics & Business Conduct at 1-888-970-7171; Mail Code: 14-14; Fax: 1-888-970-5330; TDD/TTY: 1-800-617-3384; e-mail: ethicsLine.ethics@boeing.com; Web site: <http://ethics.whq.boeing.com>

The jet that started a revolution

The first 707 leaves a rain-drenched Renton Airport on its initial flight.



BOEING ARCHIVES PHOTOS

How the Boeing 707 charted the course for commercial jet aviation

By MICHAEL LOMBARDI

It was a forbidding sky that loomed above the airport in Renton, Wash., on the afternoon of Dec. 20, 1957. The thick, dark clouds, cold wind and rain were symbolic of the adversity Boeing had to overcome as the company ushered in the era of commercial jet aviation with its brand-new 707.

Boeing's chief of flight test Tex Johnston, his co-pilot Jim Gannet and flight engineer Tom Layne sat on the drenched runway in the first production 707 checking weather reports and waiting for the chance to take the new airplane up for its first flight.

At 12:30 p.m., the decision was made

to go. But as the 707 climbed over Renton, the unpredictable weather immediately closed in around the airliner, forcing a landing at nearby Boeing Field after just seven minutes in the air. Johnston explained, "We never fly a plane under instrument conditions until it has at least 30 minutes in the air." Later that day the sky cleared enough for the crew to take the 707 up for a 71-minute flight. It was an historic day and the culmination of five years of hard work and gut-wrenching decisions.

The British had paved the way for commercial jets with the de Havilland Comet. Tragically, unforeseen structural problems led to catastrophic accidents, which grounded the Comet—and grounded any enthusiasm in the free world for the idea of the commercial jet.

With the 707, Boeing President William Allen and his leadership team had "bet the company" on a vision that the future of

commercial aviation was in jets. To counter the public nervousness about jet transports, the Boeing strategy was a combination of utilizing the pioneering Dash 80 jet transport prototype for press and customer flights, plus a well-crafted advertising campaign directed at the public—stressing the comfort and safety of jet air travel.

Boeing also was able to point to the early success of the Dash 80's first offspring—the Boeing model 717, best known as the U.S. Air Force's KC-135 Stratotanker (and not related to today's 717 jetliner). Although not a member of the 707 family, it was similar in design and performance to the 707-120.

The Boeing campaign included a film shown to airline customers titled "Operation Guillotine." The film was of a test conducted by Boeing that showed a conventional, fully pressurized airplane fuselage being pierced by two metal blades, resulting in a catastrophic failure and disinte-

gration of the structure. Next, the 707 fuselage was put to the same test; this time five blades pierced the pressurized fuselage, resulting in wisps of air escaping from the punctures—but no cracks and no structural failure.

The company's efforts successfully built up customer confidence and public expectation for the new plane and for jet travel. The world was anxiously awaiting the 707.

These expectations helped to make the terms “Boeing,” “707” and “stylish travel” synonymous. Requests poured in to Boeing for rights to use “707” for naming product lines—an example was Jantzen, which titled its 1957 swimwear line “the 707.”

The competition, however, was not sitting idle. Douglas Aircraft was the world's biggest name in commercial aviation and had a near monopoly on the business with its legendary family of “DC” prop liners. Leadership at Douglas saw the potential of the 707 and began work on its own commercial jet—the DC-8. Douglas widened the fuselage to accommodate six-abreast seating as opposed to the five-abreast of the early 707 design. Although the wing sweep of the 707 made it faster than the DC-8, Douglas countered that the DC-8 would be more stable and would have a longer range.

Customers that had been ready to buy the 707 were now ordering the DC-8. Pan Am, the launch customer for the 707, split its initial order, with 25 going to the DC-8 and only 20 to the 707; two weeks later, United Airlines ordered 30 DC-8s.

The orders were a shock to Boeing and caused a chilling sense of déjà vu because



The alpha and the omega of the 707 program: the 1954 vintage Dash 80 (left), prototype for the 707, and a 1991 vintage U.S. Navy E-6A Hermes—one of the last of 1,010 707s to be built.

of an earlier, disastrous confrontation with Douglas.

In the early 1930s Boeing had introduced the world's first modern airliner, the Model 247. The all-metal twin-engine monoplane cut travel times by nearly a third and changed commercial aviation overnight. TWA encouraged Douglas aircraft to build a competitor to the 247, and from this was born the DC-2, and ultimately, the DC-3. The DC-3 gave Douglas market dominance and practically forced Boeing out of the commercial airplane business for the next 20 years.

But Allen had started the jet race and was determined not to see it finish as a repeat of the DC-2 vs. Model 247 contest. A decision was made to widen the 707 fuselage 4 inches, 1 inch wider than the DC-8. Boeing also introduced a new version of the 707, the 707-320 Intercontinental, which had a larger wing as well as a longer fuselage and increased range. The changes were what the airline customers needed, and orders began pouring in for the 707.

Because of the design changes and need to make new tooling, the 707 would never be a big moneymaker for Boeing. But the risks taken and the decisions made set the company on the path to become the world leader in the design and production of commercial jets.

When the first 707 took to the air, those who could travel by air flew in slow, piston-powered transports, while just as many traveled by train, and most crossed the Atlantic by ship. In just two years, the 707 would help change how the world traveled—as travel by air eclipsed travel by rail and sea.

Although the future seemed uncertain at the time, looking back at the decades of outstanding success of commercial jet transportation, William Allen and the people of Boeing who ushered in the jet age with the 707 stand as visionaries. The innovative technology of jet travel has benefited our world by making safe, rapid, economical and comfortable air travel available to everyone. It's clear today that beyond those dark, threatening clouds on that December day, there was sunshine ahead. ■

michael.j.lombardi@boeing.com



A new era approaches as the first 707, now in Pan Am livery (below), meets up with one of the legendary prop liners it would soon replace—a Boeing 377 Stratocruiser.

Still going strong after 65 years

Meet Diana Rhea, whose generosity matches her diligence

BY ROBIN MCBRIDE AND BRENDA PITTSLEY

The license plate proudly states “LUV-JETS.” The frame holding it reads “Lady Diana, Boeing Aircraft Company.” And the car is parked over a name painted in big white letters: Diana Rhea.

The special Renton, Wash., indoor parking space is a small perk for Rhea, who currently holds the women’s longevity record at Boeing: 65 years of uninterrupted company service. She asks for very little, but she’s given quite a lot to the company since joining Boeing at the start of World War II as a clerk in the parts ordering group.

“It’s been a tremendous journey,” said Rhea, 85. She credited the “individual people” she has worked with for making the journey worthwhile. The first woman manager in Manufacturing Engineering, she said that good rapport and “building up people in my group to become successful” kept her motivated over the decades.

Diana Rhea began her career ordering aircraft parts in Seattle during World War II. This year, her 65th with Boeing, she is working in manufacturing position control supporting the final assembly moving line on the Next-Generation 737 in Renton, Wash.



JIM COLEY PHOTO

Currently in the panel maintenance group, she’s played an active role in the progression from manual parts ordering to mechanized methods to the modern electronic age. Beginning in about the mid-1970s she helped set up ordering systems in Wichita, Kan., and Philadelphia.

Rhea is “very loyal, conscientious, hard-working, strives to maintain group objectives, and always looks for new ways to improve processes,” said co-worker Jennifer Bishop.

But Rhea is also notable for giving consistently to the Employee Community Fund since its inception in 1951. She also gives to Books & Backpacks, an annual donation drive for Boeing employees in the Puget Sound region. Bishop said she’s helped Rhea

deliver the heavy goods, but not just to be of assistance to a senior—she also wants to hear Rhea’s stories about Boeing in past times.

“She’s very generous and caring,” Bishop said, and willing to share reminiscences as well as school supplies and money to help others—even when, as Rhea admitted, her paycheck was “meager” in earlier days when she raised a child as a single parent.

“I’m fortunate to have good health and to have been able to give to the community all of these years,” Rhea said. She added that she has no plans to retire any time soon and expects to continue to “work as long as I can” and “help as much as I can.” ■

*robin.m.mcbride@boeing.com
brenda.pittsley@boeing.com*

7-Series jets poster now at Boeing Store

The Boeing Store is offering a poster of the 7-Series family of airplanes that were on display as part of the 787 Premiere event in July. The airplanes, shown at Boeing Field in Seattle, included an Omega Air 707, an AirTran Airways 717, a FedEx 727, an Alaska Airlines 737-800, a Rolls-Royce Trent 1000 Flying Test Bed 747-200, a Continental Airlines 757, a Delta Air Lines 767 and an Air France 777-300ER (Extended Range). In addition, the Boeing 747-400 Dreamlifter can be seen nearby.

The poster measures 24 inches by 36 inches (61 centimeters by 91 centimeters) and is printed on high-quality, heavy-duty coated paper to reduce tearing or creasing, with an ultraviolet coating that inhibits fading. It’s available for \$10 at Boeing Stores as well as the store’s Web site, www.boeingstore.com.



High-power work



Mark Billings (left), Commercial Airplanes Propulsion Systems lead liaison engineer for CFM56-7B engines, and David Chi, GE field service representative supporting CFM products, met to discuss design alternatives for improving the in-service performance and reliability of the Boeing Next-Generation 737 at the Renton, Wash., final assembly engine buildup area.

JIM ANDERSON PHOTO

Propulsion Systems, engine suppliers boost quality partnership

Partnering to deliver defect-free engines to Commercial Airplanes customers was the goal of the fifth annual All Engine Company Conference hosted by

Propulsion Systems in Seattle in late October. Jointly planned with engine manufacturers CFM, General Electric, Pratt & Whitney, and Rolls-Royce, the annual conference provides a way for all to work together on improving quality.

This year's conference centered on work-process ergonomics, foreign object debris (FOD), and unusual visual conditions (UVCs). These UVCs, which are seen on the surface of engine components, don't

affect engine performance but look "different," which could cause customer concern.

At the conference, engine companies volunteered to share UVC guidelines and prevention methods with their suppliers. Participants also agreed on standard UVC documentation processes aimed at reducing customer concerns. In addition, participants defined FOD-prevention tactics that critical suppliers to the engine companies will be encouraged to adopt with support from Boeing and the engine manufacturers.

Driving quality manufacturing practices upstream to subtler suppliers is a key element of the partners' approach to quality improvement. Engine manufacturers have started to bring their suppliers to Boeing-hosted knowledge-sharing events and arrange for Propulsion Systems Quality team members to visit some of their key suppliers.

During the visits, Boeing and the engine companies share information about their top quality concerns and suggest ways to address them, observe manufacturing processes and offer feedback, and field questions from supplier employees.

Boeing employees who participate in the visits report that subtler suppliers are eager to make changes that will result in better products, and they welcome advice from Boeing.

"We aren't looking for earthshaking improvements from these events," said Richard Gallagher, a conference organizer from Propulsion Systems. "But incremental change is a basic Lean concept, and with all of us working together, we know our customers will be delighted with our products in the long run." ■

Focus: Alignment, improvement

Many opportunities exist to enact Lean+ at Boeing, suppliers

It takes time to change a culture and create an environment where continuous improvement is a way of life.

Participants at the semiannual Lean+ Conference in Tacoma, Wash., last month learned tremendous opportunities still exist to make improvements more effectively and more rapidly throughout Boeing and its suppliers.

"The whole point about the '+' in Lean+ is to align all of Boeing with a common language, common principles, and standardized tools and training to leverage the best of

Boeing and bring more customer value faster than ever before," said Bill Schnettgoecke, vice president and Lean+ initiative leader, in his keynote address. "This is what our customers expect and deserve."

A record 1,150 attendees, representing Boeing and its customers and suppliers, attended the three-day event.

Schnettgoecke closed the three-day conference by previewing the "Lean+ Roadmap," an interactive and integrated view of the Boeing continuous improvement environment where everyone can learn from and share with one another. The Lean+ Roadmap will roll out in early 2008.

The next Lean+ Conference will be held May 7-9, 2008, in St. Louis. To learn more about Lean+, visit <http://leo.web.boeing.com> on the Boeing intranet. ■



DANIEL THOMPSON PHOTO

At the recent Lean+ Conference in Tacoma, Wash., attendees work together to build a 10-cup pyramid without using their hands. From previous exercises and by increased communication, they learned the value of benchmarking and improving processes.

‘My work environment improved’

How Alternative Dispute Resolution helped one employee solve an issue

By ROBERT STERLING

The following excerpt was written by an employee who used the Alternative Dispute Resolution (ADR) process to resolve a conflict with his manager. All names and references that might compromise confidentiality of the individuals involved have been removed.

“Recently my group was assigned a new manager. We hadn’t had a chance to get to know one another well before I learned in a meeting that I hadn’t measured up to expectations. As a long-time Boeing employee who had always received fair comments from managers, I became extremely upset. No warning, no candid conversations, nothing. I had little insight into why this happened. I got nowhere with follow-up discussions and became reluctant to share my feelings, fearing things might get worse.

“I’m passionate, so this really affected me negatively. What had I done or what

did I need to improve? I had trouble sleeping, became irritable and my productivity at work began to slide. Regrettably, I even had disagreements at home with my wife.

“I learned about the ADR process shortly after this happened. A former colleague of mine pointed me in that direction. Not expecting much, I contacted them and was referred to an ADR case manager. After spending some time discussing the issues, I learned that I’d have a chance to address my issues face-to-face with my manager. I received coaching on how to make the most of that meeting.

“To make a long story short, my manager and I talked to one another, but more importantly, we listened to each other and resolved the problem. Once I entered into the ADR process, I had a solution within a week.

“My conflict was solved, but more importantly, I felt that the company appreciated me. The candid discussion and mutual understanding improved the relationship with my manager, something I hadn’t expected. My work environment improved.”

* * *
Spencer Dunn, Enterprise ADR Focal, said the ADR process is a way to give

employees a voice when they have an issue with their managers. Giving the parties involved control over the process and outcome allows them to resolve potentially serious situations quickly and respectfully.

“With so much at stake, helping resolve situations and enable understanding early and amicably has never been more critical, particularly when competition to identify, attract, retain and develop top talent in aerospace has become fierce,” Dunn said. “We are part of opening the Boeing culture and developing leaders.”

Margie Wooten, an ADR Case Manager, finds the trust, respect, value and dignity the process can foster to be most relevant. “It’s refreshing that so much positive can come from a seemingly negative event,” Wooten said. “This is about our employees’ health and well-being. I’ve seen how it’s changed working relationships and the environment. That’s good for our employees and good for Boeing.”

ADR, a process that began in 1998, is led by the Global Diversity and Employee Rights group in Human Resources. To learn more about the ADR process, visit <http://globaldiversity.whq.boeing.com/adr.html> on the Boeing Web. ■

robert.sterling2@boeing.com



Margie Wooten, an Alternative Dispute Resolution case manager in the Puget Sound region, counsels an employee on how the ADR process works and what to expect. Wooten said she finds great satisfaction in helping employees resolve workplace issues quickly.

DANIEL THOMPSON PHOTO

Boeing at Dubai

November's Dubai Airshow marked a major opportunity for Boeing representatives to strengthen relationships with their Middle East customers, as well as to underscore the company's commitment to the region and partnership with regional industry.

Jim Albaugh, Integrated Defense Systems president and CEO, held interviews with key members of the press in the Middle East to give an update on Boeing's efforts to build partnerships and provide capabilities for customers in the Middle East. Also among IDS representatives meeting with the media were Mark Kronenberg, vice president of International Business Development, and Jeff Johnson, regional director of Middle East Business Development.

Meanwhile, Commercial Airplanes representatives also were busy. The business unit announced orders from various customers totaling 55 airplanes, along with a proposal acceptance for 100 jetliners (Boeing announces jetliner orders when customers wish to do so and does not stockpile announcements for air shows). Among the executives meeting with the media or conducting briefings were Scott Carson, president and CEO, Randy Tinseth, vice president, Marketing, and Steven Hill, president, Boeing Business Jets. ■



A



B



C

A. HH Sheikh Ahmed bin Saeed Al-Maktoum (center), chairman and CEO of the airline Emirates, shakes hands with Scott Carson, president and CEO of Commercial Airplanes, after signing a deal on the carrier's order of 12 777-300ERs (Extended Range). Behind them is Lee Monson, BCA vice president, Middle East & Africa Sales.

B. and C. Among the popular displays at the Dubai Airshow was a mockup of the Boeing 787 Dreamliner interior.

D. A Boeing 737 Airborne Early Warning & Control aircraft was on static display. This aircraft is part of the Peace Eagle program for the Turkish Air Force—and made its international air show debut at Dubai.

E. Also on display at the air show were models of various Integrated Defense Systems products.



D



E



BCA's Scott Carson gives his view on aviation's challenges and opportunities

Scott Carson knows the importance of having a big-picture view while paying attention to details.

Since he became president and CEO of Boeing Commercial Airplanes 15 months ago, the business unit has experienced record demand for its products and services while being challenged to ramp up production, manage the global supply chain and redouble efforts to complete the all-new 787 Dreamliner.

Meeting employees and gaining their insight and understanding is a key part of his agenda, and nurturing BCA's relationship with customers is equally high on the list. In addition, Carson sponsors the companywide Lean+ growth and productivity initiative. Carson discussed these and other topics during a November interview with *Boeing Frontiers*.

Q: BCA is closing in on the third straight year of booking more than 1,000 orders, and a number of large U.S. carriers haven't yet begun re-equipping in earnest. Are we looking for another strong year in 2008?

A: The current cycle has been so much different from anything we've ever seen before. Two and a half years ago, no one would have believed we'd do two years back-to-back of 1,000. Unless we take the rest of this year off, we'll break through 1,000 again.

The wild card is in predicting how 2008 comes up and what's going to happen with the overall economic situation. We've seen oil in recent weeks go to well over \$90 a barrel. The good news is that puts a lot of pressure on operators to replace older aircraft. The bad news is it puts a lot of pressure on their earnings, which precludes them from having the capital to replace them.

My personal opinion is it won't be a fourth consecutive 1,000-airplane-order

Environmental concerns are "potentially one of the larger threats that the industry faces," said BCA President and CEO Scott Carson. "Boeing, as the market leader, needs to lean forward and take a stand."

JIM COLEY PHOTO

Keeping our promises to employees, customers

year. It could still be a very good year, but perhaps more normal in size.

Q: A six-month delay in the 787 program was announced in October. What needs to be done to maintain our customers' trust?

A: We have worked very hard to redevelop relationships with our customers globally, and we have made tremendous progress. There's no question that a single disappointment, like we've had on the 787, can damage those relationships.

The best course of action is to do everything we can to assure that it's a one-time slip that won't affect the other programs. Each week we spend a great deal of time in my staff meeting making sure all program managers understand that we must continue to perform flawlessly, meeting commitments that we have made to customers and keeping the promises we have made to employees. It is the only way I know to rebuild trust.

Q: How confident are you that BCA's other new products—the 777 Freighter, 747-8 and the P-8A—will remain on schedule as we boost production of existing models?

A: We didn't look at the 787 in isolation. We carefully assessed the condition on all of our programs before we announced the slide in the 787.

We believe we have the resources to execute all these programs. It's going to require careful management of our resources. It's going to require us to maintain the schedules on the 787 so people come off when they need to, and to maintain the schedule on the P-8A, so people can come off that one, because we need them to go work on the 747-8.

We remember too well the production ramp-ups in 1997 and '98 when we stumbled. We can't afford to let the customer down again, so it's imperative that the people running the production programs stay absolutely focused. Their job is to deliver those airplanes that they have committed to—make sure they are identifying challenges they have so we can put appropriate resources where we need to.

Q: The news media often focus attention on the tough challenges. What are some of BCA's key accomplishments that have been overlooked?

A: We just sold our 1,000th 777, and we recently sold our 7,000th 737. Both of those programs continue to move forward at astounding rates. We also sold the 1,000th member of the 767 family earlier this year.



GAIL HANUSA PHOTO

Boeing recently sold its 1,000th 777 airplane. Final assembly of the 777 now takes place on a moving line at the Boeing factory in Everett, Wash.—which is also the home of the 747, 767 and 787.

We certified a couple of new 737 derivatives in the last 12 months. We have implemented a moving line in [the Boeing factory in] Everett [Wash.]; we continue to harvest the benefits of the moving line in Renton [Wash.] and to reduce cost in that product.

One of the really neat things I recently experienced is on the third shift in Everett. I met with a crew that had just completed 10 years without an injury in a very labor-intensive area.

There's lots of great things happening around the company—a lot of energy, a lot of pride in the products that we produce and a lot of pride in the people our employees work with. That's what often gets overlooked when we talk just about the challenges in developing a new airplane.

Q: What market trends do you see emerging in these early years of the 21st century

that will impact our business—for example, environmental concerns, air traffic management and emerging competitors?

A: Let's start with the last one first. In this industry, if you go back 20-25 years, there were two, sometimes three competitors in the marketplace—ourselves, McDonnell Douglas, occasionally Lockheed and the very beginning of Airbus. Here we sit in this new century and there are two—Boeing and Airbus.

But wait a minute, there might now be five others—the Russians, the Chinese, the Japanese, the Brazilians and the Canadians. The marketplace, particularly at the smaller-model end, is going to be a much more dynamic place for us to live. We're going to have to understand where we fit, where we're disadvantaged, and how we exploit our advantages to be successful.

On the environment, the entire industry was relatively slow to respond to the



Commercial Airplanes' effort to nurture a strong customer relationship is exemplified by its Operations Center (above), which provides comprehensive round-the-clock support to Boeing jetliner operators.

MARIAN LOCKHART PHOTO

growing public debate on aviation and the environment. Boeing, as the market leader, needs to lean forward and take a stand.

First, we need to make sure the public is informed of the facts. Secondly, armed with those facts and the support of the public, we need to support reasonable public policies that allow the industry to survive. Thirdly, we need to continue to exploit technology to make us even better environmental citizens. This is potentially one of the larger threats that the industry faces.

Turning to air traffic management, our air transportation system today is relatively inefficient. It's technology that's been around, in some cases, for 30 or 40 years. It is technology that does not exploit the capability of the airplane, and it's technology that drives huge costs in fuel burn because of the way airlines operate. There is a 15 to 17 percent fuel savings potential through modernization of the air transportation system.

If we focus on these issues, we can prepare ourselves for this next century, though it's going to be challenging.

Q: BCA's major labor contracts expire in 2008. Is Boeing willing to take new approaches in the negotiating process—for example, linking pay to productivity increases or seeking longer contracts for greater stability?

A: Let's go back to just over a year ago, the day that I was asked to take on this responsibility as president and CEO of Commercial Airplanes. That afternoon, one of the union leaders was interviewed by a local newspaper about his relationship with me. His comment was something to the effect that, "I don't have any relationship with any management at Boeing. They never talk to me—I never hear from them."

We have spent a lot of energy this last year—myself, Doug Kight (BCA vice president of Human Resources), Carolyn Corvi (BCA vice president of Airplane Programs), and others—going out and talking to employees. First shift, second shift, third shift, in the factories, in the office areas—listening to employees, and trying to help people understand what it is we are doing. That outreach has been positive. It has helped us tell our story, and helped us understand the

issues that exist in the factories and in the office areas.

Do I think it's going to make the negotiations easy? No, there are still going to be difficult issues. But having a relationship with the people you talk to—that's a key and important first step.

As far as the tactics or strategies, everything is on the table. Certainly one of the hot topics of the year is offering a new type of retirement plan for new hires—an enhanced 401(k) plan that vests immediately and that employees can take with them if they move to another company. There are pluses and minuses to this approach, and we'd like to have dialog around those. And there will be dialog around compensation—wage rates, market-based salaries and linking pay to productivity increases. All of those things are fair game to talk about, and they need to be dealt with in an environment of integrity.

I also frequently meet with union leaders, and we agree that a strike is not the desired outcome. At the same time, we need to understand the impact of what we do in these negotiations on the competitiveness

of our business going forward. We're in this together for the long term, and the focus needs to be on long-term productivity and growth and achieving those in a culture of strong leadership and truly engaged employees. That's how we'll all share in Boeing's success.

I am confident that all of us will work through this in a principled manner, and that we'll find a way through it.

Q: Why is it important for everyone to implement the Boeing growth and productivity initiatives?

A: If you go back to 1968 when I first hired in at Boeing, in Renton we were building 727s on the order of 12 or 14 airplanes a month and we had about 30 airplanes in the flow. We had inventories stored everywhere, and we had engineering separated from the factories.

Today if you walk over to Renton, we're now producing 737s at more than twice that rate, with only about 12 airplanes in flow. You'll find teams of engineers and

mechanics working together to define better ways to build the airplane, so it can be built in less time with higher quality and it's easier to maintain. Those are the benefits you get out of Lean+. You really start behaving as a team with a common goal—and that is to create better value for our customers.

Q: How do you view Airbus as a competitor?

A: Airbus is, and has been, a very strong competitor. Over the last two years, a lot of people thought they were in trouble. At the most senior levels, clearly they were distracted. But at the lower levels they continued to understand what they needed to do to compete effectively with us. The Power 8 Program they put in place is an example of how they continued to drive Lean ideas back into their production systems.

They are going to come out of this current challenge very strong. We can't relax for a minute if we are going to maintain the lead that we built over the last several years.

We must do better tomorrow than we are doing today.

Q: What's your assessment of our services business?

A: Our secret weapon in Commercial Aviation Services is Lou Mancini (vice president and general manager of CAS). Lou comes from years and years of experience on the airline side of this business. That allows him to define market opportunities that are not tied to the production of airplanes but are tied to keeping the airplanes in service.

Materials management has been a big payoff for us. And what we are doing with the Electronic Flight Bag improves the way the airlines operate. The acquisition of Aviall allows us to get into the parts repair and overhaul side of the business. All of these are positive steps—building blocks in growing a response to a market that is asking for consolidation to take place. As that takes place, it will create new opportunities for us. ■

It's all about people

One of Scott Carson's top priorities has been to get out of the office and meet employees on the job—first, second and third shift.

What's impressed him most from these experiences? "That we're more alike than we are different," Carson said without hesitation. "I mean, we all have the same aspirations: to be valued as human beings, for our ideas to be valued, for people to ask and then care about how we respond."

Carson recalled meeting an employee at the Fabrication site in Auburn, Wash., who had worked 27 years on third shift. "He said this is the greatest company in the world that gives me the opportunity to go back and get an education," Carson said. The employee was earning a graduate degree, and he told Carson that third shift worked out ideally with his schedule.

"These are some of the smartest people. They have great creativity and great pride in the company," Carson added.

As for BCA's customers, "they clearly like the products," Carson said. "But what they remember when they come to Seattle is how they are treated."

He noted that Shared Services Group drivers, who support airline customers when they're in Seattle, exemplify what customers like best about Boeing employees.



MARIAN LOCKHART PHOTO

During a visit to the Everett, Wash., factory, BCA President and CEO Scott Carson chats with Paul Roan, 767 mechanic, who explains recent process improvements on the 767 Program.

"I've had more people tell me about the men and women in the red shirts—the drivers who pick them up at the airport, take them from the factories or office areas back to the airport," Carson said. "The men and women in red are described as the greatest ambassadors of the company because of their pride in what our company does."

The primary job for everyone at Boeing, Carson

said, is to "recognize that tomorrow we have to find better ways of doing those very good things we do today. And the day after that, we'll have to improve on those. Getting to where it is a culture where change is embraced and accepted as a necessary part of a continuous improvement model, where Lean is embedded in the way we think about our tasks for today or our tasks for tomorrow—that's where we need to go."

Bringing it all together

Boeing Human Resources balances 'high tech' with 'high touch'

By DEBBY ARKELL

Ask 10 employees to name a Human Resources–provided service and you're likely to get 10 different responses. That's a good thing.

Boeing Human Resources provides the company's employees with a wide array of services and tools designed to support many life events and experiences. What's more, the organization is doing this in a time when tremendous attention is being paid to implementing Lean+ and doing more with less.

Corporations worldwide face increasing pressure to juggle seemingly conflicting priorities, such as attracting and retaining the next-generation work force while managing the soaring costs of health care and other benefits.

For Boeing, the pressure to attract and retain new workers has never been greater. Today, 18 percent of the company's employees are eligible to retire. Another 19 percent will be eligible in five years. And in 10 years, fully 60 percent of the current Boeing population will be eligible to retire.

There also is a growing concern at Boeing about the availability of technical talent in the labor market to meet future employment requirements. Moreover, too many competitors are looking for the same skills—and offering comparable salaries and benefit packages.

Ultimately, Boeing is looking to HR and its ability to provide benefits and services that will differentiate Boeing from other competing companies—in other words, to make Boeing an employer of choice. The goal of these activities is to strengthen the company's viability and competitiveness through greater growth and productivity, as well as the creation of an environment that supports a diverse, inclusive and engaged work force.

"We want to make sure that we have the best employees in Boeing, that we develop them, and that we provide the right environment so they can be successful at all levels," said Rick Stephens, senior vice president, Human Resources and Administration. "Boeing is looking to us to help create that environment—one that develops leaders, where open dialog and diversity are valued, and that provides competitive benefits."

To that end, Boeing Human Resources has been evolving, finding a balance between a transaction- and administrative-based business model and one of personal attention where HR professionals help guide employees.

Inside

Services provided: Boeing employees explain how the human side of Human Resources helped their personal, professional lives. **Page 19**

2008 objectives: Rick Stephens, senior vice president, Human Resources and Administration, gives his view on what's in store for HR in 2008. **Page 21**

Contributions: HR does its part to streamline processes and save costs—while following best practices and providing improved support. **Page 22**

Faces of HR: Meet some of the individuals in the Human Resources organization. **Page 24**

For more information on some of the many services discussed in this package of articles, visit the sites—on the Boeing intranet as well as the World Wide Web—listed in the box below.

This evolution is coupled with HR efforts to contribute improved customer service, best practices and cost savings, and support the Lean+ and Internal Services Productivity initiatives.

Stephens acknowledged that the changes undertaken by the organization in the past have resulted in challenges for employees as well as the company. "This is a work in progress," Stephens said. "We've made some significant improvements in the way we do business from a technical standpoint. However, we're not there yet. We're working very hard to re-establish relationships with employees and find the right balance between technology and personal hands-on assistance. We're working hard with our leaders to get it right."

On the following pages are stories of some of the many services provided by Boeing Human Resources. ■

debra.j.arkell@boeing.com

For more information

To learn more about the programs discussed in the following package of articles, visit these sites on the Boeing intranet.

- **HR Five Strategies site:** <http://humanresources.web.boeing.com>
- **Employee Assistance Program:** <http://eap.web.boeing.com>
- **Dependent Eligibility Verification:** http://hr.web.boeing.com/published/9/docs/dv_qa.pdf and <http://humanresources.web.boeing.com/index.aspx?com=9&id=151>
- **Boeing Wellness:** boeingwellness.com
- **Alternative Dispute Resolution:** <http://globaldiversity.whq.boeing.com/adr.html>
- **Pay & Benefits Online Profile:** www.boeing.com/express (Those on the Boeing intranet also can access their profile through the TotalAccess link on the Boeing portal at <http://my.boeing.com>)
- **Training:** <http://ltd.web.boeing.com>
- **Family Care Resources:** <http://familycare.web.boeing.com>

The human side of HR

Boeing employees explain how services helped their lives—both personally and professionally

Providing an environment that supports a healthy, diverse and engaged work force is the key to attracting and retaining employees in a fiercely competitive market. Indeed, people are the heart and soul of Boeing. Following are just a few examples of the many services and benefits provided this past year to Boeing employees.

HEALTH RISK ASSESSMENT

The Health Risk Assessment is an online survey offered by Boeing through the Mayo Clinic. Employees and their spouses—or same-gender domestic partners—who are covered by a Boeing health-care plan can take the HRA and receive a personalized health report identifying potential health risks and suggested steps to improve their well-being. In addition, those who took the HRA in October and November were eligible for a \$50 gift card from one of numerous merchants. If the HRA identifies health risks, Boeing offers company-paid coaching through the Mayo Clinic to address issues such as stress and poor nutrition. Better health helps individuals lead more satisfying and productive lives, and it should also help keep Boeing medical costs more manageable over time. This fall, more than 107,000 individuals—including Commercial Airplanes employee Teresa Arends—completed the Boeing HRA. Here is Arends' story.

I've been with Boeing for two years, and I took the online Health Risk Assessment last year for the first time. I learned as a result of the assessment that my cholesterol was considered to be really high—a risk factor—and that surprised me because of my age. I'd had my cholesterol checked previously and knew it was borderline, but the assessment results opened my eyes.

After taking the HRA, I started receiving good tips on improving areas where I may not have scored so well—including my cholesterol. After I took the assessment results to my doctor, we had a good conversation, and I've since been able to get those numbers down.

It's encouraging to know that I have good, healthy behaviors too, and that I'm doing some things right!

I think it's remarkable that Boeing cares so much about its employees that it would make assessments like this available. I worked at another company for six years, and they didn't have anything that came even close to this in terms of wellness. The company provided gym equipment for us to use, but no counseling or other health-related information was available to us.

The HRA amounts to a 10-minute test where you can use the results however you want to, and the programs offered by Boeing Wellness are really terrific. I've become more aware of the Mayo



MARIAN LOCKHART PHOTO

Teresa Arends of Commercial Airplanes participated in the online Health Risk Assessment this past year. Her HRA's results motivated her to change her eating habits—and to improve her fitness, in part by walking during her lunch hour.

■ FEATURE STORY

Clinic Web site that Boeing offers; the exercise monitor is a great tool, too. To be perfectly honest, the \$50 incentive didn't hurt, either.

Ultimately, I feel that with tools such as the HRA, Boeing wants its employees here and that the company really values my health. That makes me feel good.

PAY & BENEFITS PROFILE

Most employees know how much pay they take home every two weeks, but few know the total value of their complete pay and benefits package. The online Pay & Benefits Profile gives employees a snapshot of their share of the nearly \$20 billion that Boeing invests annually in pay and benefits programs for employees and their families. The profile recently adopted an electronic format, increasing functionality for employees and saving the company \$500,000 annually. Shared Services Group employee Kali Louman explained how she uses her Pay & Benefits Profile to plan actively for her future.

I've been with Boeing for almost 30 years and I use the Pay & Benefits Profile quite a bit. The profile has a lot of information, and the areas I focus on have changed over the years. At this point I'm looking more at the retirement aspect and using the new modeling tools [available online]. The information in my profile has helped me realize what I need to do to help me be able to retire when I want to.

It's really important for employees to be able to have all the pieces of their compensation package available to them. I feel that, through the Pay & Benefits Profile, Boeing is providing us with the total picture, rather than just part of it.

The profile puts all the information in one place and helps employees evaluate whether Boeing is a good place to work relative



Kali Louman of Shared Services Group said she appreciates the increased functionality now available through her online Pay & Benefits Profile. The online tools have come in handy as she's adjusted the focus of her retirement-planning strategy, she added.

MARIAN LOOKHART PHOTO

On-site Health Screenings

This past summer, employees at many U.S. locations had an opportunity to participate in free wellness screenings to check blood pressure, glucose and cholesterol levels, and body mass index. This year Boeing Human Resources hosted 113 events where health care professionals conducted nearly 20,000 screenings. Wellness screenings are an important step in maintaining health, as they can identify key risk factors and help prevent serious conditions from developing. Many employees were able to use the information from their screenings to get even more meaningful results when they completed their Health Risk Assessment (see story on Page 19).



DENISE DAGLAN PHOTO

Gary Toyama, IDS vice president, Southern California Region, participated in on-site wellness screenings earlier this year. This past summer, employees at many U.S. locations had an opportunity to participate in free screenings.

to their personal needs or to other opportunities. For example, if you're considering a job in another company, you might be offered a higher salary, but that could be offset by lower benefits. Knowing the full value of your pay and benefits package at Boeing helps you make informed decisions.

Before Boeing, I worked at other companies where I didn't have benefits. Knowing the full value that Boeing invests in me is a great thing. The fact that Boeing provides this information shows me that the company wants people to know the value of working for Boeing. And it shows that the company values us.

LEADERSHIP DEVELOPMENT PROGRAMS

Strong leadership drives employee engagement—the way employees think and feel about their jobs. That, in turn, is linked to attracting and retaining a talented, diverse work force. To that end, Boeing provides leadership development programs and uses a Leaders Teaching Leaders methodology to develop leaders, open the culture and create a one-company mindset through all levels of the organization. Pete Dougherty, 737 Engineering leader in Commercial Airplanes, this past year used elements of LTL he learned from a leadership development class to drive understanding of the Boeing Leadership Attributes in his organization.

Earlier this year, my HR generalist Heidi Kenoyer and I met to discuss how we could work together to help our management team

and employees fully understand the Leadership Attributes. We modeled a “Leaders Teaching Leaders” structure to better engage the managers and prepare them to help their employees understand how the attributes apply to daily work.

We began with a series of management off-site meetings to “tee up” the idea of leadership attributes and generate buy-in. We spent a lot of time talking about what they meant and how they applied to our organization’s work. At our first meeting we all acknowledged how important the attributes are and discussed how we might share the concepts within our group by engaging our employees. We spent our second and third off-sites discussing details and establishing a plan for how we’d proceed.

Our plan was for each manager to take an attribute and create a brief training module about what it meant to him or her. We then scheduled time in staff meetings to go through each module with employees.

Leaders are supposed to be teachers, and that’s just what happened in this case. They used the Lean+ method of teaching by asking and listening to the feedback. Managers shared examples of the attributes in action and asked employees for their input on what the attributes meant to them. This way managers and employees alike felt ownership and learned from one another.

We’re seeing positive results from this approach, too. For example, when we look at our employee survey score on the question about understanding the attributes, our total group score was 70—well above the average for the company.

Even better, now employees are telling us they want to take this further. We are beginning [employee survey] action planning, and employees are saying they want more involvement in this area and want to use the attributes in their daily work model.

Ultimately, our group’s ongoing partnership with HR is helping open the culture for our employees. It’s exciting to see!

—Debby Arkell



Commercial Airplanes’ Pete Dougherty and his team recently took a “Leaders Teaching Leaders” approach to enable understanding and acceptance of the leadership attributes. At the time the efforts began, the team included (from left) Bob Rohwer, Don Helgeson, Tim Traynor, Stan Iwata, Dougherty, Mark Murdoch, Ruby Lam and Heidi Kenoyer of Human Resources.

BOEING PHOTO

Stephens: Where HR is going in 2008

What’s in store for Human Resources next year? Rick Stephens, senior vice president, Human Resources and Administration, offered his view.

“We, like other functions at Boeing, are trying to manage costs and have been using technology to achieve that. However, we’ve gone too far to the high-tech side of things, taking ‘people’ out of the equation.

“People feel they’re valued when they’re included, when there’s an open environment, when diverse perspectives are respected, and when the company appreciates what they’re doing. A computer can’t do that. Computers are great for record-keeping and certain information transactions, but they don’t do anything to improve the quality of conversations.

“To that end, Human Resources in 2008 will focus on ‘service delivery’ and help us find the right balance between our HR professionals, existing technology and tools, and new ones. We’ll use Internal Services Productivity as the tool—or metric—to measure service delivery from a cost standpoint.

“Ultimately, Human Resources’ role is all about people and creating a competitive advantage for Boeing. I’d like Boeing to be recognized and valued as the best place to start a career and as the best place to work. By helping Boeing meet business objectives, and demonstrating that we value our employees through helping them grow, learn and improve their skills, I feel we will earn that recognition.”



BOB FERGUSON PHOTO

What’s the role of the Human Resources organization at Boeing? It’s “all about people and creating a competitive advantage for Boeing,” said Rick Stephens, senior vice president, Human Resources and Administration.

Serving Boeing—and its people

HR pitches in on cost savings—while following best practices and improving customer support

When reflecting on Human Resources' work to help Boeing become an employer of choice for top talent, some successes stand out. Read on to learn about the highlights of some of HR's work to help Boeing be more competitive.

TRAINING IMPROVEMENTS

Training is a vital service managed by Human Resources. Nearly every Boeing employee likely has taken an on- or off-hours course to increase skills or maintain certification. Annual compliance training also is required of all Boeing employees in many areas, from computing security to acceptance of business gratuities.

Boeing recently undertook a massive effort to streamline the number of courses offered and the frequency with which training is needed. The work led to a more-efficient schedule for the frequency of completing required training, and a new option to “test out” on some courses. That lets employees proceed to the final test without first taking the course—and to receive credit with an 80 percent passing score. The end result: more efficient and effective training, and increased employee satisfaction. This work supports the companywide Internal Services Productivity growth and productivity initiative—along with HR's strategy of service delivery, as training services are delivered more efficiently and cost-effectively.

“The test-out option makes the training really efficient,” said Michael Massie, Safety and Mission Assurance manager for Space Exploration in Houston, earlier this year. “It takes into account what you already know and saves having to take training you don't need. For the first time in years, my training has been completed early.”

This streamlining, combined with the adoption of enhanced training technology, is expected to result in more-efficient administration of training. Labor-hour savings could amount to 160,000 hours in 2007 alone, and projected cost savings are approximately \$43 million over four years.

EMPLOYEE SURVEY

Another area with potential positive impact is the employee survey. The survey, distributed companywide every other year, is designed to measure employee engagement—how an individual thinks and feels about Boeing and his/her job. This is a key part of the HR strategy to establish and maintain a diverse and engaged work experience.



Michelle and Graham Crippin are Boeing employees who participated in the Dependent Eligibility Verification process this year, providing documentation confirming the health benefit eligibility of their children Claire and Collin.

MARIAN LOCKHART PHOTO

More than 107,000 employees participated in 2007.

The survey was re-engineered in 2005 to measure employee engagement more closely. John Messman, Employee Relations director and enterprisewide process leader for Employee Engagement, said the two years of data gathered thus far indicates it's still a work in progress.

“When we compared the 2005 and 2007 data, we didn't show much movement on an enterprisewide basis, although there are definitely pockets of significant improvement across the company,” he said. “We're hopeful that over time we'll see the progress that we're looking for taking place across all of Boeing.”

Meanwhile, HR has made other improvements to the survey to improve the quality of results and save money.

- Gathering demographic data is now automated. The manual process led to errors in the data and increased the time needed to take the survey. Now employees are assigned an anonymous ticket number, which has embedded in it the appropriate demographic information from HR databases for use by the survey vendor. This has decreased the amount of time needed to take the survey—and increased its accuracy.

- The survey is now almost completely electronic. Messman said that in 2007 the survey was fully 90 percent electronic, up from 60 percent just a few years ago. Because the electronic survey costs 10 percent of what the paper survey costs, and data can be compiled electronically, Boeing receives a higher-quality product at a significantly lower cost.

- A new vendor has added greater capabilities into the survey—

and at a lower price compared to previous vendors. Boeing managers now have “survey action planning” functionality, which provides questions for managers to help them probe more deeply into particular survey items, tools to help managers with suggested action steps for improvement and even e-mail notices to managers to remind them of action steps they’ve committed to undertake.

This year also was the first time that managers at the local team level received reports on results (if the manager received five or more responses). Indeed, this enables managers to make meaningful changes for their teams. “We find that engagement scores go up when you drive down results to that level, because more specific, actionable data is available,” Messman said. “This, we believe, will ultimately drive employee engagement to new heights over time.”

DEPENDENT ELIGIBILITY VERIFICATION

Part of being a good steward of company resources is ensuring money is spent wisely. One example: ensuring that the company’s benefit plan covers only eligible dependents. Indeed, health care market data has shown that many businesses—not just Boeing—have been covering significant numbers of ineligible dependents. This is due in part to eligibility rules being complex.

“Removing ineligible dependents not only helps manage health care costs for employees, but it also has a positive impact on Boeing’s bottom line—and contributes to the company’s efforts to boost growth and productivity,” said Rick Stephens, senior vice president, Human Resources and Administration.

To minimize these expenses, and to ensure benefit plans are administered according to the plan’s rules, Human Resources in 2007 conducted a Dependent Eligibility Verification process, asking employees to verify the eligibility of dependents covered under Boeing health care plans. Many large organizations, including Ford, Daimler Chrysler, UPS and American Airlines, have successfully implemented similar programs.

The initial process concluded midyear. As a result of this activity, nearly 22,000 ineligible participants were removed from coverage. Boeing expects to avoid \$34 million in health care costs in 2008

and even more over the next five years. This will help reduce expected cost increases while maintaining current benefit services.

Those results aren’t lost on Boeing employees.

“As a family, we place a high value on our insurance coverage benefits and really appreciate the comprehensive package Boeing provides,” said Michelle and Graham Crippin, Boeing employees in the Puget Sound region of Washington state. They participated in the Dependent Eligibility Verification process this year by providing documentation that confirmed the health-benefit eligibility of their two children. “We realize that controlling costs is an important part of the company’s ability to offer this benefit, and we found the process easy to understand and simple to complete.”

HR FUNCTIONAL EXCELLENCE PROGRAM

The work in progress isn’t just for HR services and tools for employees. The HR organization is focusing on its own team as well. Boeing HR has created a new Functional Excellence Program, designed to align all HR professionals around a “common language” and tool set for driving business results.

“At the highest level, it’s about creating a one-company approach to the key people issues facing the company,” said Nancy Cannon, vice president, Human Resources for Corporate and SSG. “Within that, we want every member of our HR team to understand the company’s HR strategies, as well as how to use business analytics and develop people, to drive productivity and growth.”

The HR Functional Excellence Program has two components: a Core Program and a Forum. The Core is designed for senior HR team members, delivered in an interactive classroom-style setting at the Boeing Leadership Center. The Forum is a regional conference-style course that brings together HR teammates in large groups to hear and talk about the key HR issues facing the company. Both programs are founded on leaders teaching leaders, and tie in with the five HR strategies. The first core session was held at the BLC in early October; the first Forum took place in November. Scheduling for sessions in 2008 and 2009 is under way.

—Debby Arkell



BCA’s Kevin Jackson (left) and Guadalupe Sanchez (right) take part in certification training for Bond and Ground in Everett, Wash., as Learning, Training and Development instructor Todd Gehlke observes. Human Resources oversees the training of Boeing employees.

GAIL HANUSA PHOTO

The people of Human Resources

The organization is made up of many teammates; here are a few of them

Debby Arkell of the *Boeing Frontiers* staff spoke to some of the many individuals in the Human Resources organization and asked them about their jobs—as well as about the HR field in general.



MARIAN LOCKHART PHOTO

LENEE HILDENBRAND (above)

Location: Seattle

Years with Boeing: 18

Process improvement: “This year I was part of a team chartered with developing and implementing a common offer/hire process within my customer groups. We used Lean+ methodologies to evaluate current processes and see where we may have been missing opportunities to incorporate diversity considerations. One key element identified was the need to ensure managers have a rich, diverse pool of qualified applicants to review for hire. We now provide hiring managers with visibility of their applicant and interview pool metrics to assist them in the hiring process. It’s important to note that we don’t tell managers who to hire and we don’t identify individual applicant data. Through this, we’re also able to monitor progress to plan and adjust staffing and recruiting strategy to support business requirements.”

On varying viewpoints: “I’ve learned that you can’t assume you know what your customers want or need; you need to take time to get to know your customer, ask lots of questions, and learn how they run their business to establish the right working relationship.”

MARIAN LOCKHART PHOTO



BRENDA HASTINGS (above)

Location: Puget Sound region, Washington state

Years at Boeing: 17

Role in HR: “My role is primarily leadership development and coaching. Everyone knows inside what they need to be successful; I help them through the use of the coaching model: by asking the questions that encourage them to find their own answers.”

“Necessary qualities in a role like mine include being approachable, enthusiastic, open-minded and having the ability to listen without judgment. We in HR advocate for both management and nonmanagement and encourage people to incorporate the Leadership Attributes in everything they do.”

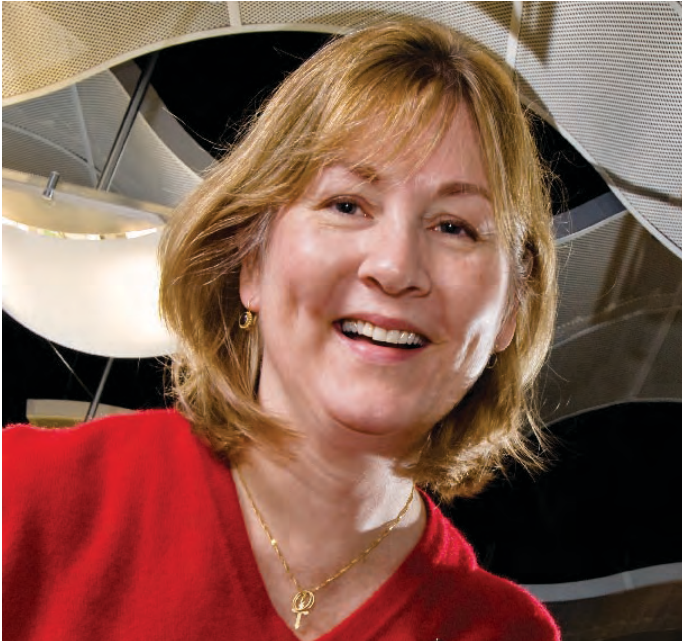
What’s important to me: “It’s important to me to know I made a difference. It is my core value and my main priority.”

It’s our future

Actions cited in the package of articles on Pages 18 to 25 show how employees are applying concepts of the Boeing Management Model to support the company’s business strategies. Here’s how.

- **Growth and productivity: Lean+ and Internal Services** Productivity, through streamlining processes, identifying ways to improve customer service and cutting costs.
- **Leadership Attributes: Leadership development programs aim to teach and promote the six attributes, as well as open the Boeing culture and create a one-company mindset.**

To learn more about the Management Model, visit <http://bmm.web.boeing.com> on the Boeing intranet.



MARJAN LOCKHART PHOTO

SUSAN REED (above)

Location: Puget Sound region, Washington state

Years at Boeing: 10

On HR's changing role: "Ten to 15 years ago, effective communication, problem solving, and 'playing well with others' were considered soft skills. Today, working well with others, trust, emotional and social intelligence, understanding people, and how you communicate and incorporate diversity of thought are essential skills that have a direct impact on the bottom line."

What employees might not know about HR: "I think the traditional view is that HR is very compliance-driven. The lesser-known part is HR's ability to be an advocate for an employee and to provide solutions."



BOB FERGUSON PHOTO

ABBY BAKER (below)

Location: Houston

Years with Boeing: 14

Changing expectations: "Much of what HR did when I first joined the company was administrative. Today our role has shifted and we are strategic business partners. Strong customer focus and business acumen is critical. It's a never-ending balancing act between employee needs and business needs."

Core values: "Our core values are fairness and impartiality when evaluating all situations. People want to feel heard, so it's important for us to exercise patience, listen and explain the impact of situations. It's also very important to establish a strong relationship and be engaged with our customers. Knowing that my customers trust and value my contributions is very rewarding."



BOB FERGUSON PHOTO

VANESSA WILKINS (left)

Location: Long Beach, Calif.

Years with Boeing: 17

On sympathy vs. empathy: "In HR you have to be empathetic and objective. Because we're working with people and issues that affect people's lives, naturally the issues will be very emotional. If you're not careful, it's easy to become emotionally attached and lose your objectivity. ... When an employee's job is more important to me than it is to them, it's hard to help the employee improve performance or change unacceptable behaviors."

The role of leadership: "Ultimately, good leadership can help curb most issues addressed in HR. When looking at most issues, if managers trust their employees and address concerns early on, the issues are much less likely to grow into problems that are disruptive to the team. Good leadership and trust are the foundation for success at this company."

Safety first

Meet Marlene Nelson,
who holds BCA's top
aviation safety job

By LIZ VERDIER

When Marlene Nelson hears the phone ring in the middle of the night, she knows something has gone dreadfully wrong.

As the director of Aviation Safety for Boeing Commercial Airplanes, she gets the first call from the Air Safety Investigation team if there is an accident involving a Boeing airplane. This exposure to the consequences of deficiencies in the global aviation safety system is the disheartening part of the job. But the flip side is that these accidents provide an impetus to work even harder to improve the system's safety.

Nelson's responsibilities include leading all BCA product safety-related activities, including accident investigations, contin-

ued airworthiness efforts for in-service airplanes, safety assessments for new and derivative airplanes, and Boeing's participation in industry global safety programs. There are about 20,000 large Western-built commercial airplanes operating worldwide today, and about 12,000 of those are Boeing products. Nelson is responsible for leading the development and implementation of Boeing strategies and tactics that positively influence global aviation safety.

A notable contribution since her appointment to this position was her leadership in the shaping of the BCA Aviation Safety Council. This council, led by the BCA chief operating officer, assembles the leaders of Engineering, Flight Operations, Product Development and Product Integrity to discuss and decide matters relevant to BCA aviation safety policy. Former U.S. National Transportation Safety Board chairman Ellen Engleman-Connors observed, "Safety is in Boeing's DNA." Nelson acknowledged: "That is an incredible compliment for our safety culture but is not something we can take for granted."

DIVERSE EXPERIENCE

Nelson's 33-year career at Boeing has spanned nearly every phase of the commercial airplane business from Sales and Marketing to final product test. She's sought new job opportunities and experiences to expand her knowledge of BCA in nearly all aspects of the business.

Nelson began her career in engineering design. She gained a systems perspective

through trade studies like the consideration of fly-by-wire spoilers on the Boeing 767. Subsequent assignment to the Flight Technical organization presented an opportunity for her contributions to the Wind Shear Safety Initiative, a significant industry activity that virtually eliminated wind shear as a cause of U.S. aviation accidents for commercial jets.

Ten-plus years of experience in the Flight Training organization, plus a commercial pilot license with instrument and multiengine ratings, led to a pilot position in Boeing Production Flight Test. She accumulated some 1,000 hours of flight time as she regularly flew production flight tests on new 737s. She currently pilots gliders and shrugs off the hazard of unpowered flight as "inherent risk management." As 747 Chief Project Engineer, Nelson moved the 747 Engineering team to the factory to further enable Lean+ concepts. Engineers on or near the factory floor, enabling the production processes, are now a way of life on all Boeing airplane production lines.

Over the past 20 years, the United States and Europe have made considerable progress to significantly reduce the rate of occurrence of aviation accidents and serious incidents. Nelson serves as Boeing's executive representative on the U.S. Commercial Aviation Safety Team, an organizational body made up of industry and government. "CAST has played a major role in leading this very successful effort; a 10-year goal to reduce the commercial transport airplane fatality risk by 80 percent has been met," she said.

Growth in commercial aviation outside of North America and Europe is ballooning. Within the past several years, coordinated international industry/government collaborative efforts have been launched that are aimed at addressing those regions of the world where aviation safety outcomes are not satisfactory. Nelson committed Boeing talent and resources to development and implementation of the resulting ICAO Global Aviation Safety Roadmap. Today, roadmap representatives are mentoring safety activities in Western Africa, Southeast Asia and South America.

"It's rewarding to be able to leverage my Boeing experiences toward something as important as improving aviation safety," Nelson said. "My experiences in design, build, support and operating the product really help me identify with all the stakeholders—the engineers, the production team, and the pilots." ■

elizabeth.a.verdier@boeing.com



COURT CHENOWETH PHOTO

Marlene Nelson buckles up an emergency parachute harness prior to takeoff in a Smyk PW5 glider. In addition to a private glider certificate, she has an Air Transport Pilot certificate with a 737 type-rating.

The midnight ride

787 simulator helps ensure 1st flight's safety

By Lori Gunter

At 11:45 p.m. on Nov. 7, a Boeing 787 Dreamliner pushes back from Gate N10 at Sea-Tac International Airport and heads out for a flight to John F. Kennedy International Airport in New York. Capt. Mike Carriker, chief test pilot for the 787 program, sits in the left seat and guides the airplane down the runway and into the air. This is Carriker's second flight of the day.

Pushback takes longer than expected. The flight isn't airborne until well after midnight.

The flight is anything but perfect—warning bells sound, fault messages appear and not everything works. But that's what a simulator is for.

Located in Seattle, the 787 engineering cab is not a motion-based simulator. But for anyone susceptible to motion sickness, the images outside the cabin "windows" provide a real enough sense of movement. The cab is being used to test new systems software loads for performance before they are loaded onto a real airplane.

TESTING SOFTWARE

A new software load had been made shortly before the flight, and not surprisingly, everything was not perfect.

Carriker and others, including Tom Cogan, chief project engineer, Jeff Hawk, director of certification, and Dan Murray, engineering lead for 787 Systems, called out the errors as they occurred. Chad Douglas, a flight crew operations integration engineer sitting at a laptop computer behind Carriker, recorded them. Dale Pool and Sean Hagen, Engineering Flight Deck Simulator integration and test, watched the



Mike Carriker, chief test pilot for the 787, "flies" the Dreamliner on a nighttime test in the 787 engineering cab.

JEFF HAWK PHOTO

digital readout of what the flight crew saw in the cabin as they managed the computer simulation.

"Some of these are easy fixes; some are the beginning of a lot of work," said Rob Davis, senior flight deck engineer. "The integration of the systems is enormous; we've got functionality from one supplier being hosted on a system by another supplier and being displayed through a graphics program and hardware provided by a third supplier."

With every load comes increased functionality and new issues—which have to be resolved before first flight around the end of the first quarter in 2008.

"It would be great to come in here and have everything work perfectly," said Carriker. "But we aren't there yet. This is just the hard work that has to happen to get us where we need to be."

And just as there are disappointments with faults and functionality, there are successes, too.

At this particular session, the head-up displays were working better than they had with the previous software load, a good sign. Likewise, a troublesome graphics issue that had caused the captain's navigation display to blink had been addressed.

The flight never makes it to the New York airport. The big tests for the night focus on the takeoff and landing sequences. Flying at cruise on autopilot for hours

to get to the landing—that just doesn't make sense.

As arranged during the preflight briefing, Carriker invents a reason to divert—he radios to air traffic control, a role being played by Davis for the night.

"We have a medical emergency and we need to get to medical assistance," Carriker says as he requests permission to divert to Moses Lake in Washington state.

Davis gives permission. A new route is plotted and soon it is time for the landing sequence.

The airplane is on the ground by 2:15 a.m., after several touch-and-go landings that test the system. Flying late at night means when first-shift people arrive, they have plenty to work on. It's good practice for what is expected to be an around-the-clock flight-test program.

Carriker estimated he's flown more than 1,000 hours in the simulator and will log 200 to 300 more before the real first flight.

"The process of building airplanes, testing them and getting them ready to fly isn't easy," he said. "There's a lot to do, and it takes a team of incredibly gifted experts to get everything working together and ready."

"We won't fly the 787 until it is ready. In addition to being structurally sound, that means the systems check out. We aren't there yet, but we will get there." ■

loretta.m.gunter@boeing.com

737: 40 years strong

Continued improvement, innovation has paid off, as order tally tops 7,000

By MICHAEL LOMBARDI

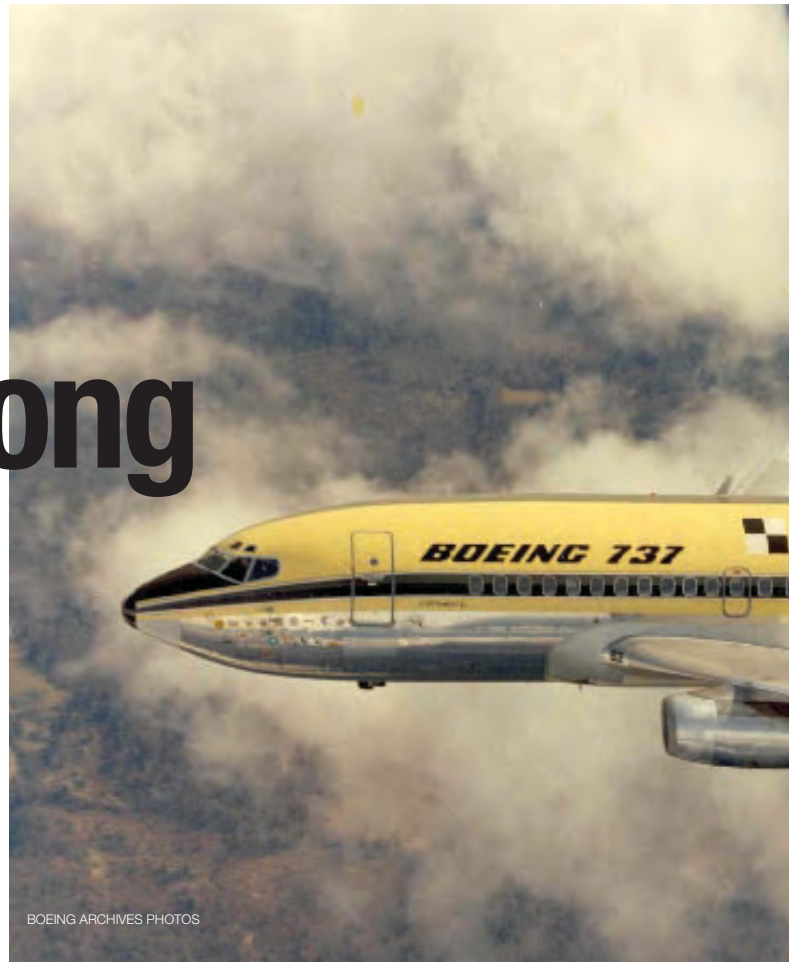
In 1965 the Boeing name was synonymous with big, multien-gine jet airplanes. So when the company announced its new commercial twinjet, the 737, it quickly earned the nickname “the baby Boeing.” While the future market for a small commercial jet looked to have minor promise at the time, no one expected the Baby Boeing would become the jet-age version of the ubiquitous DC-3.

With more than 7,000 orders since then, it’s hard to think of the 737 as anything but a tremendous success. Yet in the beginning, Boeing launched it almost reluctantly with an order from a single customer for just 21 airplanes.

Launching the 737 was one of the most hotly debated decisions in the history of the company, pitting the realities of the business situation against a vision of the future of air travel. It highlighted how consequential and long-reaching the decisions to go forward with a new airplane program can be.

At the time, the 737 was already well behind the competition,

The first of many—the prototype 737-100—lifts off from Boeing Field on its first flight April 9, 1967.



BOEING ARCHIVES PHOTOS

the Douglas DC-9 and the BAC-111. It also was in competition for resources within the company, going up against other competitions and development programs, such as the C-5, the 747, the 727-200 and the largest airplane program in the aerospace industry at that time—the supersonic transport.

In the end, based on the enthusiasm of a single but very loyal customer—Lufthansa—and the confidence of a handful of board members, including Boeing’s most trusted engineer, Ed Wells, the Boeing board voted to go forward with the 737 program.

TOO TALL FOR PLANT 2

The first 737 was the last new airplane to be built at Plant 2 on Boeing Field in Seattle, so it was fitting that the world’s most popular commercial jet would top off a production run that included the B-17 Flying Fortress, the venerable B-52 Stratofortress and the world’s first large swept-wing jet—the XB-47 Stratojet.

While the old assembly building at Plant 2 seems cavernous to this day, it still wasn’t tall enough for the 737’s tail, which was attached using a crane in the parking lot. The plane was then rolled down to the Thompson Site, just south of Plant 2 on Boeing Field, where Boeing had set up the first production line for the 737.

At a ceremony inside the Thompson Site on Jan. 17, 1967, the first 737 was introduced to the world. The festivities included a christening by flight attendants representing the 17 airlines that had ordered the new plane.

On April 9, 1967, at 1:15 p.m., Boeing test pilots Brien Wygle and Lew Wallick took off in the first 737 from Boeing Field for a flawless first flight. Wygle said, “When I began to rotate the plane (liftoff from the runway) it felt right in every way.” Throughout the



The drab “house” colors on the prototype 737-100 purposefully avoided the look of airline customer liveries.

ordered 19 737s to serve as the T-43 navigation trainer, and airline customers ordered only 31 others.

However, Boeing sales and marketing employees saw the potential for the plane with smaller airlines in smaller markets, and the order books began to fill with single-digit orders that carried the Baby Boeing through the 1970s and into the '80s. At that time Boeing introduced the 737-300/-400/-500 series, utilizing the latest technology and new high-bypass engines. The improved 737 quickly became the plane of choice for major airlines and low-cost carriers.

In the 1990s, following Bill Boeing’s timeless commandment to always stay at the forefront of technology and adapt new technologies to Boeing products, the latest innovations in avionics and aerodynamics were adapted to the 737. The result: the Next-Generation 737 family was launched with the 737-600/-700/-800/-900 series.

As airline ownership models and business models continue to change, the 737 remains a favorite choice of airlines. Not only has the 737 launched many new airlines, but some of the world’s most successful airlines have built their entire fleet—and their success—with the 737 alone.

Today, looking at the 737, it’s hard to believe that the decision to build such a tremendously successful product was an agonizing one. It highlights one of the greatest risks of the business—that the outcome of a decision to launch a new product is generally not fully realized until long after the decision makers have retired.

The 737 also is a clear reminder of how important it is to remain customer-focused, to keep products innovative by adapting the latest technologies and maintaining the enterprising spirit that enables Boeing to chart the course, find a way, and achieve success over the long run.

The 737 might be Boeing’s baby, but its lessons are huge and its tremendous success a reflection of the pioneering spirit, vision and talent of the people of Boeing. ■

michael.j.lombardi@boeing.com

flight the crew exclaimed that the plane “handles beautifully!”

The first 737 landed at Paine Field in Everett, Wash., to a cheering crowd that included Boeing President William Allen, who told reporters, “We’re going to sell a lot of these airplanes!” And he added prophetically, “I think that when I reach the old men’s home, we still will be selling lots of these airplanes.”

A few weeks later, on May 13, the first production airplane, sporting the livery of Lufthansa, was taken up for its initial flight by Boeing test pilots Lew Wallick and Kit Carson. (Five thousand 737s later, Kit’s son Scott would be leading Boeing Commercial Airplanes.) On Dec. 28, 1967, Lufthansa took delivery of the first production 737, a -100 model, in a ceremony at Boeing Field. The following day United Airlines, the first U.S. customer to order the 737, took delivery of the first 737-200.

The No. 1 737 was a prototype used for flight test and certification and never went into revenue service. In 1974 the plane turned in its drab Boeing house livery of dark green and cream for the sporty white and blue colors of NASA. For the next two decades the plane was based at the NASA Langley Research Center in Virginia and had a career as a flying laboratory. Today the plane is on display at the Museum of Flight in Seattle, surrounded by bigger members of the early Boeing 7-series jet family and parked just a few hundred feet from where it first took to the air 40 years ago.

AVOIDING CANCELLATION

The 737 was almost canceled before it got started and faced cancellation once again in 1971. At that time the 737 was considered a struggling program with considerable developmental costs that were still far from being returned. That year the U.S. Air Force

United Airlines was the first U.S. airline to receive the 737, which also was the first 737-200. The delivery ceremony for this airplane also commemorated United being the carrier to take delivery of Boeing’s first twin-engine commercial plane—the Model 247.



A better way of cutting defects?

Product and Process Surveillance, a new approach to inspection, improves quality, flow

BY KATHRINE BECK

If you're making a batch of cookies, you might eat one to see how it tastes. If you're making 10,000, you want to know exactly what temperature they should be baked at and for how long." Barb O'Dell, Commercial Airplanes vice president of Manufacturing and Quality, is explaining how a new approach to quality that focuses on correct processes, Product and Process Surveillance (PPS), is helping the business unit reduce nonconformances—the term for deviations in a product from requirements or standards—and simultaneously get leaner.

The traditional method of ensuring quality was to have a mechanic perform a task and then have an inspector check the finished work to see if it met the design specifications. The product was being monitored, but the process that built it wasn't. And when it comes to quality, performing the work according to the established processes can make it or break it.

On the 777 wing line in Everett, Wash., PPS is being used in the panel buildup area. Here, mechanics drill holes for the fasteners that will hold the wings on to the body, using a metal template. In the past, the holes were inspected after the work was done to make sure they matched the drawings and met requirements.

Today, inspectors perform surveillance of the process, watching the mechanic perform the work. The inspector has a checklist and ensures that mechanics are following instructions and documented processes. Inspectors don't watch every hole as it's drilled; the process has been designated as one with extremely low risk, so the surveillance is done on a sample of the work.

"Jobs converted to PPS are evaluated 10 percent of the time. The rest of the time, the mechanics verify their own work," said BCA Quality engineer Stephanie Van Meter. She added an important qualifier: "We implement PPS in areas where it's clear mechanics are engaged and own quality in their area."



Quality team leader Bruce Burns observes electrician Noly Pascua installing insulation at the 737 Final Assembly Blanket Shop. Surveillance of a process as it's performed helps ensure that quality is built into the airplane.

Part of the PPS implementation in the 777 Wing buildup area is that an inspector's stamp is not required for every job. The new process is leaner, too. Inspection is performed as work is being done, and mechanic buyoff eliminates the wait time associated with traditional inspection.

"It's nice to be able to sign off on my own work. It frees up my time and it frees up the inspector's time," said 777 Wing area mechanic Bryan Pierce.

DROP IN NONCONFORMANCES

Marty Wagner, QA acting manager for the 777 Wings panel buildup area, said there's been a decrease in nonconformances

since PPS was put in place. He said process surveillance makes a difference: "It helps new employees understand the importance of the process, and it helps experienced employees not get complacent. Inspectors can mentor employees and help them realize the process is there for a purpose."

O'Dell added: "Mechanics can build the quality in. Others can inspect defects out. But if you want to build the quality in the first time, the Lean way, you need to focus your attention on those who build, not those who inspect."

PPS also has registered success in a production area that previously had no inspections at all. According to 737 PPS im-

Watch the process!



MARIAN LOCKHART PHOTO

plementation leader Mary Sullivan, PPS isn't just about getting leaner by using risk assessment and process surveillance to eliminate much traditional inspection. It's also about improving quality, preventing defects and reducing rework.

Employees in the 737 blanket installation shop line the passenger cabin with insulation and clamp it in place, working around windows and other fuselage features. They need to make sure there are proper clearances for later additions to the passenger area of the airplane, such as floors and wiring. The insulation serves as a moisture barrier and fire retardant and keeps cold air out and warm air in.

The blanket installation shop had no inspections, because it was a very low-risk area of the airplane. And it was a good candidate for PPS because defects were being passed down the line.

As part of PPS implementation, a cross-functional team of mechanics, inspectors, and design and manufacturing engineers (composed of members from the Blankets Value Stream Team and PPS Team) was created. They developed stringent quality criteria to ensure that clamps are where they should be, that the fasteners known as blanket buttons are all there and that everything is positioned properly.

They used the quality criteria to create

a "defect map"—a printed map of the work area on the airplane that shows and lists the quality requirements and specs. The map is used to ensure that everyone agrees on the quality criteria. It's also used by inspectors who now do periodic surveys of the work as it's being performed. These same quality criteria are documented in the work instructions used by the mechanics.

Team lead Vivian Bergquist said that working together developing the criteria and the new regular process surveillance have changed the relationship between inspectors and mechanics. "Rather than being like the police, now they're more like teachers," she said of the inspectors. "We're more of a team."

And, she said defect rates are "way, way down. We don't see those guys from flow-day six telling us we didn't get it right." She attributed that to the fact that when her team took a hard look at their processes, "we got together with people from the whole factory to find out exactly what the issues were."

Plans are in work for implementing PPS for the 737 Water & Waste Systems commodity. This is a more complex process with a significant number of traditional inspections. As with blankets, it's expected to improve quality and reduce flow time through the use of surveillance.

Sullivan, the 737 PPS implementation leader, noted that there are currently 9,000 inspections per 737, and 84 percent of them are done by an inspector using the traditional method. She said that means there are a lot of delays in the process—but that a significant number of traditional inspections can be eliminated using scientific risk assessment and sampling.

"But," she added, "we don't want to remove inspections without putting a robust system in place that ensures quality without increasing risk. When you implement PPS, you need to make sure the mechanics have the quality tools to be successful in building a defect-free product the first time. We make sure we are doing both."

And that creates a new role for inspectors. "We can transform the role of the inspector from cop to surveyor and defect preventer," she said. "The inspectors have so much knowledge of the airplane and the factory. They can partner with manufacturing to help them find solutions to increase customer satisfaction, improve quality, improve production flow and increase ownership of quality—and that's all a part of PPS." ■

kathrine.k.beck@boeing.com

A great start

StartupBoeing helps new airlines prepare for service, success

By BRIAN WALKER

When one thinks of scheduled airlines in the United Kingdom, UKIA (United Kingdom International Airlines) is unlikely to come to mind. Still, this recently launched airline has become only the fourth scheduled commercial carrier based in the U.K. The carrier in October conducted its first flight, from East Midlands Airport in Sheffield, England, to Islamabad, Pakistan.

The story of how the airline was launched demonstrates how Lean+ principles can be applied to streamline a challenging and complicated process. By working from the outset with a prospective new airline's launch team, StartupBoeing—a BCA service for fledgling airlines made up of a Web site and people who specialize in working with such carriers—is the catalyst for building strong, successful relationships with potential new customers. It begins with the StartupBoeing Web portal, which helps customers grasp the complexities of starting an airline.

“Boeing’s expertise in airplane and fleet analysis, finance, material management and airplane sourcing, coupled with our experience with airline operations around the world, gives us unique insight into what’s required to launch a successful airline,” said Sheila Remes, Commercial Airplanes manager of StartupBoeing.

StartupBoeing’s comprehensive checklist partners Boeing experts with an airline’s launch team. Together, they collaborate to work through detailed and essential planning steps—each of which has been identified as being fundamental to an airline’s success.

“While we knew a lot about airline operations in general, Boeing’s ability to put forth a detailed and logical process for us to follow proved invaluable,” said Manawar Khaliq, chairman and CEO of UKIA. “We believe the work we did up front with Boeing will pay dividends as our operations grow, and that our preliminary planning has put us on a course for long-term success.”

StartupBoeing’s team engages prospective new airlines on such matters as market analysis, business planning, airplane selection and sourcing, airplane configuration, staff training, general maintenance and spare-part management. Boeing also points clients toward numerous outside resources

for help with such tasks as route planning and dealing with regulatory authorities.

Following the initial engagement with UKIA and some months of working closely with the carrier, StartupBoeing interfaced with Miguel Santos, a BCA International Sales director in the Middle East and Africa Sales region. UKIA is Pakistani-owned and falls within the scope of that sales region. Santos has taken lead sales responsibility with the airline, pulling in Boeing Capital Corporation’s Anil Patel to assist the airline with accessing equity and debt financing. Now the team is working to place additional Boeing airplanes with the carrier.

With resources tight in BCA Sales, the idea for a team that addresses inquiries from entrepreneurs looking to launch new airlines came about primarily as a vetting process. However, it was quickly discovered that there are a number of viable plans that could be enhanced by the StartupBoeing team’s expertise. UKIA stands as a shining example of the team’s first success.

“It’s always rewarding to see a Boeing strategy play out successfully,” said Lee Monson, BCA vice president of Sales for the Middle East and Africa. “We look forward to future opportunities to work with the StartupBoeing team, and we congratulate them on a job well done.” ■

brian.d.walker@boeing.com

United Kingdom International Airlines (UKIA) recently began operation with two used 767-200s. StartupBoeing helped the carrier fulfill the many tasks needed to begin service and position itself for success.



ERYL CRUMP PHOTO

Fuel for thought

KC-767 supporters tell why aircraft best meets USAF's requirements

By FELIX SANCHEZ

The race to build the KC-X aerial tanker jet is coming down to the wire. The U.S. Air Force wants to begin replacing its aging fleet of more than 500 KC-135 refueling planes with an initial buy of 179 KC-X planes. This work is worth an estimated \$40 billion. But the winner would also be the favorite for the

remaining KC-Y and KC-Z competitions that will ultimately replace the entire tanker fleet. Total potential value: \$100 billion, not to mention additional work for maintenance and upgrades to the jets.

The Air Force now says it likely will select the contract winner—Boeing or the team of European Aeronautic Defense and Space Co. (EADS) and Northrop Grumman—in the first quarter of 2008.

“We have developed a very compelling proposal for the Air Force,” said Mark McGraw, vice president for Tanker Programs. “Our KC-767 would provide unrivaled capability and operational flexibility to the warfighter. It’s the lowest risk to

the Air Force, by far. And for the taxpayer, it represents the absolute best value.”

Boeing has more than 75 years of experience with tankers, having built, modified and supported nearly 2,000 for the Air Force and international customers.

The KC-767 would support more than 44,000 U.S. jobs, and provide work for 300 suppliers in more than 40 states. It would be built with more than 85 percent of its parts assembled or created in the United States. That compares to the competitor’s proposed tanker being built in multiple European countries before being shipped to the United States for final assembly.

But more important than the economic benefits, Boeing’s proposal is best for the customer, company executives said.

“The KC-767’s footprint allows our warfighters to deploy more tankers, get access to more bases that are closer to the fight, put more ‘booms’ (refueling devices) in the sky and be able to offload more fuel,” McGraw said. “We will be able to deploy, with a full load of fuel, from more locations around the world than our competition. That’s a fact.”

At recent events like the Airlift/Tanker Association Conference and the Paris Air Show, executives have countered competitor claims about the KC-30 offering, especially arguments that its offering, because it’s bigger than the KC-767, will meet more of the Air Force’s requirements.

“Bigger is not better,” said Dave Bowman, vice president and general manager of Boeing Global Mobility Systems. “It’s not about being bigger—it’s about meeting the Air Force’s mission requirements. Boeing will deliver the very best tanker—the best for the mission and the best for the money.”

Support for Boeing also has come from groups with technical know-how.

“By all accounts, Boeing’s tanker is the most technologically advanced in the world, and has already gained the lion’s share of international customers based on its advanced fly-by-wire boom design, 21st century cockpit, generous fuel capacity and compact size,” said Gregory J. Junemann, president of the International Federation of Professional and Technical Engineers.

On the other hand, the competition’s proposed tanker is too big to land at many military bases, Junemann said.

Members of the U.S. Congress also have spoken on the KC-767’s behalf. Said Rep. Todd Tiahrt (R-Kan.) at Boeing’s Wichita, Kan., site: “When our sons and daughters strap into the next tanker, they need to know it was designed, built and supported by the best in the world.” ■

felix.sanchez@boeing.com



U.S. Rep. Todd Tiahrt (R-Kan.) takes the controls of an aerial refueling simulator in the KC-767 Advanced Tanker Trailer after a recent tanker rally in Wichita, Kan. Dennis Struve, Boeing Flight Test Boom Operator, looks on.

BEVERLY KNOWAC PHOTO



U.S. Air Force First Lt. John Rinaldo annotates a patient's records after completing an aeromedical evacuation mission on a C-17 Globemaster III. Rinaldo is a flight nurse serving temporary duty with the 791st Expeditionary Aeromedical Evacuation Squadron at Ramstein Air Base, Germany.

U.S. AIR FORCE PHOTO BY MASTER SGT. JOHN E. LASKY

Purple Heart employees help honor role of C-17s in medical evacuation

BY FELIX SANCHEZ

It was more than 37 years ago that a deafening explosion tore into the carrier Don Walker was driving on an isolated road south of the Demilitarized Zone during the Vietnam conflict. The land mine they had rolled over threw everyone out of the vehicle, blew off Walker's helmet and thrust his head against the shield of a 50-caliber machine gun.

Walker suffered a bloody crease in his skull, and the other soldiers suffered critical injuries, but they all survived—thanks in large part to speedy medical evacuations from the scene by UH-1 Huey helicopters. For his injuries, Walker received the Purple Heart—the medal given to U.S. troops wounded in battle, the medal no one tries to earn.

Appropriately, Walker works today as a structural mechanic for the C-17 Globemaster III—one of the closest friends a wounded soldier can have in today's war environment. The C-17 has earned respect and universal praise from troops, military leaders and medical personnel for its role in helping quickly evacuate wounded soldiers from a war zone, saving lives and potentially lessening the severity of long-lasting battle wounds.

That's because the C-17—most known for carrying cargo, military supplies and humanitarian aid—can be converted in minutes into a high-tech, flying intensive care unit that quickly transports wounded troops to field hospitals or to critical care facilities in the United States.

Former Air Mobility Command leader Gen. Duncan McNabb has called the C-17 the "flagship of U.S. compassion" for the role it plays in the care and evacuation of soldiers. The C-17 routinely picks up wounded U.S. soldiers at the Air Force Theater Hospital at Balad Air Base in Iraq. International C-17 operators also use the

airlifters to transport wounded troops.

C-17s loaded with wounded patients depart daily, mostly at night. Sometimes the C-17 flying hospital has but one wounded soldier whose injuries are so critical that the plane departs quickly, flies at low altitudes to maintain pressures that don't exacerbate brain trauma, and jets nonstop all the way to the United States.

Aeromedical evacuation operations have created a survival rate today of 96 percent for wounded troops who can be airlifted to a hospital. That's the highest rate in U.S. military history, and C-17s play a big part.

In honor of the C-17's aeromedical evacuating performance, the Mississippi Air National Guard gave the name "Spirit of the Purple Heart" to a C-17 in a ceremony last month. U.S. Air Force officials, elected representatives, Boeing executives and Boeing employees who are Purple Heart recipients participated in the event.

Walker—who could not attend the event in Mississippi—has worked for 38 years at Douglas Aircraft, McDonnell Douglas and

Boeing, and is a team leader for welders on the C-17 Program. "I'm very proud of this aircraft and even prouder to be associated with a plane named 'Spirit of the Purple Heart,'" he said. "The C-17 is one fantastic airplane."

"It's saved a lot of lives," said Purple Heart attendee George Roy, Commander of the Long Beach Chapter of the Military Order of the Purple Heart. Roy worked at Douglas Aircraft driving rivets before he was drafted for the Korean conflict and flew B-26 Invader light bombers. He flew 47 missions before he was wounded and received the Purple Heart. He was back in the air not too long afterward, only to be shot down and wounded again on his 51st mission.

Richard Rivera, a 59-year-old structural mechanic on the C-17 program, also attended the event as a Purple Heart recipient. "Whichever role the C-17 is used for, you pride yourself in what you're building," Rivera said. "But when it's being used to ferry troops back and forth, or carrying wounded soldiers, I have a lot of pride."

Rivera was working with Douglas Aircraft when he discovered he was about to be drafted and decided to enlist in the Marines instead. He was wounded in

September 1968 in Vietnam when he was walking point on a detail and tripped a landmine that sent shrapnel knifing into his legs, arms and back.

"The next thing I knew I was on the ground, and then I heard the noise," Rivera said. He was evacuated to a field hospital by jeep because rainy weather prevented a Huey helicopter from flying in to pick him up. Later he was flown to Da Nang and eventually to Japan in a C-130 for surgery. Finally, Rivera was flown to Camp Pendleton, Calif., for therapy and rehabilitation. He received his Purple Heart while in the hospital in Japan.

George Muellner, president of Boeing's IDS Advanced Systems, said all veterans have a kinship, and those who work at Boeing understand the value of what they do and the products like the C-17 they assemble. Muellner could not attend but is himself a Purple Heart recipient for wounds he received when he was shot down flying an F-4 Phantom during a combat mission in Vietnam.

"We've got really great people working on the C-17 program, people who are highly focused on the needs of the warfighter," Muellner said. ■

felix.sanchez@boeing.com

An injured soldier's best friend

Give them 30 minutes, and just a few people can transform a behemoth military cargo transport into a lifesaving flying hospital.

It's a transformation that loadmaster Allen Randall witnesses nearly every week. C-17 aeromedical evacuations include an average of two per week from Jackson, Miss., where he is stationed with the U.S. Air Force 183rd Airlift Squadron.

"I've transported patients on C-141s and C-130s, but nothing comes close to the C-17's capabilities," Randall said. "Boeing did a great job with this plane. It's set up to give injured soldiers the best care available while en route to medical facilities."

The C-17 can be rigged with litters for up to 36 patients. Each litter is fitted with a full set of medical equipment. The crew onboard includes six to eight medical personnel and two loadmasters.

Randall says medical crews can easily move around inside the C-17, the ride is smooth and comfortable, and the lighting makes it easier for caregivers to do their jobs. The design of the aircraft lets it operate on small, austere airfields. The C-17 can take off and land on runways as short as 3,000 feet and as narrow as 90 feet (910 and 27 meters, respectively).

"Time is essential for these missions," Randall said. "With other types of aircraft, you have to rig the flight overnight. With the C-17, you can fly down, and in 30 minutes you're ready to load and depart."

Randall recalled a mission in which a soldier with extremely critical head injuries was picked up in Iraq. The surgeon who was to perform the surgery was on the U.S. East Coast and not at Ramstein Air Base in Germany as anticipated. Accordingly, the C-17 traveled nonstop from Iraq to Andrews Air Force Base, Md.

It was all in a day's work for Randall, work that he finds exceptionally gratifying. "As a loadmaster I fly a lot of cargo missions," he said. "It's one thing to haul cargo, but it's really special when you can transport the injured as quickly as possible and potentially save lives. The C-17 allows that."

—Felix Sanchez



Aeromedical evacuation crewmembers prepare to take off in 2006 with 16 patients aboard a C-17 Globemaster III. The patients were stabilized at the Air Force Theater Hospital in Iraq, prepared for flight by personnel from the Contingency Aeromedical Staging Facility and then evacuated overnight to Germany. U.S. AIR FORCE PHOTO BY MASTER SGT. JOHN E. LASKY



Behind the action

Stewart Burgess, chief instructor for Aviation Training International Limited, gives an onboard lesson from the pilot's seat of the Apache Full Mission Simulator at Middle Wallop, U.K. ATIL is a 50-50 joint-venture company formed between Boeing and AgustaWestland.

BOB FERGUSON PHOTO

British Apache success begins in the classroom

By HAL KLOPPER

A part of them is there with soldiers in the field and pilots in the air. That's the feeling of the Aviation Training International Limited (ATIL) instructors who train pilots and ground crews for the British Army's Apache AH MK1 attack helicopter—declared by the Ministry of Defence to be one its most significant weapon systems.

"Since they began their training here in our training center, it's as if a part of me is with them," said Stewart Burgess, chief instructor at ATIL's Middle Wallop facility.

ATIL—a 50-50 joint venture company formed in 1998 between Boeing and AgustaWestland—offers a range of courses designed to provide aircraft, avionics and armament engineering staff with the skills to keep the Apache flying.

The Apache's sophisticated systems are represented by a range of equipment, simulators and trainers, based on full-size aircraft systems. The equipment's high level of fidelity provides realistic tactile and visual cues, greatly reducing the need to use operational aircraft.

Also, many of ATIL's instructors have

extensive operational experience—meaning the students' training is not just theory, but based on first-hand experience.

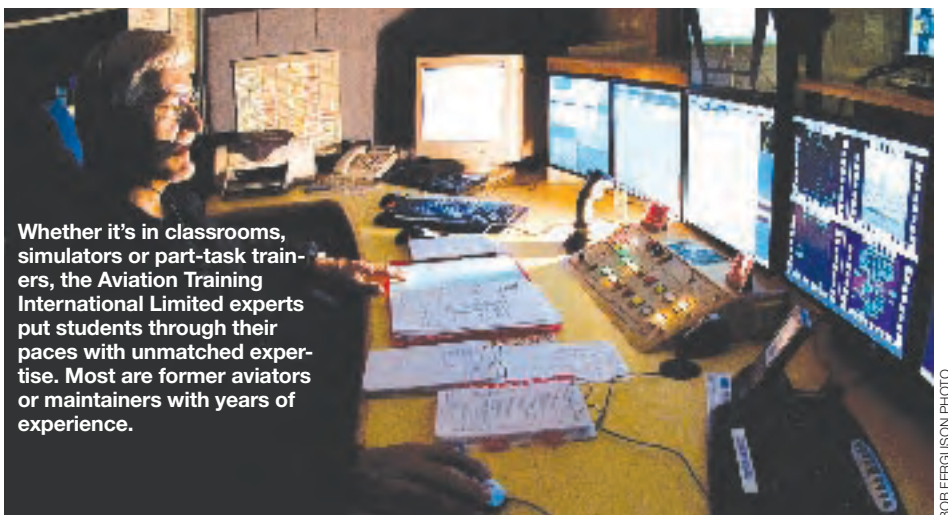
"We use a combination of advanced instructor-led classroom media, computer-based training, a full emulation of the aircraft and a range of sophisticated maintenance training devices," said Burgess.

Engineering training is conducted at ATIL's Maintenance Training Center at Arborfield, U.K. But all training elements, less the use of the maintenance training devices, can be delivered at ATIL's other U.K. Training Centers.

Each device allows maintainers to familiarize themselves with some of the most advanced technology in the world. They are trained to carry out a range of functional tests, diagnostic routines and removal and replacement tasks in a realistic maintenance environment.

Constant investment by ATIL in technology insertions ensures the training system remains one of the most up-to-date in the world—ensuring that flight and ground crews are successful whenever British Army Apaches lift off or land. ■

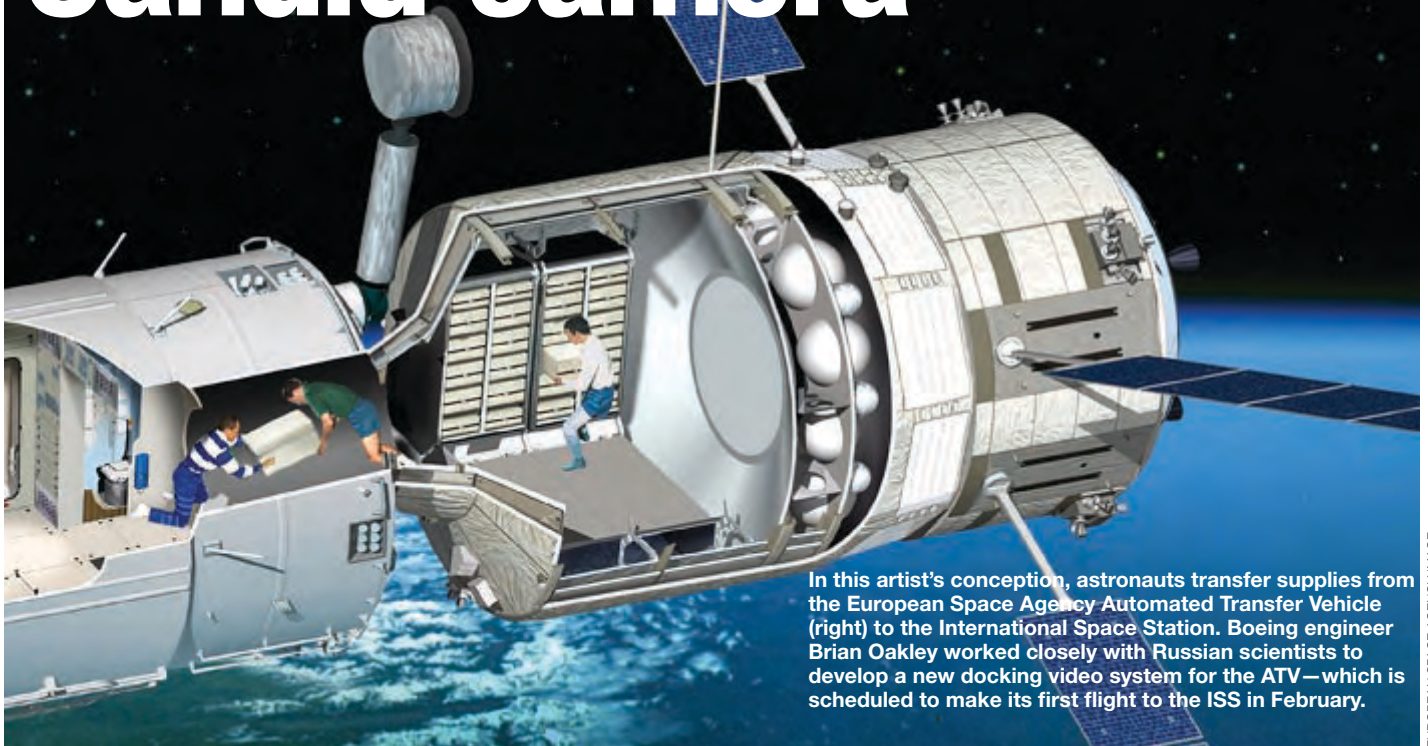
hal.g.klopper@boeing.com



Whether it's in classrooms, simulators or part-task trainers, the Aviation Training International Limited experts put students through their paces with unmatched expertise. Most are former aviators or maintainers with years of experience.

BOB FERGUSON PHOTO

Candid camera



In this artist's conception, astronauts transfer supplies from the European Space Agency Automated Transfer Vehicle (right) to the International Space Station. Boeing engineer Brian Oakley worked closely with Russian scientists to develop a new docking video system for the ATV—which is scheduled to make its first flight to the ISS in February.

EUROPEAN SPACE AGENCY IMAGE

Russian teammates laud Boeing-developed ISS video docking system

By Ed MEMI

When the European Space Agency's newest cargo spacecraft docks with the International Space Station in February, it will use a new digital video docking system designed in part by Boeing.

The system streams a high-quality digitized video feed from the Russian segment analog docking cameras and sends the signal down through the station's Boeing-developed Joint Station Local Area Network, rather than using an analog line-of-sight route to Russian ground stations. The digital signal is downloaded via the Tracking and Data Relay Satellite System to mission control centers in Houston, Germany and Moscow.

The new system improves safety and also is being used to support Russian spacecraft dockings. The video includes telemetry and has an overlay that provides additional visual cues to ensure a smooth docking.

The chief engineer of the Russian space company Energia was so impressed with U.S. efforts that he presented individual achievement awards celebrating the 50th anniversary of Sputnik to Boeing ISS engineer Brian Oakley and NASA Johnson Space Center computer resources system manager Sean Kelly, who jointly oversaw the project. Energia is working with the European Space Agency on the new cargo spacecraft called the Automated Transfer Vehicle. The ATV, unlike the Russian spacecraft, must have the video system to dock to the ISS.

"If the Russians can't get line of sight to the ISS from a ground site, they don't have communications. So what happens, you have huge blocks of time where you can't talk to the vehicle that you are trying to dock to and you have no video whatsoever," said Rob Shields, Boeing's Joint Station Local Area Network manager.

Oakley's role was to support end-to-end integration and coordinate testing plans and procedures for all tests. "The ability to pull together all these different technical groups and have the data be handed off from place to place and then have it all work—it has been a challenge, and it has been very rewarding," he said.

"Because of the constraints on docking opportunities using the Russian ground sites, we were limited to 23 dockings a year. With the new system, we have more than 100 opportunities to dock with the station now," Kelly said.

An added benefit to video is that docking specialists on the ground can sometimes see things that the crew might not see.

"All the way from onboard the ISS through the Tracking and Data Relay Satellite System and the ground stations to literally halfway around the world, we have a 1.5-second latency time requirement," Kelly said. "We also had to interface with NASA, the European Space Agency and Russian operations groups as well as the international partner organizations on those technical teams. The human interaction challenges were just as tough as the technical challenges."

Oakley said being able to test many of the systems in the ISS Electronics System Test Laboratory at Johnson Space Center was critical before the first Russian test flights. ESTL replicates the avionics used on station. "When we first got video in Moscow, it was a really big deal," he said ■

edmund.g.memi@boeing.com

Magnifico!



Two recent developments in Italy illustrate how Boeing is working with top technology providers around the world—and helping strengthen a nation’s aerospace industry in support of Boeing’s cross-enterprise efforts

ISTOCKPHOTO.COM

Inside

Advanced research activities: Boeing and Alenia Aeronautica recently signed a memorandum of understanding that calls for the companies to jointly develop research activities in advanced materials and integrated fuselage aircraft structures. **Page 39**

Educational collaboration: Through its connections and support, Boeing is helping strengthen the high-tech skill base of southern Italy by facilitating a partnership between a university in the United States and one in Italy. **Page 40**

By MAUREEN JENKINS

For Boeing, doing business in Italy is about more than merely selling commercial airplanes or military aircraft. It's also about leveraging the country's high-tech and aerospace infrastructure—and that includes its scientists and engineers—so that Italian companies can better compete in the global marketplace. And with Italian corporations of all sizes partnering on key Boeing programs, it's critical that they be involved in the creation and development of advanced technologies.

The next step in the frequent collaboration between Alenia Aeronautica and Boeing is a newly signed memorandum of understanding, one where they'll jointly develop research activities in advanced materials and integrated fuselage aircraft structures. The agreement also provides for the opening of a small Boeing Italian Research Office in the southern region of Campania, an area where government officials are keen on strengthening the high-tech skill base and creating jobs.

It's a move that will benefit both Boeing and the Italian high-tech supply chain for decades to come—and one that highlights the company's global strategy of working with top technology providers around the world. And, added Boeing Italy President Rinaldo Petrigiani, this milestone reinforces the perception of Boeing as a valuable and integrated part of the Italian landscape.

"That's an aspect that helps our company, because going global means learning how to interface," said Associate Technical Fellow Giacomo Licciardi, who works in Engineering & Technology Integration for Boeing Commercial Airplanes.

"We're not talking about an isolated Boeing office," continued

IMAST be in the right place

How a small office in southern Italy exemplifies Boeing's plan of working with the world's top tech providers



Mount Vesuvius (opposite page, background) overlooks the Bay of Naples in southern Italy. A newer area landmark is IMAST, a "technological district" that houses the just-opened Boeing Italian Research Office in the town of Portici. IMAST CEO Domenico Martorana (left) sits inside one of the facility's high-tech labs.

IDRA PHOTO PRODUZIONI PHOTO

Licciardi, who's one of two Boeing employees in the research facility (the other is Associate Technical Fellow Jim Thomas from Phantom Works). "We're talking about a center dedicated to joint projects where local small- and medium-size companies and research centers will participate." Both Licciardi and Thomas will serve as technical liaisons between Boeing and local Italian companies, universities and government agencies.

COMPOSITE EXPERTISE

The new office, which works in coordination with the Phantom Works-led Boeing Research & Technology Europe facility in Madrid, Spain, will make an impact beyond its small size, with newly created technologies having cross-enterprise applications at Boeing. It will be housed at IMAST, a three-year-old "technological district" near Naples in the small town of Portici, where researchers and engineers work on behalf of sponsor companies and universities to develop polymeric and composite materials. The consortium's goal: to enhance the research capabilities and competitiveness of Campania and southern Italy while teaming with global corporations like Boeing.

And it makes sense to house such an office in this area, said IMAST Chief Executive Officer Domenico Martorana, as companies in Naples and the nearby Puglia region are becoming known for their work with composite materials.

"For us, it is very important to have technical Boeing people here interfacing with our researchers," Martorana said. "In the (United) States, you have a different culture, and it is very important for our researchers to work with your people and their methods of working.

"Boeing is now the leader in the world in using composite materials in the industrial sector," he continued. "For any researcher in the world, it is very interesting to work with a company using this type of material." Many IMAST projects and corporate partners address some sort of transportation, from Boeing and Alenia to the Fiat Group and Avio SpA, a leader in propulsion technology.

And thanks to joint work with Alenia and IMAST researchers, Boeing benefits from improvements to the Italian supply chain. This boosts productivity of Boeing products and local suppliers, and in turn supports Italy's goal of boosting high-tech employment within southern Italian companies of all sizes.

"There are a lot of great minds here," Licciardi said. "Innovation. Young people with a lot of ideas. And of course, with that comes boosting of the south. When this much effort is invested, what is the return? Jobs, increasing revenue for the local industries and with that, a strong industry supply chain to fuel our company's future frontiers." ■

maureen.l.jenkins@boeing.com

From Rolla to Naples

How a systems engineering program helped build a transatlantic bridge

By MAUREEN JENKINS

One doesn't usually speak of the Midwestern U.S. state of Missouri and the Mediterranean nation of Italy in the same breath. But thanks to a partnership between two universities in these very different places, Boeing is helping to build high-tech bridges across the Atlantic Ocean.

The situation: Regional governments in southern Italy want to strengthen the area's high-tech skill base so it can better compete in the global marketplace. So when Leonardo Lecce, an aeronautical engineering professor at University of Naples Federico II and a member of the Campania Aerospace Research Network (CARN), learned that Boeing was willing to use its connections and dollars to help achieve this goal, "I had the idea to make a collaborative activity with education."

The end result? A Boeing-funded master's degree program in systems engineering.

Twelve students at the University of Naples—founded in 1224, it's one of the world's oldest—now are in the second of a three-year, 10-course program jointly run by the University of Missouri-Rolla and sponsored by Boeing. It's one of the tangible outcomes of Boeing's industrial participation program related to the Italian Air





Government officials in southern Italy are keen on strengthening the high-tech skill base in the region of Campania, where Naples and Portici are located. It's also true in Puglia, where Alenia is building key 787 Dreamliner elements in Grottaglie.

Force purchase of four KC-767A Tankers (Italy was the tankers' international launch customer).

The joint university venture is a win-win situation for Boeing and for the long-term development of the Italian aerospace industry, which supports Boeing in cross-enterprise efforts. For example, Alenia Aeronautica will help support the new tankers—and Alenia's state-of-the-art facility in Grottaglie, a small city in the southeastern region of Puglia, is a major supplier to the 787.

"The need was coming from industry," said Lecce. "There was a need to have education that took an integrated view to managing large projects in aerospace." And no other university in Italy was then offering the systems engineering degree these professionals needed.

So in stepped Boeing, which has a long-standing relationship with the University of Missouri-Rolla, one of this U.S. state's premier technological research universities. The university is an important employee pipeline to Boeing. And the school continues educating the company's employees even after they're on the job, offering in-classroom and video Internet distance education programs to graduate-level students.

Because of these ties—and the university's strong systems engineering master's program—Boeing enlisted Missouri-Rolla's help in setting up a similar function thousands of miles away at the University of Naples. Jim Mundloch, senior manager in Global Technologies for Engineering, Operations & Technology, met with CARN in southern Italy to get things rolling.

Classes in the program are taught by professors in Naples and in Missouri via the Internet, with CARN shaping four design classes that Mundloch said "broadened the curriculum and gave it an Italian accent." Naples' students—who must know English well enough to participate at the master's level—hail from the University of Naples, Alenia, the Italian Air Force, vehicle manufacturer Piaggio and Centro Italiano Ricerche Aerospaziali (CIRA). Boeing in 2003 signed a memorandum of understanding with CIRA to investigate and develop technology projects of mutual interest.

"What the research network in Campania recognizes is they're being asked to handle more-complex systems," Mundloch said. And, he added, with a program designed to last beyond this first class's graduation, "the structure's there for them to continually enhance their skills in systems engineering."

Rick Cisewski, Integrated Defense Systems' country manager for Italy Industrial Participation Programs, noted, "Industrial Return programs are increasingly becoming greater discriminators in our international campaigns, and our ability to develop and successfully implement nontraditional projects such as this demonstrate the long-term benefits we can deliver to our customers."

Added Mundloch: "With the enhanced capabilities of having systems engineering knowledge within these companies, such as Alenia on the 787, that can only improve their ability to perform on some of Boeing's programs." And this knowledge also will benefit Boeing's research work with CIRA, which he said "enhances the capabilities of our suppliers and collaborations."

Lecce admitted that the program is "a challenge, but very stimulating. I know that our students relish the opportunity to interact with students in the U.S." It's this professor's hope that the program live far beyond this first class of a dozen engineers.

He said he wants to show Italian aerospace companies "the advantage of [their employees] applying to this master's, and also to the regional government to make grants for students to apply for this program. I think in the south, there will be a long-term effect. They are only 12 people, but if the program continues, it can spread out and make contributions to the improvement of our companies." ■

maureen.l.jenkins@boeing.com



IDRA PHOTO PRODUZIONI PHOTO

A Boeing-funded master's degree program at Italy's University of Naples Federico II is equipping students with systems engineering skills. Professor Leonardo Lecce (center) works with Igor Bovio (left) and Benedetta Capano in a lab where the students are using a scanning laser vibrometer to conduct experimental model analysis on an aircraft engine component.



Boeing airplanes dominate the dedicated freighter market, providing more than 90 percent of the world's air cargo capacity. In the large airplane category, the complementary sizes of the 747 and 777 freighters offer customers a significant advantage in meeting the fluctuating demands of the freight market. The combination of these two platforms is the focus of this ad, which appears in aviation and cargo trade magazines worldwide.



TOGETHER, ONE BIG ADVANTAGE AFTER ANOTHER.

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 **BOEING**

Words to live by

Mesa's Mel Rhoden promotes diversity and unity by delivering the famed MLK speech

BY LISA DUNBAR

‘I say to you today, my friends, so even though we face the difficulties of today and tomorrow, I still have a dream. It is a dream deeply rooted in the American dream.’

The famous “I have a dream” speech that Dr. Martin Luther King Jr. delivered during the civil rights march on Washington, D.C., in 1963 has changed the lives and hearts of many people—including Mel Rhoden, a Mail Services staff analyst at the Boeing site in Mesa, Ariz.

Rhoden has listened to the seven-minute speech more than 100 times on video, records, cassettes and CDs, studying the civil rights leader’s tone, accents, crescendos and cadence. He began delivering the speech in 1987 to audiences in the Phoenix area during celebrations of Martin Luther King Jr.’s birthday to students during Black History Month, and to Boeing Mesa employees at diversity events. (In 2008, the holiday will be commemorated on Jan. 21.)

“My goal is to promote greater understanding among people of all races,” Rhoden said. “I’d also like to help create a more diverse culture among employees at Boeing, which will ultimately make the company stronger.”

“One of our work environment strategy goals at the Mesa site is promoting a culture in which employees respect one another,” said Nancy Reynolds, site work environment project manager/change agent. “So when Mel gives the speech to employees, it promotes the culture we want to build.”

Rhoden grew up in Mobile, Ala., during the civil rights movement. Remembering the discrimination he personally faced, one incident stands out. He cut his hand so

Mel Rhoden of the Boeing site in Mesa, Ariz., has delivered Dr. Martin Luther King Jr.’s famed “I have a dream” speech more than 30 times.



BOB FERGUSON PHOTO

badly that it bled profusely through the tourniquet his mother had applied. On the way to the hospital, despite feeling ill, he and his mother first had to move to the back of the bus and then give up their seats to white people as the bus filled up.

“I’d like to help create a more diverse culture among employees at Boeing, which will make the company stronger.”

—Mel Rhoden

In the early ’70s, Rhoden took a black-history class while in the U.S. Air Force.

His teacher challenged him to memorize King’s speech, which he did. The speech inspired him to make a difference, and he has since delivered the speech more than 30 times. His big dream is to deliver it someday at the Ebenezer Baptist Church in Atlanta—the spiritual center of the civil rights movement from 1960 to 1968, the church where both King and his father preached.

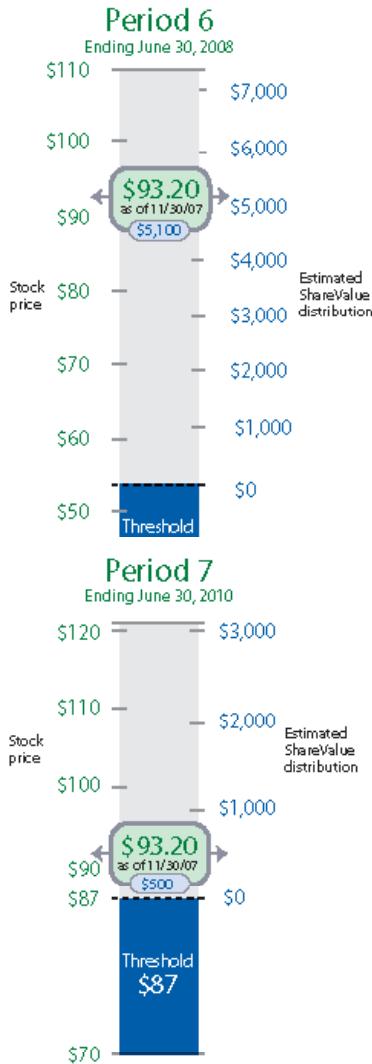
“This is the greatest speech of the 20th century,” Rhoden said. “It has touched people of all ethnic groups. They love to hear it.” ■

lisa.j.dunbar@boeing.com

Boeing stock, ShareValue Trust performance

ShareValue Trust is an employee incentive plan that allows eligible employees to share in the results of their efforts to increase shareholder value over the long term.

The program—which runs for 14 years and ends in 2010—features seven overlapping investment periods. The program is currently in Periods 6 and 7.



The above graphs show an estimate of what a “full 4-year participant” ShareValue Trust distribution (pretax) would be for Periods 6 and 7 if the end-of-period average share prices were the same as the recent price shown.

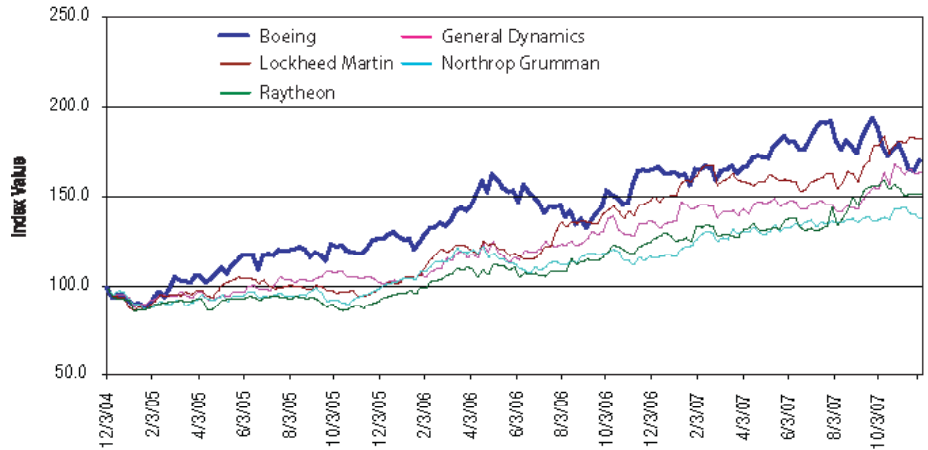
The share price shown is the average of the day’s high and low New York Stock Exchange prices. Updates to participant/employment data will be made periodically.

For more information on the ShareValue Trust, visit <http://www.boeing.com/share>.

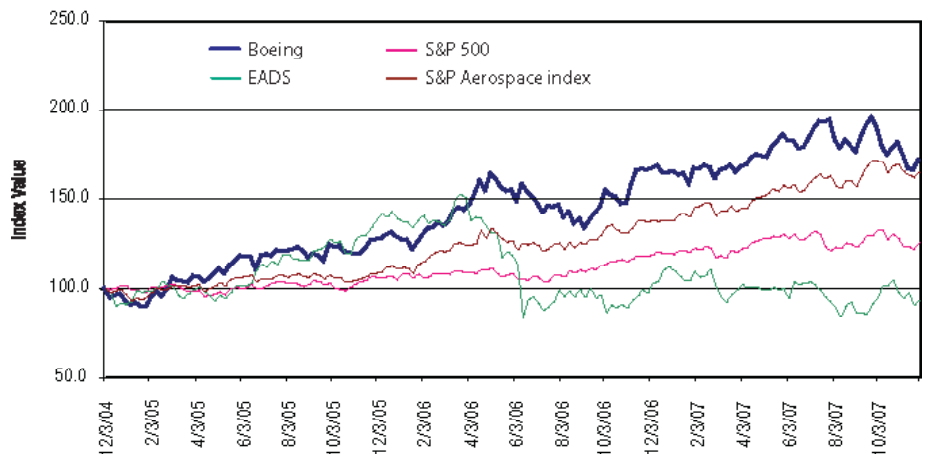
STOCK WATCH

The chart below shows the stock price of Boeing compared to other aerospace companies, the S&P 500 index and the S&P 500 Aerospace and Defense index. Prices/values are plotted as an index number. The base date for these prices/values is Dec. 3, 2004, which generates three years of data. The prices/values on that date equal 100. In other words, an index of 120 represents a 20 percent improvement over the price/value on the base date. Each data point represents the end of a trading week.

Boeing vs. U.S.-based competitors



Boeing vs. stock indexes and international competitors



Comparisons:

4-week, 52-week	Price/value as of 11/30/07	Four-week comparison		52-week comparison	
		Price/value as of 11/02/07	Percent change	Price/value as of 12/01/06	Percent change
BOEING	92.54	97.76	-5.3%	89.55	3.3%
U.S. COMPETITORS					
General Dynamics	88.78	90.13	-1.5%	74.81	18.7%
Lockheed Martin	110.67	110.12	0.5%	90.35	22.5%
Northrop Grumman	78.79	81.93	-3.8%	67.22	17.2%
Raytheon	61.85	63.16	-2.1%	51.30	20.6%
INT'L COMPETITORS					
EADS *	21.94	22.92	-4.3%	22.93	-4.3%
U.S. STOCK INDEXES					
S&P 500	1481.14	1509.65	-1.9%	1396.71	6.0%
S&P 500 Aerospace and Defense Index	444.48	455.97	-2.5%	372.94	19.2%

* Price in Euros

AROUND BOEING

OPPORTUNITIES FOR AUSTRALIAN FIRMS IS AIM OF NEW OFFICE

Integrated Defense Systems Industrial Participation organization opened The Office of Australian Industry Capability (OAIC) in Seattle to help increase business opportunities for Australian companies.

Working directly with Boeing major business units and key supplier partners, OAIC will coordinate supplier visits, host sector conferences and support small-to-medium enterprises (SMEs) by providing mentoring and training for selected SMEs within Australia. However, the office's primary focus will be to help facilitate bid opportunities for Australian industry, with an emphasis on those capabilities designated by Australia's Department of Defence as critical to gaining the through-life support capability necessary to maintain its many air defense assets.

"Boeing has established the Office of AIC in direct response to the Commonwealth's new Defence and Industry Policy Statement. We expect the Office of AIC to develop opportunities for Australian industry as well as bring value to our global customers," said Joel Gray, IDS Industrial Par-

ticipation manager, Australia/New Zealand. Boeing is the first U.S. prime contractor to establish such an office, Gray added.

As a whole, the aerospace industry in Australia employs close to 20,000. Many of these individuals support, repair and manufacture Boeing products and are critical to maintaining Australia's aerospace industry. A strong indigenous supply base is a major priority for the Australian government, especially within the defense arena.

In 1956, Qantas became the first airline outside the U.S. to order the new 707 jetliner. Since then, the relationship between Boeing and Australia's aerospace industry has grown and flourished. That relationship will continue into the next decade with commercial and defense deliveries of the Boeing 787, 737, AEW&C, C-17 and F/A-18 Super Hornet.

DERIVATIVE AIRPLANE PROGRAM DELIVERS THIRD C-40C AIRCRAFT

The Boeing Derivative Airplane Programs team last month delivered the third of three C-40C transport aircraft to the U.S. Air Force Reserve Command. The 932nd and 375th Airlift Wings, units of the AFRC

and Air Mobility Command, respectively, will use the Next-Generation Boeing Business Jet derivative to provide congressional delegations and senior government personnel with safe, secure and reliable transportation worldwide while supporting their ability to conduct in-flight business.

KLM, TRANSVIA.COM ANNOUNCE ORDERS FOR BOEING AIRPLANES

Boeing last month announced two orders from Netherlands-based airlines.

KLM Royal Dutch Airlines, part of the AIR FRANCE/KLM Group, will add three Next-Generation 737-700s and two 777-300ERs (Extended Range) to its fleet. As part of the agreement, KLM took options on one additional 737 and two additional 777s.

Meanwhile, transavia.com and Boeing finalized an order for seven 737-800s with conversion rights to other model types. The airline also secured options for a further three airplanes. The airplanes will operate out of the airline's Dutch hubs: Amsterdam, Rotterdam and Eindhoven.

Both orders were previously booked on Boeing's Orders & Deliveries Web site under the unidentified customer category. ■

RETIREMENTS: The following employees retired in October from The Boeing Company.

Gerald Arcangeli, 30 Years
Barbara Armstrong, 29 Years
William Atkins, 21 Years
Jimmie Auen, 28 Years
Richard Bahmler, 10 Years
Richard Baker, 27 Years
Steven Ball, 29 Years
Gary Bazik, 20 Years
Christopher Bellamy, 26 Years
Dennis Black, 26 Years
Edgar Blair, 41 Years
Toney Bowen, 22 Years
Richard Brainard, 35 Years
Patricia Brown, 14 Years
John Bruemmer, 38 Years
Joseph Bullock, 20 Years
Joanne Burrow, 17 Years
David Cady, 29 Years
Stephen Chase, 32 Years
Deborah Christie, 22 Years
Carloes Cox, 25 Years
Steven Cox, 28 Years
Joseph D'agostino, 23 Years
Jon Davis, 36 Years
David Deleon, 21 Years
Dayton Dennison, 20 Years
Ross Dessert, 29 Years
Robert Dewell, 36 Years

Mario Divok, 16 Years
Theresa Duke, 36 Years
Grover Duncan, 26 Years
Arthur Edison, 32 Years
James Enright, 18 Years
Richard Escobedo, 23 Years
Bessie Estep, 23 Years
Robert Everett, 20 Years
Cole Favre, 15 Years
James Fernen, 36 Years
John Foor, 10 Years
Roy Foote, 39 Years
Jitendra Gaglani, 23 Years
Harold Glor, 24 Years
Bruce Grossman, 22 Years
Robert Grover, 31 Years
Robert Gullette, 29 Years
Gerard Halpin, 42 Years
Susan Hammons, 22 Years
Kevin Hanley, 28 Years
James Hartel, 17 Years
Aaron Hazard, 14 Years
Joseph Heaney, 23 Years
Stanley Hoyt, 29 Years
Thelma Holland, 15 Years
Clinton Horn, 9 Years
Norman Hosford, 24 Years
Kumiko Huff, 20 Years

Eric Hughes, 29 Years
Judy Hunting, 36 Years
Thomas Jacobson, 34 Years
Albert Jaderberg, 18 Years
Everette Jeffries, 45 Years
Robert Kay, 23 Years
Edward Kilgore, 26 Years
Roy Kim, 23 Years
Thomas Kintz, 29 Years
Roman Kramar, 28 Years
Charles Legler, 21 Years
Don Lichtenegger, 42 Years
Gerald Lienhop, 35 Years
Charlotte Lin, 22 Years
Paul Liu, 37 Years
Linda Mangum, 30 Years
Linda McConnell, 21 Years
Danny McLaughlin, 22 Years
Terry McMeekin, 30 Years
David Medisky, 23 Years
Michael Meenen, 33 Years
Ramon Melendez, 43 Years
Lorimer Merriwether, 30 Years
Bradford Moore, 26 Years
Thomas Mullen, 22 Years
Mark Nakano, 32 Years
Daniel Nash, 23 Years
Gracie Nettles, 31 Years

Virginia Neubeck, 23 Years
Denise Neve, 12 Years
Herminia Northrup, 21 Years
Alan Obrochta, 29 Years
Ajit Panse, 22 Years
Allan Pharr, 23 Years
Joanne Phillips, 20 Years
Janet Piepgrass, 26 Years
Howard Plyler, 42 Years
Joe Powell, 45 Years
Steve Powell, 12 Years
Gary Prevost, 34 Years
Michael Ramps, 19 Years
Gerald Reilly, 40 Years
Darlene Riggsbee, 22 Years
Charles Rose, 14 Years
Donald Ross, 43 Years
Michael Rossi, 29 Years
Karen Russell, 17 Years
Michael Schmidt, 37 Years
Pamala Schneider, 20 Years
Robin Selden, 25 Years
Sang Sim, 20 Years
Leonard Smith, 20 Years
Charles Smith, 20 Years
Dale Snell, 30 Years
Joyce Souza, 11 Years
James Sparling, 28 Years

Edward Stamm, 19 Years
Richard Steele, 25 Years
Michael Steward, 28 Years
Danny Summers, 23 Years
Robert Sweeney, 20 Years
Judith Tate, 17 Years
Jerry Taylor, 22 Years
Sherrie Thomas, 10 Years
John Thompson, 20 Years
Stephen Thompson, 28 Years
Norman Tiller, 6 Years
Gary Prevost, 34 Years
Larry Truett, 27 Years
Karl Uhde, 34 Years
Linda Van Dreumel, 16 Years
Alfred Vara, 8 Years
Steven Vert, 29 Years
Ronald Wagner, 18 Years
Sharon Warford, 19 Years
Douglas Webb, 20 Years
Wilburn Webb, 30 Years
Larry Weideman, 33 Years
Christine West, 23 Years
Bradford Whitman, 30 Years
Bruce Whitney, 11 Years
Mark Witte, 26 Years
Timothy Woods, 20 Years
Douglas Young, 20 Years

■ AROUND BOEING

A nifty 150

Ryanair, Europe's largest low-cost carrier, took delivery on Oct. 26 of its 150th Boeing Next-Generation 737-800. Shown here are the airline's 146th, 147th, 148th, 149th and 150th 737s, parked in formation at Boeing Field in Seattle, where they underwent flight testing prior to delivery to the airline. More than 100 737s remain to be delivered to Ryanair—whose fleet includes only 737s. The carrier has the second-largest 737 fleet in the world, after Southwest Airlines in the United States.





MADE WITH JAPAN



ボーイングと日本企業とのパートナーシップは、航空宇宙産業に大きなイノベーションをもたらしました。三菱重工、川崎重工、富士重工とボーイング。その距離と時間、言語や文化の違いを超えて、お互いの知識と技術をリアルタイムで共有する画期的なプログラムによって、航空機の開発と製造技術を飛躍的に発展させたのです。このコラボレーションによって、いま世界が待ち望んでいた夢の次世代旅客機ボーイング787ドリームライナーが飛び立とうとしています。世界が望むものを実現する、ボーイングと日本企業とのパートナーシップ。さあ、一緒にすばいこと。

 **BOEING**

"Temple Moon" is the second in a new series of advertisements reinforcing Boeing's partnership with Japan, a relationship that began more than 50 years ago. "Temple Moon" highlights Boeing's collaboration with Mitsubishi Heavy Industries, Kawasaki Heavy Industries and Fuji Heavy Industries on the new 787 Dreamliner. The ad currently is running in Japanese publications including Nikkei Business, WING, Nikkei Shimbun, President and Toyo Kezai.



JUST ADD WONDER.

Face to face with nature, we are all children. That's why we're proud to support mankind's never-ending fascination with the world around us.



Global corporate citizenship refers to the work Boeing does—both as a company and through its employees—to improve the world. These efforts, combined across the enterprise, can yield sustainable improvement in the communities where Boeing employees live, work and support. This ad reinforces Boeing's commitment to initiatives that expose youths to the wonders of science.