August 2006
Volume V, Issue IV
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Boeing Frontiers

Teaching The Next Leaders

Jim Young (right) is a mentor to Boeing teammates such as Elizabeth Hopkins. Look inside for more about how Boeing is developing its future leaders through activities such as mentoring.

Child Life Program for Art and Music Therapy in the Cardiac Intensive Care Unit at The Children's Hospital of Philadelphia

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ON THE COVER: Elizabeth Hopkins (left) and mentor Jim Young of Integrated Defense Systems.
Photo by Peter George

Boeing Frontiers

TONY ROMERO PHOTO

COVER STORY TAKE THE LEAD 12

Gary Toyama (right) of Integrated Defense Systems has mentored many employees, including Erika Sanchez (left). Mentoring is one of many ways that Boeing uses to develop its leaders of tomorrow. Here's a glance at some of the activities Boeing is undertaking to prepare its next leaders.

THE NEXT 'CHALLENGE'

Boeing Frontiers presents a new edition of *Challenge*, a Boeing Engineering, Operations and Technology magazine. *Challenge* articles include a look at how the Development Process Excellence growth and productivity initiative is helping Boeing get more value from its R&D. After Page 22

CENTER INSERT

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COMMERCIAL AIRPLANES

Going for the green

30 Boeing Commercial Airplanes continues to design and improve its products to mitigate environmental impact. These efforts are "green"—not only because they're better for the environment, but also because they help the financial bottom line.

An engine of value

24 Engines and propulsion systems buildup work performed by the Propulsion Systems Division represents 35 percent of the value of any Boeing commercial jetliner delivered. The forthcoming relocation of some PSD manufacturing and production support employees to final-assembly sites will help the division create even more value.

A tail of improvement

26 Employees who assemble the empennage of 737 airplanes in Renton, Wash., completed the first phase of a Lean transformation. Their goal: Build the vertical fins and horizontal stabilizers on moving assembly lines.

INTEGRATED DEFENSE SYSTEMS

Something special

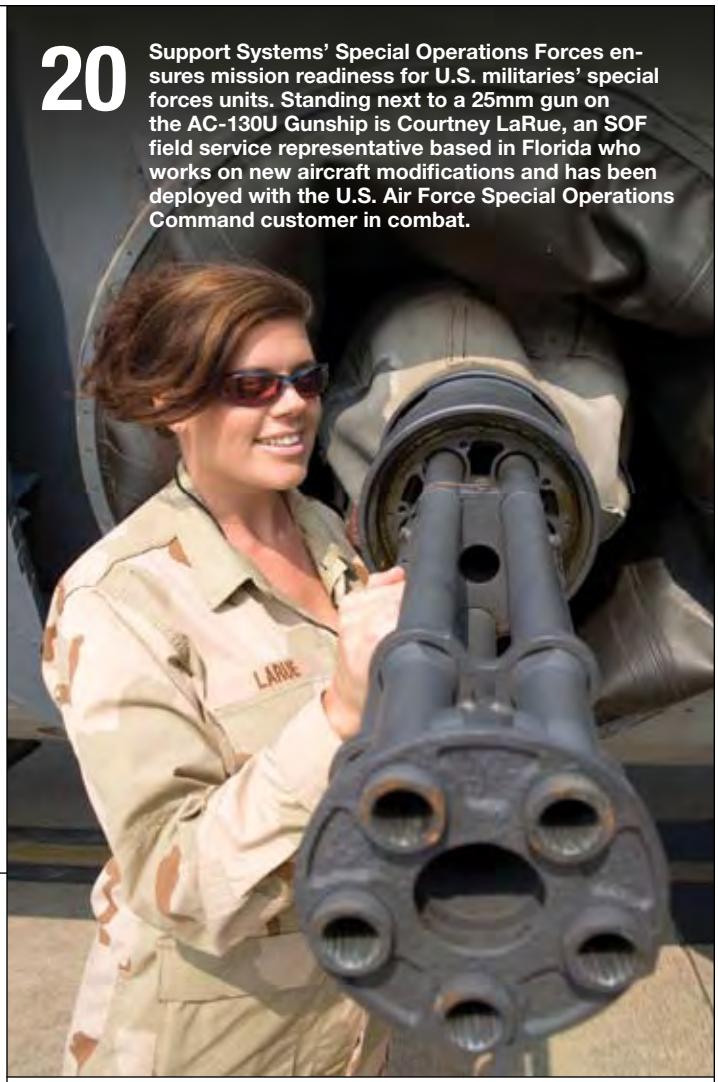
20 The members of IDS Support Systems' Special Operations Forces team deliver round-the-clock readiness to the special forces units of U.S. militaries. The work of these Boeing employees enables these elite combat groups to perform their covert operations successfully.

On target

18 Boeing recently delivered the first production Small Diameter Bomb System to the U.S. Air Force. The Boeing team brought this product in on schedule after a successful development program.

Hail to the queen

19 Apache Longbow, U.S. Army Serial Number 96-5001, is better known as "PVD-01"—the queen of flight testing. To date, it's flown more than 800 hours to validate modifications and experimental designs.



20 Support Systems' Special Operations Forces ensures mission readiness for U.S. militaries' special forces units. Standing next to a 25mm gun on the AC-130U Gunship is Courtney LaRue, an SOF field service representative based in Florida who works on new aircraft modifications and has been deployed with the U.S. Air Force Special Operations Command customer in combat.

RON BOOKOUT PHOTO

COMPANYWIDE

From charity to philanthropy

34 Are charity and philanthropy different? Yes, as seen by Community and Education Relations at Boeing. Leaders of this function explain how the two concepts are different—and why there's an ongoing shift in focus from charitable to philanthropic activities.

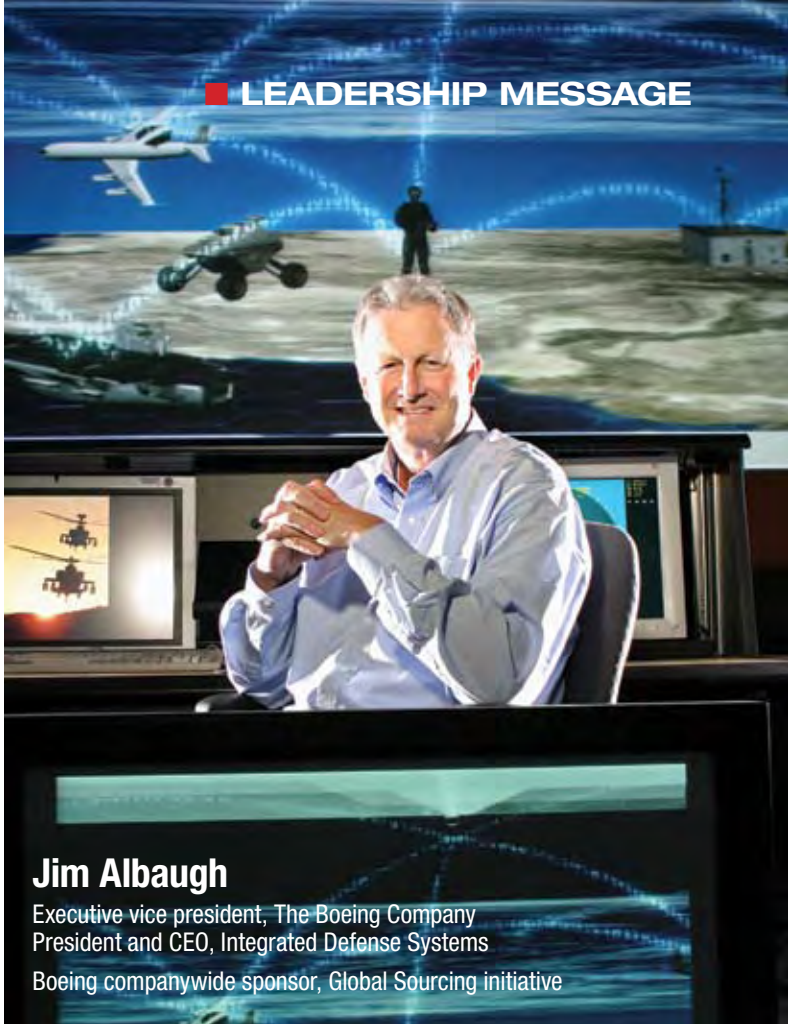
Treasury gets Lean

36 Corporate Treasury is looking to identify and eliminate unnecessary steps to cut the cycle time of various tasks by at least 50 percent. By using existing tools to make these improvements, Treasury is supporting Boeing's growth and productivity initiatives.

INSIDE

Global Sourcing's goal: Get most from each dollar spent

Jim Albaugh
Executive vice president, The Boeing Company
Boeing companywide sponsor, Global Sourcing initiative
President and CEO, Integrated Defense Systems



STEVE LABADESSA PHOTO

With order backlogs that lead the industry and strong prospects for future growth, Boeing is demonstrating that its strategy of building a balanced portfolio of products, programs and services is the right one.

The four enterprisewide initiatives introduced earlier this year are aimed at accelerating our productivity and growth. They give us the means to harness the best practices, innovative thinking and untapped potential within our business. With our support, they can propel us to achieve even greater results for our stakeholders.

Consider the Global Sourcing initiative, which I sponsor and Norma Clayton leads. This initiative is about making the most of every dollar we spend with our supply base—roughly $32 billion in 2005. By taking greater advantage of Boeing's economies of scale and working with our partners to improve their performance, we can be more competitive in the marketplace and improve the value we provide to our customers.

We all play a critical role in the success of this and the other Boeing initiatives. Some of us work directly with our supplier partners. Others contribute by sharing ideas for improvement, streamlining processes and replicating best practices. Collectively, these efforts make us stronger as a company.

The core team for Global Sourcing currently is examining 60 different projects to see which ones can be successfully replicated around the company. Those meeting the criteria for cost improvements and benefits will be entered into a companywide database that authorized employees can pull from—a kind of repository for great ideas.

> "This initiative is about making the most of every dollar we spend with our supply base."
>
> —Jim Albaugh, Boeing companywide sponsor, Global Sourcing initiative

The initiative's other near-term priorities include making additional improvements in logistics. These are aimed at helping our teammates and customers get the supplies they need—at the right time, in the right quantities, at the right locations—for the best value. We are also looking at the potential for consolidating warehouse space and standardizing systems and tools where practical.

When we strengthen relationships with suppliers, an area of particular importance to Global Sourcing, we also help large, strategically important partners lean out their factories and improve their processes, performance and cost.

As we work with our partners to enhance their performance, we need to do the same internally, making it easier for others to do business with Boeing. That means fewer transactions, less administrative costs for initiating and tracking purchase orders and invoices, improving our material forecasts, and aggregating our demand where we have common material buys across the company. We need to provide complete and accurate work packages, including common engineering standards and parts. We must provide suppliers with information, processes and tools that are both timely and accurate while ensuring that proper support and oversight are in place. By focusing on these areas, we enable our partners to improve their productivity and efficiency; optimize their resources; and invest in the critical tools, processes and technologies that meet or exceed our customers' expectations.

Some of this work is already under way. However, we must accelerate our efforts by aligning and integrating our sourcing strategies, plans and improvement tools across the company. As we continue these efforts, let's not lose sight of all that we've accomplished through Employee Involvement teams and cooperative efforts with our partners, and by working better and smarter than we have in the past.

Consider just a couple of examples. By improving management of logistics for parts and material used in final assembly and delivery, we will save $193 million over 10 years. By consolidating 20 contracts for managed print services into one, we will save $77 million over five years.

As we look to the future, Global Sourcing, along with the other growth and productivity initiatives, will help open a new world of possibilities. By identifying opportunities to improve performance and reduce risk, these initiatives will drive continuous improvement and enable us to achieve more aggressive performance targets. And they will provide us with a strategic competitive advantage in the marketplace that our competitors will be hard-pressed to match. ■

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Thanks for the B-17

I want to thank you for *Boeing Frontiers* magazine and its high-quality and informative articles. In particular, the Snapshot on Page 7 of your June 2006 issue showing the B-17 flying with a B-52 was touching to me. I served on a B-17 for 35 missions over Germany as a ball turret gunner and wouldn't be here today if not for the sturdy dependability of the Flying Fortress.

—Bob Gilbert
Murrieta, Calif.

Now hear this

Regarding the letters in the July issue about the noise of the future workspace: If the noise level is so great that the support folks can't stand it, just think what the employee on the floor has to go through. Maybe these people can get together and design future products that are more livable to work on.

—Bruce Miller
Everett, Wash.

How about Huntsville?

After reading the Letter to the Editor in the May issue titled "Don't forget Mesa," I felt moved to mention that I have considered writing you precisely the same message about the work of employees at the Huntsville, Ala., facility.

In 1998 I retired from Boeing Huntsville. I have continually been eager for news about Boeing programs everywhere, and I am always hoping to read about the activities in Huntsville. Although I look forward to receiving *Boeing Frontiers*, I have not dared to hope to read occasional mention of the Huntsville employees who are so highly deserving of recognition in your magazine.

The work of the employees in Huntsville plays an important role in the overall history of Boeing. They work hard on dynamic programs that are vital to the U.S. economy and to Boeing's financial welfare.

—Joanne Martin Scudder
Lake City, Colo.

Editors note: *Huntsville has a role in many major Boeing programs that receive coverage in Boeing Frontiers. These programs include the Ground-based Midcourse Defense system, PAC-3, Arrow, International Space Station and Future Combat Systems. In addition, Boeing Frontiers profiled Huntsville in its December 2004/January 2005 issue.*

"I served on a B-17 for 35 missions ... and wouldn't be here today if not for the sturdy dependability of the Flying Fortress."

—Bob Gilbert, Murrieta, Calif.

Ideal meeting place?

I sure hope the conference room shown being used by the members of the information technology team in Building 73 in St. Louis (June 2006, Page 16) is not an example of the typical or ideal meeting room of the future. The lighting is all wrong to see the projected material. The projector is too close to the screen. The screen is too close to the end of the table, making attendees crank their necks 90 degrees to see the material (that is, if they didn't bring their own laptop computers to be able to see the material, apparently). There are wires all over the table. And for at least those on the right, they can't move without others having to get up and move and make room.

—Scott Lee
Renton, Wash.

Watch those wetlands

Regarding a 787 program global partner's new facility in South Carolina (June 2006, Page 13): I own 1,100 acres of forested wetlands in Maine, and I highly value wetlands and the creatures that live there. I am happy that a global partner has built a new world-class production facility. But I strongly object to news stories that convey enthusiasm for filling wetlands to build the new production facility. There should have been a message about wetland reclamation that explained how new wetlands were created to balance those that were filled. This is more in line with what I expect from The Boeing Company.

—Bryan Wells
Bangor, Maine

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.

SNAPSHOT

NICE TO SEE YOU Crowds gathered around the Bell Boeing V-22 tiltrotor aircraft at last month's Royal International Air Tattoo military air show at RAF Fairford in Gloucestershire, England. The V-22 made its first public U.K. flight at this event before moving on to the Farnborough International Airshow, near London, where it performed daily flight routines.

KEVIN FLYNN PHOTO

QUOTABLE

"We are focused on turning ethics and compliance into a competitive advantage for Boeing."

—Jim McNerney, Boeing chairman, president and CEO, in a June 30 Associated Press report

"This is the cleanest orbiter anybody remembers seeing."

—Michael Griffin, NASA administrator, after examining the exterior of Space Shuttle *Discovery* for damaged heat-insulating tiles upon conclusion of its 13-day mission, in a July 18 Associated Press report. Boeing employees played a role in helping the mission succeed.

"If you want a new advance-technology aircraft, Boeing is still the place to go."

—Howard Rubel, aerospace analyst for Jefferies & Co., speaking about the Boeing 787 Dreamliner passenger airplane after Airbus introduced its A350 XWB model, in a July 18 CNN report

IAM PROMOTIONS

No promotions listed for periods ending June 30 and July 7, 14 and 21.

ETHICS QUESTIONS?

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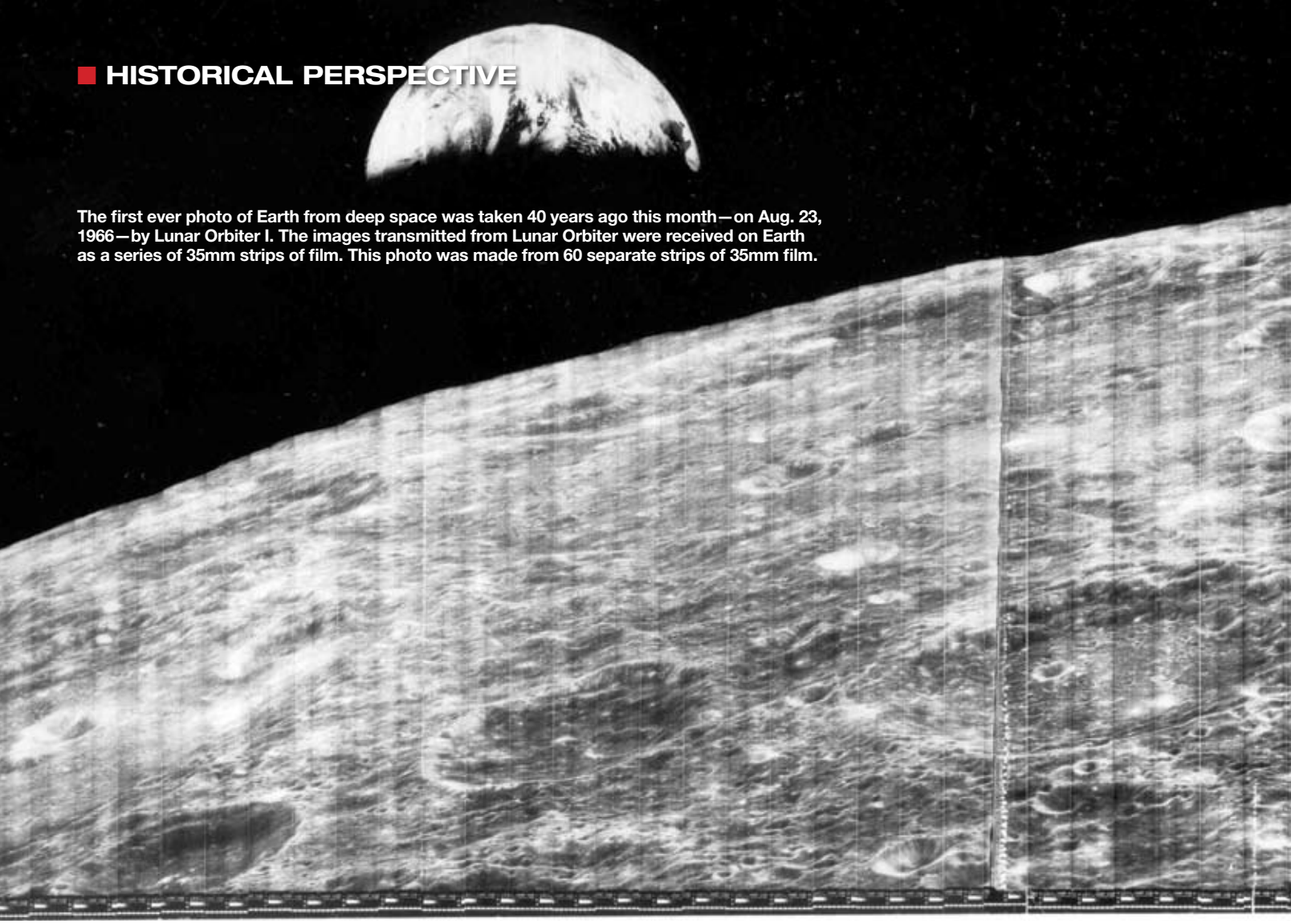


The first ever photo of Earth from deep space was taken 40 years ago this month—on Aug. 23, 1966—by Lunar Orbiter I. The images transmitted from Lunar Orbiter were received on Earth as a series of 35mm strips of film. This photo was made from 60 separate strips of 35mm film.

A great view from above

40 years ago, a Boeing-built Lunar Orbiter took a very memorable photo

By Michael Lombardi

A picture taken 40 years ago this month was hailed at that time as the greatest photograph of the 20th century. It took three days and 232,000 miles to get the camera in the right position, but the results were absolutely stunning: It was the first-ever photograph of Earth from deep space, with the moon in the foreground.

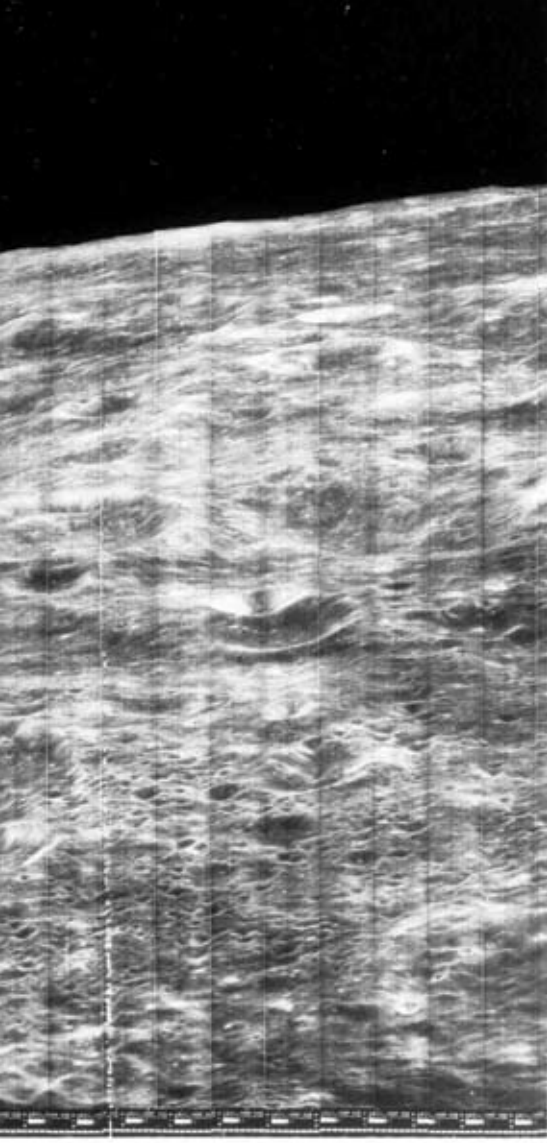
The photo was the first of many spectacular photos taken by the five unmanned space vehicles called Lunar Orbiters. The mission was one of the most successful space programs ever launched—and marked Boeing's first foray into space.

The primary mission of Lunar Orbiter was to obtain photographs of the moon's surface that would aid in the selection of suitable landing sites for the Apollo manned landings on the moon. Lunar Orbiter also had secondary objectives that included the collection of data on the moon's gravitational field, levels of radiation flux and micrometeorite density in the vicinity of the moon.

The Lunar Orbiter Project Office at NASA's Langley Research Center recommended that Boeing, along with its subcontractors Eastman Kodak and RCA, build the Lunar Orbiters. A final contract for eight orbiters (three test and five flight vehicles) was signed on May 7, 1964. Although Boeing came in with the highest bid, the company had many factors in its favor. Among them:

- A reputation for project organization and success built on a number of prior programs
- A design that used proven off-the-shelf hardware (in particular, the Kodak photographic system, a lightweight version of one developed for use on U.S. Air Force reconnaissance satellites)
- Its own on-site test facilities

The Lunar Orbiters were built at the Boeing Missile Production Center in Seattle. Testing took place there and at the space environment test chamber at the then-new



BOEING PHOTO

BOEING PHOTO

The Lunar Orbiter sits in a three-axis test rig at the Boeing Missile Production Center in Seattle. With the launch of the first Lunar Orbiter, Boeing entered the space age.

Boeing Space Center in nearby Kent, Wash. The Lunar Orbiter was an 850-pound structure that measured 5 feet wide and 5 feet 6 inches tall in its launch configuration. With its four solar panels and two antenna booms deployed, it measured 18 feet 6 inches wide.

The launch of Lunar Orbiter I on Aug. 10, 1966, aboard an Atlas–Agena D booster was Boeing's entry into the space age. So successful was the program that Orbiters I, II, and III fulfilled the program's original mission objectives—which allowed the last two Orbiters to be devoted to broader scientific studies of the moon.

Unlike the first three missions, Orbiters IV and V were placed into near-polar orbits. They performed broad photographic surveys of the lunar surface, photographing 99 percent of the moon's near side and 80 percent of the moon's far side with a resolution 10 times greater than what could be achieved by any earth-based telescope.

To this day, the photographs taken by the five Lunar Orbiters have provided the basis for all accurate maps of the moon.

The Lunar Orbiters paved the way for man's first steps on the moon by giving the Apollo project valuable data about the moon and its environment. They helped with landing site selection and verification. They also gave Apollo flight operations experience in tracking spacecraft in lunar orbit and saved NASA valuable time and money. The alternative to sending the orbiters had been a manned Apollo mission to lunar orbit. That single mission would have been considerably more expensive than the entire Lunar Orbiter program and probably would have forced Apollo to miss the goal proposed by President Kennedy for a manned landing on the moon before the end of the decade.

To commemorate the anniversary of the first Lunar Orbiter mission, members of the program will hold a reunion at the Museum of Flight in Seattle on Aug. 22. On Aug. 21, the significance of the Lunar Orbiter will be the topic of a panel discussion at the museum's William Allen Theater. For more details, contact Pat Itzen at 253-631-0113 or at pat.itzen@juno.com. ■

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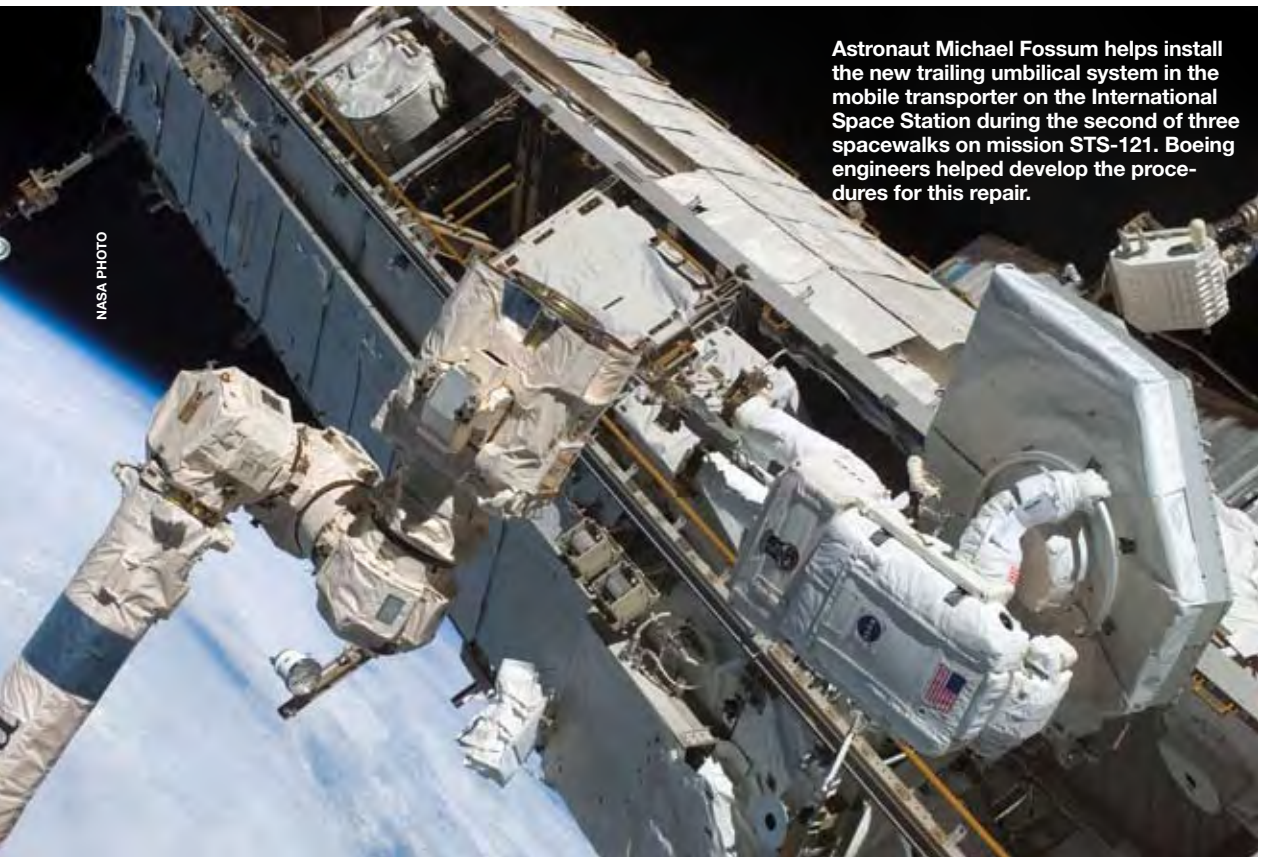

NASA PHOTO

Astronaut Michael Fossum helps install the new trailing umbilical system in the mobile transporter on the International Space Station during the second of three spacewalks on mission STS-121. Boeing engineers helped develop the procedures for this repair.

Gold-medal performance

Boeing employees help make sure STS-121 is safe and successful

By Ed Memi

Like a gold-medal Olympic gymnast, Space Shuttle *Discovery* launched, did a back flip in orbit and landed with picture-perfect precision.

Mission STS-121 began with a July 4 launch and ended 13 days later with a safe landing at Kennedy Space Center, Fla. *Discovery's* mission to repair and resupply the International Space Station (ISS) was a success, with only a few minor anomalies during the flight.

For Boeing Space Shuttle engineers, perhaps the biggest cause to celebrate came from what did not happen: The orbiter sustained virtually no debris impact damage or other serious problems. The Shuttle External Tank lost much less insulating foam than on previous flights. Prior to launch, Boeing played a key role in analyzing the aerodynamic effects of removing about 37 pounds of foam from a wind deflector on the shuttle's External Tank.

Focusing on safety, the shuttle team continued to check the orbiter for damage all through the flight. Part of that checkout involved the shuttle performing an on-orbit 360-degree back flip—only the second time in shuttle history this maneuver was performed. The back flip, coupled with a boom inspection of the shuttle's underside, confirmed that there was no significant damage to the heat shield.

Some minor anomalies did occur, however, which Boeing engineers helped NASA and the United Space Alliance—a Boeing–Lockheed Martin joint venture that's the NASA prime contractor for Space Shuttle operations—to resolve. Boeing employees helped to assess and clear as problems two protruding heat-resistant gap fillers and two thermal blanket patches that had lifted up during launch, as well as a potential fuel leak in the auxiliary power unit. Refined analysis procedures from the last shuttle mission helped engineers complete analyses in only 24 hours.

"The team's performance has been exceptional," said Dan Bell, Boeing's Thermal Protection System subsystem manager.

The shuttle docked with the ISS on the third day of the mission. Aboard *Discovery* was a cargo module for ISS, along with more than 7,400 pounds of new space station equipment and crew supplies. Boeing payload processing personnel played a key role in preparing the cargo for the mission as well as unloading it after landing. "We unloaded a lot of excess parts, old clothes and other items that freed up room in the Space Station," said Ken Koby, a Boeing senior systems payload engineer who works in the payload processing facility at Kennedy Space Center.

"The Boeing team did a tremendous job working with our NASA and United Space Alliance customers to prepare *Discovery* and ensure the safe and successful mission of STS-121," said Brewster Shaw, Boeing Space Exploration vice president and general manager. "We are now positioned to fly out the remaining shuttle missions, complete International Space Station assembly, and are prepared to take the next big steps to explore the moon, Mars and beyond."

On the next Space Shuttle mission, STS-115, scheduled for launch no earlier than Aug. 28, the orbiter *Atlantis* will carry the Boeing-built P3/P4 truss assembly and solar array to the ISS. ■

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Boeing at **Farnborough**

Jolly good show

Boeing was busy during last month's Farnborough International Airshow in the United Kingdom, one of the aerospace industry's largest gatherings. The company announced a series of orders, including one from Lion Air for 30 more 737-900ERs and one from International Lease Finance Corporation for 10 airplanes. Meanwhile, the F/A-18 and the Bell Boeing V-22 took part in daily flying displays. Here's a look at some of the Boeing sights at Farnborough.

ED TURNER PHOTO

KEVIN FLYNN PHOTO

KEVIN FLYNN PHOTO

ED TURNER PHOTO

ED TURNER PHOTO

ED TURNER PHOTO

① **The striking DreamSpace exhibit spotlighted Commercial Airplanes' vision and products. The display included this row of jetliner models.**

② **Integrated Defense Systems President and CEO Jim Albaugh prepares to shoot a video report he filed from the show.**

③ **Here's a look inside the C-17 Globemaster III that was on static display. A briefing on the C-17 program is taking place inside the airlifter.**

④ **Mike Bair, vice president and general manager of the 787 program, addresses reporters during a press conference on the new jetliner.**

⑤ **The Bell Boeing V-22 Osprey tiltrotor aircraft makes its first Farnborough flight.**

⑥ **A Boeing 777-300ER (Extended Range) in the livery of Taiwan-based carrier EVA Air was on static display. Here, performers present a traditional dragon dance in front of the airplane.**

The lead role

Developing the next generation of leaders is crucial to Boeing's growth. Here's a look at some of the many ways Boeing is tackling this task.

>>Inside

Behind every great Boeing product and service is a team of great Boeing people. Helping Boeing people and teams reach their full potential and maximize their contributions is one of the tasks of leaders at Boeing. Indeed, "sets high expectations" and "inspires others" are among the six characteristics spelled out in the Boeing Leadership Attributes.

Boeing places an immense emphasis on developing its next generation of leaders.

"Leadership development is the foundation of our management model and the key to sustainably growing our company. I consider it one of my top priorities," said Jim McNerney, Boeing chairman, president and CEO. To achieve sustained growth, McNerney said, "we must take specific steps to strengthen the culture of leadership and accountability within Boeing."

In this series of articles, *Boeing Frontiers* looks at some of the many activities organizations around the company are undertaking to develop its leaders of tomorrow.

RON BOOKOUT PHOTO

Straight from the source

By Robert Sterling

When Ginger Barnes spoke to employees attending a recent leadership development program at the Boeing Leadership Center, she acknowledged the challenges that "charts the course"—one of six leadership attributes spelled out by Boeing earlier this year—presented in growing a weapons business.

But she said she's embraced that challenge with excitement and determination.

"For me, developing a strategy to grow our weapons business has been challenging, but fun as well," said Barnes, vice president, Weapons Programs, part of Integrated Defense Systems. "It's not just about a vision for the future, but a vision that everyone can understand and wants to buy in to, complete with ways to measure our progress."

Ginger Barnes, vice president, Weapons Programs, part of Integrated Defense Systems, takes part in the Leaders Teaching Leaders process at the Boeing Leadership Center. Leadership "is all about leaders teaching leaders and about relationships," she said.

Barnes is one of a number of executives who are taking part in the Leaders Teaching Leaders (LTL) process at the Boeing Leadership Center near St. Louis. The project engages leaders from across the enterprise in open and honest dialogue about the leadership attributes, the Boeing management and leadership models, and the impact of incorporating the companywide growth and productivity initiatives into their business and people plans. "Leadership is all about leaders teaching leaders and about relationships," she said.

Executives from across the company speak to participants of the BLC's core leadership programs. Classes engage in open discussion and offer participants time to ask questions and challenge leaders on any aspect of leadership development they choose.

Barnes focused on the leadership attributes and Boeing's strengths versus weaknesses. "We can execute the daylights out

Attributes of a Boeing leader

To strengthen the culture of leadership and accountability within the company, Boeing defined its expectations for leaders. These expectations are known as the leadership attributes.

A Boeing Leader

- Charts the course
- Sets high expectations
- Inspires others
- Finds a way
- Lives the Boeing values
- Delivers results

of anything, so 'finds a way' and 'delivers results' have always been strong traits," she said. "Where we need to improve is in the areas of 'charts the course,' 'sets high expectations' and 'inspires others.'"

One suggestion Barnes offered: Seek out a mentor—"someone who's strong in the area you need to develop and will offer honest feedback," she said. "That's what I've done."

The LTL process serves as a way for executives to share their personal experiences around the attributes and initiatives. At the same time, it allows for a two-way dialogue to encourage participants to share their own applications and challenges. According to Karesa Prestage, Accelerated Leadership Development program manager, participants are reacting positively to the opportunity LTL provides.

"The Leaders Teaching Leaders session was great," said Drew Oberbeck, part of the Program Managers Workshop and member of the C-17 program in Long Beach, Calif. "The opportunity to ask any questions, especially tough ones, allows me the chance to look into the future to get a better picture of both where I'm going as an individual as well as the direction of the company."

"The leadership attributes and initiatives, along with leadership and management models, provide Boeing with a common language and a common culture and help us to better align as one company and drive behavioral change," said Rick Stephens, senior vice president, Human Resources and Administration, during a recent talk to Boeing Executive Program participants at the BLC.

"Boeing is about our products, but more about our people, and both have to be strong if we're to be successful," Stevens said. "Performance and values must work hand-in-hand. That means leaders must model and demonstrate leadership in the context of their jobs everyday [to] create the right environment so employees can find a way to be successful in their areas of expertise." ■

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PETER GEORGE PHOTO

Two years ago, Elizabeth Hopkins (left) took up an invitation from Jim Young (right), vice president of Engineering for IDS Global Strike Systems, to shadow him for a day. That started a mentoring relationship that's directed her career.

Teach your teammates well

By Mary Jo Becker

Mentoring is highly beneficial to Boeing and has been enthusiastically embraced by Integrated Defense Systems—so much so that IDS president and CEO Jim Albaugh has tasked each member of his senior leadership team to mentor a minimum of three people, including one woman and one member of another minority group.

"When I think about the things that can really change a person and the direction his or her life is headed, education and mentoring are right at the top," Albaugh said. "All leaders at one time or another have likely benefited from those who took an interest in them, helped them develop their skills and provided opportunities to learn and grow. This is really the most important job managers have—building the next generation of leaders who can take Boeing to a higher level of success. By mentoring others, by demonstrating—every day—the Boeing Leadership Attributes, and by creating a culture that values new and diverse ideas and viewpoints, we can help ensure that the Boeing of tomorrow is an even better, stronger and more diverse company than it is today."

Simply defined, to mentor is to serve as a teacher and counselor

to a willing learner. Mentoring can be formal or informal—anything from one-on-one conversations to classroom training. It can draw people from similar or diverse backgrounds and experience. It can be an inherent skill or one that is acquired.

Jim Young, vice president of Engineering for IDS Global Strike Systems, has a mentoring portfolio that includes meeting one-on-one with employees, participating in roundtable discussions and speaking at orientation sessions for new employees. It was at one of those sessions two years ago that he met current protégé Elizabeth Hopkins, who joined Boeing out of college.

When Young invited any new employee to shadow him for a day, Hopkins signed on. It was the beginning of a mentoring relationship that has directed her career and helped her transition to her current job in Industrial Engineering on the C-17 pod line.

"Talking with Jim has helped tremendously," Hopkins said. "For instance, talking with him about my Performance Development Plan changed my goals dramatically and really made the plan a workable road map for building the skills I want and need."

Derek McLuckey, general manager of IDS Wichita, sees mentoring as a way to leave a meaningful legacy. Toward that end, he meets regularly with individual employees and teaches Basics of Leadership Development, a series of classes that covers everything from production and finance to motivation and managing change.

"When you look back over your career, when you're packing your boxes and turning off the lights, your legacy is the people you've helped become leaders," McLuckey said.

Jason Beckmann got the message. He was mentored by McLuckey and in turn mentors three other employees. "The greatest benefit of mentoring is that it gives you a systems view of the world," he said.

Beckmann is really a third-generation Boeing mentor. His mentor, McLuckey, was mentored by Gary Toyama, vice president, Southern California Region for IDS. Toyama mentors up to 24 people individually and hosts monthly Web-based training sessions for employees across Boeing.

For Kory Mathews, director of F/A-18 program strategy and integration, mentoring is "hugely important—it's the epitome of diversity. It offers a chance to share experiences and to view the world from someone else's perspective, to pick someone's brain and leverage their experience and your own for mutual benefit."

Mathews formally mentors seven co-workers and has informal mentoring relationships with several others. "I can share experiences, offer opinions and help guide the people I mentor, but I learn as much from my proteges as they ever could learn from me," he said.

"Kory makes you feel comfortable, and he makes sure you know he values your opinions," said Lana Lechner, who's been mentored by Mathews for about 18 months. "Mentoring with him really helps you step back and think of things you 'know' in a different way." ■

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PETE GEORGE PHOTO

New hires can REACH for the stars

Corporate life can be overwhelming for recent college graduates who join Boeing. The Regional Events and Activities for Company Hires (REACH) organization aims to reduce this anxiety through networking and career-growth opportunities.

Originally coordinated in 1998, the organization now provides new hires at 26 Boeing sites opportunities to learn about the company, network with colleagues and learn from executives how to put their careers on track to success. For employees new to a geographic area, REACH can help familiarize them with the community's social and cultural highlights.

A typical REACH activity may be a company-sponsored community event such as refurbishing a house or stocking a food bank. It may be attending a sports event with fellow new hires or sitting down with one of the company's top leaders and asking questions such as, "How did you become the leader that you are?"

This summer, REACH and College Programs sponsored a development day in Southern California called "Take Your Career to New Heights." Two hundred REACH members and college interns heard tips from Boeing senior managers about how best to accelerate their careers.

REACH has also acted as a linchpin for Boeing's student development program, in which college interns spend 12 weeks working on a program or within a function while learning about Boeing. "The REACH program was one of the main reasons I came back to Boeing after my internship," said Betsy Jobes, a structural engineer for the C-17 program. "I saw a way I could immediately add value and make a difference, and not be lost in a company of 150,000 people."

For more information on REACH, visit http://reach.web.boeing.com on the Boeing Web.

—Erica Godfrey

Among the participants in Regional Events and Activities for Company Hires is Matt Rutherford, a participant in the IDS Engineering Skills Rotation program and currently assigned to Tactical Aircraft Reliability & Maintainability. He's been a member of REACH for three years.

New class seeks to build leadership bench strength

Accelerating the preparation of program managers is the aim of a class begun in June for 20 managers from throughout Integrated Defense Systems.

The new Program Manager Development Program, Boeing's most intense program-manager training effort, is part of a push to ensure the company will continue to meet its need for skilled leaders. The inaugural class's participants, selected by IDS executives, are spending seven weeks over 18 months in workshops exploring the fundamentals of program management.

"Our expectations for this group are high," said Steve Goo, vice president, IDS Program Management and Business Excellence. "We want them to model what they learn from the experts and take it back to their home programs so their teams can be more successful."

The class is part of a growing number of activities around the enterprise to develop program managers. For example, a monthly workshop at the Boeing Leadership Center in St. Louis enables 36 leaders from IDS, Boeing Commercial Airplanes, Shared Services Group, customers and suppliers to participate in a management simulation on leading programs using the Boeing Program Management Best Practices. In addition, training sessions are held monthly throughout Boeing to support best practice implementation. And a quarterly class will be launched at various sites in early 2007.

IDS is now working with Commercial Airplanes to take its new development program to other parts of Boeing. The two business units are merging their program-manager biographical databases to boost visibility of skilled individuals. They also are participating in an enterprisewide Program Management Development Initiative team. The team's ultimate goal is to create a system that will increase career development opportunities and the number of management-position candidates through certification, job rotation and other strategies.

"The identification, development and promotion of program managers is one of the biggest issues in the aerospace industry today," said Goo. "With our 500 programs, IDS is in a unique position to leverage what Boeing knows and prepare qualified program managers to lead our company in the future."

—Diana Eastman

Steve Goo, vice president, Program Management and Business Excellence for Integrated Defense Systems, discusses with members of the first program-manager development class the increased focus on preparing Boeing's future leaders.

TONY ROMERO PHOTO

Out of the office, onto the shop floor

By Kathrine Beck and Carrie Thearle

Beth Anderson knew she'd made the right move the day a mechanic came up to her with two seemingly identical parts, one in each hand. "This one costs $2.50 and this one costs $17," she recalled him saying. "So why am I using the one that costs $17?"

Anderson is director of the Interiors Responsibility Center (IRC) in Everett, Wash., where interior components such as overhead stow bins, sidewalls and ceilings for all Commercial Airplanes models are made. She's a living example of the Lean manufacturing ideal that good leaders must understand the daily work in great detail.

It was with that thought in mind that she moved her office onto the factory floor. Before her present assignment, Anderson had no experience in a manufacturing environment. An engineer, she had spent 20 years in Commercial Airplanes working on modifications and upgrades of existing airplanes.

A few days into her new job, she was asked to put together a report on how the organization would be able to increase its production rate.

GAIL HANUSA PHOTO

Beth Anderson (left), director of the Interiors Responsibility Center in Everett, Wash., chats with Scott Partridge, lowered-ceilings mechanic, in the production area where they both work.

Much of the area's production relies on three- and five-axis routers. Anderson laughs now, but she said there were gasps when she had to ask what a router was. "I have learned so much," she said.

Leanne Jackson, team leader for ceilings and sidewalls, said of Anderson's new work location, "I love that. It makes her more accessible to employees. I think they just feel she's not separate from us, doing her own thing. She's more involved with us in our daily work."

"The farther away managers are from the work area, the more it dilutes the information they get," said Mike Herscher, leader of the Commercial Airplanes Lean Enterprise Office.

He also said that when managers get close to the daily work, they teach as well as learn. Herscher accompanies Carolyn Corvi, vice president and general manager of Airplane Production, on her regular weekly walks through production and office areas. Corvi is responsible for managing Commercial Airplanes' fully integrated production system from design through production and delivery. Once a week, she spends three hours in a work area, accompanied by several students of Lean—hourly, salaried, managers and executives. They learn from real-life examples and talk to employees about improvements.

"The people will talk about what they're working on, and Carolyn will share the philosophy and principles of Lean and challenge them to think how they would adopt principles in their work environment. She teaches, and at the same time, she learns," said Herscher.

Lean manufacturing has been a remarkable success at Commercial Airplanes. In six years, the time it takes to build a 737 has been reduced from 22 to 11 days. Glen Kanenwisher is general supervisor for three of those flow days—days six, seven and eight—in 737 Final Assembly at Renton, Wash. He's also a strong believer in the value of understanding the daily work. "You've got to get out of the office, and you've got to know your work force, and they have to know you," he said. He added that an important part of his job is to inspire employees and to "foster ownership" of the work they do.

Gemba is Japanese for "the real place," and a gemba walk into work areas is a key part of Lean thinking. Kanenwisher tries to walk through his area and meet with the employees at least twice a day.

"I walk up to them, and I learn the issues of the day by asking them how everything is going and if there is anything I can do for them," he said. "You have to be prepared to follow up." And when he does follow up, he tries to model the right kind of problem-solving behavior, stressing Lean thinking and cooperation.

Employees might request help with a supplier issue or a "defect" report on an assembly traveling into their area. Kanenwisher said he is seeing a change in the nature of these requests as employees take ownership. Now, he's less likely to hear about what's wrong—and more likely to hear an employee asking for help making an improvement.

Kanenwisher is upbeat about Lean manufacturing and continuous improvement. "I know we are doing well because employees are dissatisfied with the current situation—meaning they want to get dramatically better than they are today. And we're already world class today," he said. He's doing his part by staying close to daily work. ■

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Here: Leadership Excellence 2006

This year's annual training program for 8,000 managers across Integrated Defense Systems is under way.

"Leadership Excellence 2006: Raising the Bar Through Integration and Alignment" began last month and continues through November. The half-day workshops include an introduction to the Boeing Management Model, Leadership Model and Leadership Attributes.

The sessions also explain how these concepts connect to both the IDS strategic imperatives—effective leadership, flawless execution, and shape markets and grow profitably—and the four IDS focus areas: program management best practices, supplier management and supplier quality, systems engineering, and cost structure.

"We use Leadership Excellence to help leaders understand and apply our management tools so they can be more effective, meet team objectives and keep IDS moving forward," said Norm Bartlett, vice president of IDS Human Resources. Bartlett said the training supports Lean+ and the other Boeing growth and productivity initiatives "by giving managers the inspiration and the means to create a culture of continuous improvement and drive higher levels of personal, team and business performance."

The program began in 1999 when the former Space & Communications business unit, now part of IDS, developed a set of common expectations for all managers and team leads. These expectations were explained through a workshop, called Leadership 2000, that was aimed at sharpening their skills and creating positive change. Since then, the leadership program has grown into required, annual training for 8,000 IDS managers.

—Ken Meuser

'On target' performance

Boeing delivers first Small Diameter Bomb to the U.S. Air Force

By Marguerite Ozburn

Following one of the most successful development programs on record, hundreds of Boeing employees and suppliers participated in a May ceremony at which Boeing delivered the first production Small Diameter Bomb System to the U.S. Air Force customer.

"You've done what a lot of people in the development business thought couldn't be done," said Judy Stokley, deputy program executive officer and executive director, Air Armament Center, Eglin Air Force Base, Fla. During development, the SDB system successfully launched 39 weapons against a variety of fixed targets, hitting each target within less than 4 feet of its aim point and resulting in a better than 95 percent success rate.

"I am very proud of the Air Force–Boeing team that brought this exceptional capability from concept to production right on schedule," added Ginger Barnes, vice president, Boeing Weapons Programs, to the audience at the Boeing Weapons facility in St. Charles, Mo.

The delivery was the first of more than 24,000 GBU-39 weapons and 2,000 BRU-61 carriages Boeing will manufacture and deliver as part of the SDB system beyond 2015. The GBU-39 weapon is built at the Boeing Lean production facility in St. Charles. The carriages are built by Boeing supplier Sargent Fletcher Inc., in El Monte, Calif. The weapon system is planned for use on the F-15E, F-22 and F-35. It also is compatible with nearly all other fixed-wing platforms. The Air Force will initially field the system this fall on the F-15E.

At just 5.9 feet long and 285 pounds, the GBU-39 weapon's small size quadruples the number of weapons that can be carried on an aircraft—and therefore the number of targets per sortie. Its size and precision accuracy also reduces collateral, or unintended, damage in the target vicinity. The all-weather weapon, equipped with deployable wings, has a maximum standoff range (or launch distance from target) of more than 60 nautical miles, improving pilots' safety by distancing them from local air defenses.

The weapon employs an Advanced Anti-Jam GPS-aided Inertial Navigation System that provides guidance to the coordinates of a stationary target.

The BRU-61 carriage is the enabler that increases an aircraft's SDB weapon load from one to four. The carriage attaches to the aircraft weapon station and has its own avionics system and four pneumatic weapon ejectors. The pneumatic system eliminates explosive cartridge ejectors used by conventional carriage racks and the attendant installation, removal and cleaning, resulting in low maintenance and low life-cycle costs.

"The superior accuracy of the SDB permits it to destroy a variety of targets with a relatively small warhead, and yet reduce the risk of collateral damage in dense urban areas," said Col. Richard Justice, commander of the 918th Armament Systems Group at Eglin Air Force Base. ■

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SDB team on the move

The Small Diameter Bomb team currently is developing another weapon for the SDB system. While the SDB I GBU-39 weapon is effective against stationary targets in all weather from stand-off launch distances, the SDB Increment II weapon will add a robust capability against moving targets in all weather.

In April, the Air Force selected Boeing and Raytheon to compete in a 42-month Risk Reduction program for the second increment of the SDB system. The winner will be the sole source producer of the SDB II weapon. The Air Force is expected to award the contract by late 2009.

For SDB II, Boeing has teamed with Lockheed Martin. As prime contractor and system integrator, Boeing will supply the air vehicle and data-link system and is responsible for the overall weapon system. Lockheed Martin will provide the multi-mode seeker, to meet the requirement of hitting moving targets in all weather.

DAVE MARTIN PHOTO

Attendees view a Small Diameter Bomb carriage during the SDB rollout ceremony in St. Charles, Mo., earlier this year.


MIKE GOETTINGS PHOTO


BOB FERGUSON PHOTO

Left: **PVD-01 Crew Chief Bob Pierce checks out the rotor system on heavily instrumented PVD-01, the first Apache Longbow off the production line and a veteran of the company's ongoing Longbow flight-test program.**

Right: **Pilots Mark Metzger (top) and Roger Hehr fly the "Queen" during tests with extended-range fuel tanks.**

Graced by royalty

Meet PVD-01, 'queen' of flight testing for the Apache program

By Hal Klopper and Lisa Dunbar

She's a high roller who knows her limits but goes beyond them. She's heavy—more than 23,000 pounds—but not too concerned. She doesn't bathe, but that's her business.

She's Apache Longbow, U.S. Army Serial Number 96-5001, better known as "PVD-01"—the queen of flight testing. To date, she's flown more than 800 hours to validate modifications and experimental designs for the Apache Longbow program.

When Boeing began using the Apache to perform air show aerobatics, guess who performed the first loops and rolls to establish the flight envelope for the demonstrations? When new survivability equipment was added to the aircraft recently, this No. 1 performer got the call to test it. And, whenever the lifespan of an Apache component needs to be validated, PVD-01 is there.

"Technologies, weapons and tactics are constantly evolving," and that results in upgrades and changes to the Apache, said Senior Flight Test Engineer Joe Flint. "We use the PVD-01 aircraft to validate the improvements and determine any detrimental effects."

Case in point: The aircraft recently was equipped with snow skis that allow it to land in soft, deep snow but may take away from its capability to carry extra ordnance. The added drag also could affect its combat radius or high-speed maneuverability.

PVD-01 has more than 600 data checkpoints wired to her fuselage to capture test data as well as monitor and record thousands of messages or parameters passed around its four electronic data buses. That's why the queen appears a little disheveled. Her heavily instrumented fuselage can't be washed.

These days, PVD-01 is helping the Boeing team in Mesa, Ariz., home of the Apache, find a new center of gravity for the eight-ton helicopter. It's her 540th experimental assignment since her 1997 delivery.

"By adding new equipment and sensors to the aircraft, we effectively change the aircraft's sense of balance or center of gravity," said Mark Metzger, Rotorcraft's chief pilot. "The designers have to put everything in the right place. Our job is to evaluate the flight performance. She needs to fly as well after the changes as before."

The Apache Longbow typically weighs around 17,650 pounds, depending on fuel load. Fully combat-ready, it can weigh around 19,200 pounds. But for validation testing, PVD-01 has been lifting off at 23,000 pounds, the heaviest it's ever flown.

"The end result of successfully flying at this weight," Metzger said, "is confirmation the aircraft is safe to fly at all design weights and stress limits." ■

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At the U.S. Air Force Special Operations Command headquarters at Hurlburt Field, Fla., Jeremy Mustain and Courtney LaRue, Boeing Special Operations Forces field service representatives, work on an AC-130U Gunship's 105mm gun position.

Always be ready

Ron Bookout photos

Meet the team that works 24/7 to deliver preparedness for a special military unit

By Katherine Sopranos

They're not told what the mission is. But their task is ensuring warfighter readiness for it.

Daunting? Not for Boeing employees who deliver around-the-clock preparedness to the special forces units of U.S. militaries—enabling these elite combat groups to perform their covert operations successfully under any threat and in any environment.

The element of surprise and high level of secrecy for special forces are critical, so these skilled warfighters depend on Boeing to provide reliable aircraft and systems to aid their missions, which may range from an unexpected ambush on an enemy target to a humanitarian airdrop into a remote location.

IDS Support Systems' Special Operations Forces employees provide special forces with maintenance, modification and upgrades for warfighter readiness and aircraft sustainment. SOF's two major programs are the Integrated Weapons System Support Program (IWSSP) and the AC-130U Gunship (see box below). Teamed with contractors, Boeing's services include depot maintenance and structural and avionics upgrades to aircraft and related systems. Customers include the U.S. Air Force Special Operations Command, Special Forces soldiers, U.S. Army Rangers and the Naval Special Warfare Command's SEALS.

"Our team never wavers from its commitment to warfighter readiness for our special forces customers," said Tony Robertson, Support Systems' Maintenance, Modifications & Upgrades vice president and general manager. "Our customers' support and sustainment requirements are extremely specialized, and their needs must be met rapidly."

Boeing stays close to the customer to prepare, anticipate and meet its needs and continually improve capabilities. SOF locations include Fort Walton Beach, Fla., near the U.S. Air Force Special Operations Command headquarters at Hurlburt Field. In May, Boeing opened a new facility at Warner Robins Air Force Base, Ga. In addition, Boeing field service representatives are embedded with customers on base and travel with aircraft crews when they deploy, including into combat theaters.

"Our strategy is to meet their constantly emerging needs and to provide rapid, capable solutions. We're not just in the business of hardware—we're providing solutions," said Ken Hill, Special Operations Forces program manager. "We have the expertise across all disciplines and functions to prepare warfighters and bring them elements they can't get elsewhere."

The IWSSP provides the U.S. Air Force

Supporting SOF

Boeing Support Systems–Special Operations Forces consists of two major programs—AC-130U Gunship and the Integrated Weapons System Support Program. The IWSSP program has four main areas:

- **Sustainment:** Oversees repair center, technical manuals, Interactive Electronic Technical Manuals, and field service representative support and deployment
- **30mm Gun System:** Modifies the AC-130U with new guns
- **Gunship Multispectral Sensor:** Upgrades capabilities of existing All Light Level Television
- **MC-130H Combat Talon II Aerial Refueling Systems:** Converts 20 MC-130Hs to tanker configuration for the U.S. Air Force

'More of a passion'

Boeing modifies and supports the AC-130U Gunship aircraft for the U.S. Air Force Special Operations Command. Michael Dottaviano, AC-130U Gunship program manager, describes Boeing's responsibilities for this one-of-a-kind aircraft and relationship with its Air Force customer.

Q: What are the responsibilities of the AC-130U program for the Special Operations Forces?

A: Under the Plus Four program, we provide the warfighter with four additional aircraft. Two have been delivered to the customer, with two expected to be delivered in the third quarter of 2006, for a total inventory of 17. We modify four C-130H-2 cargo aircraft into an AC-130U Gunship configuration and ensure these assets are quality products that perform as intended for their mission.

Q: What are the customers' expectations of Boeing?

A: We're not supposed to know what the missions are. They expect us to get them there, to help them be successful in operation and to help them come home. Because of the unique aspect of what they do and the role we have in supporting them, there is no other way to be effective than to remain close in location.

Q: Why is working with special forces rewarding?

A: Knowing that this customer counts on us is the most satisfying part of our job. The respect and admiration for the missions they perform makes what we do seem not like work—more of a passion.

—Katherine Sopranos

Tim Hann, Boeing Special Operations Forces field service lead, stands in the forward escape hatch of the AC-130U Gunship at the U.S. Air Force Special Operations Command headquarters at Hurlburt Field, Fla.

From left, Paul Parinas, Mike Banning and Steve Fick of Boeing Special Operations Forces in Fort Walton Beach, Fla., test the 30mm weapon system, which is loaded on the AC-130U Gunship.

Special Operations Command with rapid solutions to aircraft sustainment and modification tasks. Currently contracted through 2008, Boeing modifies and supports the AC-130U Gunship aircraft. AC-130U features include increased weapon and standoff range, enhanced survivability and a state-of-the-art suite of electronic and infrared countermeasure systems.

"Our repair lab provides repairs for approximately 150 different items that cannot be found anywhere else in the Air Force inventory," said Bob Boggs, IWSSP program manager. To swiftly respond to special forces fleet sustainment needs, Boeing provides quick turnaround—picking up items at Hurlburt Field, conducting repairs and then delivering them back to the base, often on the same day.

"Just one aircraft down for parts could mean the difference between mission success or failure," Boggs said. "The customer expects us to meet any unique tasking and solve their problems. It requires agility on our part, and we are always looking at ways to further streamline our processes to always be ready to serve the customer on a moment's notice."

One area of IWSSP is Interactive Electronic Technical Manuals (IETM). With aircraft fleet modifications and upgrades, it's critical that customers have updated technical manuals. Plus, generations of manuals are still on paper. IETM converts existing paper maintenance manuals into interactive and digital formats.

"The C-130 maintenance manual library, for example, requires constant updates," said Mike Petersen, Boeing Integrated Product Team leader for IETM. "We provide innovative solutions that allow us to deliver the customer with up-to-date, technically accurate and low-cost digital data."

IETM's capabilities include rapid online distribution and automated updates—providing customers with more streamlined processes, better information flow and access to an entire technical library at their fingertips, anytime and anywhere.

Whether it's the Gunship program or IETM, there's one common thread across all of Special Operations Forces businesses: the pride Boeing people have working for the elite special forces. "Knowing that our efforts contribute to the defense of the United States, that is a powerful motivation," Boggs said. ■

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KEN GRAEB PHOTO

A 30-DAY SPRINT

Cross-Boeing team works fast to provide the U.S. Army with new communications abilities

By Diana Loftis

Boeing works to provide warfighters with the capabilities they need as rapidly as possible. And delivering for U.S. soldiers under tight deadlines is just what the Network Centric Soldier System team has done.

Last year, the team and the U.S. Army's 101st Airborne Division, 10th Mountain Division and 3rd Brigade-2nd Infantry Division (Stryker Brigade Combat Team) conducted a series of integrated battle command concept demonstrations. The tests proved the worth of NCSS, a communications-on-the-move system that improves situational awareness and connectivity for warfighters across the battlespace.

As a result, the company was tasked in early 2006 to retrofit two armored-combat Stryker vehicles with the NCSS. The Boeing team, drawn from Connexion by Boeing and Integrated Defense Systems, had to deliver Connexion by Boeing on-the-move broadband satellite communications and integrated command and control capabilities to a deploying U.S. Army combat brigade. And they had less than 30 days to do it.

Three weeks after getting the go-ahead, the Boeing team arrived at the Army's Electronic Proving Grounds at Fort Huachuca, Ariz., for prefielding tests and evaluations. After receiving a safety release from the Army's Test and Evaluation Command, the team, with gear in tow, headed to Fort Irwin, Calif., to begin installing the communications system aboard two Stryker vehicles.

With just 72 hours from install to rollout, the team delivered a safe and effective system that provides situational awareness, battle command and connectivity between distributed warfighters and their tactical operations cells.

The system allowed these enhanced units to conduct distributed operations with unprecedented speed and lethality. The system works with existing military and commercial communications systems, providing integrated command and control capabilities to the tactical edge. In one instance, while out of reach using its tactical (short-range radio) communications system, a vehicle crew was able to call in a medical evacuation for an injured soldier by placing a Voice over Internet Protocol call from a moving Stryker vehicle to a cell phone operating on the public telephone network.

At the conclusion of the National Training Center rotation, an evaluation team consisting of personnel from the U.S. Army Soldier Battle Lab, the Army Capabilities Integration Center, and the U.S. Army Infantry Center reported that the Boeing-provided capabilities "provide a viable near-term battle command solution."

The first of two Stryker vehicles equipped with Boeing's Network Centric Soldier System demonstrates communications on the move shortly before rolling out for operations at the National Training Center at Fort Irwin, Calif.

Following this initial success, the NCSS team recently won a competitive procurement for Phase II development and deliveries to Army units supporting Operation Enduring Freedom and Operation Iraqi Freedom.

"We get the opportunity to help those who are willingly putting themselves in harm's way for us back here in the States, and we get to open exciting new markets and product frontiers for Boeing," said Will Grannis, program manager for the Network Centric Soldier System. "In addition, the cross-functional team is truly a best-of-Boeing group. When you have to take a program from concept to boots on the ground in less than 30 days, a lot of personal sacrifices have to be made by everyone."

"In the end analysis, promises made by the Boeing team were promises kept," said Waldo Carmona, general manager of Advanced C3 and Combat Systems. ■

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Rick Hampton, a Boeing Support Systems composite shop technician in San Antonio, documents discrepancies using I-GOLD and a tablet computer.

GOLD-en days

Lean tool redefines maintenance processes

By Ed Memi

I-GOLD (Integrated Government On-Line Data), a business database planning tool, is one of the major Lean tools improving the aircraft maintenance overhaul business performed by IDS Support Systems.

The software tool enables teammates to track planned repair jobs as well as unexpected repair activity, called nonconformance activity, and provides a database that establishes a comprehensive audit trail.

On a typical KC-135 aircraft undergoing Program Depot Maintenance, Boeing may perform 3,300 different tasks and may do as many as 1,100 nonconformance repairs. A nonconformance repair is needed when more work than usual or expected is required to restore the aircraft.

"In the old way of doing things, a mechanic would have to write up a parts order request associated with a task," said Gary Bergeron, I-GOLD program manager. In I-GOLD, however, there is a scheduling application "that looks at the job and automatically orders the parts, based on trend analysis and task requirements, and determines when they need to be on the floor for the mechanics," Bergeron said. "I-GOLD handles all timekeeping, scheduling activities, planning, inventory control, financial tracking, and job tasks and ensures applications are integrated and talking to one another."

Bergeron said I-GOLD captures these activities to a database, and the time savings are huge in terms of eliminating paperwork.

"With I-GOLD, we are able to capture a nonconformance issue, show it to the customer and get their approval to perform the work as an over-and-above condition and accordingly get paid additional funds," he said.

"In the old paper world, we would have stacks of paper that had to be carted over to the records department, and they would sit down with the customer, who would have to concur with everything," said Eric Cavenaux, I-GOLD subject-matter expert for the nonconformance module. "With I-GOLD, as each job is closed down by the mechanic or inspector, everything is archived, and the customer buys off on it immediately, so hours of records review are eliminated."

I-GOLD has been in development for about six years, but it has only recently come together into an integrated product that can be used by everyone, including mechanics. ■

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A 737 engine is moved into position for installation on a wing in the Renton, Wash., Final Assembly area. About 50 Propulsion Systems Division employees will relocate to Renton in December, performing engine buildup on a moving line alongside the 737 moving line.

ED TURNER PHOTO

Location, location, location

Propulsion Systems Division takes Lean to the next level with value stream management

By Debby Arkell

Talk about adding value. Engines and propulsion systems buildup work performed by the 500 people of Boeing's Propulsion Systems Division in Seattle represents 35 percent of the value of any Boeing jetliner delivered. And they're about to add even more value as a group of PSD employees prepares to relocate to the 737 Final Assembly factory in Renton, Wash., furthering their Lean journey.

PSD plans to relocate some team members to Renton and some to Boeing's factory in Everett, Wash. In so doing, leaders expect to achieve benefits above the gains the division already has made through Lean manufacturing improvements.

Over the next six months, PSD will take its first steps to becoming a fully integrated value stream, supporting the next phase of Boeing Production System implementation (see box at right). This means the people of PSD—who as a value stream assume ownership of everything engine-related—will be fully integrated with their most immediate customer: Final Assembly.

This December approximately 50 employees will be the first from PSD to move "shipside" in Renton. There they will build up engines alongside the 737s, on which the engines will be hung. In essence, they'll become a feeder line to 737 airplane production.

"Airplane Production has established point-of-use staging, feeder lines and moving lines separately in PSD, Renton and Everett as part of the Boeing Production System," said Sandy Postel, Propulsion Systems Division vice president. "Now it's time to take Lean to the next level and hook up these lean lines, resulting in an even more efficient system."

PSD has long been a leader in Lean. From 1997 to today, PSD employees have reduced

facility square footage by 63 percent. Inventory turn rates have jumped 79 percent, from 13 to 41 per year. And workers have achieved a 20 to 85 percent reduction in manufacturing flow time across all models by implementing moving lines. On the 737 program, this has reduced the time required to build up an engine from 30 hours to just 4.5.

Moving into the airplane factory, PSD employees will bring their culture of improvement, furthering Airplane Production's vision for the future and supporting transformation across the production system.

"Being within line of sight of the airplane and communicating directly with other Renton colleagues will be a great advantage," said Postel.

Leaders have identified a number of benefits from the move shipside. They expect more benefits to become apparent as the value stream is fully integrated.

According to Karyl Bartlett, former Boeing Production System leader for PSD, having production support closer to assembly and integrating the value stream creates many opportunities, all stemming from the ability to link processes up with the airplane program customer.

"From an operations standpoint, bringing the value stream together will be beneficial to product flows," Bartlett said. "PSD already is extremely lean and efficient. By working together we can get the whole value stream even more efficient."

THE CHANGE CHALLENGE

Propulsion Systems employees are proud of their history. PSD traces its origins back to the late 1970s when it was known as Power Pack and Strut. It officially became a division in mid-1991, responsible for all engine, strut, strut structure, nacelle and inlet work, and accomplishing the work under one roof. Later it incorporated the supply chain as well—in essence becoming responsible for "everything under the wing."

That PSD is among the first to blaze new trails in value-stream management has presented challenges. And there will be additional challenges as PSD seeks to maintain collocation synergies with the rest of its organization, Bartlett noted. Supporting emergent work such as quick engine changes (QECs) and Commercial Aviation Services support—something PSD always has done well—is one such potential challenge.

"Our people have always been extremely responsive," said Bartlett. "With collocation, if QECs are needed, you can easily put them on different lines and get the job done."

JEFF SPEIGNER GRAPHIC

Reduced transportation requirements, improved process flow, and line-of-sight process alignment are among many benefits Commercial Airplanes expects when engine and strut buildup collocates with final assembly in Renton and Everett, Wash.

Another challenge is maintaining the PSD culture. It is special in how the people work together to support the airlines, Final Assembly, Commercial Aviation Services and other customers—and each other.

With so much at stake, Human Resources naturally is focused on change management. "Whether you're managing a move of 50 people or 5,000, you treat it the same," said PSD Human Resources leader Harold Adams. "Ultimately, it's not the building that makes PSD people special—it's the people themselves."

FULL SPEED AHEAD

As Airplane Production forges ahead with plans to integrate feeder lines into Renton and Everett Final Assembly, PSD leaders are defining their management model, determining what it looks like to manage a value stream, and establishing the support structure—such as Human Resources and Finance—for their newly dispersed team.

However, one thing is certain as the first group of PSD employees moves to Renton: They're leaders, taking Lean to the next level. Ultimately, the goal is to integrate the best of PSD with the best of Renton and Everett.

"In the end, it's an airplane we deliver—an integrated product—not just engines," said Postel. "Within the Propulsion skills—whether it's operations, engineering, supply chain management or on the support side—we will always be respected. There's tremendous potential by moving shipside. It's absolutely the right thing to do. And there will always be a future for us." ■

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What it means

Value stream: The entire set of activities, from raw material to delivery, for a specific product, with processes optimized from the customer viewpoint. Value streams link internal processes and those between Boeing and its customers.

Feeder line: Assembly work performed off the main production line, such as the creation of subassemblies or parts staging, just prior to installation on an airplane.

Boeing Production System: A holistic look at the extended commercial airplane enterprise, aligning improvement efforts to meet customer needs, reduce costs, improve quality and shorten lead times. These improvements reduce waste and infrastructure and streamline the flow of material, parts and products through the system, ultimately creating simpler processes for products that are assembled more easily. The BPS is based on principles developed by Toyota and utilizes Lean tools, which can be applied in both the factory and the office.

ED TURNER PHOTO

737 Empennage Mechanic Samuel Mezgebu installs an antenna on a vertical fin. The new 737 vertical fin production line "pulses" forward every six hours.

A LEAN tail tale

737 empennage team prepares for moving line

By Sandy Angers

The phrase "moving your tail" took on new meaning as employees who assemble the empennage of 737 airplanes in Renton, Wash., recently completed the first phase of a Lean transformation.

The goal of the transformation is to build the vertical fins and horizontal stabilizers for the 737's empennage, or tail section, on continuously moving assembly lines, a hallmark of a Lean production system.

The first step, said former Empennage General Supervisor Mark Blakeley, was to eliminate fixed tools that held the parts during assembly. "This initial step was to incorporate a fundamental Lean philosophy: Make the product flow, not the people," he said.

Vertical fins and horizontal stabilizers used to sit on stationary tools in no particular order as employees moved from position to position, bringing along their tools and equipment.

By implementing Lean manufacturing techniques such as staging parts and equipment at the point of use and by redesigning how the products flow through the area, employees have reduced assembly time and the number of tools required.

Today four tools hold the vertical fins; that's down from six. Meanwhile, the number of tools needed to accommodate the horizontal stabilizers has been cut from eight to six. Stabilizers are built up in three days instead of five, and later this year vertical fins will be built in four days rather than five.

All tools are on wheels and both lines are now sequenced in straight lines, which move in a pulse fashion every six hours. Everything mechanics need—tools, equipment and support personnel—is located nearby. The goal, Blakeley said, is to treat the mechanic like a surgeon in an operating room.

The dimly lit 737 empennage area also

What's new

Teammates who assemble the empennage of 737 airplanes in Renton, Wash., recently finished the first phase of a Lean transformation. Here's a look at some of the changes that have supported improvements and increased efficiency:

- **Make the product flow.** Instead of having workers move around fixed tools that hold horizontal stabilizers and vertical fins, these tools now are on wheels and move in a line to mechanics. That reduces the number of tools needed. This arrangement also helps mechanics by permitting whatever they need—tools, equipment and support personnel—to be stationed nearby.
- **Improve the work area's appearance and layout.** The work area floor is now white, which reflects light and improves visibility. A new overhead utility rack with swing arms feeds power and hydraulic cords into each position—and eliminates cords on the floor, which were trip hazards.
- **Work with suppliers to improve packaging.** Empennage teammates are working with certain suppliers to modify shipping containers. The goal: to unload parts directly into the production area.

received a makeover. The area is brighter, clean and more organized. The floor under the empennage tools has been painted with a white epoxy designed to reflect light and improve visibility. A new overhead utility rack with swing arms feeds power and hydraulic cords to each position. The utility rack eliminates cords on the floor, which were trip hazards.

"The changes have made everybody's job easier," said Doug Newkirk, who seals stabilizers and fins. "Everything we need is right here, and the area is bright and easier to keep clean."

Team leader Tim Davis likes the new, organized layout. "The parts have a more direct route into and out of the area, and it's easier to find what you're looking for," he said. "I think it's a better area to work in."

The redesigned look and layout of the empennage area also is helping employees who support production.

"I can recall times when Tooling folks picked up the wrong fin, or quality inspectors had a hard time figuring out which part was ready for inspection because the parts weren't in a sequence. Obviously those kinds of issues go away, because it's easy to see which part is complete and ready for inspection or pickup," Blakeley said.

The Tooling employees and others who support production not only benefit from the change, but they play a part in it as well. Dave Hagen, 737 Empennage manager, said the Tooling organization is now staging tools and parts right next to the production line.

"That's been a big benefit. Often we would call for parts and then wait and wait while they were being retrieved from across the manufacturing site," Hagen said.

Suppliers, too, are playing an integral part in the empennage transformation. For instance, suppliers ship rudders in huge wooden containers. Tooling employees then remove the rudders from these containers and put them on dollies to transport them into the production area.

Empennage employees are working with the rudder suppliers to modify the shipping containers so the parts can be unloaded directly in the production area, eliminating transportation dollies, multiple handlings and the potential for damage during transportation.

The Lean transformation has also meant moving some processes out of the building. One example is the assembly of the dorsal fin fairing, which attaches to the vertical fin.

Employees used to assemble the dorsal fin next to the empennage in Renton's 4-20 building, and then send it to the nearby 4-86 building to be painted. From there, employees would deliver the dorsal fin to the 4-81 final assembly building for installation onto the airplane. The whole process used to take six days: three for assembly, one to move the dorsal fin from the 4-20 building to the 4-86, and two for paint.

Today, the dorsal fin is built up and painted in the 4-86 building and then transported to the final assembly building for installation, eliminating a day from the process.

All these changes are designed to eventually support continuously moving production lines, and customer demand will determine the rate of movement, also known as takt time. The target for implementing the moving lines is early 2007.

"When we achieve the goal, it will mean the manufacturing process will have dramatically changed from stationary positions to moving lines within a span of eight months. It's amazing, when you think about it," said Blakeley, who now is charged with spreading the Lean transformation to the wing assembly area. "Everybody is focused on flow time reduction, which drives you to process improvement, reducing costs and improving quality and safety."

Hagen also points out that the Lean efficiencies have allowed the Empennage area to increase production rates without having to add more people. More important, they have made the organization more competitive today and for the future.

"At one time there was consideration for moving some processes to external suppliers, but plans changed because of our increased efficiency," Hagen said. "Although I know there are no guarantees, the work remains, and that has been a big hit with employees." ■

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ED TURNER PHOTO

Now that the new 737 vertical fin production line "pulses" forward every six hours, employees are preparing to implement a continuous moving line.

Sharing the dream

How the right tools and an inclusive culture support the 787's global partner network

By Bill Seil

The 787 program's Global Collaborative Environment advances a Boeing tradition that has distinguished the company since World War II.

Boeing Commercial Airplanes is creating the 787 Dreamliner with the support of a network of global partners. Designing the new airplane requires real-time coordination between engineers in the United States and in other nations. Thanks to sophisticated technology, the program's approach to the development of the airplane has been as revolutionary as the jetliner itself.

Kevin Fowler, vice president, Systems Integration Processes and Tools, said the 787 program began with the expectation that any group that was designated to build part of the airplane would also be responsible for designing it. That was a change from previous programs, where Boeing did most of the design work and other companies built most of the airplane.

"This separation of the design and build functions created problems, because you ended up in a situation where it was difficult to incorporate changes to the design," Fowler said. "So it became clear we needed to share some of the design responsibility in order to more effectively partner with some of the great aerospace construction companies around the world."

COLLABORATIVE DESIGN

But the idea of globally dispersed design would only work with the right tools. The program needed precise coordination, with partners having access to centrally stored data. Also required: systems for "collaborative design," so teams can share design changes in real time.

As new approaches were developed, the team benefited from lessons learned on the 777 program. Leaders of the 777 team had broken away from the tradition of completing the structural design first, then moving on to the systems design. They had found a way to do both at the same time, thus saving time and reducing the need to adapt the structural design to new systems. This was a big advance, but the tools were still not available to spread design work among global partners.

A look at the first skin panel of the center wing box for the first 787. Fuji Heavy Industries is responsible for this component of the new airplane. Their involvement in the 787 program was made possible by new collaborative tools.

MARK WAGNER/AVIATION-IMAGES.COM PHOTO

It wasn't until 2001 that the picture started to change. The World Wide Web and various e-enabled tools permitted collaboration. In addition, Dassault Systemes developed its Product Lifecycle Management tools to support global collaboration. This "V5" suite of tools included CATIA for collaborative product development, DELMIA for engineering lean manufacturing processes and ENOVIA for decision support and lifecycle management.

Fowler said there are two major advantages to holding the data locally but letting people work it remotely. When designers are close to the build activity, it's easier for them to see what's working and what's not. In addition, "we know people aren't as effective when they have to work away from home for extended periods of time," he said.

GLOBAL PARTNERS

Steve Schaffer, vice president, Global Partners for Boeing Commercial Airplanes, said the traditional phrase for his job is "supplier management." But with the 787, "global partners" suggests a supply base that is more an extension of Boeing factories than an outside entity. Schaffer emphasized, however, the word "global" includes the United States and the Boeing business units.

Boeing had high standards for selecting companies to manufacture major sections of the Dreamliner, Schaffer said. Fewer companies would be needed because each was taking responsibility for providing a higher level of systems and structures—and bringing in their own suppliers. The companies also would be sharing in the risks and benefits of launching a new airplane, with each paying its own upfront costs related to engineering, facilities, equipment and tooling. Contracts with each of the partners have common provisions, based on the philosophy that what's good for one is good for all.

Schaffer noted the partners also have considerable experience in the principles of Lean. The idea is to extend Lean strategies from the 787's global base of partners to the factory floor during final assembly. This supports two of the company's four initiatives to boost long-term growth and productivity: Lean + and Global Sourcing.

Although 787 development is very much a team effort, there's still a need for a single decision maker on important points. Those questions are decided by Boeing management.

"We share information with our partners, we listen to them and we influence each other," Schaffer said. "But at the end of the day, there's no doubt that Boeing is leading."

MARIAN LOCKHART PHOTO

Steve Schaffer, vice president, Global Partners for Boeing Commercial Airplanes, said the partners on the 787 program have considerable experience in the principles of Lean manufacturing.

COLLABORATION TOOLS

Kevin Fowler said long-distance communication has been facilitated by the creation of more than a dozen "collaboration centers" at Boeing facilities in the Puget Sound region of Washington state, with the latest in video and teleconferencing equipment. Partners have created comparable centers. Multiple rooms can be linked per session, with encrypted transmissions to ensure security.

The 787 program also uses global collaboration tools available through Exostar, an online trading exchange for the aerospace and defense industry in which Boeing is an investor. Other collaboration tools include the Dassault Systemes V5 suite, Radiance Technologies' tools for the transmission of high volumes of data and the Boeing supplier portal.

Also critical: personal communications devices, particularly for a global partnership covering multiple time zones. "The wide availability of cell phones has been a very significant advancement in our ability to communicate," Fowler said.

These tools create a highly collaborative environment. While the term "network-centric" isn't common in the 787 program, many of the same principles are at play. As Schaffer noted, there is a strong emphasis on "situational awareness" among the 787 partners. There also is a culture where the ability of partners and team members to self-organize helps to advance the program.

The collaborative environment also strengthens the ability of the 787 program to draw on the talent of other Commercial Airplanes teams and personnel from across Boeing business units. The Dreamliner program has been a leader in advancing the use of common processes and tools, allowing it to send work packages to Integrated Defense Systems engineers in St. Louis, Southern California and Philadelphia. ■

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Movement improvement

Commercial Airplanes takes 'design for the environment' approach

By Debby Arkell

Which is more fuel efficient, jet travel or auto travel? The answer might surprise you.

Motorized travel in all its forms has an effect on the environment. Jet travel is no exception. Boeing continues to design and improve its products to mitigate impact and since the late 1990s has taken a strategic approach to its environmental efforts. These improvements can be called "green" not only because they're better for the environment, but also because they help the company's financial bottom line.

While technological improvements greatly contribute to better environmental performance for air travel, it doesn't stop there. Partnerships with businesses, agencies and industries worldwide also are fundamental to Boeing's environmental efforts.

"We are all responsible for taking the initiative and taking the lead on environmental issues," said Nicole Piasecki, Boeing Commercial Airplanes vice president of Marketing and Business Strategy, at an environmental conference earlier this year in Geneva. "As individual stakeholders, we each have unique leadership roles to play."

Four strategies stand out as major factors in making the next generation of air travel even greener:

BOB FERGUSON PHOTO

BOB FERGUSON PHOTO

MARIAN LOCKHART PHOTO

FUEL EFFICIENCY

With oil prices hovering at record highs, carriers are paying close attention to fuel efficiency, which is a major driver in airplane purchase decisions.

Commercial airliner fuel efficiency has improved more than 70 percent over the last 40 years, which cuts carbon dioxide emissions. Still, Boeing is taking every opportunity to improve fuel use further.

Long-term, Boeing is advocating research into more efficient and more available fuels such as hydrogen, ethanol and other biofuels. Greater fuel efficiency can be achieved in the near term through better airplane designs, helping airlines operate efficiently and helping develop more-efficient air-traffic-management systems.

"Boeing's newly designed products—namely the 787 and 747-8—have fuel efficiency built in," said Bill Glover, Commercial Airplanes Environmental Performance Strategy director. According to Glover, studies show the 747-8 and 787 airplane families will have fuel efficiency comparable to other forms of mass transit—and will be significantly more fuel-efficient than traditional automobiles, at levels comparable to hybrid vehicles (see chart below).

How carriers operate their aircraft also affects fuel consumption. Commercial Airplanes' product strategy clearly supports lower fuel consumption, as point-to-point travel can save 25 percent or more in fuel over hub-and-spoke flight patterns. Takeoffs and landings use the most fuel, and the hub-and-spoke connecting flights entail more takeoffs and landings.

The most immediate means of reducing aviation emissions of all types comes from improving efficiency of air-traffic-management systems. For instance, according to the Intergovernmental Panel on Climate Change, if airlines were allowed to fly the most direct routes and spend less time in holding patterns, fuel burn and emissions could be reduced 6 to 12 percent.

"We're actively working with air traffic management groups, airports, the [U.S.] Federal Aviation Administration, Eurocontrol and airlines to help develop and implement guidelines that enhance procedures for arrival and departures," said Glover.

BOB FERGUSON PHOTO

Chevrons, the jagged edges on the rear of engine nacelles, ultimately reduce jet rumble noise for the community during takeoff. Their development represents one of many efforts Boeing is involved in to reduce noise.

QUIET, PLEASE

Ask anyone who lives or works near an airport: Noise can affect the quality of life of those nearby. That's why Boeing has worked with customers and suppliers on a program called the Quiet Technology Demonstrator to reduce airplane noise—both inside the cabin and in the community.

"Most noise stems from a form of turbulence," said Belur Shivashankara, QTD program manager. "Any time air doesn't flow smoothly around an airplane, it reduces the airplane's efficiency. Noise reduction efforts really are a motivator to build a better airplane."

Working closely with technology partners, the QTD program has yielded efficient, quiet design solutions for the 787 and 747-8. One solution is to build the sound-absorbing acoustic engine inlet nacelle barrel in one piece without joints. In current airplanes, the inlet acoustic barrel is built in two pieces and joined together. The new liner dramatically lowers forward cabin noise and community noise—and it weighs less, to boot.

Boeing, General Electric and NASA also have partnered on a new design for the rear of engine nacelles, called chevrons. These jagged edges affect the way air mixes when

Easy does it

How fuel-efficient is air travel? The Boeing 787 and 747-8 airplanes will be comparable to other forms of mass transportation—and significantly better than most automobiles.

Vehicle	Liters of gas used per 100 passenger kilometers *
Sport utility vehicle	10.7
Car	6.4
Train	2.0–3.8
747-8	2.5–3.7
787	2.3–3.6

* A passenger kilometer represents moving one person a distance of one kilometer.

DEBBIE HANFORD PHOTO

All Nippon Airways last year let Boeing use one of its 777-300ER (Extended Range) airplanes to gather data on airplane noise and test technologies that would help reduce it—such as chevrons seen here at the back of the nacelle and the engine exhaust nozzle.

coming from an engine's exhaust, reducing turbulence and therefore noise. Chevrons ultimately reduce jet rumble noise during takeoff, as well as reduce the low-frequency rumble heard in the aft cabin.

"The QTD programs have helped Boeing and its partners develop new low-noise solutions for both the cabin and the community," said Shivashankara.

USING RESOURCES WISELY

Boeing researchers are also focused on using less-toxic materials in manufacturing and maintenance, and improving production processes at the same time.

Commercial Airplanes' production system transformation has resulted in positive environmental effects by eliminating waste and reducing the use of energy and chemicals—at Boeing, within the supply chain, and in its customers' maintenance activities. Boeing research and development groups continuously evaluate alternative materials both in the lab and in the field for durability and usability.

"We're looking into a replacement for materials such as chrome, copper-beryllium and cadmium," said Robin Bennett, Environmental Performance Strategy team member. "These are some materials Boeing and suppliers prefer not to use."

Much progress already has been made. For example, a non-chrome-based solution is now available for anodizing aluminum parts, and smog-forming chemicals have been greatly reduced in primers and topcoats. A number of other alternatives are undergoing implementation, replacing "tried-and-true" materials with new ones in careful steps to ensure flight safety while gaining environmental benefits.

Bennett said the 787 program is leading the way in developing suitable alternatives, noting the results likely will propagate to other in-production Boeing models. "What we incorporate in the design phase of a new airplane program benefits the life cycle of all of our products. Suppliers often will ask us to use the improvements on other airplane programs," she said.

Boeing takes its use of hazardous materials and environmental compliance seriously, and the Everett, Wash., site is stepping up to implementing an international standard called ISO 14001. It provides a framework for managing and demonstrating an effective environmental program.

In addition, Boeing's continuing Lean efforts benefit the environment. Through case-study work done with the Environmental Protection Agency, Boeing has demonstrated a synergy between Lean and the environment. Consider the following:

- Lean manufacturing results in a decreased facility footprint as inventory is delivered just in time. This releases resources for use by others.
- Smaller footprints decrease energy requirements and water usage, and cut the impact from storm water runoff from building roofs and parking lots.
- Lean efforts such as kitting result in decreased chemical usage. Kits contain just what's needed, and there's no waste from overstock spoilage.

"The Boeing Renton (Wash.) site had a significant reduction in chemical use right away as Lean was implemented," said Glover. "Boeing has reduced chemical use by more than 20 percent there."

THE LIFE (RE)CYCLE

To everything there is a season—even airplanes. Commercial airplanes typically average a life cycle of 30 years or more. But with tens of thousands of jets flying today, and an industry backlog in the thousands, there's a tremendous opportunity to effectively dispose of airplanes that have reached the end of their life cycle.

"By being able to efficiently separate the various grades of aluminum and other materials from an airplane at the end of its life

BOEING PHOTO

This aerial shot of Boeing's Renton, Wash., site shows how Lean manufacturing helps the environment. The blue area represents Renton's current footprint. The buildings in the red area have been demolished. The parking lot in the green space will be chopped up soon, and this land will be sold. Lean leads to a smaller facility footprint—which releases resources for use by others. It also cuts energy requirements, water usage and storm water runoff.

cycle, you can increase the residual value of that aircraft," said Bill Carberry, BCA Airplane and Composite Recycling project manager. Case in point: According to Carberry, properly salvaged scrap composites can fetch between $20 and $25 per pound.

Carberry said it's challenging to effectively separate the variety of aluminum alloys used in airplane manufacturing, especially where riveted together. With cars and house siding, up to 90 percent can be separated by alloy type (thus increasing value). But with airplanes, only about 30 to 40 percent of metals can be separated.

Boeing has a titanium reclamation process through which it is working to get salvage to a high enough grade. Titanium's the highest-value metal, and Boeing would like to take titanium scrap and introduce it back into the supply. The technology already exists to reclaim material that can be used in high-grade commercial applications. Boeing hopes soon to achieve a level of quality that can be used in aerospace applications.

Airplanes built with composites and aluminum will in time be even more recyclable than those built from aluminum alloys, Carberry said. "Segregation will be better, and there will be a greater return from that separation."

A recently formed group called the Aircraft Fleet Recycling Association will help improve airplane recycling efforts worldwide. AFRA is a new international association formed by 11 businesses in the United Kingdom, France and the United States with specific interests in recycling and older fleet management. Boeing is a member, providing strategic support. By year-end AFRA, whose members currently process more than 150 planes a year, expects to expand to nearly 30 firms focused on collaboration and sharing best practices.

SAVING GREEN

Many people believe that if you adopt processes to reduce environmental impact, you're going to add cost. However, Boeing is finding that environmental responsibility is saving another form of "green." Boeing is committed to using fewer and safer chemicals in manufacturing because it's good for the environment, but using less also costs less. Noise reduction is inherently good, but it also results in a better, more fuel-efficient product. Metal and composite reclamation generates revenue and returns reusable materials to the supply chain.

"The reality is that environmentally responsible activity is an economic issue helping to sustain the business," said Shivashankara.

"There's a difference between saying you're a leader and being a leader. We demonstrate leadership by how we behave," Glover said. "Designing green is a good value proposition in and of itself." ■

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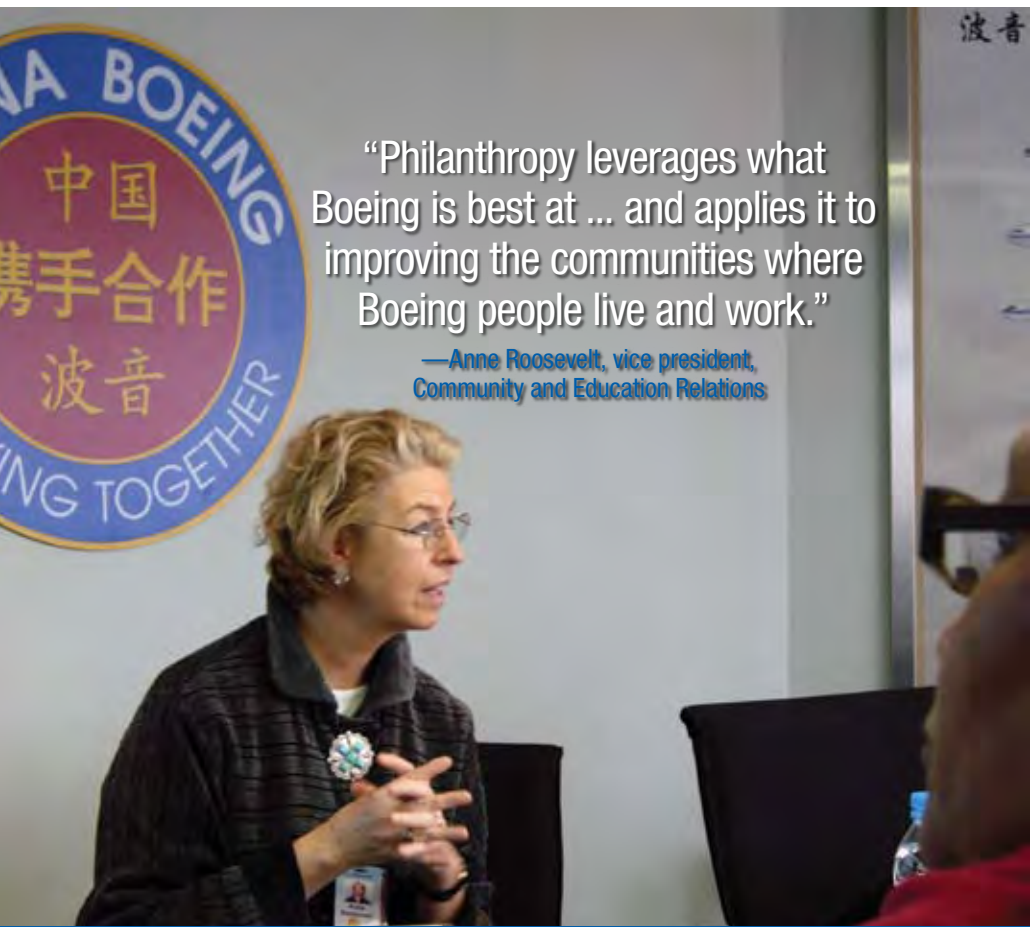
BILL CARBERRY PHOTO

Boeing is working in partnership with a recently formed association called the Aircraft Fleet Recycling Association to help improve airplane recycling efforts worldwide.

From charity to philanthropy

Why focus is shifting for Community and Education Relations' efforts in U.S., abroad



SUSAN BIRKHOLTZ PHOTO

New vision, mission

The global Community and Education Relations team discussed the function's new vision and mission at its recent Paris and Beijing meetings. Here's a look.

Vision: To be "A global corporate leader, working in concert with others, shaping a world where individuals can thrive and every community is a vibrant place to live."

Mission: "Strategically invest our portfolio of resources to inspire, motivate, educate and assist community partners in creating positive change that has lasting community impact."

By Susan Birkholtz

Charity and philanthropy may seem synonymous. But as explained during two recent face-to-face gatherings of international Community and Education Relations representatives, there's a difference.

At the meetings, C&ER leaders said the function's ongoing shift in focus from charitable to philanthropic activities—both in the United States and internationally—involves working with community partners to address underlying causes of long-term problems.

"Charity focuses on short-term relief to the immediate needs of a community, which is important, but usually does not address what causes them," said Anne Roosevelt, vice president, Community and Education Relations. "Philanthropy leverages what Boeing is best at—innovative problem-solving and large-scale systems integration—and applies it to improving the communities where Boeing people live and work." Roosevelt added that charity also is usually limited to cash grants and is less aligned to business—and is often viewed as nonessential.

"Philanthropy involves collaborating and partnering with community leaders and often other donors," said Linda Martin, director of International Corporate Citizenship for Boeing. Martin convened the meetings—one in Paris, for representatives from Europe, the Middle East and Africa, and another in Beijing for those from Asia Pacific nations. These marked the first-ever meetings of C&ER contacts from around the world.

"Further, philanthropy usually leverages resources in addition to cash, such as volunteerism and contributions of intellectual capital. And, probably most importantly, philanthropy is more likely viewed by the business as an integral part of its business strategy," Martin said.

"Besides being better suited to our core competencies, a philanthropic approach to community involvement is foundational to what it means to be a good corporate citizen," Roosevelt said. "The manner in which we interact with our communities is one of the key elements of the external face of our company and impacts how we are viewed by the outside world."

Martin said approaching community involvement in this way will be even more effective in helping the business build long-term relationships in the countries and regions where

Anne Roosevelt (left), vice president, Community and Education Relations, addresses attendees at a meeting of international C&ER focals in Beijing. C&ER recently convened its first-ever meetings of its representatives from around the world.

the company has a presence. "While international grant-making has become more strategic since the program was launched formally in 2001, there is more work to be done."

In support of the shift from charity to philanthropy and to increase flexibility in grant-making internationally, C&ER is expanding the number of focus areas from the current two (Health and Human Services and Primary/Secondary Education) to five, mirroring those available to community investors in the United States.

"Boeing's community involvement efforts internationally are sometimes the company's only face to the greater community due to a smaller employee presence than in the United States," Martin said. "Given that and the fact that our global footprint is only expected to increase, the role that the international C&ER focals play in supporting the business outside the United States is a pivotal one."

As evidence of this statement, Boeing country presidents Yves Galland and David Wang, from Boeing France and Boeing China respectively, attended the C&ER meetings to talk about Boeing's business presence in each country and to share their perspective on how good corporate citizenship adds value to the business.

NEW VISION FOR C&ER

Related to the discussions about the ongoing shift from charity to philanthropy, Roosevelt discussed a draft of the function's new vision and mission, and she asked for the thoughts and opinions of the participants. "It was important for me to get the entire U.S. and international C&ER network involved in the development of the new vision and mission for the function," said Roosevelt.

"It is good to have something to guide our efforts moving forward," said Caroline Hugon, C&ER focal in Boeing's Paris office. Added Jessie Li, C&ER focal for Boeing China: "I know I speak for my fellow focals when I say how much we appreciated being included in the development process." ■

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GILLES ROLLE / REA

Fruits and vegetables are grown in one of the gardens owned by Les Restaurants du Coeur, in Montreuil, France, a suburb of Paris, to help feed the hungry in the area. Picking Batavia lettuce are Stéphane Seys (left) and Elbekkaye Nahi. Boeing France supports Les Restaurants du Coeur.

Site visits bring grants to life

In conjunction with the recent international Community and Education Relations team meetings, representatives of the Corporate C&ER team visited several organizations Boeing supports in each country.

"The site visits were an integral part of our trips because they gave us a chance to assess the impact of Boeing support and better understand how different (non-governmental organizations) operate," said Carol Cella, Corporate C&ER specialist. "We learned much from meeting the leaders of these organizations and hearing about the issues they face and how our support helps them achieve their goals."

In France, the team visited Les Restaurants du Coeur ("Restaurants of the Heart"), a volunteer-run organization that assists about 630,000 of France's homeless and working poor population each year through a network of food distribution centers around the country. In addition to these centers, the organization owns gardens in which participants can work and grow vegetables for themselves and their families. Boeing was the first non-French company to support this organization, helping to fund its 2005 winter campaign, a seasonal program created to respond to emergency needs of the poor during the coldest months.

In China, the team visited the offices of Junior Achievement China and then traveled to a local school to hear about a student-run recycling business to which Boeing provided seed money. JA China's mission is to promote an entrepreneurial spirit among China's young people and help them appreciate and better understand the role of business in society. The JA programs supplement the school's existing curriculum and can be implemented in many flexible ways.

"Boeing China's involvement with JA China makes sense, considering that the organization can help young people navigate an economy based on capitalism," said Bridget Sweeney, the Corporate C&ER specialist who supports Boeing China.

They mean to get Lean

Treasury pursues companywide growth, productivity initiatives

Boeing Chairman and Chief Executive Officer Jim McNerney's January introduction of the company's four growth and productivity initiatives prompted Corporate Treasury to kick its internal productivity efforts into high gear.

The work undertaken so far by Treasury teammates to identify and eliminate unnecessary steps is projected to cut the cycle time of various tasks by at least 50 percent. By using existing tools to make these process improvements, Treasury is supporting Boeing's growth and productivity initiatives.

Previously, Treasury "had improvements in work that you could call Lean activities," said Phil Anderson, director of corporate finance and banking and leader of Treasury's initiatives team. "The initiatives clearly demonstrated company leadership's commitment and expectations, which focused us on expanding and intensifying our efforts."

Anderson's team came together in February to establish Treasury's way forward.

"From day one we approached Lean as a process, not a set of tools," he said. "We assessed Boeing's approach to Lean, we got smart about the latest thinking outside Boeing, and we relied on our own experiences to establish a framework."

> "The initiatives remind us that every process periodically needs a thorough scrubbing."
>
> —Paul Kinscherff, Corporate treasurer

The team ended up leveraging Lean Enterprise Institute Chairman and CEO James Womack's methods of identifying improvement opportunities; Six Sigma's Define, Measure, Analyze, Improve, Control approach to working on projects; and Boeing's extensive investment in Lean tools and practices.

"They've set a great example for other teams in terms of implementing a structured approach to improving productivity with Lean tools," said Rick Gross, leader of the Internal Services Productivity initiative.

Treasury's first step was getting everybody involved.

"The one thing Boeing's experience with Lean has demonstrated above all else is that employee engagement is essential to success," said Vice President and Corporate Treasurer Paul Kinscherff.

After defining their conceptual framework and tools, Anderson's team asked all members of Treasury to identify their key processes. They came up with more than 150.

The next step was deciding which to tackle first. "The criteria were, what's most important to our customers, what are our cost drivers and what is most important to our people," Anderson said.

The list was whittled to 35, of which 14 were tagged for immediate work.

The next step involved having the people who work with a particular process every day identify improvements.

"The initiatives remind us that every process periodically needs a thorough scrubbing," Kinscherff said. "Even though we're just starting the Lean journey, the team has already found a lot of unnecessary steps to get rid of, and declared some victories."

By early July, four processes had been streamlined in the areas of cash reporting, electricity derivatives, money market activities and investment manager actions. Projected improvements in flow time and time spent on task ranged from 50 percent to more than 80 percent.

"We're meeting our initial objectives—the foremost of which are engaging our people and approaching Lean as a process and catalyst for change," Anderson said. "Ultimately, the improvements we're making will help us meet our cost objectives in the future."

Kinscherff added that through the right tools, leadership and commitment, office workers can realize the potential that the companywide initiatives offer.

"We're running a marathon, not a 50-yard dash," he said. "Frankly we're in training now, and going to be at this for a long time. Along the way we're going to make Treasury better and more effective—and help make Boeing a better company as well." ■

Pamela Duarte, Workers Compensation analyst (left), and Katherine Carbon, Accounting & Process Compliance leader, review a mapping of Corporate Treasury processes in Chicago. As part of its effort to implement Lean practices, the Treasury team mapped its processes to identify unnecessary steps that could be eliminated to speed cycle time.

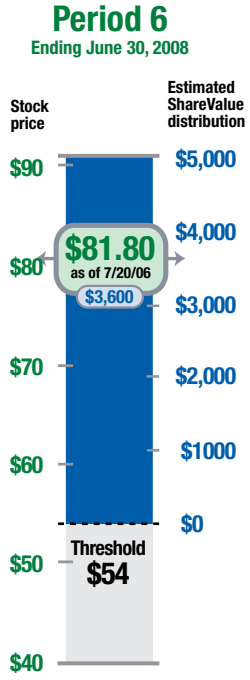
Boeing stock, ShareValue Trust performance

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. Each period lasts four years (except Period 1, which expired in 1998 and covered two years). The program is currently in Periods 6 and 7.

For each fund period, the value of the trust that exceeds 3 percent annual growth is distributed to eligible participants in the form of stock (with partial shares in cash). Participants on non-U.S. payrolls will receive cash in lieu of stock. The trust investment value can grow in two ways: when the market value of Boeing stock increases over the long term, and when shares are added to the trust because dividends have been reinvested.

The estimated Period 6 price threshold is $54. At press time, the Period 7 threshold was not available.



The above graph shows an estimate of what a "full 4-year participant" ShareValue Trust distribution (pretax) would be for Period 6 if the end-of-period average share price was the same as the recent price shown.

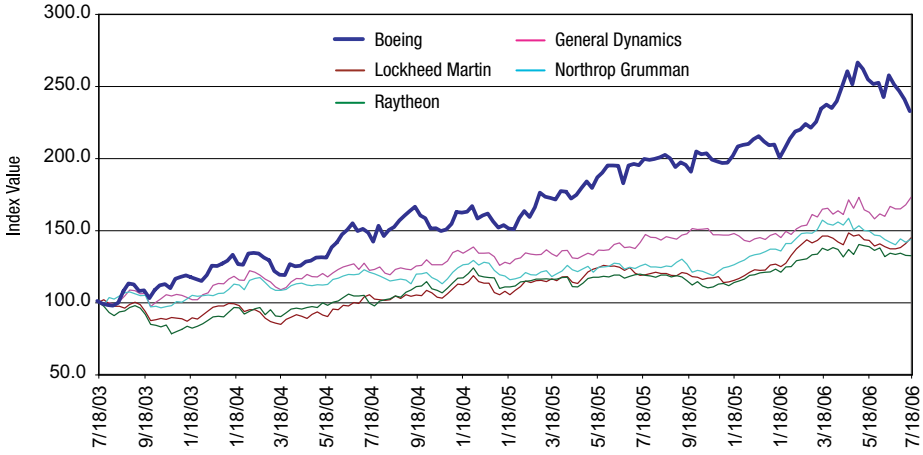
- Distributions are prorated based on the number of months an individual is eligible.
- The share price shown is the average of the day's high and low New York Stock Exchange prices.

Updates to participant/employment data will be made periodically.

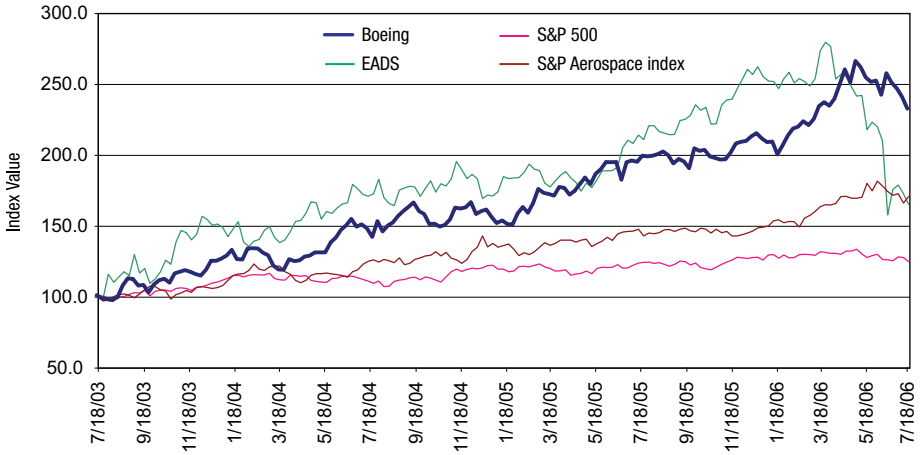
STOCK WATCH

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 July 18, 2003, 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 (3-year)



Boeing vs. stock indexes and foreign competitors (3-year)



Comparisons:

4-week, 52-week

	Price/value as of 7/14/06	Four-week comparison		52-week comparison	
		Price/value as of 6/16/06	Percent change	Price/value as of 7/15/05	Percent change
BOEING	**77.25**	**85.54**	**-9.7%**	**64.75**	**19.3%**
U.S. COMPETITORS					
General Dynamics	68.61	66.12	3.8%	56.16	22.2%
Lockheed Martin	75.30	71.32	5.6%	61.75	21.9%
Northrop Grumman	63.97	63.01	1.5%	55.69	14.9%
Raytheon	43.94	44.58	-1.4%	39.75	10.5%
FOREIGN COMPETITORS					
EADS *	20.75	19.81	4.7%	26.91	-22.9%
U.S. STOCK INDEXES					
S&P 500	1236.20	1251.54	-1.2%	1227.92	0.7%
S&P 500 Aerospace and Defense Index	330.65	342.04	-3.3%	290.84	13.7%

* Price in Euros

SERVICE AWARDS:

Boeing recognizes the following employees in August for their years of service.

55 Years
Betty Cavanagh

50 Years
Robert Skrivan

45 Years
Ronald Austin
David Berge
Guy Ervin
James Johnson
Robert Peercy
Daniel Rideout
Leo Steiner
Donald Traum

40 Years
John Allen
Kenneth Anderson
Henry Arias
Robert Ballantyne
Walter Blount
Lynwood Brunsell
Morris Coller
Meryl Counts
Thomas Derbyshire
Richard Dodge
Kermit Doelling
Marilyn Figueira
Godfred Galacia
Josette Garnichaud
Dennis Gernon
Walter Gillette
Patricia Hagerman
Thomas Halley
Johnnie Hammonds
Dale Hassebrock
Richard Hendrell
Larry Hirni
Jasper Indelicato
Barbara Jerome
Diana Johnson
Roy Johnson
Lee Kartes
Robert Katz
Bobby Keys
Stephen Klix
Emil Klug
Ronald Leap
Larry Linscheid
Reuben Lobb
Richard Medina
Calvin Miles
Theodore Mordaunt
Robert Nelson
James Peebles
Frank Perrine
Stephen Puskar
William Richards
Vickey Romero
Walter Schaub
Kurt Simmons
Richard Taylor
Bobby Thomas
Donald Walton
Larry Wassemiller
Theodore Yantis
Harry Yapp
Herman Young
Karl Ziegler

35 Years
Joseph Austin
Howard Baer
William Baldwin
Leno Blue
Rudy Braun
James Cooper
Suzanne Fillion-Friend
Ronald Fountain
Barbara Friant
David Furuta
Edith Garrett
Emerson Grimsby
Joseph Guthrie
Elizabeth Halvorson
Norman Hennigs
Richard Herrmann
Christopher Jacobsen
Norman Jones
Guy Judd
Michael Katzenberger
Allen Kwant
James Meissner
Paul Miller
Shirley Perry
Thomas Redwine
Valerie Rigdon
Elaine Rizzolo
Claude Roziere
Lawrence Schneider
Larry Scott
Edward Shepard
Ignacio Solis
Joyce Tompkins
Linda Tunnell
Paulus Vandommelen
Arlene Waldo
John Waltar
Diane Wittig
Gary Womble
James Young
Dan Ziegler

30 Years
James Ahlgren
Corwin Andrews
James Badman
William Barlow
Tyrone Bausley
Robert Beckman
William Bellrose
James Berumen
Vicky Bierbrodt
Rand Boettger
Gary Boyd
Eugene Brockenbrough
Robert Bryant
Kathy Burris
Colleen Chin
Bryan Christensen
Kirk Church
Thomas Clark
Bruce Cline
David Clinton
Charles Colburn
Barry Cole
Maria Contreras
Debbie Davidson
Jeffrey Detwiler
Robert Diderich
Gary Drivere
John Esqueda
Martin Etzold
William Everett
Rozanne Fellin
Candee Fleming
Yvonne Fonceca
William Furnas
June Galaz
James Garrette
John Gjerdrum
Robert Goellner
Corazon Grant
Jill Guthrie
Wayne Hagan
Warren Hare
Stuart Hass
Ronald Herman
Rene Hewlett
Victor Hill
Thomas Hood
John Hoover
Robert Hoverkamp
Deanna Hutfless
Mary Jackson
Richard Jaromack
William Keyes
Haeng Kim
Michael Kinsley
John Krekeler
Douglas Lesar
Richard Lescher
Forrest Lunsford
Joseph Maloney
Vincent Marcus
Nicholas Mardesich
Christopher Matusiak
Therese McClendon
Wynette McCracken
Marvin Mensik
James Miller
Reuben Moore
Barbara Mu
Robert Muir
Joseph Myers
Jeffrey Neyers
Bettie Nicholson
George Ogle
Edward Overley
Garry Paradis
Robert Patocka
Dean Pederson
Sonja Peltz
Steven Pennington
Mary Peranteau
Steven Perkins
Curtis Phelps
J.R. Phillips
Theodore Pigg
David Plitt
Danette Poulson
Peter Pozefsky
Joe Rallo
Fidel Reyes
Steven Roberts
Ricardo Salas
Charles Sanders
Patricia Schmoll
Peggy Schreiner
Michael Schriner
Kenneth Seidner
Clarence Sheckler
Mark Spenard
Steven Spence
Barbara Sun
Mark Sweeney
Robert Sweeney
Laurie Thompson
Richard Tiemann
Dolores Torres
Takashi Tsukamaki
Michael Vandernoot
Stephen Vogt
Brenda Warner
Ronald Weaver
Robert Weber
Thomas Weismuller
Andrea Welch
Mark Weltman
Donald Wharton
Jeanette Whitehorn
Robert Williams
Daniel Wilson
Charles Wolfe
Shirley Woodcox
Joye Worde-Armon
Terri Zillmer

25 Years
Brenda Abernathy
John Adams
Eduardo Aguirre
Rifki Al-Ayoubi
William Alexander
Sharon Alford
Marilyn Allen
Philip Alrutz
Leonard Altieri
Lourdes Alvarez
Kenneth Ames
Jill Araiza
Ronald Ard
Gregory Arnwine
Daniel Atzert
Rhonda Ayers
William Bachman
Linda Badgley
Lillian Baldwin
Neil Ball
Carmen Barranco
Gwendolyn Battle
Philip Becker
Marc Becraft
David Belvin
Deborah Benson
Robert Bielitz
Scott Billings
Daniel Birklid
Scott Black
Kenneth Bloms
Robert Bolan
Raymond Bradley
David Breen
Donald Brooke
William Brougham
Sherrie Bunten
Bruce Burch
Thomas Burns
David Buttson
Richard Buyce
Alex Cappelli
David Carmichael
Leland Carter
John Cassidy
Clyde Cates
Jerald Catron
William Cernansky
Dik Chan
Charles Chang
Carey Chaplin
Arnold Cheatham
Andy Chow
Jeffrey Christie
Gregory Cirhan
Scott Claggett
Dwight Clark
George Cloward
Ira Clue
Ricky Cochran
Jeanne Corrigan
Douglas Cozby
Roger Crane
William Cressall
Donald Criger
Clifton Cropper
Alice Culin
Bertha Dameron
Dale Davies
Mark Davis
Teresa Deal
Robert Del Toro
Wayne Denningmann
David Devincentis
Thanh Do
Michael Donaldson
Lee Doolan
Michael Douglas
Patricia Eadon
Donald Edmonson
Roy Eggink
Cristy Ellingson
Dennis Elliott
Jacob Elmer
Thomas Ewen
David Eynon
Thomas Fabbri
John Fabula
Virgil Farnam
Andrea Feist
Charles Ferguson
Annie Fernett
Michael Ferrara
Wanda Fleischman
Maureen Franks
Verne French
John Gallagher
David Galyardt
Joseph Garcia
Velia Garcia
John Gasvoda
Ruth Gauthier
Edward Gawronski
Albert Genthert
John Giesler
Alonzo Gilbert
Brent Gilmer
Terrence Goeckner
Morris Goodrich
Dudley Gordon
Tish Grace
Mark Granlund
James Greenwood
Michael Griffin
Amy Grimes
David Grosmick
Cindy Guilliams
Stefan Haller
Douglas Hambleton
David Hammock
Dennis Hampton
Stanislav Hanak
Frank Hanaway
William Hand
Kevin Hannon
Robert Hanson
Terry Hartman
Sandra Harvey
Sandy Harvey
Timothy Hastings
Donna Hatfield
Charles Haux
Kent Hawksworth
John Haydon-Hawkins
Donna Hays
Gordon Hebron
Bruce Herbert
Marjory Heron
Bonnie Hicks
Toni Hill
Janis Hilt
Gregory Hinkle
Charles Hock
Robert Hodges
Stephen Holding
Thomas Holland
Ann Holmes
John Hopkins
Mark Hovis
Edward Huffman
Mark Humphrey
Robert Insinna
James Jackson
Romeri Jakpor
Frederick Janecke
Ben Jannison
Ronald Jeffs
Teresa Johnson
William Johnson
Christopher Jones
Will Jones
Karen Justice
Kevin Kahler
Sharon Keckler
Douglas Kelter
Martin Kennedy
Cynthia Keppel
Roxy Kesler
Karen Kestler
Fadl Khalil
Maurice Kiely
John Korn
Susan Kranz
David Laboube
Greggory Lacomb
Richard Langley
Shirley Langver
William Lankelis
Deborah Larkin
Keith Larson
Charles Lau
Patrick Lawson
Howard Lee
James Lee
Kay Lee
Joseph Lessey
Gordon Letney

Richard Leutzinger
William Lievers
Roberta Liscano
Keith Littlefield
David Loomis
Evan Lurton
Lloyd Lytle
Joseph Maffei
Burke Magee
Paul Malkowicz
Prasarn Manakul
Robert Martin
Reuben Martinez
Paul Martorana
Carl Martz
Lawrence Masters
Gregory Mattocks
Gary Maynard
Michael McAndress
Dennis McAuliffe
Kristine McDonell
Charles McDougall
Jerry McDowell
Richard McKinnon
Steve McKinnon
Elizabeth McKirachan
Susan McLean
Lisa McMurtrey
Michael McNicholl
Dwayne Merna
John Messman

Darrell Metcalfe
Rickey Milbrath
Christopher Miller
Steven Mitchell
Dave Mittleider
Lisa Moguel
James Moore
Kevin Moore
Tabb Morgan
Jo Morris
Charles Morrow
Michele Musolino
George Muttart
Roy Myers
Jimmy Neil
Steven Nelson
Samson Ng
David Nishio
Sheila Nix
Duane Noble
Viola Nolte
Charles Norton
Mark Norton
Mohammad Nowelati
Miguel Ocasio
Steven Odom
Michael Offie
Barbara Orchard-Carr
Susan Oulton
Dennis Overdyk
Kirk Painter

Vince Parisi
Mark Patneaude
Gerald Patterson
David Pearce
Vance Pearson
Richard Peipert
Paul Petterson
Mark Petty
Richard Phan
Ronald Pierce
Norma Piombino
Julia Plank
Cary Polin
Diane Pomeroy
Keith Pope
Charles Porter
Angela Potter
Dan Powell
John Prettyman
David Price
Cheryl Quinores
David Raese
William Ramm
Christopher Reisig
Richard Reyes
Kenneth Rhein
Michael Rice
Suzanne Ries
Charles Roberts
Ruth Robertson
Keven Robins

Devern Rodocker
Jose Rodriguez
Billy Rollins
Robert Rosenberg
Douglas Ross
Steven Rowe
Virginia Rush
Jeffrey Sadler
Christopher Sales
John Sales
Michael Sanchez
Raymond Sansbury
Vincent Sardella
Patrick Sawyer
Evelyn Schauner
Richard Schee
Richard Schons
Anne Schultz
Randall Schwalbe
Eric Schwinghammer
Bart Selz
David Shamley
John Sheets
Candy Shelton
Stephen Sherman
Douglas Silva
Steven Silverman
Erik Simonsen
Maryann Skehan
Tamara Skelton
Joseph Smazik

Franklin Smith
Lawson Smith
Samuel Smoots
Usaia Sotutu
Gregory Stark
Eleanor Staten
Gene Stdenis
Martin Stevens
Thomas Stevenson
O.Z. Stewart
Bartley Stokes
Kirk Stuewe
Shaun Sullivan
Roger Swann
Michael Sweeney
John Sylvestro
Roy Tate
John Taylor
Gregory Thess
Bruce Thompson
Bruce Thompson
Mark Thompson
Julie Thorosian
Luis Toapanta
Daniel Toberman
Mark Tondre
Nannette Tornblom
Eva Travis
Jacqueline Trondle
Craig Tymony
Derek Van Alen

Marjorie Van Steenwyk
Jody Vandersaul
Ralph Viles
Joseph Vogler
Thomas Wagner
Philip Wah
John Walter
John Wei
George Whitaker
Brian Wieker
Kenneth Wilcox
Linda Wilkinson
William Williams
James Wilson
Michael Wilson
Peter Winchester
Gregory Wingo
Ward Winkelmann
Nathaniel Wise
Daniel Wood
Wayne Woolhiser
Benjamin Wu
Aline Yamanaka
Michael Yates
Timothy Young
Jim Yourkowski
Robert Zenas
Frank Zykan

RETIREMENTS:

The following employees retired in June from The Boeing Company.

Nicholas Akmon, 40 Years
Claire Akune, 20 Years
Amador Amor, 27 Years
Lupe Anguiano, 23 Years
Andrew Ashton, 27 Years
Douglas Bain, 24 Years
Alan Ballou, 31 Years
Gerald Bamon, 24 Years
Michael Barrett, 19 Years
Dorothy Bazzle, 27 Years
James Beall, 24 Years
Jack Beck, 27 Years
Thomas Beman, 29 Years
Reno Berge, 20 Years
Sten Bergstrom, 25 Years
Clifford Blanton, 25 Years
Richard Borgia, 36 Years
Marvin Bowers, 18 Years
Edward Boyle, 25 Years
Anne Breen, 22 Years
Rebecca Brewster, 31 Years
Sheryl Brooks, 27 Years
Kimberley Buckley, 29 Years
Jim Buckmaster, 23 Years
Bobbi Burnett, 33 Years
Michael Buss, 33 Years
Susan Buttram, 28 Years
Joe Cabigas, 29 Years
Delois Cade, 26 Years
Scott Campbell, 33 Years
Juan Canchola, 29 Years
David Carlson, 26 Years
Felix Carrillo, 23 Years
Howard Carter, 42 Years
Robert Carter, 33 Years
Robert Cavara, 26 Years

Robert Chalus, 16 Years
Lincoln Chambers, 31 Years
John Chodacki, 6 Years
Christiane Clark, 22 Years
Donald Clark, 39 Years
Frank Clifton, 10 Years
Jesse Coker, 35 Years
Theodore Cole, 35 Years
Peggy Coleman, 20 Years
David Commens, 40 Years
John Connolly, 27 Years
John Cook, 33 Years
Michael Cox, 28 Years
Randolph Cox, 29 Years
Mark Culp, 24 Years
Ruth Cummings, 22 Years
James Cunningham, 20 Years
Lilynne Davis, 29 Years
Richard Davis, 21 Years
Masako Davison, 32 Years
Cheryl De Gomez, 35 Years
William De Mont, 23 Years
Bertha Dean, 38 Years
Francis Delancey, 29 Years
Shelia Derochea, 29 Years
Daniel Des Forges, 31 Years
Robert Dibble, 26 Years
Frederick Dickey, 25 Years
Glenn Dohm, 29 Years
Martin Dome, 31 Years
William Doyle, 15 Years
Martin Drake, 28 Years
Bruce Dumont, 40 Years
Ronald Eisenacher, 19 Years
John Ellison, 16 Years
Elizabeth Epps, 27 Years

James Evans, 38 Years
Robert Evans, 25 Years
Margaret Farrell, 33 Years
Jane Fedoroff, 5 Years
Frederick Feiertag, 29 Years
Bruce Fennedy, 36 Years
Douglas Fiechtner, 30 Years
Richard Fitch, 40 Years
Jay Ford, 35 Years
Margaret Ford, 25 Years
Gloria Foreman, 41 Years
Donald Frampton, 20 Years
Edward Frederick, 47 Years
Dale Friedhoff, 33 Years
William Fritz, 25 Years
Frank Fuentes, 25 Years
Kathleen Gallagher, 15 Years
Thomas Gambling, 27 Years
Joe Garcia, 7 Years
Bruce Garden, 27 Years
Donald Gardner, 40 Years
Iris Gayton, 25 Years
William Gerdts, 35 Years
Vickie Gibbs, 25 Years
Harriet Giefer, 37 Years
David Gilbert, 33 Years
Reesa Goyt, 17 Years
David Graham, 20 Years
Herbert Grau, 44 Years
Howard Grayson, 9 Years
Clarence Greathouse, 32 Years
Henry Grooms, 37 Years
Brian Gubser, 33 Years
Ronald Hacker, 40 Years
Marta Hammack, 21 Years
Kenneth Hansen, 39 Years

Patricia Hartman, 23 Years
Karen Heindel, 23 Years
Jon Hicks, 38 Years
Ronald Hildahl, 25 Years
Charles Hilsinger, 25 Years
William Hinckley, 31 Years
Larry Hitchcock, 26 Years
Karl Hogen, 30 Years
Richard Holdener, 44 Years
Stuart Holdridge, 37 Years
Barbara Holman, 30 Years
John Hoobler, 33 Years
Richard Hopkins, 26 Years
Linda Horvath, 13 Years
Howard Hughes, 40 Years
Lesley Hunt, 37 Years
John Hunter, 22 Years
Barbara Hutton, 18 Years
Donald Ingerslev, 30 Years
William Jackson, 40 Years
Nancy Jaeson, 20 Years
William Jarrell, 25 Years
Roma Jensen, 27 Years
Joann Johnson, 10 Years
Joel Johnson, 17 Years
Joseph Johnson, 39 Years
Loren Johnson, 31 Years
Robert Johnson, 32 Years
Mikeal Jones, 27 Years
Donald Joynes, 37 Years
Leon Jung, 37 Years
Curtis Jurgensen, 22 Years
Kenneth Kadrmas, 33 Years
Tanya Kail, 8 Years
James Kindred, 20 Years
Leslie Kirkham, 30 Years
Steven Kitsch, 30 Years
Samuel Koedel, 23 Years
George Kondreck, 23 Years

Edward Koopman, 43 Years
Raymond Kramer, 26 Years
Walter Kraszewski, 19 Years
Elden Kruse, 43 Years
Victor Kurc, 38 Years
Alexander Labounsky, 15 Years
Milton Laeder, 32 Years
Anna Lamacchia, 29 Years
Robert Langa, 50 Years
Gordon Lawson, 15 Years
Larry Lazette, 26 Years
Jack Lepley, 10 Years
Steven Leprowse, 32 Years
Frederick Leske, 43 Years
Robert Lewis, 4 Years
Lawrence Linn, 22 Years
Bobbie Lowell, 23 Years
Elaine Lowell, 19 Years
Dennis Lydston, 31 Years
Robert Mackay, 44 Years
Richard Maki, 16 Years
John Manewal, 44 Years
Diane Marchand, 10 Years
Luis Marin, 18 Years
Janet Marott, 11 Years
Horace Martin, 27 Years
David Marzano, 29 Years
Judy Mashore, 25 Years
Thomas Mathers, 20 Years
Robert Matthews, 37 Years
Ronald McKee, 34 Years
Robert McKnight, 39 Years
John McMillan, 24 Years
Joseph Miller, 28 Years
Robert Mitchell, 10 Years
Diane Moerer, 10 Years
Robert Moody, 23 Years
John Moore, 28 Years
Philip Moore, 30 Years

John Munnis, 29 Years
Kenneth Nakamura, 39 Years
Georgio Naoum, 15 Years
Suzanne Navarro, 27 Years
Cathy Neal, 28 Years
Joseph Ng, 26 Years
Ross Nisbet, 21 Years
Daniel Norman, 27 Years
Theodore Nykreim, 33 Years
James Nyman, 42 Years
John O'Donnell, 24 Years
Gene Okino, 33 Years
Clark Olson, 38 Years
Michael Olszewski, 29 Years
Frank Osborne, 40 Years
Carlo Papini, 39 Years
Charles Parker, 9 Years
Gwen Parker, 21 Years
Douglas Perry, 27 Years
George Peterson, 36 Years
Pon Pich, 27 Years
Thomas Pickering, 5 Years
Lynn Pierce, 26 Years
Joseph Pinto, 4 Years
Joseph Porzucki, 33 Years
James Powell, 21 Years
Williemenue Powell, 32 Years
Kenneth Prather, 8 Years
Robert Pratt, 12 Years
Leo Purschke, 39 Years
William Raker, 35 Years
George Rapley, 39 Years
James Rector, 52 Years
Harold Reed, 21 Years
Richard Reinheimer, 27 Years
Vicente Reyes, 39 Years
James Rhoades, 39 Years
Ronald Rice, 38 Years
Billy Richardson, 9 Years
Phillip Rivera, 16 Years
Richard Roberts, 39 Years
Stuart Robertson, 17 Years
James Rohrer, 21 Years
Robert Roman, 11 Years
Harold Rosich, 20 Years
David Ross, 14 Years
Jack Royster, 7 Years
Wayne Salonka, 35 Years
Dennis Sanderson, 26 Years
Sharon Schaeffer, 40 Years
Gerald Schafer, 27 Years
Peter Schnebele, 21 Years
John Scofield, 33 Years
Robert Seplak, 17 Years
Elwood Sillifant, 35 Years
James Skilton, 39 Years
Stephen Slaughter, 27 Years
David Smith, 21 Years
John Smith, 42 Years
Norbert Smith, 41 Years
Rodney Smith, 29 Years
Stanley Spanski, 39 Years
Norman Speake, 27 Years
William Staufenberg, 36 Years
Grant Steele, 29 Years
Jerry Stephenson, 36 Years
Dewayne Stiers, 28 Years
Virginia Stone, 32 Years
Robert Stoos, 28 Years
Roger Surfus, 35 Years
Richard Swatman, 46 Years
Mark Tanabe, 32 Years
Randall Taylor, 32 Years
James Tertipes, 17 Years
Deane Thomson, 25 Years
Thomas Tobey, 37 Years
David Tollman, 33 Years
Alton Tomlinson, 23 Years
Quang Ton, 16 Years
Albert Torrico, 1 Year
John Towler, 24 Years
Walter Trumbull, 22 Years
Constance Turner, 19 Years
Jimmy Turner, 40 Years
William Tuten, 25 Years
Deborah Twitchell, 19 Years
Charles Ulbrickson, 22 Years
Lydia Umbaugh, 39 Years
Dennis Unruh, 20 Years
Ernest Valdivia, 48 Years
Dennis Van Liew, 23 Years
Brenda Vanbooven, 38 Years
Howard Vanlaeken, 21 Years
Chester Vaughan, 10 Years
David Vontrotha, 42 Years
Richard Walters, 25 Years
Thelma Wardell, 23 Years
Warren Wascher, 17 Years
James Watson, 20 Years
Gary Westbrook, 28 Years
Michael Wickline, 45 Years
William Wilkinson, 27 Years
John Williams, 40 Years
Stanley Wilson, 23 Years
Frederick Wodell, 11 Years
William Wolfinger, 17 Years
Danny Wood, 24 Years
Gilbert Wood, 36 Years
Claudia Woods, 22 Years
Karen Young, 35 Years

IN MEMORIAM

The Boeing Company offers condolences to the families and friends of the following employees, whose deaths recently have been reported.

Medina Alicajic, product definition & change planning specialist; service date Sept. 25, 1989; died July 9.
Joseph Connelly, aircraft and engineering mechanic; service date March 24, 1986; died July 6.
Robert Cooper, modification mechanic; service date March 21, 1989; died June 23.
Gene Delap, facilities equipment engineer; service date Nov. 18, 1999; died July 5.
Kris Frigard, tool maker; service date Dec. 15, 1972; died July 13.
Richard Harper Jr., logistics specialist; service date April 18, 1984; died June 14.
Hilda Holloway, office administrator; service date July 14, 2003; died June 15.
Ranney Johnson, supply chain management analyst; service date Oct. 11, 1989; died July 9.
Emery Krzeszowski, quality test specialist; service date Feb. 3, 1989; died July 3.
James Leffler, program analyst; service date Aug. 21, 2000; died June 18.
George Loper, aerospace product technician; service date Aug. 11, 1996; died July 1.
Erik Lundquist, assembler/installer; service date March 21, 1988; died June 22.
Thomas Lynch, engineer/scientist; service date Jan. 11, 1990; died June 26.
Michael Monrotus, engineer/scientist; service date April 30, 2004; died June 15.
Dale Nobbe, industrial security; service date Oct. 29, 1989; died July 12.
Charles Richmond, inspector/assembler; service date April 11, 1986; died July 10.
Julie Rivera, janitor; service date March 21, 1985; died June 18.
Bradford Sikes, logistics specialist; service date Oct. 16, 1978; died June 24.
Ellis Stevens, product definition & change planning specialist; service date Sept. 11, 1995; died June 20.
Mae Thomas, staff analyst; service date Dec. 13, 1963; died June 12.
Norman Volkar, machinist; service date April 17, 1978; died July 7.
Kevin Wiebe, modification electrician and mechanic; service date Sept. 24, 1987; died July 9.

A Brief Update on the Aerospace Business, Including Boeing's Partners and Competitors

CALENDAR OF EVENTS

Aug. 29–31: Unmanned Systems North America 2006. Orlando, Fla. See www.auvsi.org

Sept. 12–15: World Airline Entertainment Association 27th Annual Conference & Exhibition. Miami. See www.waea.org/events/conference/2006/indexmain.htm

Sept. 17–19: Routes. The World Route Development Forum will conduct its 12th annual conference. Dubai, United Arab Emirates. See www.routesonline.com

Sept. 18–20: SpeedNews Seventh Annual Aviation Industry Suppliers Conference. Toulouse, France. See www.speednews.com/Conference/euroconference.html

Sept. 20–24: Africa Aerospace and Defence Exhibition. Waterkloof Airbase, South Africa. See www.aadexpo.co.za

Sept. 20–24: 2006 Air Carriers Purchasing Conference. San Francisco. See www.acpc.com

Oct. 17–19: National Business Aviation Association 59th Annual Meeting & Convention. Orlando, Fla. See www.nbaa.org

Oct. 24–26: 8th International Dependency Structure Matrix Conference. Seattle. See www.boeing.com/ids/dsm06conf

Oct. 25–27: Cargo Facts 2006. Miami Beach, Fla. See www.cargofacts.com

Nov. 5–7: SpeedNews 11th Annual Regional & Corporate Aviation Industry Suppliers Conference. Indian Wells, Calif. See www.speednews.com/Conference/regionalconference.html

Nov. 8–9: 8th Annual Managing Aircraft Interior Costs Conference. Seattle. See www.aviationindustrygroup.com/index.cfm?pg=201

Nov. 27–30: 25th Army Science Conference. Orlando, Fla. See www.asc2006.org

Feb. 6–7: Asian Business Aviation Conference & Exhibition. Hong Kong. See www.abace.aero

March 19–21: SpeedNews 21st Annual Aviation Industry Suppliers Conference. Beverly Hills, Calif. See www.speednews.com/Conference

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.

AROUND BOEING

BOEING TO EXPAND PRESENCE IN UNITED KINGDOM

Boeing said last month it will expand its presence in the United Kingdom by establishing a new facility in Bristol to support its growing defense business activities.

The new facility, part of the company's wholly owned subsidiary Boeing Defence UK Ltd., will focus on supporting Boeing's efforts on the Future Rapid Effect System program. FRES is intended to develop a new family of medium-weight, network-capable armored vehicles for the British Army.

Separately, Boeing and U.K. defense technology and security company QinetiQ said last month the companies will open a center for network demonstration and experimentation at QinetiQ's Cody Technology Park site in Farnborough, England. The center will offer customers the latest in modeling, simulation and analysis tools. The facility is scheduled to be operational by the end of this year.

TOTALACCESS OFFERS PHONE SERVICE IMPROVEMENTS

TotalAccess telephone service will be easier and faster to use, thanks to a new system that will be fully implemented this month.

Under the new "say it your way" system, callers use their own words to respond to the single question, "What can I help you with today?" By eliminating the need to wade through a list of menu options, the system routs calls more quickly and accurately to Boeing-provided Human Resources services. (However, once the new phone system connects callers to services hosted by partners outside of Boeing, such as Health & Insurance, Savings and Pension, callers will still have to select from their list of phone menu options.)

Implementation began last month with a small number of callers. All users will be on the new system by Aug. 8.

As always, to protect personal information, callers must use their TotalAccess password and BEMS ID (or Social Security number) every time they call.

3 BCA TEAMMATES TAKE LEADERSHIP SPOTS

Boeing Commercial Airplanes last month tapped three teammates to fill leadership positions.

• Barb O'Dell was named vice president of Commercial Airplanes Manufacturing & Quality. O'Dell, previously the director of Procurement Quality Assurance, reports to Jim Morris, vice president, Commercial Airplanes Engineering & Manufacturing. O'Dell is responsible for manufacturing and quality processes, resources and skills at production and delivery sites across Commercial Airplanes. She replaces Steve Westby, who was recently named vice president, 787 Manufacturing and Quality.

• Todd Zarfos was named vice president, Commercial Airplanes Product Development. Previously chief production engineer on the 777 program, Zarfos is responsible for leading preliminary design of new and derivative airplanes and systems, and environmental performance strategy. He reports to Mike Cave, vice president of Airplane Programs, and to Morris.

• Joy Romero was named president of Boeing Canada Operations Ltd. and general manager of Boeing Winnipeg in Manitoba. She replaces Mark Ross, who earlier this year was named managing director of Boeing's Hawker de Havilland subsidiary in Australia. Romero, who most recently served as director of Boeing Salt Lake City, reports to Pat McKenna, vice president and general manager of Boeing Fabrication.

UNMANNED LITTLE BIRD FLIES WITHOUT SAFETY PILOT

The Unmanned Little Bird Demonstrator on June 30 completed its first unmanned flight without a safety pilot.

The milestone flight occurred at the U.S. Army's Yuma Proving Ground in Arizona and included a liftoff to a stabilized hover followed by a programmed 15-mile (24-kilometer) mission route that included six different waypoints. The vehicle had previously flown more than 250 hours as an unmanned aerial vehicle with a pilot on board who could take control of the aircraft if needed.

The demonstrator will help develop capabilities for the unmanned version of the A/MH-6M Little Bird rotorcraft. ■

JIM COLEY PHOTO

2,000 and counting

Southwest Airlines took delivery of a special 737-700 last month: the 2,000th Next-Generation 737 produced by Boeing. In honor of the milestone, the jetliner bears a commemorative decal near its nose. Currently more than 4,100 737s are in service around the world. Next-Generation 737s now account for almost half of the in-service 737 fleet.

TED WHITESIDE PHOTO

KC-767 Tanker: Inventory Control

The KC-767 Tanker Parts Control Area 767GT here at the Boeing site in Wichita, Kan., was crowded. The four large yellow wooden boxes—8 feet long, 10 feet wide and 3 feet high—filled with new tubes and ducts, slated to be installed in the Japan KC-767 Tanker #1, made it difficult for employees to move around. And when a specific tube or duct was needed, PCA workers had to search through the boxes looking for the correct part number.

We wondered why the chain-link fence that enclosed the PCA couldn't be used to support racks to hang the tubes and ducts. We had seen this type of system in other areas and thought we could use it here. We took the idea to our Lean organization, which made it happen.

Tanker program employees worked together to find a solution. The result was 11 tube racks built from existing Textube pipe and attached to the chain-link fence. Then, to make locating a specific tube or duct easy, we entered the part numbers into the I-GOLD repair-tracking system.

The system saves time, protects the parts and better utilizes space. Plus, it works great!

From left

Cindy Kill
Production control manager

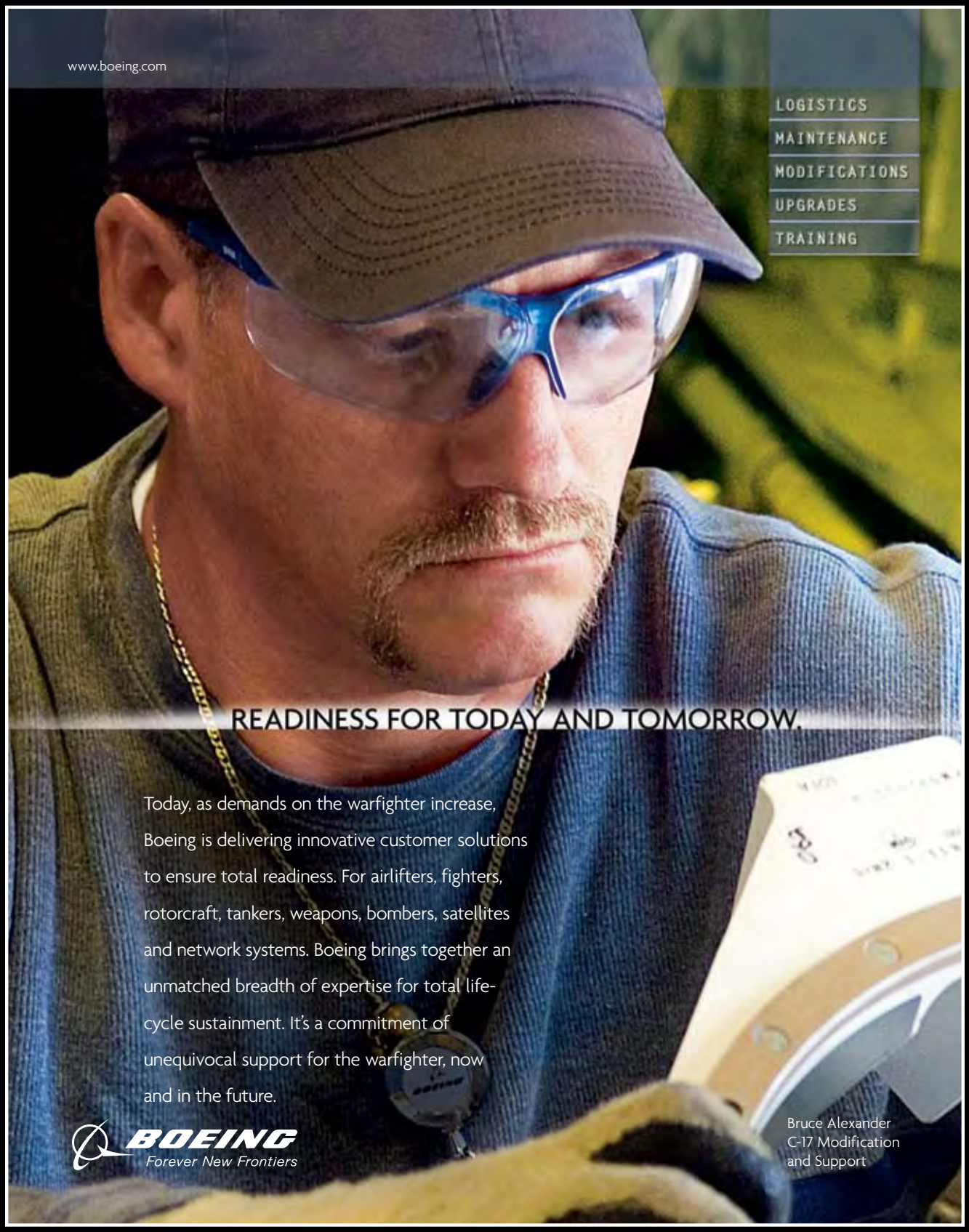
James Rudisell
Materiel processor

Bill Watring
Parts control area lead

David Hulse
Production analyst

Kent Love
Lean facilitator

Not pictured: Greg McBee
Materials processor/ requirements facilitator



This new ad is part of a series of three ads designed to position Integrated Defense Systems' Support Systems business as the provider of a full range of innovative life-cycle solutions for customer readiness. The ads, which show Boeing employees at work, are designed to illustrate Support Systems' capabilities. The campaign will run in key defense trade magazines throughout the year.

This is the fifth in a series of new ads created to build awareness of Boeing and its many valuable partnerships in the United Kingdom. Boeing, the largest overseas customer of the UK aerospace industry, currently partners with more than 300 businesses and universities around the country. The advertising campaign has appeared in The Sunday Times, The Economist, New Statesman *and other UK publications, and complements current UK-Boeing business and communications activities.*