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Quality performance

How Boeing is applying a ‘first time, every time’ quality approach to programs like the new P-8A Poseidon

This year marks the 5th anniversary of the Boeing Classic, a PGA Champions Tour event played at TPC Snoqualmie Ridge in Snoqualmie, Wash. As the title sponsor, Boeing takes great pride in bringing this event to the local community as well as the support it provides to The Heart Institute at Virginia Mason Medical Center, for which more than $2.5 million has been raised since the tournament began. This ad will appear in the tournament program during the event, which is scheduled this year on Aug. 28 – 30.

On the Cover

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A quality reputation

Boeing employees are focused on producing quality work the first time, every time, because lives often depend on the products and services they produce. Achieving first-time quality also is an effective way to increase efficiency and cut waste and rework, increasing Boeing competitiveness. This can be seen in programs and products like the P-8A Poseidon, shown here.

COVER IMAGE: THE P-8A POSEIDON IS SCHEDULED TO REPLACE THE U.S. NAVY'S FLEET OF P-3C AIRCRAFT. PHOTO ILLUSTRATION BY BRANDON LUONG/BOEING; PHOTO BY WILEY NICHOLS/BOEING

PHOTO: JIM ANDERSON/BOEING

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CORRECTIONS

On Page 8 of the July issue of *Boeing Frontiers*, the identities of the people photographed were reversed in the caption. T. Keith Glennan appears on the left, and James McDonnell appears on the right.

INSIDE

Feature Story

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Flying virtually

A network of flight simulators that enables pilots to train for combat missions jointly and simultaneously across countries and even continents is saving time, fuel, manpower and money for government customers.

PHOTO: BOB FERGUSON/BOEING

First-time quality:
We owe it to our customers, and ourselves

John Van Gels
Vice president, Operations and Supplier Management
Senior St. Louis site leader

PHOTO: RON BOOKOUT/BOEING

It's no secret that Boeing employees take tremendous pride in the products we build and the services we provide; that's always one of the highest-ranking responses on the Employee Survey.

We're proud not just because we build cool jet fighters that defend freedom and passenger airplanes that connect people all over the world. We're proud because we've done a darned good job—a quality job that makes us worthy of the trust that customers place in us.

Our reputation, our personal integrity and our company's success all ride on our collective ability to provide that quality to our customers. No matter the product or service, it needs to be complete and correct because lives depend on it.

We aim to do our work right the first time. When we don't, the results can be costly, as the stories on quality point out in this issue of *Frontiers*. This quest for quality applies at every level, in every department, to every team and business. The work we accept from others must be of high quality, what we add to it must be right, and what we pass along to our customers must be better for having come through our hands. In other words, as Boeing Chairman, President and CEO Jim McNerney said in the story on Page 12, we must accept no defects, create no defects and pass along no defects.

There's been a renewed focus on quality throughout Boeing this year. A basic concept, you might be thinking, and you're right. Yet we continue to struggle, for example, with rework, bad work instructions, foreign object debris (FOD) and the quality of parts from suppliers. Everything, whether we make it or buy it, needs to meet the same rigorous standards. Quality issues at any point along the value stream hold us back from being as productive and efficient as we can be. We simply can't accept these problems as part of how we do business, especially in today's marketplace.

So here's what's been happening. In Manufacturing—at both Integrated Defense Systems and Commercial Airplanes—we've been working together to address FOD, conducting root-cause analyses, and looking at options to help us track tools and catch metal shavings, for example. To improve supplier performance, Supplier Management is identifying and helping low-performing suppliers. Safety Now (an Environment, Health and Safety initiative) calls attention to the need for a safe workplace so everyone can be on the job, every day, performing quality work. And Engineering has launched the Lean+ 10X focus, which relies on seven simple disciplines to improve quality and performance, and which continues to spread across Boeing. We regularly coordinate efforts companywide through the Boeing Operations Leadership Team and Process Action Teams.

It takes the right culture and environment to support all of these activities—one that encourages employees to speak up when something isn't right. And it takes managers who will do what they can to make things right. It's never easy to step forward and say there's a problem. Schedules may slow or costs increase. But believe me, the personal integrity that makes us come forward with a concern means *everything* when it comes to quality. In the end, our commitment to doing the job right the first time will lower costs, and it will improve our performance and competitiveness across the board.

I like to claim first-time quality as my mantra. But it's not really mine; it belongs to all of us who feel pride in Boeing. Thanks for keeping quality at the top of your list of priorities. Now that's something I'm truly proud of. ■

Snapshot

FLYING COLORS
Boeing last month unveiled the fifth Boeing 787 Dreamliner flight-test airplane. Its new livery incorporates elements from the distinctive Commercial Airplanes livery on the first 787 flight-test airplane. The remaining unpainted flight-test airplanes also will bear the new color scheme, which saves time and expense compared with application of the previous Boeing livery. **ED TURNER/BOEING**

Quotables

"Postponing first flight was the right decision ... We are working through this matter as quickly as we can but will not sacrifice quality for expediency on such an important effort."

– Boeing Chairman, President and CEO Jim McNerney, referencing the decision to delay 787 first flight resulting from the side-of-body modification, on the July 22 earnings call

"While there is uncertainty in the 2010 [U.S. Department of Defense] budget, Integrated Defense Systems has a very healthy mix of programs and many opportunities both in the United States and with international customers."

– Jim Albaugh, president and CEO, Integrated Defense Systems, in his leadership message to employees following The Boeing Company's second-quarter earnings report on July 22.

IAM PROMOTIONS

No promotions listed for periods ending June 26 and July 3, 10, 17 and 24.

ETHICS QUESTIONS?

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50 years at the leading edge

Developmental Center keeps proving 'it *can* be done'

By Mike Lombardi

On June 19, a small group gathered to rededicate the Boeing Developmental Center, located in Tukwila, Wash., at the south end of Boeing Field. The guest of honor was William E. Boeing Jr., son of the company founder. The event recognized the 50th anniversary of the site as well as the resurrection of an almost forgotten artifact that tied the site to the founder of The Boeing Company.

Fifty years ago, in a ceremony that included William "Bill" Boeing's wife, Bertha, and son, William Jr., as well as then–Boeing President William Allen, the company dedicated its brand-new Developmental Center to company founder William E. Boeing. As part of the dedication, a memorial was erected that featured a bronze sculpture of Bill Boeing's portrait, created by Seattle artist Everett DuPen.

This was not only a memorial to William Boeing, who had recently died, but a tribute to his vision and pioneering spirit—a reminder of the very DNA of Boeing. It included his famous quote: "We are embarked as pioneers upon a new science and industry in which our problems are so new and unusual that it behooves no one to dismiss any novel idea with the statement that 'it can't be done!'"

"We are embarked as pioneers upon a new science and industry in which our problems are so new and unusual that it behooves no one to dismiss any novel idea with the statement that 'it can't be done!'"

– William E. Boeing, founder, The Boeing Company

PHOTO: The original memorial is shown during the Developmental Center's dedication in March 1959. From left: Bertha Boeing, William E. Boeing Jr. and then–Boeing President William Allen. BOEING ARCHIVES

The purpose of the Boeing Developmental Center was expressed precisely in the conclusion of this quote: "To keep everlasting at research and experiment, to adapt our laboratories to production as soon as practicable, to let no new improvement in flying and flying equipment pass us by."

Over the past 50 years the memorial was moved and nearly lost. But it was not forgotten. Following her passion for Boeing history, Pam Valdez, manager of sustainment for the F-22A Raptor fighter program, spearheaded an effort to locate and recover the lost artifact. With help from Boeing Historical Services the bronze sculpture was located at Boeing headquarters in Chicago. With the support of the center's leadership, a new memorial was erected and placed in a new lobby at the main building that dominates the Developmental Center.

The updated memorial was designed by Developmental Center residents Ryan Jutte and Steve Cox. Cox, a Boeing model-maker and artist, built the new memorial using a piece of composite from an F-22 wing skin.

Since its dedication the Developmental Center has lived up to its name and purpose, as home to some of Boeing's most important research and development programs including the Bomarc missile, Minuteman Intercontinental Ballistic Missile, Supersonic Transport (SST), YC-14 short takeoff/landing transport, YF-22 fighter prototype and the Boeing Joint Strike Fighter candidate. In the past it also has been home to military production and modification programs including significant portions of the B-2 stealth bomber and military variants of Boeing commercial jets.

Some of these programs left behind interesting artifacts on the center's grounds. In one corner of the site are the remains of a nonoperational Minuteman missile silo.

Another famous artifact was the full-size mock-up of the Boeing 2707-300 SST. The mock-up was sold when the program was canceled in 1971. After many years of storage and neglect in Florida it was purchased by former Boeing board member and helicopter pioneer Stan Hiller, who moved what remained to the Hiller Aviation Museum in San Carlos, Calif.

Ironically, a production version of the SST's competition, the Anglo-French Concorde, is on display in the Museum of Flight air park adjacent to the center.

For 25 years Boeing's Developmental Center has and continues to be the primary research and development center for carbon fiber structures on such leading-edge programs as the B-2, 777 empennage, F-22, 787 and a number of proprietary programs. The center also is responsible for the modification of advanced aircraft such as E-3A Airborne Warning and Control System, 737 Airborne Early Warning and Control, C-40 transport, and P-8A Poseidon maritime patrol platform. It is the home for Boeing production work on the F-22.

The work performed today at the center fulfills Bill Boeing's spirit that is celebrated in the updated memorial, said Kyle Duncan, director of operations for Integrated Defense Systems in the Puget Sound region. "I'm continually impressed with the extremely talented people we have at Boeing and how we are working together as 'One Boeing' to create inventions and solutions to some of the greatest challenges the company and industry face today." ■

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PHOTO: William E. Boeing Jr. is shown at the new memorial in June with Pam Valdez, F-22 sustainment manager at Boeing. Valdez helped track down the original Developmental Center memorial for updating and re-display. JIM COLEY/BOEING

"I'm continually impressed with the extremely talented people we have at Boeing and how we are working together as 'One Boeing' to create inventions and solutions to some of the greatest challenges the company and industry face today."

– Kyle Duncan, director of operations, Integrated Defense Systems

People in the Neighborhood:

Assessing the situation

Emergency dispatcher Robert Bonillas is quick to send help

By Bill Seil

Robert Bonillas is one of those seldom-seen individuals who keeps Boeing—and its employees—safe and secure. Based in Seal Beach, Calif., he is a lead Security and Fire Protection dispatcher for Southern California. Here he describes the responsibilities of his team and how his work supports Boeing efforts to improve safety and cycle times.

We work in a very dynamic environment. Every time the telephone rings it's something different. It could be anything from simply helping someone locked out of an office to someone requesting medical aid. It's our job to **take down the information, ascertain the situation and dispatch the resources** we have at our command in a timely manner. It's our goal to have all the wheels in motion within 60 seconds, and we do that consistently.

This job requires **patience and excellent communications skills**. You really have to be able to think on your feet.

Everyone at Boeing depends on us to handle a range of problems. That's a lot of responsibility and we take it very seriously.

On occasion employees call after they've lost some company property, and they're worried. It's up to us to guide them to the right people and take whatever steps are necessary to **protect the company's interests**.

From our Communications Center in Seal Beach we serve Boeing sites in the southwest region of the United States, including a site in Hawaii. Some of our information comes from callers, but we also monitor alarms, cameras and other sensors throughout our territory. It's not enough to know the facts; you have to **be familiar with the facilities** and see the situation in your mind's eye. That's essential if you're going to guide people from a distance.

We're also called on to **coordinate** other resources that might be responding to an emergency. This includes outside fire departments and other emergency service agencies. Often they need quick directions to a specific location in a factory or office building.

High ethical standards are critically important to our team. We are entrusted with confidential information involving both the company and employees. We need to be able to use that information to help people while ensuring it is kept private.

We operate in a very quiet area. Few people know where we are or what we do. But we have a lot of **responsibility** when it comes to keeping the infrastructure of Boeing operational.

It's a fantastic job and a challenging one. It's especially satisfying knowing that I'm a member of Boeing, which is so well respected in the community. ■

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Editor's note: "People in the Neighborhood" is an occasional Boeing Frontiers *series that profiles an employee who explains how his or her job fits into Boeing's overall goals.*

PHOTOS: (TOP) Robert Bonillas, lead Security and Fire Protection dispatcher at the Boeing Communications Center in Seal Beach, Calif., helps keep Boeing and its employees safe. MICHAEL GAIL/BOEING **(ABOVE)** Coordinating resources responding to a fire, as shown in this training exercise, is one of the ways the Communications Center team in Seal Beach, Calif., serves Boeing. BOEING FIRE DEPARTMENT

Plan for future well-being

Online tool helps employees manage benefits

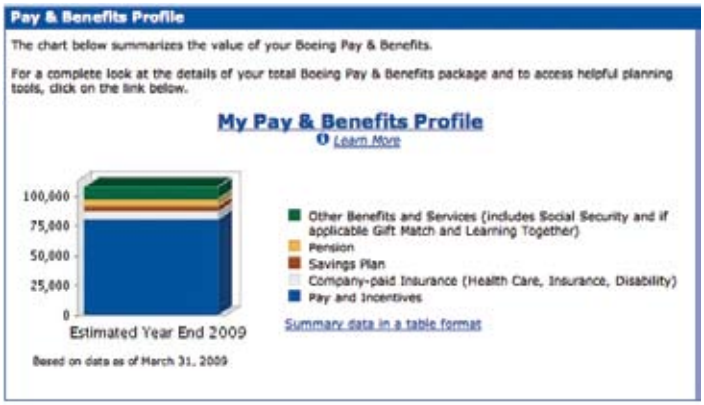
Boeing employees who are seeking help in planning for the future are encouraged to browse, and use, their newly updated online Pay & Benefits Profile in Boeing TotalAccess. The personalized online profile is one of the many comprehensive and competitive programs, tools and incentives Boeing provides to empower and encourage employees to manage their health and financial well-being.

The profile provides some 143,000 eligible employees with a consolidated and secure online view of their total pay and benefits package. It shows the value of their wages, retirement savings, health care and disability plans, insurance, and employee incentive programs. This information can be plugged into a suite of interactive tools to help employees make informed decisions about their future well-being.

"Taking care of ourselves and our future has always required planning, commitment and action, but even more so in these economically challenging times," said Rick Stephens, senior vice president, Human Resources and Administration. "Whether your goals include saving more for retirement, starting an exercise program, quitting smoking or learning new skills, your online Pay & Benefits Profile contains a wealth of information to help you meet your goals."

The online Pay & Benefits Profile is available for eligible employees throughout the year on the Boeing TotalAccess Web site.

– Ron Taylor



GRAPHIC: Through the Boeing TotalAccess Pay & Benefits Profile, employees gain a secure online view of their total pay and benefits package, as well as access to interactive planning tools.

Hired herd

Boeing Site Services of the Shared Services Group recently hired a herd of 120 goats to control brush and other vegetation on an undeveloped parcel of Boeing-owned land just south of Commercial Airplanes headquarters in Renton, Wash.

According to Darrel DeNune, Site Services Grounds/Subcontract management, recruiting ruminants is an environmentally progressive and cost-effective approach to grounds upkeep and is an example of Boeing's environmental strategy in action. Unlike tractors or other gas-powered machinery, the goats produce no air or noise pollution and can navigate terrain where machinery cannot. They also offer a natural alternative to chemical application to manage vegetation growth.

– Debby Arkell

PHOTO: Boeing's recruited ruminants are shown hard at work near Commercial Airplanes' headquarters, seen in the background. The goats offer an environmentally progressive approach to grounds upkeep on undeveloped land. **MARIAN LOCKHART/BOEING**

Q'ed up for success

Doing the job right the first time drives productivity and cuts costs, and it is one of the simplest things you can do to make Boeing more competitive

By Kathy Cook

It's easy to measure quality in common products like a cup of coffee or a blockbuster movie. We're willing to pay three or four, even five dollars for a full-flavored, smooth and delicious brew. And $100 million spent at the box office is a valid measure of success for a good film.

But how is quality evidenced in a global company as sophisticated as Boeing, with its diverse output of products and services?

Customers' willingness to repeatedly invest in Boeing products certainly suggests a high degree of excellence built into those products, as do consistently high rankings in customer satisfaction surveys and contractor rating systems. That many older models of Boeing aircraft are still flying—long after other aircraft have been retired—is a testament to their integrity.

Then there are the informal accolades from users of Boeing products. Republic of Korea pilot Lt. Col. Joo Il Kim recently attributed his achievement of 1,000 flight hours to the "superb performance" of the Boeing-built F-15K jet fighter.

GOOD HABITS, FROM THE TOP

Boeing employees build gravity-defying machines that transport millions around the globe every day, that burst through the Earth's atmosphere to distant orbits, that protect countries against potential attacks. They also provide services that support customers in critical ways such as aircraft maintenance, pilot training and satellite operations. People's lives very often depend upon Boeing services and products.

Accordingly, quality can't just be an occasional act; it has to be a habit. Boeing leadership is committed to ensuring this is the case.

"Our Lean+ initiative provides us real opportunities to help our customers, reduce costs, improve productivity and free up money to invest in our future. First-time quality—which is the ultimate in efficiency—is what we're after," said Jim McNerney, Boeing chairman, president and CEO. "It means we don't create defects, we don't accept them, and we don't pass them on to anyone else. First-time quality makes winners of us all. It makes our company and our supplier-partners more competitive, because fundamentally it makes our customers more competitive."

"First-time quality … is what we're after."

– Jim McNerney, Boeing chairman, president and CEO

PHOTOS: (TOP) Satisfying customer expectations for quality at Commercial Airplanes' Renton, Wash., factory includes kitting tools and parts, foreign object debris prevention and regular internal audits. JIM COLEY/BOEING

(ABOVE) The F-15K, shown above at 2008 Red Flag exercises at Nellis Air Force Base, Nev., is considered a superb performer by Republic of Korea pilots. PETER GEORGE/BOEING

"Every time we deliver a service or a product to a customer, our commitment is [to] perfection," said Jim Albaugh, Integrated Defense Systems president and CEO. "Nothing less is acceptable. Our reputation depends on it, and more important, lives depend on it."

"Our customers—and their passengers—depend on us daily for quality products and services," said Scott Carson, Commercial Airplanes president and CEO. "So, of course, quality is a critical focus area across Commercial Airplanes. Quality also is directly linked to productivity. You can't have one without the other. Driving quality is a necessary step toward improving productivity."

BUILT-IN STANDARDS

Also in place across the company are Quality organizations responsible for helping employees, teams, programs and businesses infuse quality into every part of Boeing. They are charged with identifying and deploying processes and tools for ensuring first-time quality.

In 2006, the Engineering, Operations & Technology organization was formed, creating enterprise Operations/Quality, Engineering and Supplier Management functions to better focus on improved integration and quality across Boeing. The organization's senior vice president, John Tracy, is charged with attaining and maintaining technical and functional excellence companywide. "To maintain our reputation and competitive edge, our products must be engineered with first-time quality, supplied with first-time quality and produced with first-time quality—all in a highly integrated manner," Tracy said.

Leveraging this integrated approach is the Boeing Operations Leadership Team (BOLT), comprising Commercial Airplanes, IDS, EO&T and Shared Services Group executives in Manufacturing; Quality; Engineering; Supplier Management; Research & Technology; and Environment, Health and Safety. Through BOLT-supported Process Action Teams, employees identify and drive improved Operations/Quality processes, systems and replication across the company to achieve higher quality and significant savings.

Boeing has also played a leadership role in creating and improving AS9100, a widely adopted and standardized quality management system for the aerospace industry.

"Quality is having pride in the work you do and ensuring that the work you've done at every level of the process gives our customers what they need … because they depend on it. Producing a quality product is essential because there are a lot of people whose lives depend on what we do right here in the factory. A job done half right is all wrong."

– Ed Kupsick, V-22 electrician, Rotorcraft Systems, Ridley Park, Pa.

FRED TROILO/BOEING

"My personal definition of quality includes the following words: honesty, integrity, workmanship, high standards and set processes. A quality product includes all of these traits. One thing that I have heard most of my career is 'do by the book or change the book.' This seems to be a good philosophy to live by."

– Cyndi Ruble, assembly inspector, Material Review Board, Quality Assurance, St. Louis

PETER GEORGE/BOEING

MANY PEOPLE, ONE FACE

All of these efforts have one goal: Satisfy customers with first-time quality—which in turn not only affects the company's bottom line but also makes Boeing an organization that people want to be a part of.

Tracy recently visited the Everett, Wash., factory, where the 747, 767, 777 and 787 are built. "We are an enterprise that creates the world's most sophisticated and complex products, with reliability and safety records second to none," he wrote on his employee blog after the visit. "The products, airplanes in this case, have been so successful that they have literally changed the way the world works by connecting people face to face. And the most exciting thing, even as good as the products are, [is that] we still aren't satisfied with the quality, the reliability, the cost, the performance, etc. Everyone is focused on making things better and better. I feel very lucky to be working for such a great company, with such talented people, who make such incredible products." ■

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First-pass success

Integrated Defense Systems and Commercial Airplanes drive P-8A Poseidon quality starting at initial design

Although they come from different Boeing business units, Quality engineers Craig Brooks of Commercial Airplanes and Doug Bowers of Integrated Defense Systems share the same philosophy: A focus on quality early in a process will lead to greater success at the end.

So from the beginning of the program, Brooks, Bowers and their teammates have led a campaign to build quality into the earliest stages of designing the P-8A Poseidon, the U.S. Navy's new long-range anti-submarine warfare, anti-surface warfare, intelligence, surveillance and reconnaissance aircraft.

Their effort is one of the many reasons behind the success of the program to date, which is on plan for designing, building and testing the first five test aircraft. The Navy plans to purchase 117 P-8As to replace its fleet of P-3C aircraft. Initial operational capability is planned for 2013.

"Our idea was that if you inject the quality aspect upfront when you do the design, you won't have to deal with it out in the factory," said Brooks, who also has worked in Industrial Engineering and Manufacturing Engineering.

A substantial number of parts for the P-8A differ from those on the 737-800, its commercial sibling—including 75 percent of the structural parts. To reduce complexity, all structural features unique to the P-8A are incorporated in sequence during fabrication and assembly. In previous military derivative aircraft programs, Commercial Airplanes

PHOTOS: (TOP) T-2, the second P-8A flight-test airplane and the first to be painted in the U.S. Navy livery, soars through skies over the Pacific Northwest during its first flight on June 5. WILEY NICHOLS/BOEING **(ABOVE)** Quality engineers Craig Brooks (left) of Commercial Airplanes and Doug Bowers of Integrated Defense Systems worked together to build quality into the earliest stages of designing the P-8A, the U.S. Navy's new long-range anti-submarine warfare, anti-surface warfare, intelligence, surveillance and reconnaissance aircraft. JIM ANDERON/BOEING

Factory mechanics participated in the review and provided great feedback.

– Doug Bowers, Quality engineer, Integrated Defense Systems

"We're all in this together and we want to be successful. We stop worrying about which business unit we're from and put our Boeing hats on."

– Craig Brooks, Quality engineer, Commercial Airplanes

PHOTOS: By building quality into the earliest stages of designing the P-8A Poseidon, the program has been able to remain on plan designing, building and testing the first five test aircraft. The U.S. Navy plans to purchase 117 P-8As to replace its fleet of P-3C aircraft. JIM ANDERSON/BOEING

delivered a "green," or newly completed aircraft without exterior paint and interior, to IDS, which would then have to tear it apart to make modifications.

"This relationship between Commercial Airplanes and IDS definitely has a different flavor than the modification programs I've been on in the past," said Bowers, who worked on 767 AWACS and AEW&C (Airborne Warning and Control System and Airborne Early Warning and Control, respectively) aircraft programs. "It was great to have this kind of access to the design from the very beginning, and everyone knows we are doing the right thing in not tearing an airplane apart."

The Quality teams from the two business units formed a "working together" team soon after the P-8 system development and demonstration contract was awarded in 2004. Team members leveraged best practices and lessons learned from defense and commercial programs. They mapped their processes and developed plans to bridge any gaps.

"We knew there was potential for issues because we had products and data crossing business unit boundaries," Bowers said. "We did some dry runs, performed gap analyses and documented everything. Basically, by the time things started happening, we already had it solved."

In addition, design processes were put in place that ensure programwide concurrence upfront. Meetings between Design Engineering, Manufacturing Engineering and Quality Engineering are required to review designs, and designs are scored objectively on a five-point scale. Those that score below 2.5 are returned for rework or a mitigation plan.

"Early in the program, about half our designs were making it through on first pass—now that's up to about 95 percent," Brooks said.

Factory mechanics also participated in the reviews.

"They provided great feedback," Bowers said. "They'd tell us we had a good idea or that they had concerns."

The years-long, working-together relationship in Quality has not only benefitted the P-8A program, it also has increased knowledge and improved understanding for Quality teammates from both business units.

"We try to learn from them, and they try to learn from us and develop best practices," Brooks said. "We're all in this together, and we want to be successful. We stop worrying about which business unit we're from and put our Boeing hats on."

"We're all just Quality," Bowers said, "and that is all that really matters."

– Dan Ivanis

On the road to zero debris

Commercial Airplanes and Integrated Defense Systems share a goal: control of foreign object debris, or FOD, in the manufacturing process and its elimination from delivered airplanes or aircraft, every time.

"Our goal is to reach anyone who touches the airplane with ways to prevent FOD," said Dan Swanburg, Commercial Airplanes' FOD team leader.

After a successful run of its enterprise-developed FOD exhibit last year, the Commercial Airplanes FOD team decided to focus its attention on specific issues inherent to that business. The team looked at real-life examples of found FOD, like this one:

An airline customer was investigating a loud rattle that came from the aft galley ceiling during flight. When the plane landed, a maintenance crew opened the ceiling and discovered a long wooden broom handle, apparently left there during production.

Solution: Brooms now are part of the 5S (sort, simplify, sweep, standardize and self-discipline) process and always have a place. "It's easy to see where brooms should be returned," Swanburg said. "In this case, there wasn't a safety issue, but it was annoying to crew and passengers. There is a simple way to prevent it."

The 2009 FOD exhibit uses interactive elements—video games and a challenge quiz—to enhance learning, Swanburg said. Attendees answer questions by touching a screen at an interactive kiosk or by testing their skills at a FOD-removal game.

"Every time we show a problem, we challenge them to find a solution," Swanburg said. "We have processes in place to an-

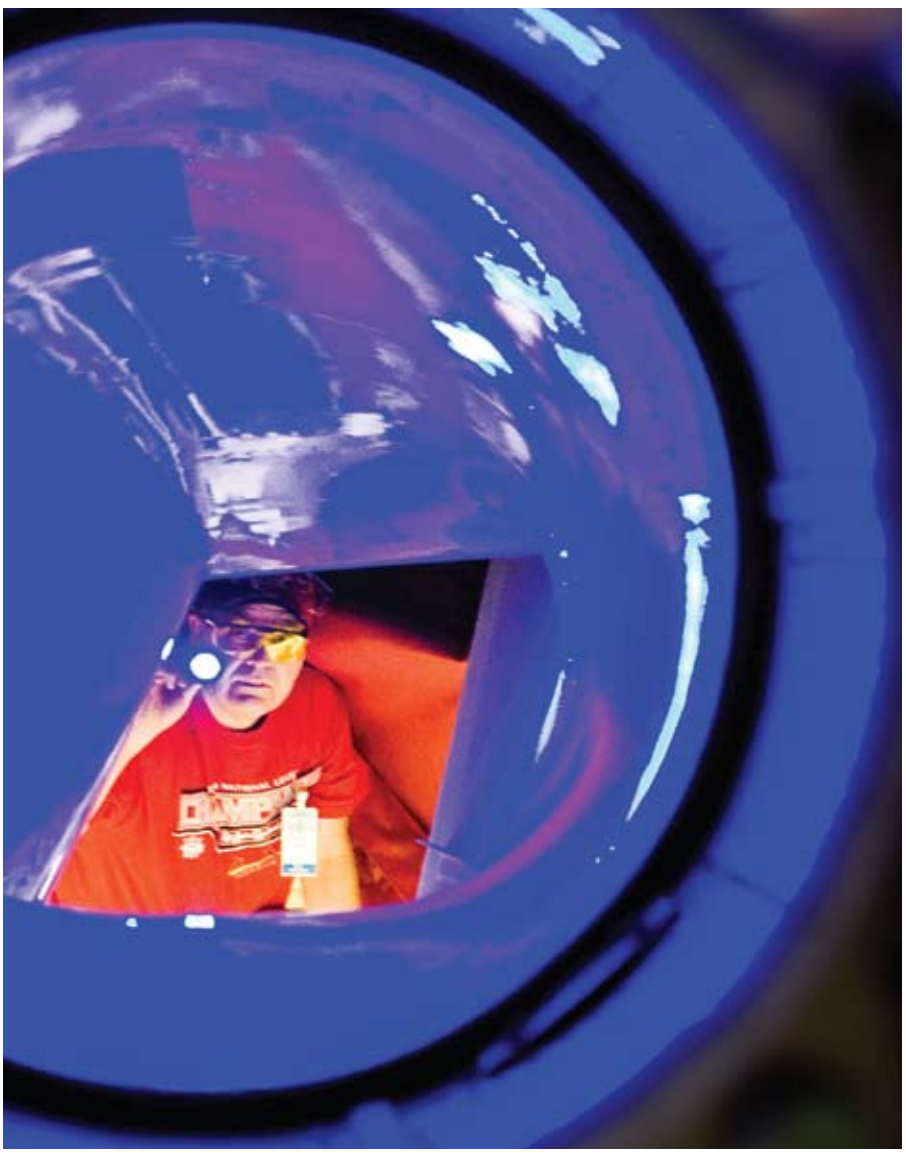


PHOTO: Daniel Wagoner, sheet-metal assembler and riveter, F/A-18 Final Assembly, uses a special "blacklight" flashlight to check for foreign object debris (FOD) during the assembly process. The flashlight is part of a larger effort to improve FOD detection and elimination. PETER GEORGE/BOEING

swer every FOD situation. The challenge comes in 'thinking' FOD prevention all the time."

The new exhibit will make its debut at the National FOD Conference in Layton, Utah, Aug. 11–13. It will spend the rest of this and next year traveling to Commercial Airplanes sites in the United States and Canada.

FOD FOCUS ENTERPRISEWIDE

Indeed, FOD prevention teams are driving Commercial Airplanes and Integrated Defense Systems to initiate myriad FOD prevention practices. Commercial Airplanes launched mandatory FOD training several years ago; it's mandatory for all Manufacturing and Operations employees. Another process improvement in the works at IDS is a common tool accountability and control procedure, PRO-6865. An effort is under way to standardize this process across the company. Utilizing company best practices, several areas are piloting the use of "electronic toolboxes" that include tools embedded with passive radio frequency identification tags that are electronically linked to the box itself. To remove a tool, an employee must swipe his or her badge on a sensor on the box, so the system "knows" that a tool is gone from the box, and who removed that tool. At the end of a shift, all tools in the box must be returned and accounted for.

"Identifying and eliminating FOD in every way possible gives both Commercial Airplanes and IDS the ability to continue to produce the quality products customers deserve," said Maryfrances Wolf, director, IDS FOD prevention.

Driving personal accountability is a top priority in the St. Louis FOD effort, according to Dave Thole, acting director of St. Louis production operations. "St. Louis has implemented several improvements, including incorporating specific FOD check sequences at critical steps in the build instructions that require operators to sign off that they've completed the necessary checks. It's all about everyone taking personal responsibility for eliminating FOD." Teams also are partnering with Advanced Manufacturing Technology to provide operators with tools that will limit or prevent debris in the assemblies, and enabling the high-performance work teams on the shop floor to know their FOD performance and identify how they will improve that performance.

Manufacturing and Quality organizations in St. Louis also are leading an effort to provide teams with specific feedback on how they're doing in preventing FOD. The teams are conducting FOD assessments with the customer to better understand customer expectations on complying with the requirements. "We are also positively reinforcing superior performance at the team level," said Thole. "We want to encourage our people to find the best solutions, because they are in the best position to know how to eliminate FOD, what the roadblocks are and how we can work most effectively to improve our performance."

At IDS in Philadelphia, Obie Jones, Philadelphia site leader and director, Operations, Rotorcraft Systems, said the team is using every communication vehicle available to reach employees with FOD prevention information. "We're trying to make it as easy and convenient as possible for everyone to access the information they need," he said. IDS employees also sign a personal commitment to help eliminate FOD and improve quality and safety.

Since FOD can include anything used on the job, Philadelphia implemented a mandatory daily 5S process to prevent FOD from migrating into production areas. "It's easy to drop earplugs, utensils, drill bits and even safety equipment," said Bob Cassidy, Manufacturing director. "We're enhancing product integrity through new security measures, including badge access to roped-off areas around aircraft. Single-point permission is required for entry into these areas to limit traffic on aircraft, which further protects products from FOD.

"But it doesn't stop there," Cassidy added. "At the end of the day, the aircraft and surrounding areas are swept for anything left behind during our regular 'clean-as-you-go' processes. Toolboxes are audited to ensure that all tools are accounted for, and production workers and managers walk all areas to ensure they are FOD-free. It's like that old saying, 'A place for everything and everything in its place.' The only difference is, this is serious business."

– Bev Holland and Donna McGinley

"The work I do I want to be proud of. I want my customer to like my work and be happy with it. Quality means having pride in my work no matter how big or small the project."

– Robert Miller, Shared Services Group welder, Wichita, Kan.

BEVERLY NOWAK/BOEING

"Quality is what is keeping our loved ones in the air, safe and alive. It should be sewn into everything we do."

– Rebecca Robinson, procurement agent, Supplier Management, Rotorcraft Systems, Mesa, Ariz.

MIKE GOETTINGS/BOEING

10X: Simple changes = significant results

Hustle and bustle has become a regular way of life for people—so much so that we have a term to describe our efforts to respond to the many pressing demands on our time: "multitasking." It's shorthand for doing simultaneously as many things as possible, as quickly as possible.

Although the ability to track more than one task or project at a time is advantageous, dividing one's attention in too many directions can result in wasted time and flawed results.

Accordingly, Integrated Defense Systems Engineering has initiated a program to decrease the risks of multitasking and to enhance quality. Named for its tenfold improvement potential, 10X consists of seven simple disciplines that anyone can apply to help ensure first-time quality, increase the amount of work completed in a given period of time, and create a more focused work environment. By applying these 10X disciplines, the first 100 projects enabled Engineering-led teams to, on average, improve output rate by 3.9X (290 percent) and quality by 4.2X (320 percent)—in less than two weeks.

Here's 10X in a nutshell:

- Establish clear priorities.
- Focus and finish.
- To deliver work earlier, limit the amount that is processed at one time.
- Prepare—start to finish.
- Use checklists to prevent mistakes, defects and "traveled risk" (incomplete work passed on to the next workstation, which can cause problems later).
- Face and resolve issues quickly.
- Drive daily execution.

For more information, visit http://10x.ids.web.boeing.com/index.aspx?com=102&id=1 on the Boeing intranet.

"Putting quality in the airplane exactly the way the customers want it, to meet or exceed their expectations; it just makes sense to give them what they purchased."

– Jon Riddle, Commercial Airplanes team leader for systems installation, 767 Final Body Join, Everett, Wash.

GAIL HANUSA/BOEING

"Every individual has a responsibility for ensuring quality. Own it."

– Kimm C. Parker, Quality engineer, F-15 Program, St. Louis

PETER GEORGE/BOEING

"Quality is having a happy customer the first time."

– Gordon Wegan, Quality engineer, Boeing Research & Technology, St. Louis

RICHARD RAU/BOEING

No big deal?

Think again—little mistakes such as a simple typo can add up to thousands of dollars in losses

Engineers prepare a document called an installation plan to guide manufacturing teams in how to assemble a product. The plan lists a particular operation and the steps to complete that operation. But those operations and the steps within each operation can fill several pages. To facilitate the operation, each step includes an illustration of the step on a "picture sheet."

The complexities of the operations turn little errors into big headaches. One operation might seem simple: Install a bracket on a bulkhead. But when an engineer typed a "2" instead of a "3" in reference to a picture sheet reference in the installation plan, the manufacturing team looked at the wrong picture. The result was a bracket installed in the wrong place. The mistake was not found until the aircraft moved down the assembly line, where another team needed to install some other part that wouldn't fit because there was a bracket in the way. The manufacturing teams had to take corrective action, which required the team to research what was wrong and then correct the mistake. In this case, a simple typing error—something that took a fraction of a second to make—translated into hours of extra work in research, removing the bracket and reinstalling it in the correct position. And that extra time did not include documenting the problem, notifying the customer and doing extra engineering analysis to determine whether any unnecessary drilled holes affected the structural integrity of the product.

By the same token, taking a little time to address a small issue can save more than time and money—it can potentially save lives. When a Weapons Programs production team found what looked like a piece of brass during a foreign object debris walk—a check at the end of a production shift to find any stray materials on the floor—they didn't merely pick it up. They examined it and determined it was part of a connector that had somehow broken off from a kit built in the shop. Instead of disassembling dozens of kits to find the defective one, the team used a borescope, a magnifying glass at the end of a flexible tube, to inspect several kits. When they found the defective kit, they corrected it—before it ever shipped to the customer. They also took the extra step to determine how the part had broken off and added a verification step to ensure it couldn't happen again. By doing the right thing, they not only saved time and money for Boeing but also guaranteed that the customer got a quality product that would not fail at a critical moment.

– Kathy Cook

"Quality means doing it right the first time. That's very important because the products we build save lives."

– Nicole Pugh, Patriot Advanced Capability-3 integration technician, Huntsville, Ala. MICHAEL MCCORMICK/BOEING

"Quality work involves discipline and paying attention to detail. Being consistent is critical."

– Steve Hawkes, avionics technician 737 flight line, Renton, Wash. JIM ANDERSON/BOEING

Air-to-air combat ... on the ground

Boeing simulators offer today's military pilots safe, networked and cost-effective aerial combat training

By Alison Sheridan
Photos by Bob Ferguson/Boeing

You're the pilot of one of four F-15C Eagle fighters loaded with missiles and headed toward the city you've been ordered to defend. A nearby E-3A Airborne Warning and Control System (AWACS) aircraft surveys the area and alerts you and the other F-15 pilots to several hostile aircraft approaching from various directions. You pick up radar returns from the incoming aircraft and direct your wingman to engage the nearest threat. Suddenly your electronic warning gear screams that you're being fired upon. Your visuals show a puff of smoke in the distance. An enemy MiG 29 fighter is headed toward you! In split seconds, you maneuver to defeat the inbound missile. Your quick thinking and evasive action saves your life and your aircraft. You continue—safe for now—toward the city you're charged to defend.

You soon land. Pumped up and dripping with sweat, you emerge from the plane. You grab a cold soda, flop down in a chair and relax for a minute, cool air blowing in from the air conditioning vents. You have to shake yourself to remember you're not flying a dangerous mission. Indeed, you've never even left the ground. You're at Langley Air Force Base, Va. You're inside a Mission Training Center, and you've just completed a Distributed Mission Operations exercise.

PHOTO: Boeing's Mission Training Centers, which together make up the Distributed Mission Operations network, link flight simulators worldwide. Today, the entire system is considered a standard.

Distributed Mission Operations, a component of the Air Force Training Transformation initiative, consists of network-connected Mission Training Centers (MTCs) that enable pilots from across the United States and around the world to train simultaneously for combat missions in a realistic but virtual environment. Pilots train in coordination with multiple simulators housed in MTCs across the globe. The benefits are obvious. Simulated training saves time, fuel, manpower and money, and troops can train as they "fight"—all from the safety of their home base.

This form of combat training originated about a decade ago when the U.S. Air Force said it needed training that, as closely as possible, mimicked real-life combat missions. It envisioned simulators across the globe connected by a single network. Fulfilling that vision required a lot of work, but Boeing found a way to transform the training that was then available into today's robust MTCs that comprise the Distributed Mission Operations network, linking flight simulators worldwide. Today, the entire system is considered a standard.

AERIAL COMBAT TRAINING THEN AND NOW

Perhaps no one at Boeing is more familiar with both the Air Force's training needs and Boeing's training capabilities than Bob Boddy, site manager for the F-15C Mission Training Center at Langley Air Force Base, Va. Originally stationed there in 1976 as an Air Force pilot with the initial F-15A Eagle cadre, Boddy has been with Boeing at Langley for 20 years. Having logged nearly 130 combat missions in Vietnam and completed several duty assignments for Air Combat Command, he recognized that both his interests and the future of pilot training lay in flight-simulator technology.

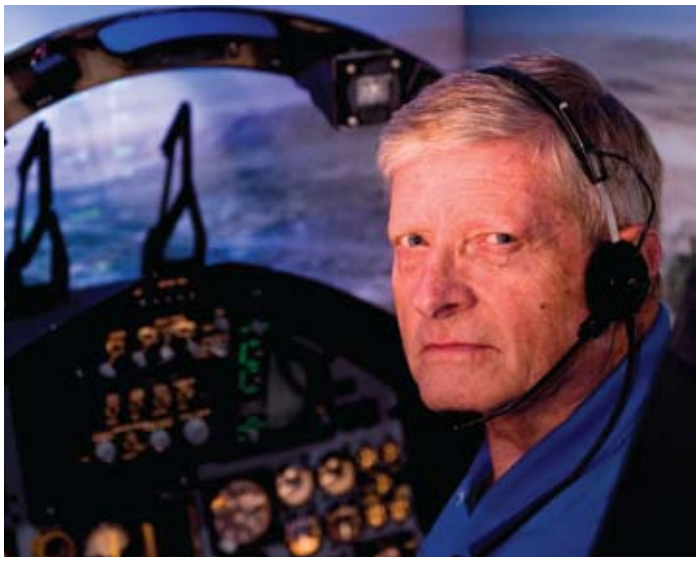
After retiring from the Air Force, Boddy joined McDonnell Douglas Training Systems in 1988 as a simulator instructor at Langley. The training facility consisted of a single F-15 cockpit that had been in use for 12 years. It was motion-based but had no visual system.

In 1989, the system was reconfigured and upgraded to include four cockpit trainers with visual displays. Today, the center houses four high-fidelity cockpits with 360-degree visual systems as well as instructor/operator computer workstations. Here, in addition to loading the simulated missions that are flown, instructors oversee the mission in progress and the brief/debrief stations where pilots who have completed their missions can review them for lessons learned.

At the time it was introduced, all of this technology was considered cutting edge. Evidence showed that training pilots on the ground was more economical and safer than flying live, highly sophisticated sorties. "It's much more complicated and difficult to correct mistakes in real time when you're actually flying," said Lt. Col. Jonathan Holdaway, active-duty adviser to the 173rd Fighter Wing. "Plus, in the air you can have maintenance issues or weather constraints. In a simulator, the weather's always good!"

"Convincing pilots of the benefits of training in a simulator was another matter. Flying instruments instead of real planes was viewed by skeptical pilots as a necessary evil," Boddy said, "and not much fun!"

As the Air Force began the transition to Distributed Mission Operations in 1997, starting with the F-15C training site at the



33rd Fighter Wing, at Eglin Air Force Base, Fla., a complete equipment overhaul at the MTCs was required. When the Langley site upgrade was completed in 1999, these two sites were the first to demonstrate the new MTC technology.

Boeing's MTCs now are connected with one another across the globe, improving the scale and fidelity of training operations. Today's tactical training exercises more closely replicate the complexities and realities of flying multi-squadron missions, and pilots actually volunteer for MTC missions.

"Pilots' attitudes toward the simulators have changed dramatically in 10 years," said Darrell Smith. A Boeing manager for the Training Systems & Services Synthetic Environments Integrated Product Team, Smith helps create the synthetic "bad guys" in the training scenarios. Said Smith: "I know pilots who would rather fly a sim at the end of the day than go get a beer at the Officers' Club."

FORWARD GLANCE

Boeing's experience in Distributed Mission training reaches beyond its F-15C platform. F-15E and F-16 trainers were recently added to the network. And this year, Boeing F-22 and C-17 simulators will be added to the global network. The U.S. Army and coalition partners in the United Kingdom are also utilizing the training. Networked Apache Longbow Crew Trainers train helicopter pilots before they face live missions, and the Royal Air Force trains on the Distributed Synthetic Air Land Training network. Boeing is also considering the possibility of Space Command Distributed Mission Operations. ■

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PHOTO: Bob Boddy—having flown some 130 combat missions in Vietnam—understands that keeping pilots out of harm's way is the most important reason behind simulated missions.

Haul aboard!

SkyHook offers heavy-lift, short-range transportation in remote areas

By Marc Sklar

You're a roughneck working an oil rig in a remote region of the world—like the Canadian Arctic or Alaska. Conventional land and water transportation does not exist and is not economically or environmentally feasible to construct. Given the rough terrain and harsh environment, how do you move in vital equipment and transport out cargo to get your work done?

Just over the horizon you spot a large, oblong aircraft. It's moving slower than a plane. As it nears, you see it combines aerostatic lift, through a large helium-filled envelope, with the features of a helicopter.

This strange-looking aircraft approaches at 60 knots (70 miles per hour, or 110 kilometers per hour), driven by four helicopter rotor systems and ducted propellers, and then descends gradually. Hovering over a small landing patch, slings attached to the underside of the aircraft deliver oversized drilling equipment.

The piloted aircraft is then reloaded with whatever product or cargo needs to be hauled out, ascends slowly and flies off. Up to 40 tons (36 metric tons) of cargo will be transported a few hundred miles away in a matter of hours—not days—even operating in severe weather.

For loggers, miners, oil companies, pipeline builders and other industries that operate in harsh and remote areas, this is more than an imagined scenario. Boeing Phantom Works has teamed up with Canadian company SkyHook International to develop the SkyHook HLV (Heavy Lift Vehicle)—a neutrally buoyant hybrid aircraft that will transport heavy loads in remote regions regardless of the season, and requires no landing strip. Its ability to lift, transport and place freight allows it to move cargo between any road, railway, depot, ship or barge and where no infrastructure exists.

GRAPHIC: At 410 feet (137 meters) long, 205 feet (62 meters) wide and 141 feet (43 meters) high, the Skyhook HLV (Heavy Lift Vehicle)—developed by Boeing Phantom Works and Canada-based Skyhook International—will combine the best features of an airship and a helicopter. CHUCK SCHROEDER/BOEING

"[SkyHook] promises to have a payload capacity unmatched by even the world's largest in-service helicopter…"

– Ken Laubsch, Boeing program manager for SkyHook HLV

"SkyHook will make it easier to get cargo into and out of remote locations faster and without the environmental impact of roads," said Pat Donnelly, director of Phantom Works' Advanced Rotorcraft Systems.

One example of potential beneficiaries is mines and other extractive industries located near the Arctic Circle in Canada's Northwest Territories.

Each year, thousands of trucks deliver crucial supplies over hundreds of miles of seasonal ice roads from bases in cities like Yellowknife. Within a limited period, about eight weeks, all logistics must be arranged and a full year's worth of equipment, materials and fuel must be shipped to the mines and other facilities. In a mild winter, the ice-road season can be even shorter. SkyHook could make a huge difference by allowing supplies to be shipped year-round. That would allow facilities to keep a smaller inventory of supplies on hand, knowing they can be replenished at any time.

Under the agreement with SkyHook International, Boeing is designing and will fabricate a production SkyHook HLV prototype at its Rotorcraft Systems facility in Ridley Park, Pa. The new aircraft will enter commercial service after it is certified by Transport Canada and the U.S. Federal Aviation Administration. The first SkyHook HLV aircraft is scheduled to fly in 2014.

SkyHook will own, operate and license the aircraft worldwide. Last month, the overall configuration for SkyHook was finalized. The program also met the configuration freeze milestone last month, meaning the aircraft's overall performance and layout have been established.

At 410 feet (137 meters) long, 205 feet (62 meters) wide and 141 feet (43 meters) high, the aircraft will combine the best features of an airship and a helicopter. Lighter-than-air helium neutralizes the aircraft's weight. Four helicopter rotors generate the power needed to lift payloads up to 40 tons (36 metric tons). Ducted propellers are used to maneuver and propel the aircraft at maximum payload horizontally up to 200 nautical miles (230 miles, or 370 kilometers) without refueling.

How does SkyHook compare with heavy-lift rotorcraft? "Since the lift generated by SkyHook's four rotors is dedicated solely to lifting the payload, the aircraft promises to have a payload capacity unmatched by even the world's largest in-service helicopter—the Russian Mil Mi-26 with its 18-ton (16-metric-ton) lift capability," said Ken Laubsch, Boeing's program manager for SkyHook HLV and subject-matter expert in Lighter Than Air technology. Boeing's CH-47 Chinook helicopter can lift up to 13 tons (11.8 metric tons). SkyHook also is expected to be more economical than traditional helicopters since it does not expend fuel lifting the weight of the aircraft itself.

Both Boeing and SkyHook International say the aircraft will reduce environmental impact compared to other transportation methods. For example, it will require a small payload delivery area, and there's no need for extensive road or rail lines, reducing the disturbance of soil, terrain, permafrost and vegetation in pristine areas. Less construction in these areas also leaves the natural migratory patterns of animals undisturbed (ditches and roads produce barriers for some species). Skyhook will generate approximately as much noise as other helicopters in commercial service. However, it will follow current aviation practices in avoiding noise-sensitive areas such as wildlife migration routes, bird sanctuaries and wildlife reserves.

"The SkyHook HLV technology is like nothing that has ever existed. We anticipate that the operational capability of this aircraft will allow SkyHook's customers to radically change the way they resupply and operate in remote regions, especially the north," said Rob Mayfield, director of SkyHook. "In the oil and gas industry, there are significant pressures on cost, speed, safety and environmental impact, and the SkyHook HLV technology represents solutions to each of these challenges in various applications." ■

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PHOTO: Members of the SkyHook team in Ridley Park, Pa., are developing a heavy-lift aircraft that promises to greatly improve the movement of heavy items to remote areas. The team includes (from left) Sean Kim, Colleen Olivo, Christopher Felker, Dennis Borgstrom, Bob Thomas and Phil Lang. FRED TROILO/BOEING

Going strong

Boeing Defence UK reflects Integrated Defense Systems' strategy for international growth

By Madonna Walsh
Photos by Peter Ashby-Hayter/Bristol Photographers, UK

A key strategy for expanding Boeing's defense business internationally has been to build a deeper and broader presence in local markets across the globe. It's not just about selling products to countries, anymore. It's about putting roots down in those countries, strengthening local relationships and presenting a single face to the customer.

One example of where this strategy is working well is the United Kingdom. About a year ago, Boeing consolidated and aligned its defense operations there into a single wholly owned subsidiary, Boeing Defence UK Ltd. Following are just a few of the new organization's achievements.

- **Increased rotorcraft support** – In January, Boeing Defence UK Ltd announced the establishment of a new operation—Boeing UK Rotorcraft Support—to focus on Boeing's rotorcraft support business in the United Kingdom. The new unit brought together all of Boeing's rotorcraft support activities for the UK Ministry of Defence (MOD), anchored by the highly successful Apache and Chinook support programs.
- **Enhanced network capability** – The Portal, a decision-support capability at QinetiQ's Cody Technology Park site in Farnborough, opened in 2007. Since then, it has allowed UK customers to explore and understand implications of

PHOTOS: (TOP) Future Logistic Integration Systems' capture team in Bristol, United Kingdom, draws on strengths across Boeing in its effort to win a 10-year, $1.6 billion (£1 billion) UK contract. **(LEFT)** Boeing Defence UK's Dave Robson (center), UK Chinook Through Life Customer Support field service representative, talks with employees from partner Vector Aerospace.

PHOTO: Trevor Kirby (front center) leads the C-17 team at Royal Air Force Brize Norton. The RAF received its fifth and sixth C-17s in 2008 and could purchase more in the near future.

proposed net-enabled systems in a real-time, dynamic environment using the latest in modeling, simulation, analysis and experimentation. Representatives from the UK MOD, Boeing and partner QinetiQ recently signed a Cooperative Research and Development Agreement (CRADA), which allows for mutually beneficial work to be undertaken at The Portal. This is the first time the MOD has signed a CRADA with industry, breaking new ground for the UK government to collaborate with industry more closely on such an important issue: understanding and analyzing future needs of the United Kingdom.

- **Training opportunities** – In June 2009, Boeing, as part of a team led by QinetiQ, received a contract to provide Distributed Synthetic Air Land Training, or DSALT, to British Army forward air controllers and artillery personnel as well as to Royal Air Force pilots. Under the contract, QinetiQ and Boeing help provide specialist training each year in which participants can experience the complexities of operations through simulated exercises, controlling aircraft, artillery and other assets in fast-moving situations.
- **C-17** – Two C-17 military transport aircraft were added to the UK inventory.

How important is Boeing's good track record in the United Kingdom over the past year? According to Mike Kurth, BDUK managing director, it's critical—not only in terms of continued growth in the United Kingdom but for Boeing's international expansion overall. "The UK is known around the world for its discerning defense procurement decisions," he recently told aerospace industry professionals, think-tank analysts, media and U.S. Department of Defense officials at an industry conference. "The UK market is critical for defense contractors because procurement decisions made by the UK customer are benchmarked and followed by other nation-states." ■

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A winning formula

David Pitchforth has long enjoyed the fast lane, having lent his engineering expertise to Jaguar Formula 1 racing in the past. In January, he joined the Boeing Defence UK team as head of Global Services & Support's newly formed UK Rotorcraft Support organization.

PHOTO: David Pitchforth became managing director, UK Rotorcraft Support, in January.

UK Rotorcraft Support houses a number of successful programs such as Chinook Through Life Customer Support and Apache Support. Add to this the Chinook Mk3 Reversion program, which under Pitchforth's leadership saw flight of the first aircraft in June.

"Being British and working for a UK subsidiary of a U.S. company has its challenges, but I get exceptional support from the GS&S Integrated Logistics organization," Pitchforth said. "The contribution Boeing makes toward the UK achieving its military goals is significant. That in itself is the reward, and that's why we're here."

PAC-ing a punch

Lean production, start to finish, helps a team position Boeing for more work

By Linda James
Photos by Eric Shindelbower/Boeing

How do you become a contractor of choice? Start by saving your customer about $100 million and ramp up production to meet increased customer requirements 18 months ahead of schedule. “It’s as simple—and as hard—as that,” said Boeing PAC-3 Missile seeker production manager Jerry McKinney.

The Patriot Advanced Capability-3 (PAC-3) Missile employs hit-to-kill technology to intercept and destroy tactical ballistic missiles, cruise missiles and “air-breathing” threats such as aircraft through direct body-to-body contact. The seeker, built by Boeing, detects and tracks the target during the terminal phase of engagement, providing precision data to the missile’s onboard guidance system.

“Seeker production is projected to more than double in the next three years,” McKinney said. “That in itself is a job, but the real challenge is balancing missile seeker production with depot recertification.”

Recertification of the PAC-3 Missile seeker is required every 10 years. That means every PAC-3 Missile in the field—either deployed or stored—is returned to the factory, disassembled and tested to ensure operational performance.

The U.S. Army, a customer of Boeing, asked the company to not only meet the Army’s rapidly increasing production requirements but also minimize building and equipment costs. The projected cost for the Army to establish a dedicated depot facility with the required tooling and test equipment exceeded $100 million, and the Army needed to reduce that number.

“Do this,” McKinney said to his team, “and you will go a long way toward positioning Boeing to continue to help build one of the world’s most successful missile defense systems.”

The team went to work immediately, applying Boeing’s Lean+ initiative to the entire program and reworking the factory from the floor up.

“This was pure Lean,” said Bennie Williams, the PAC-3 industrial engineer who led the effort.

Lean is no stranger to this team. For years, the Lean team has run Accelerated Improvement Workshops to make improvements on the factory floor. But the scope of this new project involved much more.

PHOTO: Integration technician Angelique Nelson completes final assembly of seekers for Patriot Advanced Capability-3 (PAC-3) Missiles.

“This effort encompassed the entire factory, from parts storage to final assembly,” said Gwen Harris, integration technician. “It was hard to even imagine what changes could be made—until we saw the possibilities in a scale model.”

“When you’ve been so close to the product for so long, it’s difficult to picture how it can change,” said Andrea Smith, integration technician. “But the model was a great visual. It was like playing with Lego bricks. We could build and design, or start all over.”

“As the team took apart the factory model one piece at a time and then attempted to rebuild it, tremendous improvements resulted,” Williams said.

"Seeker production is projected to more than double in the next three years. That in itself is a job, but the real challenge is balancing missile seeker production with depot recertification."

– Jerry McKinney, Boeing PAC-3 Missile seeker production manager

"Once we got started, the ideas just kept coming," said Harris. "It was exciting to see it all come together." Harris has worked in PAC-3 Missile seeker production for 10 years and has a personal investment in the program—her two daughters served in the U.S. Army during Operation Iraqi Freedom in the Middle East, where the PAC-3 missile has been deployed against missile threats.

All together, the team's ideas saved the customer approximately $100 million dollars. This included reducing floor space by 4.5 percent, returning 500 square feet (46 square kilometers) to the site and providing space for a new employee-break area. And they cut travel time of the seeker through the factory by 50 percent, reducing risk of damage through handling. The increased capabilities, paired with the smaller factory footprint, resulted in an increased capacity of 1,200 percent. "Now, that's success," McKinney said.

Perhaps most important, the team helped position Boeing to handle projected PAC-3 seeker production growth over the next decade. "It was a lot of hard work to adjust to a new way of doing business on the factory floor, but it was well worth the effort." McKinney said. "We're ready for future growth." ■

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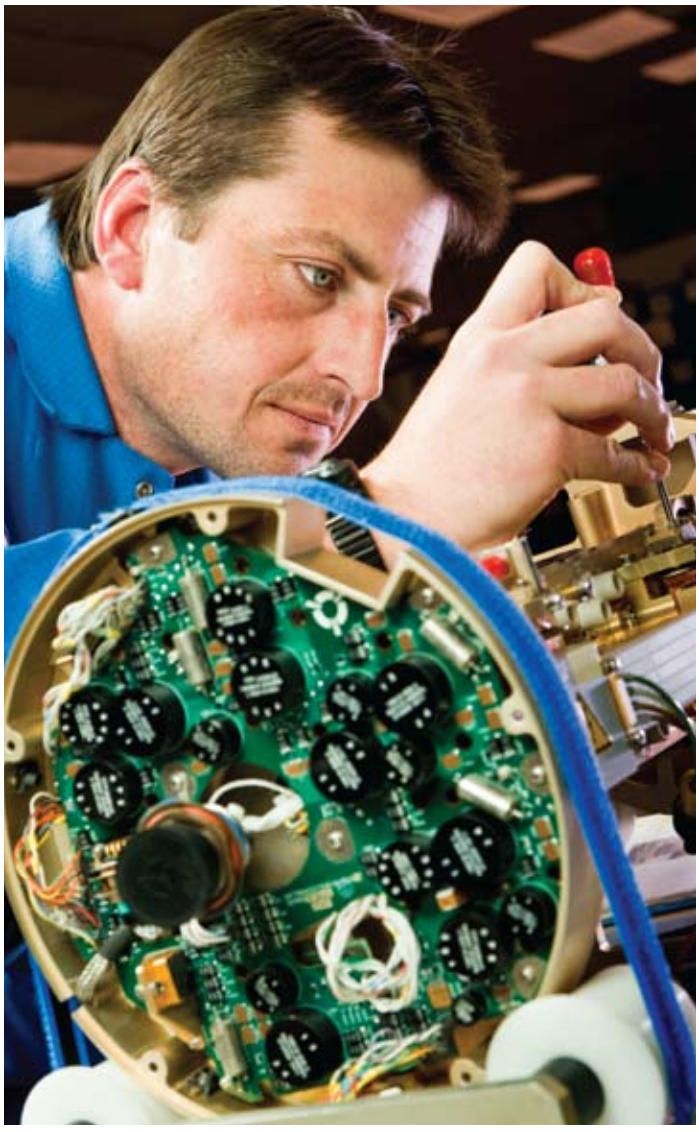

PHOTO: Integration technician Tom Colvin works on a power assembly for the seeker of a Patriot Advanced Capability-3 (PAC-3) Missile.

Team celebrates 10 years

The Boeing Patriot Advanced Capability-3 (PAC-3) team will celebrate the 10th anniversary of seeker production in Huntsville, Ala., this month and deliver its 1,000th seeker before the year ends. Work on the PAC-3 program at the Boeing Huntsville facility includes production, assembly, integration and testing. Boeing employees in El Paso, Texas, produce and test circuit card assemblies. The PAC-3 program office and design engineering functions, located in Huntington Beach, Calif., have program management and design responsibility.

PHOTO: Integration technician Billy Collins loads two seekers for the Patriot Advanced Capability-3 (PAC-3) Missile into a humidity-curing oven, which reduces an otherwise 24-hour curing cycle to five hours.

You're in the Army Now!

No pity for pint-sized U.S. Army recruits in evaluation for active-duty fitness

By Peggy Mason

Boeing engineers and technicians, alongside U.S. soldiers, are testing and evaluating some U.S. Army recruits to determine their fitness for active duty.

One of their favorites weighs less than 40 pounds (18 kilograms) but can sit motionless for hours near a potential target. The recruit can survey and share information from underwater—with no need to come up for air. Fellow soldiers throw the little guy through glass windows and send him into contaminated areas without any protective gear. They expect him to stay alert for days on end—with no sleep. Despite the rough handling, he consistently conveys reliable, accurate, real-time information to his buddies.

Another recruit can hover outside windows of a building's upper floors, stare inside and relay what it sees to fellow soldiers on the ground. Also lightweight, this recruit could still use some working out, as it's shaped like a beer keg.

Obviously, they are not the Army's human recruits. They are robotics designed by Boeing and its partners to give soldiers a layer of safety and increased situational awareness during reconnaissance and surveillance missions.

Boeing engineers and technicians work daily with soldiers assigned to the Army Evaluation Task Force at Fort Bliss, Texas, and White Sands Missile Range, N.M., to enhance the design and development of these systems and the network that will connect them. Together, they form elements of the Future Combat Systems program that the Army wants to deliver early to soldiers in the field.

The thrown-through-the-window recruit is one of the ground robots—formally called Small Unmanned Ground Vehicles (SUGVs)—and is controlled remotely by a soldier wearing a special eyepiece and using a hand-held device that looks like a video game controller. Because so many young soldiers are adept at video games, the controller was intentionally designed like the popular Microsoft Xbox controller. The unmanned ground vehicles are favorites of the soldiers involved in the evaluations, half of whom are veterans of the conflicts in Iraq and Afghanistan. More than one of them said something similar to: "If only I'd had the SUGV when I was in Iraq …"

PHOTO: The Small Unmanned Ground Vehicle can endure all kinds of rugged terrain, climb stairs and transmit what it sees to its controller. The sensor head includes both electro-optic and infrared cameras. TOM RULE/BOEING

The hovering beer keg outside the urban building is the smallest of the unmanned aerial vehicles (UAVs). Like its comrade scuttling on the ground, the Class I UAV is remotely controlled by a human soldier. The robot, weighing in at around 20 pounds (9 kilograms), is easily carried by live soldiers.

The Boeing-Army team also is evaluating several varieties of unattended ground sensors. These include a hand-sized sensor that soldiers can mount in unobtrusive locations inside buildings and that transmit real-time video images of the interior areas during urban operations. Another version is a skinny sensor with a tripod base that soldiers place along roadways or in a variety of terrains to monitor outdoor areas for hostile activity.

Information from these sensors—both robotic and unattended—is relayed to soldiers on display screens in specially equipped High-Mobility Multipurpose Wheeled Vehicles (HMMWVs, or Humvees). The vehicles are equipped with Boeing-developed Joint Tactical Radio System Ground Mobile Radios that act as another layer of the mobile network—a key part of the Army's modernization plan. The radio system—providing secure, reliable, multichannel voice, data, imagery and video communications—puts the full power of the Global Information Grid into the hands of the warfighter. The result is that soldiers will have far greater awareness of their location in relation to both friendly units and hostile forces.

"The whole net-centric concept empowers each individual soldier by providing an overall picture of the battlefield," said Iris Chavez, Boeing Mobile Node Test lead, as she monitored incoming information from a Humvee a few miles away. "The tools and the systems we are testing will be a critical part of the force, helping to protect and even save lives." ■

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PHOTOS: (ABOVE) Inside specially equipped High-Mobility Multipurpose Wheeled Vehicles, soldiers' situational awareness is maintained through a network of sensors and robotics, increasing security for the soldiers during surveillance and reconnaissance missions. BOB FERGUSON/BOEING

(RIGHT) A Tactical Unattended Ground Sensor is placed where it can most effectively scan for activity and relay information to soldiers nearby. Equipped with acoustic, seismic and infrared sensors, the easily portable device provides soldiers with extra "eyes" and "ears," greatly increasing situational awareness in the field. BOB FERGUSON/BOEING

Give and take

Although the manned-ground-vehicles component of Future Combat Systems (FCS) was recently canceled under the Acquisition Decision Memorandum from the U.S. Department of Defense, most elements of FCS continue to be developed as the U.S. Army transitions to a new Army Modernization plan.

Accordingly, Boeing engineers and technicians continue to work side by side with Army soldiers at Fort Bliss, Texas, and White Sands Missile Range, N.M., to evaluate FCS elements.

Being on site with the customer benefits both Boeing and the Army. Boeing gets valuable customer feedback that can be incorporated quickly. "Soldiers are focused on the mission and know the best use of products," said Tim Conway, Boeing technical field test manager. "They, better than anyone, can detect early development issues—that might otherwise have been missed—that we can address promptly."

Soldiers also benefit from working closely with Boeing personnel. "I interact daily with Boeing," said Capt. Marc Cervantes, assistant product manager of capabilities integration. "They are the subject matter experts, and they're right there, anticipating what we need to ensure mission success."

PHOTO: U.S. Army Maj. Theotis Clemons and Boeing employee Tim Conway are co-leaders of the Technical Field Test team at White Sands Missile Range, N.M. PEGGY MASON/BOEING

Boeing invests in lifelong learning—from childhood education to adult career development—as a key strategy for building the talent and critical skills necessary to meet the current and future needs of the aerospace industry. Beginning with this issue, *Boeing Frontiers* explores how Boeing, itself a continuous learning organization, collaborates with primary and secondary schools, institutions of higher education, and government, industry and community organizations to promote and guide learning over a lifetime. In this first installment of an ongoing series, Frontiers presents a collection of stories about nurturing development and learning during the critical school years.

Mission **success**

Boeing inspires lifelong learning in others

By Adam Morgan

With a calm look on her face, April Davis donned her spacesuit and began to mentally prepare for the upcoming mission. In just a few minutes, Davis would board Space Shuttle *Endeavour* and then travel at speeds up to 17,500 miles per hour (28,000 kilometers per hour), 220 miles (350 kilometers) above Earth, on her first mission to the International Space Station—a mission she's been training for all week.

Most astronauts train for years before their missions, but Davis is no ordinary astronaut. In fact, she's not an astronaut at all. She is a fifth-grade teacher at Windsong Intermediate School in Friendswood, Texas. And the "mission" is a simulated one, part of her week at Space Camp, courtesy of The Boeing Company.

Each year, Boeing partners with the U.S. Space & Rocket Center to sponsor educators from around the world at its Space Camp facility in Huntsville, Ala. This year marks the 18th anniversary of Boeing Educators to Space Camp. Since 1992, nearly 700 teachers have participated in Boeing's annual program, reaching more than 30,000 students.

"I'm thrilled to be a part of this," Davis said. "There are so many cool projects we do at Space Camp that will be hugely successful in the classroom—projects such as

"Enabling educators to attend Space Camp each year is just one of the many ways The Boeing Company is investing in the future of space exploration."

– Brewster Shaw, Boeing Space Exploration vice president and general manager

bottle rocket launches and heat shield exercises that are fun and educational and will get students at all levels excited about learning."

This year, Boeing brought more than 75 teachers from 10 countries to participate in the weeklong course, continuing to expand the diverse, global network of educators attending Space Camp.

"We want to work with the world's educators to inspire students and use space exploration as a way to help spark their interest in math and science," said Rick Stephens, Boeing senior vice president of Human Resources and Administration. "By sponsoring Educators to Space Camp, Boeing is helping the students of today become the citizens of the future and the next generation of scientists, engineers and space explorers."

The program uses space exploration initiatives to enhance teachers' skills in presenting math, science and technology lessons that will inspire students—and ultimately help build a skilled work force for a globally competitive technology market.

Throughout their week at camp, the teachers participate in hands-on workshops that include simulated space missions and astronaut training as well as presentations by rocketry and space-exploration experts. The workshops help bring the excitement of real-world engineering challenges to levels suitable for students so they can better understand scientific and mathematical principles. The teachers also receive resources to augment what they teach in their classrooms, to help students meet national standards for science, math and technology.

"Enabling educators to attend Space Camp each year is just one of the many ways The Boeing Company is investing in the future of space exploration," said Brewster Shaw, vice president and general manager of Boeing's Space Exploration division, headquartered in Houston, and a former astronaut. "The number of students pursuing math-, science- and technology-related degrees is declining, particularly in the United States. It is important that we work with educators, who have a direct influence on the students starting at a young age, to bring the excitement of these subjects into the classroom. The teachers' experiences at Space Camp will give them a unique perspective to share with their students."

Boeing's support of Space Camp aligns with the company's community investment focus area in primary-secondary education, which promotes the professional development of teachers and provides them with the tools and resources they need to help improve student performance.

"Space Camp provides a hands-on learning environment where the excitement of science, math and technology are explored and practiced through the mysteries and wonders of space," said Katrine Balch, director of Education at the U.S. Space & Rocket Center. "For educators, Space Camp provides a place to become a learner again and to join with other educators who share the same passions for teaching and learning."

After graduating from Space Camp, each teacher returns home with CD-ROMs filled with lesson plans and additional program materials to use in the classroom. The graduates also receive information about online educator resources to facilitate continued networking with fellow camp attendees. Additionally, Boeing is requiring participants to work with their school administrators to develop a plan describing how they intend to implement what they learned at the camp in their school or district.

"I've learned a lot and made some great connections with teachers from around the world," Davis said. "I can't wait to share this experience with my students and other teachers around the district." ■

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PHOTOS: (FAR LEFT, TOP) Teachers Rhonda Bristow (left) of Richardson, Texas, and Tamara Edmondson of San Antonio conduct a science project on the International Space Station at Space Camp. DALE RAINVILLE/BOEING

(FAR LEFT) Teacher April Davis of Friendswood, Texas, spent her week at camp in hands-on workshops including simulated space missions and astronaut training. ADAM MORGAN/BOEING

(TOP) Teachers Carlo Tripodi (foreground) of Italy and Kee Taek Hong of South Korea participate in a simulated spacewalk during Space Camp. DALE RAINVILLE/BOEING

New engineer shares DREAM

By Ed Memi

Engineering is probably not at the top of the list of fun things to do for the average high school student. But Tony Castilleja Jr. has never settled for average—not in high school, not as a student at Rice University and not now as a new Boeing employee. Castilleja is absolutely passionate about engineering and is doing a lot to share that passion.

In May, Castilleja joined Boeing as a full-time employee, following a three-summer internship at Boeing Space Exploration in Houston. The internship was through INROADS, an organization dedicated to developing and placing talented minority youth in business and industry and preparing them for corporate and community leadership.

So it was fitting that, also in May, Houston Mayor Bill White honored Castilleja at a Houston awards dinner for all his volunteer work helping high school students realize they can succeed in college and achieve fulfilling engineering careers. Castilleja received the Volunteer Houston Award in part for creating the Designing with Rice Engineers and Achievement through Mentorship (DREAM) program, which matches Rice engineering students with high school students.

As part of DREAM, "students from Rice mentor kids every day after school for up to seven weeks on engineering projects," Castilleja said. "The design project provides a natural environment in which to spur a mentoring relationship."

The mentoring program has translated into an increased understanding of engineering for the students, and for many a realization that they can attend and succeed in college. "Many of these students don't realize the opportunities that engineering and college present," Castilleja said. "When university students tell them that with engineering degrees they can launch space shuttles, build satellites or build next-generation aircraft, they get excited. Their next question is: 'How can I get into college?'"

Despite his demanding day job, Castilleja plans to continue leading DREAM for several reasons: "I am eternally grateful to Boeing's internship program, my mentors, INROADS and the people at Rice University who gave me the opportunity to challenge myself," he said. "It's time for me to give back."

As an intern, Castilleja worked on pre-flight and post-flight analysis on the solid rocket boosters; he now is focused on pre-flight and post-flight analysis of the pressurization system for the space shuttle. One of his goals as a student and intern—which he's since realized at Boeing—was to work in mission control during the shuttle's launch and landing. "It is always an amazing experience to be a part of sending humans into space," he said. "I've been able to share that experience with the students, and they're amazed at what studying engineering can lead to." ■

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PHOTOS: (TOP) Boeing space shuttle engineer Tony Castilleja Jr. was one of 12 honored at Houston Mayor Bill White's Volunteer Houston Awards dinner earlier this year. Castilleja received the award in part for his efforts in creating the DREAM—Designing with Rice Engineers and Achievement through Mentorship—program. It matches Rice University engineering majors with students at three local high schools. ELIZABETH H. MORRELL/BOEING

(ABOVE) Boeing space shuttle engineer Tony Castilleja Jr. advises Austin High School students during a DREAM competition last year at Rice University, Houston. NATILA SALIES/RICE UNIVERSITY

Launching engineering careers one rocket at a time

By David Sidman
Photos by Steve Fassa/Boeing

Jack Byers stepped up to Launch Pad No. 6 at Boeing Huntington Beach, Calif., peering through safety goggles slightly too big for his face. A flight technician provided the requisite 3, 2, 1 countdown, and at zero, Jack squeezed the launch trigger. He watched intently as his creation burst quickly into the sky—and just as quickly came back down to Earth. But Jack was elated. After all, he is 6 years old and just experienced his first flight test.

While performing pre-launch activities with the other Jack Byers—his father, who works for Boeing Creative Services—Jack, the junior, shared his objective for the day: "I hope my rocket goes all the way to the sky!"

Nearly 1,000 other kids of all ages hoped for the same thing as they took part in Launch 2009 earlier this year, where they designed, built and launched "rockets"—each one an empty 2-liter bottle with cardboard fins and a parachute perched under the rocket's cone to slow its descent. Add some water and pressurized air, and up the rockets went. Boeing hosted the event in conjunction with the Discovery Science Center of Orange County and the Future Scientists and Engineers of America organization.

"This was a great family event where kids worked with their parents to accomplish a goal—to launch a rocket," said Rick Baily, vice president and general manager of Boeing Combat Systems and a member of the Discovery Science Center's board of directors. "This is all about inspiring the next generation of engineers through hands-on learning and experience."

In many ways, the kids' experience building bottle rockets mirrored real-world engineering. First, safety was paramount on the flight line. Behind it, at 30 very busy workstations, kids wrestled with design and build challenges. The critical path for most was designing and installing the parachute to deploy during the rocket's descent. Holding a post-launch BDR—bottle design review—with her son, Jared, Nancy-Kim Yun of Boeing C3 Networks troubleshooted their rocket's parachute problem. It was a hardware issue. "I need a new cone," Jared decided.

And when siblings or parents couldn't help, Kristen Levengood could. An engineer with Boeing Research & Technology, she shared rocket-building advice while answering general aerospace questions. "It's a lot of pressure," she admitted, despite her degree in aeronautics and astronautics from the University of Washington.

Launch 2009 ended with another real-world exercise: FOD removal. Kids scoured the lawn picking up foreign object debris left behind after a busy day of building and launching rockets. ■

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PHOTOS: (LEFT) Kristen Levengood, Boeing Research & Technology engineer, answers rocket design questions during Launch 2009. **(RIGHT)** C3 Networks' Nancy-Kim Yun and son, Jared, prepare to launch their rocket during Launch 2009.

Exhibiting Lean

Lean experts in Commercial Airplanes teach and learn from community project

By Dawsalee Griffin
Photos by Marian Lockhart/Boeing

At first glance, planes and penguins don't seem to have much in common. But Boeing airplanes and the Humboldt penguins at Seattle's Woodland Park Zoo share something that you can't see: Both have benefited from Lean+.

Using the Lean skills and tools they teach to Boeing employees who build airplanes, Lean experts from Boeing Commercial Airplanes helped zoo staff find more efficient ways to design a new penguin exhibit, which opened in May, 12 months ahead of schedule and $100,000 under the cost estimate.

Using a full-scale mock-up of the exhibit area allowed the zoo to refine the design in real time and helped contractors make more accurate bids, saving time and money once building began. Using other Lean tools, zoo staff also reduced the time it takes to feed the penguins and clean the exhibit and holding areas by 90 minutes a day. These timesaving process improvements were incorporated into the new exhibit. The zoo also established its own Lean group to continue to improve processes.

The new exhibit takes advantage of the latest environmental technologies. Each year, it will save 3 million gallons (11.4 million liters) of water and 75 million BTUs of energy over the previous exhibit. In addition, all of the water used in the exhibit is recycled or reused.

For Boeing employees, the zoo project validated the Lean techniques they use—no matter the setting. "For me," said Bart Taylor, a Boeing Production System manager with the 787 program and a Lean facilitator on the zoo project, "it confirms the lesson that Lean tools work in any business environment to improve processes and eliminate waste."

When the Woodland Park Zoo began planning a new penguin exhibit three years ago, retired Boeing employee Dan Becker was a member of the zoo's board. Becker suggested the zoo use Lean+ tools—which promote continuous improvement—to improve processes, save money and develop the exhibit faster. Boeing agreed to help by providing an initial in-kind grant of Lean+ support, training and advice to help the zoo staff plan and design the exhibit.

"An in-kind grant can provide assistance to an organization beyond dollars," said Neelima Shah, an environment community investor with Boeing Global Corporate Citizenship. In-kind grants can be for something tangible, such as surplus equipment, or they can take the form of sharing the skills and expertise of Boeing employees. (See the sidebar "Boeing grants" on the next page.)

"Boeing shares its Lean+ expertise to bolster the impact and efficiencies of nonprofit organizations," Shah continued. "This

Lean+ results:

- Opened 12 months ahead of schedule
- $100,000 under the cost estimate
- 90 minutes a day saved for zoo staff who feed the penguins and clean the exhibit

is a great example of transferring business-based knowledge to make the nonprofit sector more effective." Boeing experts not only teach Lean processes and facilitate workshops, they also train facilitators and may act as advisers throughout the life of a project. While some of these types of projects may include in-kind grants to kick-start the project, others are supported by volunteers using skills they've honed at Boeing.

The zoo team's first exposure to Lean was a weeklong workshop with the 737 wings team in the Renton, Wash., factory. "It was important to bring the zoo team to Boeing to participate on a team so they had hands-on experience with the process," said Andrew Takamiya, one of the Commercial Airplanes Lean consultants who worked with the zoo. "That way, zoo staff could see how a diverse group can use Lean tools to come up with solutions."

The workshop—known as a production preparation process, or 3P—was particularly useful to the zoo's needs because the 3P tool focuses on eliminating waste in the design stage of a product or process. "The workshop we went through was about making large capital changes," said Bruce Bohmke, deputy director of the Woodland Park Zoo and leader of the zoo's Lean team. "That's exactly what we were going to do with the penguin exhibit."

After the initial experience at Boeing, the zoo staff held 3P workshops, led by Boeing Lean experts, to look at every aspect of the future penguin exhibit. Elizabeth Girdler, a Lean practitioner in Commercial Airplanes, helped the zoo staff identify exhibit customers (penguins, zoo staff and guests) and define what each group would need to make the exhibit successful. "The Lean tools pushed the zoo staff to approach designing the exhibit in a different way," Girdler said. "It was challenging at times to convince them to work through the process because they'd never done anything like this before." That is familiar territory for Girdler, who has seen Boeing employees react the same way in Lean events when asked to take a new look at a process they may have been doing for years.

And according to Taylor, who trained the zoo facilitators, led workshops and helped develop the mock-up of the new exhibit, "We looked at everything, from ways to keep the pool clean and flush out dirt, to the configuration of the penguins' dens behind the scenes."

"The exhibit is great and I'm proud I was part of the effort," Takamiya said. Summing up the team's experience, Takamiya said, "it's a good feeling that we were able to help the zoo achieve the things that they really wanted to do and teach them tools they can use from here on." ■

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"It confirms that Lean tools work in any business environment to improve processes and eliminate waste."

– Bart Taylor, Boeing Production System manager, 787 program

Boeing grants

Boeing's support for communities includes sponsorships, monetary grants and in-kind grants. Monetary grants provide money for a specific purpose—for example, creating an educational outreach program. In-kind grants provide goods or services to a nonprofit agency or community partner, depending on the need. Boeing works to match the needs with the skills and expertise of Boeing employees.

PHOTOS: (LEFT) Some of the Boeing Lean team who worked on the new penguin exhibit for Seattle's Woodland Park Zoo visit the result: Dennis Richter (left), Commercial Airplanes Lean consultant and project lead; Andrew Takamiya, Commercial Airplanes Lean consultant; Elizabeth Girdler, Commercial Airplanes Lean practitioner; and Jon Akers, Commercial Airplanes Lean practitioner. **(ABOVE)** Seattle's Woodland Park Zoo opened its new Humboldt penguin exhibit in May, a full year ahead of the original schedule.

Electrifying efficiency

Employee Involvement team's solution 'drives' usability, economy and environmental performance

By Eric Fetters-Walp
Photos by Gail Hanusa/Boeing

New electric crew vehicles at the Everett, Wash., Delivery Center are rugged-looking, carry up to four people and run with no exhaust and just a slight noise.

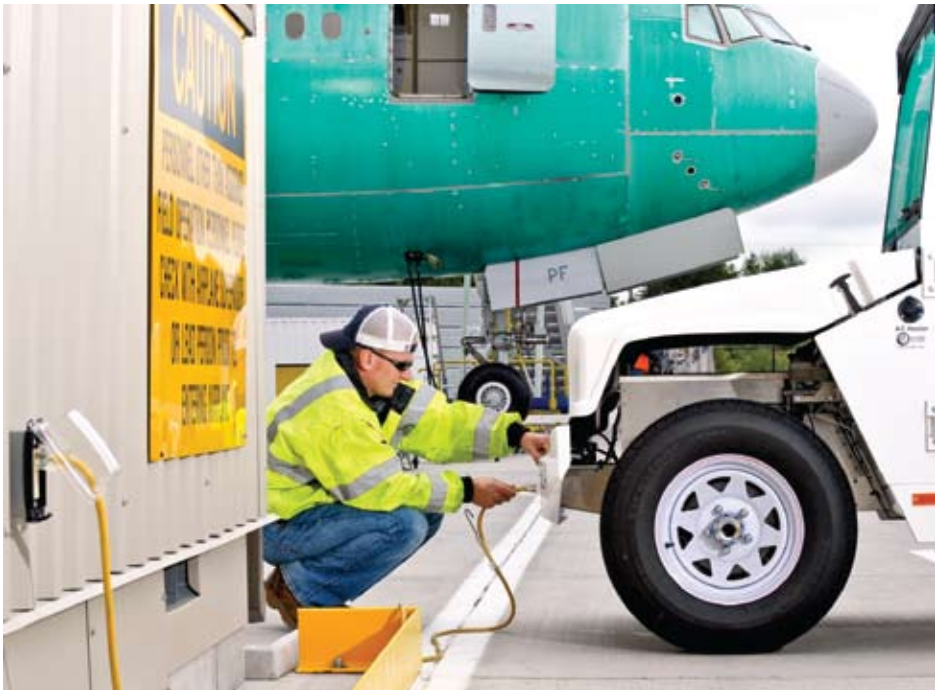
They also are cheaper to operate than the center's older vehicles, have a much smaller carbon footprint and, perhaps most important, they're exactly what the center's crew members needed for doing their jobs.

Deciding what vehicle was best for the Delivery Center's crews involved plenty of employee involvement, collaboration and consideration of both the environment and budget limitations.

Previously, the vehicle crew members used most around the Everett Delivery Center's airplane parking stalls was the 12-passenger van. When the local Employee Involvement team first looked into choosing new vehicles, the idea was simply to get new vans to replace some of the old ones, said Blaine Eveland, 777 Preflight and Delivery manager. But since those vehicles are relatively expensive, the Delivery Center team was set to order just one new van.

On the day the order for that vehicle was to be signed, however, something else happened: The Employee Involvement team learned about Boeing's conservation initiative, which changed the team's thinking, according to Michael Force, airplane maintenance technician at the Everett Delivery Center and team member.

"We started looking at different electric vehicles on the market, and we put together a plan that called for four-person electric carts and centrally pooling the 12-person vans," Force said.



It made sense to look at an alternative to the gas-guzzling vans, Force said. While useful when needed to transport an entire crew of a dozen people at once, the vans were too often underutilized. "We were seeing these 12-passenger vans running all around with just two people in them," he said. "Ninety percent of the time, I'd say, they were running with less than four people inside."

Chris Bentley, a capital assets budget focal for the Everett Delivery Center, said the Employee Involvement team made a solid business case: The electric vehicles

PHOTO: (ABOVE) Tim Vertin, airplane maintenance technician, unplugs a new electric vehicle at the Everett, Wash., Delivery Center. The vehicles are kept plugged into electric outlets when not in use. When fully charged, the vehicles usually can go for 50 miles (80 kilometers).

(RIGHT) Airplane maintenance technician Tim Vertin drives an electric vehicle at the Everett, Wash., Delivery Center.

cost about one-third less than the large vans, and maintenance and fuel costs for each electric vehicle are estimated to cost nearly $4,000 less annually.

"I was impressed that they were concerned with saving the company money and reducing environmental impact, in addition to requesting vehicles they liked," Bentley said.

Over the next year, the Employee Involvement team evaluated or tested 20 different electric vehicles and consulted with Shared Services Group's Fleet Support. The vehicle that best fit the Everett flight-line requirements was watertight, with enclosed interiors, and outfitted with a heater and a fan, making it ideal for the rainy, cold and windy conditions employees there often face.

"It came down to us choosing the right vehicle for us," Eveland said.

As of July, the Everett Delivery Center had four of the vehicles, with more scheduled to be added in the coming years.

Raising the hood on one of the new vehicles to show its simplicity without a combustion engine, Force said he's been happy with the performance so far. They are kept plugged into electric outlets whenever not in use to keep them ready for any task. When fully charged, the vehicles usually can go for 50 miles (80 kilometers), he said.

Then there are the environmental advantages. On an annual basis, each electric vehicle saves more than 10,000 pounds (4,536 kilograms) of carbon dioxide emissions from entering the atmosphere, when compared with the large van, according to the Everett Delivery Center's estimates. The electric vehicles also don't use oil, antifreeze and other potentially hazardous fluids needed by gasoline engines. Bringing Boeing closer to its environmental stewardship goals also feels good, Eveland said. "We want to be on the forefront of that," he added.

"The Everett Delivery Center team's work is an outstanding example of embedding environmental considerations into our daily operations—with dual benefit to the environment and the bottom line."

– Christer Hellstrand, Boeing Environment, Health and Safety's capabilities and processes director

Electric vehicles aren't new to Boeing, of course. But as environmental awareness has increased, electric and alternative-powered vehicles have gained favor for their reduced carbon footprints. Last year alone, Boeing purchased more than 100 electric vehicles just for its Puget Sound facilities, according to Supplier Management and Procurement.

Additionally, Boeing sites around the globe are adding lower-emissions vehicles to their fleets, including cars powered by compressed natural gas in Southern California and a solar-powered scooter being tested under the desert sun of Mesa, Ariz. All of those vehicles are helping Boeing's Fleet Support organization meet its goals of reducing emissions, fuel use and overall vehicle operation costs, said Larry Cameron, a Fleet Support fleet manager.

Christer Hellstrand, Boeing Environment, Health and Safety's capabilities and processes director, added that the Everett Delivery Center's decision to use alternative-power vehicles is a good example of how Boeing employees can help improve the company's environmental performance.

"The Everett Delivery Center team's work is an outstanding example of embedding environmental considerations into our daily operations—with dual benefit to the environment and the bottom line," Hellstrand said.

According to Eveland and Bentley, the vehicles have proved themselves at the Delivery Center. They said other groups, including the Customer Delivery Center at Seattle's Boeing Field, have been in contact to investigate whether more electric vehicles would work at their sites as well. ■

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Performance art

Through its Platform Performance technology domain Boeing is developing and sharing new technologies for its diverse product line

By Bill Seil

PHOTO: A Boeing-designed advanced wing model, to be used in high-speed aerodynamics technology studies, gets one last inspection by Commercial Airplanes engineers before it is shipped to NASA for wind-tunnel testing. From left: Jeffrey Crouch, project lead and Senior Technical Fellow; David Witkowski, principal investigator; and Mary Sutanto, wing aerodynamics designer. JIM COLEY/BOEING

What do commercial airplanes, military aircraft and space vehicles have in common?

It's a question on the minds of Boeing technologists and engineers because, while Boeing produces a diverse range of products, some of the same technologies, tools and processes can be used in their design and production.

To become even more efficient and productive in the development and use of technology, Boeing last year formed a new Enterprise Technology Strategy, which takes a "One Company" approach to technology development. The strategy is built around eight technology areas, or domains, that are designed to create a sustainable technical competitive advantage and help the company grow. Among the domains is Platform Performance, which focuses on the Boeing products, or platforms, that have captivated and inspired the general public: jetliners, military aircraft and spacecraft.

"The Platform Performance domain is identifying and developing technologies that lead to significant improvements in platform capability and efficiency," said domain leader Don Leopold. He has more than 20 years of experience at Boeing as an engineer and manager of flight sciences and advanced product design. "We're also focusing on high-value processes and tools that can be used in conceptual and preliminary design. This includes providing rapid, multidisciplinary design, analysis and optimization capabilities that can be used to reduce development cycle time, risk and costs.

"In addition, work in this domain includes developing next-generation concepts and configurations that will help shape markets and capture new business," he said.

EXPERTS, UNITED

The domain brings together experts from across Boeing to develop technology plans that align with the company's business priorities. Leopold said this task requires a team effort that includes business development, programs, functions and technologists.

“We’re also focusing on high-value processes and tools that can be used in conceptual and preliminary design.”

– Don Leopold, Platform Performance domain leader, Engineering, Operations & Technology

PHOTO: Boeing Research & Technology Platform Performance researchers are developing and applying advanced computational fluid dynamics (CFD) to study powered nozzles and wing flow field interactions. From left: Roger W. Clark, aerodynamics technology manager; Pichuraman Sundaram (seated), CFD Associate Technical Fellow; and Dharmanshu Antani, computational sciences senior manager. MICHAEL GAIL/BOEING

To accomplish this, each of the eight domains works with enterprisewide teams. Team members include representatives from different business and functional units as well as representatives from support organizations such as Intellectual Property Management and the Boeing Technical Fellowship.

The Platform Performance domain team began by organizing research around six core technology areas that align with the company’s overall strategy and support the needs of the business units. The core technology areas are:

- Aerodynamics
- Propulsion integration
- Guidance, navigation and control technologies/architectures, and autonomous mission management
- Flow control technologies
- Integrated conceptual/preliminary design, analysis and validation
- Computational sciences

The team looks to adapt technologies developed for commercial airplanes for use in military products where possible. A well-matched transfer of technology will produce improved efficiency or mission effectiveness that is valued by the customer. In all cases of technology transfer between programs and different parts of the company, Boeing strictly adheres to export compliance regulations as well as to the obligations imposed by a variety of multilateral trade agreements.

In addition to technology developed by Boeing internally, Platform Performance, like the other domains, keeps a sharp eye on technologies being developed by suppliers, business partners, universities and other entities. In fact, an important element of the Enterprise Technology Strategy is that it includes a plan to leverage external technologies, and that this plan is consistent with a sound intellectual property strategy. The goal is to optimize the company’s internal investments by making the best use of available or emerging technologies from partners and suppliers—all of which supports the design and development of outstanding products.

The Platform Performance domain enlists core technology experts from throughout Boeing to help achieve domain objectives. The team also relies on business leaders, chief engineers and other experts to assist in understanding the company’s business priorities and capability gaps, and in assessing potential technology solutions.

“We’re looking at technologies that improve the overall capabilities of each platform,” Leopold said. “On the commercial side, performance metrics such as fuel efficiency, payload and range are key factors. On the military side, those same capabilities may be important, but due to the diversity of products, we also need to consider performance

metrics that are specific to a particular mission. Of course, both commercial and military customers are looking for the best value, so affordability is essential."

GO WITH THE FLOW

The 15 or so individuals involved in the domain's Flow Control Technologies team are exploring ways to apply this relatively new approach to design. Flow control primarily uses air jets to modify the flow about a platform and improve its aerodynamic performance. It can be used to reduce drag, enhance lift, lower noise levels and, by doing the job of other hardware, lighten the weight of a structure—all of which increase a platform's capabilities. Although this technology is still in early development, it is expected to play an important role in future platforms.

Bill Bower, Boeing Research &Technology leader for Flow Control Technologies and a Boeing Senior Technical Fellow, said this core technology team is currently focusing on three areas: designing and developing improved flow control devices; applying these devices to specific Boeing needs and testing their performance; and formulating modeling techniques to design flow control systems by computer.

"One of the technology gaps we're focusing on is getting these flow control devices sufficiently lightweight and robust to operate flawlessly over many flight cycles," Bower said. "This is a critical factor in the transition of the technology to products."

"Technology improvements developed for jetliners can certainly have applicability for heavy-lift military transports."

– Laurette Lahey, director of Flight Engineering for Integrated Defense Systems and IDS Platform Performance Domain leader

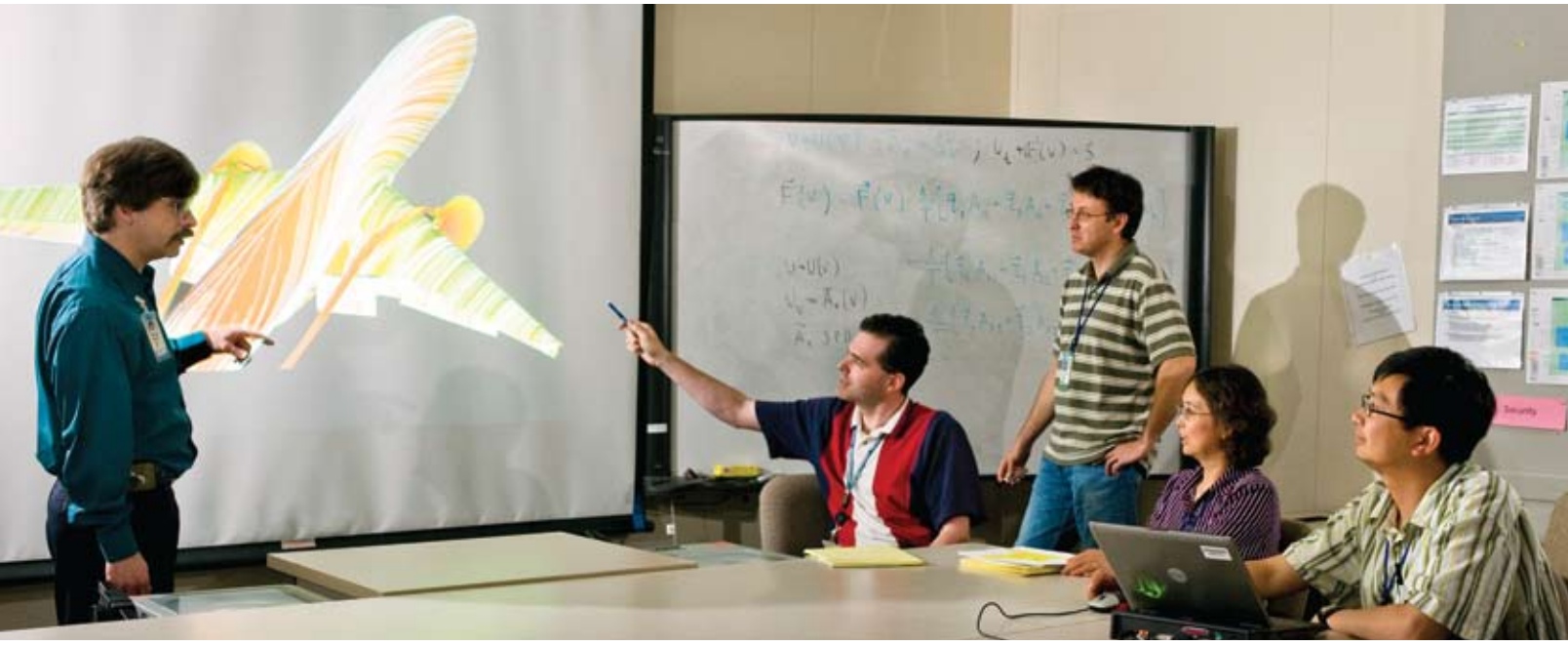

PHOTO: Commercial Airplanes Computational Sciences Core Technology Team leader Steve Sawyer (far left) discusses high-lift computational fluid dynamics results for a commercial airplane with Commercial Airplanes Enabling Technologies & Research engineers Timothy Mauery (left), Dmitry Kamenetskiy (standing), Pei Li and Emanuel Setiawan.
MARIAN LOCKHART/BOEING

In 2003, Boeing participated in a full-scale demonstration of flow control on a tilt-rotor aircraft. The airflow from this platform's rotors impinges on the wing surfaces while the aircraft is in hover, resulting in a significant loss of lift. Flow control, however, reduced this loss. In addition, Commercial Airplanes is currently pursuing possible flow control applications in weight and drag reduction, lift enhancement and noise reduction.

While the Platform Performance domain continually looks for technologies to improve existing or derivative Boeing products, its greatest impact will be on the next generation of Boeing products, Leopold predicted.

Work within the domain also is being performed to ensure that Boeing programs have the right tools and processes. Wind-tunnel testing, a traditional development tool of the aerospace industry, can be costly and time-consuming. Before going to the tunnel, computational design and analysis methods can be used to develop better, more efficient designs so that wind tunnels can be used more effectively. This is especially important when adapting new technologies to a variety of products.

THIS WORK COMPUTES

The domain's Computational Sciences team is developing and applying state-of-the-art computational fluid dynamics tools and processes that are particularly important in the design of future Boeing products. Computational sciences are of great value when integrating flow control and other new technologies.

Doug Ball, chief engineer of Enabling Technology and Research in Commercial Airplanes, said the domain's work in computational sciences has been particularly valuable in areas such as high-lift modeling, which enhances takeoff and landing performance. People in the Platform Performance domain also are working closely with people in the Environmental domain on the reduction of airplane noise.

"About half the noise produced by an aircraft coming in for a landing is produced by the engines, and about half is produced by the airframe," said Ball. "The landing gear alone accounts for 50 percent of the airframe noise. Computational methods are being developed to analyze the flow of air around the various elements of the landing gear to determine how noise can be reduced."

One of the most difficult challenges facing computational sciences is analyzing the airflow from the trailing edge of the wing to the leading edge of the tail's horizontal stabilizer.

"We can predict the flow pretty well when it's over a single surface," Ball said. "But when you look at the horizontal tail behind the wing and behind the engines, it becomes far more difficult."

Ball believes it may be decades before the computer hardware is developed to fully address this problem. But research carried out through the domain could make significant progress in this important area of study.

Laurette Lahey, director of Flight Engineering for Integrated Defense Systems and the IDS Platform Performance Domain leader, said her business unit has worked over the years to encourage collaboration among its diverse programs through a variety of approaches. This includes establishing horizontal integration leadership teams, which now operate as engineering functions, with representatives across all IDS businesses and sites. Commercial Airplanes, similarly, has used groupings called "themes" as a means of internal collaboration.

Today, the domain system has formalized such approaches to ensure collaboration. For example, Lahey said that while most IDS platforms are very different from Commercial Airplanes jetliners, the company's investment in computational sciences will enable early risk reduction and improve cycle time in both types of development programs. "Technology improvements developed for jetliners can certainly have applicability for heavy-lift military transports," she said.

Dennis Egan, director of technology for Commercial Airplanes, said platform performance is critical to the future of the business unit.

"The success of our products depends on developing technologies that allow highly efficient integration of the engines into the aerodynamics," Egan said. "The Platform Performance domain is working across the enterprise to ensure that we can draw on the best solutions available."

Egan noted that Platform Performance is one of the more mature domains in the company, thanks to the long history of collaboration Boeing business units have demonstrated in this area. The domain is working particularly well in the areas of flow control and computational sciences, he said.

"2008 was a year of discovery and the beginning of our journey," Leopold said. "We need to build on that foundation in 2009 by ensuring our technology plans stay aligned with business priorities and by realizing the enterprise's full potential. We'll be working on delivering results in support of Boeing's overall growth and productivity objectives." ■

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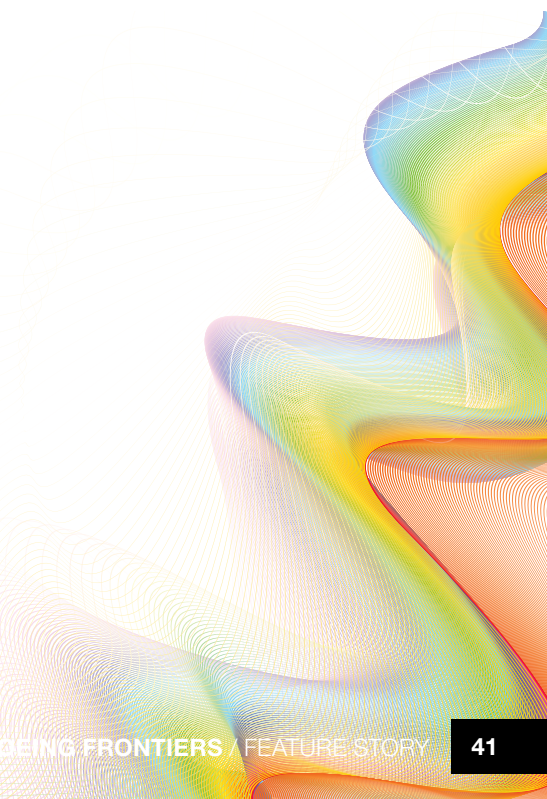
"Work in this domain includes developing next-generation concepts and configurations that will help shape markets and capture new business."

– Dennis Egan, director of technology, Commercial Airplanes



Well-being by the numbers

Screenings and Health Assessment help employees 'know their numbers'

By Susan Birkholtz and Bridget O'Meara

We lead busy lives, and sometimes our physical, emotional and financial well-being takes a back seat to the daily demands of work and home. Consider these facts:

- **One in three** American adults has high blood pressure. High blood pressure usually has no symptoms and can go undiagnosed for years while damaging the heart, blood vessels, kidneys and other parts of the body. (Source: National Institutes of Health)
- **6.2 million** people in the United States have undiagnosed diabetes. (Source: American Diabetes Association)
- **40 to 70 percent** of total U.S. health care costs are attributable to conditions that are linked to preventable health risks, such as obesity, stress, poor eating habits and a lack of regular physical activity.
- **More than 20,000** employees participated in Boeing's on-site health screenings from July through September last year. In 2009, the goal is 30,000 employees; more than 70 U.S. Boeing locations are hosting screening events in the July–September time frame this year.
- **15** is the number of minutes it takes to complete the Mayo Clinic Health Assessment. Nearly **120,000** Boeing employees and their spouses or same-gender domestic partners made this investment in their health in 2008.

Boeing offers a variety of resources to help empower employees to manage their health and well-being. Take charge of your well-being with these three steps.

1. KNOW YOUR NUMBERS.

One of the first steps to ensuring good health is getting screened and finding out your current health numbers such as your blood pressure, cholesterol and glucose levels. Your doctor can help you determine which screening tests are right for you. (Or visit www.BoeingWellness.com and follow registration instructions if you have not visited the site before. Type "health screening guidelines" in the search box for information about recommended preventive care tests based on your age and gender.)

PHOTO: Integrated Defense Systems' Theresa Sontheimer participates in an on-site wellness screening. RON BOOKOUT/BOEING

Boeing offers two ways to find out your health numbers. One way is by participating in a *free* and *completely confidential* on-site wellness screening. Screenings are being offered at most U.S. locations this summer, with some sites offering screenings through the end of September. U.S.-based Boeing employees as well as domestic subsidiary employees who are enrolled in a Boeing health plan are eligible to participate. Visit www.Boeing.com/screenings for schedule information. On-site screenings measure:

- Total cholesterol
- LDL ("bad") cholesterol
- HDL ("good") cholesterol
- Triglycerides
- Glucose (blood sugar)
- Blood pressure
- Body mass index, or BMI
- Body fat percentage

If you participate in an on-site screening this year, you will receive a complimentary copy of *The Stop & Go Fast Food Nutrition Guide* (Maple Mountain Press). Featuring almost 3,500 fast foods from 68 different restaurants, the book helps you navigate the maze of fast food choices so you can make healthful selections.

If you work outside the United States or at a U.S. site where screenings are not scheduled, you can find out your numbers by visiting your personal physician for a wellness checkup. Most Boeing health plans cover preventive care benefits at little or no cost to you. To help you keep track of your numbers, visit www.Boeing.com/screenings and download the screenings scorecard. (The link is located in the second bullet under "Where will the screenings be offered?")

2. ASSESS YOUR HEALTH.

Next, in just 15 minutes you can complete the Health Assessment on www.BoeingWellness.com between Sept. 1 and Nov. 30. Employees and their health-plan-enrolled spouses or same-gender domestic partners are eligible to take the online Health Assessment and receive a complimentary $50 gift card upon completion. Using the updated health numbers you received by participating in an on-site wellness screening or by visiting your doctor, answer a series of questions to see how your health stacks up—and then determine what, if anything, you need to do to better manage your health and well-being.

3. ACT ON THE RESULTS.

Most important, if your Health Assessment results indicate a need to get healthier, take steps on your own or with help from a Boeing Well Being resource. Sign up for healthy lifestyle coaching, enroll in the Quit for Life® Program or, if you have a chronic condition like diabetes, asthma or heart disease, contact your health plan to learn about special programs that help you manage these conditions.

Visit www.BoeingWellness.com for more information about available programs and tools to help you get healthier. ■

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Questions? From Outlook, e-mail ***GRP Boeing Well Being***.

Living with diabetes

Employee credits screening with inspiring a healthier lifestyle

In 2008, Earle Oda, a 787 Supplier Quality Customer Support representative from Everett, Wash., was diagnosed with Type 2 diabetes after participating in an on-site wellness screening at his work site. Now, a year later, he's taken charge of his health, as he explains below.

Thanks to Boeing, my daily routine and outlook on my health and well-being has changed dramatically over the past year. Last July, a test during my on-site wellness screening indicated that my blood glucose level was not normal. I was diagnosed later that same day with Type 2 diabetes by my doctor. I still remember how I felt—nervous, worried and upset all at the same time.

Since my diagnosis, exercise has become a priority. Without it, controlling my blood glucose levels becomes more of a challenge. One good thing is that diabetes has brought me back to what I used to enjoy: running. Since last summer, I've participated in more than 10 Fun Runs, a half marathon and the Seattle Rock 'n' Roll Marathon this past June.

Having diabetes has also changed how I eat. I never used to give much thought to what or how much I ate. Now I check sugar content on labels. Most everything I buy is low or free of fat, sodium and cholesterol. I try to avoid too much of one thing, and I've had to adjust to saying "no" to sweets. I also try to avoid glucose spikes by eating more vegetables and more frequent but smaller meals.

Before July of last year, I had not seen a doctor in a couple of years. Now, I have my blood work checked regularly and my numbers have steadily gone down with every test, allowing me to cut back on my medication. Weaning off the medication completely will take a lot of work, but I'm almost there.

Living with Type 2 diabetes has been an eye-opening and humbling experience. I feel very fortunate because I know there are others out there with greater challenges, and it could have been a lot worse for me if I had been diagnosed later. I will continue to take advantage of Boeing's free health screenings and do not hesitate to advocate the importance of screenings and living a healthy lifestyle. It has benefited me, and I speak from experience.

PHOTO: Earle Oda, a 787 Supplier Quality Customer Support representative from Everett, Wash., was diagnosed last July with Type 2 diabetes after participating in an on-site wellness screening at his work site. A year later, he is thriving. GAIL HANUSA/BOEING

Lean in any language

International offices work together to get leaner

By Stephen Davis

They met in London. They came from Amsterdam, Ankara, Berlin, Brussels, Madrid, Mexico City, Paris, Rome, Tel Aviv and Warsaw, as well as London. In early 2008, a team of Shared Services Group business support managers got to work streamlining how they do Boeing business, using Lean thinking and engaging in a new level of international cooperation.

"Our responsibilities are to take our knowledge of how to do things in country and integrate it with SSG and Corporate requirements," said Jason McCauley, a Berlin-based business support manager and team member.

Since that first meeting, the team has been working across international boundaries and with Boeing organizations in the United States to find ways to adapt Boeing policies and processes to local requirements. It has also sought ways to reduce costs despite rapid business growth, and to improve career development and job mobility for non-U.S. employees.

"SSG initiatives are lowering costs incurred by Boeing operating globally," said Shep Hill, president of Boeing International. "Their focus has been on improving processes, reducing costs and delivering world-class services. As these achievements are realized, it enables our business to grow profitably."

One sub-team's work supports employees who relocate around the globe. International relocation involves everything from obtaining housing and fulfilling visa and residency permit requirements to finding schools for employees' children. The team helped define responsibility, accountability and authority for all steps in the process, contributing to an improvement effort now under way worldwide.

Car leasing was another area the team improved. In the past, international employees on a long-term assignment to another country would rent cars until they could lease a car from a local dealer. Now, a simple online request form and a single, standard process gets employees out of rental cars and into more economical leased cars more quickly. The team's improvements have also reduced cell phone costs by managing variable requirements, like different roaming charges between countries.

Another need that became clear during the Lean sessions was creation of a guidebook and contact matrix for every office, listing country-specific requirements and contacts in Boeing and in country for everything from courier services to Human Resources. That's now being put together under the leadership of McCauley and Antoine Bois, business support manager in Paris. When completed, these tools will allow international office staff to fill in for one another locally and even across borders, and open up rotational opportunities. That's important to enhance career development.

"All of our Boeing offices have been put in place over the years for different reasons, using their own processes. I saw an opportunity for us to look for common processes to standardize and share," said Kim Alberts, who is based in Rome and is the SSG regional director for Europe, Israel and the non-U.S. sites in the Americas.

Said Bois: "When Kim [Alberts] asked me to do this I said, This is a good idea because it doesn't all come from the States. We are local and can really bring something to The Boeing Company. It is real teamwork."

McCauley agreed. "Having people from the international sites lead improvement initiatives while involving key functions from the U.S. represented a paradigm shift. Working together and including everybody really delivered positive results." ■

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PHOTO: Jason McCauley, Shared Services Group business support manager, calls his Berlin office from the Amsterdam Spares Distribution Center. SSG has standardized the ordering and contracting process for cellular phone service in most European countries. Standard processes strengthen Boeing's global presence. MICHA LIEVERS/BOEING

Offices support Boeing's international presence

Boeing has thousands of employees at hundreds of sites worldwide. Twenty-six international sites serve as administrative hubs for all Boeing's non-U.S.-based employees. Staff at these sites, from Corporate, Shared Services, Human Resources, Information Technology and other organizations, help ensure the company's business dealings comply with local laws—everything from getting in-country taxes paid to making sure Boeing policies conform to local laws about vacation time and working conditions. They also directly support Boeing International and the business units as these organizations develop international markets to grow the company's business. For more information, link to SSG International Business Support on the Boeing intranet at http://ssgintlsvcs.web.boeing.com/index.asp.

Boeing Company – **BA**

NYSE: Industrials/Aerospace & Defense

As of 7/24/09

$42.37

Stock snapshot

52-week range:	
52-week high	**$68.75**
52-week low	**$29.05**

International competitors

EADS* – **EAD.PA**

As of 7/24/09	**€12.98**
52-week range:	
52-week high	**€16.68**
52-week low	**€8.12**

**Prices in euros*

U.S. stock indexes

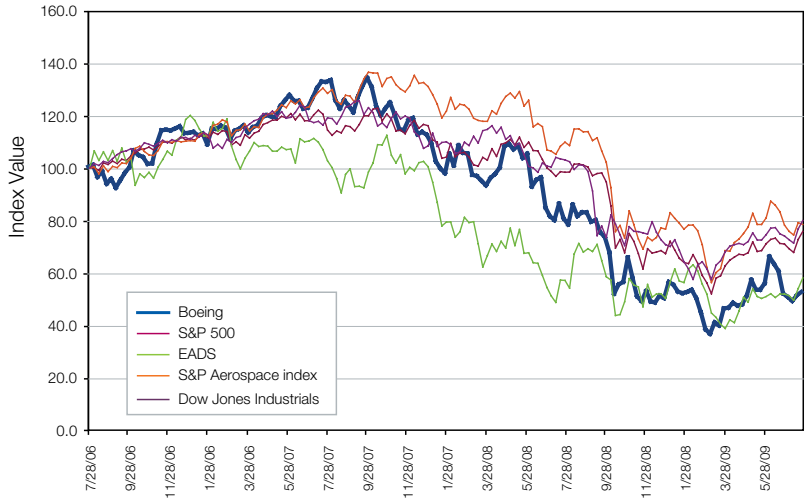
S&P 500	
As of 7/24/09	**979.26**
52-week range:	
52-week high	**1,313.15**
52-week low	**666.79**

S&P 500 Aerospace and Defense Index	
As of 7/24/09	**269.43**
52-week range:	
52-week high	**392.25**
52-week low	**194.13**

Dow Jones Industrials	
As of 7/24/09	**9,093.24**
52-week range:	
52-week high	**11,933.50**
52-week low	**6,440.08**

Stock price chart

The chart below shows the stock price of Boeing compared with other aerospace companies, the S&P 500 index, the S&P 500 Aerospace and Defense Index, and the Dow Jones Industrials. Prices/values are plotted as an index number. The base date for these prices/values is June 28, 2006, 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 stock, ShareValue Trust performance

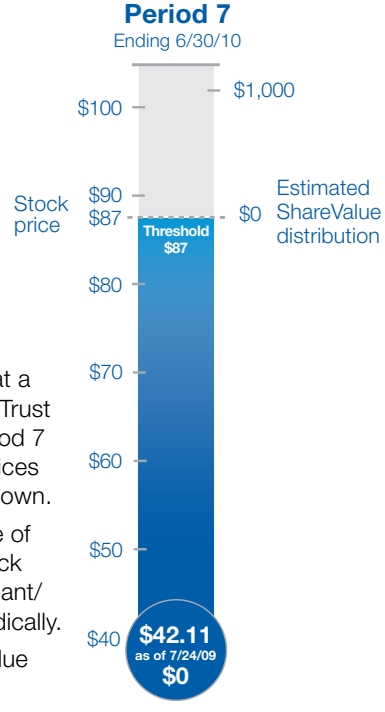
ShareValue Trust is an employee incentive plan that allows eligible employees to share in the results of their efforts to increase shareholder value over the long term.

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

This graph shows an estimate of what a "full 4-year participation" ShareValue Trust distribution (pretax) would be for Period 7 if the end-of-period average share prices were the same as the recent price shown.

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

For more information on the ShareValue Trust, visit www.boeing.com/share.



Milestones

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

50 years

Jose Gallegos
Thomas Herlikofer
Wayne Stebner
John Townsend

45 years

Pete Balotti
Charles Fain
Samuel Henson
John Kampsen
David Payne
Walter Pogulis
Joseph Scotti
Michael Taylor

40 years

Anthony Acevedo
Cecil Bell
Claude Brown
Salvatore Bufalino
Rebecca Caldwell
Daniel Castro
Ronald Currie
Donna DeVault
Aune Grefthen
Darrel Gunderson
William Halbmaier
Arthur Hayano
Scott Kraemer
Michael Nolan
Daniel Nowlan
John Pluta
Raymond Polson
Peter Reed
Gary Sandwick
Kenneth Serr
Danny Shelton
Robert Singer
Roosevelt Singleton
John Sudds
Jon Wainwright
Jerry White
Elaine Zahn

35 years

Terry Alspaugh
William Andy
Richard Baker
Floyd Beddingfield
Richard Bombard
James Bressani
Rodney Brown
William Butler
Raymond Cagle
Charles Caito
Terral Chamberlain
Peter Cheng
Jared Coyle
Vernell Crowder
Charles Davis
Tim Degani
Robert Dizard
Paul Dubeck
Wade Eldredge
Robert Foell
Joe Garcia
Linda Hanson
Gerald Hemmis
Wayne Hixson
Sheldon Hopper
Chris Johnson
Charles Jones
Nocqula Jones
Valdis Kibens
William Kleppinger
Michael Konecny
Stephen Krebel
Michael Kuntz
Aubrey Ladd
Ronald Leblanc
Daniel Lindgren
Marvin Majors
Douglas Mittelstaedt
Roger Moran
Vickie O'Connor
Alan Parker
James Peters
Judith Peyton
Sandra Pilon
Robert Purves
Jerry Rothrock
Willie Rush
Richard Russell
Robert Rusthoven
Robert Savage
Michael Sawyer
Leonard Schmitt
Adolph Schremp
Scott Shinmoto
John Smith
Ronald Smith
Richard Solberg
Cheryl Stokes
John Thompson
Patricia Wallace
Jon Watts
James Weldon
Robert White
Clyde Williams
Ronald Wimberly
Kandace Yagi
Frank Yourkowski

30 years

Steven Akers
Jimmy Allison
Richard Amigo
Barbara Amundsen-Stull
Michael Angle
James Anthis
Patrick Aragon
Robert Armbruster
Steven Arrieta
Lawrence Arroyo
Patrick Atwood
Robert Avena
Gary Backer
Denise Baldwin
Geoffrey Ball
Barbara Ballinger
Brian Bang
Ronald Barca
Ronald Beach
Wesley Beckmann
Michael Beeney
Maggie Bell
Renee Benage
John Bennett
David Berkas
Blane Berry
Brenda Bethards
Theodore Binder
Teri Binford
Karen Binns
Lynne Black
Pamela Bledsoe
James Blevins
Patrick Blodgett
Alan Boase
Fabian Borowiecki
Craig Bostow
Jimmy Bowles
Peter Bradford
Katherine Brady
Henry Brandis
Nona Braun
Gary Brog
Tommy Brook
Joseph Brown
Kirt Brown
Robert Brown
Gregory Browning
Derek Budworth
Douglas Buehler
Robert Bumpous
Rosalind Burney
Wayne Bye
Peter Camacho
Wayne Campbell
Jon Cannon
Robert Carnes
James Carpenter
Pamela Carroll
Esther Carter
Patricia Carter
Dawn Casey
Herminigilda Cataluna
Ruben Cervantes
Ronald Chambers
Frederick Clark
Joseph Clark
Gary Cole
James Collins
Teresa Conte
David Cooper
Gail Costanza
Roger Cox
Gerald Crawford
Harvard Crawford
Randal Crews
George Crofts
Timothy Curtis
Mark Dahl
Wayne Dalsanto
Vincent Danese
Mark Dannar
Brian Dapp
Kathy Darter
Lee Deegan
Eric Delgado
Deborah Dequereco
Bertram Dewell
Brian Dinkel
Bill Dolinski
William Dorrance
Michael Dosch
Randall Doty
Keith Douglas
William Douglass
Julie Drobny
Kenneth Duong
Nancy Dykeman
Mark Eaton
David Eck
David Edwards
Richard Ellerbrock
Angela Emil
Ritta Eng
Timothy Engel
Susan Erak
Alice Fagerlund
Sharon Finn
Michael Fisk
Jose Font
Jimmy Forrest
Glenn Fortin
Tom Frank
Francis Fulghum
Gregory Fulton
Gary Gaffney
David Gallagher
Gerald Gallagher
Vincent Gallagher
Michael Garrett
James George
Michael Germak
Judy Gillies
Esther Gonzalez
Gary Griffiths
David Gumm
David Guttman
Thomas Hakeman
Don Hall
Peggy Hanson
Constantino Hardi
Leigh Harlow
Kathleen Hatcher
Jeffrey Haws
Broderick Hayes
Carrie Hayes
Terrance Hedin
John Heigl
Peter Hemmen
Karen Hetrick
Donella Hines
Guy Hirsch
Dean Hnatiw
Daily Holman
James Holmes
Christopher Holtorf
Michael Horbath
Roger Houck
Steven House
Bryce Hoverter
William Howard
Mark Howze
Chris Hughett
Mildred Huxley
Jeffery Isaacson
Matias Jackson
Diane James
Daniel Jaspering
Rodney Jenson
Rodney Johnson
Stewart Johnson
Kenneth Johnston
Iris Jones
Johnny Jones
Chantal Joubert-Honacki
Mary Kane
Julie Kauffman
Dale Keim
Lorene Kellison
Brian Kelly
Maureen Kenny
Debra Kercher
Chaval Kespradit
Douglas Kihm
Steven Kindem
Oscar Kipersztok
Mary Kirby
Theodore Kitson
Alvina Kittelman
John Kladouris
Bart Knight
Diane Knight
Steven Konen
Steven Krogh
Tord Kurthy
David Labuhn
Eric Larsen
Claire Leon
Thomas LeRoy
Michael Levenberg
Bruce Lind
Martin Lindsay
Kevin Link
Karla Linstrom
David Locke
Sharon Loewen
George Lopez
Michael Lou
George Lowry
David Loyet
John Lyttle
Sandy Magin
Kathleen Manning
Janis Mantini
Julie Marquez
Steven Martin
Kathy Martini
Thomas Mason
Ty Mast
Gail Mathers
Stanley Mathews
Charles Mathis
Glenn Mathis
Timothy Matson
Mike Matthews
Linda Maynard
Patricia McDonagh
James McEachron
Thomas McGarry
John McLaughlin
Kevin McMahon
Bradley McNett
Joseph Mecca
Mark Meeker
James Metts
Craig Miller
Kristin Mitchell-Lewis
Denise Mohr
Steven Monks
Betty Moore
Rex Moore
Theodore Moore
Susan Morales
David Moran
Dan Moreillon
David Morris
Bonnie Mudge
Cathy Munson
Gary Narimatsu
Mohammed Nasrullah
Brian Nield
Harold Nordeng
Gregory Oakes
David Oberg
Randy Obrezar
Harry Odell
Craig Oen
Michelle Oliveira
Norman Oliver
Caren Ollivier
Sandra Olsen
Larry Ong
Roger Ottwell
Mitchell Owensby
Frank Parlini
Judy Patterson
Stephen Peirce
Linda Pendel
Aristeo Perez
Ronnie Perrigo
Stanley Perry
Dana Phillips
Daniel Pickett
Loren Poff
William Polfus
Timothy Pollard
Billy Pope
Howard Porter
Michael Porter
Sandra Postel
Carl Pruess
Michael Pudelkewicz
James Purcell
Islamah Rashid
Robert Rasmussen
Robert Ravetti
Mahender Reddy

Milestones

Kathy Regan
Michael Regan
Andrew Reheis
Timothy Reiterman
Ruth Remmereid
Lori Ressler
James Ries
Jeffrey Roach
Thomas Roller
Ron Rose
Pamela Ross
James Rowland
Shawn Rummel
Charles Russell
William Sager
John Santan
David Schimer
Greg Schmid
Wayne Scholl
Susan Schrier
Peter Schultz
John Schum
Carl Schuur
Bernhard Seidel
Jagdish Sharma
Christopher Shaw
Dennis Sheehan
Andrew Shelby
Alan Shinsato
Alpha Smith
David Smith
Gary Smith
Gregory Snaer
Johnny Souder
Cheryl Sovjak
Mark Spurling
Michael Sterger
Christopher Stewart
William Stinson
David Stoica
Michael Stratton
Charles Strubinger
Michael Sturm
Terrance Sullivan
William Swearengin
Evonda Tarver-Florez
Eric Thomas
Frank Thomson
Alan Thorndike
Jon Thurman
Hillard Torgerson
Terry Trimble
Jeffrey Uehling
Jon Van Buren
Yvonne Vargas
Robert Vasquez
Donald Velasco
Linda Vincent
Niel Vonmichalofski
Terry Wagner
Kenneth Wainwright
Barry Wajda
Garry Walker
Cindy Wall
Alan Wang
Joseph Ward
Wayne Warner
Thomas Warnke
Carey Welch
Kenneth Welsh
Edward Welter
Danny Wensloff
Kari Westman
George Westphal
Edwin Wheeler
Barbara Whetstine
Glen Whittaker
Lowell Wickman
Robert Wilcox
Barbara Wiley
Robert Williams
Wayne Wilmott
Bruce Wilson
Robert Wilson
Linda Wimer
Andro Wipplinger
Robyn Wittenberg
Dennis Wong
Gary Wood
Cheryl Wyatt
Terence Wysocki
Albert Yamada
Matthew Yanak
Earl Yates
James Yeilding
Michael York
Dennis Zapata
Gregory Zenner
Baxter Zilbauer
Steven Zirnfus
Ivo Zvolanek

25 years

Van Abbl
Brett Adams
Guy Adams
Linda Adkins
Gregory Akeson
Charles Allen
Leesa Allen-Caruso
Ned Alvarez
Darwin Amburgey
Philip Ament
Alan Amimoto
Bradley Anderson
David Anderson
Kevin Arflack
Carlos Argueta
Larry Arterburn
Kevin Baca
Richard Baever
Pamela Bailey
Joan Banfield
Mark Barcelona
Phyllis Barrett
Elke Bate
Michael Beamesderfer
Francis Belanger
Richard Bell
Patrick Bentson
Kathleen Bey
Carol Blatterspiel
Melanie Blea
Byron Blythe
Brent Bogar
David Bohanan
Michelle Boron
Scott Borow
Wayne Bowman
Robert Boys
Bobby Bradley
James Branley
Randall Braun
Dale Breite
Jeffrey Brening
Debbie Brenner
Scott Brozek
John Bruins
Linda Burden
Michael Byrd
James Cameron
Alfonso Campos
Matthew Capellupo
Steven Carpenter
Terrence Carrig
Dean Carroll
Edward Carroll
Marybeth Catoline
Gregory Caudel
Jose Cerda
Kenneth Chan
Hong Chau
James Chilton
Gloria Christiansen
Margaret Collier
John Commerford
Andrew Contreras
Melvin Cortez
Margaret Cortner
Lyle Couey
Cynthia Coutu
Terrence Cox
Timothy Crim
Paul Crnic
Catherine Dang
Ronald Davidson
Clarence Davis
Juliet Davis
Samuel Davison
Robert Dawson
Ana Day
Shue Dea
Richard Dean
Glorianne Decker
Randal Deidrick
Dohn Delarm
James Demick
Wanda Denson-Low
Wayne Derbyshire
Randy Devore
Kathy Diamond
Raymund Diaz
Hali Diep
Frank Digiovanni
Cecilio Dimacali
Robert Dobrowski
Marjorie Doepping
Kenneth Doerr
Dewayne Donley
Phillip Dorland
Sandra Dunek
David Easterly
Bashar El-Ali
David Elliott
Pamela Ellis
Gary Engen
Peter Eriksen
Randall Evans
Daniel Everett
Anthony Fazio
Keith Felling
Judith Ferguson
Kevin Fields
John Finigan
John Fleming
Ben Forbes
Juanita Fox
Teresa Franco
James Freeman
Ralph Freeman
Debra Friberg
Brian Fujimori
Alecia Gallanes
Robert Gallatin
Brian Garber
Jaime Gautier
Susan Gellatly
Ron Gendron
Richard Gerdsen
Kathreen Gibbs
Roy Gillmore
Jan Gilson
Gary Goebel
Jonathan Gosse
Frederick Gower
Alexander Grkinich
Jay Guengerich
Harry Gumm
Diana Guzman
Larry Haas
Nader Hafezizadeh
Maryann Halligan
Terry Hamm
Michael Harlan
Roger Harlow
Gregory Harper
Danette Harris
Gregory Hartnagel
Gerald Hasserjian
Mark Hastings
Garrett Heil
Helen Heinemeier
William Heller
John Herdlevar
Kippie Hicks
David Himes
Jeffery Hinch
Steven Hinde
Joel Hirsh
Edward Hoffman
Krishna Hoffman
Cleveland Holbert
Brad Hollers
Timothy Holt
Janet Hornberger
Peter Horne
Sharon Hughey
Jeffrey Hurt
Douglas Ilgenfritz
Bruce Inman
Brian Ivanoff
Lucius Jackson
Michael Jensen
Bradley Jeter
Norma Jimerson
Diane Johnson
Melinda Johnson
Scott Johnson
Chris Jones
Lee Jones
Milton Jones
William Jones
Katherine Josa
Kirk Kajita
Chris Kalvig
Kenneth Kaufmann
Donald Kenaga
Tien Khuat
Stephen Killman
John Kim
Curtis Kinchen
William Kirschbaum
Scott Kober
Richard Koch
Kenneth Konigsmark
Donald Kujawa
Kent Kymse
Laurence Lackmann
Kay Lafferty
Valerie Laflamme
Jack Lamson
Joseph Lancaster
David Lane
Barbara Langlois
Gary Lee
Philip Lehrke
Denise Lessik
Randy Ling
Kim Linton
Heinrich Lohmann
Mark Long
William Long
James Lovelace
John Lunardi
Robert Maclean
Rene Maldonado
Robin Mallette
Christina Maragay
Frank Marcott
Rowland Martin
Tom Martin
Linda Martineau
Joe Martinez
Karen Martins
Dale McCracken
Charles McMahan
John McCombs
Thomas McCorkle
Renee McGuinness
Lynn McPhee
Eric Means
Kim Medina
Michael Meraz
James Messer
Robert Methe
John Metz
Michael Meyer
Bruce Michniok
Diane Miller
Mary Miller
Larry Milligan
David Millman
Ben Mills
Vincent Misuraca
Neal Mogren
Shirley Molinari
Robert Molinary
Jack Moore
Michael Moore
Wilbur Moore
David Morales
Gerardo Morales
Edward Morella
John Morgan
Terri Morris
Mark Moschcau
Wilfred Moy
Gregory Muffler
Chris Mulvey
Gregory Muratore
Robin Murphy
Michael Musser
Brian Nelson
Ronald Nesheim
Joseph Nguyen
Michael Nguyen
Christie Nilson
Teri Obole-Kulla
Patrick Odonnell
Nancy O'Donoghue
Robert Okamura
Bruce Olsen
Michael O'Mara
Ryan Orme
Nathan Oshiro
Phillip Osmialowski
Melissa Ottinger
Jeff Otto
Daniel Outlaw
John Pallatt
Rosemary Palomo
Paul Papavero
Drew Pappas
Scott Parker
David Parks
Kirit Patel
Craig Patterson
Dean Patterson
Colette Perry
Dennis Perry
Carolyn Peterson
Donald Peterson
Randall Pettit
Khiet Pham
Vinh Pham
Joseph Phelps
Van Phung
Alice Price
Ralph Purcell
Kevin Purdy
David Raffa
Steven Rawlinson
Marie Ray
Douglas Reaney
Richard Riley
Gary Roberts
Scott Robertson
Jeffrey Rochetti
Raymond Roeder
Kathleen Rogers
Steven Rogers
Colleen Ronan
Gerald Rorabaugh

Milestones

Irvin Rosenfelder
Machelle Ross
Rudy Rossignol
Ronald Rosso
Molly Roth
Thomas Rowell
Deon Royster
David Ruggles
James Ryan
Art Saffell
Nannette Sanders
Debra Santos
John Scheibel
James Schneider
Charles Schnurpel
Paul Schoelen
David Schreiner
Marilyn Schunke
Kevin Segawa
Steven Senn
Branko Sertic
Ronald Shea
Timothy Sheehan
Lawrence Sherwin
Stanley Shiba
Joy Shneider
Louis Sieg
Dirk Sigrist
Kenneth Simmons
Ronald Simpson
James Singleton
Duane Skipworth
Christophe Smith
Judy Smith
Ronald Snowden
Robert Solaimani
Ward Spear
Kelly Stanley
Michael Stensen
Ryan Stillwell
Dan Stroot
Mark Struttman
Kevin Sullivan
Maria Sullivan
Mary Sullivan
Barry Sundet
Donald Svetich
Cledt Swenstad
Shirley Takatz
Tommy Talmadge
Julie Tarp
Michael Taylor
Andrew Tayon
Mary Telker
Kenneth Thomas
Marjorie Thomas
Daniel Thome
Andrew Thompson
David Thompson
Jeffrey Thompson
Joel Timms
Matthew Tom
Dung Tran
Timothy Tuttle
Joseph Twardoski
Alan Ulmer
Darwin Utter
Johnnie Uzzell
Tien Van
Eric Vanderslice
Kurt Vardaman
Raymond Ventura
Arthur Vetter
Marsha Vogel
Stephen Wahlberg
Patricia Walsh
Kenneth Warnock
Michael Warwick
Donald Waterhouse
Charles Watson
Patricia Watson
Madge Welch
Jerry Wert
Thomas Wert
Ryan Wheeler
Ted Whitley
John Whitsell
David Williams
Grant Williams
John Williams
John Williams
Peter Williams
Thomas Williams
Willie Williams
Kathryn Willis
Gerald Wilson
Guy Wilson
Robert Wright
Maria Wu
Alex Yi
Jeffry Yonemura
Darrell Young
Robert Young
Ross Youngs
Kathryn Zamboni
Richard Zuelke

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

Andrew Ade, 31 years
Steven Alberts, 32 years
Terry Anderson, 35 years
Christine Anstrom, 20 years
William Applin, 21 years
Rell Argyle, 36 years
Jack Ault, 35 years
Janice Baczewski, 22 years
Richard Bahl, 28 years
Jeffrey Baker, 35 years
Neil Ballinger, 29 years
David Barrows, 41 years
Robert Bashor, 20 years
Mark Beattie, 26 years
Randall Becker, 22 years
Arturo Belleza, 20 years
Roy Berry, 21 years
Philip Blaschke, 24 years
Russell Boesiger, 30 years
Valerie Bourton, 31 years
Daniel Brown, 36 years
Evelyn Brown, 23 years
Jeffrey Buckingham, 19 years
Paul Burdick, 22 years
Allan Campbell, 40 years
Bruce Carman, 10 years
Terry Carr, 30 years
Richard Carter, 24 years
George Chidester, 30 years
Russell Christianson, 30 years
Dennis Clark, 23 years
Terri Cook, 12 years
Joseph Cooledge, 36 years
Richard Cooper, 30 years
Cheryl Corgnati, 30 years
Diane Couch, 23 years
Phillip Cowan, 25 years
Glenn Cummings, 28 years
Michael Curtis, 29 years
Maxine Dandridge, 31 years
Shiela Daniels, 30 years
Lonnie Davis, 20 years
William Davis, 28 years
Fred De Ville, 25 years
Wayne Doucette, 26 years
Robert Dunn, 30 years
Stephen Enquist, 30 years
Timothy Eriksen, 27 years
Linda Esche, 28 years
Clara Ezell, 31 years
Ralph Fluchel, 37 years
Betty Freeman, 29 years
Cliff Frome, 23 years
Brian Glazebrook, 39 years
Kristine Groth, 23 years
Ronald Hahn, 30 years
Henry Hall, 37 years
Roger Hall, 36 years
Don Hamell, 31 years
Forrest Hammer, 42 years
Jack Hanke, 42 years
John Harcinske, 7 years
Richard Harp, 43 years
Clarence Harris, 21 years
Paul Hedeen, 18 years
Norman Hennigs, 37 years
Charlette Hiatt, 16 years
Alex Hornsby, 41 years
Charles Howard, 28 years
Richard Jennings, 10 years
Carl Johnson, 35 years
Raze Johnson, 34 years
Robert Johnson, 34 years
Richard Kane, 31 years
Steve Kassa, 42 years
James Kelley, 20 years
Lillie Kibby, 33 years
David Kroll, 24 years
Terry Lampel, 3 years
Chester Little, 11 years
Janice Little, 35 years
Erik Loodus, 30 years
Charles Magnuson, 43 years
George Mandel, 39 years
Eldon Maples, 36 years
Ronald Marcotte, 5 years
Terry Maury, 30 years
William McClain, 22 years
Maria McFarlane, 13 years
Paula McGladrey, 17 years
Leota McKelvin, 36 years
Kerry McLaughlin, 31 years
James Meagher, 46 years
Lois Mezek, 12 years
Thomas Mietus, 18 years
Donald Moore, 29 years
Richard Motsenbocker, 10 years
Linda Munden, 28 years
Hilra Nelson, 22 years
Stephen Norman, 32 years
Carla Ottesen, 11 years
Michael Pappas, 23 years
Cheryl Park, 16 years
Anthony Perry, 29 years
Donna Perry, 22 years
Arthur Peterson, 12 years
Michael Piel, 11 years
Lemoyne Pierre, 24 years
Vickie Pillon, 32 years
Joe Poage, 23 years
Edwin Porubec, 30 years
Carolyn Pritzl, 21 years
Rhonda Ramsey, 23 years
Robert Reichardt, 28 years
Paul Retka, 32 years
Allister Robinson, 29 years
Tommy Rohde, 34 years
Joellen Rubick, 43 years
Gordon Runge, 31 years
Duane Rush, 35 years
Sylvia Sand, 33 years
Carol Schweikert, 31 years
Marilyn Sewell, 37 years
Granville Shavers, 5 years
Kenneth Shaw, 42 years
Gary Smith, 47 years
Martin Soll, 4 years
Donald Spears, 20 years
Thomas Stevenson, 31 years
Claudia Stine, 16 years
Wayne Straub, 31 years
Laura Sullivan, 29 years
Carolyn Tolbert, 21 years
David Tomko, 16 years
Stephen Tompert, 13 years
James Townsend, 41 years
Donald Treise, 28 years
David Vanderwal, 36 years
Paulus Vandommelen, 37 years
Gary Vangysel, 17 years
Dennis Wait, 30 years
Dwight Whitaker, 20 years
Ronnie White, 42 years
John Whitehurst, 4 years
John Widell, 30 years
Christopher Widger, 31 years
Cherie Wilcox, 31 years
Deborah Wilson, 31 years
Alvin Yarbrough, 26 years

Milestones

IN MEMORIAM: The Boeing Company offers condolences to the families and friends of the following employees.

Frank Allen, supply chain management analyst; service date March 26, 1990; died July 7

William Amico, aircraft production mechanic; service date Jan. 5, 1994; died July 10

Trent Baylor, quality systems specialist; service date Sept. 5, 1990; died July 6

Robert Brashears, product and services manager; service date Jan. 29, 1980; died July 14

James Buehler, test and evaluation lab technician; service date June 17, 1968; died June 26

Wesley Crow, engineer; service date Nov. 1, 1983; died July 11

John Ennes, mechanical systems design and analysis engineer; service date Aug. 11, 1968; died June 29

Ronald Fox, estimating and pricing specialist; service date Aug. 30, 1994; died June 30

Robert Habowski, aviation maintenance technician and field inspector; service date March 16, 1981; died July 18

Diane Kiske, business and planning analyst; service date March 11, 1984; died June 28

Richard Moser, procurement analyst; service date Jan. 20, 1986; died July 19

Larry Muenks, crater and packer; service date June 13, 1978; died July 8

Ann Poole, information technology manager; service date June 5, 1979; died July 6

Jodie Robinson, metal services processor; service date Aug. 28, 1993; died July 12

Randy Robinson, quality production specialist; service date Sept. 6, 1985; died July 15

Larry Whitehead, systems engineer; service date Oct. 15, 1984; died July 20

Around Boeing

PHOTO: The first Strategic Airlift Capability C-17 Globemaster III takes off following a delivery ceremony at the Boeing final assembly facility in Long Beach, Calif. The advanced airlifter arrived at Pápa Air Base, Hungary, last month. PAUL PINNER/BOEING

BOEING DELIVERS 12-NATION CONSORTIUM'S 1ST C-17

Last month marked the delivery of the first of three C-17 Globemaster III aircraft to a 12-nation consortium that will share the advanced airlifters for the next 30 years. NATO officials said the consortium, known as the Strategic Airlift Capability, represents a model for the pooled acquisition and management of defense capabilities.

The consortium's first C-17 is based at the new Heavy Airlift Wing at Pápa Air Base, Hungary. Contributed by the United States—a consortium member—the first aircraft bears the number "01" on its nose, symbolizing the first aircraft delivered to the group. The fleet will support military, humanitarian, disaster-relief and peacekeeping missions.

"I salute the 12 nations that have joined together to form the Strategic Airlift Capability," said U.S. Air Force Col. John Zazworsky, the first commander of the Heavy Airlift Wing. "This aircraft, along with the two that will follow, is a direct result of their commitment to giving [the consortium] advanced airlift capabilities that will save lives around the world."

The Strategic Airlift Capability group includes 10 NATO nations—Bulgaria, Estonia, Hungary, Lithuania, the Netherlands, Norway, Poland, Romania, Slovenia and the United States—and Partnership for Peace members Sweden and Finland. They will share acquisition and operating costs for the three C-17s.

The NATO Airlift Management Agency is responsible for the acquisition, day-to-day management and support of the fleet. A Boeing team will provide support for the fleet under the C-17 Globemaster III Sustainment Partnership offered by Integrated Defense Systems' Global Services & Support business.

Boeing is scheduled to deliver the two remaining aircraft in September and October.

Around Boeing

PHOTO: A Next-Generation 737-900ER (Extended Range) marks Continental Airlines' 75th anniversary in retro style. JIM COLEY/BOEING

CONTINENTAL AIRLINES CELEBRATES 75TH ANNIVERSARY WITH 'RETRO' AIRPLANE

Continental Airlines kicked off its 75th anniversary celebrations recently with the delivery of a new Boeing Next-Generation 737-900ER (Extended Range) jetliner. To commemorate the milestone, Continental employees voted on a special livery for the jet and several traveled to Seattle's Boeing Field for the delivery. Continental then flew the airplane to its hubs in Houston, Newark, N.J., and Cleveland for celebrations with its employees and retirees.

Although sporting an old livery outside—employees chose the 1947 paint scheme "The Blue Skyway"—the new 737-900ER features advanced technology on the inside. For example, the airplane's GPS Landing System will be used later this year at Newark Liberty International Airport, which is implementing a NextGen satellite-based landing system. Based in Houston, Continental is the world's fifth-largest airline and flies the newest, most fuel-efficient jet fleet of all major U.S. network carriers, according to the airline.

BOEING SPONSORS ENGINEERING STUDENT OF THE YEAR AWARD

Boeing is sponsoring the fourth annual Engineering Student of the Year Award in association with *Flight International* magazine. Open to engineering students around the world, the 2009 award will be presented in November during the Flightglobal Achievement Awards at the Dubai Air Show in the United Arab Emirates. The competition is open to any full- or part-time engineering student pursuing a recognized academic degree. A panel of experts will review each nominee's work for its impact on current or future aeronautical or space technology in areas such as new or enhanced capabilities, systems, processes or tools; new levels of performance; and improved life cycle costs. For more information or to submit an entry before the Sept. 25, 2009, deadline, visit www.flightglobal.com/student.

NEW PARTNERS JOIN SUSTAINABLE FUEL GROUP

Last month, Boeing and the Sustainable Aviation Fuel Users Group, an airline-led industry group working to accelerate the commercialization and availability of sustainable biofuels, announced several new members. Alaska Airlines, British Airways, Cathay Pacific, TUIfly and Virgin Blue joined existing members Air France, Air New Zealand, ANA (All Nippon Airways), Cargolux, Gulf Air, Japan Airlines, KLM, SAS and Virgin Atlantic Airways. Boeing and Honeywell's UOP, a refining technology developer, are associate members.

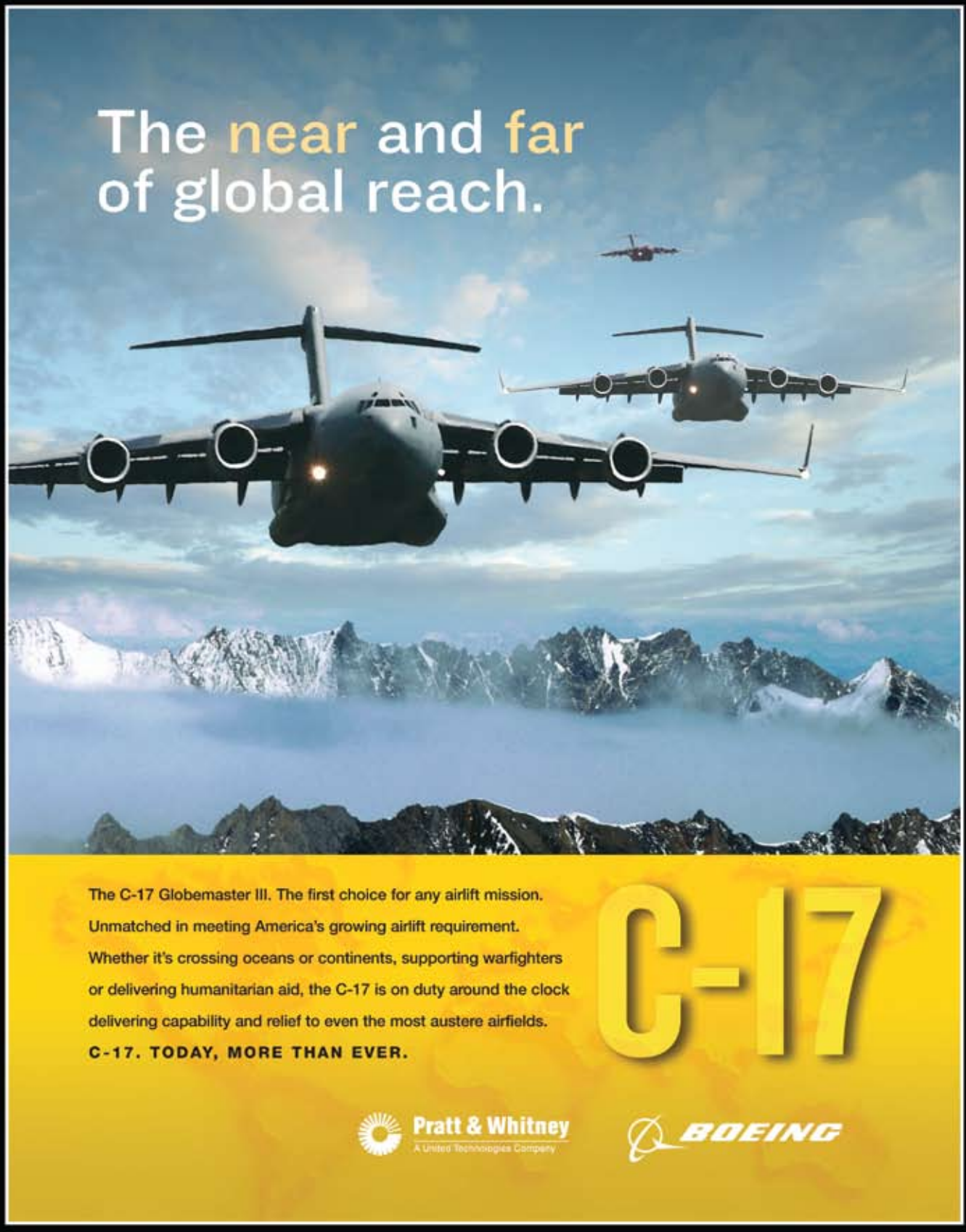
To be eligible, members must subscribe to sustainability criteria, including the expectation that plant sources for jet fuel be developed in a manner that does not compete with food production or jeopardize drinking water and that minimizes the impact on biodiversity. For more information, visit www.safug.org.

COPA AIRLINES ORDERS 13 737-800S

Panama's Copa Airlines recently announced an order for 13 737-800s, plus options for an additional eight. The airline now has a total of 27 Next-Generation 737s on order. The 737-800s will be outfitted with the new Boeing Sky Interior, which features 787-style sculpted sidewalls and window reveals.

Copa was the first carrier in the Americas to incorporate blended winglets on its 737s. All of Copa's Next-Generation 737s use the distinctive curved wing ends, which improve fuel efficiency and lift while reducing engine wear and carbon dioxide emissions. From its base at Tocumen International Airport, Copa flies four of the world's longest 737 routes—to Buenos Aires, Argentina; Santiago, Chile; Sao Paulo; and Los Angeles.

This new Flight International "house" ad has been developed to support a call for entries for the Boeing-sponsored Engineering Student of the Year Award. Part of the renowned Flightglobal Awards, the Boeing Engineering Student of the Year Award recognizes an outstanding student working on aeronautical or space technology. Qualified candidates are encouraged to apply before the September 25 deadline.



This new C-17 team ad developed by Integrated Defense Systems positions the C-17 as the indispensable backbone of airlift capability. It communicates how the world depends on the C-17 for many vital missions. Look for this ad in key military and congressional publications.