



# Frontiers

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SEPTEMBER 2012 / Volume XI, Issue V

## Starring role

After 50 years, the sky is not the limit for Boeing Huntsville



**ERNIE LANDS THE CLARET JUG BEAUTIFULLY.**

Boeing is proud to be a sponsor  
of Ernie Els and to congratulate  
him on his remarkable victory  
in the British Open.

 **BOEING**



# 22 Rocket science ... and beyond

When a handful of Boeing engineers set up shop in Huntsville, Ala., 50 years ago, they were there to help NASA's Apollo program take astronauts to the moon and back. Today, Boeing employs some 2,600 people in Huntsville working on a wide variety of projects. These include developing the core stage of a powerful new rocket and a design center with 300 engineers supporting programs across the company, such as the 787 Dreamliner.

**COVER IMAGE: ENGINEERS TIM WALTERS, LEFT, AND JOSEPH QUERIN CHECK THE WELD QUALITY OF FRICTION STIR WELDING TOOLING AT THE MARSHALL SPACE FLIGHT CENTER IN HUNTSVILLE, ALA. THIS ADVANCED WELDING PROCESS WILL BE USED ON THE NEW SPACE LAUNCH SYSTEM'S ROCKET CORE. BOB FERGUSON/BOEING**

**PHOTO: DEBBIE BARNETT, DIRECTOR OF GROUND-BASED MIDCOURSE DEFENSE (GMD) PROGRAM INTEGRATION, WITH AN INERT EXO-ATMOSPHERIC KILL VEHICLE IN THE GMD TRAINING FACILITY IN HUNTSVILLE. THE VEHICLE IS THE "TIP OF THE SPEAR" IN THE MISSILE DEFENSE WORLD—DESTROYING BALLISTIC MISSILES THROUGH FORCE OF COLLISION. ERIC SHINDELBOWER/BOEING**

## Ad watch

The stories behind the ads in this issue of *Frontiers*.

*Inside cover:*



This ad congratulates Ernie Els for winning the 141st British Open Championship at Royal Lytham & St. Annes Golf Club in Lancashire, U.K., in July. Boeing initiated the sponsorship this year with Els, one of the world's most

accomplished and best-known golfers.

*Page 6:*



This new ad highlights Boeing's leadership in satellite hosted payloads, an innovative business model that delivers capability, cost and schedule advantages to customers. The ad currently appears in trade publications.

*Back cover:*



In June, Boeing announced the launch of Milestones in Innovation, its first official iPad app available for free from the App Store. The app brings nine decades of aviation innovation to life through beautiful still and video imagery and an interactive timeline.



# Frontiers

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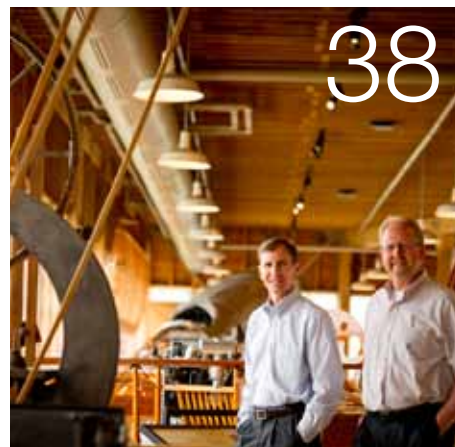
## Historical Perspective

Boeing and Air Canada have enjoyed a rich history since the airline started service 75 years ago with a Boeing Stearman mail plane and Lockheed 10A Electra. An industry pioneer with such innovations as aircraft de-icing and onboard oxygen systems, Air Canada has a growing fleet of Boeing jets that will soon include the 787 Dreamliner. PHOTO: AIR CANADA



## Star of the south

Boeing Brazil was launched a year ago to build an even stronger relationship with the largest country in South America. Brazil, a Boeing customer for the past 80 years, has today established itself as a significant global player—and a major market for Boeing military and commercial products. PHOTO: SHUTTERSTOCK



## What will they think of next?

Meet some of Boeing's most prolific patent-holders. Whether it's a device that allows engineers to view hidden aircraft structure, much like Superman's X-ray vision, or a digital tap hammer that locates defects in composite structures, their inventions help keep Boeing ahead of the competition.

PHOTO: BOB FERGUSON/BOEING

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Boeing has been pushing the frontiers of flight for nearly 100 years, so it's not surprising that many of its employees have a passion to fly. The Boeing Employees Flying Association offers just that opportunity in the Puget Sound area; the company also has flying clubs at other major sites. Those who have learned to fly through the association or earned their pilot's license include an astronaut and several Boeing test pilots. PHOTO: BOB FERGUSON/BOEING



## INSIDE

### 07 Leadership Message

Developing strong leaders is crucial for Boeing to continue to be successful and competitive, according to Norm Bartlett, vice president, Leadership Talent Management Organization Effectiveness. The company is accelerating leadership opportunities and experiences for employees to empower the next generation of leaders, who will take Boeing into its second century.

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## While supplies last

At Boeing's site in Long Beach, Calif., employees saw an opportunity to save money and cut waste by collecting unneeded and surplus office supplies and making them available for reuse at a convenient central location. Items that can't be reused are recycled or donated to local nonprofit agencies. PHOTO: PAUL PINNER/BOEING

A large satellite payload is being assembled in a cleanroom. The payload is a complex structure with a blue base and several cylindrical components. It is suspended by blue straps. The cleanroom has blue acoustic panels on the walls and ceiling. Two workers in white protective suits are visible in the foreground, working on the payload. The floor is light gray and has some equipment and cables. The overall scene is a high-tech manufacturing environment.

## ONE SOURCE HOSTING FOR A HOST OF PAYLOADS.

At Boeing, we build the buses and payloads for a range of commercial and government satellite systems. As a result, our hosted payloads come with unique advantages. Your payload can be perfectly integrated into complementing architecture with less development and infrastructure investment. So you can be on orbit sooner with full capability at lower cost. And in a better place from day one.

 **BOEING**

# Taking the lead

Developing tomorrow's leaders is essential to Boeing's success

The Boeing Leadership Center has always been considered a crossroads, a place where employees from around the globe could come together to stimulate one another's thinking, to share ideas and best practices, and to build relationships.

By the end of this year, more than 100,000 employees will have attended classes at the center in St. Louis since it opened in 1999. (See story, Page 30.) But we all know that lessons in leadership don't always happen in a classroom.

As a result, Leadership Development is continuously upgrading and revising its curricula to support our business requirements and objectives. By the end of this year, we will have offered nearly 300,000 leadership development hours in 2012 alone through our foundational, executive and functional excellence programs.

We want to accelerate the readiness of our future leaders in support of the company's seventh strategic imperative—empowering and deploying a new generation of leaders. For example, when Boeing had an influx of new managers, as Commercial Airplanes started to increase program production rates, Leadership Development partnered not only with Commercial Airplanes to deliver New Leaders Training at work sites in Puget Sound and Boeing South Carolina but also with Defense, Space & Security on curriculum changes that support them. As a result, improved new leader training will be offered throughout the enterprise in 2013.

Boeing Leadership Center programs reinforce the company's expectations of leadership by employees at every level. So does our Leaders Teaching Leaders program, where Boeing leaders serve as coaches and mentors. The contribution of our Leaders Teaching Leaders program has been significant: Hundreds of Boeing leaders have spent thousands of hours as teachers at the Leadership Center. Through the Leaders Teaching Leaders program, they have shared their wisdom, and their own personal stories of success and failure and the lessons learned from both. Those are lessons that new and seasoned managers take back to their work sites to share with others.



“Lessons in leadership don't always happen in a classroom.”

— Norm Bartlett

*Vice president, Leadership Talent Management  
Organization Effectiveness*

PHOTO: PETER GEORGE/BOEING

Our leadership development programs have come together as part of a Community of Practice to collaborate, share best practices and align around common practices, processes and tools. Ultimately, the Community will give employees greater visibility into numerous opportunities and experiences that may enable them to accelerate their leadership development. These development and rotation programs provide another avenue for those aspiring to leadership positions.

As Boeing prepares to celebrate its first 100 years as an aviation and aerospace company, we are evaluating how we deliver Leadership Development experience to help our people successfully navigate and grow the business over the next 100 years.

Our Leadership Development team and others from throughout the company are engaged in these discussions. They are focused on improving the Boeing employee experience—from the moment we have that hiring conversation with a job candidate, throughout that person's Boeing career and even beyond. We want to continue to provide a work experience that will attract the most talented men and women, whose knowledge and skills will help us grow and strengthen our business. ■

## Snapshot

**GO FOR LAUNCH:** With steam from the catapults rising over the flight deck, the crew of the USS *John C. Stennis* prepares to launch a Boeing F/A-18 Hornet from the Nimitz-class carrier in late June. A Boeing team recently visited the carrier off the coast of San Diego to observe flight-deck operations and understand challenges to operating unmanned aircraft from a carrier deck alongside manned jet fighters. Boeing is developing an Unmanned Carrier-Launched Airborne Surveillance and Strike, or UCLASS, aircraft. PHOTO: U.S. NAVY



## Quotables

“It will be really sweet to celebrate 100 years as a company with the first flight of CST-100.”

– John Elbon, Boeing vice president and general manager of Space Exploration, talking to reporters after NASA announced last month that Boeing was selected to continue developing a seven-person spaceship, the Crew Space Transportation, or CST-100. The spacecraft is expected to be ready for test flights by 2016, which is also when Boeing celebrates its 100th birthday. Los Angeles Times, Aug. 4

“We are setting the standard in the continent.”

– Ethiopian Airlines Chief Executive Officer Tewolde GebreMariam on being the first African airline—and third in the world—to start revenue service with the 787. USA Today, Aug. 16





# Planes, teams and automobiles

For this 777 mechanic, it's all about teamwork—on the line, in the garage and in the community *By Joe Young*

In this *Frontiers* series that profiles employees talking about themselves and what they do for Boeing, Joe Young, a mechanic on the 777 program in Everett, Wash., explains his three passions—working with kids, working on cars and helping build Boeing airplanes.

PHOTO: GAIL HANUSA/BOEING

**A**s a mechanic and now a team lead, my passion is leading and mentoring teams—and working on airplanes.

But I also love working on cars!

My family has a connection with cars. We race them and rebuild them. In fact, the Young family Scrap Iron racing team has been inducted into the Evergreen Speedway Hall of Fame in Monroe, Wash.

I started working on cars in my dad's engine rebuild shop when I was only 13 years old. After my dad lost his building lease, I held a number of jobs. Seeking more financial security, I started working at Boeing nearly 25 years ago.

Working on cars and airplanes has a lot of similarities. And while it requires a mechanical aptitude, it's often the teamwork that brings the most rewards. I've worked regularly on the 777 since the very first airplane. I've touched every system from wing tip to wing tip and from nose to tail.

What we do in Final Body Join is really unbelievable. As team lead, my job is to make sure my team has what it needs to install the hydraulics and pneumatics, complete the rigging, and complete the flight deck in only three days. This is a phenomenal

crew. We know how to get along with one another and we work well with Engineering and Quality.

Our job is to give our customers what they want—the best 777 we can build.

My other passion is working with kids. Years ago I volunteered with my son's middle school football team. Even though he moved on long ago, I stayed. I continue to coach football, but when the regular season is over I hold weight-training classes.

Although weight training is the objective, my real emphasis is on working with the boys and girls. For me it's about stressing education, fitness and eating right. An added benefit is that many of the former students return to the middle school as volunteers to meet their high school community service hours.

I'm happy I'm able to use the skills I've learned at Boeing to make a difference in the community. I started volunteering more than 10 years ago, and every once in a while, a former student who is now a Boeing employee shows up in my work area. It's satisfying knowing that I may have made a difference in one person's life. ■

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# Wings of innovation

With a growing fleet of Boeing airplanes, Air Canada continues to be an aviation pioneer

By Kathrine Beck



When two passengers boarded a Lockheed 10A Electra loaded with mail in Vancouver, British Columbia, on Sept. 1, 1937, they probably didn't know they were stepping into history.

The 50-minute flight to Boeing Field in Seattle would launch what was to become Canada's national airline and one of the leading innovators of modern commercial aviation.

Two years later, the airline would pioneer onboard oxygen systems and introduce the first-ever de-icing systems. Later innovations would include the first computerized reservation system, the first jet-powered freighters, the so-called "black box" that would help unravel causes of accidents, the first nonsmoking flights and even the first electronic boarding pass.

"We have to continue to build on our innovation agenda," Air Canada Chief Executive Officer Calin Rovinescu said recently. "This means having the courage to effect transformation and be early adopters."

Boeing and Air Canada have a long history. The airline started with a Boeing Stearman mail airplane and the Lockheed 10A Electra. Additionally, Philip Johnson, who left Boeing in 1933, was appointed vice president of operations for Trans-Canada Air Lines in 1937 and guided establishment of what would become Air Canada.

In 1939, Johnson resumed his former position of Boeing president. Many of the airline's early technical people came from Boeing.

Today, 75 years after that first flight from Vancouver to Seattle, Air Canada has built a fleet of more than 200 airplanes including 30 Boeing 767-300s, six 777-200LRs and 12 777-300ERs. The airline also has five more 777-300ERs on order.

That transformation is continuing with the addition of the 787 Dreamliner. The airline has 37 firm orders for the 787 and options for 13 more. First delivery is scheduled for 2014.

"We are big believers that the 787 will dramatically improve our capabilities," Rovinescu told an audience that gathered to begin a 75th anniversary celebration in Toronto last March, which included a special appearance of the 787 on its Dream Tour.

"Having a 30 percent improvement

## From a Boeing Stearman mail plane to the 787 Dreamliner, Boeing and Air Canada have a long history.



### PHOTOS: (Clockwise from far left)

A Boeing Stearman mail plane, one of the first airplanes in Air Canada's fleet.

**BOEING ARCHIVES** Air Canada flight crew donned vintage uniforms at the airline's 75th Anniversary event. **GREG THON/BOEING**

A Boeing 747-200 in Air Canada livery on a test flight in 1974; a Trans-Canada Air Lines Canadair North Star, a re-engined version of the Douglas DC-4, taxis at New York's LaGuardia Airport in 1952.

**AIR CANADA ARCHIVES** Air Canada captains Jeff Lewis, left, and Jay Musselman flank Calin Rovinescu, president and CEO, in front of the first passenger aircraft that Trans Canada flew—the Lockheed 10A Electra; a Boeing 787 Dreamliner arrives in Toronto as part of the Dream Tour and to help begin Air Canada's 75th Anniversary celebration. **AIR CANADA**

in fuel efficiency is extremely exciting for us," he said then.

The 787 Dream Tour airplane shared the spotlight with a Lockheed 10A Electra all-metal monoplane—the airplane model that started it all for Air Canada. And the symbolism was not lost.

"Today is a double celebration for Air Canada as we welcome the future, embodied by the Boeing 787 Dreamliner, and take stock of our accomplishments over our 75-year history," Rovinescu told the crowd.

Rovinescu said he is most proud of Air Canada's "innovation and courage to try different things on for size ..."

Air Canada was the first North American operator to offer lie-flat beds in business class on international routes, he noted.

In 2012, Air Canada was ranked Best International Airline in North America in a worldwide survey of more than 18 million airline passengers conducted by independent research firm Skytrax. When Air Canada won the award for the third year in a row, Skytrax itself called the feat "remarkable."

Privatized in 1989, Canada's flag carrier is now the 15th-largest commercial airline in the world and in 2011 served more than 33 million customers. Its fleet flies to more than 180 destinations on five continents. The airline also is a founding member of Star Alliance, whose member airlines serve more than 1,200 destinations in nearly 200 countries.

But Air Canada is more than a national airline in Rovinescu's view. Greater than

a third of its business is trans-border traffic from the United States. With hubs in Vancouver, Toronto and Montreal, that is part of what he calls "our global powerhouse strategy to attract traffic through hubs that connect to places where passengers otherwise can't fly direct."

The 787 clearly fits that strategy.

"We can start flying to new destinations where we haven't been able to fly before," Rovinescu said. "We're looking at destinations in India and many other markets that aren't currently served because we can't make the business case." ■

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# The right choice

Employees encouraged to carefully consider the best 2013 medical plan for them and their families

By Alex Wilson and Ken Groh

**D**avid Yingling, a 747 chief technical pilot for Boeing Commercial Airplanes in Renton, Wash., has one daughter in college and two teenagers in sports. The right medical plan is important to him and his family.

"My kids are pretty typical. They play sports, and we all live active lifestyles," Yingling said. "Usually this means a broken bone or something like that a year."

He and his family are on the Traditional Medical Plan, but they are considering their options in 2013, following the announced changes to the 2013 medical plans. Boeing will increase paycheck contributions to the Traditional Medical Plan and HMO options, and is replacing the PPO+Account plan with the Advantage+ plan—which does not require a paycheck contribution for many employees and is the lowest cost for some.

With the change in the medical plans, employees need to carefully consider their options, said Rick Stephens, senior vice president of Human Resources and Administration.

"Depending on the employee, any of the plans could be the most economical," Stephens said. "Employees need to focus on several criteria while they make their choice."

That means, he said, employees need to consider the type of medical expenses they anticipate for next year; how paycheck contributions will change; the deductibles of each plan; and the value of putting additional funds in a tax-advantaged health savings account similar to a 401(k).

Yingling is not alone as he considers next year's medical plans. Focus groups with employees around the United States have shown that the majority are interested in the Advantage+ and how it fits their lifestyles.

The plan comparison chart (see opposite page) can help employees prepare to choose a medical plan option during annual enrollment.

During annual enrollment, which begins Nov. 5, Boeing will offer tools and resources to help employees compare the plans. "It could add up to saving a lot of dollars they didn't expect," Stephens said.

These tools on "Your Benefits Resources" will include:

- Medical Expense Estimator – Compares plans and estimates medical costs for next year with a side-by-side estimation of the bottom-line costs
- Health Plan Comparison Chart – Provides information

on copayments, coinsurance for office visits, prescription drugs and more with a comparison of how each plan covers services and supplies

- Health Care Cost Summary – Summarizes an employee's personal health care claims, including the total cost and what the employee paid
- Flexible Savings Account Calculator – Shows the amount that an employee could contribute to his or her flexible savings account, or FSA, to help pay health care expenses
- Health Savings Account Calculator – Helps calculate how much employees can contribute to their accounts to help pay expenses today and save in the account for future expenses

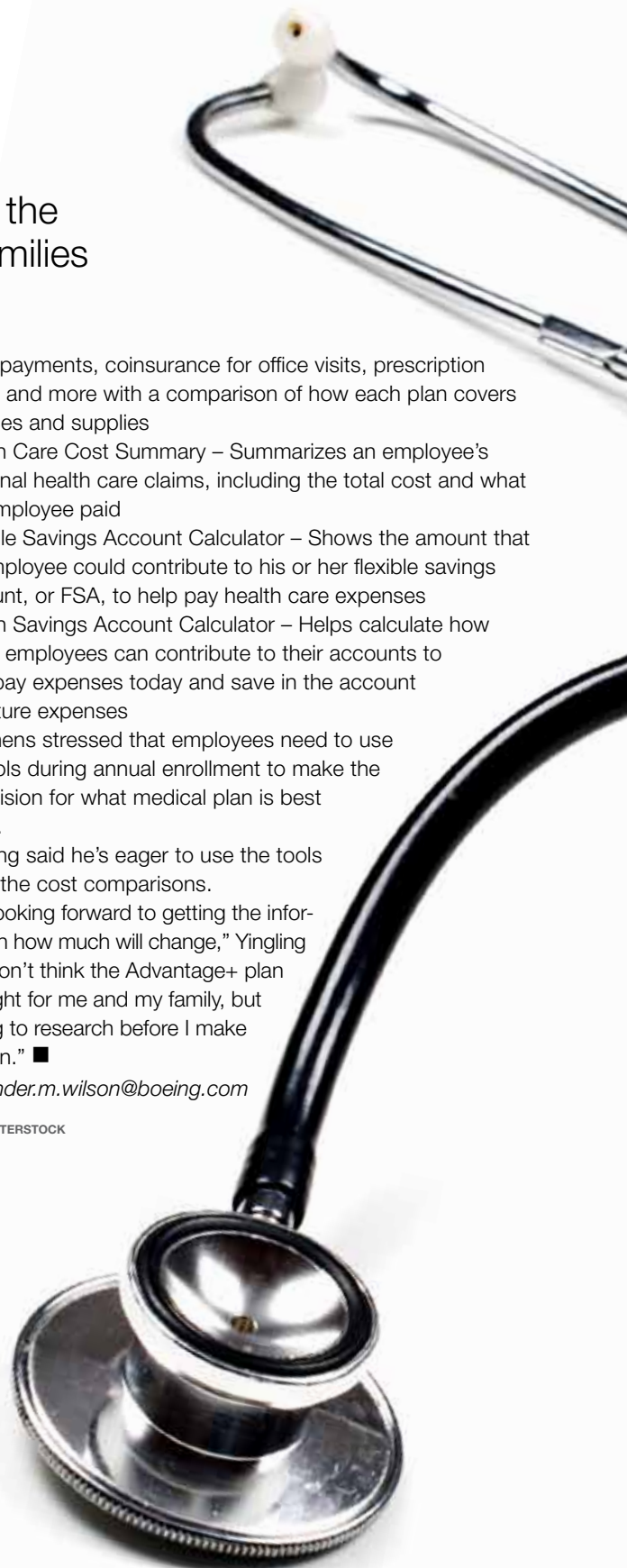
Stephens stressed that employees need to use these tools during annual enrollment to make the best decision for what medical plan is best for them.

Yingling said he's eager to use the tools to make the cost comparisons.

"I'm looking forward to getting the information on how much will change," Yingling said. "I don't think the Advantage+ plan will be right for me and my family, but I'm going to research before I make a decision." ■

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PHOTO: SHUTTERSTOCK



# Comparison of 2013 nonunion health care plan options

Plan features	Plan options		
	Advantage+ health plan	Traditional Medical Plan	HMOs and similar plans (e.g., Select Network Plan)
<b>Annual deductible</b>	<ul style="list-style-type: none"> <li>\$1,250 per individual; \$2,500 per family</li> <li>Network and non-network combined</li> </ul>	<ul style="list-style-type: none"> <li>\$300 per individual, not to exceed \$900 per family</li> <li>Separate non-network deductible: \$600 per individual, not to exceed \$1,800 per family</li> </ul>	Not applicable
<b>Health Savings Account</b> (Boeing contributions)	\$600 per individual; \$1,200 per family	Not applicable	Not applicable
<b>After the deductible, the plan pays ...</b> (for most expenses)	<ul style="list-style-type: none"> <li>90% network</li> <li>60% non-network</li> </ul>	<ul style="list-style-type: none"> <li>90% network</li> <li>60% non-network</li> </ul>	Not applicable (Plan pays 100% after copayments for most services)
<b>Annual out-of-pocket maximum</b> (for most expenses)	<ul style="list-style-type: none"> <li>Network: \$2,850 per individual; \$5,700 per family</li> <li>Non-network: \$4,450 per individual; \$8,900 per family</li> </ul>	<ul style="list-style-type: none"> <li>Network: \$2,000 per individual, not to exceed \$6,000 per family (does not include copayments for office visits, emergency room, prescription drugs)</li> <li>Non-network: \$4,000 per individual, not to exceed \$8,000 per family (does not include copayments)</li> </ul>	Generally not applicable
<b>Paycheck contributions*</b>	No	Yes	Yes
<b>Office visits</b>	90% after deductible	<ul style="list-style-type: none"> <li>\$20 copayment – primary care physician</li> <li>\$30 copayment – specialist</li> </ul>	<ul style="list-style-type: none"> <li>\$20 copayment – primary care physician</li> <li>\$30 copayment – specialist</li> </ul>

\* The Advantage+ health plan will be the only medical plan option with no paycheck contributions for most employees. Most employees will need to take the screening, and they and their covered spouses or eligible domestic partners will also need to take the health assessment.



**PHOTO:** Scott Richardson takes the club's Cessna 172 for a cruise by Mount Rainier near Seattle. The Cessna's high wing design provides a great view for pilots and passengers. **BOB FERGUSON/BOEING**

# Flight club

For employees who love to fly, or want to learn, this club has wings

By Teresa Kuhn

Since childhood, it seemed a life-threatening disorder would forever ground Ken Price's dream of learning to fly.

Price, who joined Boeing 20 years ago as a flight-test engineer, was born with cystic fibrosis. An experimental double-lung transplant at the University of Washington would save his life.

But it was the Boeing Employees Flying Association that rescued his dream of flight. A nonprofit organization that makes flight training and its airplanes available to members, the flying association, housed across from Boeing's factory at Renton Municipal Airport in Washington state, is part club, part extended family.

With nearly 500 members and 20 airplanes ranging from Cessna 150 and 172 trainers to the more advanced Cessna 182RG and a T210 Centurion, the club offers ground school and flying lessons at Renton and Paine Field, adjacent to Boeing's Everett plant.

The association draws its members from those who love aviation.

"Flying in general is a very personally gratifying experience. It teaches you patience,





**PHOTOS: (Below)** Oliver Meier, Environmental Control Systems engineer, prepares the association's Cessna 172XP float plane for a flight from Lake Washington near the Renton, Wash., 737 factory. **BOB FERGUSON/BOEING** **(Insets, from left)** Ken Price double-checks the propeller before taking a Cessna 172 for a flying lesson. **JIM ANDERSON/BOEING** John Vian in the cockpit of the turbocharged Cessna T210, which can be used for long-distance and high-altitude flights; Mike Borkan with an aerobatic Citabria in the hangar before his morning flying lesson. **BOB FERGUSON/BOEING**





and it makes you a better person,” said Mike Borkan, 737 test team lead in Renton and a private pilot, who is currently studying to earn his instrument rating with the Boeing group.

For married couple Glenn Dalby and Diana Klug, learning to fly was something they wanted to do together. The two Boeing employees took advantage of the regional flying club to learn. Now they stay with the group for access to its airplanes for short trips.

But people take part in the association for reasons that often go much further.

For John Vian, Boeing Research & Technology Technical Fellow, and a dozen other member pilots who donate time and resources, the association’s airplanes enable “angel flights” that help patients who live in remote areas get access to medical treatment.

And for Mike Rearick, volunteering for the association is a way to keep his mechanic’s license current and help

keep the club’s airplanes in top form.

The club’s fleet also includes Piper aircraft, a Cirrus SR20, as well as a float plane, an aerobatic airplane and a full-motion simulator. Students can become private pilots or commercial pilots and obtain their instrument and multi-engine ratings at either the Renton or Paine Field airports. Cost for a private pilot’s license through the association averages just over \$10,000—moderate compared with other flight schools in the region. Licensed pilots who are members may use the club planes for local flying, vacation trips and personal transportation.

Since its inception the organization has produced not only general aviators but also military, airline and test pilots.

NASA astronaut Janet Kavandi, who worked for Commercial Airplanes and later made three flights on the space shuttle, took her solo flight with the Boeing Employees Flying Association. John Cashman, who commanded the 777 on its first flight in 1994, received his private and commercial license





**PHOTOS: (Below)** A Cessna 150 taxis at Renton, Wash., after a class in the sky with instructor Shad Pipkin. **(Insets, from left)** Pipkin readies student Nathaniel Prakasam for a full-motion simulator lesson; Glenn Dalby and Diana Klug perform preflight checks before flying the association's Cessna 182 Skylane to the San Juan Islands north of Seattle, a short hop of about 65 miles (100 kilometers); the club's Cirrus undergoes routine maintenance. **BOB FERGUSON/BOEING**



through the club, as did Suzanna Darcy-Henneman, 777 chief test pilot. Joe Walker, the son of a Boeing employee, received his private license through the club and went on to become the youngest U.S. Army Apache helicopter pilot, at age 19.

The club is one of almost 170 organizations of Boeing employees—including flying clubs in Philadelphia, Mesa and St. Louis and one that is being formed in South Carolina—that are part of the Boeing Enterprise Recreation Program ([www.boeing.com/companyoffices/aboutus/recreation](http://www.boeing.com/companyoffices/aboutus/recreation)). These organizations include chess clubs, model airplane clubs, scuba groups, car clubs, ski clubs and amateur radio groups, to name just a few.

But a group that teaches people about civil aviation is a natural for Boeing, and employees often get more out of the association than background knowledge—and that's helpful at work.

That was the case for Dalby, a Boeing Research & Tech-

nology Associate Technical Fellow, and Klug, Commercial Airplanes director of Brand Marketing. They came to Boeing from outside the aviation industry and wanted to know more about their new field.

"We were interested in learning more about aviation since joining Boeing in 1998, and this is a personal way to connect with our industry and interests," Dalby explained.

Avid bicyclists, hikers and campers, Dalby and Klug each have a private pilot's license and instrument rating gained through the association. Now they often can be found packing bicycles and camping gear into one of the club's larger airplanes to make their escape from the heavily populated Puget Sound region of Washington state.

Established in 1954 under Boeing bylaws, the association for more than half a century has allowed co-workers, family members and contractors to earn their wings or continue



## *From training to testing*

The Boeing Employees Flying Association not only continues to train pilots; it sometimes supports Boeing developmental testing projects.

The group helped perform developmental testing on a Boeing-patented software package called SAFE, for Safe Area Flight Emergency, that uses airplane data to confirm safe places for emergency landings, including runways and open terrain. When considering test-bed options, the club's Cirrus SR20 was deemed the most economical and maneuverable aircraft for the testing.

The association was "a great supplier to work with," said William Pflug, Boeing Research & Technology configuration engineer.



**PHOTOS: (Below)** Scott Richardson returns to the Renton, Wash., field in the glow of sunset on Lake Washington. **BOB FERGUSON/BOEING** **(Insets, from left)** At Future Aviators Day, engineer Luis Arce-Gonzalez helps prepare the next generation, his son Alejandro. **COLLEEN PFEILSCHIEFTER/BOEING** Mike Rearick, left, and Boeing retiree Ron Larson jointly perform an oil change on the Cirrus—one way the club transfers knowledge to newer students; Marissa Singleton learned to fly with the support of mentors at the Boeing Employees Flying Association. **BOB FERGUSON/BOEING**



flying. A nonprofit corporation, the association allows members to purchase shares, making them co-owners of the club. Members are also volunteers, who lend a hand to support the Seattle-area flight community, including the Future Aviators program and Women in Aviation. Limited membership is available to non-Boeing personnel who pass a background check. A background check is not required for Boeing badge holders.

Rearick is one of the volunteers.

A 787 flight-line mechanic, he became a field service representative at Boeing last year. He and several other club members volunteer every Thursday, performing oil changes and minor preventive maintenance on the aircraft fleet. That helps Rearick remain current on his Airframe & Powerplant mechanic's license and U.S. Federal Aviation Administration Inspection Authorization.

"This is a small, tightknit community," he said, acknowledging the value in teaching the people of Boeing about civil aviation. "Volunteering with the club helps foster a brotherhood and

helps pilots understand the airplane from the mechanical side of the house, and association members get educated across the board."

It was the association's volunteers who helped Price when the FAA denied his request for a pilot's license under a Class 3 medical certificate. At that point, Price had recovered from his successful lung transplant surgery and was running marathons.

"To prove I was healthy enough to fly, I even challenged the Federal Aviation Administration inspector to beat me at tennis," Price said.

A year later, with guidance from one of the club's instructors, Price finally achieved his dream.

That was 13 years ago. Today, like Dalby, Klug, Rearick and nearly 500 others, Price, now a Commercial Airplanes regional marketing director, is still with the Boeing Employees Flying Association.

And he's working on his instrument rating. ■

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## Want to join?

The Boeing Employees Flying Association is looking for new members. Membership is open to current Boeing employees and to retirees, customers, vendors and government representatives who hold a Boeing badge.

Employee flying groups are in Puget Sound ([www.befa.org](http://www.befa.org)), Philadelphia ([www.flybefa.com](http://www.flybefa.com)), Mesa (<http://bears.club.tripod.com>) and St. Louis ([www.heilmannpub.com/BEFCSTL](http://www.heilmannpub.com/BEFCSTL)), and another is being formed in South Carolina.

For a listing of other Boeing recreation clubs, visit the Boeing Enterprise Recreation website ([www.boeing.com/companyoffices/aboutus/recreation](http://www.boeing.com/companyoffices/aboutus/recreation)).



# Stars in Alabama

Boeing has a rich history in Huntsville that has grown beyond rockets and space

*By Eric Fetters-Walp*

**B**oeing's presence in Huntsville, Ala., started with a small group of engineers who set up makeshift offices in a downtown hotel. They were working on NASA's Apollo program, figuring out how to send astronauts on the Saturn rocket to the moon.

Fifty years later, sitting in his west Huntsville office, Grant Wang is one of hundreds of Boeing employees working on an even grander goal: sending humans well beyond the moon.

"It's going to be a modernized Saturn-class rocket, with more capability and safety," said Wang, a Technical Fellow and avionics and software chief engineer for the heavy-duty Space Launch System (SLS).

Wang volunteered to lend his talents to the program. "This type of opportunity happens only once every 20 or 30 years," he explained.

With a rich history tied to the U.S. space program over the past half-century, Boeing Huntsville still is looking toward the stars. The site also is home to the Ground-based Midcourse Defense (GMD) program and provides engineering prowess to a variety of Boeing products, including the 787 Dreamliner.

"The way I describe it to people is there really are three legs to the stool in Huntsville," said Greg Hyslop, vice president and general manager of Strategic Missile and Defense Systems. "One is Space Exploration, the second is GMD and the related missile defense programs—including the Patriot Advanced Capability-3 Seeker—and the other is our Huntsville Design Center and inter-company work. That really gives us a stable base here."

Boeing employs approximately 2,600 people at the Huntsville site, making it the largest aerospace firm in Alabama. The company has



**PHOTOS: (Left and inset top left)** George Alexander, left, and Rickey Pope package a Patriot Advanced Capability-3 missile seeker for shipment to the prime contractor for final assembly. **(Inset bottom right)** Jennifer Clark, left, and William Scott install a PAC-3 seeker into a vibration test fixture. BOB FERGUSON/BOEING



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an overall economic impact of \$1.5 billion, with \$415 million going directly to 264 suppliers across the state last year. And Boeing and its employees gave \$2.5 million in 2011 to a range of charitable causes including tornado relief efforts.

Anthony "Tony" Jones, vice president for site operations, notes the diversity of programs at the Huntsville site has become its strength.

"We reach out and touch every business unit, including Commercial Airplanes," he said. "Our core competency is our people. These guys are rocket scientists in some cases; all our employees are passionate about their programs."

The latest win for Boeing Huntsville was the U.S. Missile Defense Agency's decision last December to award Boeing the Development and Sustainment Contract for future work on



the GMD program. That keeps Boeing as the prime contractor, said Dwight Potter, retired transition manager for the GMD program.

"GMD is the franchise program in the Strategic Missile and Defense Systems division, so keeping that firm foothold in the missile defense business was crucial," Potter said. Along with the new space exploration contracts, the GMD extension "continues to keep Huntsville in a viable position for the future, for at least the next seven to 10 years," he added.

It wasn't always so.

After Boeing established Huntsville operations to support initial development of the Saturn V rocket's first-stage booster, the site grew to a peak of about 4,500 employees in 1966. Growth leveled off after the Saturn rockets began launching, then reversed in the 1970s after the Apollo lunar exploration trips ended. By the early 1980s, the site's staff numbered fewer than 50.

In 1981, Boeing moved its Automated Test Systems business and more than 100 employees from Wichita, Kan., to Huntsville. Other programs, many small and a few big, have arrived since then.

David Zajic, a production engineering manager at the Huntsville

**PHOTOS: (Below and inset left)** Operations lead Norm Rowe, left, and Hal Swanson review an upcoming training procedure in the Ground-based Midcourse Defense Training Facility.

**(Opposite page, employee insets clockwise from top left)** Anna Caudle; Nicholas Antoine; Mike Hansen, left, and Stephen Clark; Chris Hartman. **BOB FERGUSON/BOEING (Inset top right)** A PAC-3 Patriot missile is test-fired. Boeing makes the seeker portion, which serves as the missile's "eyes." **LOCKHEED**



## Stars in Alabama



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## AT A GLANCE / BOEING HUNTSVILLE



Boeing's offices and production facilities in Huntsville, Ala., are home to a variety of programs, mainly related to space exploration, strategic missiles and design engineering. Some of the notable businesses at the site:

**Patriot Advanced Capability-3, or PAC-3** – Boeing's Missiles and Unmanned Airborne Systems division has produced nearly 1,500 PAC-3 missile seekers for prime contractor Lockheed Martin.

**Ground-based Midcourse Defense** – The only missile defense system to protect the United States from long-range ballistic missiles. It uses an array of sea, land and space-based sensors, and interceptors based in Alaska and California, to track and destroy the ballistic missiles. Boeing is prime contractor and is responsible for development, production and sustainment of the system's elements.

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Flight Center, the Missile Defense Agency, the U.S. Army's Redstone Arsenal and Cummings Research Park, the second-largest research park in the United States and fourth-largest research and technology park in the world.

In 2009, *Forbes* magazine named Huntsville one of the smartest cities in the world, and *Kiplinger's Personal Finance* magazine has ranked the Huntsville area's economy as No. 1 in the nation and given it high marks as a place to raise families.

"Huntsville, to me, is just a hotbed of state-of-the-art technology," said Dan Day, quality assurance manager for the GMD program and a Huntsville employee since 1981. "You don't realize what's here until you come and see it."

Like many others at Boeing Huntsville, Day mentions the "freedom" of working at a small site, where employees frequently move between programs.

"You don't have to move across the country to diversify your portfolio," said Terrence Chance, a senior business analyst with the Standard Missile-3 Block IIB program who joined Boeing in 2004.

Ryanne Jones, a product review engineer with the GMD program, echoed that thought: "I like the site because there are so many opportunities to work on different projects and systems," said Jones, who grew up in Alabama and graduated from nearby University of Alabama-Huntsville. "There are so many things Boeing does that you can apply to your job, no matter what your engineering background."

Longtime employees end up crossing back and forth with other programs beyond Huntsville. Those who worked for years supporting the International Space Station program, for example,



Design Center, said he's seen a diverse range of programs, heritage companies

and employees from other Boeing sites converge over the past 27 years.

"Huntsville has been a melting pot of companies and corporate cultures, as well as the

cultures you get from across the country," he said. "It's been interesting to watch how it all melded and fit in Huntsville very nicely."

New arrivals often are surprised to find that the north-central Alabama area boasts one of the highest per-capita populations of engineers and residents with doctorate degrees in the United States. In addition to Boeing, a long list of other defense-related firms have offices in Huntsville, which also is home to NASA Marshall Space



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## AT A GLANCE / BOEING HUNTSVILLE



**Huntsville Design Center** – With approximately 300 engineers, this center's talent is working on programs throughout the company, including the 787, to help solve complex engineering and design problems and to study and recommend engineering and production process improvements that reduce cost and cycle time.

**International Space Station** – As the station's prime contractor, Boeing is responsible for the successful integration of new hardware and software and sustaining engineering work.

**Space Launch System** – Boeing has a contract to design and produce the core cryogenic stages and avionics for this rocket, which is scheduled to begin test flights in 2017.

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have since worked on the 787 and garnered positive reviews, said Frank McCall, deputy program manager for Space Launch System.



"I think Huntsville is becoming better known across the company and gaining a well-deserved reputation as a group of people who can affordably get the job done," McCall said.

A bright spot among declining NASA budgets, Space Launch System has set its sights on meeting upcoming development milestones. The program currently employs about 650 people—including roughly 400 in Huntsville—and expects that number to grow to 800 by the year's end.

Boeing is contracted by NASA to design and produce the SLS rocket's core cryogenic stage and avionics. The program, which reuses design elements from previous programs, such as the space shuttle, is scheduled to begin test flights in 2017. The program's vision calls for developing a rocket that will enable exploration outside Earth's orbit and eventually take crews beyond the moon.

Boeing Huntsville also continues to support the International Space Station, which may be utilized well into the next decade. The site was responsible for building the U.S. components of the space station, including the Unity Node, the U.S. Destiny Laboratory, environmental control and life support system design, payload racks, a cupola viewing window, a cargo system and other controls, systems and subsystems. Huntsville employees expect to be part of the low-Earth orbit commercial crew transportation program as well,



currently in the development stage.

"I expect space to be part of this site's identity for as long as it's part of the Boeing company's," McCall said, "and I expect that to be a long, long time."

One of the legacies of Boeing's space work at the site is the Huntsville Design Center. Established from the pool of engineers who worked on the space station, the center now has about 300 engineers working on everything from elements of the 787 Dreamliner to the KC-46 refueling tanker and even helicopters.

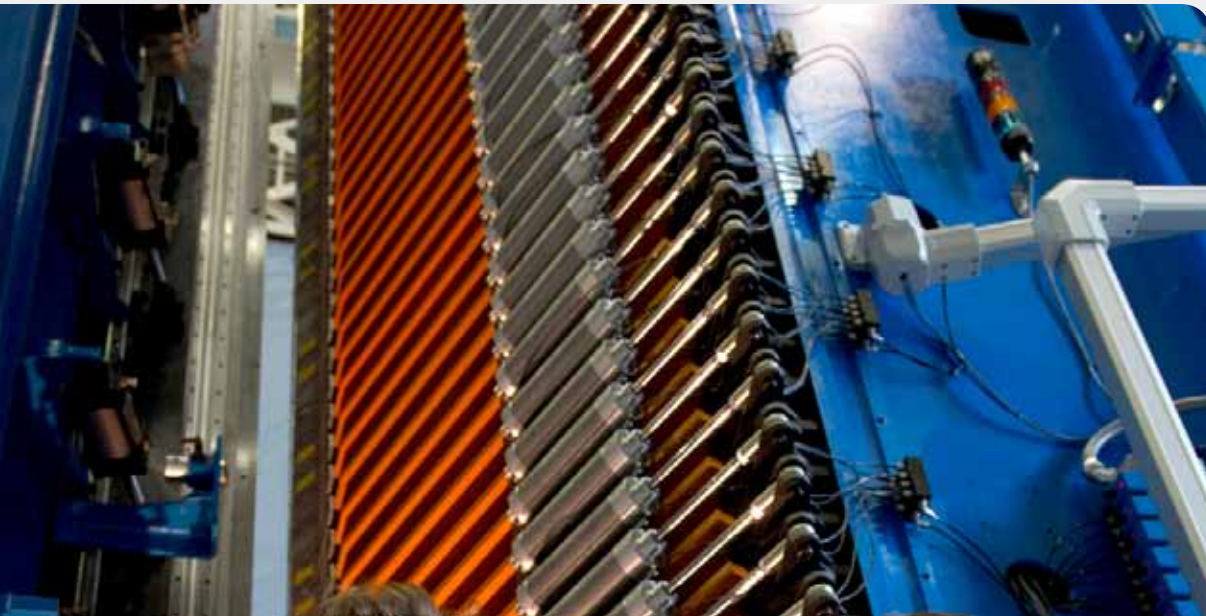
Frank Dunn, a senior manager with the center, said the variety of products and programs keeps expanding with the center's reputation.

"The team here takes ownership and a lot of pride in doing the work right and meeting its commitments," Dunn said.

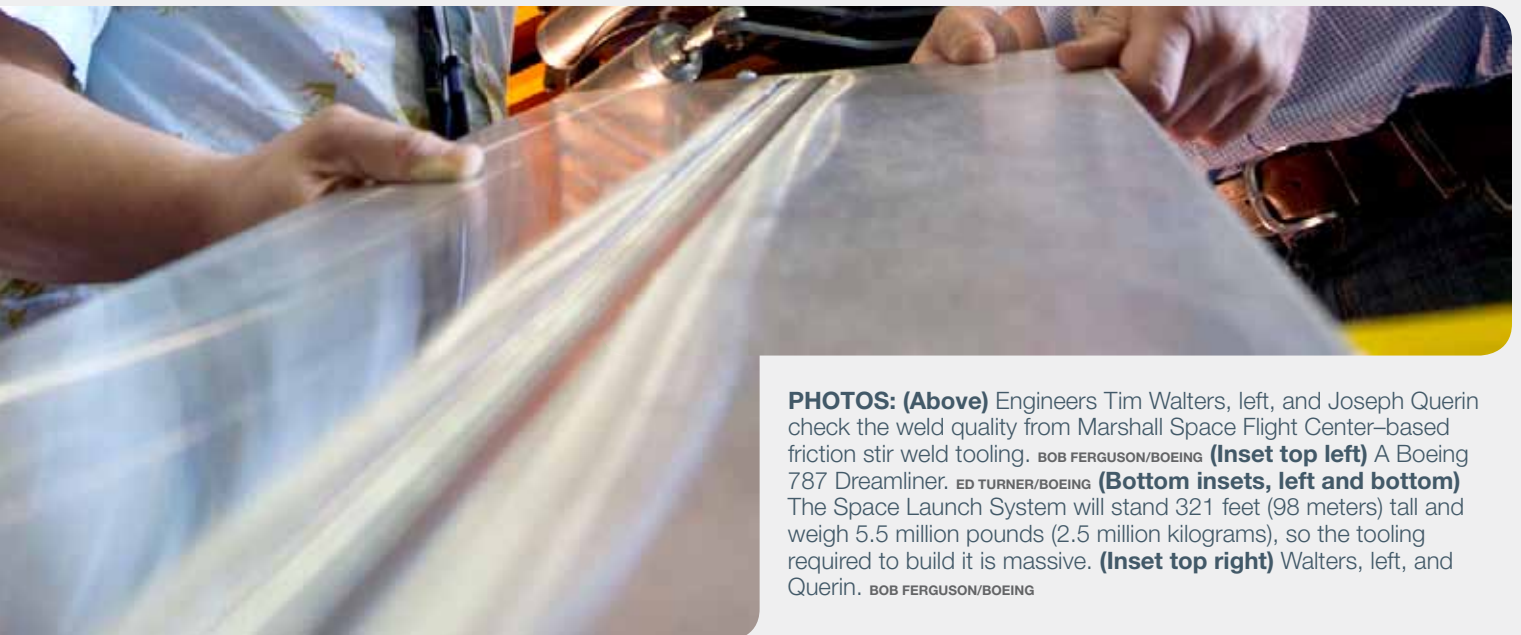
Hyslop added that the design center's lower cost structure helps it successfully bid internally for work, reducing costs for the entire company. And the work gives the site something outside of missiles and space exploration to rely on for the future.

"In a lot of ways," Dunn said, "what we try to





## Stars in Alabama



**PHOTOS: (Above)** Engineers Tim Walters, left, and Joseph Querin check the weld quality from Marshall Space Flight Center-based friction stir weld tooling. BOB FERGUSON/BOEING **(Inset top left)** A Boeing 787 Dreamliner. ED TURNER/BOEING **(Bottom insets, left and bottom)** The Space Launch System will stand 321 feet (98 meters) tall and weigh 5.5 million pounds (2.5 million kilograms), so the tooling required to build it is massive. **(Inset top right)** Walters, left, and Querin. BOB FERGUSON/BOEING

**PHOTOS: (Below)** Software engineer Dave Cazer, left, and electrical engineer Brian Rosa perform hardware and software checks in a mobile Battle Management Command and Control (BMC2) platform in Huntsville. **(Bottom insets, clockwise from top left)** Brandon Murphy, with laptop, David Cazer, left background, and Brian Rosa aid in refining the final design of the BMC2; the Advanced Design and Prototype Solutions Battle Management Command and Control demonstration vehicle under development in Huntsville; Tony Jones, vice president of the Huntsville site.

## Stars in Alabama



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## AT A GLANCE / BOEING HUNTSVILLE



Other programs with a presence in Huntsville: High Energy Laser Mobile Demonstrator (shown left), Enhanced Medium Altitude Reconnaissance and Surveillance System and the Army Aviation Command Control System. Huntsville is also headquarters to the Standard Missile-3 Block IIB. Currently in the concept definition and program planning phase, this system will provide a mobile layer for defense of the United States against ballistic missiles.

PHOTO: ERIC SHINDELBOWER

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solve in Huntsville is a microcosm of challenges that Boeing Defense, Space & Security—and Boeing as a whole—are dealing with. We're in a competitive market with all of our programs ... so we have to offer innovation at an affordable price."

Along with the success at the Huntsville Design Center, some of the site's other missile defense programs have seen recent wins as well. The PAC-3 Seeker program in March received a \$233 million contract to produce 275 additional seekers. Last fall, a two-year renovation project on the program's assembly line in Huntsville was completed, doubling the production-rate capacity to 30 seekers a month for system prime contractor Lockheed Martin Missiles and Fire Control Systems.

"With the expansion of our production capacity, I look forward to this program continuing to

thrive on our strong legacy of performance, meeting commitments and knowing that PAC-3 will perform flawlessly when called upon on the battlefield," said Debbie Rub, Missiles and Unmanned Airborne Systems vice president and general manager.

"With the Huntsville Design Center's growing success, along with the recently procured contracts for Ground-based Midcourse Defense and Space Launch System, optimism is high as the site marks its 50th year," said Tony Jones, the site's vice president.

"Those contracts took away a lot of the angst and now we're ready to seize the momentum and grow," Jones said. "The past and history have been a great ride. Now we're looking forward to what we're going to do for the future." ■

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# Learning to lead

In the classroom or on the job, Boeing prepares the leaders of today—and tomorrow *By Ann Beach*

*This is the first in a three-part series that focuses on graduates of Boeing's leadership development programs who are using what they've learned to help drive business results. Whether the learning happens at the Boeing Leadership Center in St. Louis or at their work sites, all the graduates have one thing in common—they are eager to learn more and help others succeed.*

Among Gail Meredith's many leadership challenges has been leading the Boeing team of some 350 employees who rolled out a major Windows operating system upgrade across the enterprise, including to Engineering.

"We had experts from the business units and Information Technology with different personalities and working styles collaborating across the enterprise," said Meredith, director of Windows Desktop Blockpoint for Information Technology.

"My leadership challenge became building that trust, building that collaboration and building the motivation to be successful."

What she had learned at the Boeing Leadership Center, Meredith said, was of tremendous help in undertaking



"True leadership development happens anywhere, anytime—out in the workplace, at our sites—with our people working together."

— John Messman, director, Boeing Leadership Development

**PHOTOS: (Above)** Gail Meredith (standing), director, Windows Desktop Blockpoint for Information Technology, discusses the progress of Windows 7 deployment with Catherine Lamas, project manager, IT business operations and governance. **PAUL PINNER/BOEING**

**(Right)** Craig Trewet, site director for Boeing Fabrication in Salt Lake City, welcomes guests when the 787 Dreamliner visited the site earlier this year. **DAVE HUTSELL/BOEING**

such a complex initiative.

"This was really an example of applying what I learned at the Leadership Center around a one-team or 'One Boeing' concept to roll out such a huge, innovative project," she said.

The Boeing Leadership Center in St. Louis has been the company's leadership training flagship the past 13 years.

Classes started in February 1999, and by early 2000 more than 2,500 managers had graduated from programs there. Since then, more than 100,000 employees have passed through the center. All totaled, they've spent more than 3 million hours in classroom study with subject-matter experts from inside and outside Boeing. And those employees have shared what they've learned with countless others.

"We continue to enhance the way we develop and deploy our leadership training and development opportunities," said Rick Stephens, senior vice president, Human Resources and Administration. "We know that now, more than ever, we need an environment where all our employees can continue to grow personally and professionally as they deliver the game-changing products and services our customers expect."

But learning to be a Boeing leader, or a better one, also takes place away from the center.

"True leadership development happens anywhere, anytime—out in the workplace, at our sites—with our people working together," said John Messman, director, Leadership Development.

For example, the New Leaders Training program was a result of a partnership with Commercial Airplanes to quickly provide training to an influx of new first-line managers at their work sites in Seattle and in South Carolina.

And the Saudi Emerging Leaders Program, a partnership with Boeing Defense, Space & Security, recently sponsored 15 graduate students from the Kingdom of Saudi Arabia's Alfaisal University. The one-week program provided perspectives on operating in a global economy and was the first of its kind to be held at the Boeing Leadership Center.

Meredith, a former Rockwell Aerospace manager, took her First-Line Leaders class at the center in 1999.

She said her first question was, "Why?"

"Not only did I have to go to class, but I had to be away from home for five days," she recalled. "My expectations were not high, but I accepted that this was something I had to do."

Looking back today on that first class, and the subsequent courses she's taken, including the Boeing Executive Program, Meredith said she's gained many valuable lessons, a lot of business knowledge and an expanded network of colleagues.

Currently, she's responsible for 14 employees and she mentors 10 others.

Craig Trewet, site director for Boeing Fabrication's site in Salt Lake City, also took the First-Line Leaders class at the center the same year as Meredith. At the time, he had been a manager for four years.

Trewet has since attended more than nine programs, including the Engineering Leadership Program, Strategic Leadership Seminar, Program Management and the Boeing Executive Program.

"I always ... came away with more than I expected," said Trewet, a 22-year Boeing veteran.

"One of the biggest takeaways has been learning how to connect our Salt Lake City employees with our strategies for growing our business. By engaging and communicating clearly with employees, they can understand and be inspired by what our future holds for them and for our site." ■

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## Boeing Leadership Center

Number of students since 1999: **100,000**

Number of class hours since 1999: **3 million**

# Boeing Brazil:

# Growing together

Boeing is laying the foundation for a long-term partnership with Brazil

*By Bill Seil*







**PHOTOS: (Left)** Donna Hrinak, Boeing country president for Brazil, on the roof of the Boeing Brazil office in São Paulo. **SERGIO ZACCHI**  
**(Insets, from left)** A view of Rio de Janeiro. **SHUTTERSTOCK** Brazil received its first F4B-4 fighters in September 1932. **BOEING ARCHIVES**  
 A cable car heads to the top of Sugarloaf Mountain in Rio de Janeiro. **SHUTTERSTOCK** Boeing F/A-18 Super Hornet Chief Test Pilot Ricardo Traven at Brazil's Pirassununga Air Show. **KEVINFLYNN/BOEING**

When Boeing delivered the first F4B-4 fighters to the government of Brazil, it began a relationship with the largest country of South America and the world's fifth-largest country by geographic area.

That was 80 years ago.

Much has changed since then. Over the past two decades, Brazil has been engaged in a modernization program that has made it one of the world's fastest-growing markets.

And one year ago, Boeing Brazil was launched to build stronger ties with this rapidly growing nation.

Along with Russia, India and China, Brazil is among the so-called BRIC economies that are expected to account for much of the world's economic growth over the next decade. It is the world's sixth-largest economy by gross domestic product and the fifth-largest country by population. Brazil will be hosting the World Cup soccer championships in 2014 and the Summer Olympics in 2016.

The growing importance of Brazil as a Boeing customer led the company to establish a business office there in October of last year. Donna Hrinak, who served as U.S. ambassador to Brazil from 2002 to 2004, was recruited to serve as Boeing Brazil's first president.

"Brazil has now established itself as a

significant global player in terms of economic growth and its growing need for infrastructure and modern security systems," said Shep Hill, president, Boeing International, and senior vice president, Business Development and Strategy. "Brazil's potential is immense and Boeing's products, services and partnership mindset can help Brazil realize that potential."

Hrinak was a career officer in the U.S. Foreign Service before joining the private sector in 2004. In addition to Brazil, she has served as ambassador to Venezuela, Bolivia and the Dominican Republic. Hrinak also has held the position of deputy assistant secretary of state for Mexico and the Caribbean.

Brazil represents a strong and growing market for Boeing military and commercial products, according to Hrinak.

"Brazil's short-term needs and long-term ambitions coincide very nicely with Boeing expertise and experience," Hrinak said. "We've reached a moment when both sides have come to understand our common interests."

Boeing's 2012 Current Market Outlook projects that Latin American airlines will purchase approximately 2,500 airplanes valued at \$260 billion over the next 20 years.

"Brazil, which represents more than 40 percent of today's Latin American

market, is poised for explosive growth, due to its positive economic outlook, emerging middle class and increased use of air travel," said Van Rex Gallard, vice president, Sales, Latin America. "In some respects, it's going through a period of change similar to what we saw in the U.S. market 30 years ago."

Boeing's two largest commercial customers in Brazil are GOL Airlines, the fifth-largest 737 operator in the world, and TAM, a strong 777 customer. In July 2011, GOL announced its intentions to merge with Webjet Airlines in Brazil, another all-Boeing 737 operator. In addition, TAM recently merged with Chile's LAN Airlines to create a new company called LATAM Airlines Group, becoming one of the largest airlines in the world by market value.

In response to increased air traffic, Brazil is improving its network of commercial airports and plans to convert a number of local airports to commercial status in the near future.

Hrinak said Brazil now recognizes, due to the value of its vast resources, the need to strengthen national security, both militarily and technologically.

Since the creation of Boeing Brazil there have been significant agreements in the defense arena. In April, Boeing and Brazilian aircraft manufacturer Embraer announced a

cooperation agreement focusing on enhancing operational efficiency, safety and productivity. Then in June, Boeing and Embraer announced they would collaborate on the KC-390 aircraft, a medium-lift military transport. In July, they agreed to collaborate on new weapons integration for Embraer's A-29 Super Tucano pilot training and light attack aircraft.

Boeing's F/A-18E/F Super Hornet is in competition to meet the Brazilian Air Force's requirement for 36 fighters.

Joe McAndrew, director of business development for Europe, Israel and the Americas, Defense, Space & Security, said the industrial participation opportunities included in Boeing's offer would give a major boost to Brazil's goal to develop its industrial and technological capabilities.

"Their purchase of the Super Hornet would be a big investment in their own

technological growth," McAndrew said.

"In addition, we're offering the best aircraft in terms of capabilities, life-cycle cost and dependability."

In addition, Boeing has been involved with the Brazilian satellite communications industry since it began in the 1970s. Hrinak sees continued opportunities for cooperation in this area, including both civilian and national security programs.

Brazilian President Dilma Rousseff, who took office in 2011, has focused on building competitive strength through education. She launched the Science Without Borders program, which is designed to strengthen science and technology by increasing opportunities for international education.

One of Boeing Brazil's first actions in late 2011 was to provide scholarships for all 14 of the aerospace and aeronautics engineering majors among the first group of students

selected for the Science Without Borders program. This allowed sending them to universities in the United States for one year.

"It's a very ambitious initiative—one of the keystones of the president's program to make Brazil more competitive," Hrinak said. "Boeing is providing 360-degree support, including Boeing mentors and a summer hands-on educational experience."

Boeing used a team approach to support the Science Without Borders students, involving leaders from Boeing International; Engineering, Operations & Technology; and Human Resources. The company designed an eight-week summer program for students, including direct experience in such fields as composites design, aviation biofuels and engineering design software. All participated in a course that involved redesigning the wing of a 1950s-era F-86 Sabre Jet.



"We've had a relationship with Brazil for 80 years, but in many ways we're just scratching the surface of exploring business opportunities with that important country."

— Shep Hill, president, Boeing International

**PHOTOS: (Far right)** An F/A-18 Super Hornet takes off at the Pirassununga Air Show in Brazil. KEVIN FLYNN/BOEING **(Insets, from left)** Science Without Borders students tour an airplane mock-up at Boeing's Customer Experience Center near Seattle. PAULINA BENDAÑA/BOEING A Boeing 777-300ER (Extended Range) in TAM livery. WILL WANTZ/BOEING Castor plants used for biofuel. SHUTTERSTOCK A Boeing 737-800 in GOL livery. JIM ANDERSON/BOEING

With the creation of Boeing Brazil, the company will be further expanding its corporate citizenship efforts in Brazil. In recent years, Boeing has been active in supporting forest preservation. During floods in early 2011, Boeing and its employees contributed to disaster relief.

Brazil wants to bridge the gap between Brazil's strong academic research programs and the application of this knowledge in local industry, Hrinak noted.

For example, Brazil has been a pioneer in developing biofuels for ground transportation. In late 2011, Boeing, Embraer and the São Paulo State Research Foundation announced plans to collaborate on long-term aviation biofuels-related research and development. Earlier this year, the company established Boeing Research & Technology–Brazil, based in São Paulo, which will work with the country's leading

researchers and scientists to develop aerospace technologies. This is Boeing's sixth advanced research center outside the United States.

Al Bryant, the new managing director of Boeing Research & Technology–Brazil, previously launched Boeing research centers in Australia and China. Right now, the Brazil research center is limited to office space at Boeing Brazil's headquarters in São Paulo. Over time, research facilities will be opened to meet specific needs.

"Brazilian leaders want their country to go from being seen as an agricultural country to establishing itself as a manufacturing country, and they are taking action to move in that direction," Bryant said. "They're excited to have technology companies like Boeing come here and help build those capabilities."

Brazil's strength lies in its strong univer-

sity system and natural resources, Bryant said. Minerals mined in Brazil can be used for the development of new metal alloys, and plants produced by Brazilian agriculture can be used for various products, including sustainable aviation biofuels. Bryant is currently building a network of contacts in universities and research institutes to help find the best opportunities.

It all underscores what Boeing and Brazil are doing together, and the bright future of Boeing's growing presence there, according to Hill.

"We've had a relationship with Brazil for 80 years, but in many ways we're just scratching the surface of exploring business opportunities with that important country," Hill said. "As they grow, we want to be their partner in building a bright future." ■

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# Perfect fit

737 team uses digital technology to ensure parts fit, or figure out why they don't

By Dawsalee Griffin

Insert peg A into hole 7B. The directions say that it should fit and be easy to assemble.

In building airplanes, that's not always the case, though, and often factory assemblers have no way of knowing why.

That's where the 737 Renton Computer-Aided Measurement Systems Services Group comes in.

Team members use digital measuring systems to precisely measure 737 parts, assemble them on a computer and figure out how to make parts that fit together perfectly, every time. Their skills also are proving useful across a broader set of problems in Boeing manufacturing and beyond.

"Several groups recently asked us to figure out why galley doors sometimes bind during flight," said Brian Campbell, toolmaker and subject-matter expert in the use of photogrammetry—a specialized digital camera.

The team already suspects they know what is happening.

"The airplane fuselage changes shape during flight," Campbell said. While these changes may be small, they can have an impact.

Using Campbell's camera, the measurement team is able to capture what happens to an aluminum airframe during a flight. Since the camera's accuracy is not affected by vibration, the team can take measurements while the 737 is flying.

Based on past experience, the team expects the data they develop will show Engineering how these minute fuselage shape changes affect the opening and closing of interior galley and lavatory doors—which will help Engineering institute the design changes needed to prevent binding in the future.

The photogrammetry team originally discovered the fuselage flexing after the Sept. 11 terrorist attacks on the United States. They were asked to find out why flight-deck security doors put holes in an interior ceiling panel when opened during flight. They found the new door design didn't take into consideration that the ceiling panel lowers slightly as the shape of the fuselage changes during flight.

"It's been a continuous education process to help people understand what we do and how we can help them," Campbell said.

The Renton Computer-Aided Measurement Systems Services Lab is part of the Production Platform Organization that provides tooling, equipment and manufacturing measurement services to the Renton, Wash., site.

The measurement group was created to investigate fit problems discovered by Engineering.

The team's expertise in collecting digital data on every part of the 737 is in demand when groups are looking for process improvements or designing a new airplane.

"The 737 MAX team has asked us to start collecting data on currently built airplanes," said Pat O'Dowd, Quality Assurance analyst and team member. "They'll use that data to verify their configuration."

Pushing the boundaries on how they use their data-capturing measurement equipment has garnered the team recognition beyond the 737 program and, for that matter, beyond Boeing.

NASA tapped the group to help with the Shuttle *Columbia's* digital reconstruction after its re-entry accident.

"We scanned the recovered wing debris from the Shuttle *Columbia* as it was collected," said Mike Patton, toolmaker and Scanning subject-matter expert. "We also scanned the Shuttle *Discovery's* leading edge, so we would have a reference



**PHOTOS: (Far left)** Karl Pyle, 737 toolmaker, uses a special digital camera to collect precise 737 wing data that will ensure wing panels are cut to a perfect fit. **JIM ANDERSON/BOEING (Above)** This computer-generated pattern, shown projected on a 737 wing, enables scanning equipment to collect highly accurate measurements. **BOEING**

definition to use in digitally reconstructing the *Columbia* wing leading-edge debris."

The reconstructed data showed evidence of the cause of the catastrophe: a hole in *Columbia's* leading edge caused by impact with a piece of foam insulation during launch.

Within Boeing, others are now looking at Renton's Computer-Aided Manufacturing applications.

Teams at the Everett site, where Boeing's twin-aisle jetliners are assembled, are interested in how they can apply the Renton model.

Jennifer MacKay, 777 Wing production support, turned to the Renton measurement group when the 777 Wings group was looking for ways to improve quality and efficiency in wing production and the wing-to-body join to help meet production rate increases.

"Renton's measurement team members have been generous in sharing their knowledge and lessons learned," MacKay said. "We're looking at how we can use their expertise and processes, including their team structure, to improve wing production." ■

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A man with short brown hair, wearing a light blue button-down shirt, is smiling slightly and looking towards the camera. He is standing in a workshop or museum setting, with large wooden airplane fuselage parts visible in the foreground and background. The lighting is warm and natural, suggesting an indoor space with large windows.

# World of inventions

Meet Boeing's most prolific patent-holders—sometimes they strike out, but they also hit home runs

*By Candace Heckman  
Photos by Bob Ferguson*

**PHOTO:** With 83 U.S. patents issued as of July 1, Gary Georgeson—shown in the Red Barn, Boeing's original factory and now part of Seattle's Museum of Flight—is Boeing's top inventor.



**A**s a kid, Boeing Technical Fellow Gary Georgeson wanted to be like the Man of Steel.

“I thought if I could have any of Superman’s powers, I wanted to see through walls,” he said.

Little did he know that one day, this mild-mannered engineer would figure out how to do just that—rising to the top of Boeing’s long list of patent-holders in the process.

Of more than 173,000 employees worldwide, Georgeson is Boeing’s top inventor. As of July 1, he had 83 U.S. patents issued and 139 more applications filed on his inventions.

For more than a century, invention has been the unyielding characteristic of successful aviation companies. Aerospace pioneers thrived only when they were able to sustain an advantage in protecting intellectual property from their many, formidable competitors.

Boeing’s patent portfolio and innumerable cache of protected trade secrets are collectively the company’s most valuable product—and powers its competitive advantage. Boeing has more than 6,000 active U.S. patents, and 10,500 patents active worldwide.

When they develop a novel solution, Boeing employees are required to disclose it as an invention to the company’s patent portfolio management team, which can evaluate it.

“Not all inventions we evaluate will be filed for patent protection,” explained Dan Feder, director of Boeing’s patent portfolio. “Some are more valuable to the company; others are not as valuable. But it’s important for employees to submit the ideas, so that Boeing can figure out the best way to protect them.”

In the past decade, Georgeson, who specializes in non-destructive evaluation, and his teammates have patented a series of inventions for a device that provides engineers with a view of hidden aircraft structure, much like Superman’s X-ray vision.

But he didn’t begin as an innovation Most Valuable Player. Georgeson, who came to Boeing in 1988, was discouraged early in his career by several strikeouts—his first several invention submissions were rejected.

Inventors say there’s an emotional element in submitting an invention. “I was disappointed, and almost angry about it,” he said.

“Some disclosures are just about getting on base,” Georgeson explained, comparing the game of inventing to the game of baseball. “You’re not going to hit a home run every time.”

Initially discouraged, Georgeson seldom disclosed inventions for many years.

Then, in 1997, Boeing filed a patent for a digital tap hammer that locates defects in both solid and composite structures. Georgeson and his team won a Boeing Special Invention Award, and the hammer has since been licensed worldwide for nondestructive evaluation in many industries.

At that time, Technical Fellow Marc Matsen, now the company’s second-most prolific inventor, taught Georgeson about perseverance.

Matsen’s work in materials has helped Boeing stake a role in the area of induction heating for thermoplastic



## League leaders

The secret to success is to keep trying. Here are Boeing's top five inventors, based on the number of times being named through July 1 on invention disclosures.

Inventor	U.S. patents granted	Invention disclosures	Career average
<b>Gary Georgeson</b> Technical Fellow	83	202	.411
<b>Marc Matsen</b> Technical Fellow	58	174	.333
<b>Brian Tillotson</b> Senior Technical Fellow	48	134	.358
<b>Jeff Hunt</b> Technical Fellow	47	111	.423
<b>Bradley Mitchell</b> Associate Technical Fellow	37	77	.481

**PHOTO:** Pictured in the historic Red Barn section of Seattle's Museum of Flight, Boeing's Marc Matsen has disclosed 174 inventions, with 58 issued as U.S. patents. He is holding a titanium part created through a method he invented.





fabrication, an important method for making airplane parts. A shipyard welder straight out of high school, Matsen brought a lot of real-world experience and practical metals knowledge when he joined Boeing in 1983.

He also brought a respect for protecting intellectual property and patenting his ideas. As a Technical Fellow, Matsen teaches and encourages younger employees to transform their ideas into intellectual property value.

"It's not like in school, where they give you a problem and the professor already knows the answer," said Matsen, who, like Georgeson, is with Boeing Research & Technology. "At Boeing, they give you a problem because they don't know the answer. And so, when you come up with a solution, it's probably something new."

Matsen relentlessly submits inventions, knowing some will hit while others will miss. As a hitting average, though, Matsen's record rivals even those of the best baseball players, having disclosed 174 inventions, with 58 issued as U.S. patents.

"Marc was inspiring to me because he wasn't afraid to make disclosures and be turned down," Georgeson said. "I remember asking him at one time, 'So, how many patents do you have?' And I was, like, 'What!' He had something like 30 patents!"

These days, Georgeson files about 15 to 20 invention disclosures a year. Being part of a team helped him get back in the game emotionally.

"I have only been successful in this arena because I have been fortunate to work with many inventive people and on some high-quality technology teams," Georgeson said. "I have found that collaboration and cross-pollination produce the best innovation. And you definitely have more courage to put forth your ideas when you're standing with a team." ■

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**PRO CRITICAL AREA**  
THIS AREA REQUIRES ALL PERSONNEL TO PURSUE

# Step by Step

## Boeing's health program can change lives — and maybe save some

By Carrie Howard and Tiffany Graves Drake

Less than 48 hours after telling a Boeing nurse he was feeling short of breath when he climbed stairs at work, Dave Acker found himself on a gurney being wheeled into a hospital room for an emergency heart procedure.

Acker, a 57-year-old quality inspector for the 787 program in Everett, Wash., joined Boeing last year, just six months before his heart procedure. His story shows how Boeing's Step by Step program can improve a person's health and change his or her life. And in Acker's case, the program may have saved his.

### Step 1: Know your numbers

Screenings, which are available on-site at many U.S. Boeing locations through Dec. 3, allow employees to learn their individual health numbers (such as cholesterol, body mass index and blood pressure) to detect health problems early, when the chances for successful treatment are greatest.

Acker saw his physician for his annual screening in August 2011. Because he visited his physician regularly, he knew he was doing some good things for his health—he hadn't smoked in 14 years and hadn't consumed alcohol in almost five years. He also knew there were things he could do better. He was about 25 to 30 pounds (11 to 14 kilograms) overweight and had a family history of cardiovascular disease.

As a result of the screening, he began taking medication for high blood pressure and cholesterol.

### Step 2: Understand your numbers

The health assessment is a guided questionnaire that asks questions about current health conditions, behaviors, risks and readiness to make health changes. After completing the health assessment, each person is provided with a health score based on his or her responses. The health score summarizes health risk areas and prioritizes next steps toward management and improvement. The health assessment is available between Oct. 1 and Dec. 21, 2012.

During November, Acker's first month at Boeing, he completed the health assessment, using information from his screening.

"There were some questions about what you would like to do better, and I wrote that I wanted to lose weight and get some exercise," he said.

### Step 3: Take action

Boeing offers a variety of Well Being programs to help employees take action on screenings and health assessment results. Health coaching is one option.

In May, Acker got a call from a Boeing health coach asking if she could do anything to help with his concerns about diet and exercise. She also asked if he would be interested in having a registered nurse talk to him about specific medical questions he might have, and Acker agreed.

When the nurse called, Acker explained he was getting short of breath when he climbed stairs at work to access aircraft. The nurse suggested Acker get a physical immediately. Acker saw his physician the next day and he recommended Acker see a cardiologist.

The cardiologist's office asked him to come in the next morning.

After a brief examination, the cardiologist took Acker across the street to the hospital and checked him in. Within 15 minutes, Acker was in a surgical gown being wheeled into the procedure room. He had three clogged arteries. The procedure to clear the blockages took about an hour. Acker spent that night in the hospital and was home by noon the next day.

Acker still can't believe the rapid turn of events.

"I knew that I had been getting winded, but I had no indication that I had that much of a problem."

Today he feels great. He has lost 15 pounds (7 kilograms) and lowered his cholesterol level with a change of diet. He and his wife have started walking trails around their neighborhood.

"I owe my new start on life to a lot of things," Acker said, "but it was the Well Being program that actually opened my eyes enough to get me started in the right direction." ■

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*To learn more about the Step by Step program, employees can visit Boeing TotalAccess and click "My Well Being."*

**PHOTO:** After participating in the Step by Step program, Dave Acker no longer is out of breath climbing stairs to inspect aircraft on the job. ED TURNER/BOEING

# Salvage team

Long Beach employees find new life for used office supplies

By Patrick Summers and photos by Paul Pinner



*This is another in a series of articles focusing on how Boeing employees are making a difference in the company's wide-ranging commitment to environmental stewardship.*

Staples and Office Depot probably would be envious: boxes of three-ring binders, thousands of file folders and countless pens and pencils stacked in floor-to-ceiling rows, all reusable office supplies sorted and made available to employees at the Boeing Defense, Space & Security site in Long Beach, Calif.

"I look at this room and just shake my head. We had no idea we would be able to collect and reuse so many items," said Anita Bertain, Environment, Health and Safety business operations specialist.

Bertain and other employees at Long Beach who are environmentally active saw an opportunity—to recirculate office supplies by collecting unneeded and surplus items in a central

location inside the main manufacturing building where thousands of employees build C-17 Globemaster III aircraft. Supplies in high demand, such as pens, pencils and staplers, are organized and made available for Long Beach employees to reuse.

"We want employees to come here first to look for what they need before they order new office supplies," said Joy Shneider, Site Services project administrator. "Now we're saving money by reducing the need to purchase supplies and helping the environment by cutting the amount of trash sent to landfills."

Items that employees no longer commonly use are prepared for public "salvage sales." Supplies that can't be reused by employees or sold to the public in bulk quantities are sent to recycling. Abundant reclaimed supplies, such as binders, also are donated by Boeing's Global Corporate Citizenship organization to local public schools and nonprofit groups.

Tom Mason, Site Services manager who leads recycling efforts for Long Beach, said the office supply reuse project

# “We had no idea we would be able to collect and reuse so many items.”

– Anita Bertain, Environment, Health and Safety business operations specialist



is helping the site make progress toward its goal of sending zero waste to landfills.

“Saving money by cutting our solid waste bill is a nice added bonus,” he said.

Bertain, Shneider and their environmental team won a 2012 Conservation Award from Boeing for their efforts to boost recycling and cut the amount of waste sent to landfills.

For Bertain, the project to recycle and reuse office supplies represents a personal commitment.

“As we’ve moved to a more paperless society,” she said, “we no longer need as many binders, hole-punchers and file folders. Instead of throwing them away, we found creative ways to reuse and recycle. I feel better knowing we’re doing the right thing for the environment.” ■

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**PHOTOS (Far left):** Joy Shneider, from left, Anita Bertain and Jamie Chivell helped organize an effort to recirculate office supplies at Boeing Long Beach by collecting unneeded or surplus items. **(Above)** Sorting supplies begins in a central location, clockwise from top left, and includes small desktop items, folders and document holders.





## PAINT ME A DREAM

The first 787 Dreamliner for United Airlines, featuring a customized livery that will be exclusive to the airline's 787 fleet, rolled out of Boeing's paint hangar in Everett, Wash., last month. The gold line that wraps the fuselage from nose to tail is in the same style as the trademark swoop in the livery Boeing uses on some of its aircraft, and is a tribute to the two companies' long history of working together. United is scheduled to take delivery of its first Dreamliner late this month and will be the first North American carrier to operate 787s.

PHOTO: MATTHEW THOMPSON/BOEING







# Milestones in Innovation

The history of  
**Boeing innovation**  
is now at your fingertips.

The first official Boeing app for iPad is here. Enjoy this beautiful digital coffee-table book that showcases 96 years of breakthrough innovations with the swipe of a finger.



Available on the  
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