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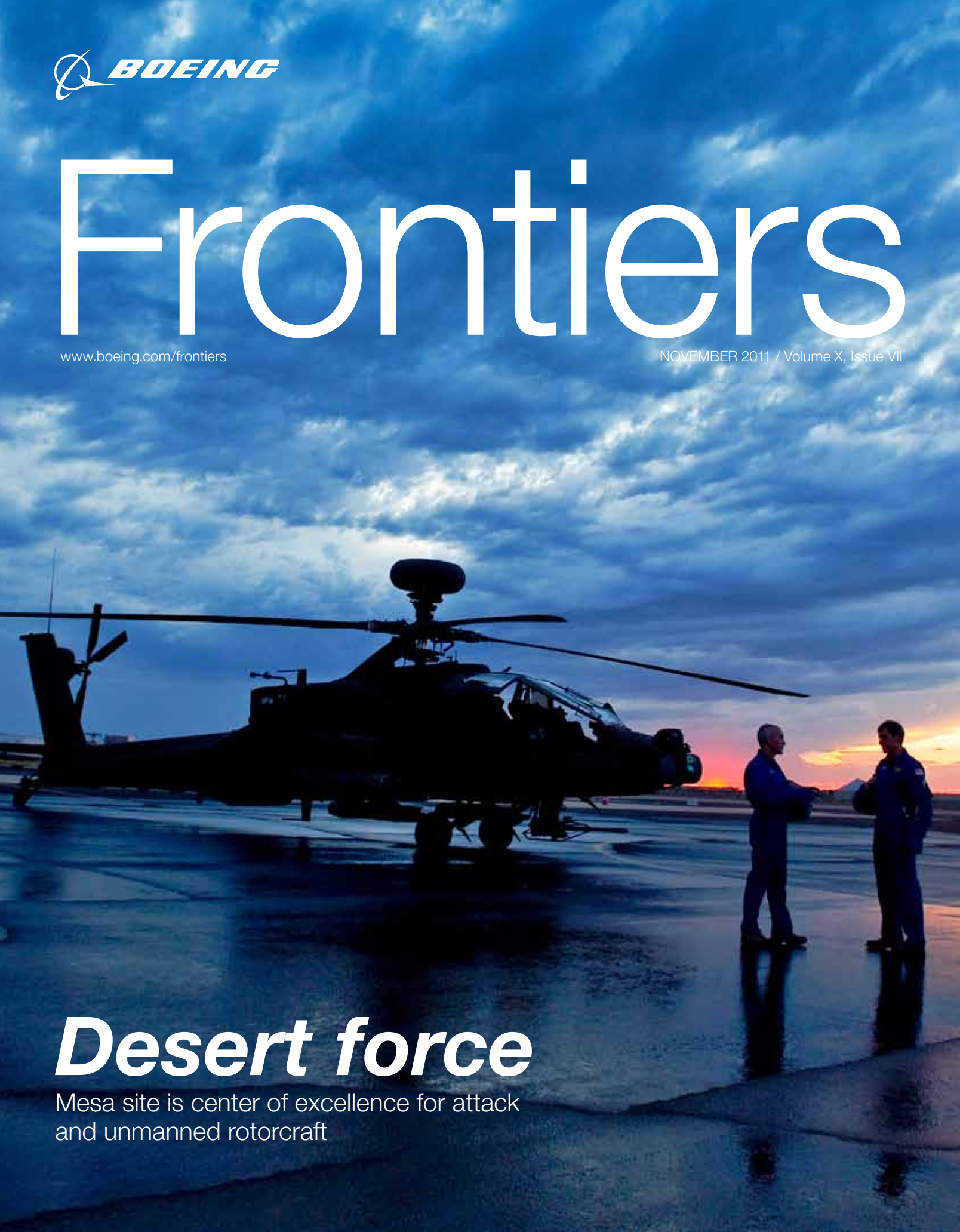

Desert force

Mesa site is center of excellence for attack and unmanned rotorcraft

Ad watch

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

Inside cover:

This ad was created to demonstrate Boeing's appreciation and gratitude to veterans and will run in *The Washington Post, The Washington Times* and more than 30 regional and trade papers. The campaign will also feature TV and online components.

Page 6:

This ad was developed for Remembrance Day (Nov. 11) in the United Kingdom to honor U.K. servicemen and -women for all they have achieved and sacrificed defending freedom. The print ad will appear in publications such as *Financial Times, The Times, Defense Focus* and *House Magazine*.

Pages 50–53:

"Enduring Mission" (shown) and "Enduring Support" (see pages 52–53) are two of several ads in a Defense, Space & Security campaign highlighting the capabilities Boeing brings its customers. This ad focuses on Boeing's space and satellite expertise; the other highlights services and support. The ads appear in print and online business, political and trade publications.

Back cover:

Corporate citizenship refers to the work Boeing does, both as a company and through its employees, to improve the world. This ad illustrates Boeing's commitment to promoting the well-being of communities worldwide.

On the Cover

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No way but up

In the skies over Boeing's Mesa site in Arizona, Apache helicopters, including the new Block III, are a familiar sight and sound. But Mesa is much more than the production home for the Apache. The site's employees also assemble the unmanned Hummingbird and are developing the AH-6i light attack/reconnaissance helicopter.

COVER IMAGE: BOEING TEST & EVALUATION PILOTS DAVE GUTHRIE, LEFT, AND DAVE BAUER ENJOY A MOMENT ON THE MESA FLIGHT LINE AT SUNSET BEFORE TAKING A BLOCK III APACHE ATTACK HELICOPTER FOR A TEST FLIGHT. BOB FERGUSON/BOEING

PHOTO: AN AH-64D APACHE BLOCK III TEST AIRCRAFT IS SHOWN TETHERED TO THE GROUND FOR POWER AND HOVER PERFORMANCE QUALIFICATION TESTS. BOB FERGUSON/BOEING

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This year marks the centennial of U.S. naval aviation. Boeing has an enduring legacy of producing top-of-the-line fighters for the Navy and other global customers. One such fighter, with a name from the spirit world—the FH-1 Phantom—and developed by predecessor company McDonnell Aircraft, ushered the U.S. Navy into the jet age in 1946. PHOTO: U.S. NAVY

14 The digital airline

Some of the most exciting advances in commercial aviation are coming from the application of information technology to airline operations. Onboard sensors, for example, keep track of an airplane's health during flight, gathering data and sending instant reports of any maintenance needed when the airplane lands. The 787 Dreamliner is considered the world's first fully e-enabled airplane, generating and capturing more data than any airplane in Boeing's history. PHOTO: GAIL HANUSA/BOEING

46 Pacesetters

At Boeing Test & Evaluation laboratories in Seattle, "waste walks" are helping employees make an environmental difference by identifying and reducing waste. It can be something as simple as checking wastebaskets during a walk to see if people are discarding items that can be recycled. PHOTO: JESSICA OYANAGI/BOEING

37 Stories of service

Thousands of men and women who work for Boeing around the world have served in the military or continue to serve in the National Guard or reserves. Several shared with *Frontiers* their stories of service and the special mementos that keep their honor and pride alive. PHOTO: FRED TROILO/BOEING

48 Safe by a nose

With a strong sense of smell that can detect thousands of different explosive-based chemicals and compounds, an elite group of dogs is on the job at Boeing. This month marks the 10th anniversary of the Boeing Explosive Detection K-9 Unit, where highly trained, longtime dog and handler partners help keep Boeing and its people safe.

PHOTO: JESSICA OYANAGI/BOEING

INSIDE

Seamless team

Collaborative decision-making and teamwork are critical to a winning product strategy

In our fiercely competitive industry, Commercial Airplanes' future will be shaped by rapid economic changes, remarkable engineering discoveries and the global contest for talent, capital and natural resources.

Decisions we make today will affect our company for decades. We need a thorough understanding of future opportunities and challenges—but that's not enough. To be successful, we need to consistently operate as a seamless team that values—and integrates—our individual strengths and perspectives.

Boeing's decision to build the 737 MAX, a new-engine variant of the world's most popular jetliner, shows how collaboration was vital to address a 20-year, $2 trillion market for single-aisle airplanes.

As a technology company that builds the most advanced commercial airplanes in the world, our core impulse will always be to reach for the horizon with a clear-eyed view of where the market is going.

To weigh our options, Boeing established a cross-enterprise team that included 737 Program leaders, Engineering, Supplier Management, Production, Sales and others. We looked closely at current and future capabilities of our production system and how rapidly technologies could be incorporated into our next single-aisle offering. We listened to customers and kept an eye on Airbus, as well as emerging competitors in Europe, Brazil, Canada, China and Russia.

As that work continued, it became increasingly clear that customers, who spend up to 40 percent of operating budgets on fuel, place greater emphasis on price, fuel efficiency and lower life-cycle costs for these workhorse airplanes. Simply put, the market demanded certainty and wanted our decision as soon as possible. The MAX provides that certainty by building on the success of the 737.

In our industry, it's critical to invest in innovation and to provide a business solution for our customers. By striking the right balance of engineering, production and technology, we'll deliver the MAX in 2017, meeting pressing demand in the single-aisle market and helping customers' profitability.

The customer knowledge and advocacy of the Commercial Airplanes Sales teams rapidly generated nearly 500 commitments for MAX's launch. And the 737 Program, in partnership with Engineering and other stakeholders, is well on its way to finalizing MAX's configuration.

With our continuous investment in innovation and production capability, Commercial Airplanes already is working on future solutions for the widebody segment. Customer demand has made today's 777 the clear market leader, and with the 1,000th model delivered last month, the airplane is enjoying one of its best order years ever. The 787 program remains focused on entry into service and increasing production rates. Meanwhile, collaborative teams are assessing how the arsenal of technologies developed for the 787 and 747-8 could be applied to the 777 and to a final member of the 787 family, which we're calling the 787-10X.

As Commercial Airplanes has done for nearly a century, we'll continue to deliver superior airplanes with unparalleled value to customers in every market we serve. Without question, teamwork and integrated decision-making will enable us to always make good on that promise. ■

"To be successful, we need to consistently operate as a seamless team that values—and integrates—our individual strengths and perspectives."

– Nicole Piasecki

Vice president, Commercial Airplanes
Business Development & Strategic Integration

PHOTO: MARIAN LOCKHART/BOEING

FREQUENT FRYER: A Boeing 757 operated by British charter airline Thomson Airways used a 50-50 blend of traditional jet fuel and biofuel, made from used cooking oil, to power one of its engines last month on a four-hour flight from Birmingham, United Kingdom, to Lanzarote, Spain. It carried 232 passengers and was the first revenue biofuel flight in the U.K. PHOTO: THOMSON AIRWAYS

Quotables

"They go exactly where they're supposed to, so I can do my job and protect that 18-year-old holding a rifle on the ground."

– Air Force Maj. Matthew "Edge" Swanson, an F-15 pilot with 200 combat flight-hours over Iraq and Afghanistan, speaking about Boeing's Laser Joint Direct Attack Munition (Laser JDAM) at the annual Direct Attack Suppliers' Conference. Swanson noted that all 26 Laser JDAMs dropped by his squadron during his most recent deployment were direct hits. Boeing News Now, Sept. 2.

"Just to hear those things fly above … it gives you a sense of accomplishment and pride to know you had a hand in something that was worthwhile."

– Ramon Pena Jr., electrical and mechanical assembler on the Apache helicopter line in Mesa, Ariz. See story on Page 21.

Fighter support

The journey is the reward for this F-15J employee in Japan

By Rob Henderson

Fumiko Uchida works at the Boeing F-15J office inside Mitsubishi Heavy Industries in Nagoya, Japan. In this *Frontiers* series that profiles employees talking about their jobs, Uchida offers an inside look at working across cultures, borders and languages to flawlessly satisfy customers. PHOTO: ASSOCIATED PRESS

I joined the company in April 1978, so I've seen a lot of changes. Of course, back then it was Boeing heritage company McDonnell Douglas and the office was buzzing with people, mostly engineers, here to help Mitsubishi Heavy Industries, or MHI, set up its licensed F-15 production line.

Now it's much quieter—in fact, I'm here on my own. You could say I'm in the "stealth" office! We have lots of visitors, though, who come to support MHI. And lots of teleconferences and videoconferences. So it's never lonely.

A lot of my work is coordinating between Boeing in St. Louis and MHI. From time to time I also deal with the Japan Air Self-Defense Force. For example, we visit bases to present certificates recognizing the achievements of its pilots, such as 4,000 flying hours on the F-15. That's an incredible feat for Japanese fighter pilots whose sorties are much shorter than those in the United States, where pilots regularly fly on longer missions, say, up to Alaska.

I was there for the first flight of the Japanese-produced F-15 and it was amazing. I was so proud to see it lift off in 1981. It was the latest and greatest at the time and had been put together by the very people I saw every day. Thirty years later, I'm still impressed to see it fly. Of course it's not the same airplane—it has been continually upgraded and modernized.

Mitsubishi Heavy Industries made around 200 F-15Js, and I was sad to see the last one roll off the production line 10 years ago. Now we assist MHI, which provides overhaul and upgrade services, with spares procurement and technical matters.

Did I ever think I'd end up working on such a historic and important program? Life is full of surprises! At university I studied Russian, as I really love Russian literature. And I've spent the past 32 years using mainly English for an American company building airplanes with its Japanese partner!

It has been a great journey, and the motivation and enthusiasm of the Boeing and MHI teams are catching. I feel really lucky to be working here. ■

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Spirit in the sky

McDonnell Aircraft's FH-1 Phantom propelled the U.S. Navy into the jet age

By Henry T. Brownlee Jr.

PHOTO: The XFD-1 takes off from the deck of the USS *Franklin D. Roosevelt* July 21, 1946. BOEING ARCHIVES

PHOTO: A McDonnell FH-1 Phantom on display in the Jet Aviation gallery at the National Mall building in Washington, D.C. SMITHSONIAN INSTITUTION

PHOTO: The XFD-1 prototype, staged in front of the original McDonnell Aircraft Corp. facilities in St. Louis in 1945. BOEING ARCHIVES

It was a phone call that changed the course of naval aviation.

On New Year's Eve, 1942, James S. McDonnell, founder and president of McDonnell Aircraft Corp., received the call from the U.S. Navy Bureau of Aeronautics offering McDonnell a contract to design and build the first American jet fighter capable of taking off from and landing on an aircraft carrier.

McDonnell signed a letter of intent to develop the experimental, or "X," jet aircraft on Jan. 7, 1943.

The Navy wanted a single-seat, jet-propelled, low-wing monoplane. McDonnell accepted the challenge and two years later, in January 1945, Woodward "Woody" Burke piloted the XFD-1 prototype on its first flight at Lambert Field in St. Louis. The XFD-1 was still in development when World War II ended, but the Navy decided that McDonnell Aircraft could continue developing the jet and move into the production phase.

PHOTOS: (Left) An FH-1 takes off from the deck of the USS *Saipan* in 1948. **(Above)** Lt. Cdr. James T. Davidson with the XFD-1 before his historic July 21, 1946, flight. U.S. NAVY

McDonnell named his new jet fighter "Phantom."

In an official interoffice correspondence a year later, McDonnell wrote: "So many airplanes have been named since 1903 that there are few fields from which such names have not been frequently drawn. One of these rare fields is the world of [animism] (the theory that life and mind are inherent in matter), and it is from this field that we will select our jet and rocket airplane names, subject to the approval by the customer."

From a list of 19 entities from the spirit world, including Phantom, Banshee and Goblin, McDonnell chose Phantom. The XFD-1, he wrote, with a speed of 500 mph (800 kilometers per hour), would "appear and disappear like an apparition."

On the morning of July 21, 1946, the XFD-1 Phantom roared 400 feet (120 meters) down the deck of the USS *Franklin D. Roosevelt*, a then–recently commissioned U.S. Navy aircraft carrier. The Phantom's pilot, Lt. Cdr. James T. Davidson, climbed quickly portside, circled the carrier and then landed. It marked the first takeoff and landing of a jet-powered aircraft from the deck of a U.S. aircraft carrier. Davidson made five takeoffs and landings and completed a successful wave-off at 95 mph (150 kilometers per hour). Later that day, he flew the Phantom to the Naval Air Test Center at Patuxent River, Md.

The XFD-1, later re-designated the FH-1 Phantom, had demonstrated that jet-powered fighter aircraft were capable of performing both the high-speed takeoffs and low-speed landings necessary for aircraft carrier operations. It ushered in a new era of naval aviation.

McDonnell Aircraft Co. would produce 62 FH-1s.

And it was the first in a long line of jet fighters designed and manufactured by McDonnell, later McDonnell Douglas and then Boeing, in its St. Louis plant. McDonnell subsequently designed and manufactured the F2H Banshee, the F3H Demon and the F-4 Phantom II for the U.S. Navy.

This year marks the centennial of U.S. naval aviation. And The Boeing Company continues an enduring legacy of producing top-notch jet fighters for the Navy and other global customers with the F/A-18 Super Hornet and EA-18 Growler programs. ■

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PHANTOM FIRSTS

The **FH-1 Phantom** is credited with a number of naval aviation firsts:

1ST	all-jet airplane ordered into production by the U.S. Navy; the first U.S. Navy aircraft to operate at a speed of 500 mph (800 kph)
1ST	jet fighter to operate from the flight deck of a U.S. aircraft carrier
1ST	jet fighter selected by a U.S. Marine Corps fighter squadron
1ST	jet fighter to serve with both the U.S. Navy and Marines

Right to privacy

Employee health information is private and closely protected by Boeing

Keeping personal information private is a concern for everyone, especially when it comes to protecting health and medical data. To address these concerns as they relate to Boeing's annual on-site health screenings and online Health Assessments, *Frontiers* spoke with Doug Kight, vice president of Strategy, Compensation and Benefits.

How does Boeing protect the information employees enter into their Health Assessments?

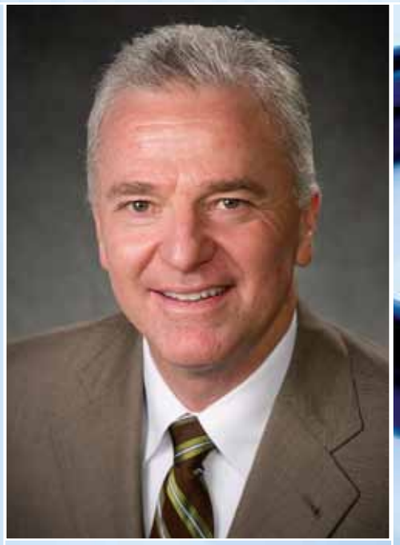
We must and do comply fully with federal and other privacy laws that protect personal health and medical information, and we have taken a series of steps to ensure compliance. We start by selecting suppliers that are committed to privacy protection. Most important, Boeing does not have access to individual employee health information from the Health Assessments, and we don't desire to.

If you can't access individual data, how can you use the results?

We use aggregated, anonymous information from all health care plan participants to help us design Well Being programs such as Boeing on the Move. Aggregate results also help us determine the resources we need from our wellness partners to help employees with chronic health conditions such as lower back pain, diabetes and high blood pressure.

How does Boeing know if an employee has completed a Health Assessment?

Boeing does not receive individual employee results from the Health Assessment.



A small number of people in Payroll and Benefit Operations will receive a file from our supplier that simply indicates whether any deduction should be made from each nonunion employee's paycheck for not participating in the Health Assessment.

What do the results tell us about the health of the Boeing workforce?

As with any population sample of 170,000 people, we've found that many employees need to exercise more, eat better and understand their health status through steps such as annual physicals. We use this data to help manage chronic health conditions and understand what can be done to avoid health risks. For example, taking the online Health Assessment and having annual checkups have helped me deal with a few instances of skin cancer. Having that third-party support and accountability helps me manage my condition. ■

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PHOTOS: (Left) Doug Kight, Boeing vice president of Strategy, Compensation and Benefits. **(Above)** Sharon Lindley, Boeing's chief privacy officer. BOB FERGUSON/BOEING; STETHOSCOPE: SHUTTERSTOCK

Boeing helps safeguard personal information

Boeing's Global Privacy Office encourages employees to protect their personal information by taking the online Health Assessment from a secure, nonpublic computer.

"Protecting passwords and securely storing printed copies of their results will also help keep their personal health information private," said Sharon Lindley, Boeing's chief privacy officer. She leads the Global Privacy Office, which works to ensure Personally Identifiable Information is handled securely.

Personal health information gathered as part of the annual Health Assessment falls under her office's jurisdiction.

Lindley's team collaborates with Information Technology, Security, the Office of Internal Governance, the Law department and other functions across the company to safeguard Personally Identifiable Information.

"Boeing contracts with professional health and wellness service providers that are required by the Health Insurance Portability and Accountability Act or other applicable privacy laws to protect the personal health and medical information they collect and handle," Lindley said. "We ensure that our agreements with these service providers include sufficient and legally compliant controls to protect the data."

Partnering on wellness

Boeing is one of many employers encouraging healthy lifestyles.

"Outstanding companies focus on improving the quality of life of their employees," said Helen Darling, president and CEO of the National Business Group on Health, a nonprofit that seeks solutions to the health care challenges faced by large employers such as Boeing, Lockheed Martin, GE and Microsoft.

"Helping a workforce learn more about the benefits, harms and risks of their behaviors is a wonderful way to empower those who have the capacity to use the information," she said. "The more we partner on wellness, the higher the quality of life and standard of living we can achieve together.

"We've seen many large corporations promote healthier lifestyles for their employees through health assessments and coaching," she said, noting that employees are also being asked to share more of the health care costs if they decide not to participate in programs such as health assessments.

While privacy of health information is a concern to both employers and employees, Darling said she's never heard of an instance where an employer has accessed an individual employee's health data for improper purposes.

"Companies like Boeing," she noted, "partner with vendors who have a heightened sensitivity to privacy issues."

Plane talk

The ‘digital airline’ instantly transforms information into action

By Mike Barber

You’re on the red-eye, a Boeing 777-300ER (Extended Range) flying overnight from Toronto to Hong Kong, which has just reached cruising altitude.

As weary passengers settle in for a long flight, in the darkened cabin a few laptops open, some ear buds pop in and, here and there, an overhead seat light flickers off as insomnia fades. Through the cabin, except for the occasional movement of a watchful flight attendant, the night grows quiet.

Yet as passengers slumber, an energetic conversation is under way. From the engines through the airframe and onto the flight deck, the airplane itself is talking.

Unheard by passengers, this important conversation in a world of electronic signals and nanosensors is the result of Boeing innovations that enable the “digital airline.”

A significant addition to situational awareness and decision-making, the digital airline walks its talk, instantly transforming information generated during flight, on the ground and in the hangar into quick, informed action that enables airlines to make decisions and fly at peak safety, reliability and efficiency.

“The most significant and exciting advances in commercial aviation come from the strategic application of information technology to airline operations,” said Per Norén, vice president of Information Services, a business unit of Commercial Aviation Services launched in 2011 to answer increased customer demand.

“The Boeing Digital Airline initiative builds on the most advanced analytics and airplane technology to take our customers and the industry’s operational efficiency to the next level.”

Key is delivery of secure, detailed operational and maintenance information to people who need it most, when they need it most, allowing airline customers to make the best possible decisions, Norén said.

This information translates into cost-savings for customers. Boeing has conservatively estimated actual costs to an airline of an airplane-on-ground delay lasting one or two hours to be at least $10,000, and as high as $150,000, depending on the airplane model and operator.

Since its inception in 2003, the technology behind Boeing’s digital airline has evolved into four main components:

- Airplane Health Management
- Electronic Flight Bag
- Maintenance Performance Toolbox
- MyBoeingFleet.com

PHOTOS: (Right) The 787 Operations Control Center in Everett, Wash., receives digital signals from airplanes to address customer needs. GAIL HANUSA/BOEING; 787: BOEING

“We have a complex system in place that makes it easy for maintenance troubleshooters to interact with embedded aircraft systems in real time.”

– Dave Kinney, product manager, Boeing Airplane Health Management

Using monitored information to diagnose an airplane part or system and interactively troubleshoot it while an airplane is en route was once an industrial dream. Now, knowing when a part or system will fail and replacing it before it does is common across airline control centers that use Boeing’s Airplane Health Management.

“It’s not an experiment; this is real,” said Dave Kinney, product manager, Boeing Airplane Health Management. “We have a complex system in place that makes it easy for maintenance troubleshooters to interact with embedded aircraft systems in real time to support diagnosis and prognosis.”

Using data from onboard sensors in the engines, auxiliaries and airframe, the airplane’s system can analyze information in flight, ranging from fuel mileage and oil performance, to hydraulic fluid or tire pressure. Upon arrival at the gate, technicians, parts and tools can be ready to quickly make any necessary repairs.

Working in tandem with that system is the troubleshooting Maintenance Performance Toolbox. Available by subscription on MyBoeingFleet.com, it contains all the technical information ever compiled about an airplane type. That includes procedures, parts lists, 3-D graphics, records of an individual airplane’s previous repairs and alternative courses of action.

Beyond information sent by the airplane, pilot observations are collected using the Electronic Logbook application, part of Boeing subsidiary Jeppesen’s Electronic Flight Bag.

Coupled with the Airplane Health Management, the Electronic Flight Bag eliminates paperwork by providing pilots with digital information, including fingertip access to up-to-date air navigation charts, documents, real-time performance calculations, taxiway positioning and flight-deck entryway video surveillance.

Access to both flows through MyBoeingFleet.com, a password-protected business-to-business Web portal. The easy-to-use system is accessible to Boeing’s registered customers—flight crews, flight operations and maintenance managers, planners, trainers and regulators—from any device with a connection to the Internet.

Commercial Aviation Services developed MyBoeingFleet.com to tap into Boeing’s vast libraries of proprietary and essential customer information. The regularly updated portal makes available everything from engineering drawings to technical manuals and warranties.

The aviation industry is moving quickly to adopt new technology to improve its operational performance. The 787 Dreamliner, which entered service in October, is considered the world’s first fully e-enabled airplane, generating and capturing more data than any airplane in Boeing’s history.

“We see a clear need to expand our support capabilities to provide even more strategic insight to our operators, and we are doing just that,” said John Maggiore, director of Airline Performance Management for Commercial Aviation Services.

As technology matures, future flights will host more silent electronic conversations. The airplane, for example, might communicate with gate scheduling personnel, allowing automatic assignments that won’t require labor-intensive schedule juggling.

Meanwhile, on board the digital airplane today, passengers can nap soundly knowing important electronic conversations about their airplane are taking place—and that Boeing has been hard at work so they will arrive safely, reliably and worry-free. ■

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PHOTOS: (Above left) A Boeing 777 in flight. BOEING
(Above right) Tracking flight operations in Everett, Wash. GAIL HANUSA/BOEING

Focused on the future

An integrated technology strategy strengthens Boeing's ability to innovate and compete

By Candace Heckman and photos by Bob Ferguson

Since its inception nearly 100 years ago, Boeing has relied on the innovation of employees to become the largest aerospace-based company in the world. By specializing in a variety of products and services that span both the commercial and defense markets, as well as adjacent areas, thousands of smart people across the enterprise are expanding possibilities for the future.

Frontiers asked John Tracy, Boeing chief technology officer and senior vice president of Engineering, Operations & Technology, and Allen Adler, vice president of Enterprise Technology Strategy, to discuss the company's approach to innovation and how a collaborative strategy helps ensure Boeing remains the world's aerospace leader.

PHOTO: Engineering, Operations & Technology's John Tracy, left, and Allen Adler.

Q&A

What is the Enterprise Technology Strategy, and why does Boeing need one?

Tracy: We invest billions of dollars into researching and developing technology to create Boeing's products and services and to provide us a competitive advantage. And we invest these resources throughout the company in multiple organizations and locations around the globe. But to make sure we are in the most competitive position we can be across our businesses, we must get the greatest yield possible out of our technology investment. That requires a strategy.

Adler: An enterprise approach starts by stepping back and taking a high-altitude view of what's going on in all facets of Boeing's businesses. The strategy is the way we look at all of this activity and figure out how to optimize technologies, as well as forge a path to the future. This visibility allows us to focus on critical capabilities, enhance the productivity of our research and development teams, keep an active lookout for disruptive technologies, and increase the yield of Boeing's R&D investment. In other words, we get a bigger bang for our buck.

How does Boeing approach its enterprise strategy?

Tracy: Working together, Commercial Airplanes President and CEO Jim Albaugh, Defense, Space & Security President and CEO Dennis Muilenburg and I review our strategy, our investments and our

Q&A

results on a regular basis as part of a comprehensive plan to make sure our enterprise strategy is taking the company where we want to go.

This direction is periodically reviewed by our Enterprise Technology Steering Team, which is made up of our senior technology and engineering leaders and outside advisers who meet several times throughout the year. Finally, we calibrate the strategy on a yearly basis and present it to Boeing Chairman, President and CEO Jim McNerney, so it's an integrated effort from the chairman's office to the laboratory bench. The goal is to make sure that everyone working on technology at Boeing is aligned in continuing our technical leadership position in the aerospace industry.

Adler: It's taken several years to develop, but now Boeing uses a common technical language, and we've developed eight general areas of technology that we call "domains." Each domain has a leader tasked with keeping tabs on all research and development projects in his or her particular fields and recommending narrowly focused key and core technologies to concentrate the company's investment. The domain leaders meet regularly to collaborate. And they make recommendations to the senior technical leaders of the company.

How does one strategy serve Boeing's two major business units, which have different customers?

Adler: One common element that binds this company is aerospace. We might make distinct products from one end of the company to the other—but the science is the same. A jet fighter might fly differently from a 777, but there are certain fundamental elements of physics that rule both aircraft. The common grounding in science is often where we can find synergy in the technology.

Tracy: We might work on different programs, but most of the technical challenges are very similar. Wherever possible, we should avoid conducting duplicate work that's already been done or that someone else is doing. If someone has found a solution to the problem, and it works, then let's use it if we can. Maybe you can improve upon it, but we owe it to ourselves and our customers to avoid reinventing the wheel. The words "invention" and "creation" are important to us at Boeing, but the word "replication" is just as important in the pursuit of innovation.

There's another important area where one strategy serves both sides of our business, and that lies within our future technology development work. As we look further into the future, it's critical that we identify and pursue those potential game-changing technology areas that could disrupt the competitive landscape and lead to new generations of commercial or defense-related applications.

What does our enterprise strategy mean for how employees do their jobs?

Tracy: By implementing our Enterprise Technology Strategy, the domains will ensure that as an enterprise we will avoid duplications and gaps in our research and development work—we'll limit the overlaps and avoid surprises. Just as important, from the individual researcher's point of view, our technical employees can be sure that whatever they are working on will have an impact on Boeing's future direction and competitiveness.

This strategy provides the line of sight that allows our engineers and scientists to see that they are working on a project that will drive value.

Adler: Boeing is so vast that there could be people in the company working on projects that do not—and likely would not—develop value because they are on divergent paths. Business decisions are dynamic, and technology competition is fierce. We need to focus all hands on deck in order to compete. The strategy is there to help us all work better, together. ■

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Mesa's edge

Boeing's Mesa site is humming with Apache production—and that's not all

By Eric Fetters-Walp and photos by Bob Ferguson

PHOTO: Boeing and U.S. Army aviators put two AH-64D Apache Longbow attack helicopters through their paces over the Arizona desert.

Mesa
by the numbers

1
ranking of Boeing Mesa's business among all Arizona manufacturers

382
acres (155 hectares) comprising the Mesa site

576
number of Boeing suppliers or vendors in Arizona

1982
year Mesa site was established by Hughes Helicopters

4,500
approximate number of employees

8,300
hours volunteered by employees in 2010

1,900,000
dollars given by Boeing Mesa and employees in charitable contributions during 2010

2,000,000
square feet (186,000 square meters) of area in site's facilities

PHOTO: An Apache maneuvers over the desert hills outside Mesa.

The hot desert air above Mesa, Ariz., frequently pulses with the sound of Apache attack helicopters as the intimidating machines are put through their paces after emerging from the Boeing production line.

It's a sound that's become familiar over the nearly 30 years that the Mesa site has built Apaches for the U.S. Army and a growing number of international customers. And Mesa employees are justly proud of the site's most famous product.

"Just to hear those things fly above … It gives you a sense of accomplishment and pride to know you had a hand in something that was worthwhile," said Ramon Pena Jr., an electrical and mechanical assembler who has spent 26 years working on the Apache.

Mesa's flagship line is rolling out the first of the next-generation Apache Block III production models this fall. The U.S. Army plans to order nearly 700 newly built or remanufactured Block III helicopters, which will keep the Mesa site busy for at least the next decade.

But there's more to Mesa than the Apache line. Working alongside the rotorcraft program employees, a contingent of more than 175 Boeing Test & Evaluation employees is instrumental in rotorcraft development, engineering and flight-test activities. Additionally, Mesa's composites and electrical fabrication centers are making a growing array of components for multiple Boeing aircraft.

"We've gone from producing Block II Apaches two years ago to having three and soon four production lines here today," said Dave Koopersmith, Boeing Military Aircraft's vice president of Attack Helicopter Programs and Mesa senior site executive, referring to the two Apache production lines, A160T Hummingbird unmanned system assembly and the anticipated AH-6i light attack/reconnaissance helicopter line. "We've had a long-term investment strategy here with an incredible foundation provided by the Apache line."

The Mesa rotorcraft facility, located on the edge of Falcon Field Airport, marks its 30th anniversary in 2012. Originally constructed by Hughes Helicopters, the

‘Sports car’ feel

Since the delivery of the first AH-64A Apache attack helicopter in 1984, the addition of new technology and refinement of its design have kept the helicopter a cutting-edge tool to support ground soldiers. And the new Block III program for the Apache AH-64D takes that evolution to another level.

Improvements include an enhanced digital electronic engine control unit, which improves the responsiveness of the rotorcraft’s twin GE T700-701D engines, along with composite main rotor blades and more powerful computer systems that even allow pilots to remotely control unmanned aircraft. The changes aren’t trivial, said Col. Shane Openshaw, Apache Program manager for the U.S. Army.

“What the pilots are going to notice almost immediately is flat-out performance. It’s faster, has more range, more payload and more maneuverability,” Openshaw said. “It brings back the ‘sports car’ feel to this model.”

Boeing Mesa delivered the first Block III Apache to the Army last month. The Army plans to acquire 690 Block III Apaches between now and 2027. Of those, 56 will be newly built rotorcraft. The rest will be remanufactured Block I and Block II models.

– Eric Fetters-Walp

PHOTO: An Apache Block III test helicopter (foreground) and an H-6U helicopter prepare to land at Boeing Mesa.

site became part of McDonnell Douglas two years later—and has assembled Apache helicopters ever since. In addition to building new Apaches, the site remanufactures earlier models into the latest version, rebuilding the aircraft from the inside out.

Jules Maddon, a manufacturing process technician on the Apache line, said she enjoys the hands-on nature of assembling the Apache. “I love crawling all over my helicopter and doing what needs to be done,” Maddon said. “I enjoy the people I work with and the product I work on.”

In the same building where the Apache is assembled is Mesa’s Electrical Strategic Fabrication Center, where employees upstairs bundle the crucial wire harnesses used in Boeing’s F-15 Eagle and the F/A-18 Super Hornet fighters. Downstairs, wiring bundles for the Apache and C-17 Globemaster III transport are put together.

Van Abbl, a longtime electrical technician with Boeing, said it takes concentration and focus—along with steady hands and good eyes—to accomplish the job, which involves manually stringing huge wires across schematic boards. One resource that assists is her laptop, which helps team members keep track of their work and allows them to call up wiring diagrams when needed. “It’s a good team. Everyone helps each other out,” Abbl said.

In a nearby building, Mesa’s newest assembly line is producing the unmanned A160T Hummingbird, a rotorcraft with an operating range of 2,590 miles (4,170 kilometers), more than twice that of other unmanned rotorcraft. It also set a record carrying a 300-pound (140-kilogram) payload for 18.7 hours without refueling, landing with 90 minutes of fuel onboard.

The Hummingbird production line, recently moved from Irvine, Calif., already has seen its production time reduced from 40 days to just 12 days. Two of the first three Hummingbirds built in Mesa are going to the U.S. Marine Corps for testing, said Jeff Shelton, manager of Business Development for Boeing Unmanned Airborne Systems in Mesa.

Bill Brady, a composite assembly technician working on the A160T line, said working on the mostly composite unmanned vehicle has been both challenging and exciting. “We’re anxious to get them out and in the field.” Brady said. “People are pretty optimistic. I think there’s a big need for this airframe and its capabilities.”

Mesa also has developed and is testing an unmanned version of its AH-6i light attack/reconnaissance helicopter. Boeing recently provided the U.S. Army, which is looking for an unmanned vertical-takeoff-and-landing aircraft, with information about the capabilities of the H-6U Unmanned Little Bird, which performed its first flight at Mesa in 2004. The company provided information on the A160T as well.

The site also modifies the S-100 Camcopter, a smaller unmanned rotorcraft that Boeing markets with Austria’s Schiebel Corp.

Tony Ham, Mesa site leader and Operations director, said Mesa’s growing capabilities in a number of products makes it a valuable part of Boeing Defense, Space & Security. At the same time, he said, the site has retained a “small-site feel” over the years, with strong camaraderie among its teams. Ham added that mentoring and employee development are high priorities at Mesa, as the site potentially faces its first big wave of retirements by longtime employees.

“Our lines are growing, and we’re hiring. It’s going in a good direction,” Ham said.

Gary Blazich, operational security with Shared Services Group, said he has long appreciated that close-knit feeling at the Mesa site. “It’s not hard to get up in the morning for work with this atmosphere and the people,” said Blazich, who has worked more than 25 years for Boeing. “We have a history here of getting things done, and that’s exciting.” ■

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More than *Apaches*

When the first production A160T Hummingbird unmanned system rolled off Mesa's production line earlier this year, the event spotlighted the composite capabilities of the site.

Mesa's Strategic Composites Fabrication Center built about 60 percent of the Hummingbird's composite parts. The center already is a supplier of composite parts for Boeing's F/A-18 Super Hornet, E/A-18G Growler and P-8A Poseidon aircraft, as well as for the Apache helicopter.

"What gets lost in the shuffle sometimes is all of what we do in Mesa. It's more than the Apaches," said Tony Jones, production manager for composite radomes at Mesa. "We do things for lots of programs in the company."

That includes making critical components for both Super Hornets and Growlers, such as their Leading Edge Flap Antenna and Leading Edge Extension Antenna. The center also makes radomes for the P-8 Poseidon and bonded braces for the 787 Dreamliner, and it is developing a bond brace for the forthcoming 787-9 jetliner model.

For the Apache, the Composites unit makes several components, including the main rotor blades for the new Block III

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PHOTOS: (Above) Mike Williams, left, and Mike Frazier, both of A160T final assembly, work on a metal structure that is part of the primarily composite aircraft. The Mesa A160T assembly line rolled out its first aircraft in March. **(Insets, from left)** From the A160T production line in Mesa are Bill Brady, Mike Blust, a view of the production line, Mike Frazier and Mike Williams.

Apache model, which also can be retrofitted to earlier versions of the attack helicopter. Nearly all of the parts outside the Apache's core fuselage are composite, said Diana Conner, a longtime manufacturing technician in Composites. The tools she and her co-workers now use to create composite pieces are much improved from when she started.

"It's still improving," Conner said. "We're always striving for better ways to do it."

Staff in the Composites center, Jones said, is scheduled to nearly double—from 60 to more than 100—as production ramps up on the new Apache rotor blades.

– Eric Fetters-Walp

PHOTOS: (Above) Flight-test technicians Austin Perkins, left, and Keith Sucher prepare an AH-6i light attack/reconnaissance helicopter for a flight. Developed in less than one year, the AH-6 is being marketed internationally and domestically. **(Insets, from left)** In the AH-6i facility in Mesa are Keith Sucher; Christine Cameron and Austin Perkins; a frontal view of the AH-6i; Sucher; and Cameron and Perkins. Safety glasses are not required in this work area.

Model of *excellence*

The Mesa site is best-known for producing world-class rotorcraft products, but employee efforts to improve manufacturing processes and reduce the site's environmental footprint have won significant recognition over the past decade.

"The people make the site—how they work together and how they're concerned with the condition of the site," said Tony Ham, site leader and Operations director for the Boeing Global Strike site. "People want to be here, and they want to produce a quality product the first time."

This year, the Arizona Manufacturers Council named Boeing Mesa as the Manufacturer of the Year in recognition of the site's products, operational excellence, managerial philosophy and the effort the company makes to enhance manufacturing in the state. Boeing Mesa won the same honor in 2000 and 1997.

"You look at the great products you build here, but also, every time you hear Boeing gets a contract, 80 or 90 suppliers benefit. It's incredibly important," said Steve Macias, chairman of the Arizona Manufacturing Council. "Boeing's the big name in the defense industry in Arizona. It's not just the daily work that emanates from Boeing but also all the technology."

As the Apache helicopter evolved from

(continued on Page 32)

PHOTOS: (Above) Technicians Joe Bakonyi, left, and Mike Trexler discuss task instructions in the Apache pre-modification area. **(Insets, from left)** Cristobal Garcia, Colandros Robinson, Diane Feeney, Ramon Pena Jr. and Vinton Poblano.

the first production model in 1983 through the newest AH-64D Apache Block III model, the manufacturing process has advanced as well. In 2005, the program won the Shingo Prize, presented by Utah State University's Jon M. Huntsman School of Business, for excellence in Lean manufacturing.

Mesa employees' attention to foreign object debris and damage (FOD) also has received notice. The U.S. Defense Contracts Management Agency gave the site a "Blue" rating, its top rating, for FOD control in 2010 and 2006, to date a feat achieved only by Mesa.

In the past five years, Boeing Mesa has received numerous environmental awards from federal, state and regional agencies, mostly for reducing single-vehicle employee commutes and improving air quality. The site also has installed active solar-tracking skylights in its maintenance building to increase natural lighting and reduce energy use, and replaced its central cooling plant to improve efficiency.

– Eric Fetters-Walp

PHOTOS: (Above) In the first production Apache Block III helicopter, crew members get the OK for engine start before a test flight. **(Insets, from left)** David Jacques, left, engineering flight-test mechanic, and Mike Dudley, Unmanned Airborne Systems integration engineer, in the pilot's station of an Apache; the Apache's information display screens, part of the rotorcraft's system that gives pilots situational awareness; instructor pilot Bill Lee, left, and U.S. Army Chief Warrant Officer 5 Art Payton; Boeing test pilots Dave Guthrie, left, and Dave Bauer; and Bauer, aft, and Guthrie.

Face to face

These Boeing Test & Evaluation employees work side by side with military customers

By Kate Zaranek

PHOTOS: (Insets) Dan Antinone, left, and Jen Cooper are part of the Boeing Test & Evaluation team at Eglin Air Force Base, Fla. **(Below)** Their work includes interacting with U.S. Air Force customer representatives, including Tech. Sgt. John Gann, center.
ASSOCIATED PRESS

It's not uncommon to find Boeing Test & Evaluation flight-test engineers Jen Cooper and Dan Antinone on the flight line at Eglin Air Force Base, Fla., prepping an aircraft for a test sortie at 3:30 a.m.

Even that early in the morning there are jets to launch, and Cooper and Antinone, who are cross-trained in ground operations, safety procedures and mission systems, ensure the aircraft is properly configured for flight tests.

Few jobs at Boeing provide the daily customer interaction that Test & Evaluation employees experience while collocated at government sites. From Naval Air Station Patuxent River, Md., to Naval Air Weapons Station China Lake, Calif., approximately 400 test employees, known within the company as outplants, work side by side with U.S. Navy, Air Force and Army customers.

Working with the people who fly and maintain Boeing products, the collocated teams reduce support costs to customers and provide real-time access to Boeing expertise.

"We are the unofficial ambassadors for Boeing," said Paul Martin, who manages the outplant teams.

Keith Svendsen, chief of F-15 Test and Integration for the U.S. Air Force, said Boeing team performance has been exceptional.

"It's not always easy for a contractor team to operate on a government installation, but the team rolls with our changing processes to get the task done," Svendsen said. "The attitude has always been one of getting the mission accomplished within the boundaries allowed and I have rarely been disappointed."

Coordinating with the maintenance and aircrews for 14 F-15s, the flight-test engineers have the big picture for the entire test program that other groups within the program may not see.

"We make sure we have a good jet. We know the details about the aircraft that the aircrew might not be aware of," Cooper said, adding: "The face-to-face interaction is invaluable to the test planning and execution and aids in ways that could not be accomplished nearly as quickly over email or the phone."

Seeing firsthand how customers interact with Boeing products also drives innovation.

For example, Ron Bear and the Test Requirements Analysis team developed software that allows testers such as Cooper and Antinone to upload test points onto a portable tablet, which transcribes test reports into a standard format that is delivered weekly to the Air Force.

What used to take the engineers about 16 hours to compile, standardize and format now takes about a minute. That gives test engineers more time for actual testing.

"There is no better job at Boeing. We get to sit in multimillion-dollar jets every day," Antinone said as he walked around the jet, checking items off his list on the tablet to ensure the aircraft was configured properly for each test.

Boeing outplant employees often are seen as members of the government team and their presence is appreciated, as demonstrated by recent customer recognition.

Jeff Miller, a loads and dynamics engineer on the F/A-18 program for Test & Evaluation, recently received the inaugural VX-23 Test Engineer of the Year award from the Navy's VX-23 Squadron at Naval Air Station Patuxent River in recognition of his technical expertise.

The U.S. Navy also recognized the P-8A Clean Flutter Test Team with a citation.

Despite their geographical distance from Boeing sites, outplant teams are proud to be part of Boeing, and take pride in the work they do for the customer.

"We wear two hats here—one for Boeing and one for the Air Force, and they interchange often," said Roger Hennicke, a Test & Evaluation missions systems specialist at Eglin. "But Boeing and the Air Force have the same goal: Keep the warfighter safe. Those two hats become one." ■

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Special guests

Engaged employees drive Canadian airline WestJet's success

By Marcy Woodhull

They succeed because they care. Owners care.

That is a mantra of the 8,300 WestJetters, otherwise known as employees of the Canadian airline WestJet. The company even made a rap video, on YouTube, timed with its November 2010 profit-sharing payout. Not only were employees featured in the video, but president and CEO Gregg Saretsky was break dancing, decked out in full rap regalia, as was the rest of WestJet's executive team.

They may not take themselves seriously, but they take their jobs very seriously. Safety, passenger comfort and service are paramount to the Calgary, Alberta–based airline. In fact, WestJetters strive to offer all passengers, known as "guests" in WestJet parlance, what the company calls a "great guest experience"—every step of the way.

It pays off. WestJet has received praise for its corporate culture.

In 2010, WestJet was inducted into Canada's 10 Most Admired Corporate Cultures Hall of Fame, one of the highest honors a Canadian company can receive. Its flight attendants were named the best in Canada in a survey by the Flight Network travel website, and WestJet was named a JD Power Customer Service Champion, one of only two Canadian companies to receive the designation.

"These awards, in particular, speak to the way our culture of caring translates into a great guest experience," Saretsky said.

Founded in 1996 by a team of Calgary entrepreneurs, WestJet began as a regional carrier with three Boeing airplanes flying to five cities. Just 15 years later, WestJet has a fleet of 96 aircraft, all Boeing 737 Next-Generation airplanes, and flies to 71 destinations in Canada, the United States, Mexico and the Caribbean.

Since its inception, WestJet has enjoyed sustained profitability and continued growth. The airline employs cost efficiencies that benefit WestJet employee owners, as well as airline guests.

"First and foremost, our WestJetters truly care about their company," Saretsky said. "And I say 'their' company because over 85 percent of our workforce owns shares in WestJet. When you own something, you have a vested interest in its well-being and, ultimately, its success."

WestJet and Boeing enjoy a mutually supportive and successful partnership, said Kevin Schemm, North America and Leasing Sales vice president for Commercial Airplanes. "We respect each other and have a collaborative working relationship."

Saretsky agreed. "We enjoy a great rapport on all levels, from the executive suite right through our line managers."

WestJet is looking forward to learning more about Boeing's new 737 MAX and the role it might play in the WestJet fleet, Saretsky said of the more fuel-efficient 737 now under development.

By next year, the WestJet fleet will number 100 Boeing 737s. The airline may add capacity on existing routes or announce new destinations and routes, according to Saretsky.

"It's important to take a long-term view of things," he said, "and continue to build this very young airline and reach our objective to be one of the top five international airlines in the world." ■

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PHOTOS: (Above) Gregg Saretsky, WestJet president and CEO. WESTJET **(Below)** A Boeing 737-700 in WestJet livery takes off from Boeing Field in Seattle. JIM ANDERSON/BOEING

Boeing salutes its thousands of employees around the world who are veterans or serve in the National Guard or reserves. In tribute to all who have served defending freedom, *Frontiers* recently invited them to reflect on a memento from their time in the armed forces.

On the following pages, Boeing men and women from across the company describe mementos that range from hand-held objects to matters more abstract. In doing so, they tell in their own words what military service has meant to them.

Thema Gordon

Office administrator

Boeing Capital Corporation
Renton, Wash.

U.S. Air Force, 1984–1994

My first duty station in the U.S. Air Force was on the island of Okinawa, or what we called “the Rock,” in Japan. We worked days and days of 12-hour shifts in preparation for inspections. We did what was necessary to accomplish each task, even if that sometimes meant doing things that might not make a lot of sense to others. I learned that it’s important to put the needs of the mission ahead of my own and that what I do makes a difference.

When I speak to other veterans and members of the military, I feel a sense of pride and camaraderie, of community and belonging. The hours we’ve served working toward a mission forges a bond that cannot be broken.

My memento from the Rock is a gold charm that is shaped like Okinawa with a Japanese torii gate and Ryukyu dance hat on it. These symbols are part of my history and connect me to Okinawa: I spent more than six years on the Rock, lived less than five minutes from U.S. Army facility Torii Station, and watched my Okinawan friends perform traditional Ryuku dances. ■

PHOTO: BOB FERGUSON/BOEING

Jon Blankemeier

Integrator, F-15 International Training Programs

Boeing Defense, Space & Security
St. Louis

U.S. Air Force, 1976–1995

Not only do I feel a continual sense of pride knowing that some part of my military service made a difference in world affairs (Cold War) and provided assistance and freedom to others (Desert Storm); I also feel a sense of fraternity with everyone who has served.

The greatest memento for me is walking through the factory every day and passing by the F-15 jet fighters being built for the future, knowing that my U.S. Air Force career was almost entirely spent being a Flightline Avionics technician on these great fighters! Who could ask for more? ■

PHOTO: RON BOOKOUT/BOEING

Les Sutton

Project manager, Site Integration Services Project

Global Services & Support, Boeing Defence Australia, Defense, Space & Security
Brisbane, Australia

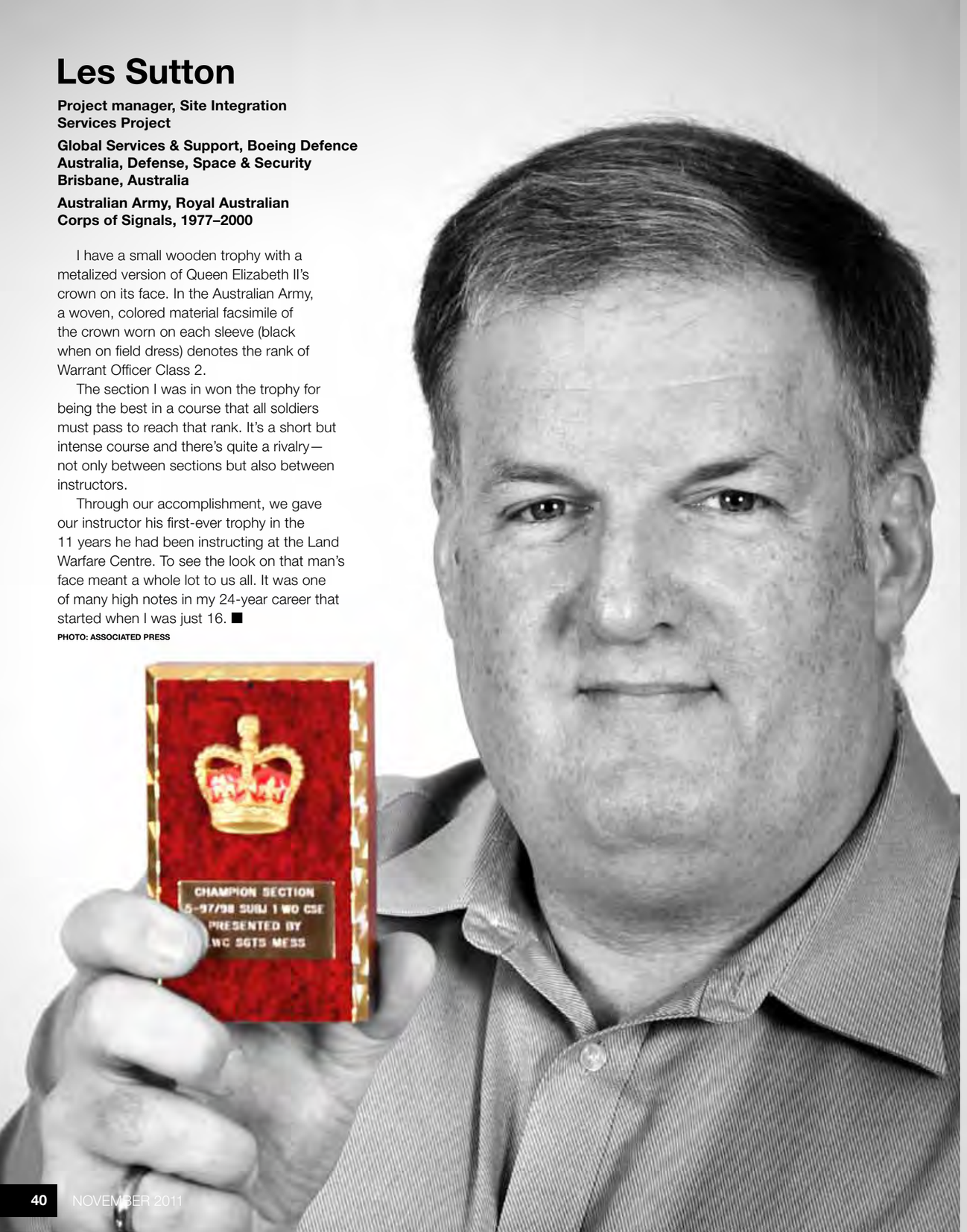
Australian Army, Royal Australian Corps of Signals, 1977–2000

I have a small wooden trophy with a metalized version of Queen Elizabeth II's crown on its face. In the Australian Army, a woven, colored material facsimile of the crown worn on each sleeve (black when on field dress) denotes the rank of Warrant Officer Class 2.

The section I was in won the trophy for being the best in a course that all soldiers must pass to reach that rank. It's a short but intense course and there's quite a rivalry—not only between sections but also between instructors.

Through our accomplishment, we gave our instructor his first-ever trophy in the 11 years he had been instructing at the Land Warfare Centre. To see the look on that man's face meant a whole lot to us all. It was one of many high notes in my 24-year career that started when I was just 16. ■

PHOTO: ASSOCIATED PRESS



Lee Walker

Manager, Program Planning & Execution Support, Program Management Core

Defense, Space & Security
Huntsville, Ala.

U.S. Army (National Guard, active duty and reserve), 1986–present

Serving my country has proved to be the most rewarding career I could have imagined. Being part of an all-volunteer army that transformed itself from a Cold War–era deterrent force to a flexible, adaptable expeditionary force has been an amazing journey.

Truly it has been quite a playing field for personal growth and development.

Although the long deployments, planning and training exercises, and military education have cost me valuable time away from family and home, the experience and perspective I have gained have made me a better leader, father and husband.

My memento is the collective experience that has provided me with skills I am able to use even in my job today at Boeing. ■ PHOTO: FRED TROILO/BOEING

Michael Kaszuba

Senior manager, Production Support
787 Program, Commercial Airplanes
North Charleston, S.C.
U.S. Navy, 1983–2009

The greatest memento from my military service has to be my shadow box. Historically, shadow boxes contained sailors' keepsakes from their time in the service.

My shadow box—a ship's wheel—is a snapshot of 26 years of service, dedication and loyalty to my nation. Each article inside has a special meaning or brings back a memory of a time that will forever hold a place in my heart. Promotions, duty stations, deployments and positions held are all visible in my wheel. ■ PHOTO: ALAN MARTS/BOEING

Clara Barnett

Procurement agent, Seat Integration Team
Commercial Airplanes, Everett, Wash.
U.S. Marine Corps, 1987–1992

Little did I know when I joined the Marine Corps that it would be the foundation of a lifelong career in aviation. I served in the Marine Corps from June 1987 to June 1992. I was an electrician for EA-6Bs, Northrop Grumman's electronic warfare and attack aircraft.

One day while on a launch at Marine Corps Air Station Cherry Point in North Carolina, the engine of my aircraft failed to start. Missing a sortie was never acceptable. From the small pouch I had on my belt, I pulled out my handy-dandy little jump wire, about 6 inches (15 centimeters) long, and hot-wired this big Marine Corps jet.

I still have that pouch and the wire. It was one of my proudest moments as a Marine. ■ PHOTO: GAIL HANUSA/BOEING

John McKnight

Delivery systems integrator
Global Infrastructure Engagement

Engineering, Operations & Technology
Oklahoma City

U.S. Air Force, 1974–1994

Crime, espionage, terrorism and subversion are not 9-to-5 activities, and neither is the job of investigating possible violations.

I spent 20 years in the U.S. Air Force, 15 of which were in the Office of Special Investigations. My memento is my badge and credentials that I carried while on active duty. Looking at this memento reminds me of the courage, devotion, tireless service and sacrifices of our military men and women. Without them, we wouldn't have the freedoms we enjoy.

To borrow and add to the motto of the U.S.A.F. Pararescue team, "That others may live—free." That's what my military service means to me. ■ PHOTO: BOB FERGUSON/BOEING

Dean Hoang

Programmer/analyst, Global Services & Support

Engineering, Operations & Technology
Huntington Beach, Calif.

U.S. Marine Corps, 1988–1991

March 1991, Camp Pendleton, California: Sgt. Robert J. Cottle, the jumpmaster from an earlier parachute operation, gives a young lance corporal a handle to a recently deployed reserve parachute and reminds the youngster of the proper protocol accorded to parachute riggers upon the occurrence of such an event. I assured the sergeant I'd adhere to tradition as I took the handle from him.

Afterward, inside an ambulance, as I held and looked at the handle, I thought about how I had no business being on a difficult static line jump from an OV-10 Bronco aircraft after experiencing only nine jumps, five of them at Airborne School. How lucky I was not to have killed myself and another Marine when I became entangled with his parachute. It wasn't my time to depart this world.

My unit never deployed overseas during Operation Desert Storm, so we were spared the experience of being in a war zone.

Nineteen years later, Sgt Maj. Cottle was deployed to a war zone in support of Operation Enduring Freedom and killed in Helmand Province, Afghanistan. He was 45 years old, a husband and a father. I was privileged to have known him. Rest in peace, Marine, and Semper Fi. ■ PHOTO: PAUL PINNER/BOEING

Step by step

This simple list helps employees identify and reduce waste

By Patrick Summers

It's known as a "waste walk." But it's no wasted walk.

With the help of a special tool with a big name—MULCHWASTER—the walks are making an environmental difference at the Airplane Systems Laboratory in Seattle, part of Boeing Test & Evaluation.

MULCHWASTER is essentially a check sheet developed by an employee environmental involvement team to identify and reduce waste and help the company shrink its environmental footprint. The process begins with a manager requesting the team to conduct a waste walk through a designated work area.

"One of the first things we do on a waste walk is look in the wastebaskets to see if people are throwing away items that can be recycled, like cans, bottles and packing material," said Richard Reuter, test engineer in the Airplane Systems Laboratory.

Work groups have used MULCHWASTER and the waste walks to reduce the amount and cost of lighting and electricity used by Boeing. In addition, teams have used this process to increase recycling and encourage suppliers to switch to more efficient and less wasteful packaging for parts and shipments to Boeing.

"People are thinking about different types of waste in new ways; that is one of MULCHWASTER's biggest achievements," said Lisa Adair, a Boeing Test & Evaluation manager and environmental involvement team member.

MULCHWASTER has its roots in the critical preflight checklist pioneered by the company's engineers and pilots developing the B-17 prototype in the 1930s. Reuter's team carried the concept over into their environmental involvement activity.

"It's the Boeing way of thinking; a process check sheet helps ensure consistency and guard against complacency," Reuter said.

Jim Waltosz is a MULCHWASTER believer. The electrical calibration technician said a waste walk raised his group's awareness and made a difference.

"I might have 15 pieces of test gear powered up and running at my bench during a normal day," he said. "Instead of walking off at the end of the shift, I will turn it all off, unless I'm in the middle of a test."

Waltosz noted that more of the 22 technicians in his group now take the simple step of powering down or turning off their equipment when it's not in use.

Determining the cost savings that have resulted from MULCHWASTER is challenging, according to Adair. A lack of water metering and cyclic laboratory testing demands can make it difficult to measure the amount of electricity and water conserved, as well as the associated cost savings to the company, she said.

"Still, we know from research and experience that turning off unused lights and office and laboratory equipment can significantly cut power use and costs," Adair explained. "We can have an even bigger impact if we can teach people to think about power consumption in the design of equipment and work areas."

Reuter agreed. "We're changing the way people think about waste, which over time will have a big effect." ■

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PHOTOS: Technical specialist Joi Curtis uses the MULCHWASTER check sheet to help Jim Waltosz, electrical calibration technician, find ways to reduce electricity usage in his Boeing Test & Evaluation work area.
JESSICA OYANAGI/BOEING

What's in a name?

The Boeing Test & Evaluation employee involvement team members chose the MULCHWASTER name to reflect the breadth of products and processes they believe can benefit from a focus on reducing waste:

Materials
Utilization
Lighting
Computers and office equipment
H_2O
Waste (hazardous waste and chemicals)
Air (compressed air and gases)
Solid waste and packaging
Transportation
Electrical power/energy
Responsibility, accountability and authority

Employees can access the MULCHWASTER check sheet at the team's website: http://bxt40.web.boeing.com/2-122GreenTeam

Nose for safety

Boeing K-9 teams are helping protect the company and its employees

By Christine Cranston

"They have to be confident and not afraid of new environments."

– Melissa Larsen, primary trainer and handler, Boeing Explosive Detection K-9 Unit

Zachi has the nose and agility to locate 17,000 different explosive-based chemicals and compounds.

The yellow Labrador retriever, with a sense of smell 100,000 times stronger than that of a human, and Robert Magner, her two-legged partner, work at Boeing's facility in Wichita, Kan. Their primary assignment is to support Global Transport & Executive Systems VC-25 program, also known as Air Force One when the president of the United States is on board.

"Zachi checks everything going into the secure area and onto the plane," Magner said. "Nothing goes in without Zachi's approval."

Zachi and Magner are one of 14 K-9 teams assembled at Boeing since the terrorist attacks on Sept. 11, 2001. As part of a wider plan to strengthen Boeing security, the company launched its own K-9 explosive detection operation.

"We needed a more secure way to manage our deliveries," said Melissa Larsen, Boeing's primary trainer for the unit. "We enacted hands-on truck inspection stations. It was the first job for the dogs."

November 2011 marks the 10th anniversary of the Boeing Explosive Detection K-9 Unit, which is part of the Shared Services Security and Fire Protection organization led by Dave Komendat, vice president and chief security officer. His organization provides the company with security, fire protection, business continuity, supply chain security, data protection and emergency preparedness across the globe.

The specialized K-9 teams, each consisting of one dog and one handler, mainly screen incoming supplier and vendor vehicles, inspect aircraft being delivered to customers, respond to abandoned packages, and conduct site sweeps for hazards or explosives. The teams are also on the job at special events, during flight tests, and at major employee forums held on and off Boeing property. They also partner with local law enforcement to provide assistance when requested.

At some locations, Boeing contracts with private security agencies for dogs and handlers. At other sites, such as Seattle and Wichita, Boeing employees and their dedicated dogs are assigned to the task. Two such teams will soon be added at the Boeing South Carolina site.

When the program was started, the company brought in trained dogs that received Boeing-specific instruction. In 2005, Larsen, then a full-time handler, transitioned to the role of dedicated trainer. In-house training strengthened the program—and opened the door to adopting rescue dogs.

"It's more cost-effective for the company to get the dogs from a shelter, and it gives the dog a job to do and a loving home," said Tony Lowry, who recently joined Boeing from the Washington State Patrol.

All Boeing dogs live with their handlers, and most are kept by the handlers as family pets when the dogs are retired, generally by age 10. Larsen finds new dog recruits at the animal shelters and pet finder agencies. She initially tests a dog's ability to use its nose to find a ball. Not giving up translates to probable persistence in tracking down harmful explosive materials that could be entering Boeing property.

Typically, Boeing takes dogs between the ages of 15 months and 2.5 years. "They have to be confident and not afraid of new environments," Larsen said. "As the program has evolved, we've transitioned to using dogs with a 'friendly' appearance so employees will feel more comfortable."

Once a dog is selected and matched with a handler, the team trains for 12 weeks at Boeing, after which they're evaluated for certification—as a team. The teams are also recertified annually.

"Even after five years, Boeing employees still look at me in my uniform and ask why I can bring my dog to work," said Chad Olson, Explosive Detection K-9 Team lead. "They don't know that we have a K-9 unit and that it's working every day to keep them safe and protect our company." ■

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PHOTOS: (Left) Boeing Wichita's Zachi, with handler Robert Magner, identifies a scent from a training device used to simulate one of many odors found in explosives. TED WHITESIDE/BOEING **(Insets, from left)** Melissa Larsen, K-9 trainer and handler, works with Scooby during an explosive detection training exercise; Huey joined Boeing from Auburn University's Canine Detection Training Center at Fort McClellan, Ala.; handler Tony Lowry and Gizmo have been on inspection and protection assignments across the company. JESSICA OYANAGI/BOEING


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In Focus

FINAL DETAILS

The first 747-8 Freighter for launch customer Cargolux undergoes routine checks by Boeing employees prior to its official delivery Oct. 12. The top of the tail is 63 feet 6 inches (19.4 meters) high, as measured from ground level. Overall, the 747-8 is 18 feet 4 inches (5.6 meters) longer than the 747-400. The added length means freight operators can carry 16 percent more revenue cargo volume compared with the 747-400 Freighter. The 747-8 also has more range and lower fuel consumption. PHOTO: BOB FERGUSON/BOEING


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