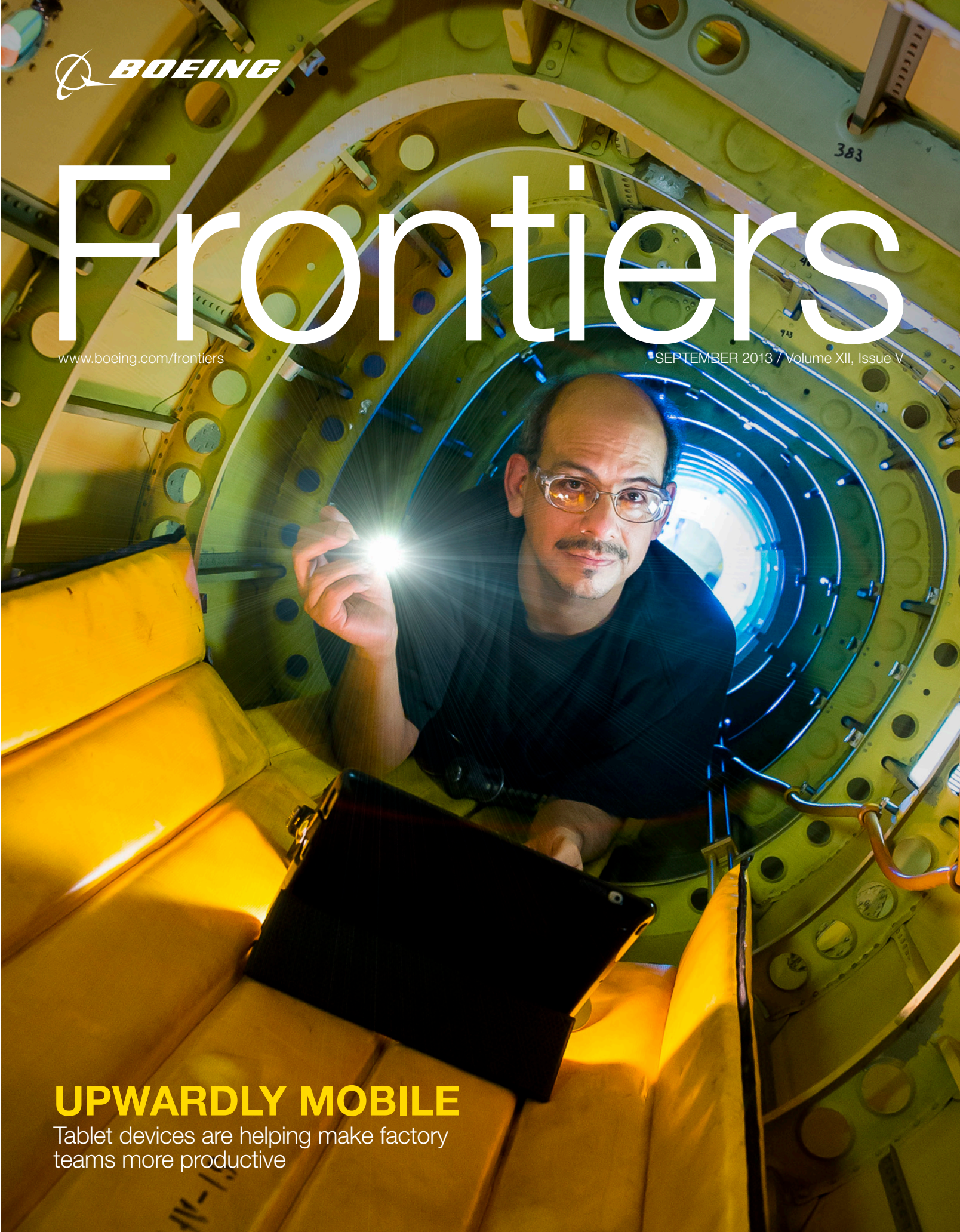

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SEPTEMBER 2013 / Volume XII, Issue V

UPWARDLY MOBILE

Tablet devices are helping make factory teams more productive

BOEING

"We are using renewable energy, recycling 3,000 tons of waste a year, building smart and conserving resources—in South Carolina, Boeing is setting an example for the factories of the future."

Hope Gonzalez
Environmental Specialist
Environment, Health and Safety

FACTORY FOR THE FUTURE

Stories of
innovation
at Boeing

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20

MOBILE ADVANTAGE

Mobile computing devices such as iPads are helping employees be more productive at Boeing production sites while also improving workplace safety. In Mesa, Ariz., home of the Apache helicopter, and at Boeing's C-17 factory in Long Beach, Calif., the use of these mobile tablets has resulted in myriad shop-floor improvements. Employees say they can accomplish more in less time with less effort. Meanwhile, Boeing's Information Technology group is working with other programs across the enterprise to see whether mobility is a good fit.

COVER: CEDRIC CABRERA, AIRCRAFT ASSEMBLY TECHNICIAN, USES A MOBILE COMPUTING DEVICE WHILE WORKING INSIDE THE FUSELAGE OF AN APACHE HELICOPTER AT THE MESA, ARIZ., SITE. BOB FERGUSON/BOEING

PHOTO: AT THE C-17 FACTORY IN LONG BEACH, CALIF., TONY GONZALES, FOREGROUND, C-17 FUSELAGE MECHANIC, AND GREG JENSEN, C-17 MANUFACTURING OPERATIONS ANALYST, USE A MOBILE TABLET TO SPEED PRODUCTION PROCESSES. BOB FERGUSON/BOEING

AD WATCH

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

Inside cover:

"Factory for the Future" is one in a series of innovation stories told by Boeing employees such as Hope Gonzalez. Learn more at www.boeing.com/stories.

Page 6:

The Boeing Store's Custom Hangar is a select collection of authentic, limited-edition Boeing artifacts, collectibles and apparel designed for true aviation fans. This ad features Custom Hangar, 737 MAX and Boeing logo merchandise. Learn more at your local store or at www.boeingstore.com.

Pages 14–15:

Boeing Commercial Airplanes announced the launch of the Boeing 787-10 Dreamliner at the Paris Air Show in June. The 787-10 will be the third and longest member of the super-efficient 787 family. With its greater passenger capacity, high degree of commonality and passenger-pleasing features, the 787-10 will complement the 787 family while setting a new benchmark for fuel efficiency and operating economics.

Back cover:

This new ad reinforces the C-17 Globemaster III's position as the world's most versatile airlifter—whatever the mission and wherever the need. The ad currently appears in global trade publications.

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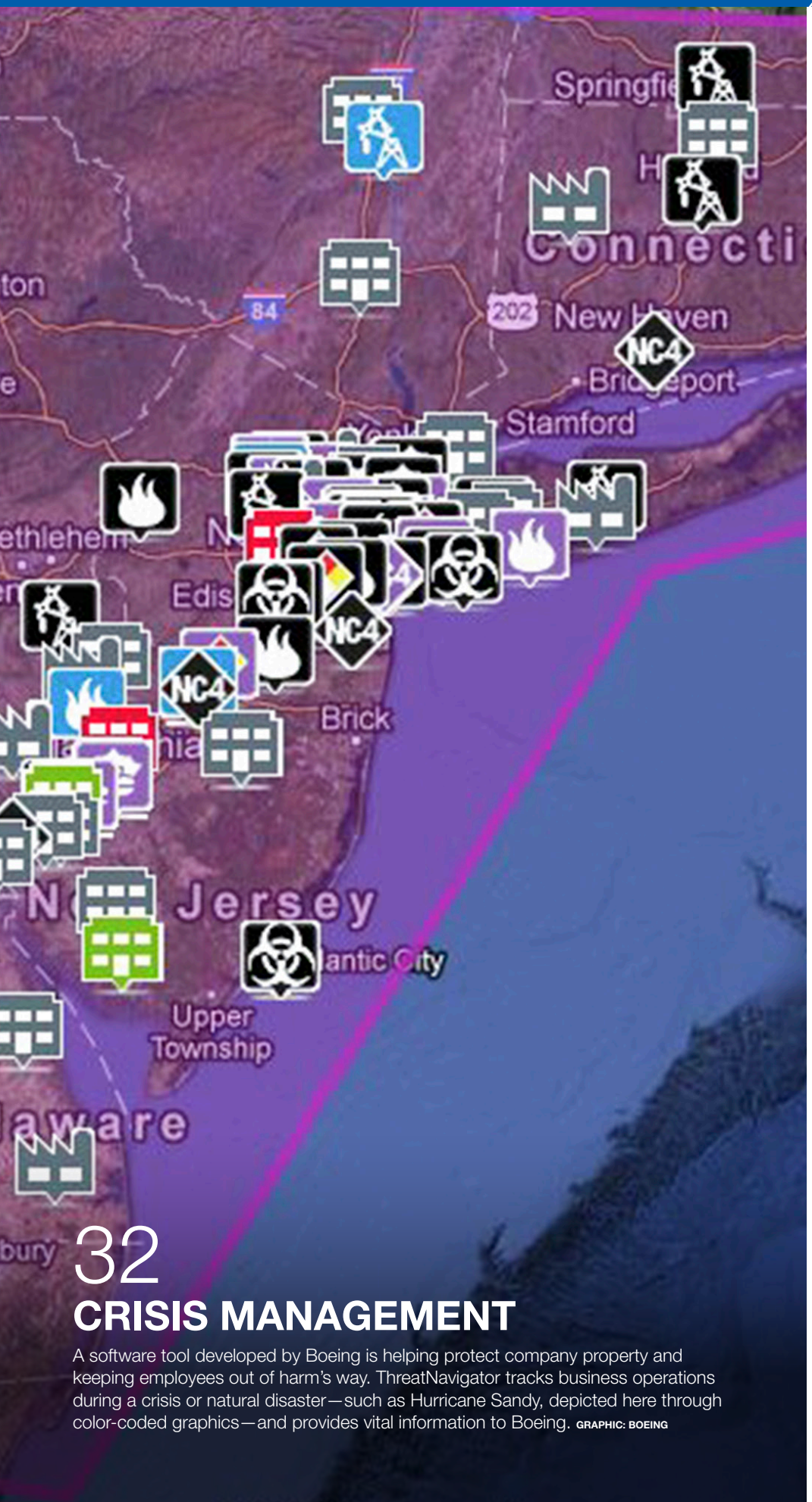

32
CRISIS MANAGEMENT

A software tool developed by Boeing is helping protect company property and keeping employees out of harm's way. ThreatNavigator tracks business operations during a crisis or natural disaster—such as Hurricane Sandy, depicted here through color-coded graphics—and provides vital information to Boeing. GRAPHIC: BOEING

Inside

CORRECTIONS:
Page 31 of the August 2013 issue of *Boeing Frontiers* misspelled two employees' names. They are Blake Izatt and Crystal Jacobson.

Something for every aviation fan

737 MAX 8
Executive Model

Authentic Boeing Apparel

Timeless collectibles from aviation's most iconic brand.

Authentic
737 window

Introducing the Custom Hangar: authentic, limited-availability Boeing aero artifacts and collectible items for true fans.

View the entire Custom Hangar line at
www.boeingstore.com

THE BOEING STORE
Authentic merchandise and collectibles

Solving problems, the first time

Lean+ provides Boeing employees a framework for continuous improvement

Bill Schnettgoecke

Vice president, Supply & Operations Chain, Boeing Defense, Space & Security, and Enterprise Lean+ Initiative leader

Our commitment to Lean+ continues to get strong traction across Boeing, enabling us to capture billions of dollars in productivity improvements to meet customer needs, and to secure our long-term growth. We've seen continued success in our factories, in each of our functions, and even in our supply chain as an enabler to our Partnering for Success efforts.

Lean+ is getting significant visibility outside Boeing and we have been benchmarked by many industry leaders. Our approach of building Lean+ on our strong foundation of Lean, Employee Involvement and Engagement, and the passion our people have for a culture of continuous improvement, has proved to be incredibly powerful.

Where are we going with Lean+?

As part of the Lean+ restaging, we bring a new focus on the discipline required to clearly define our problems and solve them permanently. We've all been in a situation where we've encountered a problem we've been through before, a problem we thought had been solved. How frustrating it is for us and our teams to have to go back and solve the same problem again and again. As we continue to ensure that our Lean+ efforts are closely tied to our business needs, the latest emphasis of Lean+ is to drive more thorough, longer-lasting problem solving. We must find problems, fix problems, and make sure the problem never comes back.

To that end, a renewed focus in Lean+ is the Boeing Problem Solving Model. Like other aspects of our Lean+ framework, the model is representative of many of the effective and proven techniques that have been used around Boeing. When the passion and innovation of our people are coupled with the structured problem-solving model, we have an effective tool to solve problems both small and large.

All too often we tend to quickly try to come to a conclusion on what we need to fix and then we find we didn't fully understand the real problem. We often hurry to solve the symptoms and not the problem. The Problem Solving Model helps us address problems in a more disciplined fashion, starting with the most important part of problem solving—spending the appropriate amount of time defining what the actual problem is we are trying to solve.

The Lean+ framework, and specifically the Problem Solving Model, will enable our teams and individuals to make another improvement and unleash another wave of innovative ideas around how we can drive first-time quality and continually improve all that we do.

Later this month, during the Lean+ Forum, employees and leaders from across the enterprise will come together to get a better understanding of how to put the Problem Solving Model into operation.

When we couple Boeing's Lean+ framework with the passion of our people, we unleash innovation that allows us to break myths and achieve breakthrough improvements in performance. And that enables our customers to meet their needs—and Boeing to secure its long-term growth. ■

PHOTO: RON BOOKOUT/BOEING

For more about Lean+, including information on the Boeing Problem Solving Model, visit the Lean+ website at http://leanplus.web.boeing.com

Home again

A NATO Airborne Warning and Control System, or AWACS, aircraft, with its signature rotating radome, arrives at Boeing Field in Seattle last month for a major flight-deck and avionics upgrade. It was a homecoming of sorts for the aircraft, which is a highly modified version of the Boeing 707 once built in Renton, Wash. Boeing will upgrade one AWACS aircraft each for the NATO and the U.S. Air Force fleets under an engineering, manufacturing and development contract—including flight-testing and qualifying new digital systems, as well as training flight crews and maintenance personnel. An upgraded "glass cockpit" will feature five main displays offering the pilot and co-pilot user-friendly and customizable engine, system, navigation and weather radar data. PHOTO: JIM ANDERSON/BOEING

On sequestration: "We're not out of the woods at all. We're just entering the woods."

– *Boeing Chairman, President and CEO Jim McNerney, on the status of deep U.S. defense cuts expected across the industry, during a call with reporters and analysts in July to discuss the company's second-quarter earnings.* The Wall Street Journal, *July 25*

"We've got to have this plane, we've got to have it in a high-quality fashion, and we've got to have it on time."

– *Maj. Gen. John Thompson, U.S. Air Force program executive officer for Tankers, speaking to workers at Boeing supplier Spirit AeroSystems about Boeing's KC-46 tanker. Spirit in July shipped the first tanker forward fuselage section to Everett, Wash., where production of the tanker is underway.* Boeing News Now, *Aug. 16*

"What you're not going to find is 1,100 or 1,600 switches."

– *Chris Ferguson, director of Boeing's Crew and Mission Operations and a former NASA astronaut, talking about the interior of Boeing's CST-100 spacecraft. Ferguson explained the modern interior is intuitive and designed not to burden astronauts with an inordinate amount of training to fly the spacecraft.* Boeing News Now, *July 23*

"Every day, I witness how my contributions directly affect the people and programs I support, and I get tremendous satisfaction."

– Dino Go

Problem solver

Appetite for learning pushes engineer to find production solutions

By Nathan A. Hulings and photo by Gail Hanusa

Dino Go is an engineer for Boeing Research & Technology, supporting Commercial Airplanes in Everett, Wash. In this Frontiers *series that profiles employees talking about their jobs, Go explains how he creates value for the company by helping solve problems.*

As a 767 program support engineer, it's my job to frequently interact with mechanics, engineers, production managers and others to understand and diagnose material and process-production challenges. It's my obligation to constantly ask myself if the solution I provide creates value for the company.

After identifying issues, I can figure out a solution away from the production line and not create disruptions. We have the opportunity with Boeing Research & Technology to step aside and do projects that other support groups may not have time to work.

I have to be a good listener and keep an open mind when I engage with my customers. Say, for example, a mechanic approaches me about finding a better or safer tool for his or her job. After our conversation, I'll research available tools on the market and maybe even buy a few to test. We will then have a demonstration, recommend the tool to the Manufacturing organization and, if all goes well, add it to the toolbox. And if there's nothing available on the market that solves our problem, it's often BR&T's job to work a solution from scratch—and that's any engineer's dream.

I must be willing to spend time on the production floor and inside the shops. Frequently, I act as a facilitator between my BR&T colleagues and my customers. I don't mind asking seemingly simple or mundane questions, because it's my job to find the answer to each and every problem I encounter, big or small.

There are many things I do to help Boeing build better airplanes—and find better ways to build them safely and more efficiently.

When a mechanic and I noticed that the 767's low-hanging cargo door could become a safety problem during production, I thought about how drivers take notice when they see the flashing lights and sirens of police cars and ambulances. With that idea in mind, I helped implement stick-on flashing LED lights to alert workers of the door so they could safely continue assembling the plane. It's a simple, inexpensive, safety-focused solution that could easily be used anywhere in the company.

I also had a hand in finding out about the Halosensor, a device that takes out the guesswork of drilling pilot holes on wings. Before, workers had a manual tool that was not as accurate, with the end result sometimes requiring timely and expensive rework. Now, mechanics can look at a screen with a crosshair that turns green once the hole is found. It was first used on the 747 and got great feedback. And by working with several engineers and mechanics from various Commercial Airplanes organizations, we were able to help replicate use of the device. Now, wings on not just the 747 line but also the 737, 767 and 777 lines use the Halosensor.

The work I do is rewarding. Every day, I witness how my contributions directly affect the people and programs I support, and I get tremendous satisfaction from the positive comments I receive. The cooperation and support from my colleagues in BR&T and across the company make me better equipped to solve problems, no matter how difficult they may be. The opportunity to work on these challenges, along with the appreciation of my customers, makes my job personally fulfilling. ■

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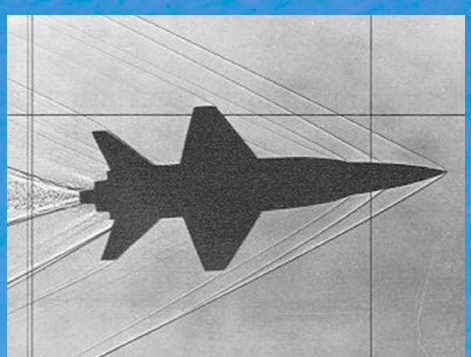
SPEEDING INTO THE UNKNOWN



The rocket-powered X-15 blazed new trails in hypersonic flight and aerospace research

By Mike Lombardi

It's an icon of the X-planes, one that took highly skilled pilots past the edge of space at unprecedented speeds—and pioneered aerospace research that was needed to take explorers to the moon.

North American Aviation's X-15 was one of the most successful and productive flight research programs of all time. A team effort of bold and innovative engineers and courageous pilots, the X-15 program rocketed again and again into the unknown, achieving amazing results while fulfilling its primary purpose of accelerating the manned U.S. spaceflight program that culminated in the first human footprints on the moon.

"The X-15 was to snoop out and lay bare the problems and dangers of manned space travel so that those coming behind us might profit," North American's X-15 project pilot Scott Crossfield would say in a *Saturday Evening Post* interview.

Crossfield had been the first to go twice the speed of sound, in the Douglas D-558-II, following in the footsteps of famed test pilot Chuck Yeager, who first broke the sound barrier in the Bell X-1 in October 1947.

The X-15 would go much further in gathering data and understanding about the unknown regions of hypersonic speeds (five times the speed of sound and above) while reaching the limits of Earth's atmosphere.

And it would set long-lasting records for speed and altitude.

Much more than a platform to break records, the X-15 had an important purpose of exploring the aerodynamic and thermodynamic forces that would be encountered during flight in and out of Earth orbit in support of the effort to put U.S. astronauts into space.

The program officially began in December 1955, when the National Advisory Committee for Aeronautics (the forerunner to NASA) awarded North American Aviation, a Boeing heritage company, a contract to build three rocket-powered X-15s. Under the leadership of North American's top engineer, Harrison Storms, and X-15 project engineer Charles Feltz, the first X-15-1 was rolled out from North American's Los Angeles plant on Oct. 15, 1958. On June 8, 1959, the X-15-1 was deployed from its Boeing B-52 mother ship for the first time and Crossfield tested the handling and landing characteristics of the rocket plane as it glided back to the dry lake bed at Edwards Air Force Base, Calif., where all X-15 flights would take place. Later, on Sept. 17, Crossfield flew the X-15 under power for the first time.

Originally the X-15 was designed to fly up to Mach 6, or six times the speed of sound, but after the second X-15 was damaged in a landing accident it was not only repaired but fitted with external fuel tanks and lengthened 29 inches (74 centimeters), reborn as the X-15A-2 and capable of Mach 8.

On Oct. 3, 1967, Pete Knight flew the X-15A-2 to Mach 6.7—an unofficial speed record for winged aircraft that would stand until the Space Shuttle *Columbia* first returned from space in 1981. Earlier, in August 1963, NASA pilot Joseph Walker set an altitude record of 354,200 feet (more than 65 miles, or 100 kilometers), a record broken in 2004 by SpaceShipOne, the first privately funded manned spacecraft.

After nearly 10 years of productive research, the X-15 program ended in October 1968. Twelve pilots had flown a combined 199 flights; 108 of those flights exceeded Mach 5 and four exceeded Mach 6. Those pilots flew into an environment that was filled with unknowns and tremendous risks, underscored by an accident that destroyed the third X-15 and claimed the life of Air Force pilot Mike Adams.

Five Air Force pilots earned astronaut wings by exceeding an altitude of 264,000 feet (50 miles, or 80 kilometers), the altitude recognized by the Air Force as crossing into space. Later, in 2005, NASA awarded three civilian X-15 pilots with their astronaut wings.

Today, the X-15-1 is displayed at the National Air and Space Museum in Washington, D.C., and the X-15A-2 is in the collection of the National Museum of the United States Air Force in Dayton, Ohio. Their structures, made of titanium covered by black Inconel-X, a nickel-steel alloy capable of withstanding temperatures of 1,200 degrees (650 degrees Celsius), show the result of being battered by extreme aerodynamic forces and superheated temperatures—a testament to the exploration of the unknown by the X-15, and the pilots who flew it. ■

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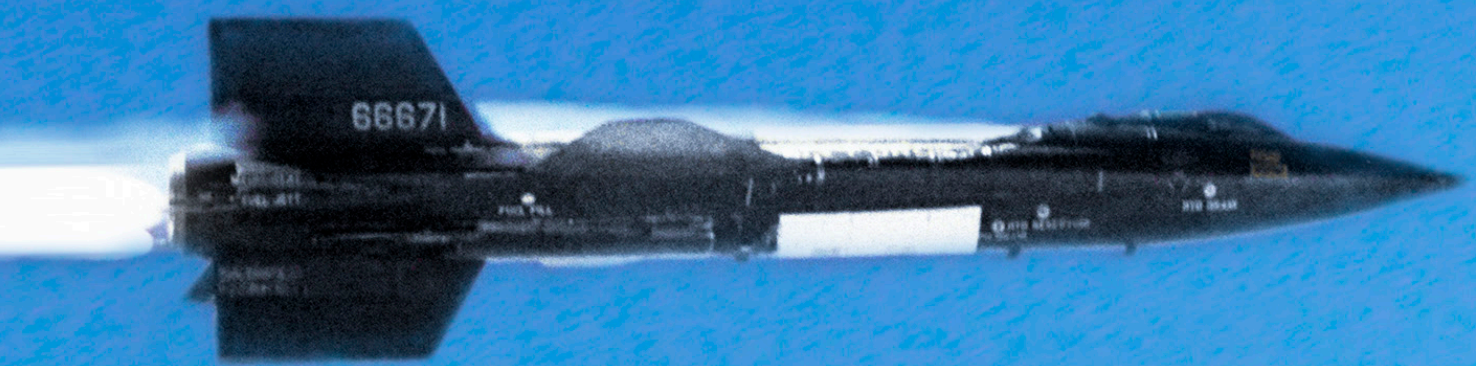


PHOTOS: (Above) The X-15 research aircraft on its first powered flight on Sept. 17, 1959. NASA (Insets, from left) A view of the X-15 from the observation port of the B-52 mother ship. NASA The X-15 is launched from its B-52 mother ship for its second powered flight. BOEING ARCHIVES This photo of a free-flight model of the X-15 being fired into a wind tunnel shows the shock-wave patterns for airflow at Mach 3.5. NASA

A Perfect 10.

INTRODUCING

THE INCOMPARABLE 787-10 BOEING

OFF-ROAD WARRIOR

Phantom Works develops versatile combat support vehicle for the V-22

By Garrett Kasper and photos by Sally Aristei

Uneven, rocky terrain is no match for its knobby 35-inch (90-centimeter) tires. Muddy, fender-deep creek water and roller-coaster-sized hills are no challenge for its 240-horsepower multi-fuel engine and four-wheel drive. It can roll over a pile of logs thicker than telephone poles, even with 3,300 pounds (1,500 kilograms) of payload strapped to its back. With all-wheel steering, it can pivot with ease and still reach 80 mph (130 kilometers per hour) on the open road.

Phantom Badger—a combat support vehicle designed to be transported in a V-22 Osprey—is Boeing's answer to a perplexing problem for today's U.S. Special Forces: how to quickly deploy from a tilt-rotor aircraft a tough, versatile combat vehicle that can adapt to any environment and meet the most challenging combat missions.

To rapidly develop the prototype, Boeing teamed with a company that has historically built race cars.

"Phantom Badger is not an ATV [all-terrain vehicle] on steroids," said John Chicoli, Boeing program manager for the V-22 Internally Transportable Vehicle program.

"It addresses a gap for a vehicle that can be internally transported in a V-22, but it also allows increased payload and speed while providing more ride comfort than a smaller ATV."

Developed by the Special Pursuits Cell at Boeing Phantom Works, the Phantom Badger is Boeing's response to a U.S. Special Operations Command operational requirement

"EVERY SINGLE ELEMENT ON PHANTOM BADGER WAS ADDED OR REMOVED BASED ON SPECIFIC INPUT OF ACTUAL SPECIAL OPERATORS."

— John Chicoli, Boeing program manager for the V-22 Internally Transportable Vehicle program

PHOTOS: (Left) Lead mechanic Wyatt Montgomery (passenger) and design engineer Andrew Wizorek, from Boeing project partner MSI Defense Solutions, donned combat fatigues to make Phantom Badger vehicle durability, compatibility and comfort testing more authentic. (Above) Phantom Badger can exit a V-22 Osprey within seconds—a critical design requirement for special operations.

for a vehicle than can be transported inside a V-22.

The V-22, built by Boeing and partner Bell, has a unique tilt-rotor configuration that gives it the capability to cruise like a fixed-wing aircraft but take off and land vertically like a helicopter. It is currently operated by the U.S. Marine Corps and U.S. Air Force Special Operations, and has been widely used for many types of missions in Afghanistan.

"We listened very closely to the customer, and every single element on Phantom Badger was added or removed based on specific input of actual special operators," Chicoli said. "We intentionally designed it to be rugged—yet affordable—because we want warfighters to trust that it will live a long life inside the demanding and unpredictable world of special operations."

With its powerful hydraulic and suspension systems, he added, Phantom Badger protects warfighters from being buffeted in rougher terrain, alleviating physical exhaustion and keeping them fresh and focused for the fight.

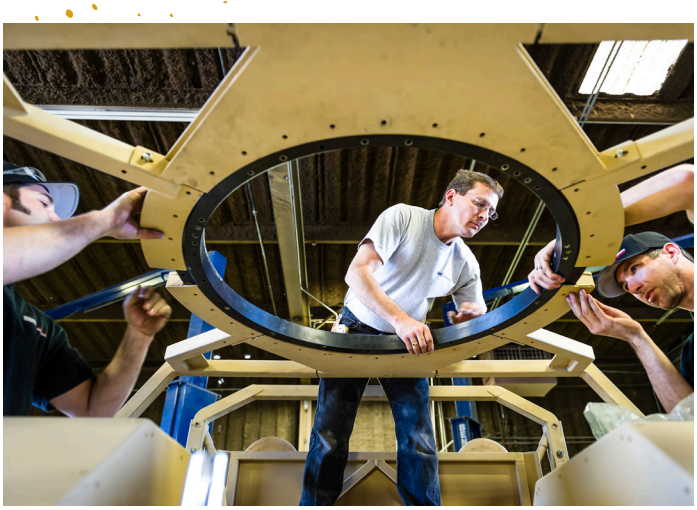
Aside from its power and rugged capabilities, one key feature of Phantom Badger is its interchangeable back end for specialized mission modules. The modules are customizable to support a variety of critical missions such as reconnaissance, explosive ordnance disposal, mounted weaponry, combat search and rescue, and transport of injured warfighters.

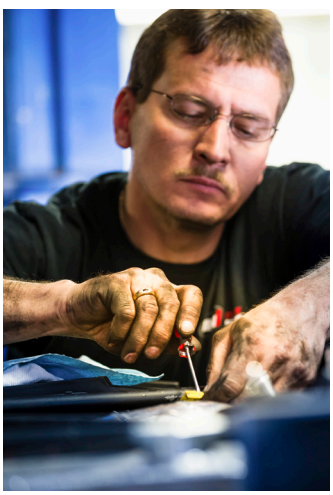
"IT'S MIND-BOGGLING TO THINK THAT THIS VEHICLE WAS JUST A DRAWING ON A COMPUTER SCREEN SIX MONTHS AGO."

— Wyatt Montgomery, lead mechanic for MSI Defense Solutions

In tandem with Phantom Works' rapid prototyping capabilities, Boeing teamed with MSI Defense Solutions to build the Phantom Badger for the Osprey and other cargo aircraft. The North Carolina–based company boasts a rich history with NASCAR and has significant experience in building tactical vehicles. Over the past year, Boeing and MSI designed, built, tested and modified Phantom Badger. The team has conducted hands-on Phantom Badger demonstrations with multiple U.S. customers and has received significant interest internationally as well.

"The engineers and technicians at MSI complement Boeing nicely because we can quickly respond to customer input and build small batches of vehicles very economically," said David Holden, president of MSI Defense Solutions. "With our history on





PHOTOS: (Clockwise from far left) From MSI Defense Solutions: Andrew Wizorek demonstrates how Phantom Badger's litter module allows a medic easy access to wounded warfighters; lead mechanic Wyatt Montgomery, left, and Wizorek fine-tune a turbocharger, which allows the Phantom Badger to reach high speeds; mechanics Linden Barnicle, from left, Paul Silvestri and Montgomery assemble a turret mount on one of Phantom Badger's various mission modules; Montgomery, left, and Wizorek demonstrate Phantom Badger's four-wheel-drive capability; Silvestri works on the vehicle's engine.

NASCAR auto racing teams, MSI's world-class technicians can build, test and deliver these machines for the warfighter immediately, to fill this gap in the special operations community."

In June, MSI moved to a larger facility in Mooresville, N.C., where Phantom Badger will be produced. Assembly of commercial components such as the engine, transmission and differentials will be performed there, as well as fabrication of the mission modules.

"It's mind-boggling to think that this vehicle was just a drawing on a computer screen six months ago," said Wyatt Montgomery, lead mechanic for MSI Defense Solutions. "Boeing's vision of Phantom Badger got this thing rolling, and our team of engineers, fabricators, mechanics and suppliers bent over backward to make it happen. Our nation's most elite forces had great ideas and suggestions for creature comforts, which we've also incorporated."

Andrew Wizorek, MSI's design engineer and program manager for Phantom Badger, said his career in NASCAR engineering has paid big dividends when it comes to fine-tuning Phantom Badger and meeting the tight requirements for cramming so much capability into the 5-foot-wide (1.5-meter) cargo hold of a V-22.

"My experiences at Joe Gibbs Racing provided me the knowledge and skills for suspension tuning that I use today on Phantom Badger," Wizorek said. "To fit in the V-22, we have very little room to package all of the subsystems. Even more challenging, we had to design each individual component for commonality and easy maintenance."

Montgomery, too, has years of experience working in a variety of jobs for many of the top teams in NASCAR.

"This project has no victory lane at the end," he said of Phantom Badger. "It will be a silent win because I'm confident that in some god-awful place in this world, there will be a team of special operations forces relying on Phantom Badger to pull them through." ■

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PHOTOS: Mobile computing devices such as iPads have increased productivity for Mesa, Ariz., production employees such as aircraft assembly technicians Jared Britt (above, from left) and Coleman Abbott; Rudy Romero (left inset); and Cedric Cabrera.

MOBILIZING BOEING'S FRONT LINE

Growing use of tablet devices on production lines boosts efficiency, safety and quality

By Kenn Johnson and Meghan Boyer; photos by Bob Ferguson

Gabe Hernandez used to begin his shift at Boeing's Mesa, Ariz., facility by consulting work plans at a desktop computer or laptop. Now he starts by transferring data to an Apple iPad.

An assembly technician for the AH-64D Apache, Hernandez transfers details of the day's jobs from a shared computer to his mobile device—including part descriptions, assembly instructions, drawings and even photographs of work areas.

With the work instructions loaded on the iPad, all of the information Hernandez needs is at hand—and remains so, even if he's on the go. He can work on the aircraft without having to return to the computer bay repeatedly for more information, an improvement that saves him time.

"Before, I either had to carry a laptop, which I had to find space for, or go out to a station computer," Hernandez said. "It's a lot easier to put the iPad in a tool bag and take it so I have it when I need it."

As the technology has evolved, Boeing Information Technology has been exploring how the use of slate-style tablet devices and related software can improve the company's manufacturing and business processes. Tablets may not be the best tool for every factory application, but when deployed in the right places, they can create myriad shop-floor improvements.

In Boeing's Apache line and the C-17 Globemaster III line in Long Beach, Calif., employees who use tablet devices are finding they can accomplish more in less time and with less effort, said Bill Black, a Boeing Military Aircraft IT Business Partner and IT leader for the C-17 Program.

That productivity gain translates into improvements in cost control, product quality, production flexibility and safety—all of which are important for the business programs and the customers they support.

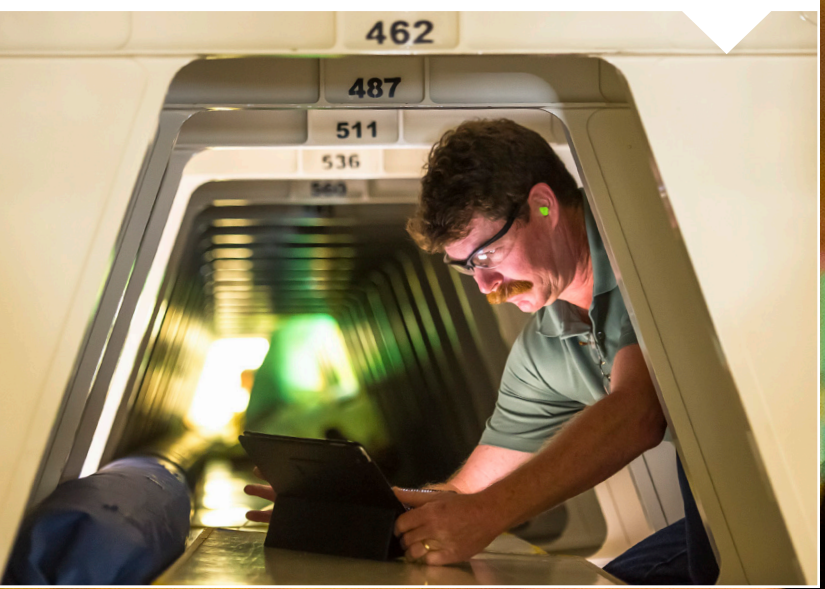
"We went from having mechanics carry paper documents to their workstations to having electronic workstations in the work centers," said Bill Warren, a senior project manager at the Mesa site. "Now, employees can take their work instructions with them on a tablet and save time and money without the

back-and-forth trips."

Many Boeing production teams use mobile devices such as laptop computers and BlackBerrys to improve productivity. Commercial Airplanes uses rugged Toughbook laptops to help shop-floor employees access critical data while they're alongside or within an airplane being built. But the latest iteration of mobile devices and the applications they run offer enhanced capabilities that benefit production, according to employees at the select Defense, Space & Security and Commercial Airplanes sites currently using tablets.

For more than two years, the Long Beach and Mesa IT teams have worked with the Manufacturing & Quality Systems Common Systems team and Information Technology infrastructure and security experts to create and test mobile applications and environments that enable putting tablets into workers' hands. It's an objective that meets one of the six strategic goals Boeing Military Aircraft's IT team set out at the request of Military Aircraft leadership: providing employees with increased access to mobile and collaborative technology.

Once deployed, the devices quickly helped workers at both



PHOTOS: By pulling up an engineering drawing on an iPad, Casey Williams (center), aircraft assembly technician, can verify a wire bundle installation in Mesa, Ariz. That mobile connectivity also helps C-17 employees in Long Beach, Calif., such as Greg Jensen (left inset), manufacturing operations analyst, and Alvin Brown, Supply Chain Management analyst.

“When you cut 15 to 20 seconds out of everybody’s job and they’re doing it 10 to 15 times a day, it’s a big deal.”

– Nicoll Johnson, shop-floor site representative, Mesa, Ariz.

sites streamline various tasks and boost productivity.

In Production Control, Long Beach employees must ensure parts arrive at the facility and are available for production workers when and where they need them, a task that requires tracking down misplaced parts.

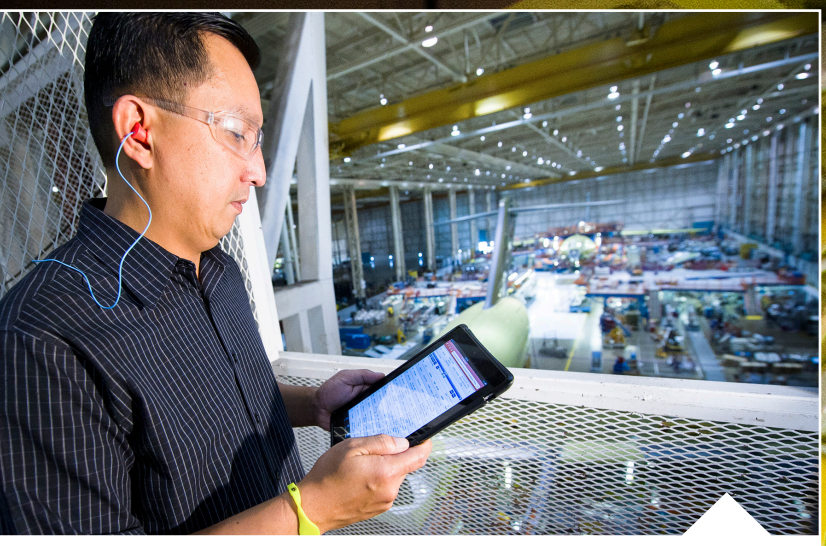
To find a missing part previously, employees had to stop work and partner with a Shop Floor Control expediter, whose job it is to investigate part shortages and other issues to keep production moving. Depending on the expediter’s location when a part is not available, he or she must walk the shop floor within the busy site to access a desktop computer loaded with software that tracks and locates parts in the facility.

Using an iPad loaded with a mobile version of that software, expediters now are able to query data in real time and resolve issues more quickly no matter where they are located in the facility, said Robert Cerniaz, a Shop Floor Control final assembly employee.

“The mechanics are now able to get real-time feedback from expediters while on the shop floor and can look up information instantly rather than waiting for the expediter to go back to his

“The mechanics are now able to get real-time feedback from expediters while on the shop floor ...”

– Robert Cerniaz, Shop Floor Control final assembly employee



or her desk to give the mechanic the right information,” he said.

Patrice St. Pierre, C-17 Flight Line manager, recalled the days when Boeing inspectors conducted pre-delivery examinations of C-17s and jotted down information about issues they saw, along with the related part numbers. Then they had to explain their findings to the responsible engineer. The engineer would travel between a desk and the aircraft repeatedly to inspect, investigate and resolve the issue.

With a mobile device and camera permit, production workers or inspectors photograph the suspected problem and email the image to the responsible engineer. While the engineer evaluates the issue at a workstation, ramp personnel can remain with the aircraft and complete the inspection. Likewise, the engineer can conduct the evaluation and provide a fix or response without having to visit the aircraft.

“Employees need as much assistance as possible to turn these airplanes out,” said Bruce Pilkington, the Long Beach IT mobility program manager. “The work we’re doing with mobility helps them be much more productive.”

The increased productivity that comes from using mobility not only is helping employees produce aircraft more quickly, it also is saving costs.

Mesa and Long Beach saved more than $160,000 during a six-month test period. For 2013, IT estimates savings at the sites will reach nearly $300,000. The production savings are expected to grow year over year once additional devices are in place at both sites.

“When you cut 15 to 20 seconds out of everybody’s job and

they're doing it 10 to 15 times a day, it's a big deal," said Nicoll Johnson, a shop-floor site representative in Mesa.

The use of mobile devices at production sites also has improved workplace health and safety. Reducing the need for employees to travel in work areas lessens the likelihood they might be injured.

In the lower parts of a C-17's forward fuselage as well as in the tail boom of an in-assembly Apache helicopter, there isn't enough room for mechanics to carry laptops. Mechanics must crawl out of, and then back into, these tight spaces to visit a computer station when they need additional data—a potential health and safety hazard.

"The repeated trips are a physical strain, but the iPads are helping reduce that," Pilkington said.

Within Commercial Airplanes, Erin Everett, senior manager of Fabrication Systems for IT Product Systems Manufacturing & Quality Systems, continues to see requests for additional tablet pilot programs. Recent successes with mobile device deployments have others eager to learn more about the ways in which their programs and sites can benefit, she noted.

For instance, a new Android tablet program at Boeing Fabrication's Salt Lake operations in Utah is helping join horizontal stabilizer sections. The mobile device enables the operator to oversee and control the join operation from a position close to the parts instead of from more than 25 feet (8 meters) away standing at an operator station.

"We think tablets will really continue to bring productivity gains to Boeing," Everett said.

Although mobility offers production teams many benefits, adding

PHOTOS: Mobile devices have helped streamline production processes at the C-17 factory in Long Beach for employees such as Robert Cerniaz (left inset), Shop Floor Control analyst, C-17 final assembly, and Collins Peoples Jr., manufacturing engineer, assembly planning department.

PHOTOS: Among the Long Beach teammates who use mobile devices to improve productivity are Stephen Burch (foreground, left), Shop Floor Control Team lead, and Robin DePaul, Shop Floor Control, both in C-17 final assembly. Barbara Burik (inset, left), C-17 project manager, and Matiel Payton, C-17 quality manager, review options for mobile devices.

it on the shop floor isn't as easy as assigning devices to employees and installing software.

Careful consideration of how tablet technology potentially could benefit each new factory application is the first step before a mobility pilot begins, and only the sites with a strong business case move forward.

IT then must prepare the infrastructure at the site, said Brad Wright, the IT Business Partner for the Commercial Aviation Services Digital Aviation Business and former director of IT Global Collaboration Services. This includes building secure wireless networking, securing the devices themselves, and addressing infrastructure, software and security considerations.

The team from across IT—including representatives from IT Infrastructure, Information Security and Product Systems—also develops mobile versions of existing systems so shop-floor workers can operate efficiently and securely in a paperless environment.

"Mobility itself was still pretty new when we first started out and we didn't know ourselves how it would ultimately fit. Trying to get customers to see the value of mobility at that time was difficult," said Emmanuel Nkeze, a business relationship manager in Collaboration & Communication Services. "Now, many programs are interested in working with mobility."

As the mobility data come in, IT will continue to work with programs across the enterprise to see if mobility is a good fit, and to implement mobile versions of more IT applications for use on the shop floor, Nkeze said.

Meanwhile, employees at locations where mobility already is a part of their everyday life say the devices and software have made a real difference.

"With the iPad, I probably save 15 to 20 percent in the time it would take to come out to the computer or pull drawings up on a laptop," said Hernandez, the Apache assembly technician in Mesa. "It's a great tool." ■

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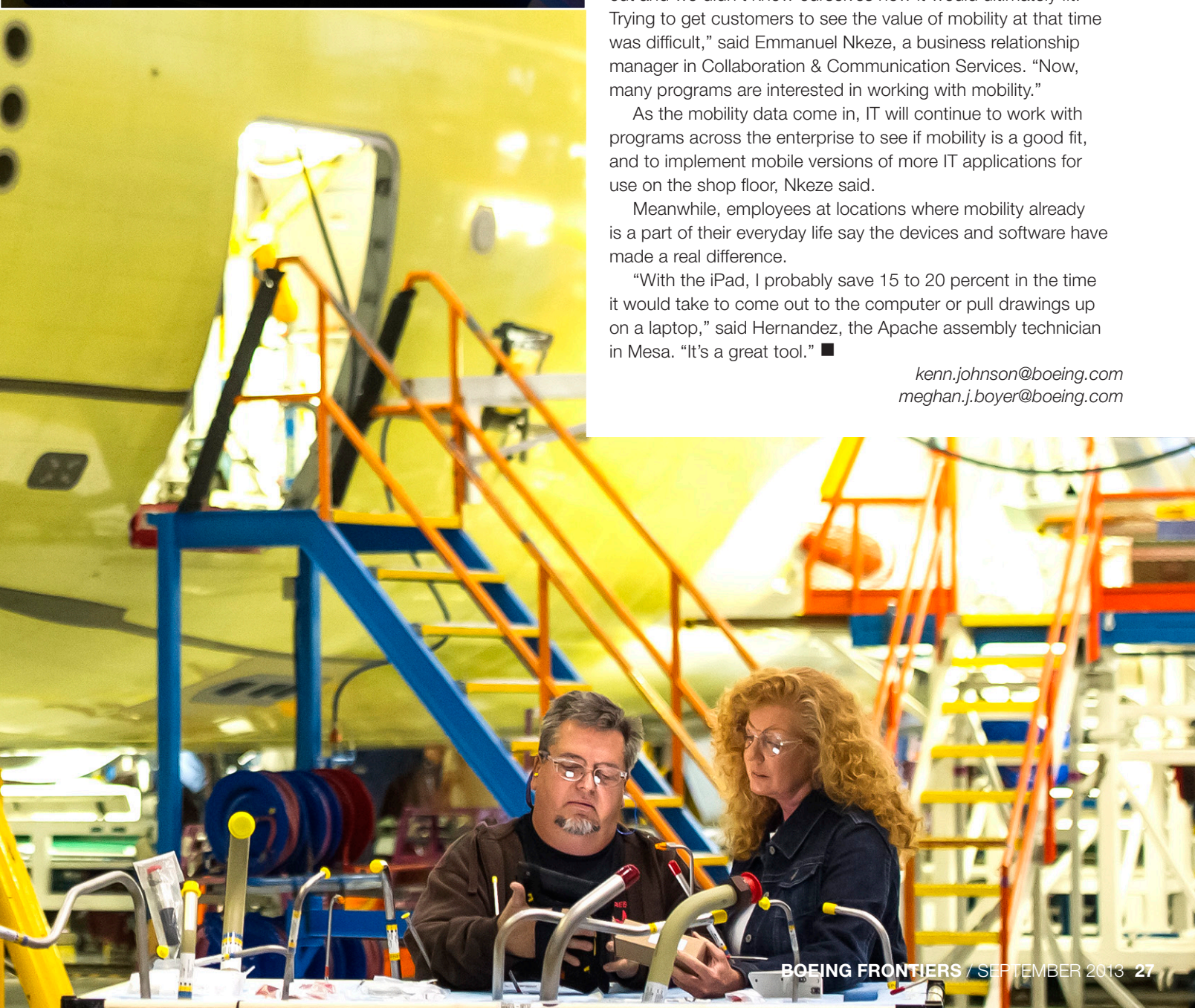

Wings of change

Boeing jetliners are helping rebuild Iraq *By Bill Seil*

The delivery of Iraqi Airways' first Next-Generation 737-800 last month marked a milestone in the rebirth of Iraq's commercial aviation industry and the renewal of its 40-year history with Boeing.

Iraq is recovering from years of war and turmoil, and an important part of its challenge is rebuilding a commercial airline fleet with new aircraft.

"Iraqi Airways is realistic and not looking to compete head to head with the big, established carriers in the region," said Don Galvanin, sales director, Middle East, Central Asia and Ukraine for Boeing Commercial Airplanes.

"Their goal is to give the Iraqi people the best service they can. And as the national carrier, they also want to fly the flag of their nation and connect with other countries around the world."

And Boeing is there to help in that effort, as it has been in the past.

Iraqi Airways placed its first order with Boeing on Oct. 1, 1973, for three 707s and two 737s. That began an ambitious effort on the part of the airline to modernize its fleet with Boeing jetliners. Three more orders followed over the next decade.

From 1974 to 1982, 16 Boeing commercial airplanes were delivered to the airline. Prior to that, Iraqi Airways' fleet consisted mainly of British Tridents and Soviet commercial aircraft.

Richard Tait, now retired, negotiated the first sales to Iraqi Airways for Boeing Commercial Airplanes. The first two orders, placed in 1973 and 1975, were only for 11 airplanes. But the mix of airplanes was unusual.

"Iraqi Airways became the only airline in the world to place into service Boeing 707s, 727s, 737s and 747s all in a space of two years," Tait said.

Today, the airline not only has Next-Generation 737s being delivered, but it has also ordered the 787 Dreamliner.

The order for 30 of Boeing's 737-800 commercial jetliners was announced by the government of Iraq in May 2008. The following year, Iraqi Airways finalized an order for 10 787-8 Dreamliners. In December 2012, it also purchased a Boeing 777-200LR (Longer Range), which the company made available after another airline did not fulfill a previous order.

"They are buying Boeing planes again ... it means they still believe, after all these years, that Boeing products are the best."

– Richard Tait, retired, led the first Boeing sales to Iraqi Airways

Galvanin said the Iraqis are off to a strong start rebuilding the country's commercial airline fleet with the delivery of the first of the 737-800s.

"The 737 that was delivered in July is a beautiful airplane that we've done with some special touches," Galvanin said. "There are interior laminates that reflect the Mesopotamian-Babylonian era. Overall, they're establishing a fresh, modern brand with some traditional features."

Boeing and the Teague design consulting firm worked directly with the Iraqis to design the airline's new livery, which has similarities to its livery style of the 1970s.

"It went from a green airplane with some white to a white airplane with that distinctive Iraqi Airways green—but it's much more stylistic," Galvanin said. "We kept the original Iraqi Airways falcon on the tail. They're basically rebranding themselves as

PHOTOS: (Left) Iraqi Airways' new livery retains the airline's traditional falcon insignia. (Above) The first of 30 Next-Generation 737-800 jetliners ordered by Iraqi Airways leaves Seattle's Boeing Field for Baghdad last month. MARIAN LOCKHART/BOEING

Gone … but not forgotten

The fleet of 16 Boeing 707, 727, 737 and 747 airplanes purchased by Iraqi Airways in the 1970s and early 1980s is gone. Around the time of the Iraqi invasion of Kuwait in 1990, the government ordered that the commercial airplane fleet be moved to secret locations outside the country.

Although a small number of these airplanes may still be in use by foreign airlines, the rest have deteriorated beyond repair.

The fleet included three 747-200C's (Convertible), which could be configured to serve as a passenger airplane, a freighter or a combination of both. After first purchasing this airplane in 1975, the airline made the unusual request for Boeing to design and build a special cargo loader that could be folded up and carried on board the airplane.

Joe Sutter, the "father" of the 747 who led the development team as chief engineer in the 1960s, said the loader was one of the most spectacular pieces of special equipment the company had designed at that time.

"It was designed so if you landed at an airport without adequate loading facilities, you could use this onboard loader," Sutter said. "The nose would open and the loader would move forward to the front of the airplane. It would then extend its arms and legs and pull itself out onto the ground. I just marveled when I first saw it work."

The last Boeing airplane delivery to Iraq in that era occurred on Aug. 30, 1982. That was a 747-SP (Special Performance), which had a shortened fuselage and was designed to fly higher, faster and farther nonstop than any 747 model of its time. It had a specially designed interior and was used as an executive aircraft by Saddam Hussein, who had become Iraq's president in 1979.

Richard Tait, now retired, who led the first Boeing sales to Iraqi Airways 40 years ago, said those early sales helped establish Boeing as the commercial airplane supplier of choice in that region.

"I'm delighted that they're buying Boeing airplanes again," he said of the Next-Generation 737s and 787s that have been ordered by Iraqi Airways. "It means they still believe, after all these years, that Boeing products are the best."

– Bill Seil

"Overall, they're establishing a fresh, modern brand with some traditional features."

– Don Galvanin, sales director, Middle East, Central Asia and Ukraine for Boeing Commercial Airplanes

the New Iraqi Airways."

Iraqi Airways' orders, both in the 1970s and today, included special customer service requirements.

In 1975, Boeing Commercial Airplanes' Customer Support organization announced it would place 152 employees in Baghdad under a special support contract with Iraqi Airways. The Iraqis realized that their jump into a big, long-range jet fleet demanded additional management and technical skills, according to Tait. Key areas of support included route and schedule planning, aircraft maintenance programs and the development of systems and procedures.

"Our presence in Baghdad was very valuable to the airline in introducing those aircraft successfully," Tait recalled. "And the people we sent there did an outstanding job."

As part of the new airplane order with Iraqi Airways, Boeing has again committed to help the airline develop the expertise and aviation infrastructure it will need for the future, Galvanin said. This will include business planning and assisting the Iraqis to improve their airports and air traffic control systems. Iraqi air traffic controllers have traveled to Florida to receive training provided through Jeppesen Academy, a service of Boeing subsidiary Jeppesen. Iraqi Airways personnel also receive pilot and maintenance training at Boeing Flight Services campuses in London and Seattle.

As Iraq rebuilds its commercial airplane fleet, it's been opening up the country to foreign airlines. The plan, over time, is to develop bilateral agreements with other nations that will open the door to Iraqi Airways serving more international routes, Galvanin said. In fact, Iraqi Airways recently received permission to fly into London Gatwick and to Frankfurt, Germany. It is exploring options for resuming flights to Beijing and opening up other cities in the Asian market. The airline is also working with the U.S. Embassy in Baghdad on possibly starting nonstop flights to the United States using their long-range Boeing 777.

The first of the airline's 787-8 Dreamliners won't arrive for a number of years. To build service in the near term, Iraqi Airways has purchased some immediately available new airplanes from both Boeing and Airbus.

"They've got a lot of work ahead of them and a lot of rebuilding to do," Galvanin said. "But their people are very resilient and they keep forging ahead." ■

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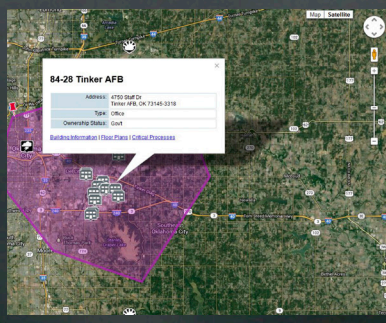
PHOTOS: (Opposite page, from top) In the 1970s, Boeing built this special self-loader for Iraqi Airways' 747-200C (Convertible) jetliners. BOEING ARCHIVES Iraqi Airways' 737-800 cabin design incorporates laminates and scenes that reflect the region's Mesopotamian-Babylonian heritage, including (top) the ancient hanging gardens of Babylon and (bottom) an Assyrian bull harp. MARIAN LOCKHART/BOEING (This page, from top) Boeing ground-crew in Seattle stand by to launch Iraqi Airways' first 737-800 on its delivery flight to Baghdad. The colors and motifs of Iraqi Airways' new livery pay homage to its 1970s Boeing fleet. MARIAN LOCKHART/BOEING

NAVIGATING THREATS

During a crisis, new software tool helps protect Boeing employees and property

By Christine Cranston



When a deadly EF5 tornado tore through an Oklahoma City suburb on May 20, leaving a lengthy path of destruction and killing more than 20 people, Laurie Willis was some 2,000 miles (3,200 kilometers) away, tracking the massive storm system from Boeing's Enterprise Crisis Management Center in the Puget Sound region of Washington state.

Willis is Boeing's Emergency Preparedness program leader, and her job is to monitor events that require lifesaving safety and rescue decisions involving Boeing employees during a crisis.

And this was one of those occasions. More than 1,400 Boeing employees live and work in the Oklahoma City area. The Boeing site there, near Tinker Air Force Base, supports a wide range of engineering and military and commercial aircraft programs.

"We noted where Boeing buildings sat in relation to the tornado and what was happening nearby—like road closures, shelter requirements and power outages," Willis said. "We were then able to predict its impact on Boeing people and property."

How was this possible? With a Boeing software tool known as ThreatNavigator.

Developed by teams from Security & Fire Protection and Boeing Information Technology, ThreatNavigator is used during

PHOTOS AND GRAPHIC: (Below) A woman salvages items in Moore, Okla., after a tornado flattened a wide swath of homes and businesses there in May. **ASSOCIATED PRESS** (Insets, clockwise from top left) A ThreatNavigator screen view. **BOEING** Chris Manning, emergency preparedness coordinator for Philadelphia and the Northeast region. **FRED TROILO/BOEING** Boeing Mesa firefighters undergo night training. **MIKE GOETTINGS/BOEING** ThreatNavigator team members Radford Sorensen (seated from left), Gary Temme, Dee Dee Haas and Kyle Bowers (standing). **JESSICA OYANAGI/BOEING**

> "ThreatNavigator was designed to increase the effectiveness of Boeing emergency responders, business continuity professionals and business organizations."
>
> *– Gary Gordon, Business and Emergency Preparedness program manager and leader of the ThreatNavigator development team*

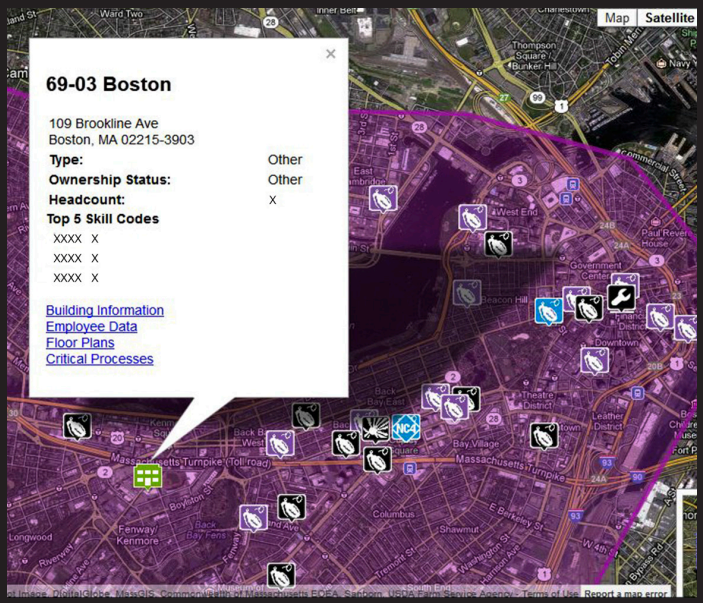
natural disasters and other crises to protect Boeing employees, property and information.

With more than 170,000 employees in 50 states and 70 countries, plus thousands of suppliers, partners and customers in 150 countries, Boeing employees and operations are, unfortunately, often at risk. In addition to storms such as the Oklahoma City tornado, potential threats include earthquakes, hurricanes, pandemics, civil unrest and terrorism. ThreatNavigator also provides an effective means of maintaining business continuity across Boeing.

"ThreatNavigator was designed to increase the effectiveness of Boeing emergency responders, business continuity professionals and business organizations," said Gary Gordon, Business and Emergency Preparedness program manager and leader of the ThreatNavigator development team.

"It's the brainchild of several Boeing emergency management professionals with years of experience," Gordon added. "We were very fortunate to envision what we wanted and then have a cutting-edge team build the application in-house with the latest Web technology."

An online tool, ThreatNavigator makes it possible for Boeing



emergency managers to grasp a complex situation quickly and to monitor it in real time, Gordon explained. It combines information from a variety of internal and external sources and displays it visually in a Google Maps format. Icons show structures and types of incidents and are color-coded to indicate time elapsed since the incident occurred. Alerts are sent through email to users.

Gordon said all Boeing employees benefit from ThreatNavigator, even if they are not aware of it.

"ThreatNavigator helps keep them safe," he said, "and it keeps critical operations running as smoothly as possible—no matter what threat comes along."

During the Oklahoma City tornado, Willis relied on ThreatNavigator's weather tracker, which is similar to those seen on TV weather news. The tracker showed storm intensity, projected paths, precipitation and wind. External information feeds—such as NC4 (a commercial information service), the U.S. Geological Service and the National Weather Service—contributed additional information.

ThreatNavigator helped the emergency preparedness teams decide how to best support the Oklahoma site locally and remotely from the Puget Sound region, Willis said. Boeing facilities were displayed in ThreatNavigator, even floor plans and the number of employees working there, their job skill codes and work shifts.

Because of the tornado's severity, local emergency coordinators had sheltered in place with other Boeing employees. They couldn't see how the event was progressing, nor could they act on behalf of the site. Willis said her team fed them up-to-the-minute information using cellphone calls and text messages.

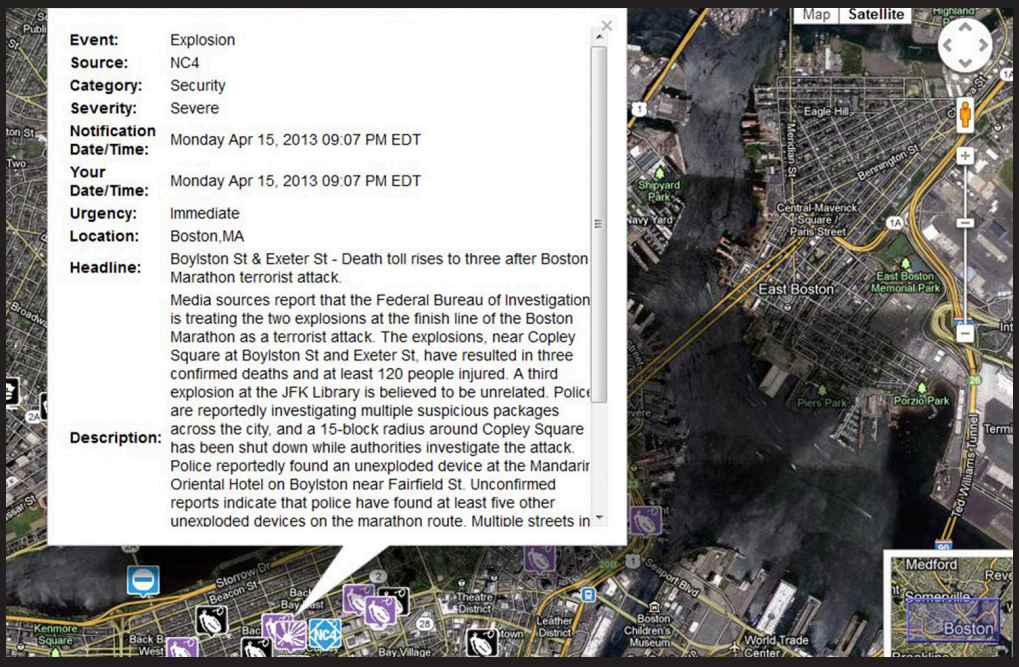
Human Resources was engaged locally to check on and account for employees and their families, Willis said. Some had been injured, but none died. Although the homes of several Boeing employees were damaged or destroyed by the tornado, no Boeing buildings were hit.

ThreatNavigator also is designed to afford a quick way to reach certain Boeing people if emergency assistance is

CRISIS COMMUNICATION

In addition to ThreatNavigator, other systems are used to find employees and communicate with them during a crisis or disaster:

- Desktop Emergency Notification System (DENS): Delivers computer alerts to employees about emergencies.
- Dialogic Automated Notification (DAN): Sends messages through a global automated phone notification system.
- Boeing Employee Accountability Network (BEACON): Accounts for employees' locations and well-being if a site evacuation is required. Employees input their contact information and update it during a crisis as their situation changes.
- Emergency Information Hotline at 800-899-6431: Provides updates to employees when an emergency occurs and affects operations.
- Boeing emergency website (external): Provides messaging capability via the Internet.
- Travel Risk Intelligence Service (TRIS): Monitors Boeing business travelers and nearby health and safety threats. Sends real-time recommendations when there's a crisis or disaster.



GRAPHICS: ThreatNavigator screen views show (far left) the Boeing Boston office and employee information near the various bomb threats that occurred just after the Boston Marathon bombing and (left) a real-time view. **BOEING**

PHOTO: ThreatNavigator team members Laurie Willis (from left), Steve Havens, a contractor for TATA America, Sandy Bartell and Ralph Kliem practice different roles. **JESSICA OYANAGI/BOEING**

needed at a Boeing site. Each critical Boeing operation, such as Security, Payroll or Supply Chain Logistics, has a designated contact person by location.

"ThreatNavigator began as a pilot program running on a single laptop and has grown into an industry leading tool that our Security & Fire Protection employees rely on to ensure the safety of Boeing assets," said Levi Sutton, lead developer, IT Business and Supply Chain Systems for Security & Fire Protection.

ThreatNavigator made its debut in May 2012 when Chicago hosted a two-day NATO summit. The conference attracted world leaders, as well as thousands of protestors who had vowed to "shut Boeing down" in opposition to its military support of NATO.

And Boeing has used ThreatNavigator many times since. It communicated employee safety and building status in areas hit hard by Hurricane Sandy in 2012, and it provided up-to-the-minute information when Boeing chose to evacuate employees during the recent Colorado wildfires and civil unrest in Cairo. And Boeing uses it almost every day to keep tabs on medical emergencies or other events at company sites.

Chris Manning, Boeing's emergency preparedness coordinator for Philadelphia and the Northeast region, used ThreatNavigator immediately following the bombings earlier this year at the Boston Marathon.

"Our Boston site has only a few people, so we were quickly able to account for them," Manning said. "It took a little longer to account for Boeing employees traveling on business in the area."

Manning said ThreatNavigator makes his job much easier during a crisis. "I no longer have to click to 40 places just to know what's happening. And it's always pushing information to me with email notifications so I don't miss anything."

It's also important for Boeing to maintain critical business operations, if safe and feasible, during a disaster or other event, or to resume normal operations as quickly as possible if a shutdown occurs. ThreatNavigator has been a big help in that regard because it provides a lot of data in real time, according to Kyle Bowers, Boeing's Business Preparedness program leader.

Before ThreatNavigator, alerts and information from many sources were sent to emergency responders, Bowers noted. "It took hours to accumulate accurate information and by the time it was analyzed, the situation had changed," Bowers explained. "In a disaster, speedy action is vital." ■

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Taking care

Clinical care programs provide expanded health services to employees

By Bridget O'Meara and Susan D'Alexander

When Barbara Schroyer's husband, Ty, experienced chest pains in November of last year, they initially went to the emergency room as a precaution. But it was a follow-up visit with a local cardiologist that confirmed the worst: Open-heart surgery was needed.

"It was scary," said Barbara Schroyer, an employee involvement and engagement facilitator at the company's Everett, Wash., site.

"Our cardiologist said to look at the top possible facilities for heart surgery. In our research, we saw the Cleveland Clinic mentioned as a top cardiac surgery hospital, but never did we think we could go to Cleveland for this type of operation."

Boeing clinical care program	When to use	Best uses	Getting connected
Best Doctors Second Opinion Service	Confirm a difficult medical diagnosis or determine the best course of care	Need a second opinion or trying to decide between treatments	Call Boeing TotalAccess at 866-473-2016 (say "Best Doctors")
Carena Urgent Care at Home	Medical advice via telephone, webcam or house call visit when your primary physician is unavailable and your condition doesn't warrant an emergency room visit (availability based on location)	Specific episodes of medical care, such as moderate sprains, asthma attacks or lower respiratory infections	Call Carena at 855-935-WELL (9355) or visit www.boeing.carenamd.com
Cleveland Clinic Specialty Program	Care for non-emergency cardiac procedures	Heart defect closures and heart valve replacements and repairs	Call Health Design Plus at 877-230-0988 or visit www.clevelandclinic.org/boeing
Nurseline	Around-the-clock access to registered nurses who can answer questions about minor medical conditions	Cuts or burns, a sick child, headaches, fever, asthma, back pain and other chronic conditions	Call TotalAccess at 866-473-2016 (say "Well Being")
Primary Nurse Program	Continuing support from a registered nurse for chronic health conditions	Ongoing health concerns such as diabetes or hypertension; pre- and post-hospital treatments	Call BlueCross BlueShield of Illinois at 888-802-8776

The programs are only available to eligible individuals. This is a summary only. For details, please consult the terms of the benefit plans or call 866-473-2016 if you have questions. In the event of a conflict between this summary and the benefit plans, the terms of the plans will control. The Boeing Company reserves the right to modify or terminate the plans at any time.

Then she read an item in *Boeing News Now*, the news source for employees, about the Boeing Cleveland Clinic Specialty Program and the various services available to employees. She called, learned that her husband qualified for the program, and two months later they were headed to Cleveland for the surgery—back to the same hospital, ironically, where Ty Schroyer was born.

Her husband first had open-heart surgery at age 17. He loves sports, hiking and other outdoor activities, but has faced limits on his activities for much of his life.

"I was made whole," he said of the successful surgery at the Cleveland Clinic.

The Boeing Cleveland Clinic Specialty Program is just one of several clinical care programs offered in addition to traditional medical plan benefits, explained Dr. Eric C. Hisken, director of Boeing's Health Services & Workers Compensation organization. He also serves as the company's chief medical officer.

"As medical care and technology evolve, Boeing looks for ways to make it possible to get the best available treatment—no matter where or what time of day," Hisken said, adding that the clinical care programs offered by Boeing, such as the Cleveland Clinic Specialty Program, help do just that for employees and their dependents.

The Cleveland Clinic program was introduced in October 2012, adding to the many benefits in Boeing's total compensation package.

"We offer high-quality, market-leading programs to our employees," Hisken said, "and Cleveland Clinic ranks among the best in the country. Another reason they were chosen was that they are transparent about their quality data, which is very important to Boeing."

When patients receive care from providers with a proven track record, they benefit from better outcomes, Hisken said. "When you get care right the first time around, there are fewer complications and a quicker return to normal activities—it's a win-win for all involved."

Barbara Schroyer said she could not be more pleased with the overall experience before, during and after her husband's surgery at the clinic.

Eight days after surgery, her husband flew home with a scheduled follow-up appointment with his cardiologist. A nurse practitioner from Cleveland Clinic checked in periodically with him for six months following his surgery. A recommended three-month cardiac rehab program helped him get back on the hiking trails.

With no physical restrictions for the first time in his life, Ty Schroyer hiked and jogged a 6.5-mile, 2,000-foot-elevation (10.5-kilometer, 610-meter-elevation) trail in August. ■

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PHOTO: Barbara Schroyer, left, and her husband, Ty, near the Anacortes, Wash., waterfront. ED TURNER/BOEING

GOING THE DISTANCE

A CV-22 Osprey operated by the U.S. Air Force Special Operations Command receives fuel off the coast of Greenland in June while en route to the Royal Air Force base in Mildenhall, United Kingdom. Assigned to the 7th Special Operations Squadron, the Osprey was the first of 10 to be deployed to the base as part of an expansion by the 352nd Special Operations Group. Refueling the Osprey is an MC-130H Combat Talon II, with the photo shot through its open rear loading door. The Osprey, built by Boeing and partner Bell, has a unique tilt-rotor configuration that allows it to cruise like a fixed-winged aircraft but land and take off like a helicopter. PHOTO: U.S. AIR FORCE


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