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Frontiers

Shaping tomorrow today

Portland Fabrication site one of several around the world turning hard metal into jetliner parts

PHOTO: RENE FRANCILLON

PHOTO: BOB FERGUSON | BOEING

Cover: Portland machinist Thomas Nguyen loads a 747 flap track onto a fixture before it is moved by crane to another workstation. **BOB FERGUSON | BOEING**

Photo: (Far right) Machinist Daniel Jones adjusts tool-length offsets on a boring mill controller. **BOB FERGUSON | BOEING**

TABLE OF CONTENTS


GE Fanuc

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The stories behind the ads in this issue.

Featuring the Bell Boeing V-22 Osprey, this ad is one of several in a campaign running in domestic and global trade publications.

Adapted from a series of posters in support of Boeing's environmental strategy, this ad illustrates the commitment Boeing employees have made to building a better planet year-round, and celebrating those efforts on Earth Day (April 22). Learn more at boeing.com/environment.

"Enduring Innovation" is one of several ads in a Boeing Defense, Space & Security advertising campaign highlighting the capabilities Boeing brings to its customers. The ads are running in print and online business, political and trade publications.

This composite image was created for a Japan advertising campaign recognizing a history of industrial collaboration that spans more than 60 years. The theme highlights the concept of "tomoni," or "together," and features a Boeing employee and supplier-partners. The photo was shot in a studio using the 787 as a backdrop.

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LEADERSHIP MESSAGE

Chris Chadwick
Boeing executive vice president
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Boeing Defense, Space & Security

Breaking away

With a new focus and organization, BDS will leave competitors behind

At Boeing Defense, Space & Security, we are taking our game to a different level. And in the process, we are going to make history—with your help.

The pattern of competition in our industry is changing, and our future success will be driven by growth through innovation, productivity, and dependable and repeatable execution. In the midst of this change lies opportunity. Many of the companies we compete with are indistinguishable from one another, in spite of different strategies, portfolios and marketing efforts. By differentiating ourselves from our competitors—by being more agile, and by delivering what our customers need, when they need it—we will separate ourselves from the pack.

To achieve this, we have made important changes to the structure and organization of BDS, changes that will enhance our execution across the full life cycle of our products and services. Put another way, we are evolving and breaking through the complexity that has built up over time in our processes.

"Create, develop, produce and support." That's going to be our focus. It is nothing short of a strategic imperative.

A new organization, BDS Development, will position us to improve performance on key development programs and "break the price curve" for our customers. In the defense industry, for example, each new aircraft costs more to produce than the previous one. We must break that trend. Our new organization will help us establish a firm foundation for operational excellence that will be a key element of differentiating Boeing in the marketplace. And by partnering with the Airplane Development organization in Boeing Commercial Airplanes, our success will be accelerated.

We will develop programs in a simplified and sharply focused way. BDS Development will work closely with Phantom Works as that organization creates tomorrow's products. It will work with Boeing Military Aircraft and Network & Space Systems as those businesses produce and grow our franchise programs. And it will work with Global Services & Support as it sustains our customers' products worldwide. We will continue to embrace functional excellence and apply best practices from across the enterprise. After all, that's what our customers expect.

We could not have taken this strategic step without first shaping our culture. Throughout the past 15 months we have heightened our focus on personal accountability and shared responsibility. We have increased our emphasis on safety, honesty, integrity, transparency and constant sharing across all of Boeing, starting with ourselves. This approach sets us apart from competitors by sending a clear signal to our customers that "more for less" is what we deliver, not just what we talk about. Already, our customers are responding positively.

We've created the environment to get things done. Our strategy provides us direction, and will deliver results by allowing each of us to do what we do best. Now let's go make history. ■

PHOTO: BOB FERGUSON | BOEING

Two legends, one delivery

Cargolux last month took delivery of its 30th Boeing 747 and marked the milestone with a tribute to the engineer, Joe Sutter, who led the Boeing team in the 1960s that designed and developed the "Queen of the Skies." The latest 747-8 Freighter for Cargolux has a special decal on the side of the airplane with the words "Father of the 747" and a picture of Sutter. "We have built our business around the iconic 747 and therefore we wanted to celebrate our 30th direct delivery from Boeing by honoring the man behind this magnificent machine," said Dirk Reich, president and CEO of Cargolux. **PHOTO: KATIE LOMAX | BOEING**

QUOTABLES

“When you take risk, you’re at the very least going to learn something, and you will empower people along the way.”

—Darryl Davis, president of Phantom Works, speaking to a panel about innovation at the U.S. Air Force Association’s 31st annual Air Warfare Symposium, which took place in Orlando, Fla., in February. *Boeing News Now*, March 8

“We have been surprised at the size of the opportunity.”

—Ken Sain, managing director of Professional Services at Boeing Commercial Aviation Services, on performance of the Boeing Fuel Dashboard, which automatically downloads aircraft operational performance data to help airlines analyze and decrease fuel consumption. Although Boeing expected total fuel savings across the fleet of 1 to 3 percent, in early use by 14 customers it has shown an average 4.5 percent improvement. *Aviation Week & Space Technology*, March 2

Pride and awe

Passion for aerospace led this employee to tanker

BY MEERA CHANDER, AS TOLD TO ED MUIR

Meera Chander is a Flight Test Propulsion Analysis engineer and test conductor supporting the Wet Fuels Lab for the KC-46 tanker program in Seattle. In this *Frontiers* series that profiles employees discussing their jobs, Chander explains her love of aerospace engineering and the excitement of working on the next Boeing tanker.

Seldom does a day go by that I don't get to see customers in uniform or Boeing employees who used to be in the military. Hearing about their experiences and understanding the important missions the new Boeing tanker will be called on to perform for our military is a constant reminder of how cool this work really is—and how proud I am to be a part of it. That pride and awe about what we are accomplishing keeps me motivated.

This incredible Boeing airplane will be able to refuel a number of different aircraft while they're in flight. But before that can happen, a lot of testing, in and out of our labs, is needed.

In the Wet Fuels Lab, we have representative components of a tanker that enable us to conduct tests on several different systems: aerial refueling, fuel offload, hydraulics and control systems, to name a few. We can approximate flying conditions and each day learn more about the airplane's systems and hardware, which is a great asset.

I work with a team of about 10 test conductors and system operators to perform tests for program test directors. We coordinate with them to determine what data they want to validate from a particular test, prepare accordingly, perform a readiness review, and then execute the test. After it's completed, we package the data for the test director to review.

There's so much that goes into executing a successful test plan, and so many different people with whom you need to coordinate. You have to be resourceful, able to make quick decisions and be present at all times.

The journey to get here has been fun, rewarding and certainly educational.

For me, that road started in my seventh-grade science class. We were learning about the Hubble Space Telescope, and I was enthralled by the images the telescope beamed back to Earth. It showed me how big the universe was and how much there is to explore, and my love of aerospace took off. Since then, I took as many industry opportunities as I could.

In the summer of 2012, during a college internship at NASA's Jet Propulsion Laboratory in Pasadena, Calif., I saw the Mars Rover Curiosity land on the red planet. It solidified my belief that aerospace was the industry I wanted to work in, where we are part of something so much bigger than ourselves.

Back at school that fall, Boeing offered me a great opportunity the next summer to work in Boeing Test & Evaluation for Flight Test Engineering Propulsion Analysis. When I arrived in the summer of 2013, I immediately began test planning and flying on various aircraft. I fell in love with test and evaluation.

After I graduated from college, I learned to fly before returning to work full time for Boeing and Flight Test. I was transferred temporarily to the Lab Test side of company, to help out on the tanker in the Wet Fuels Lab.

I am so grateful to be interacting with Boeing experts day to day. The more I talk and work with them, the more I realize I have so much to learn.

It's so inspiring to be part of two phases of such an important Boeing program, and I can't wait to see where my Boeing career takes me. ■

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Meera Chander

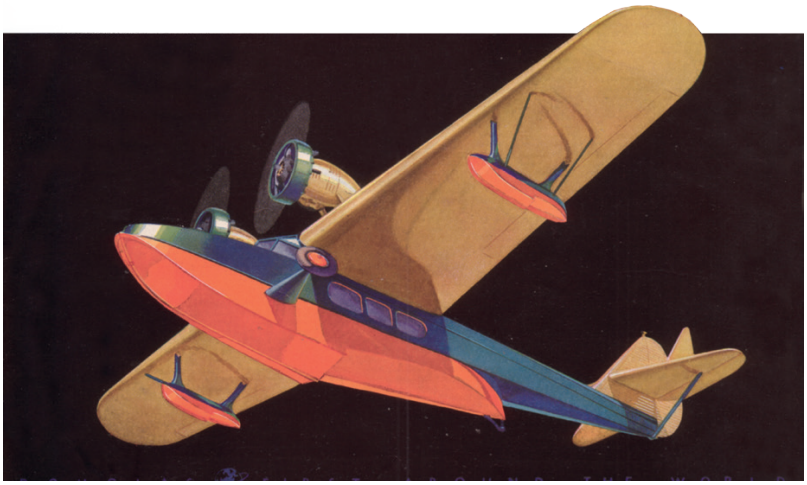
HAS WORKED FOR BOEING:
9 months

LOCATION:
Seattle

TEAM:
Boeing Test
& Evaluation

PHOTO: MARIAN LOCKHART | BOEING

HISTORICAL PERSPECTIVE



Day of the Dolphin

Production of the Douglas 'flying boat' was limited, but even Bill Boeing owned one

BY DAN RALEY

The Douglas Dolphin could land anywhere—on the ground, in the water and, in the throes of the Great Depression, on its feet.

While just 59 were built over four years, the amphibious aircraft made the most of its limited run for Boeing heritage company Douglas Aircraft, demonstrating resilience and versatility during the uncertain times before and during World War II.

The Dolphin was flown by multiple branches of the U.S. military, carrying weapons and performing search-and-rescue operations and border-patrol missions. It also culled favor with some of the country's more influential families, with last names like Wrigley, Vanderbilt and Boeing, supporting their business or sporting pursuits. And it was designated as the first presidential aircraft of any kind, made available for President Franklin D. Roosevelt, though there is no indication he ever used the plane while in office.

The Dolphin was the next version of what was a single luxury air yacht created by company founder Donald Douglas, who christened it Sinbad. First flight of Sinbad came in July 1930. But its twin engines mounted atop the cantilever wing took in too much water while the airplane was operating on California's Santa Monica Bay. So it was redesigned and renamed Dolphin, with raised engines and retractable landing gear.

Douglas Aircraft faced many obstacles with this hand-crafted airplane. In the aftermath of the stock market crash, the company doggedly kept the project alive, largely selling the Dolphin for military and commercial needs.

Candy and gum magnate William Wrigley Jr. operated a fleet of five Dolphins for his Wilmington-Catalina Airline to ferry passengers the 26 miles (42 kilometers) to and from the California mainland and Santa Catalina Island. The dependable planes made 39,295 channel crossings carrying 213,000 people over nine years without a mishap. The Dolphin landed in the ocean, taxied up a ramp to a confined airport space, and used a turntable to reverse direction and return to the water for departure.

"I used to go up on a hill and look down and watch them fly in as a kid," recalled Sid Galley, a retired gas company engineer from Pasadena, Calif. "It was so exciting."

The U.S. Coast Guard put great trust in the Dolphin to land in high seas and pull off daring rescues, actions that mesmerized the public during the 1930s, two resulting in Distinguished Flying Crosses for the aviators. Initially supervised by the U.S. Treasury Department, the Coast Guard took delivery in 1933 of the Dolphin custom-built for presidential use.

Military forces obtained 48 Dolphins, with the U.S. Army Air Corps receiving 24, the Coast Guard and U.S. Navy a combined 23, and the Argentine Navy one. For wartime purposes, the planes were outfitted with machine guns in the bow and depth-charge explosives hung on the wings. With smoke billowing all around them, two Dolphins were parked inside and one outside a Navy hangar on the Hawaiian island of Oahu and each somehow survived the Pearl Harbor air attack on Dec. 7, 1941.

Just one Dolphin, originally owned by Bill Boeing that he called Rover, is believed to be in existence today. Colgate Darden III, a South Carolina physics professor, piloted that aircraft a final time on Oct. 30, 1998, accompanied by his wife and two friends, before donating it to the National Naval Aviation Museum in Pensacola, Fla.

"It was an honor to fly on that plane," recalled Bill McAbee, a retired postal worker from Pelzer, S.C., who shared in the historic last flight.

While this particular aircraft was never used by the Coast Guard, it now carries the military branch's blue and gray livery for museum display purposes, demonstrating once again the Douglas Dolphin's ability to land in any conditions. ■

DANIEL.W.RALEY@BOEING.COM

Photo and illustration: (Far left) This Dolphin, one of the earliest built, was used by the U.S. Coast Guard from 1932 to 1939. (Above) An artist's concept of the same airplane, shown on the cover of an undated brochure, was one of 17 variants. **BOEING ARCHIVES**

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Difference

Insitu's new Eagle Point facility has helped employees perform better and more safely—and improved the production rate

BY ERIC FETTERS-WALP | PHOTOS BY BOB FERGUSON

Tyler Leslie helps build and repair some of the world's most advanced unmanned aircraft systems, and he and his co-workers now do their work in Insitu Inc.'s new, specifically designed production facility.

The new building in Bingen, Wash., along the banks of the Columbia River, offers views of the river gorge that any visitor would envy. But that's not the first thing he mentions when comparing his former workspace to the new one. Sometimes, the little

Photo: Wendy Viehmann (clockwise from bottom right), Quality supervisor, and manufacturing and repair technicians Radjesh Azore, Aaron Thompson and Kyle Westerman inspect Integrator unmanned aircraft in Insitu's Eagle Point facility.

maker

things make a bigger difference.

"The lighting is a lot better than in the old building, and the floors are much nicer. It's much easier to find screws now when you drop them," said Leslie, a repair and production technician for the Boeing subsidiary that produces the ScanEagle and Integrator unmanned systems.

While Insitu has grown rapidly during the past decade, the need to add space and employees often outpaced the time needed for a careful facility expansion. As a result, the company at one point occupied nearly 30 buildings spread out on both the Oregon and Washington sides of the Columbia River. Especially for the production work, there still wasn't enough room, said Ahmad Ziada, Insitu's director of production operations. "We were over capacity at our old production building. We were using every nook and cranny there," he said.

Insitu's operations now occupy about half that number of buildings after the recent opening of the company's Eagle Point facility. The company moved into the new space last summer, said Jennifer Taylor, facilities director at Insitu, with logistical and site leasing assistance from Boeing's Real Estate division.

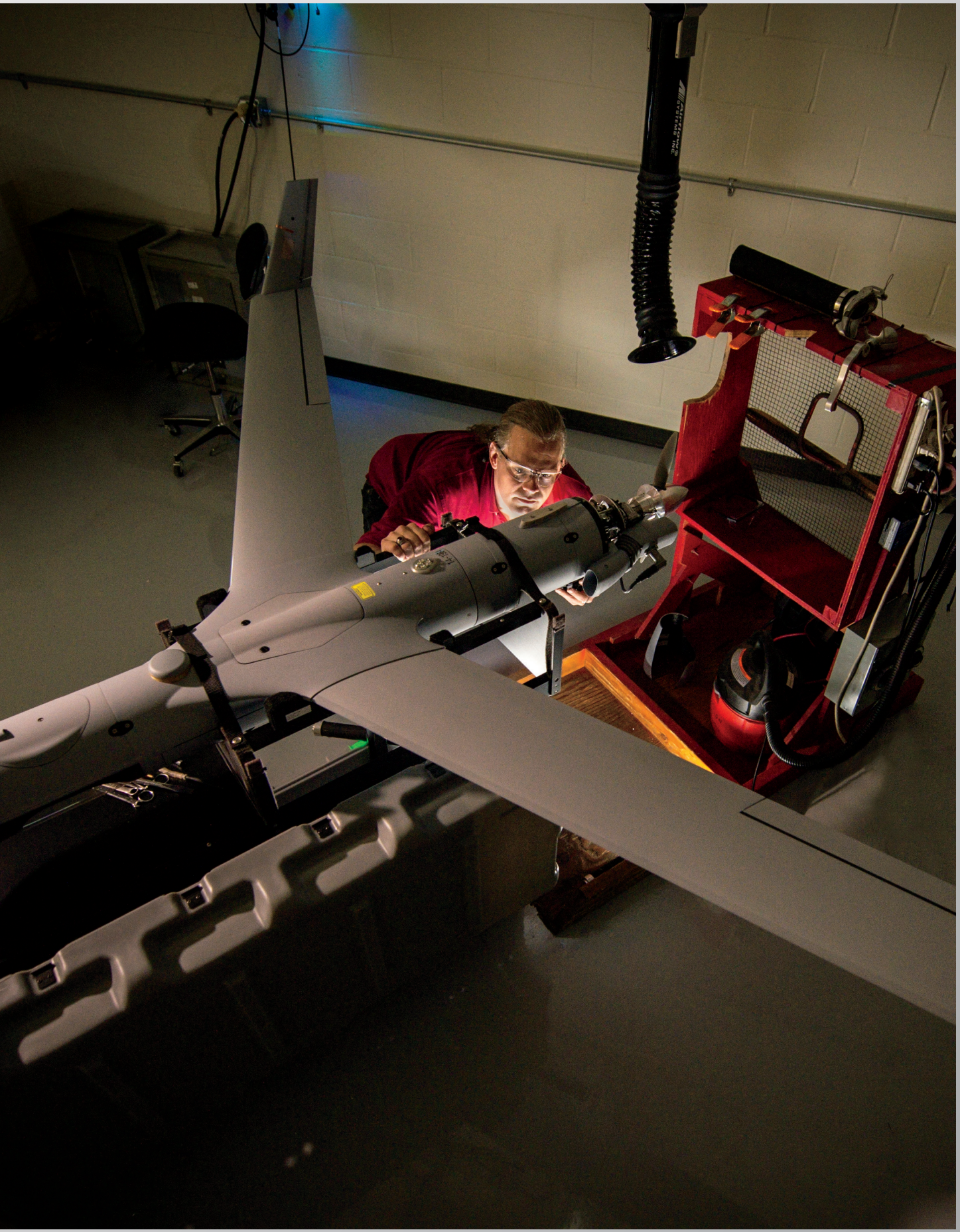
Eagle Point includes 120,000 square feet (11,000 square meters) of production, maintenance, warehouse and office space, more than double the space in the previous production building and nearly five times bigger than Insitu's original production site, Taylor said.

It also is the only LEED Silver–rated industrial building in the Columbia Gorge area, an internationally recognized certification for best-in-class building energy efficiency and low environmental impact. Skylights draw in natural light. Large windows do the same and offer panoramic views of the colorful hills on either side of the Columbia River. Employees also can take a break on a deck overlooking the river, on which many of them wind-surf or enjoy in other ways when they're away from work. The building's research and development space includes special rooms for engine testing that are outfitted with high-tech air-scrubbing systems to handle exhaust fumes.

Acknowledging those features are important, Ziada said the real value in the new building is how it helps employees perform their jobs better and more easily, with less physical strain on their bodies. The production space for ScanEagle and Integrator now is set up for a linear production flow, much like the final assembly lines used by Boeing Commercial Airplanes.

"I think we always have had a collaborative culture, but the facilities didn't always allow that," Ziada said, explaining that managers, engineers and production technicians worked in places that were about a

Photos: (Above) Manufacturing and repair technicians Obeth Juarez, left, and Sam Cieslinski install avionics into a ScanEagle fuselage. (Right) Kevin Block, manufacturing and repair technician, performs a preflight inspection of a ScanEagle.




Check
ONE BEFORE FLIGHT

20-minute drive from each other. At Eagle Point, managers' offices overlook the production floor. "Before, we couldn't always get production support immediately," said Kevin Block, a building and repair technician and ScanEagle floor lead. "Now, when we need that, we just go upstairs to the offices."

Parts are laid out close to work areas so employees don't have to use time and energy searching for what they need. A time-motion study of the previous production system found it was much less efficient for employees. "It was a lot of people going back and forth constantly," Taylor said.

Even as more of Insitu's aircraft systems are deployed around the world, the company is making sure it remains responsive to customers' needs for maintenance and related services. The Depot Maintenance Group takes in unmanned systems in need of service or repairs, which often come straight from use in faraway places, including the battlefield.

"They come in with layers of dirt and sand," said Ben Schwartz, a materials handler, who sometimes finds himself vacuuming up sand fleas and inspecting for spiders before focusing on a vehicle's repair or maintenance needs.

Despite this, "Being all together is the big advantage," he said of Insitu's new facility. "We used to get shipments in and then have to drive them to other facilities."

Wendy Viehmann, a Quality supervisor for the past six years, agreed that it's all making a difference in Insitu's production pace. "Things are moving a lot faster," she said. That is vital as demand for Insitu's products multiplies as well.

Last summer, Insitu marked the completion of its 2,000th ScanEagle aircraft, which together with Integrator has collectively racked up more than 800,000 operational hours. Meanwhile, Ryan Hartman, previously senior vice president of Insitu Programs, took over as Insitu's president and CEO when his predecessor, Steve Morrow, retired.

Most important for the company's future, however, was the introduction of ScanEagle 2, announced late last year. It can carry more payload, offers a new navigation system and a sharper, fully digital video system, as well as a state-of-the-art propulsion system built specifically for ScanEagle 2. That is a first for that class of unmanned aerial vehicles, Hartman said. At the same time, ScanEagle 2 is designed for commonality with all Insitu systems, reducing training, hardware and operational costs.

Meanwhile, Insitu is ramping up its Integrator unmanned aircraft line. This bigger unmanned system can handle up to 40 pounds (18 kilograms) of payload, compared with ScanEagle's 7.5-pound (3.4-kilogram) payload limit, without a reduction in maximum flight time.

Only months after completing its new production building, Insitu already is considering how to centralize other parts of its business at the site along the Columbia River, company officials said. For now, however, the Eagle Point facility has ample room for expansion and flexibility as Insitu moves ahead, according to Taylor.

"As the market changes, as we change, our production can change, too," she said. "We built a lot of capability here, so as the business grows, we can grow with it." ■

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***Frontiers* is interested in reader stories for future editorial use. Tell us about your own experience working on Boeing's unmanned aircraft systems at boeingfrontiers@boeing.com.**

Photo: Radjesh Azore, left, manufacturing and repair technician, and Wendy Viehmann, Quality supervisor, check out an Integrator aircraft at Insitu's recently opened production facility.

Hard metal mettle

Fabrication's Portland site has transformed into a Center of Excellence

BY DAN RALEY | PHOTOS BY BOB FERGUSON

John Iesalnieks doesn't worry about the morning commute. Traffic reports and big backups don't concern him. From Boeing Fabrication Portland, where he's worked as a machinist for 18 years, it's just a few blocks to his front door.

"It's kind of a small-town feel," he said. "I go home for lunch."

The bustling outside world still manages to catch up with Iesalnieks. Awaiting him inside the sprawling plant each day is titanium mined and roughly forged in Russia's Siberian mountain region and shipped nearly 7,000 miles (11,300 kilometers) to Oregon's largest city. He helps turn it into airplane parts.

Iesalnieks bores holes and hones, or finishes, them into 737 flap tracks, which are shiny 4-foot-long (1.2-meter) pieces that help raise and lower

Photo: Assembler Tuyet Tran installs bushings in a 787 upper side-of-body chord.

movable wing sections to control lift and descent. The work is so precise the holes can't have a greater tolerance than half of a strand of human hair.

Boeing Fabrication operates sites in such places as Helena, Mont.; the Salt Lake region in Utah; the Seattle area in Washington; Melbourne, Australia; and Winnipeg, Canada. Each plays a role in converting bulky-shaped metals into flight-critical jetliner parts.

Portland sets itself apart with its complex assembly work, dealing with 5,800 different pieces that fit into 350 end items made from titanium, plus stainless steel culled from France or aluminum from Ohio and Maine, according to Bill O'Neill, a senior leader at the Oregon plant.

"Portland is considered a Boeing Center of Excellence for machining hard metals" such as titanium, O'Neill said.

Located 200 miles (320 kilometers) south of Boeing's final-assembly jetliner plants in Renton and Everett, Wash., the Oregon city is regarded as one of America's most livable places. Proximity to natural wonders is a big attraction. Mount Hood is an hour's drive away, ocean beaches 90 minutes away. Residents like to say they can ski in the morning and wade in the surf that same afternoon.

"Living in Portland gives you unique things," Iesalnieks said. "You have everything really close."

The Boeing Portland factory sits 10 miles (16 kilometers) east of Portland International Airport, offering workers nonstop views of their craftsmanship in service. Low-flying jetliners pass overhead on takeoff or approach for landing. Inside the plant, big boxlike machines hum continually, churning out large, glistening parts such as the 787 side-of-body chord, which helps connect the Dreamliner wings to

(CONTINUED ON PAGE 26)

Photos: (Below) A machined 747 flap track is surrounded by stainless steel chips, which are recyclable. (Far right) Quality inspector Garry Frame checks a 737 auto-throttle assembly before it is shipped to Renton, Wash.

AT A GLANCE: Boeing in Oregon

In addition to its well-known and busy Portland manufacturing plant, Boeing has operations in Oregon for painting some of its commercial jetliners, testing unmanned aircraft systems, and providing parts and software.

At Portland International Airport, Boeing leases two hangars and employs 13 people to paint 777s and occasionally 787s, 767s and 747s. The site, which serves as an overflow paint facility to those in Everett, Wash., turned out 63 freshly coated airplanes this past year.

Located between Portland International and the airport in Troutdale, Ore., is the Aviall Customer Service Center, a Boeing subsidiary and one of 40 Aviall sites worldwide. Aviall employs eight people and provides a wide selection of parts such as batteries, brakes, wheels and hoses.

"We're like an auto-parts store, only for airplanes," said Rich Teza, an Aviall vice president based in Dallas.

The Portland suburb of Wilsonville is home to an office of Jeppesen, a Boeing subsidiary with a workforce of 49 local employees who develop flight-planning software and other personal-computer applications.

To the east of Oregon's largest city, and located along the banks of the Columbia River, are several sites for Insitu, another Boeing subsidiary. (See story, Page 16.) Consisting of 800 employees, Insitu builds and tests ScanEagle and Integrator unmanned aircraft systems at sites spread throughout Washington and Oregon in the Columbia River Gorge region. ■

the main fuselage. It starts out as a 5,400-pound (2,450-kilogram) chunk of titanium, then is milled down to a fraction of its size. All of the excess titanium chips are recycled for reuse.

When Boeing originally purchased the machining facility in 1974, it was fronted by palm trees encased in clear, plastic tubing, planted by its California owners. The trees didn't survive, but Boeing has doubled the building space, adding a state-of-the-art chemical-processing center in 2013, and increased the workforce to more than 1,600, all of this marking the company's long-term commitment to Portland.

Relationships are everything on the spacious 87-acre (35-hectare) campus, enhanced by an incident- and injury-free mindset, said Mike Starr, Boeing Portland general manager. Turnover is low; apprentices are groomed for permanent jobs, preferred over outside candidates.

"It's 10 times better for us to hire from within," said Don Hendrickson, senior finance and business operations manager.

Starr himself is proof someone can move all the way through the ranks and assume Portland's highest leadership role. He's a 25-year Boeing employee who started out as a liaison engineer.

"One of my biggest motivations is stability," Starr said. "There's a level of trust here, that people have a future. Everything looked at is for the company and the employee. They can see the possibility of a future job."

Boeing Portland has vigorously pursued continuous improvement in efficiency and productivity to stay competitive in the global marketplace. This has taken the manufacturing plant down an interesting path.

Portland, in consultation with the University of Kentucky School of Engineering and its group of thought-provoking former Toyota executives, reached a somewhat surprising conclusion in assessing plant operations: The employees still

Photo: Tuan Ton, left, and Khem Khuth, both machinists, load a 747 flap track onto a gantry mill machine.


BOEING


74

weren't involved nearly enough.

"The Toyota philosophy is to share knowledge to make the world a better place," O'Neill said. "We had the tools. We were missing the culture piece."

The Boeing Portland Production System was created, incorporating more people into decision-making and problem-solving. Communication was enhanced. Goals were streamlined. Innovative ideas exchanged.

Today, white organizational boards, customized to fit different workstations and often created by the employees they track, are filled with job directives, sticky notes or color-coded magnets. Parts carts come with instructional cards attached. Tasks are checked off hourly, helping spot unexpected shortfalls.

Klynn Bragg, a first-line assembly manager, once logged 10 to 12 miles (16 to 20 kilometers) per day on foot in pursuit of parts across the plant, and wore a pedometer to prove it. She had masking tape stuck to her wrists, filled with scribbled parts numbers. Now she simply takes a few steps to a screen and checks it for part location and identification.

"It's unbelievable, the change," Bragg said. "I'll never outlive the masking tape. When I retire, that will be my gift."

Steve Watson, a Boeing machinist who also works on 737 flap tracks, came up with a creative solution for using floor space. He once was surrounded by as many as 16 parts-filled carts; it's four now. The Panama native suggested stacking things for efficiency.

"This job is great; I have input in the work—and that's the best part," Watson said. "If you have something you think can make an improvement or make things better in any way, you can bring it up. We're willing to try it. We've been very successful."

Since 2008, Boeing Portland's on-time delivery has increased from 70 percent to 97 percent, and overtime pay has dropped from 20 percent to 9 percent. Both lost-workday and recordable-injury rates have decreased by more than 40 percent since 2011. The site also hit its 2013 and 2014 financial targets to reduce its overall cost forecasts, Starr said.

The plant has its eye on the future, too. It offers 28 apprenticeships and 70 internships each year, providing prospective machinists with training and full-time jobs if ready and selected. Once teeming with machine shops, the Portland area has experienced a decline in this skill set, necessitating the Boeing classroom instruction, according to Starr.

Daniel Jones is a graduate of the program. A machinist, he's been a full-time employee for four years after spending four as an intern. He works on the 777 pilot steering column, which includes the yoke. He's grateful for the opportunity.

"I don't know how many companies are out there where they pay you to learn on the job," Jones said. "I thought that was a unique situation."

Typically outfitted in safety goggles, a Boeing Fabrication T-shirt and cargo shorts, Iesalnieks spends three hours on a flap-track part. It weighs 115 pounds (43 kilograms). He uses a crane to move the piece from a machine that bores the roughed-in hole to an area for finishing work, which he performs with a hand-held tool.

It might keep the daily commute simple, but there's plenty of challenge inside the Boeing Portland gates.

"We produce components for the wings, for a really important part of the plane," Iesalnieks said. "And we have a sense of pride that we do high-quality work here." ■

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***Frontiers* is interested in reader stories for future editorial use. Tell us about your own experience working in Fabrication at boeingfrontiers@boeing.com.**

Photos: (From far left) Machinist and team leader John Iesalnieks operates a crane during 737 flap-track boring and honing; team leader Chris Lambert, left, and first-line leader Klynn Bragg inspect a completed 737 flap track.

Diverse education

Employees help foster a culture of diversity and inclusion

BY LEN VRANIAK

Before Robert "Chili" Hicks joined Boeing, he spent 21 years in the U.S. Navy, and finished his military career helping sailors in the Pacific Northwest learn about programs that could help their own careers.

Hicks is still helping veterans, only from inside Boeing.

"One of the things that drives me is helping veterans connect to what we do at Boeing," said Hicks, who came to Boeing in 2006 and today is a Commercial Airplanes Quality Core Business Intelligence manager in Everett, Wash.

Not only do veterans bring many different and important skills to Boeing's workforce, but they are part of the company's rich history of diversity—one that began when Bill Boeing hired Chinese-born Massachusetts Institute of Technology graduate Wong Tsoo as the company's first chief engineer in 1916.

Creating and fostering a culture of diversity and inclusion is essential for Boeing's continued success as it enters its second century of operation, according to Michael Ford, vice president of Boeing's Global Diversity and Inclusion organization.

"Having a commitment to diversity means creating an environment for all our employees and customers that is welcoming, respectful and engaging, and it means that all employees have opportunities for personal and professional development," Ford explained.

Boeing employees around the world are helping create that kind of environment, Ford said.

Hicks is one. Van Vaidya is another.

Vaidya is based in Dubai in the United Arab Emirates, where she works for Shared Services Group's International Business Support organization. Originally from India, she has extensive knowledge and experience in global cultures outside the U.S. That's a good thing, she noted, "because we have employees from 21 nations here in the Dubai office."

Vaidya has helped create presentations with insights and practical advice on how to work more effectively across the globe.

"I try to be available to present information to groups who are in

different time zones. So sometimes I'm making diversity- and inclusion-related presentations early in the morning or late at night," Vaidya said.

Such employee efforts when it comes to diversity are especially valuable, Ford said.

"When our employees are seen, heard, valued and respected in all their diversity, they are much more engaged at work," Ford said. "That engagement translates to better ideas and better solutions for our customers, which enables innovation and positions us for greater success in the marketplace."

Hicks, for example, volunteered to be the first president of the Puget Sound chapter of the Boeing Veterans Employees Association Affinity Group (now Business Resource Group—renamed to strengthen focus on the business results the groups already help drive), when the chapter was formed in 2013. Today, that chapter is Boeing's largest, with more than 700 members.

But Hicks said it's less about the size of the membership and more about developing one-on-one connections with veterans, both inside and outside Boeing.

Hicks, along with Traci Fuller, diversity officer in the Puget Sound area, gathered a team of Boeing employees who are veterans to educate employees about veterans issues, such as post-traumatic stress disorder, and to serve veterans in the community, through a mentoring program and by supporting groups such as Wounded Warrior and Hire America's Heroes.

"Chili really pushed us to go beyond setting up a booth at a veterans career day," Fuller said. "He inspired us to get 'boots on the ground' and put our people in front of veterans as much as possible."

That's not unlike the work done by Vaidya that is helping Boeing become even more inclusive and diverse—but her boots are virtual. ■

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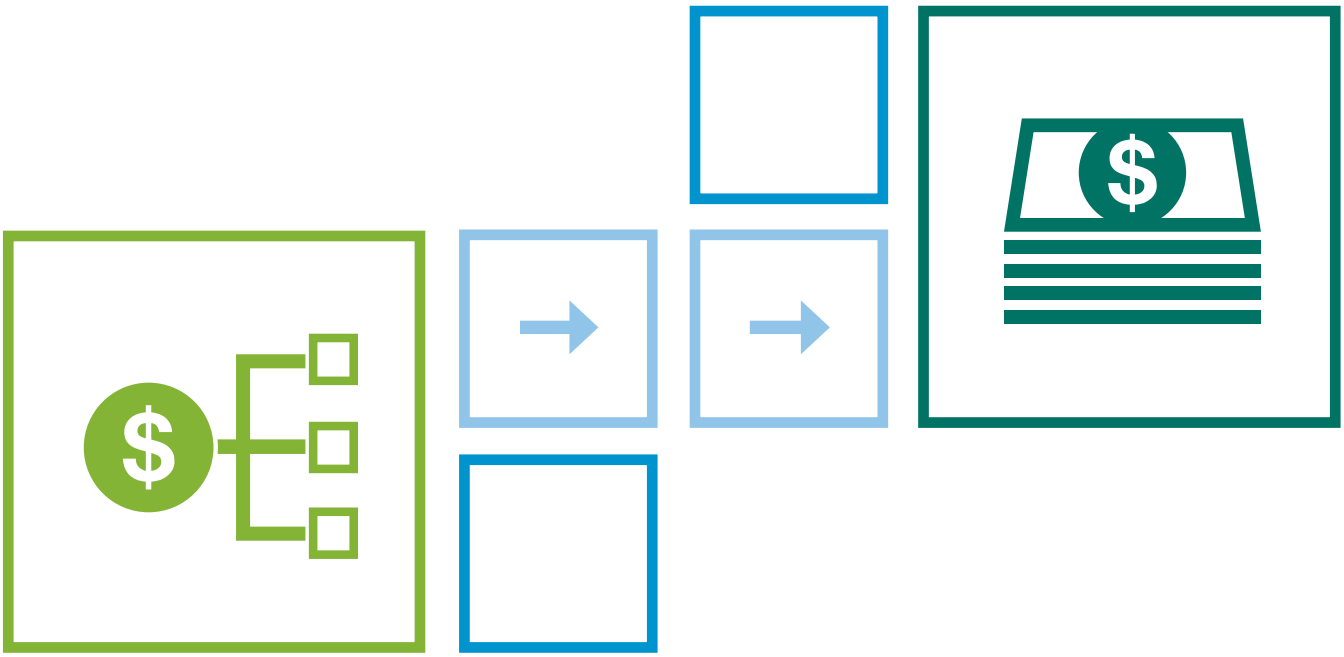
Photo: Boeing employees Curtis Nimmons, from left, Charlie Conley, Chili Hicks and Dana Siegel are also military veterans who help others transition from the military to the civilian workforce. **BOEING**



$AVE IT!

It's never too early to begin saving for retirement

BY RON TAYLOR AND DELLA O'HALLORAN

Mike Arshop, a material analyst for Boeing Satellite Systems in El Segundo, Calif., is thinking more these days about his future after he retires from Boeing. He's been planning and saving for that day for a long time.

Arshop has worked for Boeing and its heritage company, Hughes Aircraft, for just over three decades. He's 56 years old and would like to retire in about six years.

One of the best things he ever did to make sure he was saving enough money to retire, Arshop said, was to sign up for company retirement plans as soon as he could. "I want to have options when I retire. I know people who didn't save and they couldn't retire when they wanted to, or afford the things they wanted to do."

Pam French, vice president of Compensation and Benefits, said there is "no doubt" that starting early is better than starting later when it comes to saving for retirement.

"But wherever you are in your Boeing career," she said, "one of the best ways to help make sure you have enough money to fulfill your retirement vision is to put some away in the Voluntary Investment Plan (VIP). Save as much as you can as early as you can, but at least contribute enough to get the full company match."

Employees can pay into their VIP accounts on a pretax, aftertax or, if eligible, Roth basis. In addition, most VIP participants receive a company match and most newer nonunion employees receive an additional company contribution.

Most nonunion employees hired before Jan. 1, 2009, will begin receiving a new company contribution called VIP+ in 2016 as Boeing moves from traditional pensions to the enhanced VIP. To help these employees manage their retirement savings, Boeing offers tools and services such as one-on-one financial counseling from Ayco and, for eligible employees, the new Retirement Income Modeler.

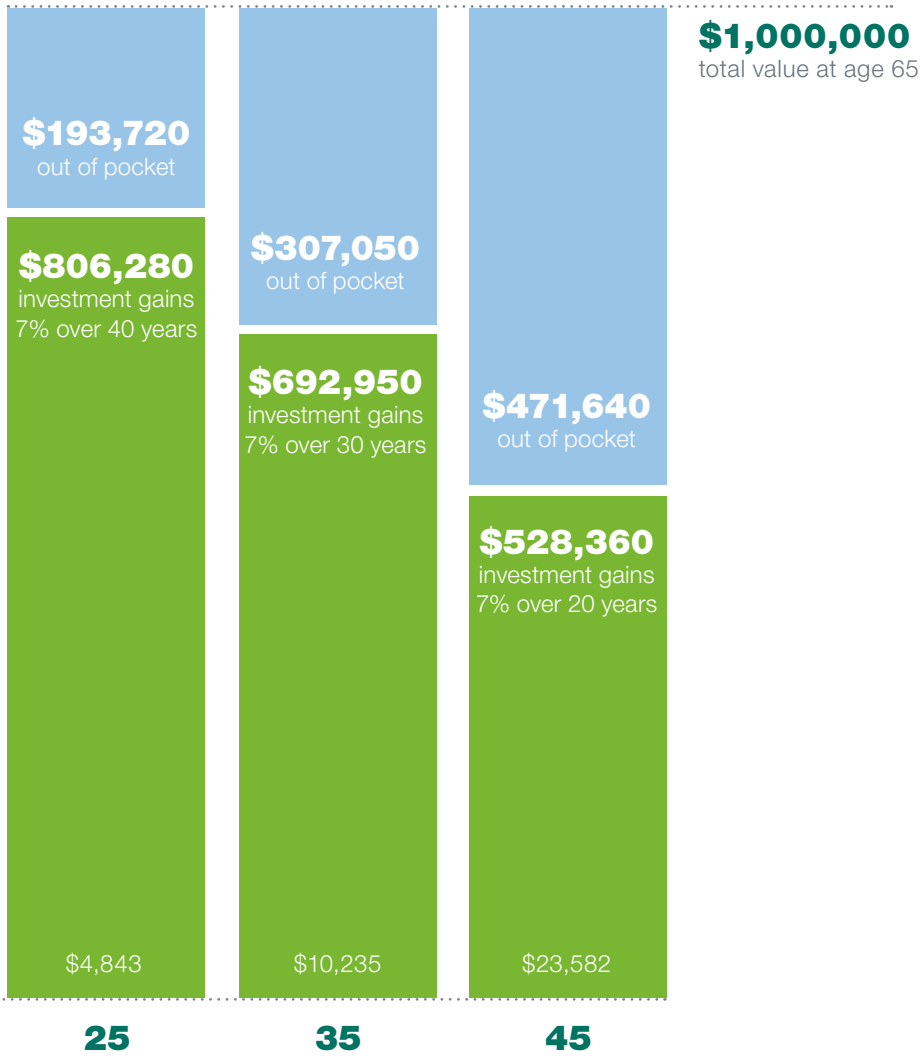
Another resource is My Retirement Income through Boeing TotalAccess. Arshop uses the site to periodically check on his investments. He said

HOW TO SAVE A MILLION

This table shows at each age how much employees would need to save annually and what their total out-of-pocket contributions would be to reach a savings goal of $1 million by age 65. The figures are based on an investment return of 7 percent per year, compounded annually. They do not include company contributions and are not a guarantee.

TIPS

- Start now.
- Maximize the company match.
- Avoid withdrawals and loans.
- Diversify investments.
- Make catch-up contributions, if age 50 or older.
- Use Boeing-sponsored tools and services.



he likes the Financial Engines "stoplight" graphic—green, yellow, red—that lets him know when he should consider making adjustments to his investments.

Most VIP participants also have access to Financial Engines investment advice, as well as a series of online, on-demand retirement-themed courses designed to help them "retire well."

Retiring well is a top goal for Alyssa Voightmann, a 32-year-old marketing specialist with Commercial Airplanes in Renton, Wash. Although her retirement is a long ways off, Voightmann said, with the transition of her nonunion pension plan just months away, she and her husband understand they are more responsible than ever for managing their retirement finances.

Starting the online courses was just one of many steps she's taking.

"My husband and I have regular discussions where we review our finances," said Voightmann, who has been with Boeing for nine years. "If you don't start planning right now and really start thinking about your desire to live as comfortable as possible in retirement, you might be rudely surprised."

Hemanth Kumar also has worked for Boeing for nine years. A manager with Engineering, Operations & Technology in St. Louis, he grew up in India, where adult children frequently provide for their parents in retirement. Saving for his own retirement was an unfamiliar concept, Kumar said. Even after arriving in the U.S., Kumar only gradually started saving for retirement because he didn't see the value in putting away money that he couldn't touch for decades.

That changed, Kumar said, when he got married and had a child. His co-workers at a previous job convinced him it was time to start saving—at least enough to get the company match.

A few years later, when he came to work for Boeing, Kumar was given a report on his retirement savings to that point—and was pleasantly surprised. The money saved from his previous job had grown substantially. He eventually rolled it into the Boeing VIP and has kept a watch on it ever since.

"If I stick to my contributions I don't have to worry about it," he said. "I may even call it quits early." ■

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MILESTONES

IN FOCUS

Electric arc

In this time-lapse photo, a Falcon 9 rocket carrying Boeing-built 702SP (small platform) all-electric-propulsion satellites for two customers leaves a trail through the night sky after launch from Cape Canaveral, Fla., last month. The satellites, the first all-electric to launch, used a new vertical-stack technology developed and patented by Boeing that can reduce launch costs. PHOTO: SPACEX


ともに歩む。
767/777型機、そして787ドリームライナー。
日本の空の歴史は、ボーイングの歴史でもあります。
60年以上にわたる日本企業とのパートナーシップ。
最新の787型機では、三菱重工、川崎重工、富士重工の3社が、
主翼をはじめとする機体の35%の開発・製造を担当。
さらに数十もの日本企業が製造に携わっています。
全ての壁を超え、絆を深め、共に未来を創る。
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