



Frontiers

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FILL 'ER UP

FOCUS ON PLAN 18

A Q&A with **BCA's Scott Carson**

A BIG DEAL 34

Meet the **747 Large Cargo Freighter**

'ENERGIZING MARKETS' 38

Boeing Capital builds relationships

Boeing is ready to meet whatever in-air refueling capabilities are specified by the U.S. Air Force. Here's a look at what Boeing can provide—and what's new on the KC-767 tanker program.



TRAINING FOR WHATEVER THE FUTURE BRINGS.

To help ensure that our warfighters are fully prepared for the complexities of the future battlespace, Boeing delivers a complete range of advanced training solutions. From distributed mission operations in a network-centric environment to the integration of live, virtual and constructive exercises, Boeing's leadership crosses the entire spectrum of training requirements. So warfighters are better prepared to fight, win and return home.



 **BOEING**
Forever New Frontiers

This Integrated Defense Systems ad positions its Training Systems and Services organization as a complete resource for advanced training solutions that equip the warfighter for a complex and changing battlespace. The ad will appear in key trade publications.



ON THE COVER: An artist's concept of refueling tankers based on the Boeing 767 (top) and 777 airplanes.

Boeing graphic

Frontiers



JIM COLEY PHOTO

**FEATURE
STORY**

BIG PLANS 34

At first glance, there's no doubt that the 747 Large Cargo Freighter, which has begun its flight-test program, looks like a unique airplane. But there's more to this aircraft than its one-of-a-kind shape: The LCF is an important tool in the production of the 787 Dreamliner.

**SET TO
FLY**

12 Boeing responded last month to the U.S. Air Force's recent draft request for proposals for next-generation tanker aircraft. Here's a look at Boeing's take on the draft RFP—along with an update on tankers it's building for Japan and Italy, and profiles of some Boeing employees on this program.

**COVER
STORY**

INTEGRATED DEFENSE SYSTEMS

Power trip

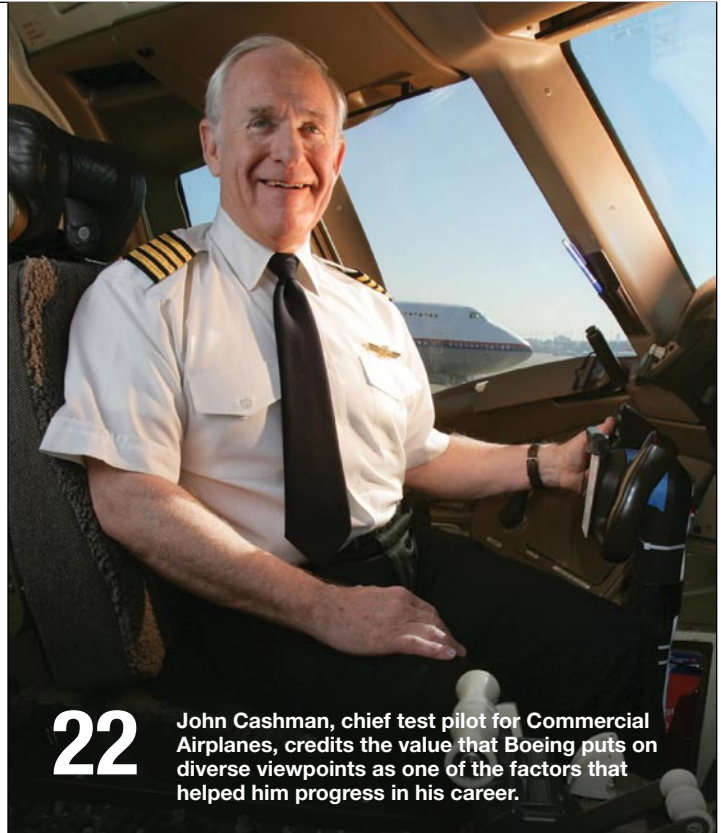
30 Spectrolab, a Boeing subsidiary, is the world's largest manufacturer of space solar cells. Its products are used in a wide range of applications, from high-intensity searchlights on police helicopters to the International Space Station to rovers traversing Mars.

There where it happens

24 At the Johnson Space Center in Houston you'll find the Mission Evaluation Room. During Space Shuttle missions—including STS-115, the recent mission aboard Space Shuttle *Atlantis*—Boeing engineers are ready around the clock to provide advice to NASA leaders.

He's in the know

28 John Fulenwider knows a lot about the C-130 aircraft. His knowledge makes him a go-to person on the C-130 Avionics Modernization Program, in which Boeing is upgrading more than 400 of these aircraft.



22

John Cashman, chief test pilot for Commercial Airplanes, credits the value that Boeing puts on diverse viewpoints as one of the factors that helped him progress in his career.

ED TURNER PHOTO

COMMERCIAL AIRPLANES

Time to execute on the plan

18 Scott Carson was named president and CEO of Boeing Commercial Airplanes in September. In his first interview with *Boeing Frontiers* since being appointed to this position, Carson discusses topics from the current state of BCA to the challenges he foresees for the business unit in 2007.

Still in flight

22 John Cashman, chief test pilot for Commercial Airplanes, recently received the prestigious Brackley Memorial Trophy, an industry award that recognizes contributions to the development of airplanes. He's built his career on passion, some lucky breaks—and the chance to work with great people.

COMPANYWIDE

Leadership and growth

5 What do the leadership attributes have to do with growth? In this month's Leadership Message, Rick Stephens, senior vice president, Human Resources and Administration, explains how leadership is connected to growth—and why the attributes matter to all of Boeing.

A Capital time for all

38 Boeing Capital Corp. has been conducting an outreach program. The organization's aims: Build relationships with aircraft financiers and investors, and ensure there's adequate capital for customers to fund purchasing and leasing Boeing products and services.

Degrees of importance

42 What's better than best practices? How about best practices shared throughout an enterprise? Supplier Management University aims to spread across the company ways to manage supplier relationships effectively.

INSIDE

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Rick Stephens
Senior vice president, Human Resources
and Administration

MATT FERGUSON PHOTO

“We all have the opportunity to learn and improve every day.”

—Rick Stephens, senior vice president,
Human Resources and Administration

Leadership’s value: Helping individuals and Boeing grow

Rick Stephens
Senior vice president
Human Resources and Administration

“As leaders grow, Boeing grows” is the central theme of the Boeing Leadership Model. It provides the foundation for all that employees do as leaders in achieving the growth and productivity that drive company performance.

The leadership model also provides the basis for our own personal development. I can’t recall finding an individual who doesn’t want to improve. Sometimes there may be misalignment about expectations or objectives, but—always—people want to improve.

The challenge of the leader is to create the right environment where every individual can improve. That’s how Boeing grows. Thus, leadership is about us—about everyone in The Boeing Company and helping everyone improve.

While some believe that leadership is something we are born with, I think most would agree that leadership is something we learn as a result of watching others, being mentored, working in challenging assignments, and having candid dialog with others about what we do and how we do it. We all have the opportunity to learn and improve every day. The key is the choices we make when presented with those opportunities.

Last January, our Chairman, President and CEO Jim McNerney led the Executive Council in developing a common language we can all use in evaluating how we lead. This common language also will serve as the basis for candid discussions among those we work for and with.

The common language describes our leadership attributes: Chart the course, set high expectations, inspire others, find a way, live the Boeing values and deliver results. These attributes integrate common expectations of all of us, whether we are individual contributors, team members, managers or senior leaders. In one form or another, everyone can lead.

To help bring the attributes to life, we are developing tools for facilitating assessments and providing the foundation for the candid dialog necessary for improvement. The leadership attributes are being incorporated into Boeing people’s performance evaluations, starting with executives. We used the attributes as the basis for improving the 360-degree feedback tool. They are a key element in the leadership selection, promotion and succession-planning process. And the leadership attributes are being incorporated in training we do at the Boeing Leadership Center. Over time, the leadership attributes should become the fabric of how we discuss and evaluate individual development at all levels in the company.

While the attributes provide a common language, they are not a cookbook. We all have different styles and approaches for what we do and how we lead. They are intended to provide the foundational expectations of all leaders throughout the company. By charting the course, setting high expectations, inspiring others, finding a way and living Boeing values, we will deliver results for our stakeholders.

If we think objectively about our own capabilities and have the important, candid discussions with those we work with, we have the potential for improving every employee 15 percent year after year. Now that’s a competitive advantage!

As you think about the role you play in Boeing, use the leadership attributes as a yardstick to assess your own capabilities. Discuss them with your manager. If you’re a manager, develop a candid assessment of how everyone who works for you stacks up against them. Then focus on each employee’s top two or three areas—and the two or three areas that can be improved. Share your thoughts with each individual you’ve assessed.

Everyone has strengths, and everyone can learn. It’s through those candid discussions that we all can grow.

Leadership is about you; it’s about me; it’s about all of us growing. And as we grow, Boeing grows, too. ■

Frontiers

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KC-135 kudos

My husband and I read with delight your article on the KC-135. This plane is very dear to our hearts because our daughter is a boom operator presently stationed with the U.S. Air Force Reserve in Japan. Her husband was a boom operator instructor at Altus Air Force Base, Okla., for several years and continues to be a boom operator at their present station.

Again, thanks for the awesome article.

—Donna Garst
Glasco, Kan.

Badge procedures, Part I

I want to echo concern about people, no matter who they are, not wearing their badges visible (see Letters, Page 6, October 2006). I used to work in a “black” (high security) area where you didn’t go anywhere without your badge. For the last 10 years, I’ve worked in a “white” area.

I constantly check for badges out of (a hard-to-break) habit and have stopped a couple of people over the years. Most thank me and show me their badge. But I did have one woman who didn’t have her badge. When she wanted me to let her in, she got mad when I refused.

I refused because I didn’t know her and didn’t remember ever seeing her in our building before. I feel I was right in not letting her into a Boeing building since I didn’t know her.

And I would do it again.
—Christina Titchenal
Bellevue, Wash.

Badge procedures, Part II

I’d like to add my comment to Russ Christianson’s letter in the October 2006 issue.

I work in a secured building with badge readers at every door. It’s my responsibility to

“The KC-135 is very dear to our hearts because our daughter is a boom operator presently stationed with the U.S. Air Force Reserve in Japan.”

—Donna Garst, Glasco, Kan.



stands for preferred provider organization, a type of medical plan.

• In “Speaking with one voice” (October 2006, Page 34), the name of the organization responsible for improving quality processes at businesses in the Asia-Pacific region was misstated. Its name is Asia Pacific Aerospace Quality Group (APAQG). Also, the quality standard AS9100 is international, not specific to the Americas; however, this standard is specific to aerospace.

• Because of production errors, lines in several articles in the October 2006 issue were omitted.

On the Letters page (Page 6), the letter “Way to go, Chinooks” was written by Bernie Weisberg of San Diego and ends with, “I am proud to have been associated with all of the other products built at Boeing during my employment.” The correct page is on the Boeing Frontiers Web site at http://www.boeing.com/news/frontiers/archive/2006/october/i_letters.pdf

The caption for the 747 Large Cargo Freighter photo on Page 8 ends with, “The airplanes are being modified by Evergreen Aviation Technologies Corp. (EGAT), a joint venture between General Electric and EVA Air.” The correct page is on the Boeing Frontiers Web site at http://www.boeing.com/news/frontiers/archive/2006/october/i_nan.pdf

look at the badge of the person following me into the building to ensure that they are cleared for access. I detest having to look at someone’s crotch because they insist on hanging their badge off their belt instead of chest high. Maybe you can address this in a future issue?

—Debi Pennington
Everett, Wash.

Corrections and clarifications

• In “Determined to find a better way” (October 2006), the titles of Mike Sheary and Dana Dowell were misstated on Page 17. They are mechanics.

• The address of the Web site with information on the Share-Value Trust incentive plan was misstated (October 2006, Page 37). That site is at <http://www.boeing.com/nosearch/share>.

• In “Another health choice” (October 2006, Page 10), PPO

Letters guidelines

Boeing Frontiers provides its letters page for readers to state their opinions. The page is intended to encourage an exchange of ideas and information that stimulates dialogue on issues or events in the company or the aerospace industry.

The opinions may not necessarily reflect those of The Boeing Company. Letters must include name, organization and a telephone number for verification purposes. Letters may be edited for grammar, syntax and size.

SNAPSHOT

LET'S CHECK IT OUT Senior Airman Phillip Larson runs through a recent preflight inspection next to a B-1 Lancer in Southwest Asia. The crew chief's tasks include observing the firing up of four turbofan engines that produce a combined thrust of 120,000 pounds (530 kilonewtons). Airman Larson is assigned to the 379th Aircraft Maintenance Squadron at a forward-operating base. Boeing has been modernizing the B-1 fleet's avionics, defensive systems, standoff precision weapons delivery, time-sensitive targeting and network-centric capability to keep it in step with the Joint Forces' transformational objectives.

U.S. AIR FORCE PHOTO BY MASTER SGT. SCOTT WAGERS



QUOTABLE

If the people who are running and participating in a company grow, then the company's growth will in many respects take care of itself."

—Boeing Chairman, President and CEO Jim McNerney, on the importance of continuous personal and professional development, in the Oct. 30 issue of *Fortune*

It is on budget and on schedule."

—U.S. Army Chief of Staff Gen. Peter Schoomaker, on the status of Future Combat Systems, an integral component of the Army's modernization, in the Oct. 11 *Defense Daily*

Quite frankly, there's been very little news. And that's a good thing."

—Paul Nisbet, an analyst with JSA Research, on the lack of major changes at Boeing Commercial Airplanes after the September appointment of Scott Carson as the business unit's president and CEO, in the Oct. 5 *Everett (Wash.) Herald*

IAM PROMOTIONS

No promotions listed for periods ending Sept. 29 and Oct. 6, 13 and 20.

ETHICS QUESTIONS?

You can reach the Office of Ethics & Business Conduct at 1-888-970-7171; Mail Code: 14-14; Fax: 1-888-970-5330; TDD/TTY: 1-800-617-3384; e-mail: ethicsLine.ethics@boeing.com; Web site: <http://ethics.whq.boeing.com>



An arc toward the future

BOEING ARCHIVES PHOTO

How the development of the Navaho missile led to greater tech advances

By MICHAEL LOMBARDI

As World War II came to a close in Europe, Germany introduced a deadly new weapon: the V-2 ballistic missile. There was no defense against the rocket-powered supersonic missile. As a result, destroying its launch sites and capturing advanced rocket technology, as well as the German scientists who created it, became a priority as the allies advanced across Europe.

Similar research on rocketry and guided missile technology had been largely neglect-

ed in the United States during the war. But after seeing the V-2, it became a priority. The U.S. Army initiated a series of postwar guided missile and rocket development programs with a number of U.S. aviation companies.

One such program was North American Aviation's Navaho, which began with a 1946 Army Air Force contract that called for initial studies of existing rocket technology, including technology collected from Germany, to develop a surface-to-surface guided missile.

Other than captured German rocket technology, none of the other technologies that were needed to make Navaho existed. Everything from ramjet engines to computer guidance, high-temperature materials and knowledge of the aerodynamics of high-speed flight had to be developed from scratch. A company report on Navaho stat-

An X-10 is shown at Edwards Air Force Base, Calif. The X-10, used to evaluate the guidance systems and flight characteristics of the Navaho missile, was the first turbojet-powered vehicle to reach a speed of Mach 2.

ed: "North American found itself in the position of a composer who is commissioned to write a symphony but must base it on a new tonal scale, a new principle of harmonics and a new set of instruments."

For the next four years, North American and the Air Force studied various concepts. In 1950, they arrived at a phased program that was to lead to a nuclear-armed, supersonic intercontinental-range surface-to-surface missile designated the SM-64A Navaho.

The first phase was an evaluation of the guidance systems and flight characteristics

of the Navaho missile. To evaluate them, North American built the turbojet-powered X-10 test vehicle. The design of the X-10—with its rear wings, long slender fuselage and canard control surfaces—later influenced the design of the XB-70 Valkyrie, as well as the Boeing Sonic Cruiser. The X-10 was the first turbojet-powered vehicle to reach Mach 2 (twice the speed of sound); it also was the first aircraft to fly a complete mission under inertial (computerized) guidance and the first to use a self-contained automatic landing system.

The next phase of the Navaho program was the development of the SM-64 ground-to-ground missile, or what North American called the G-26. The G-26 required the development of powerful rocket engines and an autonavigator unit that was small and lightweight. To develop them, North American pioneered precise lightweight electronics through the use of transistors and the development of printed circuit boards.

The 67-foot-long (20.4-meter), ramjet-powered missile rode piggyback on a 76-foot (24-meter) booster powered by a pair of 200,000-pound-thrust (890-kilonewton) engines. This powerful combination helped the G-26 become the first jet vehicle to reach Mach 3 and an altitude of 77,000 feet (23,500 meters).

In July 1957, after extensive testing at Cape Canaveral Auxiliary Air Force Base, Fla., the Air Force decided to go forward with ballistic missiles for land-based nuclear deterrence and canceled the Navaho program. While many Navaho delays and teething problems were due to its complexity, the simple reason for its cancellation was the fact that a ballistic missile traveling near Mach 20 would reach its target in a fraction of the time and was (at the time) impossible to intercept.

During its nearly 10 years of development and testing, the Navaho program made key technological breakthroughs in nearly every discipline of engineering and electronics. The pioneering work in developing the rocket engines led to the formation of North American's Rocketdyne division, still a leader in the development and production of rocket engines. The pioneering work in the development of digital computer technology and modular electronic circuitry as well as inertial guidance systems would lead to the formation of North American's Autonetics Division—now the home of the Boeing site in Anaheim, Calif.—and the development of navigation systems for airplanes, missiles and even the system used on the USS *Nautilus* to navigate under the polar icecap.

“Even though it was canceled, Navaho made important contributions to the nation's aerospace industry,” said Sam F. Iacobellis, retired Rockwell executive vice president and chief operating officer, who worked on the Navaho program early in his career at North American Aviation. “In many ways, the Navaho booster was more powerful than the Atlas or Titan rockets and helped Rocketdyne in its development of the 7.5 million-pound-thrust (33,400-kilonewton) Saturn V rocket engines. The Navaho

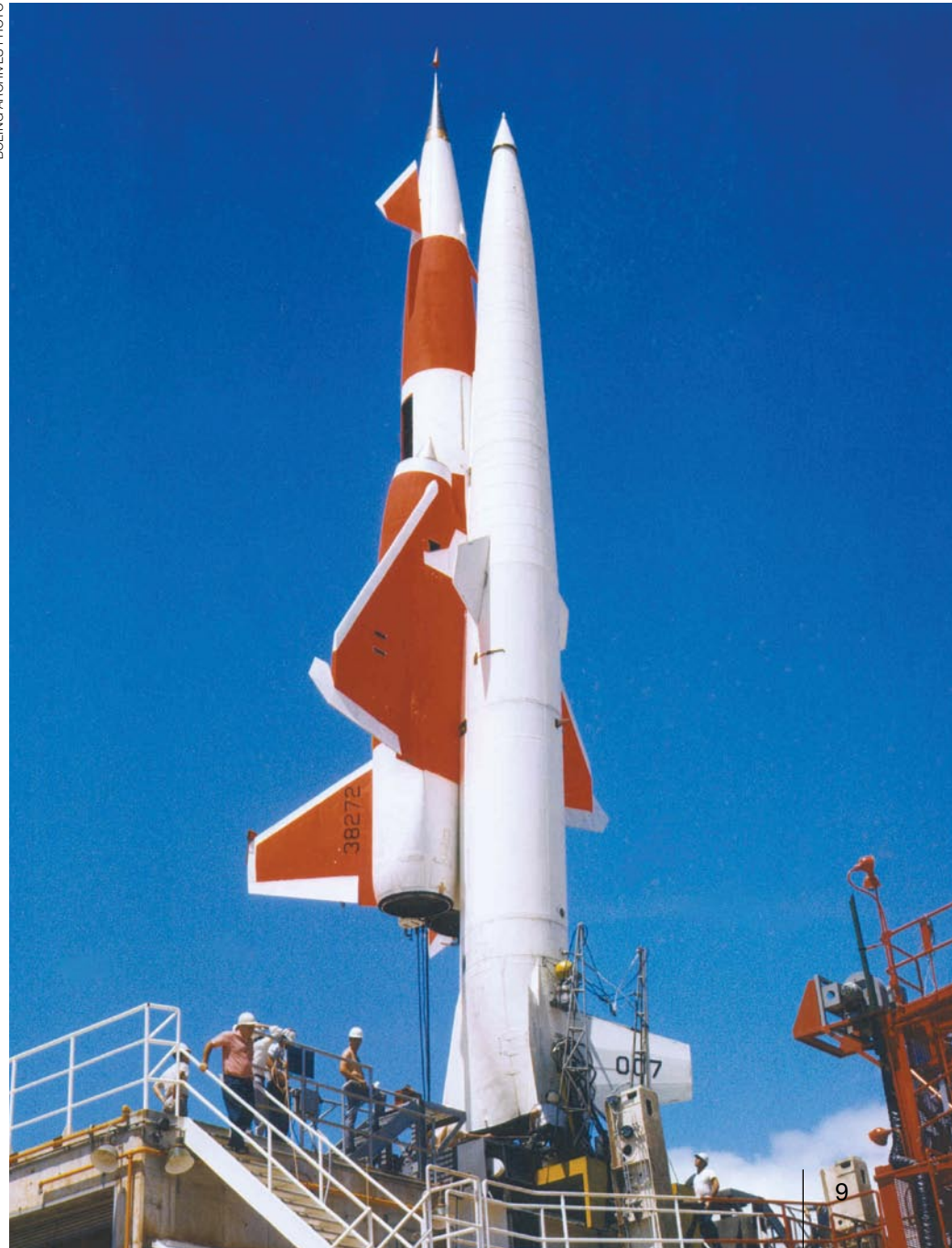
is another example of ‘the patient died, but the operation was a success.’”

That success thrust North American Aviation into a position of technological leadership that led to the company being selected for the XB-70, X-15 and A3J Vigilante programs, as well as two of the most important and prestigious programs in aerospace history: the Apollo spacecraft and the space shuttle. ■

michael.j.lombardi@boeing.com

The Navaho G-26 (SM-64) pioneered the piggyback launch configuration later used by the space shuttle. Although the U.S. Air Force eventually canceled the Navaho, the program achieved many technological breakthroughs in engineering and electronics.

BOEING ARCHIVES PHOTO



BOEING GRAPHIC



Members of the Boeing Business Jet family of airplanes include (from top) the BBJ 3, BBJ 2 and BBJ.

New orders boost Boeing Business Jets recent tally to 19 airplanes

Boeing Business Jets unveiled the newest additions to its family of products and disclosed several new orders at last month's National Business Aviation Association annual convention in Orlando, Fla. With these orders, the Boeing Business Jets sales team has won a total of 19 new airplane orders within the last 11 months—business valued at \$2.25 billion at list prices. Overall, Boeing Business Jets has sold more than 120 aircraft in the program's 10-year history. Here's a look at the latest 19 airplanes ordered by Boeing Business Jets customers.

Model	Airplanes ordered	Cabin space, in square feet (square meters)	Maximum range, in nautical miles (kilometers)	Typical passenger capacity	Other
BBJ	10	807 (75)	6,135 (11,360)	8-25	
BBJ 3	2*	1,120 (104)	5,475 (10,140)	8-47	Newest BBJ model; based on the Next-Generation 737-900ER; cabin space is 35 percent bigger than the BBJ and 11 percent more than the BBJ 2
787-8**	1*	2,404 (223)	9,590 (17,760)	75	Can fly anywhere in the world nonstop, depending on payload
787-9**	3*	2,762 (257)	9,950 (18,430)	75	Can fly anywhere in the world nonstop, depending on payload
747-8**	3*	4,786 (445)	9,260 (17,150)	100	Fastest large-cabin business jet (can cruise at Mach 0.86)

* Airplane orders announced during National Business Aviation Association convention

** These airplanes are specifically designated for the VIP market



NASA PHOTO

Leaning toward ISS completion

With nearly half of International Space Station assembly complete, some of the most difficult work lies ahead. But a team of Boeing employees at Kennedy Space Center, Fla., is up to the challenge, thanks to Lean improvements they've made.

The work ahead includes getting 10 major station components ready to fly on 15 remaining space shuttle missions. The next four flights will take new truss segments and massive, girder-like structural support beams to the outpost.

Trained in Lean principles and tools, the Boeing Checkout, Assembly and Payload Processing Services team at KSC went to work streamlining processes in the Space Station Processing Facility. The goal: get the right information, parts, tools and equipment to workers at the right time and place.

The team created an efficient workplace around each ISS element, organizing and placing within arm's reach all tools and equipment needed for each task. For the special garments needed to work in a clean room environment, they created garments stations and placed them adjacent to work stations. The team also moved a heat sealer from a distant location onto the floor, eliminating steps. Activities as simple as locating documentation forms got the Lean treatment as each form was filed in a color-coded folder.

Their efforts cut prep work time by 80 percent, giving engineers and technicians more time to work on the spacecraft.

"Who knows better how to make a job more efficient than those who actually perform the work," said Scott Shearer, lean integrator and lead for the Lean+ activity. "They know better than anyone how to efficiently organize their work space and take the waste out of the activities and processes they're involved in each day."

—Susan Wells

Tex Boullioun, at the time President of Boeing Commercial Airplane Company, visits the 727 production line in Renton, Wash., in December 1973.



BOEING ARCHIVES PHOTO

Former commercial business head Tex Boullioun dies

Ernest “Tex” Boullioun, the former president of Boeing Commercial Airplane Company, died Sept. 24 at the age of 87.

Called the world’s greatest airplane sales-

man by many, Boullioun’s honesty, outgoing personality, can-do attitude and negotiation skills earned him and Boeing the respect and loyalty of airline customers.

Boullioun joined Boeing in 1940 after

graduating from the University of Texas. His first assignment at Boeing was in quality control on the company’s major military programs of that time: the B-17 and B-29. After World War II, he worked on the B-47, B-52 and Bomarc air defense missile. In 1952 Boullioun moved to Wichita, Kan., where he became manager of quality control.

In 1959, Boullioun returned to Seattle as a manager of the Minuteman missile program. In 1964 he was elected a vice president of the company and given leadership of the Missile Division of the company’s Aerospace Group.

In 1967, Boullioun moved to the commercial business and directed the company’s efforts on the 707, 727, 737 and 747 programs as vice president—general manager of the Boeing Commercial Airplane Division. During this period, he oversaw the successful introduction of the 747.

Boullioun in 1972 became president of the newly formed Boeing Commercial Airplane Company. In 1981 he joined the corporate office as senior vice president—Commercial Airplanes and was a member of the corporate executive council.

Boullioun loved the business of buying and selling airplanes. After his retirement from Boeing in 1984, he formed Boullioun Aviation, which grew to become one of the world’s top 10 airplane leasing companies.

Boullioun, whose wife died in 2005, is survived by three children. ■

Record-breaking boat gets a ride home on 747-400

Boeing recently helped facilitate the return of a rowboat used in a transoceanic fundraising journey. A four-man rowing team from OAR Northwest this summer became the first to row from the United States mainland to the United Kingdom mainland. The team’s 71-day transatlantic crossing raised awareness and more than \$40,000 in donations for the American Lung Association of Washington. After the team completed its crossing, Boeing helped get the boat back to OAR Northwest’s Seattle base by connecting the group with Cargolux, the Luxembourg-based freight carrier. The boat is shown here about to be loaded into a Cargolux 747-400 at Glasgow Prestwick Airport in late September.



ALISTER FIRTH PHOTO

The Boeing KC-767 Tanker has surpassed 400 flight hours in its flight test program. The future Italian tanker completed its first phase of boom free-air stability testing and has begun fuel off-load testing on the ground.

Ready to fill 'er up



>> Inside

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Feel a draft?: A peek at the U.S. Air Force's draft request for proposals for the next-generation tanker aircraft. [Page 14](#)

At the core: Why the Boeing 767 and 777 make great platforms for tankers. [Page 15](#)

Meet the team: Short profiles of some of the many tanker program teammates. [Page 16](#)

Boom time: Recently, Boeing successfully flight-tested its fifth-generation KC-767 Tanker boom. [Page 17](#)

Boeing set to meet U.S. Air Force's needs for tankers

U.S. warfighters rely on tankers to extend their reach around the world. U.S. Air Force Chief of Staff Gen. T. Michael Moseley highlighted that importance recently by identifying the critical missions enabled by aerial refueling. “The single point failure for everything we do—global strike, globalized air bridges, global mobility—is the jet tanker,” Moseley said.

With the recent issue of a draft request for proposals for the Air Force's next-generation KC-X tanker, the stage is set for the service to move forward in replac-

ing its existing fleet of more than 500 Eisenhower-era KC-135 Stratotankers.

As shown in this feature package, Boeing is ready to provide whatever capabilities are requested by the Air Force. This package examines what Boeing can offer to meet the Air Force's refueling needs. It also reports on the progress made by the KC-767 tanker team as it prepares refueling aircraft for Italy and Japan, and presents a look at some of the Boeing employees who work on the tanker program.

RON BOOKOUT PHOTO



Mark McGraw, vice president of Tanker Programs for Boeing, said the tanker team aims to understand what the U.S. Air Force requires for its tanker needs—and provide a platform that will deliver the best technology to the customer and the best value to the taxpayer, while giving the U.S. government the lowest possible risk.

Fleet of ‘global importance’

Tanker VP McGraw: Plan is to ‘help best solve needs’ of U.S. Air Force

With the September issue of the U.S. Air Force's draft request for proposals (RFP) for the next-generation tanker aircraft, the competition to provide the Air Force with new tankers took a giant step forward. That's music to the ears of Mark McGraw, vice president of Tanker Programs, and the many Boeing employees supporting this program.

Boeing Frontiers recently spoke to McGraw and asked about what Boeing can offer to meet the Air Force's refueling needs, including a 777-based tanker. McGraw also gave an update on the progress of the tanker program, which includes 767 tankers being built for Italy and Japan.

Q: What did you think of the draft RFP?

A: Obviously, we were very pleased to see the U.S. Air Force release the draft request for proposals, and happy to see that the process is moving forward. The global importance of the tanker fleet is demonstrated every day in Department of Defense operations. But the aircraft in our current fleet are on average more than 45

years old. I know the DOD and Congress understand the necessity to move forward with replacing these aircraft. It's been stated publicly by U.S. Air Force leadership that this is a high priority—even in these budget-constrained times.

Ultimately, we want to provide a platform that will deliver the best technology to our military customer and the best value to the taxpayer—and give the government the lowest possible risk.

Q: What's next on the tanker contract timeline?

A: We had 21 days to respond to the draft RFP, which we have done. Based on statements from DOD senior leadership, we expect the final RFP to be released before the end of the year and a contract award to be announced in the summer of 2007.

Q: Who's on the Global Tanker Team?

A: To build and deliver the safest, most reliable new tanker requires a team comprised of the world's best—from the platform to the aerial refueling components, engines, modification and ultimately product support. Our Global Tanker Team fits that description and includes not only our Boeing Commercial Airplanes colleagues, but also such well known names as GE, Honeywell, Pratt & Whitney, Aeronavali, Rockwell Collins, Smiths and Vought.

We have brought the best of the best to help us develop and build this tanker. Boeing has 75 years of aerial refueling expertise. We have supplied more than 95 percent of the world's aerial refueling aircraft with more than 1,900 tankers delivered to the world's military air forces. And we've invested \$1 billion in developing next-generation tanker platforms.

Q: Why did you recently make the Boeing 777 a tanker option?

A: In late September, we began discussing the KC-777 at the Air Force Association conference. This was not a publicity stunt. We wanted to provide a glimpse of what a true large tanker would look like and why it would make an incredible platform in the future.

Q: What platform will you offer the Air Force, a 767 or 777 derivative?

A: First and foremost, we want to understand the needs of the Air Force customer. That knowledge will tell us how we can best provide the customer with low-risk solutions. It's important to understand those requirements and follow the internal process that will lead to offering the best possible platform for the U.S. Air Force.

Boeing responds to tanker draft RFP

The U.S. Air Force on Sept. 25 issued its draft request for proposals for the next-generation tanker aircraft, now called the KC-X. The current plan is for the Air Force to issue its final RFP by year's end and select the winning platform by mid-2007.

Mark McGraw, Boeing vice president of Tanker Programs, said Boeing responded to the draft RFP within the allotted 21-day period. He added that Boeing expects the final RFP to be released before the end of 2006.

The first tranche is expected to replace hundreds of Eisenhower-era KC-135 Stratotankers at a rate of about 12 to 15 each year, with a value of around \$20 billion.

Boeing believes the KC-767 is a great replacement for the KC-135. But if requirements change and the Air Force wants a larger tanker, we can fulfill that need with a KC-777 Tanker.

Q: How long would it take to develop a 777 tanker?

A: Right now the 777 is just a concept. The development process would take about three years. However, much of the technologies and experiences of creating a tanker from a 767 would be applicable in the case of a KC-777. Also, the commercial freighter version of the 777 has matured in the past several years, and that also would decrease the developmental risk of converting the 777 to a tanker.

Q: So the same technology would appear in both a 767 and 777 tanker?

A: That's correct. Our team will offer the most advanced refueling technology in the world today. The boom operator's station was developed with the boom operator in mind. The station is located near the flight deck and features a third-generation Remote Vision System that provides a 185-degree field of view and offers full control of air refueling. The fly-by-wire boom is fifth-generation; it's compatible with all U.S. Air Force receivers and offers the highest fuel transfer rates available. In addition, wing aerial refueling pod and centerline hose drum technology is all transferable.

• **Meet some tanker teammates, and learn more about the tanker's refueling boom. Pages 16-17**

Q: How does the 777 compare to the 767 as a tanker?

A: The KC-767 offers more operational flexibility, while the KC-777 would be better suited for long-range strategic missions in which more cargo needs to be delivered. The KC-777 would be able to carry more than 350,000 pounds (160,000 kilograms) of fuel and offload more than 220,000 pounds (100,000 kg) of it on a mission of 500 nautical miles (900 kilometers). On the other hand, the KC-767 can lift off with more than 200,000 pounds (90,000 kg) of fuel and offload more than 130,000 pounds (60,000 kg) in a similar mission. The KC-777 could carry up to 37 pallets of cargo, compared to the 19 pallets for the KC-767. Again, the idea is to offer future customers alternatives and help best solve their needs.

Q: How many KC-767 Tankers are you building?

A: We are currently under contract for four KC-767 Tankers for the Italian Air Force and four for the Japan Air Self-Defense Force. The first tanker for Italy is currently in flight test at our Wichita [Kan.] facility, and it's recently achieved several significant milestones. In September, the KC-767 surpassed 400 hours in its flight-test program and has completed the first phase of boom free-air-stability testing. During the tests, the crew of the KC-767 deployed the tanker's fifth-generation fly-by-wire boom, and the telescoping tube was extended for the first time in flight. To further demonstrate the tanker's boom stability in actual flight conditions, we then had a Boeing-built F-15 maneuver into a near-refueling position. So, we have now embarked on the aerial refueling portion of our flight-test program.

As for the Japan #1 Tanker, it's currently completing its modification work in Wichita. In late summer, our tanker employees activated power on the Japan #1 tanker, which signifies the end of the



In late September, the KC-767 Tanker deployed its fly-by-wire boom for the first time during flight. The milestone demonstrates integration between the aircrew operator and the advanced refueling system.

modification phase and the beginning of hangar operations. In late September, the crews began final clamp and routing, which is an inspection of the airplane's wire-bundle installation. During clamp and routing, the entire electrical system is checked to ensure proper wire separation and proper functioning of all systems prior to interior installation. Once hangar operations are completed, the aircraft will begin flight-line operations and ground testing in preparation for first flight later this fall.

There will be a delivery ceremony for the first KC-767 Japan Tanker in February 2007. We will follow that by delivering the first two Italian tankers in mid-2007.

Q: Can you tell us something about the competition?

A: We recognize up front that this will be a tough competition. EADS/Airbus has partnered with Northrop Grumman, and we take their entry into this competition very, very seriously. But we are completely focused on listening to our Air Force customer and believe we will win by offering the best tanker solution for the warfighter.

Q: If Boeing wins the U.S. Air Force Tanker contract, where will it be built?

A: Our position has been that Boeing will build its KC-X offering in Washington state, since that's where our commercial lines reside. Our company may have additional work performed on our tanker offering at other locations. ■

At the heart of it all: 767, 777

To produce the world's newest and most advanced aerial refueling tanker ever built, it makes sense to start with great airplanes—in this case, the Boeing 767 and 777.

With proven performance and reliability, the 767 already is the most widely used commercial airplane on transatlantic routes. It boasts a 99 percent schedule reliability rate with low operating costs. In addition, the 767 offers multiple interior configurations—passenger, freighter, convertible freighter or convertible combination—while maintaining its tanker capability.

Long-range and cargo capacity make the 777 the best tanker option for missions where maximum fuel offload and cargo/passenger capabilities are paramount. The 777 provides extended payload range, strong fuel offload performance and hauling capacity that exceeds 170,000 pounds (77,000 kilograms) of cargo. With its fuel-efficient design, it would excel at supporting global strike and aircraft deployment missions.

“Boeing Commercial Airplanes is a critical part of our global tanker team. By working together, we are offering customers a truly remarkable tanker,” said Mark McGraw, Boeing vice president, Tanker Programs. “Throughout the current KC-767 Tanker modification and flight-test programs, our BCA partners have provided invaluable insight and expertise.”

The combined BCA/Integrated Defense Systems team has undertaken several process initiatives that will help provide a fully provisioned airplane, he said. This process integration has been investigating such crucial areas as weight reduction and improved performance.

“Boeing has a superb team,” McGraw added, “that will provide the safest, most reliable state-of-the-art tanker to U.S. service men and women.”

Who's on the roster

It takes a team of many talented individuals to make the Boeing tanker program a success. Here's a look at a few of these employees.

PETER GEORGE PHOTO



Dave Ziegler

U.S. Air Force Capture Team Lead, Integrated Defense Systems

Work site: St. Louis

Years at Boeing: 26

Role on program: "Assure that we have the right customer messages, customer contacts, and a winning, customer-focused team that is creating the right offer for our U.S. Air Force customer."

Best part about working on the tanker program: "Our combined IDS and BCA team have the right solution, the right program and the right team to provide the Air Force with the next-generation tanker."

Most memorable experience at Boeing: Led the proposal team for the P-8A Poseidon. "The win was especially meaningful for the U.S. Navy and our team at Boeing."



GAIL HANUSA PHOTO

Beverly Wyse

Vice president-program manager, 767 and Tanker, Commercial Airplanes

Work site: Everett, Wash.

Years at Boeing: 18

Role on the tanker program: Leading BCA in supporting IDS' tanker program efforts

Most memorable experience at Boeing: Seeing the first flight of the 777

Daily philosophy: "I am a fan of Yoda (a character from the "Star Wars" movie series). A favorite saying of Yoda's is, 'Do or do not; there is no "try."' Yoda's message is one of conviction and raising the bar high, as well as committing 100 percent to whatever you do. That is critical in any team because we all depend on each other and must rely on each other to follow through. We will all have to reach high and *do!*"



TED WHITESIDE PHOTO

Melissa Magee

Engineering, Integrated Defense Systems

Work site: Wichita, Kan.

Years at Boeing: 11

Role on program: Engineering technical analyst

Best part about working on the tanker program: "It's a new, developmental program, so we run into challenges that you wouldn't encounter every day on a more-established program. We have the opportunity to develop new processes that will be used throughout the tanker program."



Charles Scott

Sheet metal mechanic, Integrated Defense Systems

Work site: Wichita, Kan.

Years at Boeing: 18

Role on program: Working on the modification program for the first KC-767 Tanker that will be delivered to the Japan Air Self-Defense Force

Best part about working on the tanker program: "Working with a team that has a lot of knowledge and experience. Also, in the early 1990s I worked on the 767 41 section here in Wichita, so I'm familiar with the airplane."

Most memorable experience at Boeing: "Being able to work on so many diverse programs such as the 747 CRAF (civil reserve air force) program. And I was fortunate enough to spend nine months working in Seattle on the 767 and 777 in final join and install. It's all great experience that I can draw on every single day on the tanker program."



Jeremy Levin

Contracts administrator, Integrated Defense Systems

Work site: St. Louis

Years at Boeing: 6

Role on program: Primary responsibilities are defining the terms and conditions of the prime contract with the Air Force and arranging IDS' purchase of commercial aircraft and development activities from BCA.

Best part about working on the tanker program: "The challenge of the competition, working with a great group of people and having the opportunity to help the company win such an important program."

Daily philosophy: "Get the work done, and try to have some fun in the process. It helps to keep a positive attitude and find ways to enjoy your day."

Boom boom



A peek at the world's most advanced refueling technology

By successfully flight-testing its fifth-generation KC-767 Tanker boom—the telescoping tube to be used to deliver fuel during flight from the tanker to military aircraft—Boeing last month began a new chapter in aerial-refueling history.

In a complex series of tests over Wichita, Kan., the test team deployed the fly-by-wire boom to several vertical and horizontal positions during flight and successfully demonstrated integration between the aircrew operator and the advanced refueling system. These were the first in a series of extensive air-refueling tests that will be conducted in upcoming months.

The fly-by-wire boom, which can transfer up to 900 gallons (3,400 liters) of fuel per minute, provides more precise and responsive controls to the operator, and automatically corrects its position to reduce the possibility of damage to receiver aircraft. With 2,600 fewer parts than earlier versions, the new boom is easier to maintain.

The evolutionary design also features a full-time Independent Disconnect System that improves safety by allowing the boom operator to disconnect from the receiver aircraft at any time.

"We've taken the proven aerodynamic shape and size of previous systems and made the KC-767 boom even more capable and reliable," said Mark McGraw, Boeing vice president for Tanker Programs.

Using a boom is the most common method for aerial refueling. Boeing has more than 75 years of experience in building aerial refueling tankers and has manufactured 99 percent of all aerial refueling booms in the world.

The KC-767 tanker also offers other ways of transferring fuel:

- The Centerline Hose Drum Unit (HDU). On the KC-767 a drogue, or basket, is trailed behind the tanker. Up to 600 gallons (2,300 liters) of fuel per minute can be transferred using this method. The KC-767 HDU's improved drag monitoring improves safety during hookups.
- Wing pods. A Wing Air Refueling Pod can be attached to the underside of each wing. These enable simultaneous refueling of two aircraft. Each pod can deliver up to 400 gallons (1,500 liters) of fuel per minute.

On the KC-767 Tanker, all refueling activity is conducted by the boom operator, situated at a computerized station located near the flight deck. Remote Vision System near-infrared cameras mounted near the air refueling boom provide the boom operator with a high-definition stereoscopic view of the receiver aircraft for refueling operations. Additional cameras provide a 180-degree wingtip-to-wingtip view covering the rear of the aircraft to allow monitoring of all refueling operations.

—Doug Webb

Focus on the plan



MARIAN LOCKHART PHOTO

Scott Carson reveals his priorities for 2007

By KAMARA SAMS

With his appointment as president and CEO of Boeing Commercial Airplanes in September, Scott Carson leads a Boeing business unit that appears to be firing on all cylinders. BCA is following up a record year in 2005 with a strong performance in 2006.

Boeing Frontiers recently sat down with Carson and asked about his first few months in the new position. Carson spoke about the growth of Commercial Aviation Services, production rate increases, Jim Jamieson's role as BCA chief operating officer and challenges in 2007.

Q: What are your observations after your first months as president and CEO of Boeing Commercial Airplanes? In what areas do we excel? Are there areas in which we can do better, and are there things that keep you up at night?

A: My observations are the same as they were when I started this assignment. This is a wonderful team of people. We are producing wonderful products, we know our mission, and we know what to do. The strategy is right, the product is right, and it's the right team. So that's the really good news.

In terms of things I am worried about: Execution is the single most important thing that we have to focus on right now. The risk we face is thinking we are doing well and can re-

Scott Carson, president and CEO of Boeing Commercial Airplanes, said the business unit has the right strategy, products and people, and that it must continue its focus on execution.

MARIAN LOCKHART PHOTO



lax. In this industry, you can never relax. We have to stay humble and focused on the success of our customers each and every day.

Q: We have several major development programs under way, including the 787, the 747-8 and the 777 Freighter. What must we do to meet all of our commitments to our customers?

A: For each of the three programs, the issue is focus and delivering on promises. We have promised our customers on the 787 that the airplane will roll out next year, fly next year and be ready for service in mid-2008.

We have a very complex production system that will, in the end, bring great value to our customers, but it's different from the way we've ever built an airplane before. At the same time that we are focused on the capability of the airplane, we also have to stay focused on the production process and systems to make sure our suppliers are delivering at the rate and quality we need.

We have much the same challenge with the 747-8. We have a very robust schedule for an airplane that will, for the first time, be a freighter first and a passenger airplane second.

We have a similar challenge with the 777 freighter—a brand new mission for that airplane, but a mission that as the months unfold we'll find is a key part of a strong, well-rounded product family.

Q: How is Commercial Airplanes' effort to increase production going? What are the challenges and what should we focus on to be successful?

A: Carolyn Corvi (vice president of Airplane Production) and her team have done a wonderful job with our production rate increases. Our execution has been very, very good.

We're delivering high-quality products

Despite recent news reports, Airbus shouldn't be dismissed as a competitor, said Commercial Airplanes President and CEO Scott Carson. "I think it would be a mistake for any of us to believe that Airbus is down and out," he said.

to our customers, we're delivering them on schedule, and we're creating products that bring real value to our customers every day.

At the same time, we realize that employees are working really hard and there are some real challenges in fulfilling our commitments and delivering results. We have to make sure that we stay focused on Lean+ and our other companywide growth and productivity initiatives, and stay focused on our plan.

We must continue the journey of improving our efficiencies in the factories, and I can't think of a better person to be leading that than Carolyn Corvi, who delivered the moving line in Renton and has the moving line under way in Everett.

Q: BCA's Commercial Aviation Services unit has been experiencing tremendous growth, both by providing new types of support to airlines and making selected acquisitions. Looking out over the next few years, how do you see CAS contributing to Commercial Airplanes' business plan?

A: What we need to do is look at what is happening in the airline industry. As many

airlines have worked over this last decade to find a profitable business model, they have been outsourcing more and more work they historically had done themselves

That has created a real opportunity for CAS, both in terms of jobs that we know and in jobs that are emerging but are of critical importance to the airlines.

By applying that technical capability we can offer the airlines a service that creates great value for them, allows them to continue to lean out their own operations and at the same time improves the utility of the airplane and service.

So, CAS is the right organization at the right time to help the airlines find this profitable path forward.

Q: Now that Airbus has a new leadership team, what do you expect from our competition in the near term and over the next few years?

A: I think it would be a mistake for any of us to believe Airbus is down and out. We all can remember Boeing's own difficulties of the last decade, and we know we came back stronger than ever with a better set of products. We should expect ex-

MARIAN LOCKHART PHOTO

“In this industry, you can never relax. We have to stay humble and we have to stay focused on the success of our customers each and every day.”

—Scott Carson, president and CEO, Boeing Commercial Airplanes



Scott Carson speaks to Boeing employees after a videocast from the Spares Distribution Center, located near Seattle-Tacoma International Airport.

actly the same thing of Airbus. So for us, we have to get better every day in every way to maintain the leadership position that we have re-earned. To maintain it, we have to be better every day—creating value for our customers and shareholders, creating opportunities for our people, and making a difference within the community.

Q: Can you elaborate on Jim Jamieson’s role as chief operating officer of BCA? What will he focus on, what will you focus on, and how will you divide responsibilities?

A: We have a great management team. Jim brings to that an added dimension of excellence from his experience over many decades in this industry and many development programs. He’ll lead the execution of our airplane programs and will help drive the development on the 787 and 747-8 home and also make sure, as we continue our ramp up across the factories, that we do it right. I think his background, his oversight, his ability to help lead and shape the direction of the team will make our excellent team even better.

Q: What are our challenges—and what should we focus on—as we head into 2007?

A: 2007 will be an interesting time. We have a lot of critical milestones in front of us. Certainly the beginning of production of the 787 is critical. But similarly, we have the 777 Freighter coming down the path. We have the 747-8 Freighters and Intercontinentals coming down the road. We must perform on those programs as well and at the same time take the steps necessary to prepare us for the future.

That means continued research work on the replacement study for the 737 family of airplanes. It means continuing to look forward to ensure the continued dominant position enjoyed by the 777 in its market segment, and it means being excellent in every way, every day. Certainly it means continuing to create opportunities inside of CAS, in terms of how we create value for our customers. So there is a large market basket of important needs as we face 2007.

And in no small measure, preparing the team for the future is key. I see that as one of my critical roles. I want there to be no ques-

tion about the readiness of our next group of leaders to step in, lead our team and develop the generation behind them.

So I think a big part of the role that both Jim and I have is to continue the journey of developing people and their capabilities so that when we’re gone, they carry on, and this company remains as great as it is today.

Q: What one message would you like to leave with employees?

A: This is a great company with a great heritage and a great legacy within the industry. Boeing is the name that—anywhere you go in the world—is equated with quality. That’s the legacy.

Every one of our employees should continue to work hard every day so that Boeing remains the name associated with excellence—product excellence, service excellence, customer relationship excellence, excellence in our support to our communities, excellence in every way. ■

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Flying on—and off—the job

Meet an engineer who pilots aerobatic and racing planes

BY KATHY COOK

Among the thousands of people at Boeing who work on aircraft, chances are, many of them dream about flying planes. John Housley took his dream and made it real.

Today, the Global Strike Systems engineer flies aerobatic and racing planes, using what he knows about propulsion systems to help his planes perform well both in competitions and at work. “Flying these types of aircraft, as well as designing and testing new ideas, increases my credibility with our military customers,” he said.

Housley’s interest in planes goes back to early childhood when he spent hours building and flying plastic models with his best friend—who today is Housley’s crew chief at racing competitions. Housley went on to fly control-line airplanes (model-size planes that fly in circles and can perform aerobatics) and then to radio-controlled aircraft competitions. He brought his passion for flying to college, where he earned a degree

in aeronautical engineering—which landed him a job at McDonnell Douglas in 1978.

“A fellow engineer’s enthusiasm for experimental aircraft got me interested in flying full-scale aircraft,” said Housley, who took flying lessons, learned some basic aerobatic maneuvers, bought his first plane and got into racing. “It was straight-line, informal racing—nothing like Formula One air racing that I do now.”

Formula One air racing is like car racing in that the aircraft must meet very strict design specifications including wing area, cockpit height, minimum weight, fuel carriage, a fixed-pitch propeller and restrictions on the size and type of engine (200 cubic inches/3.3 liters and 100 horsepower/75 kilowatts).

Also, Formula One airplanes are small. Housley’s *Aero Magic* weighs 585 pounds (265 kilograms) empty. It’s a custom-built, single-seat plane with very few amenities that would add weight, and accordingly not overly comfortable. The propeller is wood, although Housley said most of his competitors have changed to composite propellers.

The aircraft has a half-fabric, half-composite cover over a steel tube-welded frame, with wings made of composite material.

Although he has flown the aircraft as fast as 260 mph (418 kilometers per hour) in level flight, Housley’s typical race speed is around 220 mph (354 kph).

“There aren’t a lot of airplane races these days,” Housley said, but he’s competed in the largest U.S. competition, the National Champion Air Races in Reno, Nev., nearly every year since 1991. The race is limited to the fastest 24 aircraft, based on qualifying times.

But Housley won’t be flying *Aero Magic* in this year’s race. He’s stripping down the plane and rebuilding it to shave time off his record by reducing weight and improving aerodynamics. “This is where my engineering skills come in very handy,” he said.

Although his race plane is grounded for now, Housley isn’t. He’s part owner of a Pitts Special S2-A aerobatic plane and has flown in two local competitions “Although my race plane can do some aerobatics, the Pitts was built for aerobatics,” he said.

Housley loves flying, but beyond fun and relaxation, his hobby is also beneficial to Boeing. Housley said working on his plane helps him solve problems on the flight ramp. Boeing’s military customers “know that I know what it’s like to feel Gs, to fly in formation, to fly upside down, or to be the first to try out a new design,” he said. “Of course, it’s not the same level of flying that they do. But having this real-life experience is a very helpful supplement to my engineering education.” ■

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John Housley (bottom left), a propulsion engineer for Global Strike Systems, loves to fly on and off his job. Among the aircraft he flies on his own time is his Pitts Special S2-A aerobatic plane (below), shown near the Gateway Arch in St. Louis. The experiences he has when flying aerobatic and racing planes increases his credibility when talking with Boeing’s military customers, he said.



RON BOOKOUT PHOTO



KYLE WELKE PHOTO



John Cashman, Boeing Commercial Airplanes chief test pilot and director of Flight Crew Operations, credits his 40-year Boeing career to having passion and some lucky breaks—and to working with great people along the way.

40 years and still soaring

Test pilot's career is built on passion, hope—and a little luck

BY DEBBY ARKELL

You would think heart-stopping moments such as piloting a transport airplane to a full stall and having it roll unexpectedly past vertical bank—and

scrambling successfully to right the aircraft—would be among the highlights of Commercial Airplanes Chief Test Pilot John Cashman's 40-year Boeing career.

It's a career that began with Cashman joining Boeing as an engineer and eventually becoming a test pilot. It's also included Cashman's earning honors for his contributions to the development of airplanes—including The Brackley Memorial Trophy, a prestigious award he received last month from the Guild of Air Pilots and Air Navigators.

Yet Cashman, the director of Flight

Crew Operations, cited his participation in the "working-together" approach taken by the 777 program—something that's now part of the everyday vernacular of Commercial Airplanes employees—as a memorable moment.

"The whole 777 program has been the highlight of my career," Cashman said. "The concept of working together on that program was done so well, it truly was fun. We had some heated debates and intense discussions that were a little stressful and tiring at times. But because of that approach

and because we were working with exceptional people, the results were so much better than the sum of the individual parts.”

‘VERY REWARDING’ EXPERIENCE

Cashman became 777 Program Chief Pilot in 1990 and had what he called a “very rewarding” experience as chief pilot on the 777’s first flight. “When you put your heart into a program, it’s very satisfying,” he said.

Cashman credits a good portion of his flying career to lucky breaks. He grew up near a naval air station in Illinois, his father was a pilot in the early 1930s, and his uncle owned an airplane. Cashman had always wanted to fly, but his eyesight didn’t meet high military standards and he wasn’t able to pursue military training. It was while earning his bachelor’s degree at the University of Michigan that Cashman decided to take to the skies.

“While I was studying aerospace engineering there I decided that in addition to understanding the science of flight I needed to know how to fly,” he said. He joined the school’s flying club—ultimately becoming the club’s president—and getting his private pilot’s license.

His first job as a pilot was for the university’s skydiving club. “It didn’t pay, but I’d do anything to fly,” Cashman said.

Upon graduation in 1966, Cashman moved to Seattle. As luck would have it, Boeing was hiring. His first job at Boeing was as a structures engineer on the 727 program. Yet he continued to pursue his passion for flying on his own time, acquiring his commercial pilot’s license and ultimately earning all his ratings while flying with the Boeing Flying Club. It was there Cashman continued his fondness for aerobatic flying—flying loops, rolls and other maneuvers—and began teaching flying after work and on weekends.

Cashman joined Boeing’s aerodynamics staff early in his career and finally got his break to become a Boeing pilot in 1974.

Historically, Cashman said, Boeing pilots tended to be former military pilots who’d gone through military test pilot school. But 747 Flight Engineer Jess Wallick was a civilian pilot who worked his way into flying, ultimately attaining captain’s rank. “He worked his way up as a civilian, and that gave me hope,” Cashman said.

“The 747SP (Special Performance) program took a chance and decided to hire two flight engineers into experimental flight test (new airplane testing),” he said. “They wanted to do something different, to hire flight engineers who knew about flight test

and how to fly, so they hired me and [recently retired Vice President of Flight Operations] Ken Higgins.”

Looking back, Cashman credited his ability to pursue his dreams to Boeing’s changing attitudes and increasing diversity—in addition to passion and lucky breaks.

“The key point for me was the shift to allowing civilian pilots into the ranks,” he said. “Today Boeing really values diverse backgrounds in its test pilots—civilian, military and test-pilot-school graduates—because everyone brings a different perspective when designing our products.”

MANY ACHIEVEMENTS

Cashman’s achievements include flying copilot on the 707 and being rated as captain on all other Boeing jet transports: 727, 737, 747, 757, 767 and 777. He’s flown both in production and experimental flight-test roles.

Cashman also has received several prestigious awards and honors during his Boeing career. He’s received the Iven C. Kincheloe Award of the Society of Experimental Test Pilots for outstanding contributions to developmental flight test in an individual aerospace program, along with The Brackley Memorial Trophy—which honors transport pilots for outstanding flying, for contributions to the operational development of air transport or for new techniques in air transport flying. These are tremendous accolades, but as with other exciting events in his career, the even-keeled Cashman takes them in stride.

“Receiving an international award like this is an honor,” he said. “Boeing is the only company in the world where I could have worked my way up to be a chief pilot. Having a passion for what you do and a little luck helps, but it’s the people that give you the chance—and people that make it fun.” ■

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“It’s the people that give you the chance—and people that make it fun.”

—John Cashman, Commercial Airplanes chief test pilot



GREG THON PHOTO

In this mid-1990s image, Boeing Commercial Airplanes Chief Test Pilot John Cashman (left) and now-retired Boeing executive Ken Higgins are in front of the first Boeing 777, shortly before the airplane’s first flight. Cashman and Higgins got their start as Boeing pilots when they were hired together as flight engineers on the 747SP (Special Performance) program.

Their support MERits acclaim

Boeing experts advise NASA during shuttle, ISS assembly missions

By Ed MEMI

In TV commercials for a wireless communications company, you see a “network” of people behind someone making a telephone call. Likewise, when NASA performs the most complex International Space Station assembly missions ever attempted, a network of Boeing and industry workers supports its Mission Evaluation Room.

The MER is a large room at Johnson Space Center in Houston where Boeing engineers assemble. There are separate MERs for the shuttle and the ISS, and they’re staffed around the clock during shuttle missions—including the Space Shuttle *Atlantis* mission (STS-115) to the International Space Station in September. Spaceflight operations are extremely complex, and problems can occur that are not covered by NASA’s flight rules. That’s where the MER comes in.

The MER concept garnered lots of attention during the Apollo 13 mission in 1970 when a ruptured fuel cell caused severe damage and engineers devised a number of solutions for the crew’s survival and return. Although life-threatening situations are

rare, Boeing engineers in the MER work complex issues on every shuttle flight and station-assembly mission.

“We rely upon the MER to provide sound technical advice to the station’s Mission Management Team,” said Kirk Shireman, chair of the NASA space station Mission Management Team (MMT), a senior leadership team. “The team provided outstanding support during this mission.”

NO MAJOR ANOMALIES

The crew of STS-115 delivered the Boeing-built Port 3/Port 4 integrated truss segment to the ISS and conducted three successful spacewalks to prepare the truss and its solar arrays for operation.

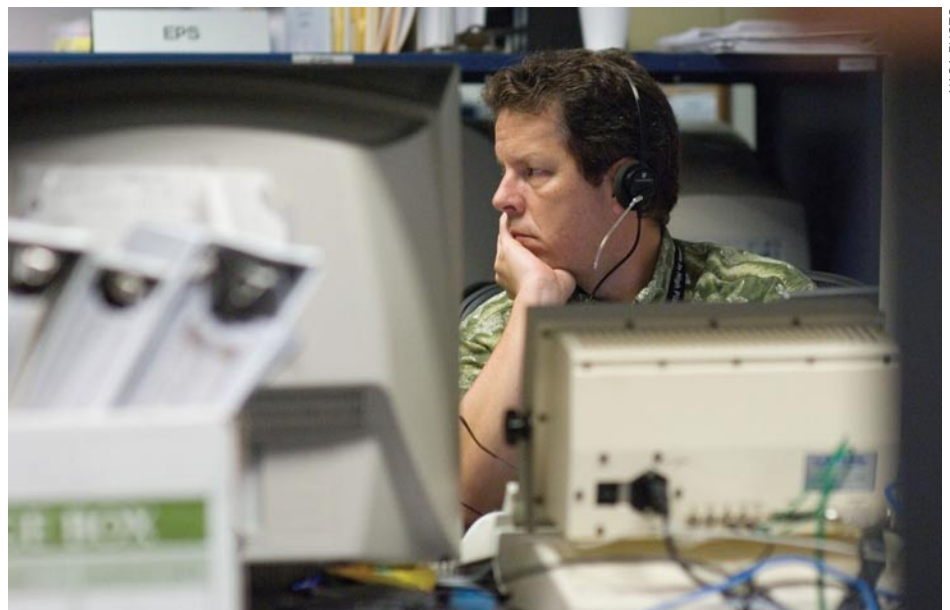
“We really didn’t have any major anomalies during this mission,” said Matt Duggan, ISS MER manager. “We accom-

plished every space station task we wanted to do. This assembly mission was an unequivocal success.”

Boeing staffs the ISS MER console positions around the clock during an assembly mission. MER managers are split 50-50 between Boeing and NASA. The ISS MER also conducts traffic analysis when a large number of vehicles approach and leave the station. In fact, during STS-115, a Russian cargo craft undocked just before *Atlantis* docked, and the Soyuz spacecraft docked shortly after *Atlantis* undocked.

“An approaching vehicle will fire thrusters to slow down, and thruster plumes will impact the ISS, so we determine the configurations to minimize the impact, which might include turning the solar arrays,” Duggan said. “We have to balance those actions with the operation of the station itself.

Boeing engineer Barry Williams works at a console in the ISS Mission Evaluation Room at Johnson Space Center during Space Shuttle *Atlantis*’ recent mission to the International Space Station. He’s monitoring on-orbit assembly operations after the Boeing-built P3/P4 truss was installed on the ISS.



NASA PHOTO



NASA PHOTO

Boeing engineers help staff the NASA Space Shuttle Mission Evaluation Room at Johnson Space Center in Houston. NASA and its industry team of engineers assist with troubleshooting of any prelaunch or on-orbit problems with the space shuttle.

The MER does that for every vehicle.”

Although the mission went well, there were a few situations where Boeing engineers provided their expertise to the NASA MER manager, who often will brief NASA’s station or shuttle MMT.

During STS-115 when astronauts reported two bolts missing from two covers on the P3/P4 truss, the ISS console operators immediately sprang into action and started to gather the necessary subsystem experts. “We’ll start to develop a story on the impact,” Duggan said. “If the items are not needed, then you start to develop a ‘work around’ to keep the station running smoothly.”

“From our earlier analysis we knew the covers would be fine with only three of the four bolts. We also helped NASA understand the conditions in which the aircraft-like fastener bolts and their washers could separate, so procedures could be modified,” said David McCann, a Boeing ISS manager of structures and mechanical systems

who worked many hours in the ISS MER. McCann said more than 300 bolts were turned during the assembly mission.

PRELAUNCH CHALLENGES

The *Atlantis* flight was a success, in part, because NASA identified and overcame several challenges close to launch. A lightning strike and a tropical storm were just some of the things that held up the shuttle launch. While *Atlantis* sat at the launch pad, there was a problem with a cooling-pump motor on one of the orbiter’s three electricity-producing fuel cells.

“Whenever we have a problem we kick off ‘tiger’ teams, which include experts on all the affected shuttle subsystems. We get all the right folks onto the team to solve the problem and look critically at the mission components. The entire event is chaired out of the MER and run by those tiger team leaders,” said Tim Reith, Boeing’s assistant

chief engineer on the orbiter and on console in the shuttle MER.

Reith said there was good consensus between the industry and NASA team that the pump motor would work fine, and it did.

NASA reported some debris floating by the shuttle after it undocked from the station. Once again, Boeing engineers in the MER called together a tiger team to look at the orbiter and determine if anything was missing. Boeing engineers worked closely with NASA and its industry team as the shuttle’s robotic arm and a 50-foot boom were used to inspect and clear the orbiter’s critical systems for a safe landing.

“The Mission Management Team relies on us to get the right answer,” Reith said. “It’s not just what you know but what you don’t know that typically helps us to figure out the right way to go.”

During the next shuttle flight to the ISS, now scheduled for December, Boeing engineers will be on duty to assist NASA as astronauts deliver the Port 5 truss segment and reconfigure the station’s primary cooling and electrical systems. ■

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'A walking, talking C-130'

Meet a San Antonio employee who brings a wealth of aircraft know-how, experience

BY DEBORAH VAN NIEROP

Reliable, dependable, an icon. You could use these words to describe the C-130, an aircraft that has been around for more than 40 years. But these are the words John Fulenwider's co-workers use to describe him—not just the aircraft he works on as a C-130 modifications specialist contractor in San Antonio.

Fulenwider embodies the experience and capabilities that Boeing brings to the C-130 Avionics Modernization Program. In this program, Boeing is upgrading more than 400 of the Lockheed-built, U.S. Air Force transport aircraft to common avionics. The upgrade will make the aircraft safer and extend its service life.

"John is basically a walking, talking C-130, to put it plainly," explained John Rush, C-130 Avionics Modernization Program (AMP) Quality Assurance manager. "He brings a depth of C-130 aircraft experience that is rarely found on any aircraft."

That may actually be an understatement when considering Fulenwider's background.

Fulenwider entered the aerospace industry in 1968 when he joined Collins Radio; this firm was eventually acquired by Rock-

well, and Boeing acquired parts of that company in 1996. "I worked on a lot of different things, but I ended up on a Navy tactical program working on C-130s," he said.

However, his introduction to the aircraft actually occurred in 1964, a fact that many of his co-workers may be surprised to learn. The soft-spoken Fulenwider doesn't talk much about the four years he spent in the U.S. Air Force as a C-130 crew chief or his year-long tour in Vietnam. "No stories to tell. I try not to remember that far back," he said.

Those four years, however, made an impact. "I came to this industry—to Boeing—because it was what I knew, what I had learned," Fulenwider explained. While he's always felt a sense of familiarity with the aircraft, he said he believes the C-130 also gives him some job security. "The military has wanted to replace the C-130 for 40 years and it's still here," he explained.

It's a somewhat ironic observation from a man who, like the aircraft, refuses to retire. Not that he hasn't tried. He retired from Boeing after 32 years of service, but realized after a year at home that standing around wasn't for him.

"My wife and I did some traveling and we had a great time, but when I got home I was bored. I'm not the sitting type, and I guess I don't have enough hobbies to keep me busy," he said.

It didn't help that he found himself answering questions and talking a lot about the C-130. "Co-workers would call and ask

To his teammates, John Fulenwider, a C-130 modification specialist contractor, is known as a "walking, talking C-130." That honor refers to his decades of expertise on the aircraft.



RON BOOKOUT PHOTO

A C-130 makes its first flight after upgrades Boeing performed under the C-130 Avionics Modernization Program. Boeing is upgrading more than 400 of these U.S. Air Force transport aircraft to common avionics.



RICH RAU PHOTO

C-130 all decked out

U.S. Air Force Col. Kevin Buckley and Boeing C-130 program manager Mike Harris couldn't have been prouder as they recently watched a C-130 aircraft take off from the runway at Lackland Air Force Base, Texas.

It was the aircraft's first flight following upgrades under the C-130 Avionics Modernization Program, in which Boeing is upgrading more than 400 of the U.S. Air Force transport aircraft to common avionics.

The upgrade not only is making the aircraft safer, but is preparing it for another 30 years of service.

The upgrades will increase situational awareness for the warfighter tenfold over old analog cockpits, dramatically increase information available to aircrews at a glance, simplify tasks and decrease workload. Commonality

will also allow the Air Force greater flexibility in assigning C-130 aircrews regardless of the model design type.

The aircraft's new avionics system features digital displays and the 737 commercial airliner's proven flight-management system, which provides navigation, safety and communication improvements to meet Communication Navigation Surveillance/Air Traffic Management requirements. With the CNS/ATM upgrade, C-130s can continue to be deployed worldwide.

Boeing test pilot Mike Leone, who helped conduct the flight, said it's been a great experience watching the aircraft evolve. "It's exciting to see a design we worked so hard to put together become a reality," he said, "and the graphics and displays are even better than I expected."

—Deborah VanNierop and Madonna Walsh

me about this or that, so I was never far away from what was going on with the program," Fulenwider said.

While the 60-year-old Fulenwider said he is surprised to be working again with Boeing, he's glad to be back around the people and the aircraft that he enjoys so much.

"The people here (in San Antonio) are very knowledgeable and easy to work with," he said. "I try to answer their questions, keep them calm when we hit a snag and get everyone moving in the right direction. I

think they appreciate my knowledge."

It's that modesty and his wealth of experience that make him a valuable asset to Boeing and the C-130 AMP team.

"John's interaction with the maintenance crew is a combination of coach and mentor. He has a strong work ethic and a calm-natured attitude that allows him to interact with anyone at their level, whether program director or shop mechanic," Rush said.

Fulenwider has watched the C-130 change over the years and is now involved in yet

another evolution of the aircraft. The C-130 AMP was initiated to simplify multiple C-130 fleet configurations. "These modifications will definitely help the pilots and ground maintenance personnel," he said.

In addition to making the aircraft safer, the C-130 AMP is also designed to prepare the C-130 for another 30 years of service. Perhaps then, Fulenwider said, it would be a good time to retire. ■

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Spectrolab's Connie Siv pays close attention to the business of building solar cells that generate electricity.

DANA REIMER PHOTO



Energy cell

Spectrolab delivers power to Earth—as well as to other planets

By JOEL R. NELSON

What do telecommunications-service customers, planetary scientists, homeowners and law-enforcement officers around the world have

in common? They all benefit from products made by the 375 people at Boeing subsidiary Spectrolab Inc.

You'll also find Spectrolab involved in other important applications. Those majestic solar panels extending from Earth-orbiting communications satellites, including those that support U.S. national security and intelligence? Built by Spectrolab. Rovers trekking across Mars? The International Space Station? Powered by Spectrolab. Solar cells generating energy for residences, and high-intensity searchlights that help po-

lice helicopters home in on crime suspects? Spectrolab again.

As the world's largest manufacturer of space solar cells, this Sylmar, Calif.-based company plays a central role in Boeing Space & Intelligence Systems' mission success. Virtually every spacecraft built by S&IS carries Spectrolab solar cells that convert sunlight into power, as do satellites built by other manufacturers. About 60 percent of commercial satellites currently operating carry Spectrolab products. The company also plays a significant role

in generating renewable energy and builds powerful airborne searchlights.

This year marked two significant milestones: Spectrolab's 50th year in business and the production of the company's two millionth multijunction solar cell, a level far beyond what anyone else has achieved (see box on Page 33).

THERE AT SPACE AGE'S DAWN

Spectrolab was founded in 1956, as the space age dawned. Within three years it had supplied solar cells to such U.S. spacecraft as Pioneer 1, the first satellite launched by NASA, and Explorer 6, a 1959 mission that produced the first photo of Earth from space. In 1969 Spectrolab solar panels accompanied the first humans to visit the surface of the moon.

More recently, Spectrolab cells have helped keep the Mars Opportunity and Spirit rovers—designed for 90-day missions—operating for nearly three years. The ISS derives its power from Spectrolab cells, which eventually will enable more than 200 kilowatts of power for mission requirements and day-to-day operations. The Mars Reconnaissance Orbiter carries the largest solar array ever sent to another planet. It is built by Spectrolab. And Spectrolab powers the spacecraft built by S&IS' Satellite Development Center in El Segundo, Calif., including the Boeing 702, the world's most powerful commercial communications satellite.

"While we are diversifying, our core business is space. We're in that industry for the long term and we'll continue to focus on maintaining Spectrolab's leadership through technological improvements and further cost reductions," said David Lillington, Spectrolab president.

MEANWHILE, BACK ON EARTH ...

Leveraging its space expertise, Spectrolab cultivated a bustling business in terrestrial solar cells over the past decade.

Spectrolab has developed terrestrial solar cells that convert almost 40 percent of sunlight into electricity and might eventually deliver power through solar concentrator systems to isolated areas of the U.S. Southwest, as well as to Australia, Africa and Europe.

Under a contract signed in August, Spectrolab will deliver 600,000 solar cell concentrators to SolFocus, Inc., a California-based company that develops renewable energy alternatives. Also that month, Spectrolab contracted with Australia's Solar Systems Pty. to deliver 500,000 solar cells for solar concentrator power stations. These cells, capable of collectively generating more than 20 megawatts of

electricity—enough to power about 8,000 U.S. homes—will convert the sun's rays into affordable electricity for homes and businesses. Working with several international and U.S. solar concentrator system manufacturers, Spectrolab is seeking to rapidly expand its share of this market.

While providing power in space and electricity on Earth, Spectrolab also generates light with its Nightsun searchlight.

BOEING GRAPHIC



An artist's concept shows Spaceway F2, a commercial communications satellite built by Boeing Space & Intelligence Systems, drawing solar power from panels built by Spectrolab.

■ INTEGRATED DEFENSE SYSTEMS

These are used by more than 90 percent of all law-enforcement airplanes and helicopters worldwide. A Nightsun, the world's brightest searchlight, is equal to 215,000 100-watt light bulbs.

BUILDING A CULTURE

"We put a lot of effort into using the annual Boeing Employee Survey feedback to improve the quality of life here, and to make Spectrolab a place where associates want to work," Lillington said. "We all work closely together as one team."

This unity has spawned some unique cultural traits. For example, Spectrolab workers call themselves "associates of Team Spectrolab" rather than "employees," and the company runs its own monetary Team Incentive Plan. Spectrolab sponsors an annual Pride in Spectrolab celebration along with a steady stream of reward-and-recognition events.

"It's great to tell our families we help build systems they use every day, such as XM Satellite Radio," said Spectrolab technician Ali Glaser, Spectrolab's Associate of the Year in 2005. "That makes us all feel good."

Along with rewarding associates for achieving certain financial and delivery-schedule metrics, the Team Incentive Plan promotes maintaining a safe workplace by incorporating safety goals. The company recently celebrated more than 300 days without an accident.

WITH THE BOEING PROGRAM

Spectrolab might be small, but it's fully aligned with Boeing's vision, values and initiatives.

"Customer satisfaction is absolutely key for us, and we work very hard on that," said Lillington, adding that every customer is surveyed quarterly. "We also work hard to provide the best value. Our industry expects continuous cost reductions and technological advances, and our success in becoming a recognized Lean leader within Boeing will help us deliver them."

Glaser credited Spectrolab's embrace of Lean manufacturing, including factory performance boards that illustrate production flow, metrics, scheduling and safety, for improving efficiency. "Lean empowers us to decide what needs to be done, and to do it," she said.

The best-value emphasis has produced tangible results. For example, the company earned the prestigious California Awards for Performance Excellence in both 2005 and 2006. Spectrolab won the George M. Low Award, NASA's premier recognition for



PHOTO COURTESY OF SOLFOCUS

Solar cells populating a solar concentrator owned by California-based SolFocus Inc. show one of Spectrolab's Earth-bound applications.

supplier quality and technical excellence, in 2004. Also that year, the company's triple-junction solar cells and four associates were inducted into the U.S. Space Foundation's Space Technology Hall of Fame.

Entering its second half-century, Spectrolab looks to a promising future.

"We are following a long-term technology road map to maintain our leadership position in each of our product areas," said

Lillington. "We're making the investments necessary to improve our products' performance and lower production costs, and we have great opportunities for growth. I think pride is very important also in achieving our growth potential. It's clear from the Employee Survey data that all Spectrolab associates are proud of the work they do." ■

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Multijunction Solar Cells 101

Spectrolab this year produced its two millionth multijunction solar cell—a milestone that sets the company apart from its competitors.

Which raises a question: What's a multijunction solar cell?

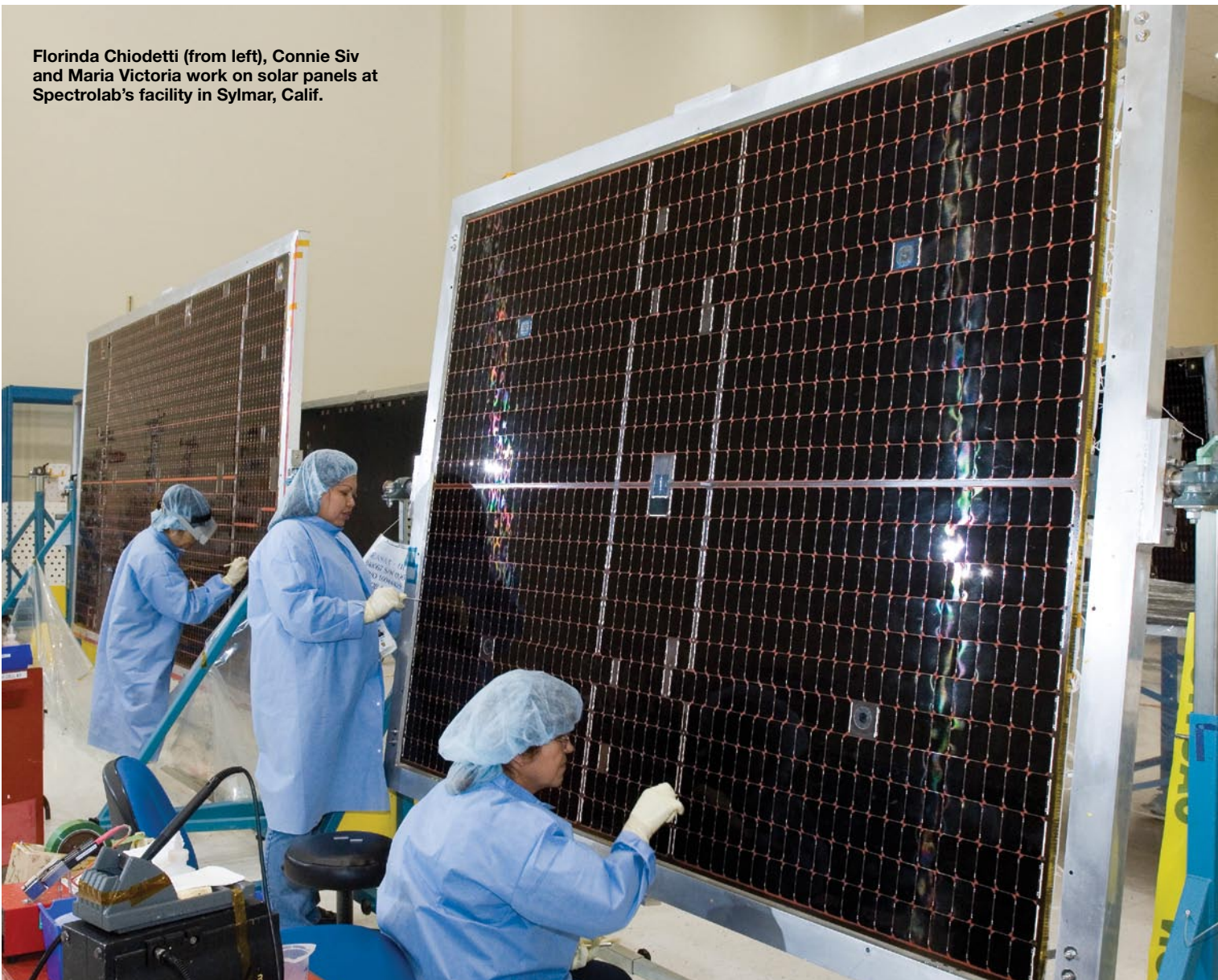
Made of semiconducting materials resembling those found in computer chips, solar cells capture sunlight and convert it into electricity. Solar energy dislodges electrons from these materials' atoms, letting the electrons flow through the material and produce electricity. This process of converting light (photons) to electricity (voltage) is called the photovoltaic effect.

"Multijunction" refers to a layered structure that captures solar energy and converts it into electricity. Each junction converts a different part of the solar spectrum. Portions that are unused at one layer pass to the next one. Terrestrial multijunction cells' conversion efficiency has gained steadily over the years; Spectrolab attained the current world record, 39 percent, in 2005. (The company's space cells operate at 28.3 percent efficiency.) Spectrolab is continually pushing for new levels of conversion efficiency in both its space and terrestrial products.

Each Spectrolab space-based solar cell can produce approximately 1 watt of power. These cells are attached to panels that extend from the spacecraft's body. Approximately 100 such cells would be needed to generate power for a 100-watt incandescent light bulb.

Spectrolab solar cells have powered more than 550 satellites and interplanetary missions over the last 50 years. Its multijunction solar cells generate more than 575 kilowatts of power on orbit.

Florinda Chiodetti (from left), Connie Siv and Maria Victoria work on solar panels at Spectrolab's facility in Sylmar, Calif.



DANA REIMER PHOTO

Something big is in the air

Flight test program is under way for the 747 Large Cargo Freighter, an important 787 production tool

By MARY HANSON

“When you have a team of people who are fully focused on the goal—and understand the importance of the work they are doing—personal considerations get set aside, and you accomplish great things.”

Mike Bunney, director of Global Logistics for the Boeing 787 Dreamliner program, isn't just waxing philosophical. He's referring to the hundreds of Boeing employees who have spent the past three years designing, building and now flight-testing the 747-400 Large Cargo Freighter.

The LCF recently achieved some crucial milestones, including taking to the air for the first time and making its first-ever transoceanic flight. Specially designed and modified to carry the large composite fuselage sections and wings of the all-new 787, the LCF can carry three times the capacity of a standard 747-400 freighter. It's the first time Boeing has designed an airplane to serve as a tool within another airplane program.

“The LCF is a key element in our lean, global production system for the 787,” Bunney said. “Flying the 787 components from partner sites worldwide to Everett, Wash., for final assembly reduces travel times from as many as 30 days down to one. This not only

saves us a lot of money, but it's key to achieving our goal of performing final assembly in just three days.”

It also meant developing and building an essentially new airplane to do the job. Traditional freighters didn't have the capacity to hold the fully integrated 787 structures being built in Kansas, South Carolina, Italy and Japan.

WORK BEGAN IN 2004

In early 2004, Boeing engineers in the Puget Sound region of Washington state, California and Moscow partnered with Aernnova in Spain (formerly Gamesa Aeronautica) and Stork Fokker of The Netherlands to begin designing the LCF to the exact specifications required by the 787 program.

Firm configuration of the airplane's design was achieved in October 2004, and parts production began at more than 200 suppliers around the world. The team also bought three used passenger jets, one through the Boeing Aircraft Trading organization and two from China Airlines.

The fleet is being modified by Evergreen Aviation Technologies Corp. (EGAT), a joint venture between EVA Air and General Electric based in Taiwan. A Boeing/EGAT team of more than 450 engineers, technicians, mechanics, construction specialists, quality control experts, ground-support personnel and others spent more than 500,000 collective work hours modifying the first airplane to its unique configuration, often working seven days a week and forgoing holidays and vacations.

On Sept. 9, a mere 375 working days after the modifications began, the first LCF made its first flight. The two-hour, four-minute



The 747 Large Cargo Freighter will play a critical role in the production of the 787 Dreamliner airplane. Using the LCF to fly 787 components from partner sites worldwide to Everett, Wash., reduces travel times from up to 30 days down to one.

JIM ANDERSON PHOTO



GAIL HANUSA PHOTO

Part of the test program for the 747-400 Large Cargo Freighter is validating that the airplane's giant swing-tail properly opens and closes. Boeing employees in Everett, Wash., watch on Oct. 10 as the gigantic airplane's tail swings open for the first time.

flight over Taiwan was a tribute to the LCF team and also to the extensive preparation by the three Boeing flight-test pilots tasked with putting the LCF through its paces.

"We spent countless hours in design reviews and, later, doing extensive simulation of the expected handling qualities of the airplane," said 747 Chief Pilot Joe MacDonald. Before the flight, MacDonald's biggest question was whether the airplane's enormous upper fuselage would affect the handling characteristics of the airplane. Upon landing, he said there were times during the flight he forgot he wasn't flying a standard 747-400.

"It all looks the same when you're looking out the front windows," he joked. "The airplane is handling really well."

Just one week later, after completing three test flights in Taiwan and exercising and/or verifying the electrical, oxygen, communications, pneumatics, hydraulics, flight controls, fuel and other airplane systems, MacDonald and his team—Randy Wyatt and Gerald Whites—flew the airplane nonstop from Taipei to Seattle's Boeing Field. There, the LCF will undergo an additional 240 hours of flying time and hundreds more hours of ground testing in order

to achieve certification by the U.S. Federal Aviation Administration in early 2007.

The first LCF is a highly visible indication the Boeing 787 Dreamliner is fast becoming a reality. The airplane is instantly recognizable flying around the Puget Sound area—not only because of its enormous size, but because it hasn't yet been painted beyond green primer. Its first flight occurred later than anticipated because of delays in getting parts, so aesthetics were sacrificed in order to keep the flight test program on track. It will be painted in January.

Most recently the LCF has been in the Everett, Wash., factory, completing its most visually stunning ground test: the opening and closing of the swing tail, the unusual system that is the means for loading and unloading the airplane's cavernous cargo bay. Hundreds of employees gathered to watch the enormous swing tail slowly open for the first time. "Now we know the whole system works," said LCF chief project engineer Kurt Kraft.

The swing tail was guided by an enormous mobile tail support, which carries most of the weight of the 44,000-pound (20,000-kilogram) tail and continually adjusts to changes in position during the opening and closing of the tail. That reduces wear and tear on the two hinges visible on the aft section of the fuselage.

THINGS FOUND AND FIXED

As with any flight test program, the team has found things that



MARIAN LOCKHART PHOTO

JOE PARKE PHOTO

Above: The cavernous cargo bay of the 747-400 Large Cargo Freighter is 65,000 cubic feet (1,840 cubic meters), more than three times the cargo capacity by volume of a standard 747-400 freighter. A fleet of three LCFs will ferry 787 assemblies between Japan, Italy, Kansas and South Carolina before flying them to the Boeing factory in Everett, Wash., for final assembly.

Top right: The 747 Large Cargo Freighter flies over the Puget Sound area of Washington state. The airplane's flight-test program is expected to last until early 2007.

need attention. These are primarily maintenance issues, and although some were unexpected, Kraft said that's not unusual when you consider the base airframes first entered service in the early 1990s.

"That's the nature of a flight-test program. You find things and you fix them," Kraft said. Nothing has been found that indicates a fundamental flaw that would prevent the LCF from fulfilling its mission.

"All things considered, the airplane is behaving really well," Kraft noted. "All the designs and aerodynamics are performing exactly as we predicted they would."

Back in Taiwan, the Boeing/EGAT team is hard at work building up the second LCF, which is expected to arrive in Seattle at the end of the year. Both airplanes will begin ferrying 787 components in early 2007. Modifications on the third LCF start next year. ■

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Think big

Here are some fun facts about the 747 Large Cargo Freighter.

- It will be in nearly constant service at five locations: Everett, Wash.; Wichita, Kan.; Charleston, S.C.; Grottaglie, Italy; and Nagoya, Japan.
- More than 30,000 pounds (13,600 kilograms) of aluminum are removed from each airplane for the modification.
- The swinging portion of the airplane's tail weighs as much as a loaded World War II B-17 bomber.
- It will be loaded and unloaded with the help of the largest cargo loader in the world, at 120 feet (36.5 meters) long, 28 feet (8.5 meters) wide.
- The LCF is the biggest cargo airplane in the world, by volume.
- The volume of the main cargo deck is 65,000 cubic feet (1,840 cubic meters)—big enough to carry
 - 42 million ping-pong balls
 - 8 million 12-ounce drink cans
 - 80 Mini Cooper cars
 - A three-level, 10-lane bowling alley, with room to spare for a restaurant



ED TURNER PHOTO

Boeing Capital President Walt Skowronski said the organization is working to “energize the financial markets.” Among the goals of these efforts: to ensure Boeing products are successful in the marketplace.

Creating 'rational exuberance'

Boeing Capital builds financiers' confidence in Boeing products

For the past two years, Boeing Capital has been conducting an aggressive aircraft financier and investor outreach program. The objectives: Build relationships with the financial community, and ensure there's adequate capital available for customers to fund purchasing or leasing Boeing's products and services.

Walt Skowronski, president of Boeing Capital Corp., recently answered questions about the program and gave an update of results so far.

Q: What is BCC's investor outreach program and how does it differ from Corporate Investor Relations?

A: The two programs are very similar in their communication approaches but are targeted to different audiences. Corporate Investor Relations targets equity analysts and shareholders, while we are targeting the financiers and investors of aircraft assets, and related parties.

Our mission is to support the Boeing businesses. We support growth at Boeing Commercial Airplanes and Integrated Defense Systems by finding and structuring financing for Boeing products and services. We develop ways to help Boeing customers finance [the purchase or lease of] our products, preferably using other people's money. We ensure there is commercial market financing available, and only when absolutely necessary do we use our own balance sheet to help customers finance our products.

Corporate Investor Relations, on the other hand, works to build investor confidence in Boeing's leadership, strategy, performance and outlook so it can help achieve full valuation for Boeing's stock price.

Q: Who are you trying to reach?

A: We're trying to establish and maintain close relationships with airline treasurers and chief financial officers, as well as the people who actually finance and own our aircraft. This includes bankers, lessors, hedge funds, private equity funds and other aircraft investors. It also includes opinion makers such as rating agencies, appraisers, analysts and the financial media, since their assessments

of Boeing products and services influence those who finance our aircraft and the decisions they ultimately make.

Q: What are you trying to achieve?

A: We have three key objectives. First, we're trying to ensure the financial community understands, first hand, our Boeing products and services strategy and its value and advantages relative to the competition. Second, we're trying to ensure there is an adequate and cost-efficient supply of capital (or funding) to meet our customers' near- and long-term requirements. And third, we're trying to capture and integrate financiers' requirements into the evolving design of Boeing's products and services.

In essence, we're trying to energize the financial markets by partnering with them to ensure the success of Boeing products in the marketplace.

Q: How are you "energizing the financial markets"?

A: Over the past five to 10 years, the business of owning airplanes—or what we call asset management and financing—has moved away from the airlines and into the hands of financiers. Recognizing this, we established a new function for Boeing Capital called Capital Markets Development and named Kostya Zolotusky as its leader.

Kostya's primary role, as well as others on our Aircraft Financial Services team, is to work with aircraft financiers and opinion makers in a similar way that Boeing does with the airlines to explain the value and life cycle of our products, and the strengths of partnering with Boeing. We provide them adequate information to make their investments and manage the risk associated with financing aircraft.

Q: Is this another term for marketing?

A: When we work with an airline to analyze the merits of our airplanes and services relative to the competition, it could be viewed as a form of marketing, and it could be viewed as "working together." We're telling our side of the story, but the story is very real and very relevant to understanding the complex products and services we offer. In the same way, financiers are funding aircraft that are very complex with very long life cycles, and they need a detailed and complex understanding of the underlying assets that secure their financing. So yes, we tell our story, and we try to build

ED TURNER PHOTO



Boeing Capital joined with Commercial Airplanes on the 2005 world tour of the 777-200LR airplane (above) and created events to conduct in-depth discussions about the jetliner with financiers.

confidence among the capital markets and financiers regarding the value, advantages and superiority of our products.

Q: What specifically are you doing to reach out to the financial community?

A: Our program is executed on many levels, targeting specific audiences with specific messages. We help the financial community focus on the right issues and then provide deeper dives into topics that help them better understand our airplanes and associated services. Boeing Capital has four annual flagship events called BCC Financier and Investor Conferences held in key aircraft financial centers: New York, London, Hong Kong and Dubai. At these events we update the financiers on market developments, product strategy and the aircraft financing environment, and then we listen. This is a great opportunity to get key aircraft financiers together to share their perspective on what we're doing well, where we can do better, and how we can help them create a more efficient financing infrastructure.

We also hold senior financier events in America, Europe and Asia, and a series of more focused meetings where we have in-depth discussions on specific areas or products and the underlying market that drives the requirement for those products. This year, we're talking in greater detail about the technology used on our air-

craft and how that technology delivers strategic and product advantages. We're also sharing details of our aircraft maintenance program because it's a very important component in valuing aircraft. Along with that, we're describing how Boeing Commercial Aviation Services is revolutionizing aircraft maintenance by making it more predictable, more reliable and more transparent.

Q: We understand you've been taking financiers on flights aboard Boeing airplanes?

A: Last year we joined with Commercial Airplanes on its 777-200LR tour, creating three separate events where we introduced the financiers to more in-depth discussions of the airplane. Having an opportunity to spend dedicated time with top aircraft financiers played a significant role in gaining broader acceptance of the aircraft among the financial community, and provided them a sense of ownership in the program.

This year, we've done something similar with the 737 family. Recognizing we're expanding the family with the introduction of the 737-900ER, we partnered with Royal Air Maroc and jointly hosted top European bankers on one of its delivery flights. This provided the bankers an opportunity to tour our Seattle facilities and have in-depth product and market discussions, and provided Boeing an opportunity to strengthen our "working together" relationships.

Q: What has been the reaction of the investment community so far?

A: Rational exuberance. One of the things we always worry about

is how you measure whether you're achieving results. Right now, rational exuberance is not an overstatement, because there is great hunger in the financial community for more information so they can better understand the assets and services affecting their financing. They recognize a dramatic shift in how Boeing is focusing on them and acknowledging their important role as a customer—the people who pay for our products and services. Our attention to this crucial set of stakeholders has really differentiated us from the competition.

Q: Have you learned anything new from the financial community?

A: We learn every day because this is a two-way conversation. We share our views of the market, our product strategies and our understanding of how best to address aircraft financing. At the same time, they share with us how they view the market, what their challenges are, and where we can help them. The most dramatic example is our in-depth working-together discussions on the 787 and 747-8 programs.

On the 787 program, we took the opportunity to learn everything that was important to aircraft financiers and ensure their input was part of the aircraft design consideration. We've done the same thing on the 747-8. For example, we recognized that someday 747-8 passenger airplanes will likely be converted into freighters. The 747-8 passenger airplane is being designed with that in mind, so it will be easier and less expensive to convert into a freighter when needed.

Q: Is there anything that worries financiers and investors?

A: The financial community by nature has to worry because their business is really risk management. That's what financing is. You assess the risk, and then you price the risk. In aircraft financing, one of the things Boeing has been able to effectively address is fewer surprises. For example, financiers like predictable aircraft life cycles. They love the fact that the 747, 757, 767 and 777 families have either sold more than 1,000 units or are nearing 1,000 units. Predictability in product strategy, product longevity and timely ap-

Get the message

What exactly is Boeing Capital telling financiers to shape their understanding and perceptions of the market? BCC President Walt Skowronski summarized the messages the organization delivers to customers—aircraft financiers and opinion makers:

- **Airplanes are good investments.** Boeing's current 20-year market outlook foresees a need for some 27,000 airplanes, or about \$2.6 trillion of aircraft. This forecast is based on continued air traffic growth, which is crucial to global economic growth. That means while airlines that carry this traffic may change, the aircraft still are needed—and there is still a need to finance those aircraft, which should be a good investment.
- **Boeing airplanes deliver the highest value at the lowest risk to airline customers and aircraft investors.** This statement's based on the ability of Boeing's product strategy to address market requirements, the engineering of its airplanes, the longevity and predictability of its aircraft life cycles, and the strength and stability of the aircrafts' residual values. These factors reduce the risk to aircraft financiers.
- **Boeing Capital is committed to the success of Boeing products and services in the financial markets.** BCC is demonstrating this commitment in many ways. Among them:
 - Partnering with the financial community to ensure availability of funding
 - Ensuring the community understands Boeing's product strategy and the key value discriminators that differentiate the company's products from the competition
 - Enhancing aircraft value and liquidity by incorporating financiers' requirements into Boeing's product strategy and design
 - Improving the international financing infrastructure to make it easier and less expensive to finance aircraft
 - Developing creative financing solutions that enhance opportunities for aircraft investments



JIM COLEY PHOTO

To strengthen relationships and ensure availability of reasonably priced aircraft financing, Boeing Capital partnered with Royal Air Maroc to jointly host European bankers on one of the airline's delivery flights. Above is a Royal Air Maroc 737-700.

plication of advanced technologies are Boeing trademarks. That's why Boeing aircraft are not dependent upon residual value support in order to deliver strong market performance.

Q: What does BCC bring to the table in helping the airlines find financing for Boeing airplanes?

A: We bring our product expertise, detailed customer knowledge and deep understanding of the financial markets. For product expertise, we're able to help aircraft financiers better understand our products and the underlying demand for them, so they can better evaluate their risk. We work with our airline customers all the time, whether they're buying and financing airplanes or not. This detailed customer knowledge allows us to help financiers understand specific customers' business models and helps them evaluate associated risks. And for a deep understanding of the financial markets, Boeing Capital's team of finance directors has an unparalleled experience base in performing aircraft transactions.

We've been doing this longer than anyone in the industry and have played a role in financing more than half of the global aircraft fleet. This level of expertise and experience is very rare and very valuable in our industry. ■

School's in session

Supplier Management University training program gives Boeing employees a 'degree' in best practices

By DEBBY ARKELL

Best practices are good, but best practices shared across business units are even better. As Boeing becomes increasingly global and competition becomes fiercer in the worldwide marketplace, Boeing needs to leverage best practices across business units and functional disciplines whenever possible.

One Boeing program does exactly that. Supplier Management University is an enterprisewide training program that serves as a forum for employees from across Boeing to come together and learn how to manage supplier relationships effectively—both internal and external to Boeing—by learning and using best practices.

Boeing is very reliant on its suppliers today and will only become more so in the future as the company continues its transformation into a large-scale systems integrator. Currently 65 to 95

percent of what the company provides to its end customers comes from suppliers. As Boeing continues to evolve, suppliers undoubtedly will provide even more.

Supplier Management University ties in to Boeing's Global Sourcing initiative by helping its participants work together more thoughtfully and effectively with their suppliers by using common approaches, tools and techniques, and encouraging constructive dialog.

"We need to know how to work with all our suppliers—both big and small," said Scott Amelung, Supplier Management University program manager. "If all Boeing people are using common processes and techniques in their relationships, it makes our jobs easier and the job easier for our suppliers."

CORE CURRICULUM

As Boeing places more work with its suppliers, it's becoming increasingly complex to manage those relationships.

The doors to SMU first opened four and a half years ago. Today the curriculum consists of four increasingly challenging parts: an eight-hour overview session setting the foundation for strategy, processes and tools; a week-long session focusing on planning and leadership; a week-long strategic application session; and a self-directed learning project (see box on Page 43).

The courses ultimately focus on three fundamental areas: how to create and use a supplier management plan, how to manage relationships, and how to apply plans and techniques effectively in a variety of circumstances.

"We take issues surrounding supplier quality, cost targets and affordability and bring it all together to work with the supplier," Amelung said. "No matter what we're buying—whether we're being supplied with radars, components or copy paper—the best practices we teach in this class apply."

The way Boeing people manage relationships is at the heart of SMU, so the courses teach participants to have a plan for managing those relationships and how to ask the right questions. Instructors convey information through workshops, templates, supplier management plans and role playing.

"We've moved up the value chain as a system-of-systems integrator," said Laurie Anderson, Space & Intelligence Systems director of supplier management proprietary programs and an occasional SMU guest speaker. "In so doing, we need a lot of interaction with our suppliers to ensure the products we're now asking them to deliver are what we require. We need to know how to effectively interact with our suppliers, mitigate risk, and ensure we're all on the same page with regard to costs and schedules. Communication is key."

Nicole Williams, procurement agent on the Future Combat Systems program in Huntington Beach, Calif., writes for her teammates as they perform an exercise during Supplier Management University's Practices Class held earlier this year in Cerritos, Calif. SMU includes four courses; the Practices Class is the second in the series.



SALVADOR SANCHEZ PHOTO

Debbie Lueckenotte, procurement agent for the P-8A Poseidon program in Kent, Wash., provides results of her team's work on an exercise just completed at Supplier Management University's Practices Class held earlier this year in Cerritos, Calif.

Participation is not limited to employees in Supplier Management & Procurement; the practices and principles are relevant to nearly all disciplines at Boeing. Indeed, in addition to supplier-related disciplines, SMU students come from Finance, Contracts, Engineering, Program Management and Quality, and Amelung said they find that they, too, benefit from the techniques taught in the classes.

"We teach people how to find out what the issues are and to work together to resolve the issues," Amelung said. "It's not poker we're playing with suppliers—it's bridge. We stress communication—within Boeing, with our customers and with our suppliers. By teaching people to listen, we build trust and understanding, and that makes all the difference."

MAKING THE GRADE

Supplier Management University has grown in popularity since its inception as employees tell their colleagues about their experiences. To date, the Overview class alone has reached about 4,100 people in nearly 200 offerings. All courses have a waiting list.

Paula Janson, Commercial Airplanes director of Human Resources for Airplane Production, attended SMU and took it a step further. When she was the HR leader for Global Partners, she had her entire team of HR generalists attend the Overview session.

"When I attended, it gave me a clearer understanding of the challenges my customer was facing and the complexities they had to deal with," she said. "It was apparent our HR team would be able to better support our customers by having an increased understanding of their business challenges and processes. It was a terrific learning experience and really helped us be better business partners, supporting our customer with meaningful people strategies and development plans."

Steve Winkler, director of F-15 Production Programs, noted that to fully understand and support the Boeing story it's important to understand the design, production, and value streams of different companies with different levels of contributions.

"Three-fourths of our total expenditures on the F-15 program are with suppliers," Winkler said. "Suppliers are the name of the game. I participated in the first two courses because I wanted to ensure I was fully up to speed on the best practices for supplier integration, production plans, metrics and teaming. Times are changing, and the Boeing story is changing with it." ■

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SALVADOR SANCHEZ PHOTO

A closer look at SMU

Here's a look at the components of the Supplier Management University training program.

Supplier Management Overview is an eight-hour instructor-led course. It's designed to teach employees to identify supplier management best practices, apply them in the various phases of a subcontract cycle, and identify the benefits of effective application through use of a Supplier Management plan. The course is open to all Boeing employees.

Supplier Management Practices is a week-long instructor-led course that explains the relationship between Supplier Management best practices and Program Management best practices. This course is more in-depth and focuses on best practices and supplier management plans. Participants must be nominated by their management and have attended the overview session prior to attending this course.

Supplier Management Application Strategies is a week-long instructor-led course held three times yearly at the Boeing Leadership Center. Student teams lead a virtual integrated product team through a full program simulation. This course focuses on risk-mitigation and cost and schedule plans, setting expectations, communication and more. Eligible participants will have senior management nomination and have completed the two previous courses.

Supplier Management Learning Project is a facilitated, self-directed course conducted partly at the Boeing Leadership Center and partly at an employee's home location. This final course addresses current—and critical—Supplier Management challenges through real-world application of SMU learnings.

To register for any of these courses, visit <http://smu.web.boeing.com/schedule.htm> on the Boeing Web. For more information, visit <http://smu.web.boeing.com> on the Boeing Web.

Spread out, reduce risk

Why diversification matters to pension managers—as well as your retirement funds

Mark Schmid, Boeing chief investment officer, and his 15-person investment team have a significant responsibility. The team manages more than \$45 billion in defined benefit pension plans and more than \$27 billion in defined contribution savings plans.

“We’re very aware that a lot of retirements are riding on these,” Schmid said.

Under the defined benefit plans, eligible participants receive monthly payments that are determined by formulas outlined in their plans. Boeing funds the plans and manages the assets.

Conversely, under the defined contribution plans, commonly known as the 401(k) or savings plans, employees set aside a portion of their annual compensation, with Boeing making matching contributions in most cases. The employee decides in which of the available options to invest the money.

For both plans, two fundamental principles apply: having a long-term view and spreading money among several different investment choices—known as diversifying—to reduce risk. Schmid, Corporate Treasurer Paul Kinscherff and others remind fund participants about the benefits of diversification

whenever they can. Yet, the data shows that nearly 40 percent of participants in Boeing’s savings plans invest in no more than two of the available investment options.

“People should be very careful and ensure their investments are appropriately diversified,” Kinscherff said. “Diversification is the best way to minimize the potential risk to your investments while building the personal wealth you’ll need for retirement.”

Kinscherff noted that employees can assemble a well-diversified portfolio from the 15 options Boeing offers in the savings plans. Investment decisions should be made in consultation with a professional investment advisor if possible, he added.

Employees who prefer a simpler way of managing their investments can choose the savings plans’ lifecycle funds, which are well-diversified funds geared toward estimated retirement dates.

To ensure diversification within the defined benefit pension funds, Schmid’s team invests with outside professional portfolio managers across seven asset types, including U.S. and non-U.S. stocks, bonds and other fixed-income vehicles, and real estate.

During the past three years, those investments achieved 12 percent annualized returns, reversing poorer results after this decade’s dot-com boom went bust.

Boeing in recent years has contributed more than \$8 billion to the defined benefit plans—which, measured by assets, are the fourth-largest group of qualified retirement plans in the corporate sector, topped only by General Motors, IBM and General Electric.

Schmid’s team is taking steps to further diversify what those plans invest in to make them even less susceptible to the ups and downs of the stock market. “We want to be able to withstand the negative moves of major stock markets,” he explained. “Diversification is as important to the pension plans’ investments as it is to a person’s investments.”

Funded status is a widely watched assessment of pension plan strength. To determine that status, the company compares the asset amounts currently in the plans with the value, in today’s dollars, of projected future benefits.

Boeing measures its plans’ status as of Sept. 30. Based on this year’s valuation, the defined benefit plans are fully funded. “These plans are healthy, and we’d like to remain fully funded,” Schmid said.

Many things influence the funded status, including terms of the plans, actuarial assumptions about how long retirees will collect benefits, the discount rate used to determine present value of future payments, and the value of the pension assets, which are held in a separate trust.

Collectively, Schmid’s team has more than 150 years of investment experience. They’re often asked for investment picks, which they’re not allowed to provide. But they do offer some advice.

“I tell everybody the same thing,” Schmid said. “You should put the most that you can afford into your 401(k) plans. Boeing’s plans can help fund a good retirement lifestyle, but you’ve got to plan today to make that happen for your retirement.” ■

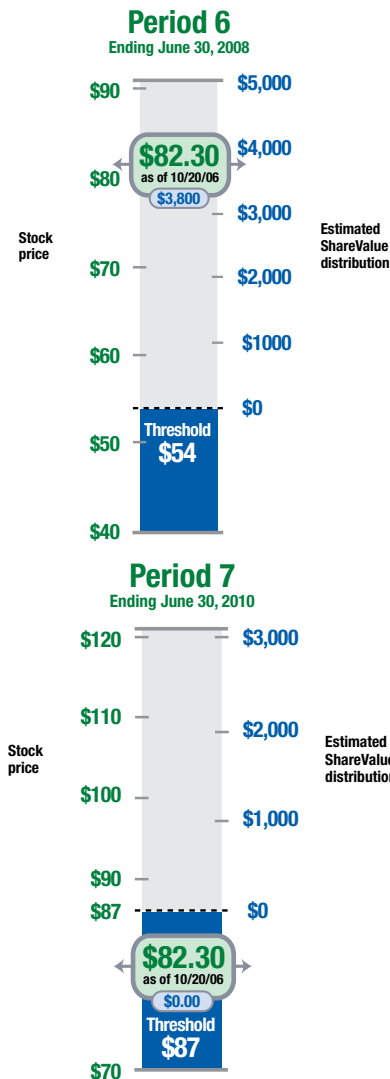
ISTOCK PHOTOS



Boeing stock, ShareValue Trust performance

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

The program—which runs for 14 years and ends in 2010—features seven overlapping investment periods. The program is currently in Periods 6 and 7.



The above graphs show an estimate of what a “full 4-year participant” ShareValue Trust distribution (pretax) would be for Periods 6 and 7 if the end-of-period average share prices were the same as the recent price shown.

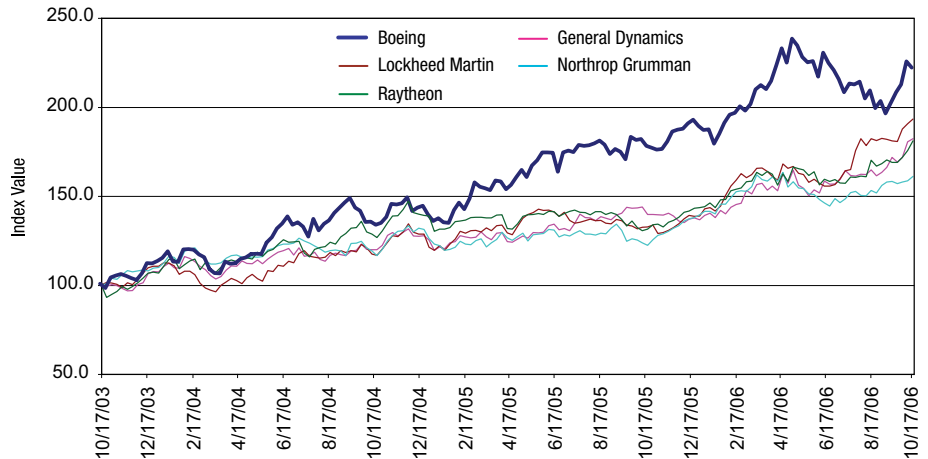
The share price shown is the average of the day’s high and low New York Stock Exchange prices. Updates to participant/employment data will be made periodically.

For more information on the ShareValue Trust, visit <http://www.boeing.com/share>.

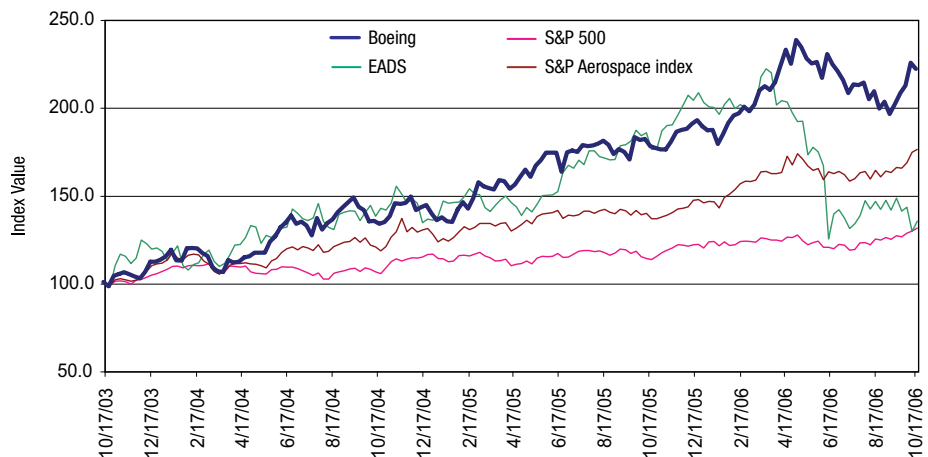
STOCK WATCH

The chart below shows the stock price of Boeing compared to other aerospace companies, the S&P 500 index and the S&P 500 Aerospace and Defense index. Prices/values are plotted as an index number. The base date for these prices/values is Oct. 17, 2003, which generates three years of data. The prices/values on that date equal 100. In other words, an index of 120 represents a 20 percent improvement over the price/value on the base date. Each data point represents the end of a trading week.

Boeing vs. U.S.-based competitors (3-year)



Boeing vs. stock indexes and foreign competitors (3-year)



Comparisons:

4-week, 52-week

	Price/value as of 10/13/06	Four-week comparison		52-week comparison	
		Price/value as of 9/15/06	Percent change	Price/value as of 10/14/05	Percent change
BOEING	82.39	75.01	9.8%	67.50	22.1%
U.S. COMPETITORS					
General Dynamics	76.09	71.69	6.1%	60.04	26.7%
Lockheed Martin	88.60	83.00	6.7%	60.72	45.9%
Northrop Grumman	69.46	68.24	1.8%	53.35	30.2%
Raytheon	50.65	47.26	7.2%	36.53	38.7%
FOREIGN COMPETITORS					
EADS *	21.40	23.50	-8.9%	29.36	-27.1%
U.S. STOCK INDEXES					
S&P 500	1365.62	1319.87	3.5%	1186.57	15.1%
S&P 500 Aerospace and Defense Index	368.51	346.99	6.2%	292.52	26.0%

* Price in Euros

SERVICE AWARDS:

Boeing recognizes the following employees in November for their years of service.

50 Years

Harley Doak

45 Years

James Clausner
William Fleming
Robert Greninger
Walter Kauai
Earl Moore
Harlan Tucker
Corman Wilkins

40 Years

Sandra Apodaca
Robert Arvizo
Tommy Bailey
Richard Barager
Arnold Barr
Richard Beckemeyer
Gary Boothe
Jesse Bradford
Marc Bruno
Robert Calliotte
Hans Carney
Luis Carrillo
Dennis Davinroy
Barbara Davis
Henry Gissel
John Gittemeier
Paul Harkins
Ronald Harris
James Haskell
Paul Heidotten
Omer Helfer
Joseph Huff
Robert Jacobs
Maxie Jarvis
Harold Jenkins
Patrick Kennedy
Sandra King
Annette Kohlmeier
Leslie Lich
Michael Lovelace
Clarence Lutz
Mona Manning
Paul McEldowney
Lynn Merrell
David Nestoss
Allan Oudean
Sallie Piccorillo
Isaac Richman
Richard Romero
William Russell
Billy Sakovich
Albert Schrammeyer
Kennard Seeney
Ramesh Shah
Dennis Steers
James Todd
Martha Wangeman
Norman Whipple
Calvin Wilson

35 Years

William Affeldt
Douglas Alquist
Duwayne Andrews
David Babinski
William Bauer

Roger Bovee
William Coalsen
Lawrence Dunn
Don Durgin
Ralph Fluchel
Gary Gilbert
Henry Hall
Richard Herman
Joe Hernandez
Nancy Jack
Patricia Johnson
Maria Jones
Leonard Lindsted
Marshall Parker
Robert Patterson
Linda Pine
Bertha Rodes
Edward Simmons
Gary Sinclair
Joyce Sonnier
Robert Souza
George Terpening
Joseph Vollmer
Carole Welch
John Wong
Theodore Yellman

30 Years

Steven Allen
Lillie Amerson
Joseph Arredondo
Gary Bauche
Terrilee Bishop
Steven Botkin
Carl Bowers
Virginia Bowne
Klynn Bragg
Phillip Bright
David Brumbaugh
Barry Brunt
William Burnett
Anthony Carter
William Claycomb
David Claysen
Susan Collison
Janith Coutret
Lynn Dyr Dahl
Stanley Erskine
Nadia Ferrer
Kelly Foley
Mary Gates
Mary Gerdes
Om Goel
Steven Goettel
Paul Goforth
Donna Gordon
Paulla Gordon
Kenneth Gray
Thomas Grimes
David Gwin
Steven Hartley
David Heath
Raymond Hemker
Donald Holland
Joan Holmgren
Rowland Horst
Margaret Huff
Patrick Hughes
Eddie Hugley

Lawrence Jacobs
Steven Jensen
Dennis Johnson
Desiree Johnson
John Jones
Kay Jones
Arthur Jorgensen
Robert Joret
Clair Judkins
Brenda Karch
Joseph Keenan
Peggy Kenney
Daniel Klovdahl
Milton Knight
Edith Lang
Carol Larrabee
William Larsen
John Long
William Matheson
Charles McCammon
Craig McDonel
Peter McGuire
Dennis McNamee
James Means
Debra Mechlin
James Meyer
Bradley Meyring
Steven Millett
Regina Minor
Lawrence Mock
Carl Monaco
Lamont Morrell
Jeffrey Nevills
Sharon Pedersen
Wallace Perks
Susan Pietrowski
David Pinick
Kathleen Reid
Craig Roloff
Gregory Russell
Beatrice Saheli
Terry Sewell
David Shearer
Jan Short
Jack Shuler
Scott Standing
Stephanie Stanhope
John Stencler
David Stephanson
Brian Stivers
Rebecca Stryker
Kay Sturm
Michael Sutter
Norma Sykes
Ronald Tapp
Otis Taylor
Anne Teich
Robert Thul
Charles Trumpowsky
Mary Valenti
Martin Voss
Arthur Ward
Gary Waters
David Webster
Mary West
Mark Williams
Mary Wilson
Robin Wilson
Jon Woodall

Rodney Wright
Richard Wyss
Michael Yohe

25 Years

Paul Aaron
Mark Abshire
Maria Adame
Robert Adams
Richard Akehurst
Delita Allison
Melanie Alvitre
Derek Andrews
Kathy Anthony
Stephanie Armstrong
Craig Arnold
Richard Aspey
Catherine Augustin
Ron Ayers
Heidi Bailey
Douglas Bain
Martin Ball
Kent Barbour
Lynn Barker
Sandra Barker
William Barloon
Darryl Barrabee
Robert Bartell
Jeanne Bartels
Mary Bauer
David Beaman
Reynolds Berger
Paul Berner
Terry Bigger
Gary Bivens
Murdock Blackmore
Dale Blanchet
Jeffery Blanchet
David Boespflug
Robert Bond
Daniel Bose
Melody Bostinelos
Patricia Bower
William Braselton
Roger Brinkley
William Brooks
Delores Brown
Kevin Bruce
Richard Bullock
Steven Bunger
Jeffrey Byers
Yolanda Calderon
Joel Camp
Constance Campbell
James Cannon
James Caravello
Maureen Carlson
Lance Carrothers
Claudia Castillo
Frank Castro
Paul Chang
Catherine Chase
Bruce Cleary
Catherine Coleman
Edward Conger
Edward Conroy
Kevin Coolidge
Jeffrey Coon
Reatha Corbett

Kathy Cordero
Robert Corprew
Mike Cotten
William Crew
Keith Cribb
Anthony Damore
Clarence Dancer
Frank D'andrea
Gerald Demuth
Fred Dewinkler
Cheryl Doorbar
Barbara Dunson
Raymond Dymale
Leo Eblen
Lawrence Eckles
Todd Eilers
Ana Escobar
J.D. Espie
Michael Essinger
Joseph Evans
William Fairbanks
Milton Farrand
Janice Fleming
Helen Forbes
Robert Foshage
David Galbraith
Thomas Gathmann
Danny Gillespie
Mark Glover
Roderick Godwin
Robert Goike
Edward Graham
Kenneth Grelle
Chris Gulacsik
Paul Gunderson
Robert Gursley
Alfred Gutierrez
Jerry Hackett
David Hallman
Arnel Handugan
Dennis Hanks
Steven Harris
James Hart
Artie Henderson
Bruce Hershberger
Michael Hewett
Daryl Hicks
Paul Hinz
James Holdener
Jeff Houchard
Richard House
William Huebner
Gerald Inukai
Pam Jacobs
Rose Jacobsen
Scotty Johnson
John Johnston
Paula Jones
Geraldyn Joubert
Connie Jusenius
Peter Kajca
Barbara Kampelman
Stephen Keeler
Alice King
Thomas Klotz
Kirby Klunder
Steven Kotzerke
John Kubiak
Joseph Kuhl
Jerry Kuhlmann
Natalie Kum
Pamela Kyle

Rhonda Larance
Sun Lee
Rose Lepo
Scott Lillard
John Lins-Morstadt
Shu-Mae Liu
Antonia Lopez
Michael Louie
Harold Lowe
John Luman
Robert Lundgren
Keith Luschei
So Ma
Lois Maes
Steven Mancino
Wilma Manning
Kin Mar
Wayne Marble
Manuel Marin
Geraldyn Marshall
Gilbert Martinez
Louis Mason
Thomas McDavid
Harry McGee
Roger McGhee
Roger McKinley
Keith McNeil
Keith Meldahl
Michael Meline
Dan Metzler
Harry Middleton
Lucinda Miller
Richard Miller
Richard Mills
Miyako Minami
Joan Mixan
Cheryl Moeller
Gene Monday
Michael Montgomery
Francisco Moran
Sydney Morgan
Fernando Morlet
Kerri Morrison
Gregory Murden
Ferman Muro
Sharron Musin
Kimberly Myers
Hilda Mynatt
Pete Nash
Arlene Nava
Victor Neally
Eric Nelson
Martin Neumann
George Newton
Dong Ngo
Hai Nguyen
Robert Norris
Matthew Nuzzo
Perwez Ubaid
Lin Ohara
James Oliver
John Olson
Daniel O'Malley
Maureen O'Neill
Morton Palmer
Gerald Parker
Timothy Parker
Thomas Partridge
Nathan Paskal
Carl Pearson
Paul Perez
Patricia Perry

Gaylene Petcu	Randall Rich	Janelle Sire	Terry Taller	Helen Viaene	John Wines
Peter Peterson	Steven Richard	Karen Slider	Douglas Taylor	Kevin Vogler	Ronald Wingfield
Gloria Petty	Ruth Robertson	Christopher Smith	Linda Taylor	Loc Vu	Charles Witte
Roger Petty	Michael Robinson	Michael Smith	Carl Tegnelia	Lauriston Wah	Mary Wollum
Steve Pewitt	Carlos Rodriguez	Jill Snell	Lee Thomas	Loretha Walker	Sandra Wood
Walter Pinkston	James Rodriguez	Audrey Stapleton	Patricia Thompson	Robert Walker	Leonidas Wright
Galen Pohl	Steven Rogiers	Douglas Stearns	Guy Thornton	Sandra Wall	Pilar Yuson
Patrick Pollock	Donna Romans	Robert Stelloh	David Troupe	Barbara Walton-	Robert Zaniboni
Christopher Potts	Charles Runge	Donald Stemple	Jose Trujillo	Hardacker	Dennis Zeugschmidt
Hazel Powers	Daniel Ryan	Roger Stine	Douglas Tulip	Kai Wang	
Jeffery Preston	Jan Sahlin	Bradley Stivers	Patrick Tymony	Richard Warner	
Pete Puhich	Douglas Savard	Jeffrey Stone	Kathleen Underwood	Ralph Webb	
Nola Rasmussen	Gary Schultz	Brian Stours	James Unland	Jackie Williams	
Blaine Rawdon	Leroy Scott	Patricia Stovey	Richard Van Alstyne	John Williams	
Gail Reagan	Maria Sellers	Walter Stretch	Tina Vargas	Mary Williams	
Sandra Reyes	Ronald Shoemaker	Jeffrey Strunk	Cody Vaught	Sandra Williams	
Joseph Rice	Richard Siers	Terrance Stuefen	Richard Verrall	Michael Willmann	

RETIREMENTS:

The following employees retired in September from The Boeing Company.

Giuseppe Abbate, 17 Years	George Coleman, 25 Years	Gregg Helterbran, 11 Years	Leonard Mallari, 20 Years	Thomas Redwine, 35 Years
Joanne Adair, 29 Years	Jerald Collier, 36 Years	Steven Henderson, 28 Years	Benjamin Malloy, 42 Years	Steven Reed, 38 Years
William Adams, 27 Years	Hubert Corder, 20 Years	John Hennigan, 10 Years	Gary Malmquist, 26 Years	Joyce Ribbert, 12 Years
John Aitken, 33 Years	William Crawford, 42 Years	Gary Herigstad, 25 Years	Harry Marienau, 28 Years	Michele Rich, 32 Years
Gilbert Allis, 27 Years	Richard Davis, 28 Years	Donald Hibler, 34 Years	John Mark, 19 Years	William Robeen, 20 Years
Dennis Andrew, 12 Years	Walter Davis, 25 Years	Ronald Hill, 33 Years	Samuel Markand, 19 Years	Ernie Roberts, 38 Years
Steven Andrews, 11 Years	Delilah Deatry, 24 Years	Dennis Hoff, 34 Years	Bruce Marshall, 21 Years	Larry Robertson, 26 Years
Cory Antonsen, 24 Years	Bruce Dennis, 33 Years	Kenneth Hogan, 30 Years	Barbara Maxon, 33 Years	Barbara Rogers, 20 Years
Jose Aponte, 32 Years	David Deschene, 39 Years	Hazel Holmes, 34 Years	Shirley McChesney, 10 Years	Richard Root, 41 Years
Allan Artimisi, 29 Years	Richard Digregorio, 40 Years	James Horsager, 42 Years	James McCormack, 23 Years	Noel Roth, 42 Years
Wayne Avilez, 42 Years	Ronald Dill, 40 Years	Raymond Hudson, 16 Years	Margaret McCormick, 21 Years	Donley Ruder, 39 Years
Howard Baer, 35 Years	Virgil Dion, 45 Years	Don Hunziker, 24 Years	Anita McCune, 27 Years	Joe Rupp, 27 Years
Ollie Baker, 24 Years	Lee Doolan, 25 Years	Forrest Hurt, 17 Years	James McEnulty, 34 Years	John Salkins, 23 Years
John Banbury, 28 Years	Grace Dooley, 27 Years	Ronald Kellm, 44 Years	Terrence McGaughan, 25 Years	James Sayers, 37 Years
John Barry, 28 Years	Ronald Dotson, 42 Years	Richard Ibach, 23 Years	Robert Meals, 19 Years	Mark Schaaf, 27 Years
Margaret Bartlett, 18 Years	Charles Dowd, 41 Years	Leonor Irabagon, 32 Years	Ronald Melliere, 37 Years	Donald Schill, 36 Years
Walter Bartlett, 24 Years	Thomas Dreier, 11 Years	Earl Johnson, 28 Years	Donald Mercer, 28 Years	George Schlie, 50 Years
Kathleen Bates, 25 Years	Michael Dupras, 24 Years	Shadrick Johnson, 21 Years	Gary Michalek, 35 Years	Kenneth Schmidt, 37 Years
William Bellrose, 30 Years	David Easterson, 40 Years	Samuel Jones, 38 Years	Victoria Millaway, 20 Years	Cecilia Schnakenberg,
Rudell Bess, 36 Years	Karon Etter, 34 Years	Lee Jorgensen, 30 Years	Andrew Miller, 22 Years	23 Years
Harry Beyer, 40 Years	Barry Evans, 16 Years	John Judy, 23 Years	Linda Miller, 16 Years	Friedrich-Wilhelm Scholz,
Waman Bhat, 38 Years	Goldie Fadeley, 3 Years	George Keller, 24 Years	Robert Miller, 22 Years	28 Years
Fred Bittick, 40 Years	Michael Fata, 32 Years	George Keramidas, 5 Years	Theodore Miller, 21 Years	William Scollard, 29 Years
Larry Blackwell, 19 Years	David Fennell, 27 Years	Judy Kirk, 19 Years	Leonard Mokshefski, 15 Years	Derotha Scott, 33 Years
Walter Blount, 40 Years	Georgine Follstad, 25 Years	Jerald Kline, 30 Years	Ruth Moore, 27 Years	Mark Scott, 33 Years
John Bogdan, 17 Years	Lillian Frazier, 34 Years	Robert Klinefelter, 33 Years	Barbara Morris, 27 Years	Tarjison Seibert, 40 Years
James Boldt, 19 Years	William Freese, 8 Years	Larry Kolesar, 33 Years	Channing Morse, 22 Years	William Semler, 32 Years
Ardis Bolen, 27 Years	Stephen Friborg, 20 Years	David Krug, 22 Years	Robert Mortell, 19 Years	Glenn Serl, 25 Years
John Bond, 11 Years	Steven Fromm, 16 Years	Kenneth Kube, 41 Years	Jerome Morton, 27 Years	Gary Sheff, 36 Years
Albert Botta, 37 Years	Christie Gage, 18 Years	Robert Lacy, 48 Years	Alan Mulally, 37 Years	Donald Shouse, 37 Years
Earnest Bowens, 30 Years	Paul Gallaway, 30 Years	Wayne Laing, 40 Years	Joanne Munkacsi, 27 Years	Lynn Shultz, 17 Years
Larry Bradshaw, 25 Years	John Gannon, 28 Years	Dean Lambert, 20 Years	Rickie Munson, 37 Years	Kim Simonelli, 31 Years
William Brester, 29 Years	Jesse Garcia, 26 Years	Kathleen Landis, 49 Years	Stephen Murdock, 7 Years	James Skidmore, 12 Years
Betty Brooks, 29 Years	Sherry George, 19 Years	Sandra Lapinski, 29 Years	Michael Mutter, 36 Years	Clifford Skouby, 34 Years
Matthew Brown, 34 Years	Charles Gifford, 21 Years	Bonita Lawrence, 25 Years	Marvin Nelsen, 43 Years	Teresa Sloniker, 19 Years
Richard Brown, 16 Years	Elmer Gipaya, 23 Years	John Legg, 22 Years	Jonna Neporadny, 7 Years	John Smiley, 33 Years
Vicki Bundy, 16 Years	Elizabeth Goforth, 22 Years	Danny Leirness, 23 Years	Roger Nutt, 20 Years	Johnny Smith, 39 Years
Roger Burk, 20 Years	Lorraine Greger, 21 Years	Allen Lener, 41 Years	James O'Brien, 27 Years	Patricia Smith, 31 Years
Edward Buxton, 41 Years	Gary Gudyka, 32 Years	Sharon Linville, 19 Years	Lorinda Padgett, 31 Years	Stephen Smith, 10 Years
James Campolo, 27 Years	John Hall, 24 Years	Bonnie Lisoski, 17 Years	Donald Page, 17 Years	Douglas Solbeck, 41 Years
Ned Carnes, 19 Years	Rosalind Harry, 23 Years	William Little, 17 Years	Cheryl Pandos, 31 Years	Richard Spickler, 29 Years
David Carter, 40 Years	Jon Harston, 11 Years	Larry Lomax, 7 Years	Donald Pennington, 37 Years	Carole Stalcup, 25 Years
Michael Chaney, 28 Years	Doris Havlick, 26 Years	Theresa Luce, 25 Years	Jill Perkins, 31 Years	Harry Steger, 43 Years
Dennis Cheasebro, 32 Years	George Hawkins, 19 Years	Ernest Macias, 40 Years	Pearle Pierce, 32 Years	Carolyn Stout, 9 Years
Jen Chu, 21 Years	Steven Hayward, 20 Years	Roger Maddox, 34 Years	David Plummer, 42 Years	Haruhiko Taima, 17 Years
Gail Clair, 22 Years	Kenneth Heaney, 36 Years	Harry Magill, 40 Years	David Plunk, 27 Years	Robert Taylor, 31 Years
Larry Clifton, 39 Years	Teddy Hedrick, 16 Years	Nickolas Mahtesian, 19 Years	Myron Posivak, 11 Years	Steven Taylor, 40 Years
			Pennie Prather, 6 Years	Edward Terry, 39 Years
			David Price, 21 Years	John Teske, 17 Years
			Roy Pryor, 29 Years	

Michael Thackeray, 10 Years
Joseph Thomas, 36 Years
Gary Thompson, 32 Years
James Thompson, 44 Years
Kenneth Thompson, 8 Years
Minh Tran, 17 Years
Leng Ung, 21 Years
Kenneth Vanderwall, 18 Years
Scott Velez, 32 Years
Jan Vetrovec, 17 Years
Vernon Vogt, 49 Years
Karen Warren, 22 Years
Jerry Watson, 17 Years
Pamela Watson, 10 Years
Mary Watt, 26 Years
Yvonne Welch, 16 Years
Gary Williams, 26 Years

Virginia Williams, 31 Years
Debbie Wilson, 26 Years
Janice Wilson, 33 Years
Janie Wilson, 22 Years
Richard Wolf, 21 Years
Gary Womble, 35 Years
Ronald Woodruff, 10 Years
Russell Wortman, 22 Years
Russell Wright, 28 Years
Gregory Young, 41 Years
Thomas Young, 22 Years
Vernon Young, 23 Years
Jerry Zankich, 21 Years
Richard Zeiss, 41 Years
Gilbert Zickler, 33 Years

IN MEMORIAM

The Boeing Company offers condolences to the families and friends of the following employees, whose deaths recently have been reported.

- Garrett Billman**, engineer/scientist manager; service date July 7, 1980; died Oct. 4.
John Carroll, housekeeper; service date Sept. 8, 1975; died Sept. 29.
Mark Cellucci, methods process analyst; service date Aug. 4, 1979; died Sept. 23.
Michael Delaney, field test technician; service date Dec. 1, 1997; died Sept. 22.
Thomas Domikaitis, facilities analyst; service date Nov. 11, 1985; died Oct. 12.
James Fox, motive equipment operator; service date May 8, 1978; died Oct. 21.
Mary Frisch, software quality engineer; service date July 28, 2006; died Oct. 2.
Timothy Giguere, production engineering project specialist; service date March 3, 1986; died Sept. 30.
William Graham, guidance navigation & control engineer; service date Feb. 11, 2005; died Oct. 24.
David Heath, Employee Relations specialist; service date Oct. 7, 1985; died Sept. 27.
Peter Hosey, electrician; service date March 22, 1971; died Sept. 21.
Robert Houchens, contract and pricing administrator; service date March 21, 1985; died Sept. 26.
Kathleen Kane, engineer/scientist; service date Jan. 15, 2001; died Oct. 10.
Frederick Leviton, mechanic; service date Sept. 16, 1977; died Oct. 10.
Constance MaGill, applications analyst; service date June 27, 1967; died Oct. 19.
Steven Mather, production associate; service date Sept. 7, 2000; died Oct. 21.
Leroy McAllister, dispatcher; service date Feb. 17, 1975; died Oct. 10.
Sherri Melnick, interiors fabrication and assembly mechanic; service date April 10, 1989; died Oct. 1.
Robert Nelson Jr., Facilities project manager; service date May 2, 1988; died Oct. 4.
Bradley Rindahl, engineer/scientist; service date March 9, 1992; died Oct. 4.
Richard Robinson, engineer/scientist; service date Sept. 25, 1985; died Sept. 27.
Ruben Rodriguez, network designer; service date March 9, 1990; died Sept. 25.
Panos Rontos, embedded software engineer; service date March 17, 1998; died Oct. 12.
Robert Rosengarten, tool fabrication manager; service date March 25, 1985; died Oct. 3.
Robert Rudd, engineer/scientist; service date Oct. 24, 1983; died Oct. 15.
Josephine Vega, mechanic; service date May 15, 1999; died Sept. 25.
Dennis Williams, Product Engineering Program Management specialist; service date Aug. 11, 1987; died Sept. 6.
Frederick White, security officer; service date Aug. 19, 1996; died Oct. 10.

A BRIEF UPDATE ON THE AEROSPACE BUSINESS,
INCLUDING BOEING'S PARTNERS AND COMPETITORS

CALENDAR OF EVENTS

- Nov. 5-7:** SpeedNews 11th Annual Regional & Corporate Aviation Industry Suppliers Conference. Indian Wells, Calif. See www.speednews.com/Conference/regionalconference.html
- Nov. 6-8:** National Defense Industrial Association's Annual International Integrated Program Management Conference. Alexandria, Va. See www.ndia.org
- Nov. 8-9:** 8th Annual Managing Aircraft Interior Costs Conference. Seattle. See www.aviationindustrygroup.com/index.cfm?pg=201
- Nov. 13-17:** National Defense Industrial Association's 6th Annual CMMI Technology Conference and User Group. Denver. See www.ndia.org
- Nov. 27-30:** 25th Army Science Conference. Orlando, Fla. See www.asc2006.org
- Nov. 28-29:** 10th Annual Latin American & Caribbean Airline Engineering & Maintenance Conference. Mexico City. See www.aviationindustrygroup.com/index.cfm?pg=210
- Dec. 4-7:** Technical Analysis and Applications Center (TAAC) 2006 Conference. This unmanned aerial systems conference is conducted by New Mexico State University. Santa Ana Pueblo, N.M. See www.psl.nmsu.edu/uav/conferences/2006

Boeing Frontiers assembles the above listings for the convenience of its readers only, and they do not constitute an endorsement by The Boeing Company. Times, dates and subject matter are subject to change or cancellation. If you have any items you wish *Frontiers* to consider for the Calendar, please e-mail them to boeingfrontiers@boeing.com, or send them by regular mail to *Boeing Frontiers* magazine, 100 N. Riverside, MC: 5003-0983, Chicago, IL 60606-1596.



Boeing, Emirates finalize 747-8 Freighter order

Boeing and Emirates last month finalized an order for 10 747-8 Freighters that's valued at \$2.8 billion at list prices. Emirates SkyCargo will receive its first delivery of Boeing's latest heavy freighter in 2010. The 747-8F is an advanced design that offers even greater operational efficiency for global freight operations, which are based largely on the industry-leading 747 freighter family. With these new 747-8 Freighters, Emirates can take advantage of strong regional and international cargo markets. Air cargo traffic into, out of and within the Middle East accounted for 5.8 percent of the world's tonnage and nearly 5 percent of the world's revenue tonne-kilometers during 2005.

AROUND BOEING

U.S. AIR FORCE PHOTO



A Boeing F-15E Eagle drops five MK-84 Joint Direct Attack Munitions over the U.S. Navy's China Lake test range near Edwards Air Force Base, Calif. Boeing recently marked 100 straight months of delivering JDAMs on time and on cost.

3,000 JDAMS, 100 STRAIGHT MONTHS

The Boeing Weapons facility in St. Charles, Mo.—a model of Lean innovation—recently celebrated 100 consecutive months of delivering Joint Direct Attack Munitions on time and on cost to the U.S. Air Force, Navy and 16 international customers.

The JDAM is a guidance tail kit that converts existing unguided free-fall bombs into accurate, “smart” munitions. Known as the world’s most accurate bomb, JDAM is a weapon that the Air Force and Navy have used extensively in global combat operations.

The Weapons plant—which to date has delivered more than 160,000 JDAM tail kits—received the highest score in last year’s Lean Manufacturing Assessment, a Boeing-sponsored external audit of the implementation of Lean philosophies and techniques. The state-of-the-art facility is a “visual factory”: Everything in the construction of the JDAM kits can be seen at a glance, inventory is kept to a minimum, and problems are identified and resolved quickly.

Boeing’s Weapons program has won numerous awards, including the Missouri Quality Award and the Shingo Prize for Excellence in Manufacturing. The Missouri Quality Award is the official state recognition for excellence in quality leadership and is modeled after the Malcolm Baldrige National Quality Award. The Shingo Prize recognizes companies in the United States, Canada and Mexico that achieve world-class manufacturing status.

Although Lean implementation is a key element in Boeing’s delivery of as many as 30,000 JDAMs in a month, the 250 employees there know Lean is not an end in itself, and prizes and milestones aren’t the end goal.

“We all have the warfighters on our minds,” said JDAM Contract lead Marcia Whitehouse. “This 100-month milestone reflects all the hard work that’s ultimately for them.”

—Marguerite Ozburn

ALSO AROUND BOEING

- **Boeing PART Page turns 10 years old.** The PART Page site recently celebrated its 10th anniversary of facilitating the day-to-day working relationship between the world’s airlines and Boeing’s Material Management organization. The secure site allows customers to place orders for spare parts, view part prices, check inventory, track the status of their orders and request price quotes. Since its introduction in October 1996, the PART (Part Analysis and Requirements Tracking) Page has received more than \$4 billion in orders. Today, the PART Page receives more than one million requests per month and serves 1,160 customers around the world.

The site does more than help Boeing serve its customers better. Boeing also benefits from the PART Page with fewer phone calls and e-mails, resulting in greater productivity.

- **Australian Hornet upgrade program celebrates milestone.** The Boeing Australia team recently celebrated a significant Hornet Upgrade Program milestone by delivering the 300th aircraft serviced in its hangar at Royal Australian Air Force base Williamtown.

The first aircraft was delivered to Williamtown for modification on Sept. 5, 2000. Since then, the team has handed back to the RAAF an average of more than four aircraft per month. ■



GAIL HANUSA PHOTO

Renovated Everett Delivery Center opens

Hundreds of employees and airline customers gathered recently in Everett, Wash., to celebrate the opening of the Everett Delivery Center (left). The new facility includes 4,400 square feet (410 square meters) of new construction and more than 15,000 square feet (1,400 square meters) of remodeled space. It features a new glass facade, second-floor observation deck, two customer lounges, 27 customer offices and eight high-tech conference rooms. In addition to the renovated Delivery Center, eight crew shelters on the Everett flight line are being upgraded with new furniture, paint and carpeting, kitchenettes, and flat-screen monitors to communicate airplane schedule information. The Everett Delivery Center and flight line upgrades are part of larger Boeing Production System and Lean+ efforts to reduce costs, shorten lead times and improve quality to increase customer satisfaction.

Scenes from all around

A quick look at recent Boeing milestones

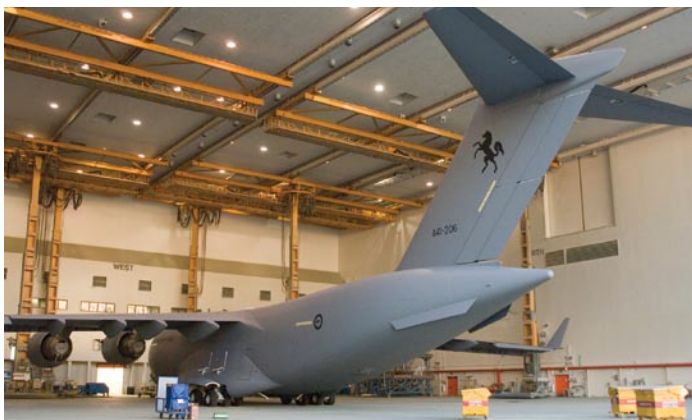
➤ SINGAPORE FINALIZES 787-9 ORDER

Boeing and Singapore Airlines said last month that the airline had ordered 20 Boeing 787-9 Dreamliners, with purchase rights for 20 additional airplanes. The carrier originally announced the selection of and intent to purchase the 787-9 in June. With this order, 33 airline customers have ordered a total of 422 airplanes in the 787 family.



BOEING IMAGE

KEN GRAEB PHOTO



^^ AUSTRALIA'S FIRST C-17 NEARS FIRST FLIGHT

The first Boeing C-17 Globemaster III for the Royal Australian Air Force rolled out of the company's paint hangar last month in Long Beach, Calif., and is being prepared for its first flight. The airplane is scheduled to arrive at RAAF Base Amberley, its home base, in December; Boeing is scheduled to deliver three more C-17s to the RAAF by 2008.

MIKE GOETTINGS PHOTO



JIM COLEY PHOTO

^^ RYANAIR ORDERS 32 MORE 737-800S

Ryanair has ordered another 32 Next-Generation 737-800 airplanes, Boeing and the Dublin-based airline said in late September. Deliveries for this order are scheduled to begin in 2008. To date, Ryanair has ordered 281 737-800s. Ryanair, whose fleet is made up solely of 737-800s, is the largest European operator of 737s and operates one of the youngest fleets in Europe.

<< NEW LIGHT HELICOPTER TAKES TO AIR

Boeing's newly designed A/MH-6X light-turbine helicopter made its first flight in late September. The A/MH-6X lifted off at the Boeing Rotorcraft Systems facility in Mesa, Ariz., and flew as a piloted aircraft for about 14 minutes before landing safely. The aircraft combines the performance of the A/MH-6M Mission Enhanced Little Bird with the unmanned aerial vehicle technologies of the Unmanned Little Bird Demonstrator.



MADE WITH JAPAN

ボーイングの見果てぬ夢。

それは、航空機の理想を追い求めることだけに限りません。

空の安全を守るのもボーイングの願いのひとつだからです。

空の上で起きているすべてを監視・報告して、空を絶えず安全に

保つための早期警戒管制機、AWACS(Airborne Warning And Control System)。

このAWACSのメンテナンスは日本のパートナーである川崎重工と東芝が行い

常にベストコンディションで飛行させることで、空の安全確保に貢献しています。

数十年にわたってパートナーシップを友情にまで深めた信頼の絆。

その成果が、日本の国土を守るために役立てられているのです。

ひとりでは夢に過ぎないことも

手を取り合えるパートナーがいれば、きっと実現できる。

さあ、一緒にすごいこと。

 **BOEING**
いつも新しいフロンティアへ

This ad, titled "Moon," is the fourth in a series of advertisements developed to reinforce Boeing's commitment to its partnerships with Japan, a relationship that began more than 50 years ago. "Moon" highlights Boeing's collaboration with Kawasaki Heavy Industries and Toshiba for maintenance of the Airborne Warning and Control System aircraft.



THE MOST LASTING GIFT EVER GIVEN TO FREEDOM WAS COURAGE.

On this Veterans Day, we salute and remember all of those who have given so much to protect our democracy and freedom.

 **BOEING**

This ad was created to demonstrate Boeing's appreciation and gratitude to U.S. veterans. Part of an integrated effort, this print ad will run in The Washington Post and The Washington Times, as well as in more than 70 regional, trade and military publications. The campaign will also feature TV and online components.