

Frontiers

www.boeing.com/frontiers

LOOKING AHEAD

Meet the Advanced Systems organization of IDS, where Boeing employees are developing new-technology solutions to support its defense, security, space and new market customers

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Determinant assembly helps 777 line

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A look at Boeing's wellness resources

A QUALITY DECISION 34

Streamlined process aids Boeing, suppliers



FOR YOU, THERE WERE NO LIMITS.

FOR AS LONG AS YOU CAN REMEMBER, you never let anything stop you from doing what you wanted to do. At Boeing, we encourage our employees to pursue their dreams so their ideas have the chance to soar above the rest. The job categories below include some of the key skills we are seeking for open positions in Alabama, Arizona, California, Colorado, Florida, Kansas, Maryland, Missouri, Oklahoma, Pennsylvania, Texas, Virginia and Washington. To view detailed job descriptions and apply for these and other similar positions, please visit: boeing.com/careers

- Avionics - Flight Test
- Communication Systems - MILSATCOM/
Network/Satellite/Wireless
- Electrical Engineering - Components
- Electronic Warfare
- Finance/Accounting/Planning/
Scheduling/Estimating/Pricing/EVMS
- Flight Control Law Engineering
- GIS/Imagery
- Ground Missile Defense/Ground-Based Missiles
- Information Technology
- Mechanical Engineering - EM/Structural/
Dynamic/Thermal/Stress
- Modeling & Simulation
- Network Architect/Network Security
- Networking/Embedded/Web/Architecture
- Operational Concept Analysis
- Payload Systems - Spacecraft/Satellite/Aircraft
- Quality Engineering
- Radar Design/Analysis
- Signal Processing - Sonar/Radar/DSP/SIGINT Systems
- Software Engineering - Real-Time
- Systems Engineering

To view a comprehensive listing of all available positions, please visit: boeing.com/employment. Security clearance requirements are indicated in the position listings. U.S. citizenship is necessary for all positions requiring a security clearance.

Boeing is an equal opportunity employer supporting diversity in the workplace.

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This ad, from the "Hope for the Future" recruitment campaign, is part of Boeing's efforts to attract a talented and diverse group of professionals and encourage them to explore a career with Boeing. The skill sets listed demonstrate the breadth and depth of Boeing opportunities. The ad directs candidates to visit: boeing.com/careers to read detailed job descriptions and apply online.



ON THE COVER: The A160 Hummingbird.
Photo by Bob Ferguson

Frontiers



BOB FERGUSON PHOTO

**COVER
STORY**

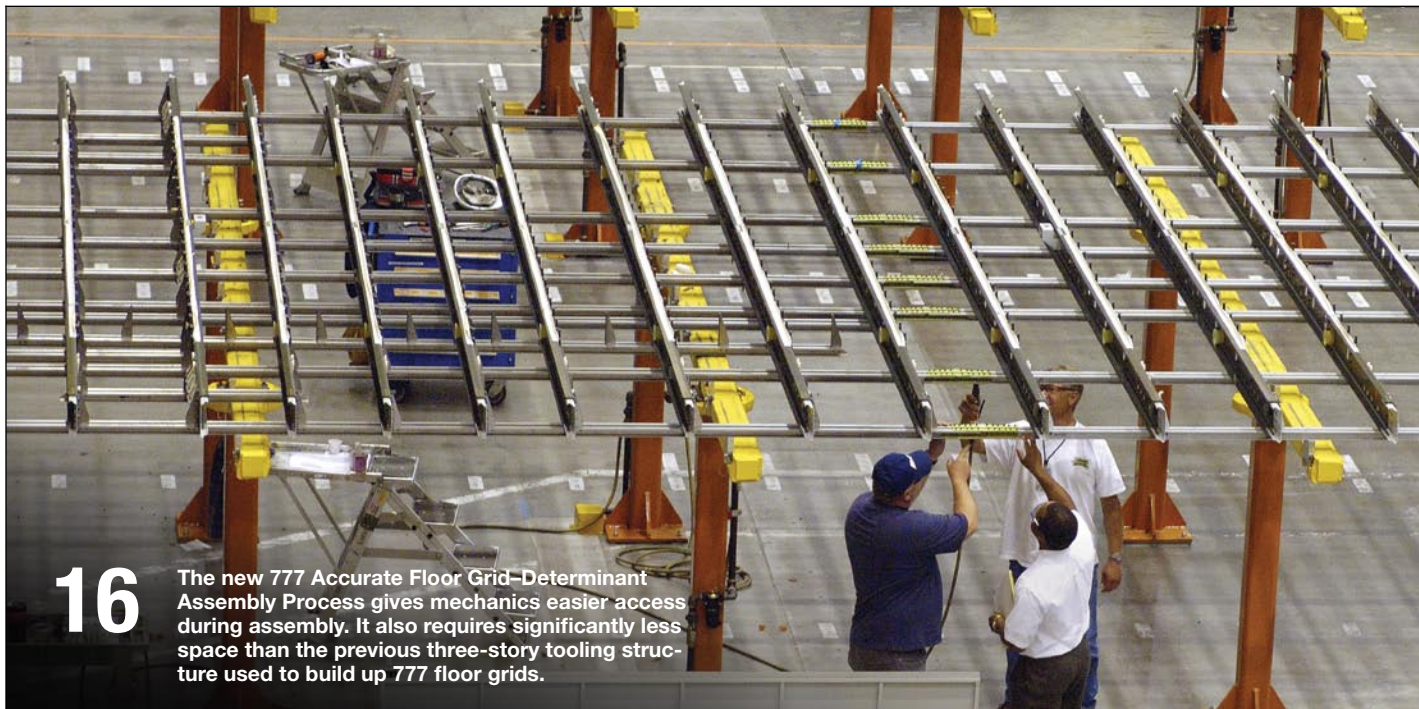
MOVING AHEAD 12

Employees in the Advanced Systems organization of Integrated Defense Systems—such as those working on the Orbital Express ASTRO demonstration satellite in Huntington Beach, Calif. (above)—are developing future capabilities to support defense, security and other customers.

**FEELING
BETTER**

28 What's in your wellness toolkit? Boeing offers employees wellness "tools" from information to services to fitness opportunities. These resources allow employees to focus on the wellness of themselves and their family members. That helps employees be more productive at work and at home.

**FEATURE
STORY**



MARIAN LOCKHART PHOTO

16

The new 777 Accurate Floor Grid-Determinant Assembly Process gives mechanics easier access during assembly. It also requires significantly less space than the previous three-story tooling structure used to build up 777 floor grids.

COMMERCIAL AIRPLANES

Parts of a tool

16 Members of the Manufacturing Engineering team in Everett, Wash., came up with an idea to improve the assembly of 777 floor grids. If you've played with Lego toys or an Erector set, you'll understand how this process improvement works.

COMPANYWIDE

Boosting growth, productivity

5 In this month's Leadership Message, Shep Hill, senior vice president, Business Development and Strategy, explains what elements go into achieving simultaneous productivity and growth—and how these elements are implemented.

Helping suppliers help Boeing

34 To better ensure quality compliance among suppliers, Boeing has streamlined processes. This lets Boeing spend more time being proactive with suppliers—and makes suppliers more efficient by reducing duplicative quality-compliance audits and processes.

INTEGRATED DEFENSE SYSTEMS

What's the big idea

20 Boeing is developing a high-capacity miniature satellite. It weighs less than three pounds (1.36 kilograms) and can fit in a lunch box, but it can perform more than 300 million instructions per second with just one of its four microcontrollers.

Commitment to Service

18 Boeing Service Company tackles spacecraft-related jobs from preparing payloads for launch into space to maintaining communications satellites.

Look over here

21 When in space, astronauts must be ready to tackle myriad maintenance and repair tasks. Boeing is working on augmented reality, a video-based technology designed to help improve training methods

Teach your airmen well

24 Boeing is overseeing the planning of an F-22 Raptor maintenance training facility at Sheppard Air Force Base, Texas. The facility will give attending airmen the equivalent of a two-year college program in four months.

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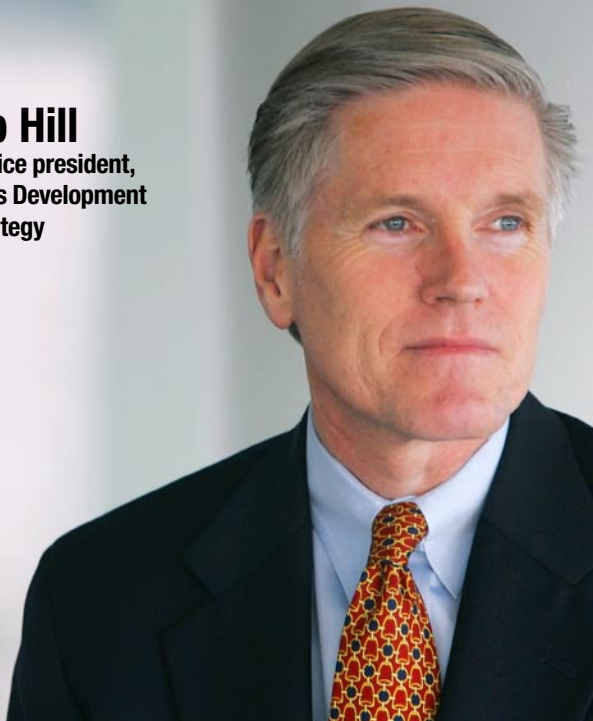
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Defining the process of growth

Shep Hill

Senior vice president,
Business Development
and Strategy



KEITH WOOD PHOTO

Process—Webster’s dictionary defines process as “a series of actions or operations conducing to an end.” Related words include course, method, route, practice and means. At Boeing, the phrase “growth as a process” highlights the concept that business growth results from a disciplined set of actions, a method of operation and a repeatable course, rather than simply as a reaction to a series of opportunities.

Why is this concept important to Boeing now and in the future? Boeing enjoys a position as the world’s largest aerospace company. Our market strategies—of efficient point-to-point commercial air travel, network-enabled military platforms, and high-quality, cost-effective services in support of both—have resulted in competitive success and an industry-leading backlog. Our balanced portfolio of both commercial airplanes and national-security products has helped mitigate inherent market cycles. But from a historical perspective, Boeing has struggled—relative to industry peers—in sustaining profitable growth. Even today, we remain subject to the ebb and flow of our markets.

Chairman, President and Chief Executive Officer Jim McNerney’s emphasis on productivity and growth points to the need for us to be both efficient at the bottom line (profits) and disciplined in adding to the top line (revenues). If we do this, we will create sustainable value and earnings-per-share growth over time. The greatest challenge for achieving simultaneous productivity and growth is developing an ability to improve the top line and the bottom line, year after year, even in difficult market conditions.

So, then, how do we describe the process, and what are its essential ingredients?

The process is not elaborate and the ingredients are not new; the emphasis is on the discipline of implementation.

First, we must understand the markets we serve, in detail and objectively. Are the markets growing and profitable? How are they segmented? Are there fault lines due to change?

Within those markets, we have to define the enduring customer needs—articulated and unarticulated, addressed and unaddressed, current and future.

Next, we must develop a strategy to competitively distinguish ourselves in meeting those needs.

Then comes assessing the capabilities necessary to implement our strategy and whether we possess those capabilities or need to develop, partner or acquire them. If the latter, we then identify the necessary resources to do so.

Finally, we create a Boeing solution and determine how it will be delivered and supported in a manner that delights the customer.

While the process is straightforward, it cannot be mechanical in nature. It relies on insight, foresight and judgment. To grow, Boeing must be anticipatory—using current market and customer knowledge to envision the future while taking the actions necessary to intercept that future before the competition does. The in-depth thinking and analysis of what the future might look like—and how we can shape it—is integral to the process.

Our future focus must be aligned with our current performance. Incremental growth relies on a stable base from which to grow. We must continue our focus on customer relationships, the quality of the customer experience, and the value of our products and services. We must ensure we capture the full value of the business we have by executing flawlessly and driving down our costs. We must continue to expand our services capabilities and market share through improved cost structure, partnerships and acquisitions. Through Phantom Works, we must continue to provide innovative technologies that enable our businesses to deliver the capabilities that our customers will need in the future. Finally, to augment organic growth, we must prepare to move into attractive adjacencies with existing capabilities or through strategy-driven acquisitions that enable market access or capability enhancement.

Boeing’s revenue growth forecast is healthy today. It benefits from an up cycle in commercial airplanes offsetting a moderating defense market—just as a rising defense cycle had offset the post-9/11 downturn in commercial aviation.

The critical challenge Boeing faces in the future is whether we can sustain profitable growth through the highs and lows of both of our largest markets. This will depend on technology and innovation, as well as strategies that anticipate the future and competencies that will help create it. It will also depend on leaders engaging and inspiring their teams to realize that driving growth and improving productivity is hard work—yet it’s exciting, rewarding, and fun!

Repeatable excellence in design and manufacturing of our products is achieved by outstanding employees who use disciplined processes. Sustainable growth will be accomplished in the same manner. ■

Frontiers

Publisher: Tom Downey
Editorial director: Jo Anne Davis

EDITORIAL TEAM

Editor:
 Paul Proctor: (312) 544-2938
Managing editor:
 Junu Kim: (312) 544-2939

Designer:
 Heather Dubinskas: (312) 544-2118
 Cal Romaneschi: (312) 544-2930

Commercial Airplanes editor:
 Dick Schleh: (206) 766-2124

Integrated Defense Systems editor:
 Diane Stratman: (562) 797-1443

Engineering, Operations and Technology editor:
 William Cole: (314) 232-2186

Shared Services editor:
 Mick Boroughs: (206) 919-7584

Copy editor:
 Walter Polt: (312) 544-2954

CONTRIBUTING EDITORS

Boeing Capital Corp.:
 Donna Mikov: (425) 965-4057

Connexion by Boeing:
 Jack Arends: (206) 655-9509

ONLINE PRODUCTION

Production manager:
 Alma Dayawon: (312) 544-2936

Web designer:
 Michael Craddock: (312) 544-2931

Graphic artists:
 Heather Dubinskas: (312) 544-2118
 Cal Romaneschi: (312) 544-2930

Web developers:
 Lynn Hesby: (312) 544-2934
 Keith Ward: (312) 544-2935

Information technology consultant:
 Tina Skelley: (312) 544-2323

How to contact us:

E-mail:
 BoeingFrontiers@boeing.com

Mailing address:
 Boeing Frontiers
 MC: 5003-0983
 100 N. Riverside Plaza
 Chicago, IL 60606

Phone:
 (312) 544-2954

Fax:
 (312) 544-2078

Web address:
 www.boeing.com/frontiers

Send all retiree address changes to
 Boeing Frontiers, MC 3T-12
 P.O. Box 3707
 Seattle, WA 98124-2207

Postmaster: Send address corrections to
 Boeing Frontiers, MC 3T-12
 P.O. Box 3707, Seattle, WA 98124-2207
 (Present addressees, include label)

You can't fuel me

I wish to dispute the fuel-efficiency comparison table in "Movement improvement" (Page 30, August 2006)—specifically, the 10.7 and 6.4 liters per 100 passenger kilometers attributed, respectively, to the sport utility vehicle and the car. Per the description at the bottom of the table and simple algebra, an SUV or car transporting five passengers need only travel 20 kilometers (12.43 miles) to achieve 100 passenger kilometers.

I own a Jeep Grand Cherokee. I know from experience that my rig with five passengers and the cargo area loaded-to-the-gills with heavy camping gear will deliver more than 16 miles per gallon all day long. Given that a gallon of gasoline equals 3.79 liters and my passengers' trip of 12.43 miles is going to consume 0.77 gallon of gasoline, SUV's fuel-efficiency (per 100 passenger kilometers) magically drops to 2.94—right in the midst of Jumbo/Dreamliner efficiencies.

If the five of us hop into my daughter's Toyota Corolla and double the gas mileage, the "car" now delivers the 100 passenger kilometers on a miserly 1.47 liters of gasoline. Might someone have been comparing a single-rider road vehicle to a fully-loaded aircraft? Not a very fair comparison, I'd assert.

—Patrick McKillip
 Puyallup, Wash.

Editor's note: *The following response comes from Bill Glover, Director, Environmental Performance for Commercial Airplanes:*

"The automobile numbers used in the referenced illustration were calculated from the vehicle manufacturer's published numbers. Typical passenger load

"Might someone have been comparing [the gas mileage of] a single-rider road vehicle to a fully-loaded aircraft? Not a very fair comparison, I'd assert."

—Patrick McKillip, Puyallup, Wash.



in Everett about how important it is to wear your Boeing Identification badge "chest high" while on company property. Then I notice multiple articles in the August 2006 edition of *Boeing Frontiers* and *Challenge* with photos of our leaders not wearing a Boeing badge. Are they setting a bad example and not following company policy? Or do they think everybody recognizes them so there is no need to wear a badge?

—Russ Christianson
 Everett, Wash.

for each mode [of transportation] was used in the calculation in order to put all vehicle types on an equal footing. The number of passengers assumed was based on published statistics. Typical number of passengers for road travel, according to Eurostat, is 1.7 passengers per vehicle; typical road travel passenger load per the U.S. Department of Transportation is 1.8. For trains, 40 percent full is typical for low speed trains; 50 percent is typical for high speed trains. For airplanes, 70 to 90 percent is typical, depending on configuration. With these charts, our intent is to truthfully state typical use while making the points that airplanes are pretty frugal on fuel—and that Boeing's newer airplanes are even more so."

Badge of honor?

I notice all the fliers posted around the office buildings

Way to go, Chinooks

I enjoyed the article about the CH-47F Chinook in the September 2006 issue. As a retiree of Boeing Rotorcraft of Philadelphia, this article brought back many wonderful memories of working on the CH-47 program. Having started with Boeing in the shop, then transferring to Quality Assurance and finally ending my career in Contracts, I was involved in many facets with this great aircraft.

In the article, Chinook director Jack Dougherty said he "could not be more proud to be associated with this great aircraft." I agree with this statement, and I am proud to have been associated with all of the other products built at Boeing during my employment.

—Bernie Weisberg
 San Diego

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

AN A-MAZE-ING 787 DISPLAY People in the Puget Sound area of Washington state this fall will get a unique look at Boeing's super-efficient 787 Dreamliner when they visit Stocker Farms in the town of Snohomish. Boeing partnered with Stocker Farms to feature the 787 as the design of the farm's annual corn maze. The maze uses a series of trails throughout the 10-acre field to create the design of a 787. The theme of this year's maze, "Outstanding in Our Field," represents Boeing's commitment to excellence and innovation in aerospace and Stocker Farms' excellence and innovation in agricultural entertainment.

SCOTT LEFEBER PHOTO



QUOTABLE

We believe [Boeing] is well positioned to continue to deliver superior results and customers will continue to hold Boeing products and services in high regard.”

—Howard Rubel, an analyst for Jefferies & Co., in a Sept. 6 report issued after the appointment of Scott Carson as president and CEO of Boeing Commercial Airplanes

This is a big deal, and none of us will fail. And we won't let them fail, either.”

—Craig Saddler, vice president, Business Management for the 787 Program, on the program's global partners network, in a Sept. 8 Bloomberg News Service report

I am pleased that today's test of our ballistic missile defense system appears to have been a success.”

—Donald Rumsfeld, U.S. Secretary of Defense, in a Sept. 1 statement issued after the Ground-based Midcourse Defense system successfully completed an intercept test. Boeing is the GMD program's prime contractor

IAM PROMOTIONS

No promotions listed for periods ending Aug. 25 and Sept. 1, 8, 15 and 22.

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>



BOEING PHOTO



ED TURNER PHOTO

747 Large Cargo Freighter completes 1st flight

The first 747-400 Large Cargo Freighter lands at Taiwan Taoyuan International Airport near Taipei Sept. 9 at the end of its first-ever flight. Capt. Joe MacDonald, 747 chief pilot, flew the LCF—one of a fleet of three specially modified airplanes that will transport the major components of the 787 Dreamliner—for two hours, four minutes, starting a flight test program that is expected to last through the end of the year. After completing three test flights in Taipei, the LCF flew to Seattle in mid-September to complete its flight-testing program. The airplanes are being modified by Evergreen Aviation Technologies Corp. (EGAT), a joint venture between General Electric and EVA Air.

Newest 737 takes flight

The newest member of the Next-Generation 737 airplane family flew for the first time last month. Painted in the Boeing blue-and-white livery, the 737-900ER (Extended Range) took off on Sept. 1 from the Renton Municipal Airport in Renton, Wash., and flew over the Seattle area and other parts of Washington State. The first flight marks the beginning of a five-month flight-test program to obtain certification of the airplane from the U.S. Federal Aviation Administration and the European Aviation Safety Agency by early 2007. The 737-900ER flight-test program will include a second test airplane. Both flight-test airplanes are scheduled to be delivered next year to Indonesia's Lion Air, the 737-900ER launch customer.

See the full picture

Where can I find out about all the benefits Boeing offers? How do I know how much my total package is worth? Will I be able to afford to retire? What would happen to my finances if I increased my savings-plan contribution?

You can now get answers to and information on these and many other questions about the valuable pay and benefits package Boeing provides to employees. It's in your personalized Pay & Benefits Profile—available online through TotalAccess.

Here's a sample of what your Pay & Benefits Profile offers.

Know the numbers. See how your total package adds up and understand the value of each component of your overall pay and benefits package. Understand what Boeing invests in you.

Plan your future. Your profile has a variety of tools to help you plan your financial future, including

- Estimating pension benefits at various retirement ages.
- Modeling different potential investment returns.

- Modeling additional contributions to the savings plan.
- Estimating your retirement expenses.
- And lots more.

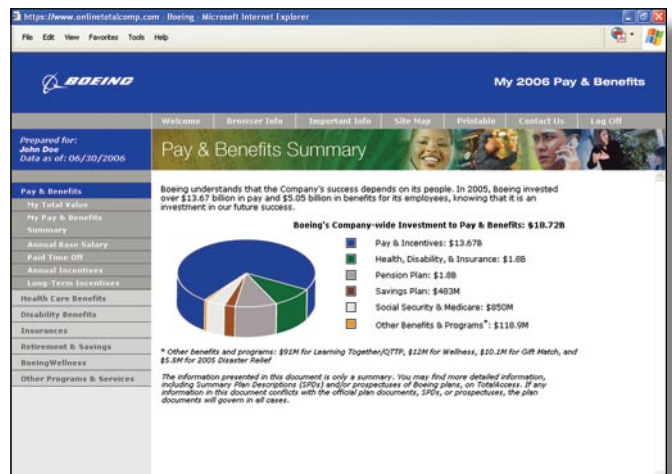
Take advantage.

Boeing offers an enormous variety of programs and services to help you manage your health, wealth and life. Be sure to check out all the tools and resources, including the Employee Assistance Plan, Family Care Resources, Boeing Wellness and a whole lot more (for more on wellness resources, see Page 28).

Take control. The real value of your benefits only comes from actively taking control and using the benefits to your best advantage. The new Pay & Benefits Profile can help. And be sure to share this information with your eligible family members. Or print it out and let a financial advisor help you plan your future.

To view your personalized Pay & Benefits Profile, visit TotalAccess online:

- From the Boeing network, log on to the MyBoeing employee portal at <https://my.boeing.com> and select the TotalAccess tab. Click My Pay & Incentives, and you'll



Employees can now see their personalized Pay & Benefits Profile on TotalAccess.

see a link to your Pay & Benefits Profile in the right column.

• From an Internet-connected computer outside the Boeing network (such as a home computer), use your TotalAccess password and BEMS ID (or Social Security Number) to log on to www.boeing.com/express. Select the TotalAccess tab, and then click My Pay & Incentives to view your profile.

(The profile is available to most U.S.-based employees and those on international assignment.) ■

Where no F-15 pilot has gone before

Col. Jon “JB” Kelk isn’t your “average” F-15 pilot. In fact, he’s spent more time at the controls of single-seat F-15s than any other pilot.

On Aug. 8, Kelk surpassed 4,000 flight hours in F-15A-Ds—marking the first time an F-15 pilot has reached the 4,000-hour plateau. The historic milestone represents more than double the average number of hours F-15 pilots spend in the cockpit over the course of a career.

“One thousand hours in a fighter is a lot and 2,000 hours is incredible,” said Bob Martyn, who works in business development on the F-15 program for Boeing and flies F-15s with Kelk’s squadron in the Missouri Air National Guard 110th Fighter Squadron. “Three thousand hours is rare, but 4,000 hours is unheard of. Until now.”

To commemorate the feat, what did Kelk and nine other pilots do? What else but take

to the skies for a 10-ship sortie on Sept. 9, with Kelk leading the way.

“It’s really a celebration to all the men and women of the 110th Fighter Squadron and the 131 Fighter Wing. I just happen to be part of it,” said Kelk. “The 4,000-hour milestone is a nice reflection point to look back on. You cross it and then look to your next flight, because you’re only as good as your last sortie.”

One would think that after spending so much time in and around aircraft for a part-time job with the Air National Guard, Kelk would choose something a little more down-to-earth for a full-time job. But for his full-time job, Col. Kelk becomes First Officer Kelk, flying Boeing 757s and 767s for a U.S.-based carrier.

“What can I say?” Kelk said. “I’m a happy, satisfied Boeing customer.”

—Chris Haddox

Col. Jon “JB” Kelk prepares to take off in an F-15. He’s the first U.S. Air Force pilot to surpass 4,000 hours of flight time in F-15A-Ds.



MISSOURI AIR NATIONAL GUARD PHOTO



Former Boeing engineering leader Cosgrove dies

Benjamin Cosgrove (left), retired senior vice president for Technical and Government Affairs for Boeing Commercial Airplane Group, passed away Sept. 8 at the age of 79. Cosgrove joined Boeing in 1949 and served as a stress engineer and structural unit chief in technical staff on the B-47, B-52, 367-80, KC-135, 707, 727, 737, 747 and the Supersonic Transport programs. In 1975, Cosgrove became director of engineering for the 7X7 development program (forerunner of the 767). Subsequent roles included director of engineering for the 707/727/737 Division, director of engineering for the 767 program, head of engineering for the Everett Division, and head of the Engineering Division of the Boeing Commercial Airplane Group. Cosgrove is survived by his wife and five children.

An experiment for security

As U.S. homeland security requirements heighten, the work of a group of students at California State University, Long Beach (CSULB), is paving the way toward understanding how unmanned aerial vehicles can contribute. Their work recently reached a milestone, as commercial jetliner pilots took part in a study and provided feedback on operating around UAVs.

This UAV/Air Traffic Management simulation lab effort began in 2003 under a \$250,000 Boeing donation for computer hardware and integration. Nine Human Factors graduate students, four of whom are on Boeing scholarships, began investigating the impact of UAVs operating in proximity to commercial aircraft.

After a series of successful tests, a major accomplishment was achieved early this year when four commercial airline pilots participated in a study, flying simulated UAVs as the CSULB team acted as air traffic controllers. The subjects said they found the idea of integrated UAV/aircraft flight in the terminal area to be clearly feasible and potentially quite valuable.

“University studies are important because they prove feasibility, which often translates into future business,” said Howard Chambers, Boeing vice president and general manager of Space and Intelligence Systems and a sponsor of the project.

Through Boeing’s Enterprise University Relations program, Boeing partners with colleges and universities to shape the future work force, develop educational opportunities for current employees and access research in critical technologies.

—Diana Ball

Howard Chambers (left), vice president of Space & Intelligence Systems for Boeing, and Cal State University, Long Beach, graduate student Jerome Kraft monitor the results of a simulation of an unmanned aerial vehicle sharing airspace with commercial jetliners near a busy airport.



TONY POMERO PHOTO

Another health choice

Coming soon: New insurance option that offers coverage and tax advantages

Beginning in January, Boeing will offer nonunion employees a new health-care option that provides comprehensive medical coverage—and something more.

In connection with the health plan, Aetna, the plan's administrator, will offer employees a tax-advantaged opportunity to save for current and future medical expenses, including retiree medical expenses.

Here's how it works. If an individual is enrolled in a "high-deductible health plan," as defined by federal law, and meets certain other requirements, that individual can establish a Health Savings Account. Employers can contribute to an employee's HSA with tax-free contributions, and an employee can add his or her own pretax contributions.

The accounts can grow tax-free, and amounts withdrawn for qualified medical expenses are also tax-free. Employees own the accounts; they can use the funds for medical expenses even if they switch health plans or leave Boeing.

This type of health plan is catching on. The number of individuals enrolled in high-deductible health plans has grown from about 438,000 in late 2004 to 3.2 million in January. And in his State of the Union address and in later legislative recommendations, President Bush highlighted this type of plan as one that might help alleviate high medical costs for individuals and businesses.

MEET PPO+ACCOUNT

Boeing's new medical plan will be

called the PPO+Account and will use Aetna's national network of doctors and hospitals. Although the deductible is higher than other plans Boeing offers, people who enroll in the plan can offset the deductible by establishing an HSA (as long as they meet certain other requirements, such as not being covered by another medical plan).

For employees who enroll in the PPO+Account plan and meet eligibility requirements, Aetna will offer the opportunity to establish an HSA.

Like any qualified Health Savings Account, the Aetna HSA offers enrollees a unique combination of tax-saving features:

- The employer can make tax-free contributions to the account.
- The employee can add pretax contributions through payroll deductions.
- The funds in the account grow tax free.
- Any funds withdrawn for qualified medical expenses are tax free.

(For employees in California, New Hampshire, New Jersey and Wisconsin, federal tax advantages apply, but state tax advantages currently do not.)

HSA'S OTHER ADVANTAGES

Here are other advantages to an HSA:

- The employee's HSA balance rolls over from year to year. There is no "use it or lose it rule," and while there is an annual limit on contributions, there is no limit on the total amount that an employee can accumulate over time.

- An HSA is fully portable. Once the funds are deposited in an employee's account, they belong to the employee. If the employee switches health plans or leaves his/her employer, the funds still belong to the employee. And the employee can roll over the funds to another qualified HSA at any time.



ISTOCK PHOTO

For those who qualify for and choose to set up an Aetna HSA, Boeing will make contributions to the account—whether or not the employee makes contributions.

WHO'S ELIGIBLE

The new PPO+Account is being offered to nonunion employees who work in the United States. Nonunion employees who meet the HSA requirements will be able to sign up for Aetna's HSA. (Because of tax laws and other federal requirements, the plans will not be offered to residents of Hawaii or to U.S. employees on assignments outside the United States.)

It's a new plan and a new concept, and it may not be right for everyone. Boeing encourages employees to see whether the PPO+Account and an HSA make sense for them.

During benefits enrollment, which runs from Nov. 6 through Dec. 1, employees will have tools available through the Your Benefits Resources Web site (available via TotalAccess) and on Aetna's Web site (www.aetna.com) to help them compare health-plan options and decide what's best for their personal situation.

Nonunion employees should watch their home mail for more information from Boeing and Aetna about their plan options, as well as more details about the new PPO+Account and the Aetna HSA. Watch for announcements in late October about an online tutorial that will provide an interactive way to learn more about the PPO+Account. ■



ISTOCK PHOTO

Why it's aligned with strategy

How does the new PPO+*Account* plan support Boeing's health-care strategy? Here's how it's aligned with Boeing's strategic benefit objectives.

Promotes individual responsibility for choosing and using the right health care services. The PPO+*Account* encourages employees to think about health care from a new perspective—that of a consumer—by providing employees more responsibility for how their health care dollars are spent.

Encourages the use of providers who meet certain performance standards. In many areas, the specialists in the Aetna network carry Aetna's Aexcel designation, which means that those doctors have been measured on a variety of nationally accepted quality and efficiency criteria.

Supports a healthy lifestyle. To help employees and their families stay healthy and avoid the need for major (and costly) care, the PPO+*Account* pays 100 percent for covered network preventive care up to an annual

maximum. As always, employees have access to health management resources through Boeing's wellness programs and tools available at www.BoeingWellness.com.

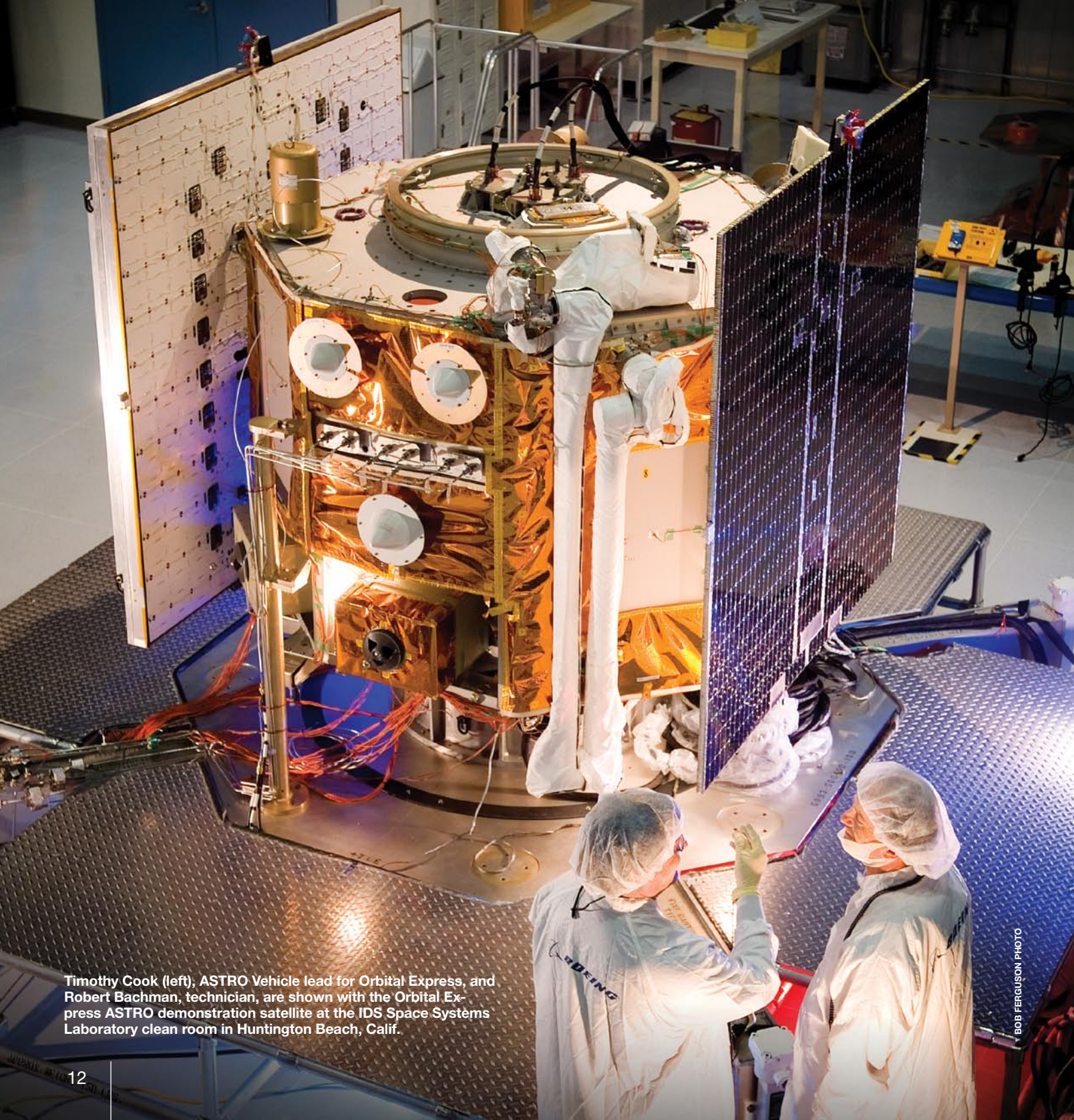
Provides a cost-competitive solution. Boeing continues to look for innovative ways to provide benefit choices that are cost effective for Boeing and its employees. Accordingly:

- The higher deductible (a federal requirement for individuals who wish to set up HSAs) can be partially offset in the first year by Boeing's contribution to the employee's Aetna HSA.
- In future years, if an employee chooses an HSA and there is a balance left in the HSA, that money can grow and be used to completely offset the deductible. It can also be used for other future medical expenses, including retiree medical expenses.

PPO+*Account* for union employees

Some of Boeing's union-represented employees are offered a different PPO+*Account* with a Health Reimbursement Account (HRA) instead of a Health Savings Account (HSA). The HRA has some different features than an HSA. Employees should carefully read the materials they receive about the plans available to them.

BRIGHT IDEAS!



Timothy Cook (left), ASTRO Vehicle lead for Orbital Express, and Robert Bachman, technician, are shown with the Orbital Express ASTRO demonstration satellite at the IDS Space Systems Laboratory clean room in Huntington Beach, Calif.

BOB FERGUSON PHOTO

IDS' Advanced Systems looks to develop products that are futuristic—yet are in line with budgets and Lean

By MARC SKLAR

Imagine a helicopter that can fly autonomously for long periods of time. A networked system to secure U.S. borders. A satellite that provides a space repair and refueling service. A hypersonic vehicle that can soar through the atmosphere at six times the speed of sound. Or a fighter aircraft that can conduct missions without help from human controllers on the ground.

These are just a few of the many futuristic programs within Advanced Systems, the organization responsible for generating new business opportunities and transitioning technologies for Integrated Defense Systems. Through the work undertaken by the people of Advanced Systems, Boeing is channeling its technical know-how to develop future solutions that will support its defense and other customers while respecting their budgets—and will give Boeing an advantage in the competitive defense market.

As part of this year's IDS reorganization, Advanced Systems absorbed the former IDeAS (Integrated Defense Advanced Systems) organization of Phantom Works that was responsible for creating and capturing new opportunities and transferring them to IDS business units. Advanced Systems remains vitally linked to Phantom Works, which provides advanced technologies to the Boeing enterprise.

Here's a brief look at some of Advanced Systems' top programs.

SBlinet. SBlinet is the technology component of the U.S. Department of Homeland Security's Secure Border Initiative. A Boeing-led team won this contract in September. Boeing's solution, developed by Advanced Systems' Integrated Defense & Security Solutions (IDSS) element, concentrated on using proven, low-risk, off-the-shelf technology to ensure SBlinet will significantly improve the availability of information and tools to Border Patrol agents. This will let them better detect, identify, classify and resolve illegal border crossing incidents. IDSS' ability to rapidly deploy people and best-of-industry capabilities enabled it to provide DHS and Customs and Border Protection with the preferred solution and team.

A160 Hummingbird Unmanned Aerial System. The autonomously flown A160 looks like a helicopter but is unlike any other helicopter on the market. It can reach higher altitudes, hover for longer periods

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It's elemental

There are five elements of the Advanced Systems organization of Integrated Defense Systems. Here's a quick overview of each.

Advanced Logistics Support Systems: ALSS is driving the development, growth and transition of innovative, knowledge-based logistics capabilities for Support Systems. With a central focus on the emerging network-centric logistics marketplace, ALSS is working on deploying total asset visibility, data management/mining, prognostics and legacy systems integration solutions for end-to-end (factory-to-foxhole) logistics.

Advanced Network and Space Systems: AN&SS is developing the next generation of network capabilities and space assets for both defense and commercial uses. This includes the Orbital Express on-orbit satellite servicing system scheduled for launch this fall. Other programs include the WaveRider hypersonic demonstrator, Space Radar and network systems such as Army Airborne Command and Control Systems and wide band on the move.



BOE FERGUSON PHOTO

The A160 Hummingbird is being tested at Victorville, Calif. This unmanned aerial vehicle has the capability of flying at higher altitudes and traveling longer distances than current helicopters.

Advanced Precision Engagement & Mobility Systems: APEMS programs will provide the capabilities needed by the transformational defense forces of the future. Programs include the A160 Hummingbird rotorcraft unmanned vehicle and the X-45N Unmanned Combat Air Systems program that is following up the highly successful Joint-UCAS X-45A demonstrators.

Analysis, Modeling, Simulation and Experimentation: AMSE is responsible for coordinating and integrating the company's diverse worldwide array of modeling, simulation and analysis resources along with related experimentation activities. Its facilities include the Boeing Integration Centers in Anaheim, Calif., and Crystal City, Va., the Virtual Warfare Center in St. Louis and a growing number of BIC-distributed environments located near customer facilities to support mission demonstrations.

Integrated Defense & Security Solutions: IDSS is leading the development of innovative, integrated defense and security solutions—such as SBlinet—designed to meet a wide variety of customer applications.

A focus on growth through technology

Meet George Muellner, leader of Advanced Systems

As president of Advanced Systems, George Muellner heads an organization that develops solutions to support the warfighter. That's no small matter to Muellner, who spent 31 years with the U.S. Air Force.

Since joining Boeing in 1998, Muellner has held various leadership assignments, including serving as vice president—general manager of Air Force Systems immediately before his Advanced Systems role. Muellner spoke to *Boeing Frontiers* about his view of this organization within Integrated Defense Systems—as well as about career advancement.

Q: What's your primary goal as president of Advanced Systems?

A: My role is to lead an organization focused on enabling IDS to grow the business. This includes focusing the enterprise technology investments to obtain maximum value; providing other business units with mature technologies and business opportunities to grow our core businesses; and developing opportunities in adjacent markets such as Homeland Security.

Q: What do you find most exciting about your job?

A: The best part of the job is working with a group of people who are creative, entrepreneurial and focused on the future. We have a tremendous wealth of talent in The Boeing Company. Putting together new concepts for solving customer needs by exploiting that talent is exciting. Every day, someone will hear or read of a customer need and will envision a solution that brings together talent and technology from across the enterprise to solve the problem.

Q: What has driven you in your career?

A: My personal growth has always been driven by challenging opportunities. I have benefited by being able to see new opportunities on the road ahead. I have then tried to prepare myself for the challenge and have been fortunate to have been given the opportunity to prove myself.

Preparation always pays off, since we all want to have the most qualified person taking on a task. This preparation has often required a side step or even a step backwards to insure I had the right skills for a challenge. In the end, success comes from preparation and opportunity coming together.

Q: What do you like to do outside of work?

A: Away from work, I have several distractions that provide some balance. Flying is still an escape for me, and cruising the Sierras in a sailplane provides a new outlook on life. Since I have lived on several sides of the defense acquisition process, I am writing a book on defense acquisition. Also, golf provides the opportunity to experience what happens when inadequate preparation creates insurmountable challenges.

“The best part of the job is working with a group of people who are creative, entrepreneurial and focused on the future.”

—George Muellner, president,
Advanced Systems

RON BOOKOUT PHOTO

Continued from Page 13

of time, go greater distances and operate much more quietly than current helicopters. And it features a unique optimum-speed rotor technology that enables the Hummingbird to adjust rotor revolutions per minute at different altitudes and cruise speeds.

The Hummingbird is designed to fly 2,500 nautical miles (4,600 kilometers) with endurance in excess of 24 hours and a payload of more than 300 pounds (136 kilograms). The autonomously flown A160 is 35 feet long with a 36-foot rotor diameter (10.7 and 11 meters, respectively). It will fly at an estimated top speed of 140 knots at ceilings up to 30,000 feet, which is about 10,000 feet higher than conventional helicopters can fly today (9,100 and 3,000 meters, respectively). Future missions for the A160 include reconnaissance, surveillance, target acquisition, communications relay and precision resupply.

Orbital Express. Orbital Express is a safe and cost-effective approach to autonomously service satellites in orbit. The system will employ autonomous maneuverable satellites to refuel, reconfigure and repair satellites, extending their lives with a bottom-line benefit for customers.

X-45N Unmanned Combat Air Systems. The X-45N demonstration program is designed to demonstrate in 2011 aircraft carrier suitability of an unmanned air vehicle that can carry out persistent (long-endurance) intelligence, surveillance and reconnaissance missions and has low-observable (hard to detect by radar) characteristics. This U.S. Navy-led program is designed to mature critical technologies prior to a potential System Development and Demonstration phase. The SDD program would be for a system providing persistent, penetrating 24/7 reconnaissance, surveillance and intelligence gathering as well as attack of time-sensitive targets for the Navy.

X-51A Scramjet Engine Demonstrator—WaveRider. The X-51A is intended to prove innovative hydrocarbon-fueled hypersonic propulsion technology. Using jet fuel, it will operate above Mach 6 (six times the speed of sound) and provide the technologies for affordable space access and global strike.

Other Advanced Systems capabilities and programs include providing advanced network-centric logistics systems, an advanced security system for U.S. government compounds outside the United States, and analysis, modeling, simulation and experimentation capabilities.

AFFORDABILITY MATTERS

As exciting as these technologies might be, Advanced Systems' leadership recognizes today's economic climate. Products and systems that promise a bright future for IDS are squarely balanced with the realities of budgets, technologies and Lean requirements.

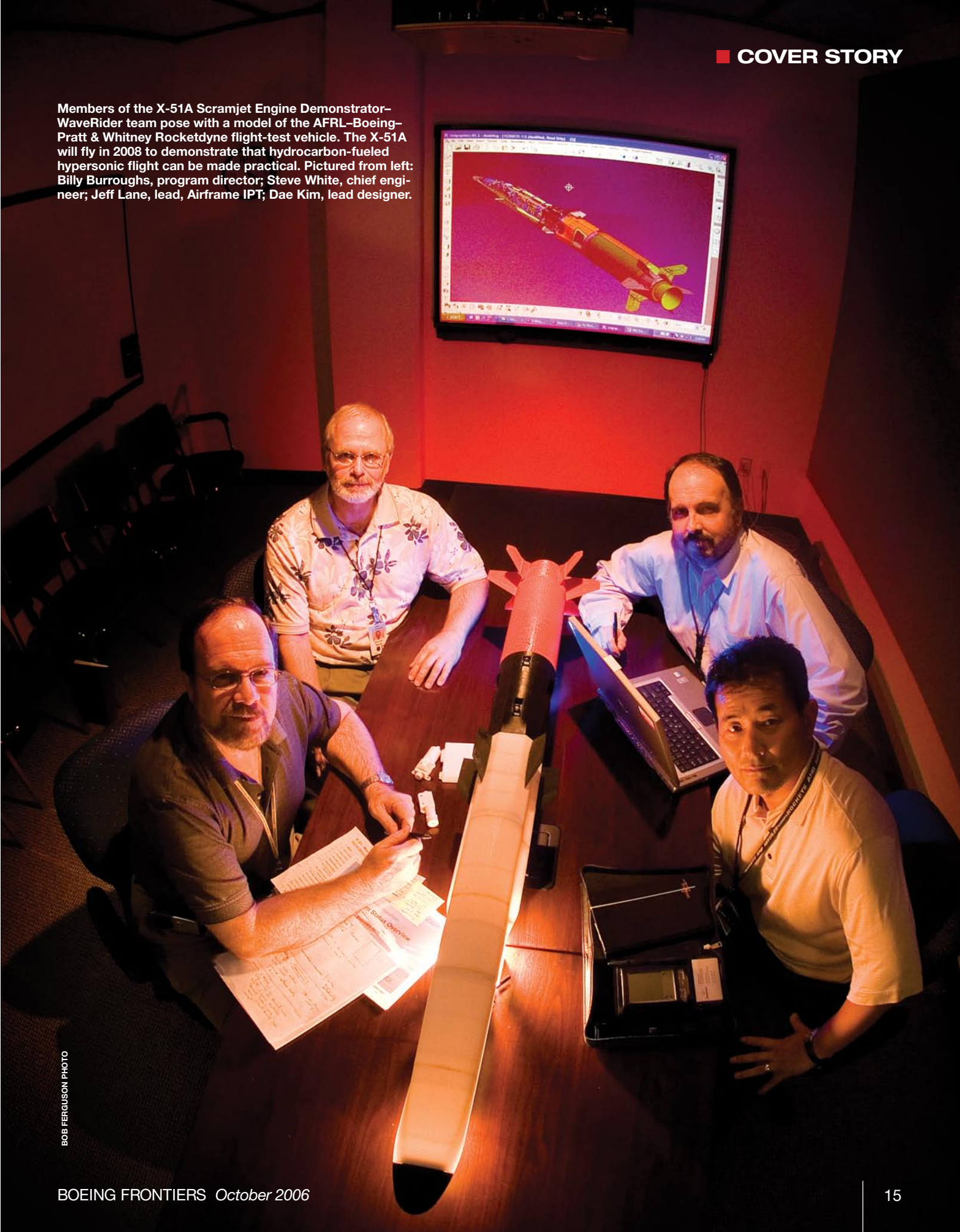
“Innovation is important, but in this day and age, affordability is just as critical,” said George Muellner, president, Advanced Systems. “We're not only improving how we do our work, but ensuring that when we hand off a program to a business, the benefits of the Lean+ and Global Sourcing (companywide growth and productivity) initiatives are already built in for the full life cycle of the program.”

The challenge of cost can be particularly tough in development programs where one-of-a-kind systems are being built. But Muellner's team knows if they build in cost savings during development, those savings can carry through to the production phase.

Additionally, Advanced Systems is taking a tougher look at programs earlier in their development. “We're going to drop programs earlier if we find they're not working with our strategy,” Muellner said. “That will allow us to move dollars into the areas that will get the best return and get those programs to market faster. So, with the same investment dollars, we'll get greater growth.” ■

marc.a.sklar@boeing.com

Members of the X-51A Scramjet Engine Demonstrator-WaveRider team pose with a model of the AFRL-Boeing-Pratt & Whitney Rocketdyne flight-test vehicle. The X-51A will fly in 2008 to demonstrate that hydrocarbon-fueled hypersonic flight can be made practical. Pictured from left: Billy Burroughs, program director; Steve White, chief engineer; Jeff Lane, lead, Airframe IPT; Dae Kim, lead designer.



BOB FERGUSON PHOTO

Determined to find a better way

In this Lean assembly idea, implemented on the 777 line in Everett, the part becomes a tool

By CHUCK CADENA

“Chance favors the prepared mind.” That phrase, widely attributed to 19th century chemist Louis Pasteur, proved true for two Commercial Airplanes employees who leveraged an opportunity to apply Lean principles to improve 777 manufacturing.

James Stockard and Jon McKenzie, who work in Manufacturing Engineering at the Everett, Wash., facility, both had the idea of applying a process called determinant assembly to improve the assembly of 777 floor grids. McKenzie had the idea from his previous work with floor grid assembly on the 767 Program. Stockard began considering determinant assembly when he purchased a bookshelf that was ready to assemble out of its box without the aid of tools.

“I thought if it can be done with furniture, why can’t we do this with airplanes,” Stockard said.

Determinant assembly is a process that allows for quicker assembly by using features of the parts, such as drilled holes, to quickly align components without the use of additional tooling to aid with alignment. Lego toys or an Erector set are simple examples of determinant assembly.

‘WE WENT FORWARD IMMEDIATELY’

Stockard and McKenzie had an opportunity to use their ideas when their group was asked to support the relocation of 777 floor grid tooling, which was in an area that will eventually be used for 787 production.

“We didn’t wait for someone to ask us about our ideas,” McKenzie said. “We went forward immediately with a detailed plan that included a favorable cost analysis.”

The cost of the proposed improvements

was relatively small compared to the benefits. By having some holes predrilled by the supplier and replacing outdated machinery, 777 floor grid assembly and installation was significantly transformed.

One idea improved the way seat tracks are attached to clips on the floor beams. Previously, the holes necessary to attach seat tracks to the clips were hand drilled after the supplier delivered the floor beams. Because employees had to do this work while the floor beams were loaded vertically in a three-story tooling structure, it was time-consuming and prone to error if the equipment was out of alignment. It also required employees to work in awkward positions.

“I thought if it can be done with furniture, why can’t we do this with airplanes.”

—James Stockard, with Manufacturing Engineering, on applying a process called determinant assembly

Stockard and McKenzie proposed a straightforward solution: Have the suppliers drill the holes in the floor beam clips and mate seat tracks prior to delivery. This allowed for quicker assembly of the floor grids, eliminated the need for the massive tooling structure and improved ergonomics for mechanics assembling the floor grids.

“The changes made the work much easier,” said Mike Shannon, a lead mechanic in the group that assembles the floor grids. “The old way required a lot of prework to load the detail parts of the floor grid and drill the holes.”

With the need for a tooling structure eliminated, the 777 floor grid work was combined in the same area where 767 and 747 floor grids are assembled. That allowed the team to make an additional im-

provement by replacing an outdated numerically controlled machine with a newer one to drill floor panel holes into the seat tracks before they are attached to the floor beams and installed in the airplane.

“By predrilling the holes, it allows the mechanics more time to work on the airplane,” McKenzie said. “We eliminated the need for them to exit the airplane and wait while a portable (numerically controlled) machine was put on the airplane to drill holes into the seat tracks after they were installed with the floor beams.”

To make their ideas work, Stockard and McKenzie held workshops and collaborated with cross-functional teams within Boeing and the suppliers. They admit to meeting some resistance initially to the proposed changes. “Moving away from tooling was a cultural shift,” Stockard said. “A lot of people had to stretch to make this happen, including Jon and me.”

As Stockard and McKenzie’s ideas proved successful, the idea of applying determinant assembly began to win acceptance. “I was skeptical at first,” said Shannon, who helped develop the new assembly method. “But that changed over time as I saw how much the change improved the way we work.”

Stockard and McKenzie’s ideas have visibly transformed the efficiency of 777 floor grid assembly. One example: The square footage required for the new 777 Accurate Floor Grid–Determinant Assembly Process is less than one-fourth the square footage of the previous method.

“We found a better way that contributes to the overall effort to transform 777 manufacturing,” Stockard said. “With determinant assembly, the part becomes your tool. Essentially you are using a new tool, in the form of the part, each time you assemble them. Quality improves because the fit is right each time, assembly is quicker and you save money because you have no tools to maintain.” ■

chuck.cadena@boeing.com



The new 777 Accurate Floor Grid-Determinant Assembly Process provides mechanics easier access during assembly. Here, manufacturing engineers Mike Sheary (left) and Dana Dowell assemble 777 floor grids.

MARIAN LOCKHART PHOTO



BOEING GRAPHIC

Service station

Meet the Boeing team that maintains complex networks for communications, data

By BRAD MUDD

When the White House needs secure communications, Boeing Service Company is there. When warfighters on the ground need to know exact geographic locations, Boeing Service

Company helps make it happen. When fans of American football settle in for an NFL game on DIRECTV, Boeing Service Company makes sure they don't miss a play.

A subsidiary of the Integrated Logistics division within Integrated Defense Systems' Support Systems business, Boeing Service Company and its 1,500 people handle jobs as varied as tasking communications satellites to readying payloads for launch into space to maintaining classified government facilities. BSC simply works to successfully maintain and sustain its customers' systems.

"We are a very fast, nimble and agile business with a broad range of capabilities,"

An artist's rendering shows an Iridium communications satellite on orbit above Earth. Boeing Service Company doubled the expected life of the Iridium satellites and helped make the network profitable.

said Greg Deiter, director of BSC. "For Integrated Defense Systems, we're unique. We are totally service-oriented, with military and government customers as well as customers in the commercial sector."

ROOTS FROM THE 1960S

The roots of BSC date back more than 40 years as the classified-program business for

Collins Radio Company. It was later part of Rockwell Collins before becoming Boeing North American Services Inc. in 1996. Based in Richardson, Texas, BSC is a wholly-owned subsidiary of Boeing. While program leadership may work in northern Texas, only 300 employees call that location home. BSC has small groups of people supporting programs in 21 different locations, mostly working in customer-owned facilities.

The core of BSC's work involves its experience maintaining complex communications and data networks. The Iridium constellation of about 70 communications satellites is one example of how the business has been successful.

Iridium was originally started in the mid-1990s by another company and was intended to have 200 satellites on orbit handling voice and data communications worldwide, mostly for cellular phones. But the bubble burst for the business and Iridium was sold for pennies on the dollar. BSC then doubled the expected life of the satellites and helped the network turn profitable in 2006 by finding U.S. Department of Defense customers to use the satellites for streaming information between ground stations. The bottom line: BSC found a way to make it work.

"One of the keys is the flexibility in the organization—being able to go into a new city and set up an operational capability in a fast period of time, sometimes in a matter of days," said Gary Grogan, director of BSC Special Programs. "Most other companies would have a tough time doing that."

BSC also supports rocket launches at Cape Canaveral, Fla., and Vandenberg Air Force Base, Calif., and plays a role in the Ground-based Midcourse Defense program. Several contracts are classified and cannot be discussed publicly.

FITTING INTO BIG PICTURE

Several long-time BSC employees have been affiliated with the same program for many years, sometimes decades. The business is still executing on contracts signed 30 or 40 years ago when the business was originally formed.

"BSC employees can easily see how they fit into the big picture, especially with some of our long-term programs," Deiter said. "Those who work on classified communications programs know they play a direct role in protecting national security. It's a small group of people, but they're very proud of the work we do. Our people feel like they own the division they work in."

Software Engineer Jean Christopher has worked on secure communications programs for Rockwell and now Boeing for

25 years. She currently works on a White House specialized communications system.

"One of the things I like most about my job is that I really like the customer we work for," Christopher said. "The customer has been willing to change the system and make

"We often count on Boeing to solve other issues that are not clearly within its responsibilities."

—U.S. Air Force. Lt. Col. Mike Harms, the GPS Architecture Evolution Plan development director, on Boeing Service Company's capabilities

it more modern. There hasn't been any stagnation working on this program."

Don Scott is the site manager for BSC at Vandenberg on the GMD program. His group is responsible for joining the kill vehicle with the booster rocket and emplacing the missiles in silos the group also has prepared. When their work is done, the silos at Vandenberg in California and Fort Greeley in Alaska are handed over to the warfighter. While the pace of the program is aggressive and frequent travel to Alaska can become hectic, Scott said his team is dedicated to performing.

"I have a lot of retired military people working on this team," Scott said. "When you ask them why they do this job, they say they're proud to help defend the country."

Despite having a wide range of programs covering different disciplines, BSC has focused on meeting the needs of each individual customer. During a meeting earlier this year, U.S. Air Force. Lt. Col. Mike Harms, the GPS Architecture Evolution Plan development director, talked about his views on BSC's performance.

"Boeing regularly finds the best-value method for meeting our mission and is an exceptionally good steward of our funding," Harms said. "We often count on Boeing to solve other issues that are not clearly within its responsibilities."

When contracts are put out to bid by a potential commercial or government customer, the determining factor always comes down to executing at a reasonable cost. Deiter said BSC is positioned to give the best value now and in the future.

"We work really hard at keeping our infrastructure costs as low as possible, yet at the same time making sure we maintain the highest levels of skills in our organization," Deiter said. "Because of this approach, we are able to provide the productivity improvement some customers are looking for at two-thirds of the cost."

"That's what Boeing Service Company is all about." ■

bradley.h.mudd@boeing.com



From a control room in Leesburg, Va., Boeing Service Company employees track the location of Iridium communications satellites and manage the health of the system.

Small box, big potential

Boeing engineers think 'outside the cube' in satellite development

BY ELAINE CADAY-EAMES

Very big things can come in very small packages—such as a high-capacity miniature satellite currently being developed by Boeing.

The ultra-low-power spacecraft, called CubeSat TestBed 1 (CSTBI), fits in a lunch box and weighs less than three pounds (1.36 kilograms). But it can perform more than 300 million instructions per second with just one of its four microcontrollers.

An Integrated Defense Systems Advanced Systems team of engineers at Huntington Beach, Calif., is building the spacecraft as a testbed for components that will be used in Boeing's development of nanosatellites (spacecraft weighing less than 22 pounds or about 10 kilograms).

Although Boeing makes satellites, nanosatellites serve a different market. Nanosatellites such as the CSTBI weigh only about 1/1000th of the weight of satellites such as the Boeing 601 and 702 satellites. The difference is analogous to the comparison between personal computers and large mainframe computers. Each type of computer supports different needs, but the models complement each other.

Besides its "brains"—four microcontrollers—the tiny satellite contains

- Redundant communications systems with two independent radios.
- Two high-capacity batteries.
- A deployable antenna.
- A sophisticated control system that determines the attitude (relative position) of the spacecraft by using sun and magnetic field sensors.
- A simple attitude control system that uses embedded magnetic torque coils.
- Multifunctional boards on the side panels that contain a variety of sensors and electronics.

The benefits of packing so much capability into a miniature satellite are obvious: Nanosatellites are much less costly to

manufacture and deploy than multi-ton satellites and can be piggybacked on rockets launching larger payloads.

"These small satellites can inexpensively and quickly test components and subsystems," said Scott MacGillivray, CubeSat project manager. "And many of the miniature and low-power components developed for nano-satellites can be used on larger satellites, reducing their power requirements and weight. Leveraging CubeSats for on-orbit tests can be conducted years earlier in a program's life cycle and for just a few hundred thousand dollars, which makes using CubeSats a low-cost alternative for doing some earth based testing."

And, because nanosatellites are so small, very little work space is required for development. The nanosatellite Engineering Development Center at Huntington Beach is in a room of 500 square feet (46 square meters).

MacGillivray's team of engineers has

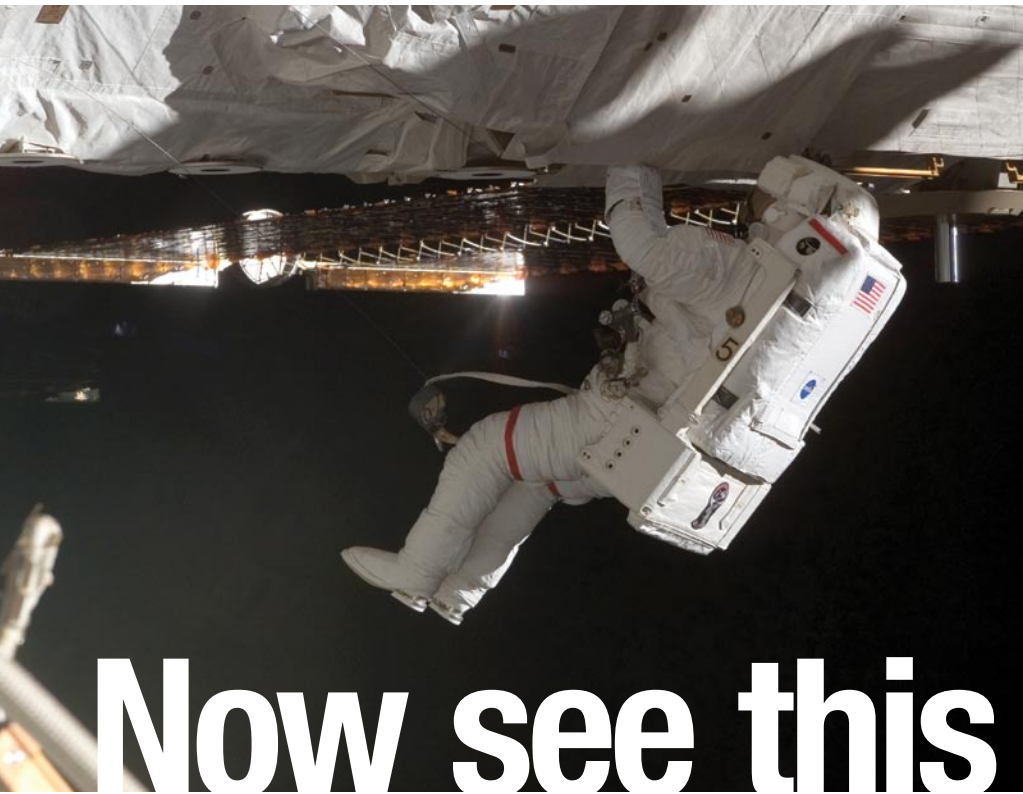
been developing the CSTBI CubeSat since early 2005 and hopes to launch the spacecraft in late 2006. In the process, he said team members have collectively learned a skill that is important to any company these days: to think Lean and create quality products very inexpensively. "For example, we used commercially available radios and software to establish a simple ground station to communicate with the spacecraft," he said.

MacGillivray added that in a world where all technology is shrinking, he and his team of five engineers have found the nanosatellite work extraordinarily stimulating. "It's so cool to create a spacecraft so capable, yet so small it can fit in a lunchbox," he said. Christian Rayburn, a CubeSat team member who developed software for both the satellite and the ground station, added: "To be able to create something so unique and have it do exactly what you envision is awesome. That's the best part of the job." ■

elaine.s.caday-eames@boeing.com



From left, Chris Day, avionics engineer; Scott MacGillivray, project manager; and Christian Rayburn, embedded software engineer, perform integrated development and testing on Boeing's CubeSat TestBed 1 picosatellite (small black box in center).



NASA PHOTO

Astronaut Joseph Tanner, STS-115 mission specialist, performs work on the Boeing-built P3/P4 truss on the International Space Station last month. Boeing is working on a technology called augmented reality that could support NASA's training efforts for space-based endeavors.

Now see this

Boeing's working on augmented reality, which could change space training, ops

By Ed MEMI

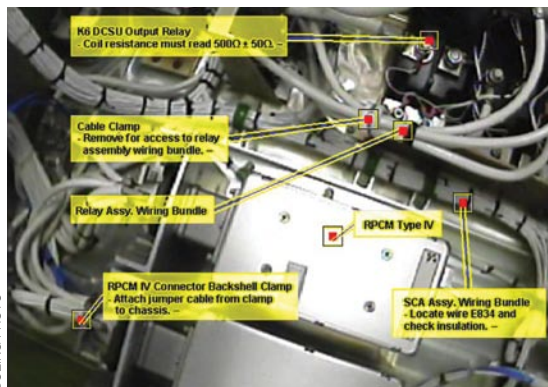
When NASA begins the six-month trek to Mars someday, astronauts will face the daunting task of operating and maintaining numerous systems that might unexpectedly break, or maybe having to perform life-saving surgery. Because of time delays of more than 15 minutes, communications back to earth can be a problem. And it's difficult for a crew member

to remember every detail of every system.

That's where "augmented reality" can help reduce training requirements and communicate complicated technical instructions. Augmented reality is a machine vision and computer-graphics technology that overlays graphic additions on views of the real world. The hallmark of AR is that the graphics are spatially registered; that is, they are positioned in the viewed scene relative to the positions of actual objects.

Former astronaut Rich Clifford is leading Boeing efforts to create an AR demonstration project on the International Space Station and hopes to show NASA the value of AR in terms of savings over traditional training methods. Boeing Phantom Works is providing the research and development for this demonstration project.

Anthony Majoros, a Phantom Works product engineer in Human Systems Integration and a Technical Fellow, said AR operates by determining a viewer's direction of gaze



In this single frame from an augmented reality session, graphic additions are positioned relative to features in a scene. As the viewpoint changes, the graphics change positions as if attached to the features. Boeing hopes to create an augmented reality demonstration project on the International Space Station.

and merging graphics into the viewer's perspective. The resulting composite view is displayed on a conventional monitor or on a head-mounted display screen.

"AR adds information to observed scenes, eliminates the need to search for information, and eliminates the time it takes to mentally associate information with objects," Majoros said. For example, the AR "view" when performing tasks such as the removal and replacement of a printed circuit board could include graphic text boxes with instructions and leader lines "attached" to features (e.g., fasteners) that are important in the task sequence.

"AR could revolutionize human space-flight by replacing time-consuming task-based instruction with skills-based training," Clifford said. "Astronauts can be taught the basics of making repairs and then can reference AR for more detailed procedures to accomplish needed repairs."

Majoros said learning is easier when information about objects and devices is embedded in viewed scenes. Added Paul Jackson, advanced design systems engineer for Phantom Works: "AR can be difficult to visualize without seeing examples, but single frames captured from AR sessions help."

Properties of AR such as spatial registration, feature tracking and rapid authoring produce methods that are adaptable to human space flight requirements. That adaptability is central to Clifford's vision. For example, detailed procedural instructions to complement skill-based training can be generated with AR overlays based on video documentation; and downlinked video from spaceflight crews can be rapidly annotated and then uplinked to help crewmembers resolve anomalies.

Clifford said skill-based training is a key transformation needed to reduce the cost of space travel, and AR is an enabling media form for skill-based training. "With AR, we could eliminate repetitive task instruction, and crews could access an AR library that can be updated by ground crews," Clifford said. He added that AR could allow astronauts to go through the refresher steps of performing critical space tasks. In addition, AR can save money by reducing paper procedures while significantly decreasing training, operations and logistics requirements. ■

edmund.g.memi@boeing.com



With the rollout of the new 737-900ER for launch customer Lion Air, Boeing expands the value of the world's most efficient family of single-aisle commercial airplanes. With its increased range and capacity, the 737-900ER enables airlines to operate more nonstop flights to more destinations at lower fares. A sure way to win the lion's share of any market.

 **BOEING**
Forever New Frontiers

On Aug. 8, Boeing unveiled the 737-900ER airplane at a rollout ceremony. Present at the event were representatives of Indonesia-based carrier Lion Air, the jetliner's launch customer, as well as suppliers, government officials and Boeing employees. This program milestone was supported by ads, such as the one above, that ran in aviation trade magazines and newspapers in Seattle and Indonesia. The 737-900ER, the newest member of the world's most popular airplane, offers even greater capacity, range and cost savings for its operators.



SHARE OF VALUE.

Train like you maintain

Cutting-edge F-22 maintenance site will immerse trainees in flight-line realism

BY DOUG CANTWELL

How long does it take to train a raw recruit to maintain the F-22 Raptor, the world's most advanced air dominance fighter? The state-of-the-art "schoolhouse" currently under construction at Sheppard Air Force Base, Texas, will take a total-immersion approach, packing the equivalent of a two-year college program into four busy months.

Starting in early 2008, airmen will arrive at Sheppard from boot camp. They'll spend eight-hour days interacting with the latest computer courseware and tuning their motor skills on high-fidelity training devices that might as well be chunks of an actual Raptor. Boeing leads the F-22 training effort for both pilots and maintenance technicians.

In designing the new trainers, Boeing engineers set their sights on achieving maximal realism—but without tying up precious operational aircraft. They reasoned if the cockpit needs to be serviced from atop a 15-foot ladder on the flight line, then that's what a specialist ought to train to at Sheppard.

For instructional purposes, the Boeing team has divided the airplane into seven full-scale training devices and tailored the schoolhouse floor plan to accommodate them. The facility will house classified and unclassified classrooms, a computer center and administrative offices as well as the trainer bays.

As a first-tier partner in the F-22 program, Boeing builds the wings and aft fuselage and integrates the aircraft's avionics. The company also has the lead on developing and administering training programs. As part of its maintenance technician-training assignment, Boeing is overseeing the planning of the

Sheppard facility, including development and integration of the training devices.

TRAINERS TUNE MUSCLES

The seven training devices provide hands-on practice in inspection, operation, removal and installation, system-testing and fault-isolation. They range from simple to highly complex, covering as few as 14 to as many as 240 separate tasks.

The Armament trainer, for example, addresses 89 individual functions that technicians must perform in maintaining the F-22's weapon bays, missile launchers, wing pylons, countermeasures dispenser and 20mm cannon. Each component of the trainer must replicate its onboard counterpart as faithfully as possible in dimensions, weight, center of gravity, color and texture.

It's not enough simply to read about

maintaining a Raptor or watch someone else doing it on a video. There's the kinetic aspect of training—i.e., getting physically attuned to the task. This is critical not only for efficient, timely execution but also for the technician's safety and comfort.

"If you've ever picked up a television set, you'll understand why center of gravity is a key training issue," said Tricia Morris, lead engineer for all seven of the Raptor training devices. "The center of gravity of the typical TV is nowhere near its dimensional center, which can catch you off guard the first time you pick one up. The same holds true for many tasks in the maintenance mission."

While authenticity is critical, engineers also must take into account the safety of new trainees. In most cases, they're able to address these issues by incorporating "blind" safety features—concealed shutoff or other devices cued by the instructor that protect trainees from injury without compromising the authenticity of a potentially hazardous task.

MODERNIZATION MOVES ENGINEERS

Another challenge is the ongoing modernization spirals that keep the Raptor current with technological advances.

To maintain authenticity of the training experience, engineers must continually update the trainers. In fact, at the conclusion of the engineering, manufacturing and development phase, the trainers simply didn't



U.S. AIR FORCE PHOTO BY STAFF SGT. ERIC T. SHELTER

At Langley Air Force Base, Va., airmen with the 27th Aircraft Maintenance Unit of the U.S. Air Force inspect an F-22 Raptor before flight. Technicians who will train at Sheppard Air Force Base's new F-22 maintenance schoolhouse, for which Boeing is leading development, will do so under conditions that resemble an actual Raptor flight line.

Boeing is the lead on developing the F-22 maintenance training program, designing and integrating the Raptor training devices and planning the training facility at Sheppard Air Force Base, Texas. It's slated to accept its first students in January 2008.



U.S. AIR FORCE PHOTO BY 1ST LT. STEVEN A. SMITH

match the airplane. This was due in part to a design freeze placed on the trainers in November 2000 to control costs.

The trainers destined for Sheppard are being matched to the specifications of Raptor No. 41, the first fully operational aircraft, which was delivered to Langley Air Force Base, Va., in March. But trainer modernization will continue throughout the program's 40-year span, and the Boeing team currently is under contract to assess updates required to match Spiral 3A upgrades.

For the Armament trainer, 3A primarily involves integration of the Air Force's new Small Diameter Bomb (a Boeing-manufactured precision munition) and its corresponding carriage.

CONCURRENCY IS KEY

If you're going to provide effective maintenance training, you've got to keep your trainers and courseware current with the airplanes on the flight line. And you have to keep the equipment on line 16 hours a day, five days a week at the customer's prescribed 95 percent availability rating.

That's much easier said than done, said Pam Valdez, who manages both maintenance and pilot training programs for F-22.

"The airplane keeps getting modernized, systems get redesigned, and parts continually are being upgraded," she said, "so you're trying to lock on a moving target."

To throw another challenge into the mix, the Air Force requires any change to the air-

plane's design to be implemented in the corresponding trainer two months in advance. That's so students training today won't have to play catch-up when they start their duty assignments with the active squadrons.

In spite of the challenges, Valdez noted how smoothly the Sheppard schoolhouse is coming together.

"We've enjoyed an excellent spirit of cooperation among the F-22 program office, the folks at Sheppard, the Army Corps of Engineers, our trainer suppliers, the architectural design house and our construction company," she said. "You don't see that very often on a project of this scale, and we're not taking it for granted." ■

doug.cantwell@boeing.com

Tried and true

Program managers use best of Boeing to speed improvements

By DIANA EASTMAN

Why do some programs succeed while others falter? That's the question a Boeing team was chartered to investigate in 1998. It discovered high-performers used management strategies the other programs didn't. The finding led to the Boeing Program Management Best Practices (PMBP), a management system for executing to plan, maximizing value and meeting customer expectations.

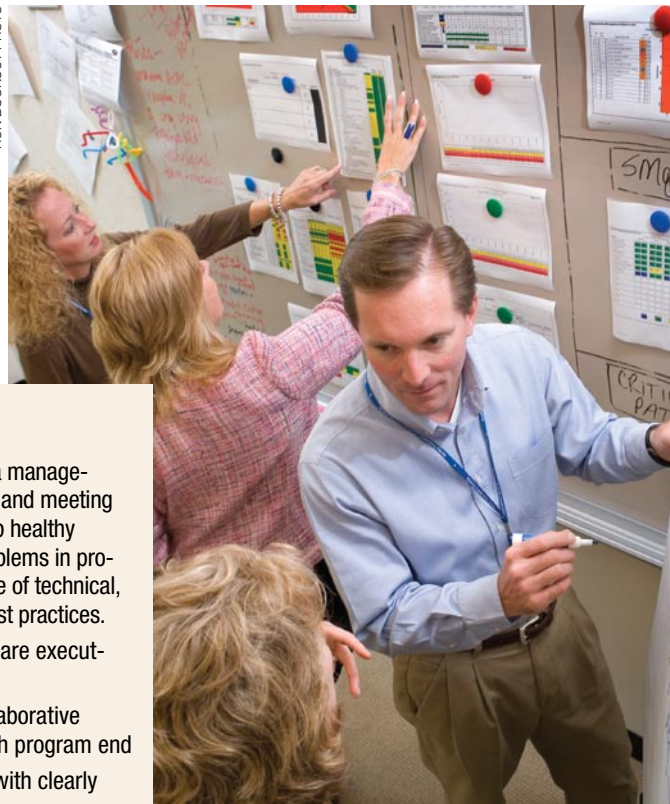
Today, Boeing is making implementation of the best practices a top priority and is initiating policies, processes, tools and metrics to assist program managers. The targeted results are improved program performance, greater consistency, increased productivity and stronger growth—all of which are good for Boeing and its employees.

“Use of the best practices allows us to replicate our successes and take maximum advantage of what we've learned as a company,” said Steve Goo, vice president of Program Management and Business Excellence at Integrated Defense Systems.

While there are no guarantees, Goo said the best practices can help healthy programs see better results and can reduce problems in programs that are overcommitted or at high risk because of technical, schedule or budget challenges.

The eight best practices (see box at left)

RON BOOKOUT PHOTO



Steve Sipprell of C-17 Production Contract Program Management and his classmates review their simulated program during an intense week of best-practices training at a Program Managers Workshop at the Boeing Leadership Center in St. Louis.

serve as a road map for creating a focused, disciplined and integrated management approach. They include almost 150 supporting strategies, attributes and actions required to achieve peak program performance. For each of these, there are five implementation levels that help program managers track how well they are utilizing the PMBP.

At IDS, all programs are required to assess themselves annually against the best practices so they can analyze their performance and measure the progress being made in their improvement plans. Earlier this year, they were challenged to accelerate their improvements and “strive for five” to reach the top implementation level.

Best-practice experts from Goo's team are providing consultation and on-site assessments to help IDS program managers attain this stretch goal.

In addition, they conduct the monthly Program Managers Workshop at the Boeing Leadership Center, where for five days program managers from throughout the enterprise take part in a business simulation based on the PMBP.

Goo noted that Boeing annually reviews the best practices to incorporate lessons learned during the previous year's PMBP assessments. Assessment information will be used also to identify and share successes among programs through the new enterprisewide database that supports the four Boeing growth and productivity initiatives. (As another way of supporting the Global

Sourcing initiative, Goo said supplier-partners are encouraged to use the PMBP.)

“Experience is a powerful teacher,” Goo said. “If our program managers use what Boeing knows to improve their focus and execution, we can delight our customers and move ahead of our competitors.”

For more information on the Boeing Program Management Best Practices, visit http://web-sbc-11.slb.cal.boeing.com/pmpc/program_management/pmbp_2.html on the Boeing Web. ■

diana.b.eastman@boeing.com

The Big Eight

The Boeing Program Management Best Practices is a management system for executing to plan, maximizing value and meeting customer expectations. These best practices can help healthy programs see better results and can help reduce problems in programs that are overcommitted or at high risk because of technical, schedule or budget challenges. Here are the eight best practices.

Business Offer: Understand requirements and prepare executable and profitable proposals and changes

Supplier Integration: Establish and maintain a collaborative working environment from the earliest stage through program end

Organization: Develop an organizational structure with clearly documented team responsibilities

Business Plan Creation and Review: Set strategic objectives and measure progress throughout the program life cycle

Program Execution and Control: Use a formal concept of operations to manage activities, monitor performance and implement changes to meet technical, quality, schedule, cost and other objectives

Risk, Issue and Opportunity Management: Use an integrated methodology to capture opportunities and mitigate or correct risks and issues

Help Needed and Independent Review: Promote a culture of open communication and continuous improvement

Program Communication: Maintain strong relationships with internal and external stakeholders



KEVIN FLYNN PHOTO

At the Joint Expeditionary Force Experiment earlier this year, specially equipped Humvee vehicles were modified to demonstrate forthcoming Future Combat Systems networking and systems capabilities.

Here's what we can do

FCS networking capabilities shown at a recent exercise

By JOHN MORROCCO

The revolutionary capabilities of Future Combat Systems (FCS)—an integral component of the U.S. Army's modernization—were demonstrated for the first time in a joint, realistic operational environment earlier this year.

The venue was the U.S. Air Force–led Joint Expeditionary Force Experiment (JEFX '06) held at Nellis Air Force Base, Nev. The biennial event is intended to accelerate research, development and fielding of new combat systems.

FCS, in which Boeing is partnered with SAIC as the Lead Systems Integrator, utilizes advanced communications and technologies to link soldiers with both manned and unmanned ground and air platforms and sensors. JEFX '06 offered the Army an opportunity for validating the progress made on FCS networking and systems capabilities, especially those elements designated for early delivery to the Army in 2008. It also offered a first look at the network-

centric capabilities FCS can bring to warfighters and joint operations.

SYSTEMS IN ACTION

Spotlighted technologies included tactical unattended ground sensors capable of detecting, locating and classifying targets; and specially equipped Humvees acting as surrogate FCS command and control vehicles.

The Humvees, each with three operator workstations, were equipped with the most recent versions of FCS battle command software. Also being used: System-of-Systems Common Operating Environment (SoSCOE) software, which links Army units with one another and with other external intelligence sources and friendly forces. SoSCOE also acted as the bridge to the Air Force's command and control network.

During the mock battle scenarios, unattended ground sensors detected, tracked and reported (via the network) threat information, such as simulated Scud missile launchers, in near real time. The threat data was transmitted from the sensor field to FCS command and control vehicles. There it was automatically fused with the locations of friendly forces to create a single, common operating picture for commanders on the ground.

JEFX '06 marked the first time sensor data was gathered and fused with other

intelligence to create a picture of the battlespace for soldiers in near real time. Level One Fusion and Battle Command software provided soldiers pictures of enemy threats, displayed as red icons on battle command screens, as well as the location of friendly forces identified by blue icons.

FCS command and control vehicles also were networked with the Air Force's Consolidated Space and Air Operations Center. This enabled the same information to be transmitted to those controlling and executing air operations, providing shared situational awareness between the soldiers on and aircraft flying over the battlefield. Red threat information passed through the network showed as icons on screens in the cockpits of strike aircraft, allowing for "rounds on target" in a matter of minutes. At the same time, the networking capabilities of FCS allowed the picture from the air to be transmitted to soldiers on the ground.

Data and information collected at JEFX '06 is being used to support the next major experiment—which will culminate early next year in field exercises that will allow soldiers to get hands-on experience with FCS technologies and develop early doctrinal concepts. ■

john.morrocco@boeing.com

Your wellness toolkit

Boeing provides many resources to help employees maintain and improve their wellness. Here's a look at some of the many opportunities available

COMPILED BY DEBBY ARKELL, MARIBETH BRUNO AND JUNU KIM

What's in your toolkit? To help you take care of your on-the-job tasks, maybe your toolkit has drills and rivets. Or perhaps your main tool is a computer and software such as a computer-aided design program or a spreadsheet program.

Now, how about the tools you use to tackle another important job—taking care of yourself?

If you're looking for resources to support your state of well-being, Boeing provides employees like you a wealth of tools to help you maintain and improve your wellness. Some of these tools are targeted at your physical well-being, while others are meant to help put your mind at ease. What's more, many of these tools are available at little or no cost.

"Boeing offers these resources to help you focus on the wellness of you and your family members," said Rick Stephens, senior vice president of Human Resources and Administration for Boeing.

"When you're well, you can be more productive at home and at work—and you might even be able to avoid longer-term health issues and health care costs," Stephens added. "Managing long-term health care costs is beneficial for you, and it also can help Boeing remain competitive in the market. And a more-competitive Boeing is good news for all Boeing stakeholders, including employees and their family members."

How good is Boeing's collection of wellness tools? The National Business Group on Health this year named Boeing as one of the winners of its Best Employers for Healthy Lifestyles awards. The organization presents these annual awards to employers that have demonstrated ongoing commitment to the health and well-being of their workers and families.

Here's a look at some of the many options Boeing makes available for you to use as part of your wellness toolkit.



1 www.BoeingWellness.com

A wealth of tools and resources to help you feel your best is just a mouse click away. With content powered by the world-renowned Mayo Clinic, www.BoeingWellness.com delivers detailed, reliable health information on virtually any health-related topic to employees and their families. The site features dynamic online tools—including an interactive Symptom Checker and the brand-new My Stress Solutions program—along with delicious and nutritious recipes and health-related news about local site-based programs and services. Access to the site is free, secure and confidential and can be a key component of any employee or family member's wellness plan. It's a great place to start!

The Web site www.BoeingWellness.com offers Boeing employees information on almost any health-related topic.



BOEING PHOTO



The BoeingWellness Health Letter offers information that's customized for the Boeing audience and is mailed each month to employees' homes.

2 BoeingWellness Health Letter

Talk about a special delivery. The BoeingWellness Health Letter is mailed monthly to employees' homes. Created by Mayo Clinic and customized for the Boeing audience, this colorful and entertaining newsletter complements available Web-based information and resources. It includes practical information on various wellness topics, tips for healthy living, and inspirational stories and quotes. Back issues are available online at www.BoeingWellness.com.

3 Health Risk Assessment

How well do you know yourself? The Mayo Clinic Health Risk Assessment is an interactive tool offered on BoeingWellness.com each year. Participants complete the HRA in Mayo Clinic's confidential, secure online environment, entering information such as blood pressure, cholesterol, and dietary and fitness habits. They then receive a Personal Health Report designed to help them understand potential risk areas and develop an action plan for making life-enhancing changes. Depending on participants' HRA results, they may also be offered six months of free one-on-one professional coaching for exercise, nutrition, weight or stress management from a Mayo Clinic Advisor. This clinically-tested program features private telephone sessions with trained coaches.



ISTOCK PHOTO

4 Weight management tools

Don't wait! A wide variety of **weight management tools** are available to Boeing employees and their family members through www.BoeingWellness.com. Some are free; others involve a weekly or monthly fee, though

usually discounted from typical public rates. Tools and services available to all include Weight Watchers Online and the Online Mayo Clinic Healthy Weight Program. Some Boeing sites also offer Weight Watchers at Work; check BoeingWellness.com to find out if this program is active in your area. BoeingWellness.com also provides links to on-site fitness centers and online fitness program tools, as well as information about discounts on fitness equipment, gym memberships and some Boeing recreation clubs. All these tools can work together to contribute to helping employees achieve a healthy weight and lifestyle.

5 Employee Assistance Program

We all encounter difficult situations. Thankfully, the **Employee Assistance Program** is there to help you and your family members when a little extra support is needed. The EAP is a confidential service that connects Boeing employees and their families with experienced counseling professionals for help with personal issues.

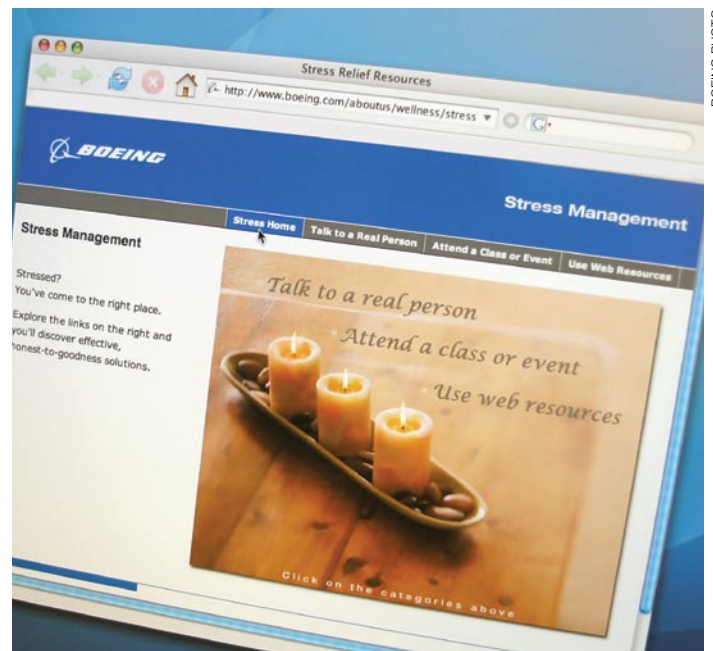
Counseling services are available to all employees and their eligible dependents in the United States at no cost for up to six sessions per issue each year. EAP also offers legal counseling, providing a free 30-minute consultation with an attorney and subsequent reduced rates. Financial counseling with a financial professional also is available by phone. For more information about the EAP, employees in the United States should call 866-719-5788 toll-free or visit <http://eap.web.boeing.com> on the Boeing Web. International employees should call Canada collect at +1-905-270-7658 or visit <http://eap.web.boeing.com/international> on the Boeing Web.

6 Family Care Resources

Companies that provide services such as elder care intend to make life easier for you. Isn't it ironic that finding such a provider can be difficult? That's where **Family Care Resources** comes in. Family Care Resources provides free, confidential referral services for Boeing employees, retirees and their family members, helping them find a variety of services including day care, family care, elder care—and even household services such as home improvement contractors and pet-care specialists. The experienced specialists of Family Care Resources are available 24 hours a day, seven days a week. Visit <http://familycare.web.boeing.com> on the Boeing Web to learn more; U.S. employees can also call 800-358-8515.

7 Stress Management Web site

Are you just plain stressed out? Visit the **Stress Management Web site** at <http://www.boeing.com/stressmanagement>, where since May 2006 Boeing employees and family members have been experiencing “one-stop shopping” for all the stress-related resources Boeing offers. Phone numbers and links to online resources lead visitors to services such as professional counseling through the Employee Assistance Program, Mayo Clinic one-on-one stress-management coaching, qualified referrals for stress-busting services such as child care and elder care, and an assortment of classes and seminars. All services are confidential and free of charge to eligible Boeing employees and family members. Help is available 24 hours a day, seven days a week.



BOEING PHOTO

The Stress Management Web site on Boeing's World Wide Web site leads employees to the stress-related resources provided by the company.



MARIAN LOCKHART PHOTO

9 Flu prevention programs

Show the flu who's in charge by taking advantage of Boeing's **free flu shot program and self-care tips**. Each fall, Boeing offers free flu shots to employees at company sites across North America. For schedules and locations, visit www.BoeingWellness.com in the fall and look for the Flu Prevention icon. The Flu Prevention Program Web site includes links to a schedule of flu-shot events; a consent form to fill out in advance; and recommendations on hand-washing and other ways to avoid illness. BoeingWellness.com's Flu Center (look up "flu" under "Manage a Condition") explains the causes and symptoms of flu and offers prevention and treatment tips.



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BoeingWellness: By the numbers

How successful are some of Boeing's wellness programs? Here's a look at some recent outcomes.

8.7 million Number of visits to BoeingWellness.com in 2005

175,000 Approximate number of individuals registered on BoeingWellness.com

80,000 Number of individuals (employees and spouses/domestic partners) who completed the online health risk assessment in 2006

15,000 Estimated number of enrollees in a Mayo Clinic coaching program following completion of the health risk assessment in 2006

8,100 Approximate number of participants in Free & Clear Quit For Life, Boeing's free quit-tobacco program, since its inception in November 2002

83 Percentage of respondents who used a Mayo Clinic Nutrition Advisor in 2005 and said they lost weight and maintained weight loss*

70 Percentage of respondents who used a Mayo Clinic Stress Advisor in 2005 and said they experienced less stress-related physical symptoms*

* Results are based on a self-report survey of 3,769 program participants. Enrollees who participated in the program reported these conditions during a six-month outcomes assessment call.

The Oxbow Fitness Center in Seattle is one of many facilities across Boeing where employees can use exercise equipment such as treadmills.

8 Exercise opportunities

Let's get moving! Boeing makes it convenient—and affordable—to get some **exercise**. Many Boeing facilities have health & fitness and activity centers on site for employees to use; in some cases, they're also open to employees' family members. Find a fitness center in your region and its rates at <http://companyfitness.web.boeing.com>. Also, Boeing families in some parts of the United States can save up to 65 per-

cent when they join a fitness club by purchasing their memberships through GlobalFit, a company that negotiates discounted prices with commercial health clubs. See <http://companyfitness.web.boeing.com/globalfit.htm> on the Boeing Web for more information. And don't forget to check out exercise opportunities and fitness tools on www.BoeingWellness.com.

Quit For Life gives ‘wonderful’ feeling

Jackie Wong is a Shared Services Group Health Services support administrator at Boeing’s Renton, Wash., medical clinic. She’s worked in hospitals and doctor’s offices. Yet she was a cigarette smoker from 1985 until earlier this year.

“I worked in a [nonmedical] office where there was smoking, and that gave me a craving,” Wong explained.

Usually, she hid her habit from co-workers, which was her first clue that she should quit. “If you’re embarrassed about it, you know it’s not good for you,” she said.

Family illnesses and deaths in 2005, combined with her own rapid heartbeat, convinced Wong that she needed to stop smoking to protect her health. She had never made a sustained effort to kick the habit.

Wong called 866-QUIT-4-LIFE (784-8454) in January and spoke with a Free & Clear Quit For Life counselor. The counselor chose a package of materials for Wong that included nicotine patches and informational CDs.

“As soon as I got them I started, and I was done in February,” Wong says. “I put some effort and time and energy into it, and it worked just fine.”

The best parts of the Quit For Life program, Wong said, were “free products in the mail, and nice counselors to talk to. They said I could call them anytime, which I did twice for a little more information. The CDs were wonderful—they gave me a lot of information and helpful tips—and [the counselors] reviewed things with me.”

Wong, who said she feels “wonderful” now, described Quit For Life as “an easy thing to do. I just think people should give it a chance, take advantage of it. It’s one of the benefits the company offers.”

—Maribeth Bruno

Jackie Wong used the Free & Clear Quit For Life smoking-cessation program to give up cigarettes. She said the program was “an easy thing to do.”



ROBERT RUSSELL PHOTO



ISTOCK PHOTO

10

Free & Clear Quit For Life—a quit-tobacco program

Trying to give up tobacco? Boeing offers **Free & Clear Quit For Life**, an award-

winning program that gives participants a coach to cheer them on and offer advice through a 12-month quit-tobacco plan. The program includes free nicotine replacement therapy products (if recommended), one-on-one telephone support from a specialist Quit Coach, online progress tracking and discussion forums, and milestone certificates. Quit For Life is available free of charge to employees (as well as spouses, domestic partners and dependents over the age of 18 enrolled in a Boeing health plan). To learn more or get started, visit <http://www.freeclear.com/boeing> or call 866-QUIT-4-LIFE (784-8454).

11

Physical exams

Numerous news reports have touted the benefit of **regular physical examinations**. Through these exams, you and your doctor can discuss your state of health, identify potential risk areas and develop a plan to minimize these risks.

Boeing recognizes how important preventive exams can be to your overall health and has designed its health plan options to include preventive-care benefits. If you or your dependents are covered by a Boeing medical plan, you are likely eligible to receive preventive-care exams—often at low or no cost. For more information, review your health plan benefits online at Your Benefits Resources through TotalAccess (by clicking the Health & Insurance Plans quick link). Or call TotalAccess at 866-473-2016 and, when prompted, say Health and Insurance.

12

Care management

Some of us may have conditions that require long-term care. Most of Boeing’s health plans offer **care-management programs**, which provide personalized education and support for people with chronic conditions such as asthma, diabetes or coronary artery disease.

Care-management programs are administered by Boeing’s health plans, and participation is voluntary and confidential. Boeing doesn’t have access to any patient’s health data. To learn what your medical plan offers, call your plan through Boeing TotalAccess at 866-473-2016.



CAL ROMANESCHI PHOTO

Maggie Surges (left), Health, Fitness, and Wellness Coordinator at Corporate Offices in Chicago, reviews cardiopulmonary resuscitation techniques with Arlene Buchanan, office administrator. Most Boeing sites offer CPR and first aid training.

13

First aid techniques

In emergencies, knowing **basic first aid techniques and cardiopulmonary resuscitation** can make a major difference. The immediate use of CPR after a person suffers sudden

cardiac arrest can potentially double a victim's chance of survival, according to the American Heart Association. Most Boeing sites offer CPR and first aid training; check with your location's Health and Fitness Center and/or Security and Fire Protection office to learn more. (If training isn't available at your site, check with contacts in your hometown. Try your local fire department, or the local chapters of American Red Cross or the American Heart Association.) On a related note: Do you know what your worksite's emergency phone number is? Contact your Security and Fire Protection focal to get it—and to learn more about what to do in an emergency.

14

International travel preparations

As a global company, many Boeing employees leave their current home countries to travel afar in support of business programs and customers. If you're going abroad, it's important to be aware of your personal health status and any health concerns at your international destinations. Indeed, you may need an examination, immunizations or special medications (think malaria pills!) before you leave. Or you may need to bring enough of your usual prescriptions to last for your stay. **Boeing International Health Services** is there to help you out before, during and after your trip—so contact them early in your travel planning. This organization provides a number of services to help you with safe, healthy travel and successful international living experiences. To learn more, visit <http://companymedical.web.boeing.com/international> on the Boeing Web, or call them at 425-234-0537.



ISTOCK PHOTO

Speaking with one voice

Boeing-developed process streamlines supplier quality efforts for aerospace firms

By DEBBY ARKELL

Imagine you're a parts manufacturer or service provider for the aerospace industry. Your work spans multiple commercial and military platforms, and your customers include some of the biggest names in the business.

Each company you supply has its own quality guidelines and documentation,

sometimes involving multiple processes. Each company also audits your quality processes. Sometimes they'll send to your site multiple representatives, one for each program of theirs you support.

Sound inefficient? That's exactly the conclusion Boeing Quality employees made. They quickly set out to partner with others in the aerospace industry to find a better way to ensure quality compliance in the supply base. Thanks to their efforts, Boeing has been able to streamline its processes in this area. This lets Boeing spend

more time being proactive with suppliers and makes suppliers more efficient by reducing the number of quality-compliance processes they must tackle.

"Following the Boeing-McDonnell Douglas merger we realized the military and commercial sides of the business shared a lot of the same suppliers, and we were sending them different requirements for very similar parts," said John Eash, Integrated Defense Systems Supplier Quality director. "We realized it was not efficient for us to operate that way, and we could be a

Gordy Barnes (right), Global Partners Field Representative-Northwest Region and Aerospace Industry Experienced Auditor, works with JD Ott Company Shop Inspector Bob Martin on a 747 Main Landing Gear Anti-skid Transducer Support. Now that quality auditors such as Barnes no longer have to perform system audits at supplier locations, they can look at specific factory issues and be more proactive with the supply base.



GAIL HANUSA PHOTO

much better customer to our suppliers if we made some improvements.”

Sponsored by the Procurement Quality Integration Team, an enterprisewide sub-team was formed to integrate Commercial Airplanes and IDS quality oversight into common processes and tools, and to serve as a forum to share best practices.

The team developed a new supplier quality-management-system approval process called ICOP, for Industry Controlled Other Party. This process allows the recognition of suppliers’ accredited aerospace quality-management-system certificates from third-party certification/registration bodies.

These certification/registration bodies, hired by suppliers, hold suppliers accountable to a single industry quality management standard—AS9100, or its international equivalent. The industry holds the third-party entities accountable to a common process for accreditation and certification.

COMMON SET OF RULES

Boeing worked with aerospace participants from around the globe to further develop the ICOP oversight process into a common set of worldwide requirements and operational guidelines. These have been adopted worldwide through the International Aerospace Quality Group.

ICOP ultimately eliminates the need for individual aerospace companies to perform unique quality audits. It establishes a common set of rules to which all suppliers worldwide will be measured—all with aerospace industry oversight.

“Implementing ICOP in the supply base is one of many things we’re doing to support the Global Sourcing initiative,” said Mike Song, Procurement Quality Assurance director for BCA. “Because of the number of suppliers our business units share, there are tremendous opportunities for us to streamline and simplify our processes and for us to work together at the industry level to help our suppliers while meeting customer expectations.”

ICOP allows Boeing to retain a level of engagement with its suppliers by having control over the auditors and the certification/registration bodies that certify the auditors.

Boeing takes its quality management a step further by assigning Oversight Representatives to support industry oversight of the ICOP scheme. The representative’s role “is key to ensuring integrity of the ICOP process,” Song said.

Since ICOP’s debut in July 2005, 70 percent of Boeing’s suppliers have obtained accreditation through the new process.

How acronyms help spell quality

We can’t escape acronyms; that’s a fact of life. Yet the quality compliance side of the aerospace industry seems to have more than its share. Here’s a list of some of the important acronyms used when talking about quality compliance.

IAQG: The **International Aerospace Quality Group** is a cooperative body responsible for improving quality processes throughout the aerospace supply chain. Broken into three groups representing Europe, the Americas and Asia Pacific regions, IAQG comprises representatives of all major aerospace businesses worldwide. Each of the three sectors of IAQG recognize each other’s standard—eliminating the need for a manufacturer to perform quality system audits of suppliers in other countries.

AAQG: The **Americas Aerospace Quality Group** is a subgroup of the IAQG responsible for improving quality processes at businesses in the Americas. This group adheres to the AS9100 quality standard (see below) and recognizes quality standards held by the other two quality groups.

EAQG: The **European Aerospace Quality Group** is a subgroup of IAQG responsible for improving quality processes at businesses in Europe.

APQG: The **Asia Pacific Quality Group** is a subgroup of IAQG responsible for improving quality processes at businesses in the Asia-Pacific region.

AS9100: The aerospace standard for quality management systems in the Americas.

ISO9001: An internationally recognized quality management system standard.

IAQG OPMT: The **Other Party Management Team** is an IAQG subcommittee that oversees sector management structures, accreditation and certification bodies, aerospace auditors and auditor competency training, and conducts database review for all global sectors.

HERE’S THE PAYOFF

The approach is paying off for Boeing and its suppliers. Italian supplier Logic, which manufactures environmental control systems for CH-47 and CH-46 programs among others, is one such beneficiary.

Nicola Ghilioni, Logic’s Quality Assurance director, noted that obtaining its AS9100 certification has helped the company become more efficient, improving on-time deliveries and product quality while reducing cost and defects. It also has helped them implement Lean manufacturing processes.

“Since our accreditation to AS9100, we now have a standard method in conducting our First Article Inspection in accordance with AS9102 (a complement of

improved performance and satisfaction,” he added.

Logic now has a variety of meaningful matrixes to help its departments measure the effectiveness of processes and improvements, as well.

ICOP helps Boeing use its resources more efficiently, first and foremost giving Boeing one face and one voice to its suppliers. Also, instead of assessing suppliers’ quality systems through its own second-party audits, Boeing Quality organizations now are free to look at specific factory issues and be more proactive with the supply base.

“Prior to ICOP, we were so busy conducting audits we didn’t focus as much on Boeing-specific risks and other issues relative to suppliers,” Song said. “Now we are able to conduct supplier risk assessments and focus our efforts where needed. This is having a notable effect on our quality trends; nonconformance and other issues are definitely improving.”

“We all understand the importance of supplier quality to our customers,” Eash said. “As we focus on what Boeing does well, we will be relying more and more on our suppliers. We cannot lose sight of the importance of having the right tools and processes in place to maintain quality. ICOP and the industry’s adoption of these processes is just one example of how Boeing people can work together to improve efficiency and quality in the worldwide supply chain.” ■

debra.j.arkell@boeing.com

“We could be a much better customer to our suppliers if we made some improvements.”

—John Eash, Integrated Defense Systems Supplier Quality director, on the benefits of streamlining supplier quality processes

AS9100),” Ghilioni said. “This alone provides our customers with accurate data in defining and ensuring manufactured items meet the approved Engineering specifications and requirements.”

“ICOP frees us to engage with our customers and focus on their expectations, with

NOT JUST A FOREIGN NOTION

Here's how currency hedging helps support Global Sourcing

By TODD BLECHER

It's pop quiz time! Question: How large is Boeing's foreign-exchange hedge portfolio?

- A) \$250 million
- B) \$500 million
- C) Greater than \$1 billion
- D) None of the above. Foreign-exchange hedges are too risky.

The answer is ... C. Surprised?

"People around the company are usually surprised to hear Boeing has any foreign-exchange hedges," said Assistant Treasurer Verett Mims, who oversees Boeing's global treasury operations from the Corporate Office. "They're more surprised to hear us say we should have more."

In finance, a hedge is a transaction that reduces the risk of investment. In the currency-exchange market, hedges lock in exchange rates between currencies for a period of time. They protect against rate changes that otherwise could unexpectedly alter a company's financial position.

Mims and her team believe hedges can be an important tool of Chairman and Chief Executive Officer Jim McNerney's Global Sourcing initiative, as they can improve Boeing's profitability by reducing costs.

"With few exceptions, customers pay Boeing in U.S. dollars and we pay suppliers in dollars," said Randy Durling, corporate director of international finance. "But our non-U.S. suppliers pay their expenses in their local currencies. That means many suppliers face currency risk. Not surprisingly, most of them add a risk premium to what they charge us."

Such premiums aren't immediately obvious, yet they typically represent a noteworthy markup. Boeing is increasingly requesting pricing in dollars and local currency to uncover those premiums. In fact, Integrated Defense Systems now requires foreign exchange pricing analysis for new contracts with non-U.S. suppliers.

Once those premiums are discovered, Boeing and the supplier can discuss eliminating them. Boeing prefers to contract in U.S. dollars. But if an agreement can't be



ISTOCK PHOTO

Corporate Treasury has put hedges on foreign currencies to reduce the financial risk that can come from exchange-rate changes. Hedges can help support the Global Sourcing initiative by eliminating premiums that non-U.S. suppliers may charge to cover this risk.

reached, Boeing could accept a contract denominated in the supplier's local currency.

Boeing Canada Operations Ltd. is a good example of hedging in action. Commercial Airplanes pays Boeing Canada in U.S. dollars, but it really needs Canadian dollars. Corporate Treasury hedges any mismatch between the two currencies' value to protect Boeing Canada's financials.

"Our foreign exchange hedges have insulated us from the volatile currency moves and have really helped us in our long-term planning," said Stan Lazar, director of business management at Boeing Canada.

Mims added: "Foreign currency hedges allow the business units to focus on execution, versus becoming currency experts."

Preserving the financial projections inherent in Boeing's long-term business plan is a fundamental goal of the company's hedging.

"A popular misconception in the company is that hedges are expensive," Durling said. "The fact is, most hedges don't cost anything. We work with the business units to create custom hedge strategies."

Corporate Treasury manages the process for evaluating whether to use local currencies and conducts a significant amount

of foreign-exchange-related training. That training highlights potential pitfalls associated with Boeing imposing foreign-exchange risk on its suppliers.

Conventional wisdom holds that contracting in U.S. dollars eliminates Boeing's risk. In reality, if a non-U.S. supplier's local currency appreciated substantially against the dollar, that could mean financial hardship for the supplier and challenges for Boeing.

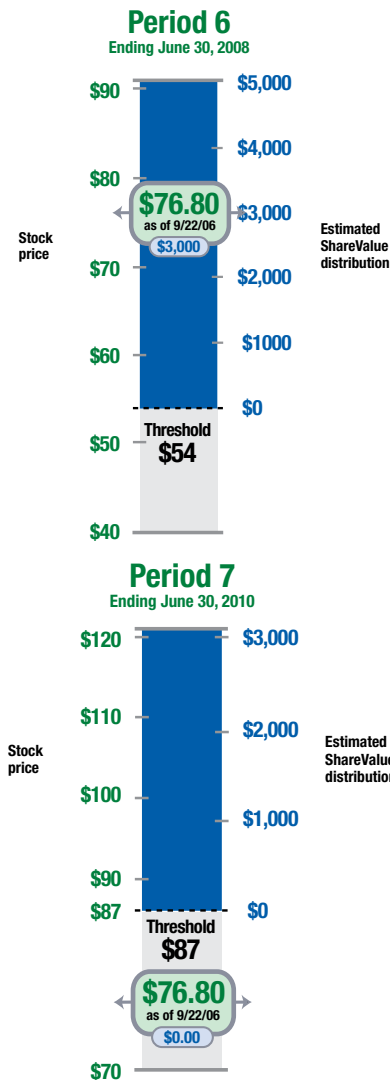
"We assume our suppliers are hedging their foreign-exchange risk," said Dan Morrell, the foreign-exchange manager assisting Durling. "But if they don't have hedges that guarantee the exchange rates they need, they could actually end up earning less from Boeing than they expected. If that goes on for very long, you can bet those suppliers will come to Boeing for relief."

Although Boeing's hedging now centers on supplier arrangements, Mims sees other ways hedges could bolster Boeing's competitiveness. "Say, for example, that a sales campaign comes down to whether Boeing is willing to accept a currency other than the U.S. dollar," she said. "With the hedges that are available, we should be open to that." ■

todd.h.blecher@boeing.com

Boeing stock, ShareValue Trust performance

This month's look at future potential ShareValue Trust award distributions includes *Frontiers'* first glimpse at the estimated award distribution status for Period 7, which began July 1 and ends June 30, 2010. The \$87 threshold for Period 7 is higher than the thresholds for previous periods. The reason: Essentially, it's driven by Boeing's stock price being higher at the start of Period 7 than it was at the beginning of previous periods. For a more detailed explanation of the ShareValue Trust incentive plan and how thresholds are set, visit <http://www.boeing.com/nosearch.share>.

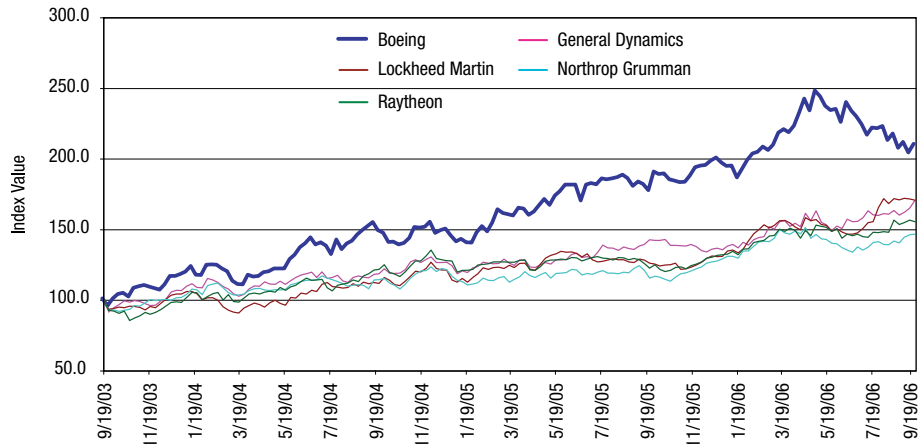


The above graphs shows an estimate of what a "full 4-year participant" ShareValue Trust distribution (pretax) would be for Periods 6 and 7 if the end-of-period average share prices were the same as the recent price shown. Distributions are prorated based on the number of months an individual is eligible. Updates to participant/employment data will be made periodically.

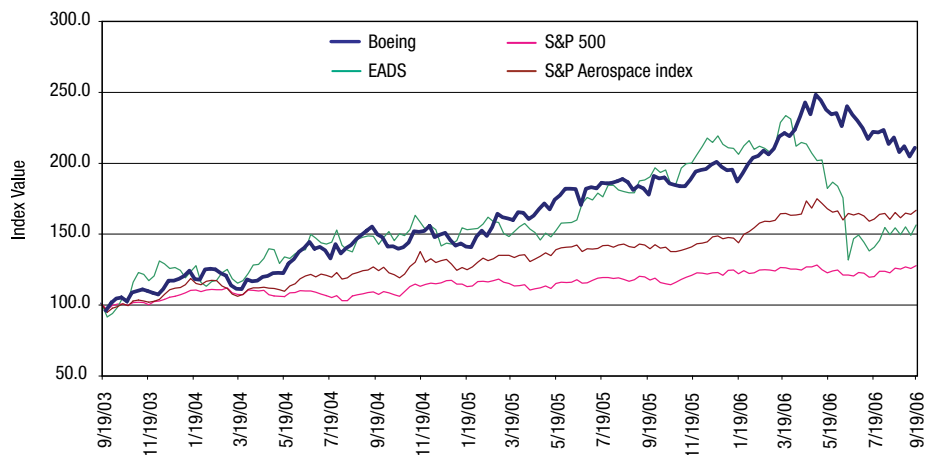
STOCK WATCH

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 Sept. 19, 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 9/15/06	Four-week comparison		52-week comparison	
		Price/value as of 8/16/06	Percent change	Price/value as of 9/16/05	Percent change
BOEING	75.01	77.62	-3.4%	64.80	15.8%
U.S. COMPETITORS					
General Dynamics	71.69	68.76	4.3%	58.55	22.4%
Lockheed Martin	83.00	83.55	-0.7%	62.38	33.1%
Northrop Grumman	68.24	66.00	3.4%	56.32	21.2%
Raytheon	47.26	47.61	-0.7%	38.25	23.6%
FOREIGN COMPETITORS					
EADS *	23.50	23.20	1.3%	28.30	-17.0%
U.S. STOCK INDEXES					
S&P 500	1319.87	1302.30	1.3%	1237.91	6.6%
S&P 500 Aerospace and Defense Index	346.99	343.75	0.9%	295.65	17.4%

* Price in Euros

SERVICE AWARDS:

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

50 Years

Lyle Bruns
August Marsala
Marvin Picou
Vernon Vogt
Harvey Williams

45 Years

George Fontes
Betty Greene
Everette Jeffries
Donald Lennebacker

40 Years

James Armstrong
William Bakker
William Brooks
Donald Buenemann
Louis Chavez
Barry Davis
Dennis Dyer
Duane Edgar
Chester Ekstrand
William Emerson
Gerald Feldmann
Franklin Foster
Sharon Gilmartin
Melvin Hall
Forrest Hamner
Edmund Haugen
Gary Hill
Jasper Hutton
John Jung
James Kennedy
Ronald Kujawa
Charles Lee
Timothy Manus
Stephen Martin
Elizabeth McCarver
Gary Meissner
Clarence Merkel
William Olmstead
Larry Pratt
James Reid
James Renfro
Vincent Responde
Virgil Schlough
Terry Thompson
Robert Watley
Terry Weaver
Willie Wells
Ronnie White
James Wright

35 Years

Geraldine Alfafara
Stanley Banek
Cary Barnett
Menton Berry
Mark Brave
Robert Bridges
Ronald Crouse
Stephen Diehl
James Donegan
Kjell Feroy
Robert Ford
Jack Griffin
Donald Hofferber
Terrance Kartes
Richard Lenk
John Lixvar

James Lofton
Robert Makuta
Frederick Martin
Susan Martin
Robert Morrison
Martha Moyers
Stanley Norton
Kenneth Peters
Gregory Ray
Dawn Shively
Linda Van Raden
Joyce White
Lester Withers
Ronnie Wong
John Zapata
Robert Zimmerman

30 Years

Estes Adams
David Angel
David Bowker
Michael Brown
James Bryant
Joshua Ciyborne
Robin Courter
Arthur Cuellar
Sharon Davidson
Richard Dombay
Anthony Dotson
Michael Elhoffer
Debra Englund
Cynthia Ferguson
Carl Frederick
Dale Fry
Maureen Gain
Maurice Gila
Thomas Gilbert
Skip Gingras
Susan Greer
Frank Grubka
Hany Haddad
Kimberly Hamel
Peggy Hard
Bob Harrington
James Head
Eva Herring
Fred Hoch
John Hoffman
Richard Hooe
Stanley Houlberg
Thomas Jackson
Maureen Jennings
Richard Jensen
Ruby Jones
Earl Kennedy
Thomas King
Frank Kinney
Joan Landgraf
Elvin Lerew
Han Liang
Michael Little
Andrew Lopez
Pete Madsen
Jimmy Marshall
Jeffrey Martin
Joe Masters
Thomas Matschiner
Martin McClendon
Stanley McHone
John Miles

Scott Milner
Robert Montague
Bryan Mosenbucker
Joni Nadeau
David Nelson
Martin Neubauer
David Noble
Theodore Nye
Michael Peter
Claus Petersen
Gary Plueger
Dwight Potter
Dennis Price
Roger Rader
Bruce Reid
Denise Rexroth
Larry Rush
Kenneth Russ
Steven Sargeant
Sandra Scott
Leslie Sells
Rocky Sitz
Richard Smithson
Theresa Steig
Paul Summers
John Tagg
James Thomas
Danny Thomason
Harry Todd
Brian Trimmell
Gary Wahle
Alfred Waller
Janice Walter
William Ward
Douglas White
Sheryl White
Vicky White
Frank Wilkerson
Dennis Wilkins
Clarence Wilson

25 Years

Rita Aguirre
Robert Aitken
Ulysses Albert
Jeffery Alexander
Jeffrey Allen
Robert Andersen
Brent Anthony
Suheil Aranki
David Arnold
Susan Baker
John Balcerak
Timothy Banks
Gayle Beatty
Elayne Bendel
Joann Berardo
Earl Berry
Sandra Biggerstaff
Frank Billand
Raymond Bittel
Bruce Blaser
Daryl Boersema
Jeffrey Boultinghouse
Frank Bowling
Helen Bozarth
Shane Bracerros
Melida Bradford
Ronald Brandes
Mark Brewer

Darlene Britt
Michael Brown
Michael Brown
William Buckley
Arthur Burden
Hazel Burks
Bruce Campbell
Mark Capellupo
Jon Casazza
Deborah Cate
William Chau
Larry Christman
John Clancy
Daryl Clark
Toni Clark
Robin Clarke
Victoria Coakley
Jerry Cobb
Rebecca Collins
Susan Conlin
Drew Copeland
John Cordova
Banks Crooms
Deborah Curtis
Sheila Curtis
Elizabeth Davis
Janice Dawley
Ana De Castro
Thomas Del Nero
Scott Denton
Nick Dettore
Ivan Diedrich
George Dixon
Kenneth Drummond
Eric Dubber
Pamela Dunkmann
Lee Durham
Johnnie Dyer
Stephen Eastman
Andrea Egan
Richard Eith
Russell Ellman
Don Enriquez
Suzanne Esparza
David Farnam
Boris Feldmanis
Ginger Feng
Thomas Fischer-Benzon
Jeff Fish
Kamran Frouhar
Johnny Fowler
Karen Franklin
Thomas Freudenthal
Donald Friend
Gary Frisch
Don Fujinami
Cheryle Fukuma
William Furbush
Shelly Garay
Gary Garcia
Noel Gerken
Giday Girmay
Anna Goldsworthy
Paul Goodwin
Kenneth Grabinski
Arnold Graham
Daniel Gray
Dennis Gregory
Charles Grenier
Kevin Griffith

Bonnie Grisim
Stephen Hanes
Sigurd Haugen
David Haysbrook
Larry Hefti
Jay Helman
Anita Hewitt
Gary Hibberd
Flordeliza Hidalgo
Jeffrey Higgins
David Hills
Kennard Hiramoto
Dean Hodgins
Donald Holt
Edward Hope
Pamela Horton
Carl Hough
Kevin Howard
Douglas Huber
John Hudson
Jo Hunnicutt
Robert Huntsinger
Christine Hurdt
David Ingersoll
Keith Jackson
Stephen Jahns
Josefa Jett
Mark Jewell
Steven Johnson
Thomas Johnson
Wendell Jones
John Julien
Henry Kampschroeder
Daryl Kawaoka
James Keller
George Kendrick
Michael Kersting
Richard King
Garry Kiphart
Stanley Klemchuk
Gwendolyn Kopsie
Robert Kuhlmann
Marilynn Labarge
Deborah Lacoste
William Lamkin
Rocky Lancaster
Gordon Larson
Michael Lau
Ronald Lauener
Joseph Lavalle
Sue Lebens
David Leep
Michael Leese
David Leevey
Glen Lewis
Judy Lewis
Craig Lindberg
James Lohman
George Long
Roger Lord
Steve Loy
David Ludwig
James Maddock
James Maguire
Cheryl Mahan
Matthew Malaspina
Cynthia Marks
Dianna Marshall
Deepak Mathur
Robert Matthews
Hugo Mayorga
Robert McBride
Roy McClincy

Thomas McGee
Norman McGeeney
John McGonigal
Robert McGrath
Terese McLeod
Deborah McRae
Kathy Meredith
Sherrie Metz
John Meyer
Raymon Mishrah
Jaye Morrell
David Moskitis
David Mulcihy
Douglas Munsell
Gary Myrand
Arun Nadkarni
James Nakayama
Douglas Nast
John Neece
David Neher
Eric Nelson
Teresa Nelson
Suzanne Nevins
Ro Nguyen
Thao Nguyen
Rhonda Norfleet
Lizabeth Nussbaum
Debra O'Connor
William Odle
Chie Okinaka
Susan Osborne
Joseph Paden
David Palmer
Paul Parham
Dwight Parker
Mark Parmenter
Anita Paulson
Dale Payne
Thomas Peevey
Dennis Pendergast
Steve Perry
Ruth Peters
Gerald Peterson
Brian Phelps
Thomas Phillips
Caroline Pierce
Richard Plunk
Alan Potter
Everett Potts
Jess Ramey
Christian Ramiller
Dennis Rasler
Patsy Ray
Vernon Razo
Glenn Redfield
Laurel Reiff
David Renfro
Michael Rex
Ramon Rivera
David Robbins
Martel Robinson
Cathy Roles
Roger Royce
Terrence Runland
Dennis Sam
Pantazis Samolis
Timothy Saner
Stanley Sato
John Saxen
Ruth Scanlan
Donald Scanlon
Marie Scheiern
William Schultheis

James Scott
Pete Sedovic
John Sell
Thomas Senczakiewicz
B.J. Shamburger
James Shaw
Sherry Shay
Michael Shea
George Shuman
Frank Simmons

Shawn Simmons
James Simpson
Charles Sisson
Eric Sosa
Larry Sparks
Albert Stephens
Mark Stephens
Richard Stone
Mary Strandt
Michael Stroh

Scott Surber
Warren Svuba
Alan Swartz
Dale Swift
Daniel Tandecki
Yvonne Tarumoto
Sireric Teasley
Fred Thomas
Kenneth Thomas
Blanca Thuve

Monica Tieu
William Tillette
Roxanne Tovey
Layna Trimmell
Rodney Tubbs
Luis Valdes
Anastasia Vallas
Daniel Varon
O.C. Vickers
Nikola Vitalich

David Voytko
Kenneth Wagoner
Richard Waldrop
Donald Walters
Kevin Waymack
Tonya Wells
Laurice Whited
Gary Wigle
Penny Wilhelm
Judy Wilkison

Robert Wilmot
Edward Woo
Karla Wood
Doris Woodward
Mark Wright
Roberta Wright
Edward Yegla
Charles Younts
Richard Zohler

RETIREMENTS:

The following employees retired in August from The Boeing Company.

Mark Allred, 23 Years
Virginia Aquino, 28 Years
Ove Arndtson, 8 Years
Betty Ashworth, 14 Years
Michael Atkins, 26 Years
Richard Baggett, 34 Years
Dale Barrett, 20 Years
Margaret Becker, 28 Years
Jose Bedregal, 39 Years
Thomas Bell, 15 Years
Edmund Bennett, 22 Years
Loren Berryhill, 33 Years
Fred Bisbey, 21 Years
Kathleen Boggs, 26 Years
Robert Bollinger, 30 Years
Deanna Bongiorno, 21 Years
Theera Boonthue, 18 Years
Leroy Borgman, 20 Years
Maaouia Bouazza, 34 Years
Raymond Bradley, 25 Years
John Broadrick, 15 Years
David Brower, 19 Years
William Brown, 38 Years
William Brown, 33 Years
Alinda Brumm, 22 Years
Ronald Bunner, 19 Years
Carl Burger, 9 Years
Judith Burt, 21 Years
William Butenko, 28 Years
James Canavan, 40 Years
Jay Carbon, 29 Years
Scott Cartwright, 28 Years
Carmen Casillas, 9 Years
Gilbert Cerise, 40 Years
Mike Chan, 20 Years
Kenneth Claphan, 22 Years

Joseph Conley, 19 Years
James Connell, 40 Years
David Cook, 13 Years
Kathleen Cook, 28 Years
Alexander Coronado, 26 Years
Richard Crispo, 28 Years
John Davis, 20 Years
John Davis, 37 Years
Francis De Mattia, 37 Years
Linda Dean, 20 Years
Linda Delamare, 24 Years
Allen Deshler, 40 Years
John Di Rosario, 21 Years
Terry Dick, 20 Years
Sharron Dickman, 18 Years
Nicholas Donelson, 20 Years
Douglas Draper, 18 Years
Michael Du Pas, 27 Years
Irma Dudas, 26 Years
James Dullea, 31 Years
Barbara Eden, 33 Years
Charles Ferguson, 25 Years
David Forman, 20 Years
Wayne Fortner, 31 Years
Raymond Fowler, 8 Years
Michael Geder, 39 Years
William Gehring, 28 Years
David Germain, 20 Years
Rose Marie Gipson, 36 Years
Jimmy Goodson, 18 Years
Rebecca Gottschalk, 22 Years
Joseph Gregg, 25 Years
Scott Hagen, 47 Years
Canna Hall, 18 Years
Ida Hampton, 24 Years
Kenneth Hanf, 25 Years
Ann Hansen, 20 Years

Robert Harmon, 10 Years
Larry Hawkins, 29 Years
Karmet Hilsen, 20 Years
Philip Holman, 12 Years
Jerry Janssen, 20 Years
James Jessup, 28 Years
Johnny Johnson, 28 Years
Jackie Johnston, 18 Years
Wilbur Jurden, 26 Years
George Kasai, 36 Years
William Katzenberger, 25 Years
Gregory Key, 21 Years
Linda Kiesel, 25 Years
Eugene Kopp, 26 Years
Edgars Kupcis, 40 Years
Kathleen Kwakenat, 18 Years
Donald Lambbeck, 30 Years
Charles Lee, 34 Years
Shiang-Yu Lee, 27 Years
Robert Legere, 35 Years
Lawrence Lewis, 32 Years
Sien-Chang Liu, 27 Years
Stella Lumley, 31 Years
Perry Manack, 26 Years
Patricia Marquis, 26 Years
Christopher Matthews, 27 Years
Donald Matthews, 24 Years
Jerald Mays, 32 Years
Leonard McAfee, 29 Years
William McDougall, 24 Years
Michael Mechanic, 17 Years
Elaine Miller, 39 Years
Joseph Mills, 26 Years
Grover Morgan, 39 Years
Rebecca Morrical, 18 Years
Joe Morris, 28 Years

Raymond Morse, 19 Years
Leslie Moser, 20 Years
Ramona Munoz, 25 Years
Arthur Murphy, 8 Years
Barbara Nelson, 28 Years
James Nelson, 19 Years
Edward Nye, 22 Years
Carol O'Brien, 20 Years
Gary Osness, 38 Years
Athen Pappas, 19 Years
Richard Parker, 20 Years
Roy Parker, 31 Years
Steven Parrick, 33 Years
Joanne Pearson, 37 Years
Billie Peters, 32 Years
Bela Petro, 23 Years
David Petz, 28 Years
Larry Pierce, 22 Years
Carole Pilger, 20 Years
Abraham Porat, 46 Years
Carl Powers, 33 Years
John Prehm, 31 Years
Elizabeth Redd, 34 Years
Robert Riccardi, 41 Years
Helen Rice, 32 Years
James Riley, 21 Years
Joseph Riley, 39 Years
Elaine Rizzolo, 35 Years
Annabel Rogan, 20 Years
Jacqueline Roper, 37 Years
Donald Rubsam, 39 Years
Peter Saari, 18 Years
James Samis, 30 Years
Alton Sapp, 21 Years
Joseph Savoni, 20 Years
Frederick Saywell, 45 Years
Kenneth Schenk, 24 Years
Hubert Schwarzer, 8 Years
Lawrence Seabrook, 22 Years
George Sevick, 28 Years

Richard Sevier, 32 Years
Anil Shah, 41 Years
Oconnor Shannon, 12 Years
Donald Shirie, 21 Years
Wanda Shubert, 21 Years
Trevia Skadan, 22 Years
Dale Smith, 38 Years
Sara Smith, 28 Years
Toni Smith, 10 Years
Earl Startzman, 25 Years
Robert Steele, 25 Years
Charles Stewart, 36 Years
Alfred Story, 40 Years
Sharon Summer, 8 Years
William Swarmer, 14 Years
Lawrence Thien, 44 Years
Dianna Tolley, 25 Years
Ronald Tustison, 26 Years
Marco Tyler, 21 Years
Robert Vogtmann, 40 Years
James Wallace, 37 Years
Yvonne Walton, 26 Years
Jack Warren, 42 Years
Robert Weddell, 24 Years
John Weeks, 32 Years
Kenneth Weldin, 32 Years
Larry Wheelis, 43 Years
Douglas Widmann, 31 Years
William Wigmore, 43 Years
Patricia Williams, 25 Years
Elaine Wilson, 39 Years
Carole Wolfe, 16 Years
Gerald Wujcik, 17 Years

IN MEMORIAM

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

Marque Allen, security; service date Jan. 14, 2005; died Aug. 20.
Nelson Brown, electrical and radio mechanic; service date Jan. 9, 1967; died Aug. 16.
Ronald Brown, housekeeper; service date July 24, 1989; died Sept. 5.
Sharon Carroll, accountant; service date Sept. 28, 1984; died Aug. 24.
Brian Chamberland, technical production designer; service date Feb. 16, 1979; died Sept. 4.
Vicki Coleman, embedded software engineer; service date Sept. 27, 1995; died Sept. 8.
Martin Crehan, engineer/scientist; service date Nov. 1, 1976; died Aug. 22.
Alan Frid, product support technical specialist; service date Sept. 30, 1985; died Sept. 15.
Donald Hullinger, sheetmetal assembler; service date July 27, 1989; died Sept. 21.

Maria Krauss, office administrator; service date Sept. 17, 1990; died Aug. 2.
Donna Leslie, office administrator; service date Sept. 20, 1980; died Aug. 25.
Jerrold Lind, painter spray specialist; service date Aug. 3, 1978; died Aug. 25.
Yung-Pai Liu, business program analyst; service date April 23, 1986; died Aug. 19.
Thomas McMillan, field test technician; service date Dec. 5, 1988; died Aug. 28.
George Murrell, manufacturing operations analyst; service date Oct. 6, 1980; died Sept. 13.
Kerri Piccinich, engineer/scientist; service date July 21, 1997; died Aug. 6.
James Ritter, engineer/scientist; service date Aug. 18, 1979; died Sept. 5.
Tim Valerio, marketing and sales; service date March 2, 1987; died Aug. 31.

CALENDAR OF EVENTS

Oct. 17–19: National Business Aviation Association 59th Annual Meeting & Convention. Orlando, Fla. See www.nbaa.org

Oct. 24–26: 8th International Dependency Structure Matrix Conference. Seattle. See www.boeing.com/ids/dsm06conf

Oct. 25–27: Cargo Facts 2006. Miami Beach, Fla. See www.cargofacts.com

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. 5–6: Aerospace & Defense Finance Conference. New York. See www.aviationweek.com/conferences/finmain.htm

Feb. 6–7: Asian Business Aviation Conference & Exhibition. Hong Kong. See www.abace.aero

Feb. 14–15: Defense Technology & Requirements. Washington, D.C. See www.aviationweek.com/conferences/dtarmain.htm

Feb. 18–22: IDEX 2007. This marks the eighth occurrence of the annual Middle East defense conference and exhibition. Abu Dhabi, United Arab Emirates. See www.idexuae.com

March 19–21: SpeedNews 21st Annual Aviation Industry Suppliers Conference. Beverly Hills, Calif. See www.speednews.com/Conference

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.



Roaring into the skies

Boeing last month delivered the first EA-18G Growler airborne electronic attack aircraft to the U.S. Navy. Here, the aircraft takes off from Lambert–St. Louis International Airport on Sept. 22, heading to its new home at Naval Air Station Patuxent River, Md.

RICHARD FAUJ PHOTO



First thing in the morning

Space Shuttle *Atlantis*' main landing gear is about to touch down at the Shuttle Landing Facility at Kennedy Space Center, Fla. The Sept. 21 return concluded a successful STS-115 mission in which the crew traveled to the International Space Station to resume construction of the space outpost. While at the ISS, the crew installed the Boeing-built P3/P4 integrated truss and solar arrays.

NASA PHOTO



And away we go

A Boeing Delta II launch vehicle blasts off from Cape Canaveral Air Force Station, Fla., on Sept. 25 on its way to successfully deploying a replenishment Block IIR Global Positioning System (GPS) satellite for the U.S. Air Force. Boeing provides launches for the GPS program aboard Delta II vehicles and has a planned GPS manifest through at least 2007.

CARLETON BAILIE PHOTO

AROUND BOEING



This poster is part of a seven-poster series that features the Boeing leadership attributes. Managers now can order the series through the Shared Services Procurement-Payables Network (SSPN).

To view the posters and download PDF versions of them (from which you can print free 8.5-by-11 inch versions on a color printer), check the Forms Library Web site at <http://forms.web.boeing.com> and enter “leadership attributes” in the “Search” box in the upper right.

EFFICIENCIES NEEDED, BOEING TELLS SUPPLIER CONFERENCE

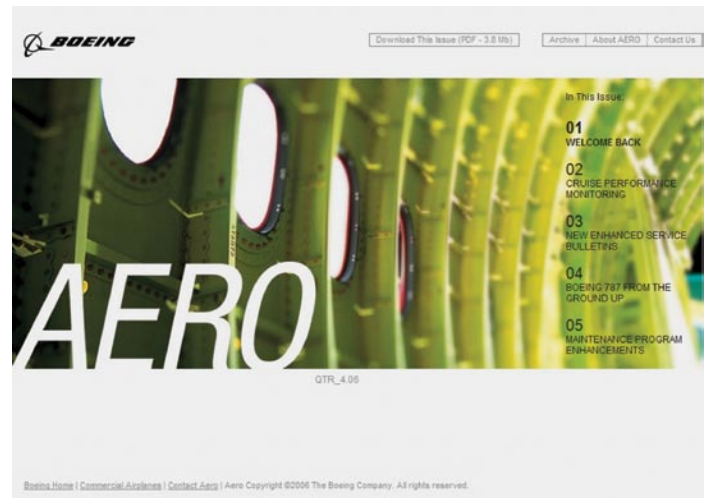
Attendees at a Global Supplier Conference last month got a better understanding of Boeing’s vision, strategy, market outlook and the resources available to drive productivity and growth.

Shep Hill, Business Development and Strategy senior vice president, represented Boeing Chairman, President and CEO Jim McNerney at the event, and delivered the message to suppliers that, even as costs rise, the prices Boeing charges its customers must hold steady or even decline.

“Our job as a prime contractor and a systems integrator is not to give away our customers’ money,” said Hill to the more than 650 attendees. “Rather, it is to make sure that our customers always get the best value for their money—even in the face of rising material and commodity costs. Instead, Boeing—and its supplier-partners—must gain efficiencies that offset rising costs and, in fact, continue to bring costs down.”

AERO MAGAZINE ON THE WEB

Aero magazine, Boeing Commercial Airplanes’ newly relaunched customer publication, is now available at www.boeing.com/commercial/aeromagazine. The publication provides technical information to help customers operate their Boeing commercial airplane fleets efficiently and increase their awareness of BCA products and services. The magazine is published quarterly, and print copies are distributed at no cost to operators of Boeing commercial airplanes. ■



Commercial Airplanes recently relaunched *Aero*, its publication for customers, and has posted it on the World Wide Web at www.boeing.com/commercial/aeromagazine.

LEADERSHIP ATTRIBUTES POSTERS NOW AVAILABLE

Boeing managers now can order a series of seven posters that feature the Boeing leadership attributes.

Managers can use these posters to display the six leadership attributes and their associated behaviors, plus one poster that lists all six. Boeing’s senior leadership has said the most successful leaders are those who conduct regular, open discussions with their teams about the leadership attributes and their link to business performance. Beginning in 2007, the final assessment of each executive’s and each manager’s demonstration of the leadership attributes will be linked to compensation decisions for the next year.

To order the series, use the Shared Services Procurement-Payables Network (SSPN) site at <http://sspn.web.boeing.com> on the Boeing Web. The posters are available in two sizes—11-by-17 inches (form number X32882SMALL, \$16.60 a set) and 24-by-36 inches (form number X32882LARGE, \$50.50 a set). You must have an account with SSPN to access the system and order items.



MARIAN LOCKHART PHOTO

Addressing safety of transporting parts

Even though Boeing Licensed Transportation has a strong safety record, we recently gathered a number of Boeing organizations from the Puget Sound area to hold a Lean Accelerated Improvement Workshop. We wanted to take a closer look at our current operations transporting parts and materials over Washington state roads, and make changes that would make a safe system even safer.

The AIW was prompted by a new Washington state law that makes it a gross misdemeanor if an unsecured load from a private or commercial vehicle causes an injury or death to another individual. The new law was established after an accident in the Seattle area where a woman was blinded and permanently disfigured when a piece of particle board flew off a private truck and hit her car.

As a result of the AIW, we came up with a number of recommendations including providing additional training and inspections; purchasing plastic tubs with lids; using a “heat shrink” process to secure parts, dollies and tub skids; and replacing or modifying old and unsafe equipment.

We would like all employees to join us in promoting a safety culture at Boeing as we transport parts and materials over the roads. Employees can help by ensuring boxes and other materials are wrapped securely when being prepared for transport to another site. This is especially true when employees move to a new location and pack up their offices for the move. Remember: We all play a key role in making things safer for ourselves and others.

Front row

Jack Dove Supply Chain Logistics	Murray McIntyre Licensed Transportation	Larry Olson Licensed Transportation	Linda Stone Site Services	Faye Raley Licensed Transportation–Safety	Joe Hedberg Material Handling
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Back row

Tony Manthie Reclamation	Christina Dolkiewicz SSG Finance	DeAndre' Stallworth SHEA	Jim Newkirk Licensed Transportation
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Not pictured

Tim Aguilar, Expediter Team Leader
Denise Alonzo, Licensed Transportation
Dennis Boespflug, Receiving
David Carmine, Expediter
Clarence Dancer, Supply Chain Services–Expediter

Larry Falk, Auburn Tooling Services
Elizabeth Girdler, Lean
Trish Holt, Package Engineering
Todd Kennedy, Expediter
Dean Kohrs, Manufacturing Support

Punit Mattoo, Lean intern
Bob Meneghini, Licensed Transportation
Mark Ribich, Material Handling
Jeff Ricketts, Motive equipment operator
Lily Shietze, SSG, Mesa, Ariz.



BOEING AND THE GOOD PEOPLE OF GLOUCESTER.

If you're looking for the world leader in landing gear systems, sooner or later you'll find your way to Gloucester. It's a trip Boeing has made more than once, partnering with Messier-Dowty on landing gear for the T-45 Goshawk, F/A-18 Super Hornet, and other airframes. To get the best of class, it's always good to work with the best of all possible partners.

Messier-Dowty
LANDING GEAR GROUP

 **BOEING**
Forever New Frontiers

This is the sixth in a series of new ads created to build awareness of Boeing and its many valuable partnerships in the United Kingdom. Boeing, the largest overseas customer of the UK aerospace industry, currently partners with more than 300 businesses and universities around the country. The advertising campaign has appeared in The Sunday Times, The Economist, New Statesman and other UK publications, and complements current UK-Boeing business and communications activities.

www.boeing.com

ON COURSE TO NEW FRONTIERS.

NASA's mission to return humans to the moon and later travel to Mars is taking shape daily at its Marshall Space Flight Center in Alabama. The first design cycle of the new Ares I crew launch vehicle has been released and critical testing continues to support its initial development. We salute NASA on this important progress and express the commitment of our entire team to help bring this vision to reality.



This Integrated Defense Systems ad has been created to support Ares I, NASA's next generation crew launch vehicle. Specifically designed to salute the progress NASA has already made and to express Boeing's shared commitment to making Ares I a reality, the ad will appear in targeted publications including Aviation Week, Space News and the Huntsville Times.