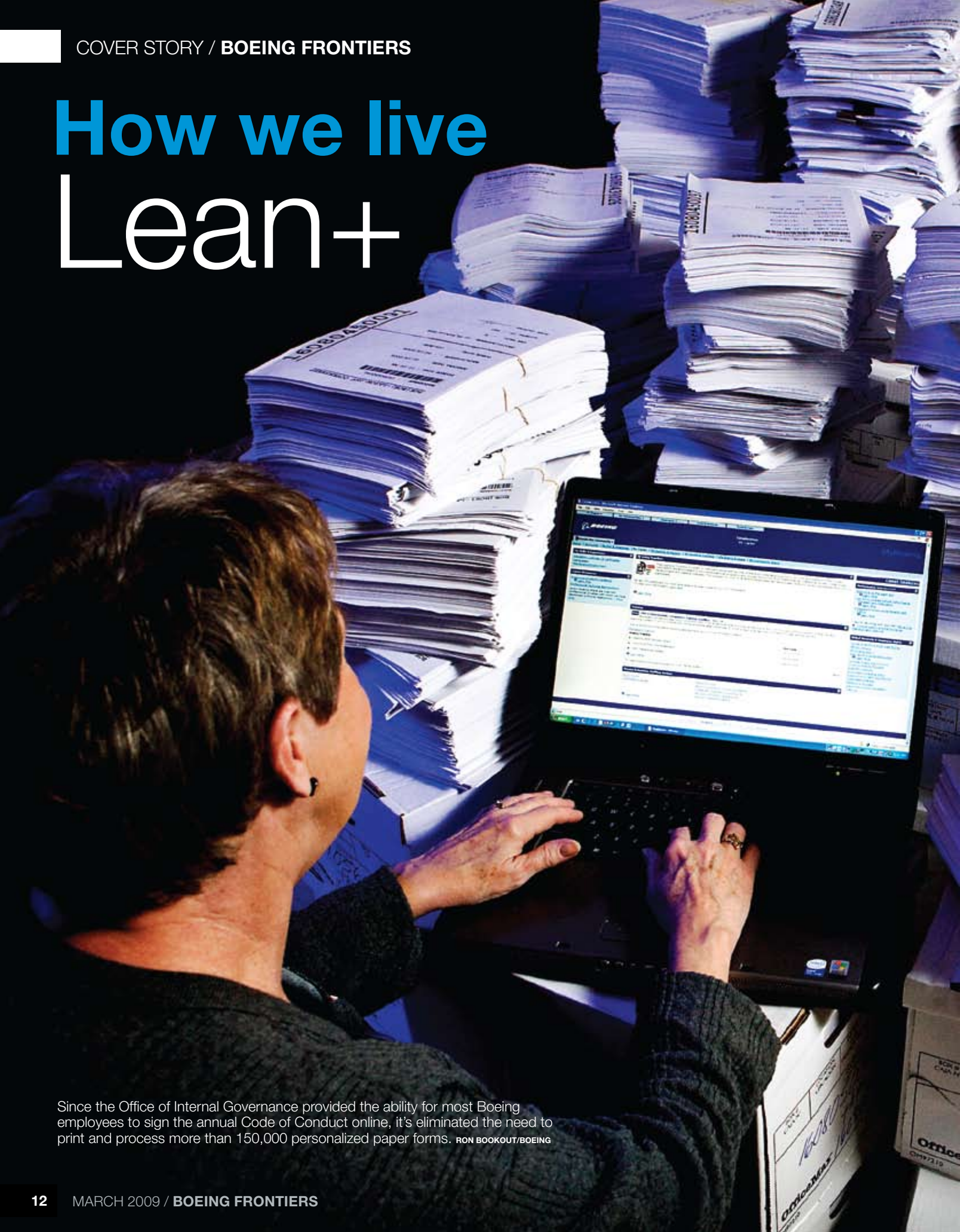
How we live Lean+



Since the Office of Internal Governance provided the ability for most Boeing employees to sign the annual Code of Conduct online, it's eliminated the need to print and process more than 150,000 personalized paper forms. **RON BOOKOUT/BOEING**

Inside

Examples of this initiative in action abound across Boeing. Here's why it matters now more than ever.

By Lynn Steinberg

Employees from different organizations at Commercial Airplanes came together to solve a vexing quality issue. The Engineering team at Integrated Defense Systems deployed a checklist of simple ways to boost productivity and meet business goals. Shared Services Group used existing tools to help employees report travel expenses more efficiently and get reimbursed faster.

These are just some examples of how Boeing people are living Lean+, one of the company's four growth and productivity initiatives. Employees across the enterprise are using Lean+ to improve productivity, provide better value to customers, free up resources for growth, and make Boeing more competitive. That's especially important amid today's financial challenges.

Boeing Frontiers recently sat down with Bill Schnettgoecke, leader of the Lean+ initiative, to talk about what progress has been made, what opportunities and challenges lie ahead, and how Lean+ can help Boeing navigate these difficult economic times.

Q: When Lean+ was first introduced in 2006, many people thought it was about moving Lean from the factory to the office. But it's much more than that. Can you explain?

A: We knew we had great success with Lean in the factory environment. The overall approach, the principles, techniques and tools all worked. We also knew that there was enormous untapped potential in the non-factory environment, and that many of the same principles, techniques and tools applied. So we started using them more broadly, in back shops and offices, and across the value stream.

That first year, 2006, was really a time of exploration. We went all across the company, looking and learning, and discovered two things. First, that Boeing people were using a variety of approaches to get incredible results. We have unbelievable talent at this company, shaped in part by different customer bases and heritage company cultures.

The second thing we learned was that the results were better—and came quicker—when teams used a blend of tools to address a problem. And we thought, to use an old adage, "If Boeing only knew what Boeing knew."

So we started working to align and leverage what we had, creating one overarching continuous improvement approach that includes strategies, tools and resources like Lean, Employee Involvement and Engagement, Six Sigma, Process Management, Theory of Constraints, the Boeing Production System and others. We simplified, standardized and aligned the best of Boeing so we can be the best of industry. That's Lean+.

Q: Do you believe Lean+ has taken root at Boeing?

A: Where we see leaders embracing and teaching Lean+ is where we see it deeply embedded. Those leaders know the value and talk about it with their teams. And they're getting great results.

There is no longer a business or function at Boeing that can say, "This doesn't apply to us because we're not Manufacturing."

Lean+ *by the numbers*

Here's a quick look at some of the figures reflecting Lean+ in action at Boeing.

150,000

Approximate number of paper Code of Conduct forms eliminated—and that no longer must be printed, manually signed, gathered, tracked, mailed, scanned and stored each year—since an Office of Internal Governance team provided online signing capability on TotalAccess in January.

112,900

Approximate number of Boeing employees who took basic online Lean training and learned about making improvements in their business units and functions, since Lean+ was unveiled in 2006.

30,000

Gallons of water (113,600 liters) per day conserved by applying Six Sigma process improvements to chemical rinse operations at Commercial Airplanes' Fabrication division, where detail parts are anodized and alodined for corrosion protection.

23,000

Approximate number of classes eliminated since 2005 by applying Lean 5S practices (sorting, simplifying, sweeping, standardizing and self-discipline) to the list of courses Boeing's Learning Training and Development organization, business units and functions offer employees.

There are great examples of people, in every environment at Boeing, working together to improve. So we're getting traction because Lean+ really does apply to everyone.

At the same time, employees don't always consider their work as a product that can be measured to ensure it meets customer expectations for quality and value. People will say, "Engineering is an iterative process, so we have to redesign." Well, we do an awful lot of redesign because we didn't get it right the first time. And I know leaders like Charles Toups [vice president of Engineering and Mission Assurance for Integrated Defense Systems] are working this hard (see story on Page 18).

Q: You've often said you think Lean+ gives Boeing a competitive advantage. In what way?

A: We have 160,000 people at Boeing with a range of skills, knowledge and experience that very few companies can claim. Just think about the things we do: connecting people around the globe; providing warfighters the capability to safely carry out their missions; producing the technology that will reshape and redefine the future. Lean+ helps us capture that collective body of knowledge so we can deliver the highest quality and best value to our customers, while improving the way we work. It gives us a framework—with a common language, and common tools, principles and training—to take the amazing products and services we provide, and make them better than we did before and better than our competitors ever could.

Q: How can Lean+ help in today's difficult economic climate

A: Now more than ever, we've got to pull together and act with a sense of urgency. We've got to reach out and help one another work through the challenges we face. And we've got to focus on the projects that will create the most value for our customers and for the company. Because ultimately, that's what will secure Boeing's future and the future of its people.

Lean+ helps us do that. It creates an environment where good ideas can thrive, then be shared and replicated across the value stream, from our suppliers to our customers. And it provides tools, training, experts and other resources from across the enterprise. Chances are that someone in this company already has wrestled with and solved a problem very much like the one you're facing. So rather than reinventing the wheel, look beyond the boundaries of your individual business or function for answers.

Take advantage of Lean+ products and services. The Web site (http://leo.web.boeing.com/home.cfm on the Boeing intranet), which is being redesigned with new collaborative tools, is a great place to start. That will take you to the Lean+ Roadmap, an online, interactive guide to Lean+; and to the NavTool, an online resource that walks you through a five-step cycle of continuous improvement. At each step in that cycle you'll see a range of possibilities unfold, from easy-to-use self-help tools to resource lists for professional assistance, and you can choose the one that best suits you and your particular circumstance.

Q: Are you pleased with the progress you've seen?

A: I've been so impressed by what I've seen these last few years. People are dying to show you what they've done. They're so proud. And also gratified, because they've managed to free up time and resources that now can be devoted to new and creative endeavors, increasing opportunities for success.

As I see it, we have two challenges at this point. We need to take those pockets of excellence and make them universal. And we need to pay more attention to first-time quality. Lean+ is about the prevention and elimination of waste. Unfortunately, we can't always eliminate waste as fast as we've created it, so there are times when the improvements don't show up on the bottom line. We've got to address that.

Q: Where do we go from here?

A: We need more focus on first-time quality—on fostering an environment where everyone takes responsibility for getting things right, and refuses to accept, create or pass along defects.

We've still got lots of opportunity for improvement—and we need to go after it, immediately and aggressively. We've got to be relentless about preventing and eliminating waste. We've got to continue to work on common principles, language, training and tools because that makes it easier to share successes and accelerates productivity improvements across the company.

We've got to operate as one Boeing and get aligned behind Lean+. That starts with leaders who enable it and expect it, leaders who teach it and talk about it with their teams. And it depends on each one of us at Boeing getting engaged in continuous improvement, reaching out for new ideas and sharing our successes. In the end, that's what will make Boeing the benchmark for productivity, free up resources for growth and help us be the best—and best integrated—aerospace company in the world. ■

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Bill Schnettgoecke, leader of the Lean+ growth and productivity intiative, said Lean+ creates an "environment where good ideas can thrive." **RICHARD RAU/BOEING**

Getting back to **business**

Lean improvements in travel, expense processes save employees time

By Stephen Davis

It's now easier for Boeing travelers to book cost-saving itineraries, submit accurate expense reports and be reimbursed quickly, thanks to the Shared Services Travel & Expense Services (T&ES) team applying Lean+ principles and tools.

Nearly 1,000 Boeing employees travel on company business every day. To get them into airplanes and nightly accommodations, account for their expenses and pay the bills is a job that takes lots of behind-the-scenes activity. Process improvements here help reduce costs for organizations, since travel is the second-most controllable cost for most, after labor.

"Our goal is to provide travel and expensing tools that save employees time, reduce travel costs and improve compliance. It's a top-priority service improvement in SSG. Ultimately our aim is to increase productivity for Boeing," said Yvette Winn, director of Travel & Expense Services.

T&ES began by using the Value Stream Mapping (VSM) tool, where those involved in a process create a chart showing all its steps. They used the resulting diagram of the employee travel process to guide their Process Management initiatives.

"Because we recognize that people have experienced difficulties with our process, we looked at it from end to end—from when travelers book trips through when they complete their expense reports and see final payments to themselves and the Boeing credit card," Winn said.

The VSM activity involved users of travel services, people in organizations who oversee and interact with travel systems and processes, as well as supplier representatives. Participant Melanie Faulkner, from Commercial Airplanes' Customer Relations team, helps 25 co-workers expense their frequent travel to U.S. and international customer sites. "The travel-process frustration level is high with my co-workers, so I felt obligated to get everything out on the table," she said. "I felt I was listened to on every point."

As with any mapping activity, participants highlighted "kaizen bursts," or areas of actionable improvement. "I like to think of each kaizen burst as a voice of our travelers, giving us advice as to what are the most important improvements for us to work," Winn said.

The kaizen bursts are influencing improvements in several T&ES Process Management initiatives. "The VSM showed us how we affect travelers," said Nate Seibel, T&ES manager for Lean+ and Process Excellence. "It was easy then to identify the measures that matter most and improve processes accordingly."

Jim Johnson (from left), Cory Peters and Yvette Winn, leaders of Shared Services' Travel & Expense Services, work on the 84-foot (25.6-meter) long current-state map of the "book-to-pay" process, from booking a trip to making payment. RICHARD RAU/BOEING

These improvements include:

- For incomplete online expense reports, T&ES now gives users a better view of what information is missing. Users have responded, updating information quickly. That's led to a nearly 50 percent reduction in audit cycle time, faster reimbursements and increased reconciliations.
- Starting last September, travelers began seeing an immediate online view of the required expense-report receipts they faxed to T&ES. Submittal accuracy soared to 98 percent because people who accidently faxed illegible documents took immediate action.
- A new feature in TRIPS, Boeing's online booking system, now allows travelers to hold flight choices for about 24 hours before purchasing. Since about a third of all reservations are changed—often within the first 24 hours of purchase—this has reduced the number of canceled or unused tickets.

"Using Process Management and Six Sigma tools, we keep an eye on our operational metrics and constantly adjust. That's how we have really embedded a Lean+ approach into our processes," Seibel said. In addition, he said, many of the VSM insights were included in an upcoming major upgrade to the online expense tool, on the Boeing intranet at http://expense.boeing.com, that's scheduled for this year. The upgrade will further reduce expense cycle time and traveler effort.

"We care about our Boeing travelers every step of the journey," Winn said. "We must make the entire travel experience as easy as possible so they can focus on doing their business for Boeing." ■

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Below th

Team finds a revealing solution to ongoing 777 interior challenge

By Dan Ivanis

Hidden in the Cost of Rework, Repair and Scrap (CORRS) database at the Commercial Airplanes twin-aisle factory in Everett, Wash., was evidence of a costly nuisance lurking behind the interior sidewalls of every 777 passenger airplane.

As part of his job, Matt Boyle, an interiors quality representative who's since become a support cell manager, regularly monitored the database, which tracks the monthly average cost of rework per airplane. Looking for improvement opportunities, Boyle developed a specialized report that grouped CORRS costs by module (for instance, galleys or seat tracks) and displayed the top five for the month.

"Two things emerged quickly," Boyle said. "First, the top five issues were always the same—the order varied, but it was always the same five issues. Second, sidewalls [airplane interior walls] were always among the top five."

From his background in interiors, Boyle had a good idea what was causing rework. Window reveals—clear plastic interior windows and the surrounding frame, which are supposed to snap easily and snugly into cutouts in the sidewalls—did not work like they were supposed to. Mechanics had to twist and bend the reveals to fit them in place, often popping them into place by using a skin wedge, a hand tool with a thin metal blade.

What emerged from this discovery was a textbook example of Lean+ in action: a team effort that involved people taking the initiative, preventing and eliminating waste, and securing the support of appropriate colleagues to provide a benefit to Boeing and its customers.

"This solution really demonstrates the power each of us has to make a difference—to our team, to Boeing and ultimately to our customers," said Alison Timidaiski, 777 Boeing Production System leader and Boyle's manager. "Matt suspected a problem, analyzed the data to verify and engaged all the right people in finding a solution that ensures first-time quality."

ROOT CAUSE

According to Boyle, the structure of the reveal was just a little too big to fit in the cutout, and the placement of the clips on the back of the reveal interfered with part of the sidewall. "There was always this gut-wrenching snap, crackle, pop and you just hoped you weren't breaking something," he said.

The twisting, turning and sharp metal tools sometimes led to minor, cosmetic—but conspicuous—cracks to the sidewall beneath the window reveal, which must be removable so fuselage windows can be accessed for cleaning and other tasks. "We have vinyl repair technicians who can do incredible things. But often as not, customers would insist on replacing the sidewall because the damage is so visible to passengers," Boyle said.

Replacing a sidewall presents several problems: To access the sidewall, seats frequently must be removed. Because sidewall patterns are unique, Boeing Fabrication's Interiors Responsibility

Mary Dougherty, a flight line mechanic at the Commercial Airplanes facility in Everett, Wash., prepares to replace a 777 window reveal. Using an employee's idea and a lot of teamwork, the window reveals were recently redesigned to greatly reduce sidewall damage during the manufacturing process. **GAIL HANUSA/BOEING**

e surface

Center (IRC) often had to interrupt regular operations to manufacture single replacement panels. The damage often occurred after a customer requested that certain windows be cleaned—and a delay in replacing a damaged panel threatened on-time delivery.

With the approval of his management and the support of the IRC, Boyle pursued the matter. Christer Bjorkegren of Commercial Airplanes Material and Process Technology (M&PT), the factory support organization in the business unit, investigated the assembly process and determined the parts were built according to design and that three-dimensional measurements and interference simulations were required to further assess the situation. Metrology expert Wayne Clark of M&PT's technology organization used advanced scanning technology to precisely measure all parts of the production assembly. He then used that data to perform a virtual assembly, which confirmed that the structure and clips interfered with the remove-replace procedure. M&PT also helped Boyle develop a prototype modification by grinding down part of the window structure and using smaller clips in a slightly different location.

"We brought in a representative from our vendor who makes the window reveal," Boyle said. "He had no idea. He said, 'If my product is doing that, we need to fix it.'"

PROMISING RESULTS

Kristina Gustin, an IRC design engineer, helped Boyle take his project the rest of the way. "I investigated to make sure the solution would work and not interfere with any of the surrounding components. Chaz Wichman [with IRC estimating] and I worked together on the business case development," she said. "Matt's initial design was pretty much there when he came to us. I just tweaked it a little where needed."

Gustin, who has since moved to the 787 Dreamliner program as a propulsion engineer, quarterbacked the change through the various management, technical review and change boards that had to sign off both at the manufacturing and production levels. "Even with a change that seems, physically, relatively minor, there are so many things to be considered. It was a long, long list," she said.

The change was implemented late last year and the results are promising. Of the 140 777s built before the change, about half required a sidewall replacement. In the 22 since then, only four have required sidewall replacements due to these cracks.

"That's really only part of the story because you know our customers are having the same problem," Boyle said. "They have to clean the windows, so they are dealing with the same issues."

Tom Pellerin, a 777 interiors mechanic who deals with window reveals regularly, is sold on the change. "They pop in and out much easier. You don't have to fight them, and I can put my skin wedge away."

What did Boyle find most revealing about this experience? "Probably the most important lesson I learned through this was how many people and groups are available to help you in this company," he said. "You just need to dig beneath the surface to find them." ■

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Engineering better **performance**

An IDS group is making simple yet high-impact changes in behavior that help meet productivity targets —and support Lean+

By Richard Esposito

Shut off your e-mail. Block out five minutes to read this story, and finish it once you've started it. Those steps, in a nutshell, represent some of the simple yet powerful productivity-enhancing behavior changes advocated by Integrated Defense Systems Engineering's 10X initiative.

A functionwide imperative, 10X represents an aggressive pursuit of high-impact Lean+ behaviors. The goal: Over the next 15 months, achieve a tenfold improvement in first-time quality and a 50 percent reduction in engineering cycle time.

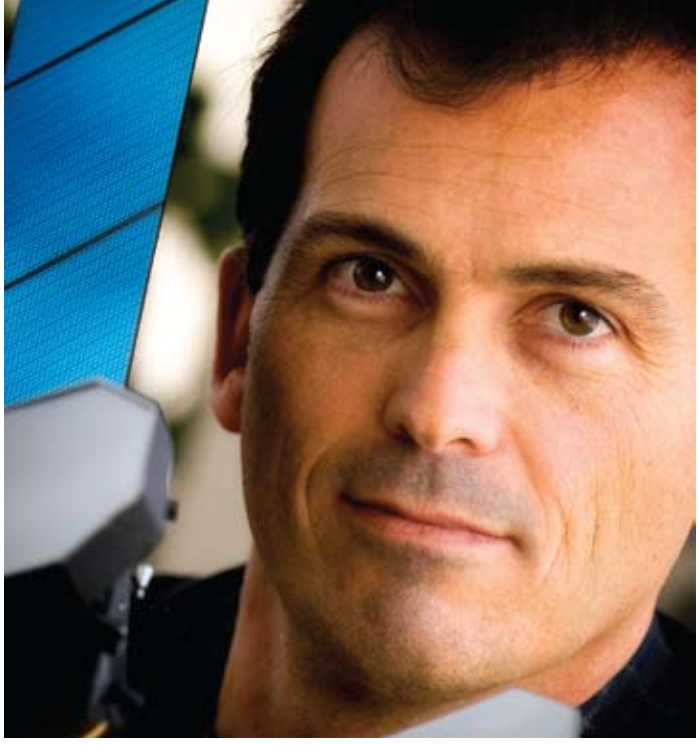
In a recent audit, the Government Accountability Office found that major defense acquisition programs are, as a set, running more than $260 billion above initial contract commitments. Charles Toups, vice president of IDS Engineering and Mission Assurance, said that the industry and Boeing are not blameless. The company's military customers require and deserve better performance, and the lean-themed 10X improvements are one powerful way for Boeing to deliver.

"A close look at the new data on the costs we at IDS incur due to poor quality shows that engineering contributes the most to the cost of poor quality," Toups said. "This is why IDS Engineering is applying Lean+ on a massive scale to improve this critical area. Not just a little, but a lot. Not just soon, but today. And not just in a few spots, but everywhere we can."

The experience of one engineering team on the Joint Tactical Radio System's Ground Mobile Radio (GMR) Program demonstrates what gains can be made from following the first three items on an Engineering Lean+ Checklist of seven simple but powerful 10X rules:

- Establish clear priorities to separate and permit focus on the most important tasks and allow them to be finished first.
- Eliminate bad multitasking—instead, focus and finish.
- Limit the release of work in process (unfinished work) in order to deliver earlier.

The Wideband Networking Waveform team, comprising systems and software engineers who write, test and certify software code, thought about Lean in the past. "But Charles' approach boiled it down to a checklist, giving the team workable ideas," said Joyce Neiman, JTRS GMR deputy program manager, Network and Waveform Products.



Among those "workable ideas" was a sharp reduction in the time spent in meetings and in monitoring and reacting to e-mail. But perhaps the biggest—and measurable—bang for their buck came from an effort to establish clearer priorities in dealing with a backlog of more than 100 software anomaly reports, which are the code writer's equivalent to trouble tickets.

First, the team mapped out and streamlined the anomaly report closure process. Next, each one of 43 people was assigned an anomaly report to close, with ownership from inception to closure. The results? Before adopting the new approach, the team was closing an average of two anomaly reports a week. And within four weeks of implementing the new approach, the team was closing 20 per week. What's more, the team burned down the backlog three months early and now has a stable, high quality base on which to build more code.

Pat Goggin, chief engineer of C3 (Command, Control, and Communications) Networks, agreed that the simplest changes can yield powerful results. "Think about it at home: When I mow the lawn, I don't do part of the front lawn, stop to go work on the car, and then return to mowing the lawn. You do things to completion," he said.

"As more teams show results and more programs completely embrace these methods, we believe they will achieve substantial gains in engineering quality, drive down the cost of rework, and channel those benefits to make their programs more successful. It can make a huge difference for our company, for the commitments we make to customers, and for the missions our products enable," Toups said. "The stakes are high, and these changes are vital." ■

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PHOTO: Charles Toups, vice president of IDS Engineering and Mission Assurance, says his organization is using Lean+ "on a massive scale" to improve quality. **BOB FERGUSON/BOEING**

Let's get it **done**

Try these 7 easy-to-implement ways to improve your productivity

Here are the productivity-enhancing behavior changes set forth in the Lean+ Checklist from Integrated Defense Systems' Engineering organization.

1. **Establish clear priorities.** Separates the important tasks from the rest, permits focus on the most important jobs and helps those tasks to be finished first.

2. **Eliminate bad multitasking: Focus and finish.** Reduces stress, defects, work in progress, cycle time and switching costs.

3. **Limit the release of work in process to deliver earlier.** Permits focus, controls multitasking, and helps leadership create a productive environment.

4. **Prepare! Start → Finish.** Refers to starting only when you have everything you need. Improves productivity, reduces defects and mitigates the time spent by key resources reacting to issues.

5. **Use checklists to prevent defects and traveled risk.** Ensures work is performed to the right level of quality and completeness, and prevents costly downstream rework and risk.

6. **"Face into" and resolve issues quickly.** Refers to the visibility, transparency and responsiveness to see and address issues, ensure quality and reduce delays.

7. **Drive daily execution.** Focuses the team on the daily closure plan, applies attention where required, and provides feedback against goals.

PHOTO: The members of the Joint Tactical Radio System's Ground Mobile Radio Wideband Networking Waveform team used Lean+ principles to clear a backlog of corrective work. Shown from left are Ankit Patel, Jason Fair, Henry Shu, Diana Biera-Smith and James Freckelton. MICHAEL GAIL/BOEING

Never missed **a beat**

How the F-15 team modernized its factory without disrupting production of this fighter jet

By Kathy Cook and Terence Williams

Perhaps the one thing more challenging than building and delivering F-15 fighter aircraft to air force customers worldwide is to do so while radically modernizing the factory where the aircraft is built.

Yet the F-15 team in St. Louis did exactly that: In a major project that took a mere 11 months and ended in December, the team revamped the aircraft's entire production line and equipment to speed production, cut costs and boost competitiveness—all while maintaining a stringent schedule to build and deliver 24 F-15s to the Republic of Singapore. Their story exemplifies how Boeing teams can use the Lean+ growth and productivity initiative to meet performance goals.

"The F-15 is a great aircraft," said Mark Bass, vice president, F-15 program. "Customers across the globe want the capability it brings to their air forces. But we're always looking for ways to reduce its cost to make it even more attractive. The top priority while making these changes was to make sure we delivered high-quality aircraft on time."

Toward that end, the team, led by High Performance Work Organizations, took lessons from St. Louis' F/A-18 assembly team, which had already transitioned to a more efficient setup known as a pulse line. (An HPWO is a group of co-workers who are responsible for a common function or product, share common goals and exercise self-determination in continuously improving the quality of their output and the efficiency of their processes. The teams are part of Boeing's employee involvement and engagement efforts.) They even borrowed one of the key architects of that project, Doug Cook, an industrial engineer who was able to help them accomplish in essentially one year what took two years on the F/A-18. The C-17 team in St. Louis, which makes seven major assemblies for this aircraft, also helped by giving up storage space. That gave the F-15 crew ample room to set up the new pulse line.

In the F-15 team's old configuration, work was not divided evenly among stations; tooling was duplicated at various positions on the line; and the aircraft had to be moved by crane

> "The top priority while making these changes was to make sure we delivered high-quality aircraft on time."
>
> *– Mark Bass, vice president, F-15 program*

between tooling frames. By contrast, the new pulse line divides work evenly between 10 stations; the tools and parts at each station are unique to that station; and the aircraft is moved while within the frame. (The frame includes a floating sled base to allow for easy movement.)

The biggest change was to the shape of the assembly line itself—from a U to an L—which reduced the number of crane lifts and made it easier to maneuver the center fuselage through the line.

Thanks to their actions, the team met the plan's goal for reducing the time the aircraft spends in each of 10 workstations (beginning with the aircraft's center fuselage) to 18 days, a 25 percent improvement. In the new configuration, once a jet moves into station 1, it goes through the pulse line without stopping.

The value of a pulse line comes from its consistent work flow: Assembly work is performed continually, unlike the old system, where an aircraft could sit idle at one position while work was completed at a previous position.

One challenge in setting up the new pulse line was that the work had to be completed backward, in a sense, according to Cook. "Ideally, when you do something like this, you'd like to build station 1 first, then 2 and so on," he said. But space constraints meant they had to build stations 8, 9 and 10 first "because that was the area we were able to clear out first."

Lean+ integrator Rich Schilf said this change is just one part of a larger effort to streamline the F-15 line and continually improve both the quality of the product and the safety of the work area. Other efforts under way include changing to monolithic parts, changing from sheet metal to machined parts, redesigning tools and work areas to be more ergonomic, using lasers to better align parts and working with suppliers to reduce lead times. ■

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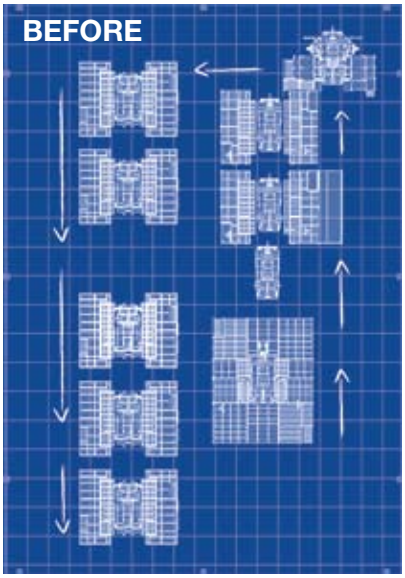

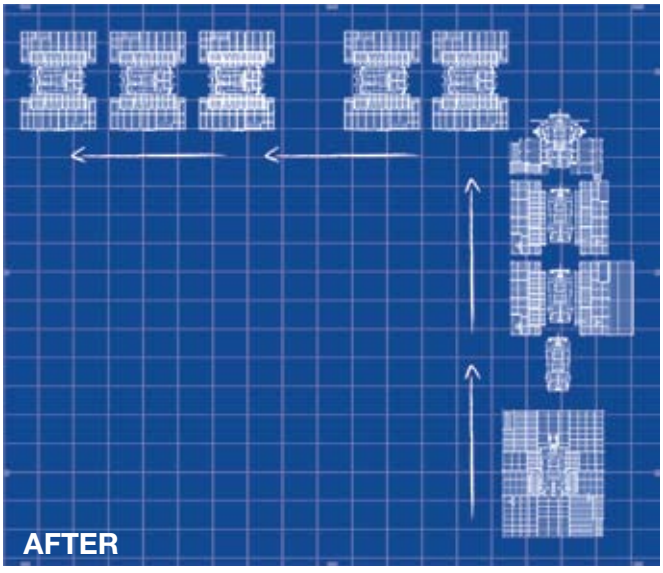

The diagrams above depict the path of the F-15 line before and after its recently completed modernization. The top diagram shows how the assembly had to undergo a tight U-turn; the above diagram reveals how the turn is now in an L-shape, which helps cut time and costs.

PHOTO: The F-15 program's work in revamping its factory configuration while staying on its production schedule shows how Lean+ can help Boeing teams meet performance goals.
RON BOOKOUT/BOEING

Leaner, greener

Suppliers play role in Boeing's environmental efforts, efficiency measures

By Dean Tougas

The measures of environmental performance at Boeing tell a compelling story of progress in process and product design, along with corresponding declines in energy use and waste. But in the view of Mary Armstrong, Boeing vice president, Environment, Health and Safety, that does not tell the whole story.

"We are focused on solutions that go far beyond our own four walls," she said. "It is really a life-cycle approach that looks at the impact of our products and processes through the entire value chain." To Armstrong, that means engaging with suppliers who provide raw materials, parts and supplies to Boeing, as well as with those who buy and operate Boeing products.

A survey of Boeing's supply base shows a diverse range of suppliers (see sidebar on Page 23) that represent many industries, each with important knowledge and capabilities to share. Aerospace parts suppliers partner with Boeing on process and technology breakthroughs to reduce chemical emissions. Electrical equipment suppliers and energy providers work to reduce energy demands. And suppliers in many industries are focusing on reducing packaging. As suppliers take a growing role in Boeing's environmental strategy, a team from Boeing Supplier Management is integrating activities that involve those suppliers.

Doug Perry, who manages the Site Services procurement group in Shared Services' Supplier Management organization, leads the EHS Supplier Engagement Team. For Perry and his team, the first step is to build on existing relationships in high-priority areas. "We've found many of our suppliers are eager to work with us on environmental projects," Perry said. "Working with those companies is a natural starting place."

Pallets of recycled paper will soon be arriving at Boeing as Dell, the company that provides Boeing with printers and copiers, begins stocking the machines with paper containing 30 percent post-consumer content. JIM ANDERSON/BOEING

"We'll expect our suppliers to have the same level of commitment to this as we do inside Boeing."

– Doug Perry, Supplier Management, Shared Services Group

In coming months the team will launch events to bring additional suppliers together on specific, targeted environmental projects, including various Lean+ process improvements. "In Boeing's view," said Perry, "It is very clear that being Lean is also being green."

As an example, Perry cited a pilot project at several Boeing buildings in Renton, Wash., involving OfficeMax, Boeing's office supply provider. A team featuring members of each company is using Lean+ tools to drastically reduce packaging waste and fuel use to benefit Boeing, OfficeMax and the environment.

Boeing Supplier Management, Site Services and OfficeMax experts held a Lean workshop to identify unnecessary ordering,

In Renton, Wash., Boeing joined with OfficeMax to design a Lean-inspired system of office supply ordering. Members of the project team from Boeing include (from left) Jane Gladney, Linda Flegel and Barbara Brown. JIM ANDERSON/BOEING

shipping and delivery practices that produce a larger-than-necessary environmental footprint. The team found that random supply orders result in OfficeMax trucks making daily trips to Boeing sites, even when an order is small and not urgent. And, with each order packed in its own cardboard box, the process generates a large amount of packaging that must be recycled.

As a result of the Lean workshop, Boeing and OfficeMax will begin testing a new approach that cuts deliveries and replaces cardboard boxes with reusable containers—all while implementing Lean and efficient methods for managing office supplies.

"We think this idea—or a variation of it—is probably the right thing to do across the enterprise," Perry said.

Similar projects with suppliers are happening at aircraft assembly sites.

A Commercial Airplanes technical team has been working with suppliers for years to redesign shipping crates for aircraft parts. One recent project focused on the packaging of interior panels for the 747-400 freighter conversion. The project slashed the number of crates from 99 per aircraft to 14, reduced handling time by four hours and trimmed storage space by 2,300 square feet (214 square meters).

Meanwhile, a Boeing Lean+ process improvement team from Integrated Defense Systems in Long Beach, Calif., worked with insulation blanket supplier Orcon Mexico to implement lean production and delivery practices. The C-17 Lean Team and the supplier focused primarily on reducing inventory and eliminating unnecessary handling, said Jim Kuwada of Supply Chain Management and the project's sponsor. But Kuwada said the activity created environmental benefits. Among them:

- Paperless order processing
- Delivery in reusable rolling carts (replacing 5,600 cardboard boxes annually)
- Reduced transportation costs and emissions
- 3,000 square feet (279 square meters) of warehouse space freed up

"The project resulted in a process that is much easier on the environment," Kuwada said.

Moving forward, Boeing will involve more suppliers. While the projects will vary according to the supplier's industry and unique capabilities (see sidebar above), each project will provide lessons to be shared with the broader supply base. According to Perry, getting suppliers to collaborate with Boeing and each other will help Boeing achieve its longer-term goal of direct engagement with all suppliers.

"We don't plan to ask suppliers to meet specific carbon-reduction targets in the same way that we are doing ourselves. But we'll expect our suppliers to have the same level of commitment to this as we do inside Boeing." ■

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Supplier landscape surveyed

With thousands of suppliers worldwide, Boeing recognizes that engaging suppliers is not a one-size-fits-all proposition. The Supplier Engagement Team of Boeing's Environment, Health and Safety organization is carefully analyzing the Boeing supply base to understand what suppliers are doing to reduce impact on the environment—and learn about programs and processes they have developed to be good environmental stewards.

Approximately 130 Boeing suppliers agreed to participate in a study conducted by the Carbon Disclosure Project. The CDP is a research organization that's assembled the largest corporate greenhouse gas emissions database in the world. It annually publishes reports that provide detailed analysis of how the world's largest companies are responding to climate change.

"The survey results will help us understand some specifics on their greenhouse gas emissions and emission reduction targets," said Susan Miller, a procurement manager in Shared Services Group who helped coordinate the survey for Boeing. According to Miller, Boeing will use the survey data to help the company shape a set of long-range expectations for its supply base in a way that's practical and adaptable to the diverse array of Boeing suppliers.

"We see many suppliers are already on this journey with us," said Miller. "And we've invited the others to join us. The momentum will only grow as we're joined by every Boeing supplier."

—Dean Tougas