Simple as...

New technique removes complexity and saves millions

By Elaine Brabant
Photos by Marian Lockhart

The Boeing Company has done it for nearly a century. And very successfully. But developing a new airplane remains an enormously complex task.

Now, a new tool in Boeing's how-to arsenal is making that task a little simpler. It's known as Lean+ 10X. The concept is so basic it might be easily dismissed in the complex aerospace environment: Prioritize work and complete tasks without interruption.

"It's a notion that's surprisingly simple, but counterintuitive," said Charles Toups, vice president of Engineering and Mission Assurance for Boeing Integrated Defense Systems. "To go faster, with higher quality, you want to limit the number of tasks you are working on at any given time. We tend to think getting everything started is the fastest way to finish, but we end up with too many different tasks at once and actually go slower."
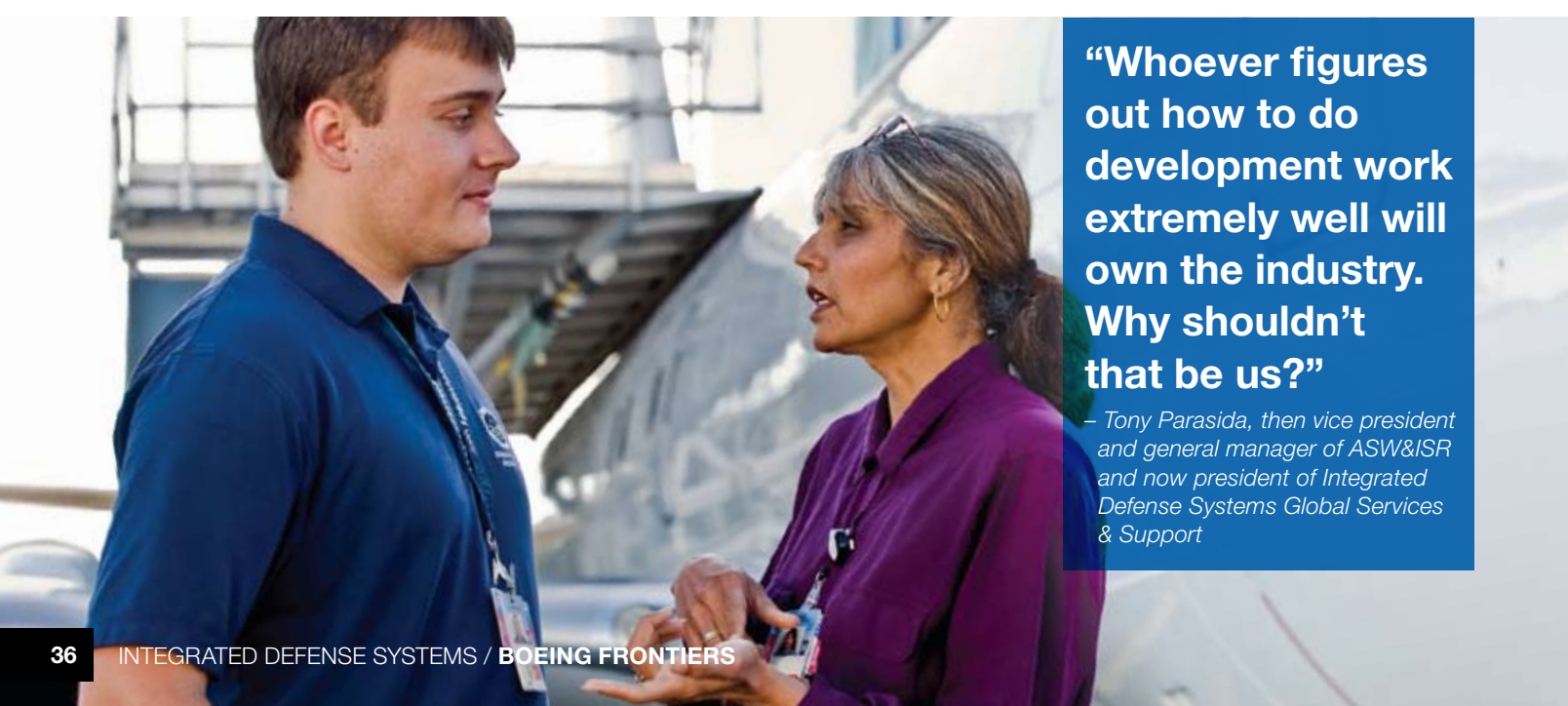
Introduced last fall by Toups' unit, Lean+ 10X is already paying rewards on programs such as the P-8A Poseidon for the U.S. Navy and the Airborne Early Warning & Control (AEW&C) system planes for international customers.

"Whoever figures out how to do development work extremely well will own the industry. Why shouldn't that be us?" said Tony Parasida, then vice president and general manager of Airborne Anti-Submarine Warfare & Intelligence, Surveillance and Reconnaissance Systems (ASW&ISR), the division leading the P-8A and AEW&C programs, and now president of IDS Global Services & Support.

A plane is an incredibly complex system composed of thousands of subsystems, many of them highly complex, which must function flawlessly and be able to work with one another. To that challenge add a fiercely competitive business environment. Customers are focused on affordability, and contractors are under pressure to be even more competitive. Customers hold them accountable with tough penalties for not meeting commitments.

Although these challenges aren't likely to disappear, Boeing leaders agree that the company—in fact, the entire aerospace industry—must become more nimble and responsive in the development stage of products.

That's where Lean+10X has entered the picture. Parasida

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7 disciplines of Lean+ 10X

- Establish clear priorities.
- Eliminate bad multitasking—focus and finish.
- Limit the release of work in process to deliver earlier (i.e., limit the amount that is processed at one time).
- Prepare—start to finish.
- Use checklists to prevent defects and "traveled risk" (mistakes or incomplete work passed on to the next workstation, which can cause problems later).
- Face into and resolve issues quickly.
- Drive daily execution.

Visit *http://10x.ids.web.boeing.com/index.aspx?com=102&id=1* on the Boeing intranet for more information.

has embraced Lean+ 10X to rapidly bring about change in ASW&ISR aircraft development programs. "It will help us perform better than plan and get the job done better, faster and less expensively," he said.

For example, an ASW&ISR team received the okay from the customer to delay development of a subsystem for Korea's AEW&C planes until similar work had been completed on Australia's aircraft. One team focused exclusively on building the Australian customer's subsystem. After completing the job, the team used what was learned to quickly build the Korean subsystem, with necessary tailoring. By performing the jobs sequentially, rather than simultaneously, the team avoiding spending $50 million.

Parasida believes Lean+ 10X can be adopted at every level of the organization, not just in the factory.

Conrad Ball, ASW&ISR chief engineer, agrees and encourages teams, whatever their size or work type, to look at their entire work statement—not just a piece of it—and start applying Lean+ 10X.

"There isn't a team that can't apply the concept," Ball said. "It's that simple. No matter what our core skill, we need to realize that the development of new products involves everyone from the inventor to factory-line workers to office personnel. Each of us must think like businesspeople in everything that we do. Lean+10X is a small step toward that goal."

But a big step toward securing Boeing's future, according to Parasida.

"Shorter but more productive development cycles, bidding confidently and accurately on more competitive programs—that's the ultimate goal," Parasida said. "That's when we can say we've been successful." ∎

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PHOTOS: (LEFT) Using Lean+ 10X techniques to prioritize work and limit interruptions, test engineers Chris Dangelo (left), Rekha Rabadia and the Wedgetail Integrated Test Team for mission-computing software have significantly improved the quality and speed of airplane software tests. **(ABOVE)** Josh Sting, leader of the Wedgetail Integrated Test Team for mission-computing software, monitors team work assignments to prevent task overload.

We beat work overload … **and thrived**

How an Integrated Defense Systems test team ramped up production—by slowing down

The picture wasn't pretty.

Last spring, our team, responsible for one-third of the Wedgetail program's test activities, was overwhelmed. There was too much work, too many errors and not enough time. With priorities constantly changing, we could barely start one task without being interrupted with another.

But in one week, we transformed the way we operate.

How? By slowing down, using Lean+ 10X as our guide. In doing less, we actually ended up accomplishing more.

Our customer, the Royal Australian Air Force, is scheduled to receive its first two Wedgetail aircraft next month. These are 737s modified as Airborne Early Warning & Control system platforms. Our team, the Wedgetail Integrated Test Team for mission-computing software, ensures the aircraft's mission-computing software functions correctly and completely. This is critical, as this software can be considered the "brain" of the operation and controls every other subsystem on the aircraft.

Testing is a thorough process that requires documentation at every step. Our team writes and validates the test procedures. Then we conduct tests in the air, on the ground or at simulators. Finally, we report our findings.

This last step is where we found

While we expected the Lean+ 10X changes would bring improvement, we were surprised by how much and how quickly. *– Wedgetail Integrated Test Team*

ourselves with more reports to complete than we could handle. Plus, our customer, who reviews our documents, was returning reports due to quality issues. It was clear we had to improve the report process.

As we explored Lean+ 10X in just one hour of training, we realized that to get the greatest benefit we needed to focus not just on the reports but on our entire work statement.

Per the Lean+ 10X disciplines (see Page 37), we first established clear priorities. Previously, when groups we do not support asked for help we felt compelled to respond, even if it took us away from our primary duties. But with management's help, we provided training to these groups that improved efficiency for all involved.

Next, we prioritized work that was within our scope. We created a simple electronic queue to stage and assign tasks by priority. Now, no team member works more than a few tasks at one time. We also created checklists to prevent common mistakes.

The most difficult part of the Lean+ 10X journey was finding a way to measure throughput. A mentor suggested weighting tasks based on difficulty. Using this system, we now balance workload between team members and can more accurately measure completed work.

While we expected the Lean+ 10X changes would bring improvement, we were surprised by how much and how quickly. Within one week we saw a 50 percent improvement in throughput and an immediate reduction in quality errors. Within four months, throughput improved 100 percent, and quality increased 75 percent.

Our team leaders play important roles in maintaining the new process. They monitor work to ensure the right priorities are being addressed. And by carefully controlling the work flow, they allow us to focus on our jobs without interruption.

Now we are getting more done in a shorter time. Our accuracy has improved dramatically. And, while schedule and resource pressures are still high, we are better positioned to respond to challenges and execute on plan. Also, having clear priorities and being able to work without interruption has greatly improved team morale.

– Wedgetail Integrated Test Team

PHOTO: Heidi Harwood, Wedgetail Integrated Test Team sub-lead, along with test engineers Tom Wolford (center) and Jon Hamilton and their team, have improved speed and quality using Lean+ 10X.