

# PAC-ing a punch

Lean production, start to finish, helps  
a team position Boeing for more work

By Linda James

Photos by Eric Shindelbower/Boeing

**H**ow do you become a contractor of choice? Start by saving your customer about \$100 million and ramp up production to meet increased customer requirements 18 months ahead of schedule. “It’s as simple—and as hard—as that,” said Boeing PAC-3 Missile seeker production manager Jerry McKinney.

The Patriot Advanced Capability-3 (PAC-3) Missile employs hit-to-kill technology to intercept and destroy tactical ballistic missiles, cruise missiles and “air-breathing” threats such as aircraft through direct body-to-body contact. The seeker, built by Boeing, detects and tracks the target during the terminal phase of engagement, providing precision data to the missile’s onboard guidance system.

“Seeker production is projected to more than double in the next three years,” McKinney said. “That in itself is a job, but the real challenge is balancing missile seeker production with depot recertification.”

Recertification of the PAC-3 Missile seeker is required every 10 years. That means every PAC-3 Missile in the field—either deployed or stored—is returned to the factory, disassembled and tested to ensure operational performance.

The U.S. Army, a customer of Boeing, asked the company to not only meet the Army’s rapidly increasing production requirements but also minimize building and equipment costs. The projected cost for the Army to establish a dedicated depot facility with the required tooling and test equipment exceeded \$100 million, and the Army needed to reduce that number.

“Do this,” McKinney said to his team, “and you will go a long way toward positioning Boeing to continue to help build one of the world’s most successful missile defense systems.”

The team went to work immediately, applying Boeing’s Lean+ initiative to the entire program and reworking the factory from the floor up.

“This was pure Lean,” said Bennie Williams, the PAC-3 industrial engineer who led the effort.

Lean is no stranger to this team. For years, the Lean team has run Accelerated Improvement Workshops to make improvements on the factory floor. But the scope of this new project involved much more.



**PHOTO:** Integration technician Angelique Nelson completes final assembly of seekers for Patriot Advanced Capability-3 (PAC-3) Missiles.

“This effort encompassed the entire factory, from parts storage to final assembly,” said Gwen Harris, integration technician. “It was hard to even imagine what changes could be made—until we saw the possibilities in a scale model.”

“When you’ve been so close to the product for so long, it’s difficult to picture how it can change,” said Andrea Smith, integration technician. “But the model was a great visual. It was like playing with Lego bricks. We could build and design, or start all over.”

“As the team took apart the factory model one piece at a time and then attempted to rebuild it, tremendous improvements resulted,” Williams said.

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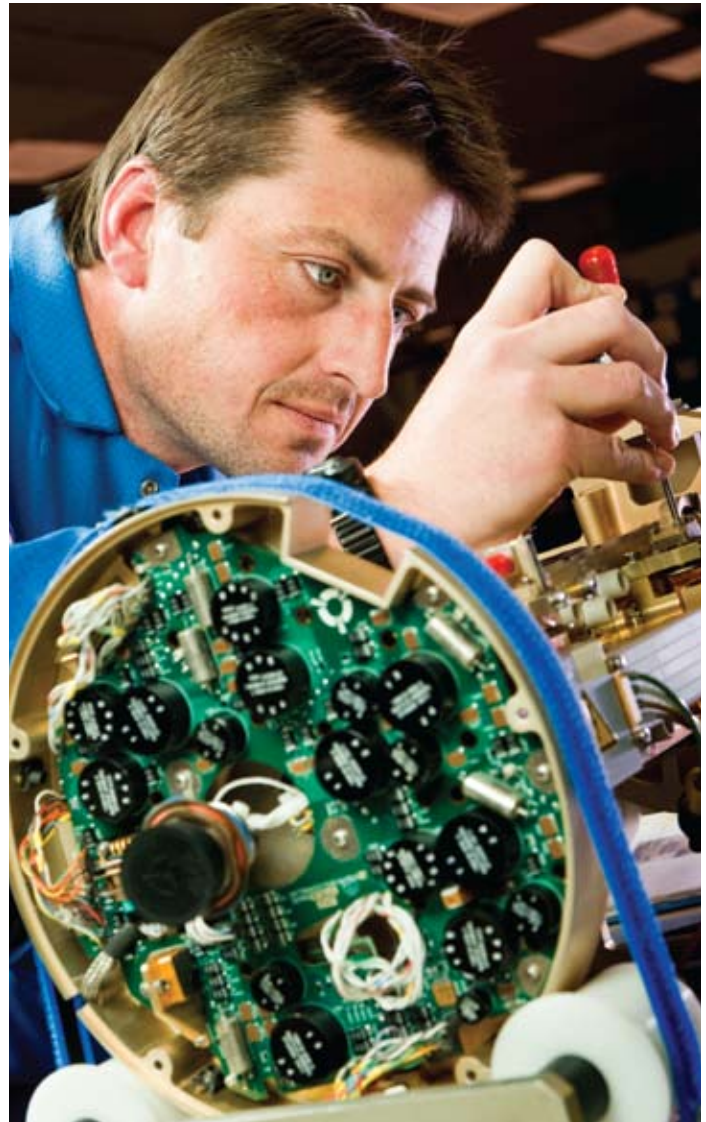
– Jerry McKinney, Boeing PAC-3 Missile seeker production manager

“Once we got started, the ideas just kept coming,” said Harris. “It was exciting to see it all come together.” Harris has worked in PAC-3 Missile seeker production for 10 years and has a personal investment in the program—her two daughters served in the U.S. Army during Operation Iraqi Freedom in the Middle East, where the PAC-3 missile has been deployed against missile threats.

All together, the team’s ideas saved the customer approximately \$100 million dollars. This included reducing floor space by 4.5 percent, returning 500 square feet (46 square kilometers) to the site and providing space for a new employee-break area. And they cut travel time of the seeker through the factory by 50 percent, reducing risk of damage through handling. The increased capabilities, paired with the smaller factory footprint, resulted in an increased capacity of 1,200 percent. “Now, that’s success,” McKinney said.

Perhaps most important, the team helped position Boeing to handle projected PAC-3 seeker production growth over the next decade. “It was a lot of hard work to adjust to a new way of doing business on the factory floor, but it was well worth the effort.” McKinney said. “We’re ready for future growth.” ■

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**PHOTO:** Integration technician Tom Colvin works on a power assembly for the seeker of a Patriot Advanced Capability-3 (PAC-3) Missile.



## Team celebrates 10 years

The Boeing Patriot Advanced Capability-3 (PAC-3) team will celebrate the 10th anniversary of seeker production in Huntsville, Ala., this month and deliver its 1,000th seeker before the year ends. Work on the PAC-3 program at the Boeing Huntsville facility includes production, assembly, integration and testing. Boeing employees in El Paso, Texas, produce and test circuit card assemblies. The PAC-3 program office and design engineering functions, located in Huntington Beach, Calif., have program management and design responsibility.

**PHOTO:** Integration technician Billy Collins loads two seekers for the Patriot Advanced Capability-3 (PAC-3) Missile into a humidity-curing oven, which reduces an otherwise 24-hour curing cycle to five hours.