The multiplier effect

When it comes to achieving innovation, replication is just as important as invention

By Bill Seil

A decade ago, a team of Boeing rotorcraft employees in Philadelphia noticed how employees in Wichita, Kan., had revolutionized the way they worked with their suppliers.

Wichita's Min/Max system set inventory ranges for parts and allowed suppliers

PHOTO: John DeAntoni, left, and Craig Scott were part of a team that shared a 2011 Technical Replication Award for developing non-chromated exterior decorative primers for aircraft.
RON BOOKOUT/BOEING

to actively monitor the overall supply.

Understanding how significantly inventory control can affect the company's bottom line, the Philadelphia team grasped Wichita's idea and combined it with the user-friendly interface of its own Consumption-Based Ordering tool, which increased the system's visibility—and value.

Today, the enhanced Min/Max inventory control system is being used by programs at 15 sites across the company, and it is being accessed by approximately 1,725 Boeing suppliers, used to access roughly 42,000 different parts. Min/Max has also become an industry standard, having been adopted by other corporations.

"I can't imagine that our Wichita employees, a decade ago, realized how widely Min/Max would spread," said Angela McLaughlin, now a procurement analyst in Boeing Defense, Space & Security. She was among the Supplier Management employees who saw the companywide potential of Min/Max all those years ago.

"For those of us in Supplier Management," McLaughlin said, "it's become a cornerstone of the way we do business. It's been quite a journey, but well worth the effort."

Min/Max was one of four innovation success stories recognized by a Boeing Technical Replication Award in 2011. McLaughlin was recognized for her involvement in the program, along with Brian Laughlin, the original developer of the system. Two other Min/Max leaders were also named.

The Technical Replication Award recognizes how important problems are solved by creatively leveraging proven, good ideas.

"These awards recognize employees who have taken an existing capability and applied it to other Boeing programs, spreading important advancements throughout the enterprise," said Allen Adler, vice president of Boeing's Enterprise Technology Strategy.

Boeing's long-standing practice of honoring innovators with an annual invention award was recently broadened to include technical replication efforts. The reason is simple, Adler explained: In the broad scheme of technology, replication is just as important as invention to achieving innovation.

"Even most inventions are built upon the prior art, or original idea, of someone else," he said. "The natural progression of human technology depends on the widespread use and copying of good ideas and best practices."

This year's Technical Replication Award winners included key individuals involved in the expanded use of Min/Max; methods for the development of non-chromated exterior decorative primer, used on both commercial and military aircraft; Common Open Mission Management Command and Control, a software toolkit for developing unmanned air vehicle ground stations; and the Boeing Agile Software Process, which incorporates Lean+ principles in software development methodology.

Laughlin, now a Boeing Technical Fellow, first thought of the Min/Max idea when he was a process engineering analyst on the shop floor in the late 1990s. The 737 program was having serious problems getting parts in a timely manner. Laughlin and his manager decided to look for alternatives to standard supply chain procedures.

"We found that we were artificially bogging ourselves down in a nightmare of purchase order and change order maintenance," Laughlin recalled.

PHOTO: Dale Lauer, left, of the F-15 program and Technical Fellow Brian Laughlin discuss aspects of Min/Max, an inventory control system Boeing uses with suppliers. Laughlin developed Min/Max, which is now in use in other parts of the company. RON BOOKOUT/BOEING

PHOTO: Randy Jahren, who shared a Technical Replication Award for developing non-chromated exterior decorative primers for aircraft, has worked mainly on paints for commercial airplanes. JIM COLEY//BOEING

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They found that vendors were delaying deliveries until they could supply the exact quantity listed in the purchase order. As a result, there were often shortages on the shop floor. If extra units inadvertently came in, this would have to be addressed by a change order.

The proposed solution was based on relationships with suppliers—not transactions—that gave suppliers visibility to inventory information.

The team experienced resistance from some in management, who back then had little confidence in their proposed use of the Internet to build the system. Since then, Min/Max has won two Boeing Special Invention awards and, in 2010, was awarded a U.S. patent.

"The neat thing about the Technical Replication Awards is that they recognize growth in the use of new technologies," Laughlin said. "It shows how you can leverage and spread good ideas across the enterprise."

When it comes to the art of replication, "use," "leverage" and "spread" are operative words.

Consider, for example, another of this year's Technical Replication Award winners.

The aerospace industry has a long history of using chrome-based primers on the outside of aircraft to inhibit corrosion. Unfortunately, those chemicals also pose health hazards when being applied. Boeing takes extensive precautions, at much expense, to protect both workers and the public from compounds such as hexavalent chromium.

For the past 15 years, both military and commercial airplane programs have been working to develop non-chromated exterior decorative primers for aircraft. This is no easy task, since different aircraft require primers that are specific to their needs.

Randy Jahren, a Technical Fellow in the Paints & Coatings Group of Boeing Research & Technology, is among nine researchers across the enterprise who are sharing a 2011 Technical Replication Award for succeeding in this challenge. Jahren has devoted most of his efforts to paints for commercial airplanes.

"Military aircraft have very specific requirements," Jahren said. "In a commercial airplane, we don't really care about the infrared signature. But in our military programs, we're very concerned about things like that."

So although the company does not have a unified enterprise-wide research program for the development of non-chromated primers, the programs talk with one another and share their research methodologies.

Technical replication is even in his group's scorecard, said John DeAntoni, a St. Louis–based BR&T engineer who developed new coatings for military jet fighters.

"This is not an end game; we've got a ways to go," DeAntoni said, explaining that the replication must continue across many Boeing teams until all chrome is eliminated from paint on the outside and inside of all products.

Said Adler about replication team efforts: "It definitely takes both coming up with a good idea and leading a larger team by charting the course to success—and that is not frequently easy to do." ■

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