LASER-GUIDED EFFICIENCY

Innovations in 3-D laser projection aid in the manufacture, assembly, and inspection of composite materials

As the world's leading industrial laser-projection company, Aligned Vision has spent decades helping fabricators streamline their manufacturing processes even while increasing accuracy and cutting costs. An important early linchpin in the success of the company—which today contracts with Boeing, Lockheed Martin, Northrop Grumman, and many others—was a 1990s contract from the Air Force's Small Business Innovation Research (SBIR) program.

In the early 1980s, Scott Blake, now president of Aligned Vision, worked for a company that produced laser media as part of "big laser light shows" for corporate special events and spectacles such as the Olympics, Super Bowls, and the Statue of Liberty rededication ceremony. In a major twist of fate, the technology attracted the interest of the Sikorsky Aircraft Corporation, a division of Lockheed, which wanted to use it to project the dimensions and locations on blueprints for aircraft builds to assist in the manufacturing process.

In response, Blake formed Assembly Guidance (now Aligned Vision), and pioneered 3-D laser projection technology to guide the hand layup of composite materials in the manufacture of advanced aircraft. The business supplied laser-based assembly guidance systems to companies that included Sikorsky and Learjet. But then the aerospace industry saw a recession in the 1990s.

That, Blake said, is where the SBIR came in. "One of the key things that kept us in business in the lean times and kept our business moving forward was that SBIR."

The Assembly Guidance team had a vision for a new kind of projection system, one that would not only create laser projectors to facilitate the assembly of composite components but would also instruct workers in how to actually fabricate the composite materials, and automatically inspect the materials afterward.

With its detailed proposal, the company received a Phase I SBIR contract from the Air Force to design and build a concept.

Their initial concept, Blake said, "was really ugly, but it worked."

In fact, the concept was so successful, and received enough outside interest from the aerospace sector, that Aligned Vision was able to commercialize its Laserguide technology even before the company received the second phase of its SBIR award. During the Phase II work, the team focused on helping manufacturers get composite materials set precisely in place during builds. Out of this "composite manufacturing process control system" came a new generation of automated inspection systems, Laservision.

"Without LASERVISION, inspection is done by people, and while people have good mobility and visual and tactile senses, they are not accurate or rigorous," Blake said. "[Our systems] cost a lot less than human inspectors, do a much better job of inspecting, and create documentation from the process that you can't get from a human inspector."

Manufacturers want to know what's going into all their various parts, he said, explaining that the SBIR-funded inspection system has evolved into a way to verify and document the integrity of each part during every step of its production.

The company has firmly established itself as the go-to solution for aerospace manufacturers, and just about everything that flies uses at least one of Aligned Visions' systems in its manufacture, Blake said, including the F-22, F-35, 787 and the H-60 family of military helicopters. Aligned Vision also works with ship builders, and has pegged the automotive industry as its next frontier. In 2000, the company, grown to include roughly 30 employees, received the coveted Tibbetts Award for its SBIR work on automated manufacturing processes.

Blake credits the SBIR program for giving his company a shot in the arm when it needed it most, propelling it to the successful position it's in today.

Over the years, other companies have imitated and adopted laser systems similar to those developed by Aligned Vision. It's no wonder. As Blake said, the systems have been so effective at reducing errors, improving speed, and saving money that they've become industry standard among many aerospace companies.

Blake credits the SBIR program for giving his company a shot in the arm when it needed it most, propelling it to the successful position it's in today. "To me, it's an ideal way to drive new technologies," he said. "All new technology has risks, and if the envelope is really being pushed there will be failures. SBIR funding enables the ability to work through failures to achieve new levels of performance that benefit everyone."

Aligned Vision
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