

ONLINE EXCLUSIVE: Preserving U.S. Competitiveness: Non-Profit Company Provides Competitive Edge in Global Market

By Adam Madison

While most manufacturers understand the political dangers of moving operations overseas, the lower cost structure in other nations can be too tempting to ignore. However, if all of the goods that Americans use end up stamped “Made in China,” a political climate shift could leave the nation prone to catastrophic supply-chain disruptions. Fortunately, the technology and innovation now is available to keep America competitive in the global business environment.



The Connecticut Center for Advanced Technology Inc. (CCAT) is a prime resource available to U.S. companies. Based in East Hartford, CT, it was developed in 2004 with federal grant money to strengthen national defense. The CCAT enhances the state of manufacturing by educating the workforce and improving technology in both public and private sectors. The non-profit company continues to operate on local and federal grants, but also has expanded through U.S. manufacturer private investments. The CCAT recently introduced its Advanced Manufacturing Center that assists entities, including Boeing Co., General Motors Co. and the military.

“We take a manufacturer’s existing process and optimize it using various advanced CAM (computer-aided manufacturing) tools,” said Robert Torrani, CCAT director of Manufacturing and Supply Chain Initiative. “Some of the projects that we have done for companies have taken up to 70 percent off of their cycle time.”

The equipment available to the CCAT is technologically advanced and often enhances machining used by the aerospace industry. In many instances, the company has moved beyond part analysis with coordinate measure machines (CMMs). Torrani said these machines provide a physical analysis to extract the dimensions of a part. It is typically a lengthy procedure of programming and point-by-point processing. A much faster method now available is a non-contact structured light inspection system that projects patterns of light onto parts. Digital cameras view the light that exposes the complex geometry to create solid models to compare with original computer-aided design (CAD) drawings. These comparisons tell clients exactly what they have versus the original equipment manufacturer (OEM)'s intended design. Accuracy is within a half thousandth of an inch, and it is only limited by holes with large aspect ratios or depths beyond the light's penetration.

This same system can be used for reverse engineering legacy parts to reduce the time required to make solid models. Torrani said this technology has been useful when recreating parts for B-52 bombers. The airplane was designed in the 1940s and built in the 1950s, long before the invention of CAD drawings. The CCAT creates both models and drawings for machine shops so these airplanes can fly for another several decades.

The CCAT also improves programming of machine parts with advanced CAM systems and verifies the improved program with five-axis CNC machines. Advanced laser processing provides precise hole drilling and shaping, welding, coating removal, and laser machining and marking. A CCAT engineer has even used this laser to complete complicated welds on Boeing's 787 Dreamliner in Seattle.

In addition to developments at its manufacturing center, CCAT has invested in additive manufacturing and its applications in conjunction with its Laser Applications Lab. This process reduces scrap and time required to remove unwanted materials. It also enables parts and product creation that cannot be

produced using traditional methods. The challenge now is to master this technology and validate it as a mainstream manufacturing technique. As a preliminary step, CCAT has combined its 10-kilowatt laser with an Optomec Lens 850-R, so parts may be fabricated from powdered metals including titanium and nickel alloys.

Torrani said CCAT helps customers provide their products faster, better and cheaper. This is essential in an industry quickly being dominated by regions with lower costs and fewer regulations. Today, U.S. companies have no choice but to find the competitive edge within the production process. As more companies enhance onshore operations, the desire to offshore should shrink substantially and put the country in a safer and competitive position.

Training for the Rebound

As manufacturing embarks on a slow but steady rebound, finding qualified men and women to fill positions is easier said than done.

Even at the recession's peak, the Connecticut Center for Advanced Technology Inc. (CCAT) continued to chart more than a dozen openings a week in manufacturing, said Robert Torrani, CCAT director of Manufacturing and Supply Chain Initiative. Many manufacturers are even turning business away due to a lack of skilled manpower. To address this phenomenon, the CCAT continues its efforts to introduce new blood to the industry and train existing workforces with the help of local and federal grants.

A major barrier to recruitment is the lasting impression by America's youth that manufacturing is a dark, dirty and dangerous profession. Torrani works with students, assuring them that this perception is false and explains that manufacturing provides opportunities for growth. As a result, he said, students are more likely to take an early interest in science, technology, engineering and math. "This way, when the economy is in full swing, they will enter the workforce with the needed skills," Torrani said.

The CCAT recently introduced the Young Manufacturers Summer Academy, a partnership with the Connecticut Technical High School System. For two weeks, students participate in hands-on workshops, tour manufacturing facilities and engage in shop-floor discussions, he said. The program emphasizes communication skills, and students receive assistance in developing résumés for mock career fairs. Parents also are encouraged to attend. The program already has influenced more than 240 students, who are potential recruits for the future, Torrani added.

The CCAT also offers traditional lean-focused training, as well as consulting on emerging technologies, as continuing education to current manufacturing workers. The education is offered as part of the Connecticut Quality Council that promotes total quality management and includes Six Sigma training. Also, the CCAT has been instrumental in introducing companies to fuel cell energy through collaborations with local providers, Torrani said.