The TIDE Program: Strengthening the Defense Manufacturing Base

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Like other sectors within the U.S. economy, the defense manufacturing base in the U.S. is evolving. Increasingly, product development is being outsourced to small manufacturing enterprises, and large defense-contractor organizations are becoming integrators of supply chains, as opposed to manufacturers. A supply chain is only as strong as its weakest link. As the defense manufacturing base evolves, these links will be crucial for rapid defense response to future events, especially regional engagements.

Small manufacturers have typically been reluctant to utilize software technology in their design and manufacturing activities. As easier-to-use, less costly tools have been developed to aid the manufacturing process, this reluctance has prevented small manufacturers from participating in the information technology-driven changes that have fueled economic growth and improvement in other sectors. The Technology Insertion, Demonstration, and Evaluation (TIDE) Program, initiated in May 2000, seeks to improve the profitability and efficiency of small defense and commercial manufacturers by helping them overcome the barriers to technology adoption.

To improve the capabilities of smaller manufacturers, the SEI is helping such enterprises adopt state-of-the-art software practices and technology through the TIDE Program. Funded through an appropriation sponsored by Congressman Mike Doyle, the TIDE Program supports the SEI's mission to transition best software engineering practices into widespread use. Advanced software engineering practices—advanced engineering environments, modeling and simulation capabilities, and better performing manufacturing control systems—promise to provide small manufacturers with

- higher quality
- predictable performance
- reduced cycle time
- reduced costs

Demonstration Projects

Currently, two small manufacturers in Southwestern Pennsylvania—Carco Electronics and the Kurt J. Lesker Company—are investing time and engineering personnel to

collaborate with the SEI on projects demonstrating the business benefits and process of adopting advanced technology in small manufacturing enterprises.

While solving specific problems for the companies that participate in these demonstration projects, the SEI is documenting lessons learned. The intended outcome of these demonstration projects will be a toolkit that can be used by any smaller manufacturer attempting to establish an enhanced engineering and design capability, to move into new markets, and to provide more value to customers in the form of more technically sophisticated products. Case studies generated from these demonstration projects will provide solid justification to investors as well as to risk-averse owners of smaller businesses that insertion of commercially available software does have substantial benefit. These case studies and other lessons learned from the demonstration projects will then be shared in forums such as workshops, conferences, and curricula so that others in the DoD supply chain can take advantage of this work. Carco Electronics manufactures multi-axis rotational devices for testing inertial navigation and missile-seeker systems. The SEI is working with Carco to evaluate Carco's engineering process and adopt commercial technologies for improvement. The SEI and Carco Electronics are currently pursuing the adoption of new tools to support structural, kinematics, and servo-analysis capability within Carco's engineering process. As the technology adoption plan continues to be implemented, additional results will be collected and documented.

"The TIDE program is helping Carco Electronics to expand our technical analysis capabilities, enabling us to be more competitive in the global aerospace market," says Joe Elm, general manager for Carco Electronics. "This will drive our continued growth."

The Kurt J. Lesker Company manufactures ultrahigh vacuum systems used in the production of a variety of products including semiconductors and flat-panel displays. An assessment of the Lesker engineering process found that it could be improved through the adoption of tools required to efficiently design the more complex products demanded by its customers. The SEI is helping Lesker evaluate and select appropriate commercial software tools that meet the company's engineering requirements. In the process of doing so, the SEI is determining what evaluation processes are suitable for use by small manufacturers.

"We are already doing things smarter," says Kurt Lesker III, president of Kurt J. Lesker Company," and as soon as we get the new tools in, we will be doing them better as well."

Workforce Development

Concurrently with the TIDE demonstration projects, the SEI has initiated an education-and-training outreach program to expand technology adoption throughout the Southwestern Pennsylvania manufacturing community. This program offers scholarship support for small business personnel to attend courses, seminars, and workshops in

leading-edge information technology, leading to increased awareness of the value of and return on investment from technology adoption.

“Western Pennsylvania has a tremendous industry base, manufacturing metals, medicine, and a great deal more,” says Congressman Mike Doyle. “In addition to traditional industries, we are developing a new kind of factory—one that manufactures knowledge based on research. The SEI is a prime example of this. It was created by the Department of Defense to transform research results into knowledge-based products that others can use to build better software. This type of knowledge factory is very important. It is my belief that the real benefit of the technological revolution will not be fully realized until our traditional factories reap the benefits produced by our knowledge factories. The TIDE Program is making this happen.”

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