

D. Manufacturing Technology (ManTech)

Background

Advanced manufacturing technologies are vital to affordable defense systems and economic security. The maturity level of processes employed to produce defense weapon systems has a telling effect on the ability of those systems to meet schedule and cost targets as they transition through development into production. Immature manufacturing processes represent a major source of risk and uncertainty that is often translated into system cost growth and schedule slippage. The DoD Manufacturing Technology (ManTech) Program's work in maturing factory processes as well as promoting integrated product and process development (IPPD) is a critical element in understanding and resolving risk early in the system development cycle.

ManTech investments made by the Military Services, Defense Advanced Research Projects Agency (DARPA), and the Defense Logistics Agency (DLA) are grouped into three technology areas - Processing and Fabrication projects mature factory floor processes and improve yields through variability reduction for electrical, mechanical, and composite products; Manufacturing and Engineering Systems projects improve the support functions associated with planning, scheduling, and controlling manufacturing and enterprise-level activities, including customer and supplier interfaces; and Advanced Industrial Practices projects leverage manufacturing process developments with advanced business practices to demonstrate new industrial base capabilities.

The congressional funding level for ManTech programs (Service//DLA) in FY97 was \$189 million.

Technology Transfer & Dual Use

The ManTech program is driven by defense needs for technologies and systems that provide a superiority edge to the warfighters. In today's environment, DoD is involving the commercial industrial base as soon as possible, by either adopting its best practices or transferring results of military processes to the commercial arena. For example:

- The Air Force Lean Aerospace Initiative (LAI) is a collaborative multi-million-dollar ManTech effort that receives funding from all of the Services, several other government agencies (e.g., NASA and the Coast Guard) and approximately 20 aerospace companies. It has been underway for more than four years. LAI's objective is to foster the identification and implementation of the most efficient known practices in product development, factory operations, supplier relationships, and other areas that can sharply (on the order of 50 percent) reduce cost and cycle time for the production and sustainment of aerospace products. Lean concepts present the US military aircraft industry with an opportunity to address the challenges presented by both reductions in DoD procurements and worldwide competition.

- The Defense Logistics Agency, working with Rutgers University, developed an alternative process for manufacturing sterilized food pouches for combat rations. The program leveraged best commercial practices in the food industry to modify equipment, develop a suitable packaging film, and produce test articles to demonstrate the results. The production rate for 8 ounce pouches was 102 per minute, compared to the usual 60 pouches per minute per line for traditional equipment. The US Army Natick Labs subjected the pouches to rough handling and cold weather test, and reported that the results were two to four times better than test results of legacy pouches.

Recent Management Initiatives & Accomplishments

- Science & Technology (S&T) Affordability Task Force. In May, 1995, the Director for Defense Research and Engineering chartered the S&T Affordability Task Force to address the issue of assessing and strengthening the affordability content of the DoD's S&T programs. The intent was to identify mechanisms for focusing the DoD's technology programs on obtaining manufacturing process maturity as early as possible in the acquisition cycle. Over the past year the Affordability Task Force has sponsored a workshop with S&T managers and industry to share affordability best practices and lessons learned; reviewed pilot programs for attention to IPPD and Integrated Product Teams (IPTs); and conducted a pilot training course to improve affordability awareness. 1998 activities will focus on developing an action plan for transitioning the results of 6.3 advanced technology development efforts into acquisition and assembling an Affordability Handbook, or toolkit, for S&T managers to use during program formulation.
- Interagency Collaboration. Over the past year, the Joint Defense Manufacturing Technology and the Manufacturing Technology Information Analysis Center (MTIAC) worked with representatives of the Department of Commerce and Department of Energy to explore synergy with the Partnership for a New Generation of Vehicles (PNGV) consortium. Both programs are working through the MTIAC to exchange technical data and research agendas for metal casting projects.
- Manufacturing Technology Information and Analysis Center (MTIAC). MTIAC is a DoD-supported center that provides Manufacturing Technology Information to government agencies and qualified government contractors. They publish a *Current Awareness Bulletin* that alerts subscribers to the latest developments in DoD ManTech and they perform a wide variety of technical search and analysis services for which they charge a fee. They have access to the technical documents that result from ManTech projects and make them available to qualified requesters. MTIAC also operates an extensive Internet web site, accessible at <http://mtiac.iitri.com>, through which most of their services can be obtained.

- Internet Web Sites. In addition to the MTIAC web site, there are several other ManTech-related web sites that provide Program information and facilitate technology transfer and transition. The DoD ManTech web site, sponsored by ODDR&E, is located at <http://mantech.iitri.com>. This site provides information on DoD ManTech Program-related publications, meetings, budgets, technology transfer, and a variety of other related topics to an unrestricted audience. It also offers a password-protected area that the DoD ManTech community uses to coordinate and share information internally. The Services' ManTech Programs also operate their own web sites that contain information about their specific programs and organizations:

Website	Military Service
http://ippd.redstone.army.mil/mst_army/mantech_97	Army
http://mantech_nt.bmpcoe.org	Navy
http://www.wl.wpafb.af.mil/mtx/index-n.html	Air Force

- Technology Transfer. Each year, the Joint Defense Manufacturing Technology Panel sponsors the Defense Manufacturing Conference (DMC). The DMC is a major technical conference at which the latest developments in DoD manufacturing technology are briefed to an audience made up of representatives of industry, government and academia. DMC '97, held on 1-4 December 1997, drew more than 800 attendees. The conferences feature mini-symposia in which program plans and the results of specific projects are briefed, as well as an exhibit area where industry and government exhibits provide details of ManTech-related projects, products, and services. The plenary sessions of the conferences provide insight into the needs of DoD customers, as well as policy issues and other topics of general interest. Other significant technical meetings are held throughout the year for specialized purposes. The Air Force, for example, holds a Roadmap Review each year to explain their detailed program plans to an industry and government audience, as well as an Industry Days meeting to review the results of their efforts to reduce the risk of implementing advanced business practices.

Recommendations for Program Improvements

Cost Sharing. Subsection 2525(d) of Title 10 of the United States Code requires two types of cost sharing for ManTech. The first provision requires cost sharing for all ManTech programs, unless waived by the USD(A&T). The amount of sharing is not prescribed. The second provision requires 2-to-1 recipient to government cost sharing for 25 percent of the available funds each year. ManTech primarily addresses high risk, defense-unique, military defense technologies. There is little industry incentive to provide such a high level of cost sharing when there is limited or no commercial applicability. Further, the 2-to-1 cost share requirement disincentivizes small and medium suppliers from responding to ManTech solicitations since they do not have the corporate resources to participate in cost sharing. The DoD will provide a recommendation for revising the ManTech cost sharing provisions for Congressional consideration in future legislative proposals.