



MANUFACTURING EXTENSION
PARTNERSHIP
NATIONAL ADVISORY BOARD
ANNUAL REPORT 2002

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LETTER FROM MEP

2002 was a year filled with challenges. U.S. manufacturers were hit hard as the economy continued to spiral downward, forcing firms to cut back capital expenses, staffing, and expansion. Many manufacturers eventually succumbed to economic pressures and closed plants or outsourced production overseas. But despite these difficulties, there were manufacturers that focused on surviving and thriving by adopting new methods, processes, and technology that streamlined operations and increased productivity.

Small manufacturers' continued survival is integral to America's economic recovery, global competition, and

homeland security. Loss of this vital component could have widespread repercussions. For this reason, the Manufacturing Extension Partnership (MEP) has helped to introduce and implement products and services designed to improve small manufacturers' efficiency, productivity, and global competitiveness.

In light of today's economic environment, MEP also has taken a close look at how it operates so that it is client focused and productive and generates a strong return on investment. Holding itself to a high standard, MEP is fully aware that it must employ the same strategies, processes, techniques, and efficiencies that it recommends to small manufacturers and has made extensive adjustments to

its own internal operations that have already had significant impact.

MEP's assistance to small manufacturers exemplifies how a strong federal, state, and private sector can significantly improve America's ability to retain its position as a world leader and successfully compete in the global economy.

Edward J. Noha
Kevin Carr



Ed Noha, Chairman
National Advisory Board



Kevin Carr, Director
Manufacturing Extension Partnership

BOARD MEMBERS

The Board consists of nine members with backgrounds in industrial extension and are all appointed by the Director of NIST to serve three-year terms. The members bring a variety of manufacturing and manufacturing-related backgrounds to the Board, including small and large manufacturing, labor, academia, economic development, consulting, and state government. This mix brings to MEP the outside advice critical to maintain and enhance the program's focus on the customer—America's smaller manufacturers. See the following three pages for the 2002 members and their bios.

RONALD AUGER
President/CEO
American Industrial Casting, Inc.
East Greenwich, Rhode Island



Mr. Auger has over 35 years of managerial and production facilities experience. In addition to serving on the Small Business Administration's (SBA) Regulatory Fairness Board, Mr. Auger serves as Board Chair for the Rhode Island Manufacturing Extension Services and as a review panelist for NIST MEP.

In 1999, he was recognized by the SBA as the Rhode Island Small Business Person of the Year. From 1993-1996, Mr. Auger served on the Department of Energy's Metal Casting Advisory Board and on the Rhode Island Governor's Defense Conversion Advisory Board. He received the John J. Touhy Award from the City of Cranston for outstanding business and civic-minded person in 1996 and the U.S. Chamber of Commerce's Blue Chip Enterprise Award in 1993.

RICHARD BENDIS
President & CEO
Innovation Philadelphia
Philadelphia, Pennsylvania



Mr. Bendis joined Innovation Philadelphia in 2002. Innovation Philadelphia is a public/private partnership dedicated to increasing the region's entrepreneurial capacity and position Philadelphia as a leader in the global knowledge economy. Prior to that, he was President and CEO of the Kansas Technology Enterprise Corporation (KTEC), and he designed and implemented the Kansas Innovation and Commercialization Corporation. He also serves on numerous boards and committees including the White House U.S. Innovation Partnership Advisory Task Force Steering Committee and co-chairs the SBIR Committee, the National Governors Association Science and Technology Council advisory board, and the State Science and Technology Institute Board of Directors.

MARÍA ESTELA de RÍOS
Executive Vice President
of Corporate Affairs
Orion International Technologies, Inc.
Albuquerque, New Mexico



Ms. de Rios has over 25 years of experience in general business and in government and commercial contracting. Currently she is executive vice president of Orion International Technologies, which is a research and development engineering company specializing in nuclear and environmental engineering services, advanced technologies, and data and control systems. She currently sits on the Governor's Business Advisory Council and the Board of Directors for the Industry Network Corporation, the local MEP center in New Mexico.

She is recognized as knowledgeable in the areas of economic development and international trade for the state of New Mexico. As such, she is a frequent speaker at forums and seminars. She has also served in leadership positions on the boards of major community- and business-related organizations since 1972.

KELLIE DODSON
President
ACE Clearwater Enterprises
Torrance, California



Ms. Dodson joined ACE Clearwater Enterprises, a family business, in 1983, taking over operations in 1985. By 1995, she had doubled annual sales, positioning ACE as the preferred supplier for several prime original equipment manufacturers and the full-service manufacturing facility of choice for Lockheed Martin, General Electric, Allied Signal, Bell/Textron, and other primes.

Under Ms. Dodson's leadership, ACE has been featured in two business books, Transformational Learning and The Knowledge Enabled Corporation. In addition to her professional work, Ms. Dodson served as Board Chair for the California Manufacturing Technology Center in 1995, and remains an active Board member and Technical Advisory Council Member for that organization. She also sits on the Board for The Gateway Cities partnership and the Technical Advisory Board for City National Bank.

DEAN J. GARRITSON
Vice President, Small &
Medium Manufacturers
National Association
of Manufacturers (NAM)
Washington, D.C.



As Vice President of Small & Medium Manufacturers (SMM) for the Policy and Public Affairs Division, Mr. Garritson is responsible for SMM legislative policy and serves as the key staff spokesperson for SMM issues.

Previously, Mr. Garritson was the Vice President and Division Manager of the National Division in NAM's Greenbelt, Maryland office. During his tenure there, he more than tripled membership sales to small and medium manufacturers and doubled the number of small manufacturers who serve as members of NAM's Board.

Mr. Garritson is the Chairman of the International Association of Membership and Marketing Executives. In addition to serving on the MEPNAB Board, he is a board member for The Institute for Organization Management, the center for Workforce Success, and the City Club of Washington.

DAN J. MARCUM
Chairman
Micro Craft, Inc.
Tullahoma, Tennessee



Mr. Marcum founded Micro Craft, Inc., in 1972, and helped lead its growth from a regional job shop into a key player in aerodynamic, propulsion, and space flight research and development with annual revenues exceeding \$70 million. He also is the Founder and Managing Partner of Marcum Capital, a private merchant banking firm specializing in raising capital for emerging technology-oriented companies and nurturing their growth and development in a private business incubator based in Tullahoma, Tennessee. Mr. Marcum currently serves on the Board of Directors and Executive Committee of the Tennessee Technology Development Corporation, a public entity founded to develop technology-driven enterprises in Tennessee. He also serves as Chairman of the Tennessee Manufacturing Extension Partnership (MEP), the Tennessee MEP affiliate.

ROBERT S. MONTJOY

Professor and Assistant Vice-
President for Outreach
Auburn University
Auburn, Alabama



Robert Montjoy is Professor of Political Science and Assistant Vice President for Outreach at Auburn University. He was the founding director of the Master of Public Administration program and held the position of director of the Economic Development Institute (EDI) at Auburn. He also serves on the Workforce Development Board of Alabama.

As director of EDI, Dr. Montjoy was instrumental in the creation of the Alabama Technology Network (ATN), the state center for the Manufacturing Extension Partnership. Dr. Montjoy chaired the operating committee that initially oversaw the ATN and served as its president from 1998 to 2001.

Dr. Montjoy is the author and co-author of several books, reports, and articles on how the interaction between the public sector and private and not-for-profit organizations promotes economic and community development.

EDWARD NOHA

Chairman of the Board, Emeritus
CNA Financial Corporation
Chicago, Illinois



Prior to his current position, Mr. Noha served as chairman of the board and chief executive officer of the CNA Insurance Companies. Under his leadership, CNA rose to become one of the strongest and largest multi-line insurance organizations in the U.S.

In 1992, Mr. Noha was appointed chairman of the Chicago Economic Development Commission by Mayor Richard M. Daley. In this role, he established the primary goal of job retention and expansion leading to over 20,000 jobs in the last three years.

He also organized the proposal for the Chicago Manufacturing Center, one of the local MEP centers in Illinois. He is currently the Chairman of the MEPNAB.

JOHN A. YNGVE

Chairman
Bondhus Corporation
Monticello, Minnesota



Mr. Yngve has more than 25 years of management experience in manufacturing industries. Presently, Mr. Yngve is serving as Chairman of Bondhus Corporation, a tool manufacturer in Monticello, Minnesota. Previously, he was president and chairman of Nortronics Company, an electronics manufacturer.

Since 1991, he has served as chair of Minnesota Technology, Inc. He also served as an officer or member on the board of the Minnesota Council, national board of the American Electronics Association, Minnesota High Technology Council, Metropolitan Transit Commission, Citizens League, Plymouth, MN City Council, Board of Regents of the University of Minnesota, University of Minnesota Foundation, and the University of Minnesota Institute of Technology. In addition, he was a State Representative in the Minnesota Legislature.

THE YEAR IN REVIEW

In the 1990s, small manufacturing drove the economy, employing more than 12 million Americans and producing an estimated 55 percent of the value of all manufactured goods. Whether they are producing electrical components for jet fighters or subassemblies for cars, the contributions of small manufacturers are vital to national defense, homeland security, and our economic recovery.

To improve productivity and become more competitive, a growing number of manufacturers have turned to the Manufacturing Extension Partnership (MEP), a nationwide network of not-for-profit Centers whose sole purpose is to provide small- and medium-sized manufacturers with the help they need to succeed.

MEP has a history of success: Over \$1.4 billion in increased or retained sales, \$364 million in cost savings, and \$576 million in new investment for manufacturers. To date, the network has helped over 107,000 manufacturers. A 1999 Census Bureau study determined that MEP clients experienced productivity gains more than four times greater than comparable non-MEP clients.

The MEP program—which was authorized in the Omnibus Trade Act of 1988 and signed into law by President Reagan—has earned strong

bipartisan support at the state and federal levels. Its principal objective is to help U.S. manufacturers, especially the 355,500 small manufacturers, adopt new technologies, processes, and business practices and improve the productivity and competitiveness of American manufacturing. The MEP network now consists of over 2,000 professionals, working out of nearly 400 locations across the country, providing direct advice and assistance to manufacturers.

Because of small manufacturers' immediate need for the type of assistance provided by MEP Centers, MEP was able to partner with states and build its infrastructure in a very short time. Many small manufacturers would be underserved or ignored without MEP's products and services. Although small manufacturers are vital to our economy, they can be an expensive market to serve. A 1997 survey found that because smaller manufacturers are not sophisticated buyers of expert help, private consultants face significant barriers that

include an inability to charge standard prices and recover marketing costs from smaller scale projects.

This situation becomes more pronounced when serving small manufacturers outside of the major metropolitan areas. Public funds—federal, state, and local—offset the high cost of marketing and sales as well help to cover the direct or variable costs of delivering services to small manufacturers. These funds, in addition to lower-than-market fees charged by the Centers, enable MEP to serve small manufacturers and ensure their viability and continued contribution to the nation's economy. Furthermore, the results of MEP Centers' assistance demonstrate measurable impacts and return on investment in increased productivity and the creation of badly needed jobs. The National Advisory

Board has found that the number of companies sustained through initial stages of growth by MEP is significant. This contributes further to the Board's conviction that MEP is vital to the success of the manufacturing industry and impacts national priorities and the U.S. economy.

Federal financing, while limited to one-third of an MEP Center's budget, is a critical component in the stability of Center funding. While states are reporting budget deficits, some as severe as \$34 billion, they continue to support the Centers as a federal program that works.

MEP is recognized across the country and around the world as the model of a successful federal-state-private partnership. Governors Mike Johanns (R-NE) and James McGreevey (D-NJ), co-chairs of the National Governors' Association's Economic Development and Commerce Committee, sent a letter on behalf of the nation's governors urging Members of the Senate and House "to maintain the federal government's share of support for the Manufacturing Extension Partnership (MEP) in the fiscal year (FY) 2003 appropriations." The governors point out that each partner in MEP benefits and has a responsibility to maintain the partnership, stating further that "neither the states nor the small manufacturers are capable of replacing a loss in federal funding for MEP."



Letter

January 2, 2003

The Honorable Ernest F. Hollings
Chairman
Subcommittee on Commerce, Justice, State, and the
Judiciary
Committee on Appropriations
The Capitol, Room S-206
Washington, D.C. 20510

The Honorable Judd Gregg
Ranking Member
Subcommittee on Commerce, Justice, State, and the
Judiciary
Committee on Appropriations
The Capitol, Room S-125
Washington, D.C. 20510

The Honorable Frank R. Wolf
Chairman
Appropriations Subcommittee on Commerce,
Justice, State, and Judiciary
The Capitol, Room H-309
Washington, D.C. 20515

The Honorable Jose E. Serrano
Ranking Member
Appropriations Subcommittee on Commerce,
Justice, State, and Judiciary
1016 Longworth House Office Building
Washington, D.C. 20515

Dear Chairman Hollings and Senator Gregg:

On behalf of the nation's Governors, we urge you to maintain the federal government's share of support for the Manufacturing Extension Partnership (MEP) in the fiscal year (FY) 2003 appropriations. MEP is a partnership of the states, the federal government, and small manufacturers. Each partner benefits from the partnership and has a responsibility to maintain it. Neither the states nor the small manufacturers are capable of replacing a loss in federal funding for MEP.

As our economy struggles to recover, MEP is needed more than ever. It plays an important role in our state and national economies that no other entity is likely to fulfill. MEP clients that completed projects in FY 2000 alone reported more than \$2.3 billion in increased or retained sales, \$483 million in cost savings, and the creation or retention of 25,000 jobs as a result of their MEP projects.

We thank you for your past support of MEP and strongly encourage you to appropriate the needed funds to ensure MEP centers across the states continue to provide valuable technical and business assistance to our small manufacturers. With your leadership, MEP will continue to contribute significantly to our economy and small manufacturers' competitiveness.

Sincerely,

Governor Mike Johanns
Chair
Economic Development and Commerce Committee

Governor James E. McGreevey
Vice Chair
Economic Development and Commerce Committee

A bipartisan coalition of more than 50 U.S. Senators urged continued funding for MEP in a letter spearheaded to Senate appropriators by Senators Olympia Snowe (R-ME) and Joe Lieberman (D-CT), co-chairs of the Senate Task Force on Manufacturing, that requested \$110 million in FY 2003 funding for the program. The Senators sent their joint letter to Senators Fritz Hollings (D-SC) and Judd Gregg (R-NH), respectively, the Chairman and Ranking Member of the Senate Appropriations Committee on Commerce, Justice, State, and the Judiciary.

In addition, letters from members of the Senate and the House requesting \$110 million for MEP showed bipartisan support for a program that has a deep relationship with the states and has been effective in ensuring the productivity of U.S. firms.

MORE IMPACTS AND GREATER ROI

Since 1996, NIST MEP has sponsored a national survey of center clients, conducted by an independent third party four times a year. The survey asks clients to comment on the business impact of the services provided by their local Center. MEP places a strong emphasis on Centers' ability to demonstrate impacts and uses the survey results in its program reviews. The survey results also provide MEP Centers with a tool to measure their Center's performance and effectiveness and benchmark their performance against other Centers and performance standards. In addition, the data allows MEP to gauge the impact of its national network on America's manufacturers and its impact on the national and regional economies.

Published results in the May 2002 report *The Manufacturing Extension Partnership Delivering Measurable Returns to Its Clients* showed that clients reported \$2.3 billion in

increased and retained sales, cost savings of \$483 million, and more than 25,000 jobs created or retained. Significantly, the survey also found that MEP involvement was a catalyst for additional modernization by firms, which reported over \$883 million in new investment as a result of MEP services.¹ Even if these impacts were reduced by half, they would still stand as a powerful testament to the success of MEP Centers across the country.

Independent analysis shows that MEP services increase corporate and personal tax payments by significantly growing the before-tax profits of small manufacturers and by stabilizing or growing the manufacturing workforce. A conservative estimate of the return on federal investment in MEP Centers is \$4 in federal tax revenues for every \$1 invested in the program.² According to a report by the U.S. Census Bureau Center of Economic Studies, MEP clients experience productivity gains more than four times greater than those achieved by comparable firms that did not use MEP.

In 2002, preliminary results showed that market penetration was slightly above targets, as was the number for new sales and clients, while cost-savings also continued to trend upward. In addition, performance metrics for the number of jobs created and retained also rose in 2002.

MEP's goal is to expand its ability to create larger, more substantive engagements that generate greater impacts. By applying "Lean" practices to MEP and the individual Center operations and carefully monitoring the balance of federal, state, and revenue funding, the program can protect itself against the fluctuations in the market. Also, new financial practices have yielded significant improvements in the tracking and capturing of state in-kind match and, until September 11, 2001, the Centers generated strong revenues through direct fees for services.

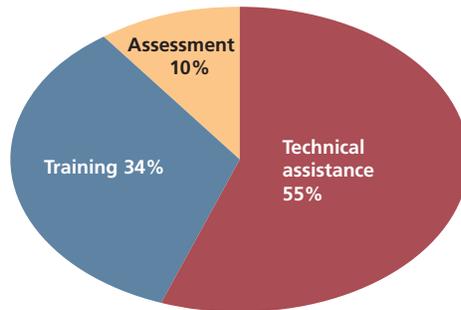
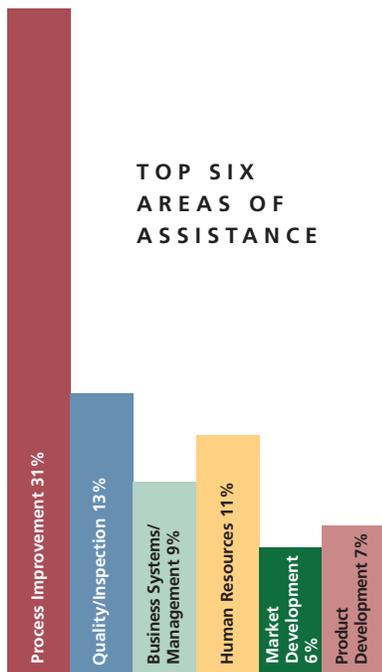
¹ Independent follow-up survey of over 4,890 clients with projects completed between October 1999 and September 2000.

² "NIST MEP Program: Impact on the U.S. Economy in 2000," Nexus Associates, November 2001.

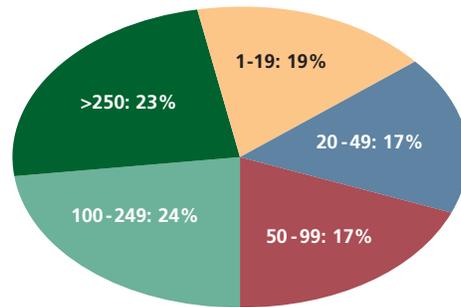
THE YEAR IN REVIEW

FY 2002 MEP ACTIVITIES

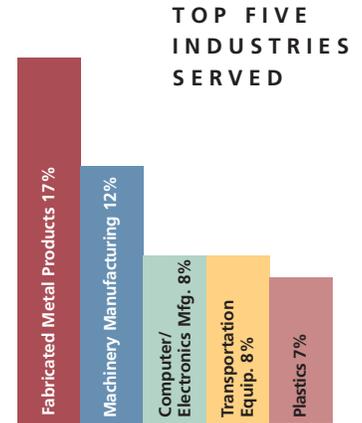
Nearly 17,000 manufacturers served in FY 2002
 Manufacturers used MEP services over 165,000 times through FY 2002



HOW WE ASSISTED FIRMS



SIZE OF FIRMS SERVED BY NUMBER OF EMPLOYEES



Notes:

FY 2002 activity data derived from reports on 11,098 activities with over 6,500 client firms.

FY 2001* MEP CLIENT-REPORTED IMPACTS

CLIENT-REPORTED IMPACTS AS A DIRECT RESULT OF MEP ASSISTANCE

Increased/Retained Sales		\$2.19 billion
New Sales	\$635.7 million	
Retained Sales	\$1.56 billion	
Cost Savings		\$441.5 million
New Client Investment in Modernization		\$680.5 million
Jobs Created		7,226
Jobs Retained		17,231

*Independent follow-up of over 6,100 clients with projects completed in FY 2001. Of the over 6,100 clients selected to be surveyed, over 4,800 completed the survey in FY 2002. Measures are a conservative snapshot of benefits. Recurring or cumulative benefits may be larger.

360vuSM

MEP Centers' customers changing needs spurred the introduction and implementation of 360vu—a brand carried by only those Centers that have been trained in and held accountable to mutually agreed-upon professional performance and delivery standards. Launched to the market in September 2002, 360vu capitalizes on as well as expands Centers' expertise, enabling MEP to continue to help small manufacturers become more productive and competitive. And like MEP, 360vu is market-driven, accessible to all small manufacturers, quality-oriented, locally based, and continuously improving.

Due to the uncertainty of the FY 2003 federal budget that began October 1, 2002, MEP took a layered approach to the 360vu branding initiative. The first layer of implementation is built around a network of qualified Professional Business Advisors (PBAs). This network will be supported by a knowledge-sharing system created to leverage the collective expertise of this group where tools will exist that facilitate the

fulfillment of daily activities while also providing PBAs with vital market research data. The last layer of the implementation plan refers to 360vu Products and Services, targeted for release in December 2002.

360vu was designed to foster an on-going working relationship between the CEO of a small manufacturing enterprise and an MEP Center manufacturing specialist who, together, implement solutions that address every aspect of the company's operations. By building upon the core values of MEP, 360vu leverages the Centers' combined expertise and increases the overall professionalism of staff that will drive MEP to next-level performance. The program's business approach, set of services, and certification process foster a stronger, long-term strategic relationship between an MEP Center and its clients.

Already, the 360vu methodology, standards, and products have generated an increase in the number of large client projects and continuous client improvement projects and streamlined the process of collaborating with supply chains and other Centers across state lines. In addition, there have been more efficient uses of resources

and less duplication in product development, marketing, market research, training, and knowledge management. Centers now have better access to other 360vu-brand-carrying Centers' existing products and services as well as to tools and resources such as standard proposals, successful methodologies, suggested pricing, ongoing market research, and national and collective marketing and sales initiatives.

360vu-branded Centers are required to have PBAs. These individuals have extensive business experience and function as business consultants who can address organizational objectives at the CEO level. Throughout 2002, MEP trained a core group of individuals from select Centers as PBAs. To date, MEP has delivered PBA training to 120 individuals nationwide, with the pilot group of PBAs serving as mentors to subsequent generations.

BRANDED CENTERS

As of November 20, 2002, under direction from the 360vu Policy Board, NIST MEP's 360vu team will begin the implementation planning, and deployment of the following 360vu-branded Centers:

- Alabama Technology Network
- California Manufacturing Technology Center
- Catalyst Connection
- Chicago Manufacturing Center
- Delaware MEP
- Delaware Valley Industrial Resource Center
- Idaho TechHelp
- Illinois Manufacturing Extension Center
- Indiana Business Modernization & Technology Corp.
- Iowa MEP
- MAMTC (Colorado, Kansas, and Wyoming)
- Michigan Manufacturing Technology Center
- Minnesota Technology Inc.
- Missouri Enterprise
- NEPIRC
- New Jersey
- New York MEP
- NWMOC
- Oklahoma Alliance
- South Carolina MEP
- TechSolve
- Texas Manufacturing Assistance Center
- Vermont Manufacturing Extension Center
- Virginia's A.L. Philpott MEP
- Washington Manufacturing Services

CENTER COLLABORATIONS

Spearheading an initiative to systematize the knowledge and skills within the Centers, NIST MEP, with the Board's approval, is using 360vu to ease the way for Centers to expand opportunities to jointly develop and deliver products and services. With the collective knowledge and expertise acquired through Center collaboration, MEP Centers strengthen their ability to provide a wide-range of services and assistance to industries that depend on a national supply chain.

KARDEX SYSTEMS, INC.

Kardex Systems, Inc., of Marietta, OH, specializes in file storage systems. Process automation and current marketing demand created the need for more space, which was costly. For help in this area, the 180-employee company contacted the Manufacturing Resource Office (MRO), an MEP affiliate in Columbus, OH. MRO, in turn, contacted a Cleveland, OH-based MEP affiliate, the Great Lakes Manufacturing Technology Center (GLMTC), to gain access to GLMTC's expertise in value stream mapping (VSM). The two Centers worked together and applied VSM techniques to assess machine utilization, material flow, material handling, and travel distances, with the

common goal of utilizing cell layout by functionality, and developed a plant layout that met Kardex's needs by reducing its floor space requirements 33 percent.

The start of the project held several challenges. One was to determine a pricing structure that would work for both Centers and for the client. Another challenge was to outline the role that each Center would play and provide the client with a seamless operation.

The two Centers were able to compromise on their different pricing structures. In addition, a detailed scope of work was written and attached to the purchase order. This provided the company with a detailed description of the services they were to receive, and it outlined each Center's responsibilities.

BRANDED CENTERS continued

The MRO-GLMTC team then used VSM techniques to maximize Kardex's shop floor layout. Through their collaborative services, Kardex reduced operating overhead costs by 25 percent, eliminated unnecessary material handling within operations, increased throughput by 50 percent, and implemented kanban systems for commonly used parts. Margie Hiermer of MRO stated, "The new 360vu brand should help ease the challenges in future collaborative efforts."

BOEING AGREEMENT TO ENHANCE OPERATIONS AT PRECISION MACHINE AND MANUFACTURING

The Oklahoma Alliance for Manufacturing Excellence (The Alliance) recently was granted an opportunity through Boeing Company in St. Louis, MO to provide training for Precision Machine and Manufacturing in Grove, OK. The company produces

parts for nearly every Boeing military aircraft as well as many parts for Boeing's commercial aircraft programs. This agreement is part of an Air Force "Mentor-Protégé" program that seeks to enhance the military supply chain.

Over the next two years, The Alliance, working with Oklahoma's Northeast Technology Center, will provide a series of instructional courses designed to increase efficiency and improve processes at the 87-employee manufacturer. Workshops will focus on Lean manufacturing concepts, quality systems, and business management.

BOEING SUPPLY CHAIN

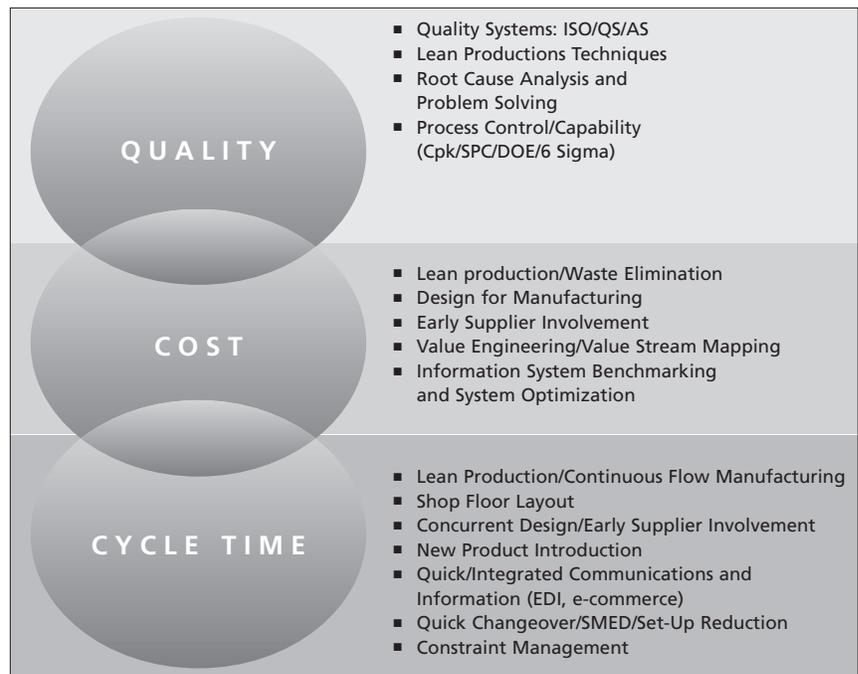
In a pilot project, Boeing selected six of its small manufacturer suppliers to receive Lean assessments and training through Kaizen events from Techsolve, the local MEP in Dayton, OH. Because the suppliers were spread out across the U.S., Techsolve collaborated with the California Manufacturing Technology Center in Gardena, CA; Oklahoma Alliance for Manufacturing Excellence in Tulsa, OK; Minnesota Technology, Inc., in Minneapolis, MN; and Industry Network Corporation-Arizona in Scottsdale, AZ on the project.

As a result of all the Centers' joint efforts, Techsolve received the National Center for Advanced Technologies' top award for Defense Manufacturing Excellence in recognition of its high-quality work with Boeing small manufacturer suppliers.

STRENGTHENING THE SUPPLY CHAIN THROUGH LEAN AND E-COMMERCE

As large manufacturers become less vertically integrated, they must rely more on their suppliers. However, many original equipment manufacturers (OEMs), in an effort to optimize their supply chain, have reduced their number of suppliers. To continue to be a part of the supply chain, lower tier suppliers, the majority of which are small manufacturers, must share common goals, business processes, and strategies as well as the cost-efficiencies employed by their OEM clients.

MEP gives small manufacturers the opportunity to access the expertise and guidance of business and manufacturing professionals that they may not otherwise be able to access. The immediate result of MEP assistance is that smaller manufacturers learn how to implement new techniques, processes, and strategies that help maximize quality, labor, and cycle time. With this new-found expertise and productivity, OEMs are less likely to outsource manufacturing overseas. Long-term benefits include a higher rate of employment, a more knowledgeable workforce, greater revenue, and maintenance of the U.S. leadership position and competitiveness in the global economy.



Some of the many services MEP Centers deploy to assist small manufacturers in their drive to optimize internal operations and competitiveness.

INTRODUCING SMALL MANUFACTURERS TO E-COMMERCE

Increasing communication with employees is an area of high concern for manufacturers, with 55 percent saying it was important or critical. Perhaps most importantly, the percentage of manufacturers using online employee training doubled, a trend that is likely to continue as business travel decreases.

Large manufacturers lead the way in investing in e-business because they are somewhat more likely to invest in technologies that will take time to produce positive results, while many smaller manufacturers continue to wait for concrete evidence of practical benefits. In a time of economic challenge and prolonged manufacturing recession, there has been a sharper decline in information technology investment by manufacturers. Rep. Jim Barcia (D-MI) called small- and medium-size businesses the “backbone of our economy” and introduced legislation (H.R. 524) to ensure that small manufacturers would not be left behind. The Electronic Commerce Enhancement

Act of 2001 would require NIST to work with major industries and develop a plan detailing how manufacturers, suppliers, and others in the supply chain can be linked electronically. NIST also would have to establish an advisory panel to draft a three-year e-commerce plan for MEP and, if necessary, produce some recommendations for NIST on how to address e-commerce interoperability issues. MEP would play a large role in carrying out the plan with small firms.

TRANSFORMING BUSINESS THROUGH LEAN MANUFACTURING

Lean is a systematic approach to identifying and eliminating waste (non-value-added activities) through continuous improvement. MEP offers a range of Lean tools and services that include:

- Value Stream Mapping
- 5S System
- Setup Reduction
- Cellular/Flow Manufacturing
- Pull Systems/Kanban
- Total Productive Maintenance
- Kaizen Blitz

THE BENEFITS GAINED BY SMALL MANUFACTURERS THAT IMPLEMENTED LEAN INCLUDE:

- Annual productivity increased up to 30 percent
- On-time delivery improved to almost 100 percent
- Defects reduced by 20 percent per year
- Lead times reduced by more than 75 percent
- Inventory reductions of more than 70 percent

MEP's California Manufacturing Technology Center (CMTTC) found that its aerospace industry clients needed employee training and development, workflow improvement, and plant layout assistance. But, the small manufacturers lacked the necessary technical knowledge, staff, and resources to take advantage of the newest techniques and technology that large manufacturers had already adopted. With assistance from CMTTC and other MEP Centers, the small manufacturers integrated Lean processes, new technology, and best business practices into their operations and achieved measurable gains in productivity and efficiency.

CONTRIBUTING TO THE NATIONAL DEFENSE

Suzanne D. Patrick, the Deputy Under Secretary of Defense for Industrial Policy, emphasized in her March 2002 testimony before the U.S. House of Representatives that, “innovation and small firms have always had an important place in our defense industrial base.” Of the companies that produce specialty components for prime contractors, sell spare parts directly to the Defense Department, and are a source of innovation and productivity in the weapon system production process, 90 percent employ less than 500 people.

However, a report published by the National Coalition for Advanced Manufacturing (NACFAM) stated that the techniques and manufacturing systems of small- and medium-sized manufacturers are outdated and aging.

Increasing the productivity of small- and medium-sized defense suppliers is a national priority. Since the 1990s, firms in the upper tiers of the defense industry adopted Lean manufacturing to reduce costs, improve delivery time, and increase quality. Most prime contractors and larger suppliers have the in-house expertise and the financial leverage to invest in improvements to their manufacturing and administrative processes. This, however, is not the case for small manufacturers, although they are a critical component of the defense supply chain.

MEP’s core strengths include supply chain integration, modernizing techniques and systems, and improving the productivity of smaller manufacturers.

According to Defense Department data, small firms account for 21 percent of the value of prime contracts awarded to businesses in FY 1999 and 41 percent of the value of subcontracting activity performed by businesses on behalf of the Department of Defense (DoD).

Prime contracting trends to small businesses were quite stable over the decade of the 1990s. Small firms consistently secured 20 percent of all prime contracts awarded by DoD. The value of those awards fluctuated within a range of \$3 billion, from a low of \$23 billion to a high of \$26 billion. In FY 1999, small businesses secured \$23.5 billion in prime con-

tracts, an amount slightly below where they were in the first part of the decade. During the same period, prime contracts to large businesses fell \$11 billion, from \$99 billion in FY 1990 to \$88 billion in FY 1999. Subcontracting trends show similar stability. DoD subcontracts fluctuated in a band of about \$10 billion over the period, from a high of \$54.7 billion to a low of \$44.9 billion. During that time, small businesses retained at least 34 percent of the value of all subcontracts. Since 1995, small businesses have secured consistently over 40 percent of the value of the subcontracts.

DEFENSE DEPARTMENT PRIME AND SUBCONTRACTING TRENDS

Looking at the distribution of prime contracts by activity provides a glimpse of the types of products the small business community provides the Defense Department. Major hard goods, defined by DoD as weapon system platforms, provided by small manufacturers grew slightly between FY 1995 and FY 1999, from just under \$5 billion to just over \$5 billion. The slight growth in this area came from contracts for aircraft-related work (up \$310 million) and ammunition (up \$46.9 million). Other analyses of weapon systems' costs reveal that subcontractors account for a considerable portion of defense-related manufacturing. One study of prime contractors shows that "the dependence on subcontractors ranges from 60 percent to more than 70 percent of prime contractors' costs."³ Another review suggests that "over 80 percent of the value of some weapon systems is supplied, and the percentage is nearly that for most sub-systems."⁴ While large businesses are undoubtedly a significant part of these calculations, the roles of small- and medium-sized businesses should not be overlooked.

MEP is "among the best resources" to help small manufacturers "systematically identify specific constraints and performance gaps that inhibit their competitiveness," according to a National Research Council study.

MEP is active within U.S. defense supply chains, assisting small sub-tier suppliers to cut costs, boost productivity, and accelerate delivery times. At a recent Defense Supply Chain Roundtable, officials from Boeing, General Dynamics, Lockheed Martin, Northrop Grumman, and Raytheon expressed how they rely on MEP for providing cost and quality improvements to small manufacturing firms they depend on for component parts and assemblies.

For instance, MEP centers in seven states are working with 9 of Boeing's 22 small manufacturing suppliers on the Joint Direct Attack Munition (JDAM) project producing kits to convert "dumb bombs" to "smart bombs" as DoD rushes to restock its inventory. In the war in Afghanistan, JDAM weapons accounted for more than one-quarter of the 17,000 bombs

dropped by U.S. forces. In another example, Lockheed Martin recently engaged the CMTC to provide Lean manufacturing services to its small sub-tier suppliers for the F-22 fighter jet. Lockheed Martin outsources production for approximately two-thirds of the value of each F-22 fighter.

The defense industry relies on suppliers from nearly the entire spectrum of NAICS codes; therefore, specific figures are not easily compiled for the proportion of MEP clients that are defense-related. However, MEP Centers have conducted more than 149,000 consulting and technical assistance projects with small manufacturers since the program's inception in 1989, and Centers increasingly note that their work has lasting implications for America's national defense and domestic security.⁵

On the following page is a sampling of the work MEP performed for small defense manufacturers.

³ Contributions of and Issues Concerning Small- and Medium-Sized Manufacturers in the Defense Industrial Base. National Coalition for Advanced Manufacturing. June 2002.

⁴ Contributions of and Issues Concerning Small- and Medium-Sized Manufacturers in the Defense Industrial Base. National Coalition for Advanced Manufacturing. June 2002.

⁵ MEP's role with small manufacturers in the defense supply chain. (ModForum, 2002). <http://www.modforum.org/mepdefense.htm>.

D.G. O'BRIEN (DGO), SEABROOK, NH

DGO manufactures electrical and optical connectors, communications systems, and sonar arrays for ocean environments. The 150-employee company has become a leading supplier to the U.S. Navy through the Electric Boat Company, a submarine builder. New Hampshire MEP brought DGO into the Pathways for Continuous Improvement program (Pathways) and directed the company toward a Lean enterprise transformation. As a result of its participation in Pathways, DGO reduced space utilization by 15 percent and increased output per employee by 30 percent.

CHARLESTON MARINE CONTAINER, INC. (CMCI), CHARLESTON, SC

CMCI is a 182-employee manufacturer of containers used to transport a wide variety of military supplies, from bombs to bullets to beans. Among other places, CMCI containers are being used in support of the 101st Airborne in Afghanistan. When the South Carolina MEP (SCMEP) first began working with CMCI, a variety

of issues faced the company, including production capacity, quality, hiring and training, and inventory control. SCMEP guided CMCI through reorganizations of its welding operation, production scheduling, and military standards documentation. As a result, throughput at CMCI increased by nearly 30 percent and rework was reduced by 90 percent. CMCI also increased its product line and now has a new military contract to produce Tri-cons, 20-foot-long three-part containers, and flat racks, transportation frames that can be used to carry a variety of different loads.

CREATIVE URETHANES INC. (CU), PURCELLVILLE, VA

In addition to other products, CU, a 50-employee company, produces a patented swim fin product for a designer that supplies the Navy Seals and molded parts for a major defense contractor that specifically fits new mail-handling equipment. CU management realized that the company needed to achieve a strong, recognizable quality standard to continue growing.

Virginia's A.L. Philpott MEP Center worked with the company to prepare it for ISO Certification by a third party resource. As a result, CU was able to cut its reject rate in half, resulting in savings of about \$150,000.

HELPING SMALL DEFENSE MANUFACTURING

The United States, as the world's superpower, established its leadership position through military courage and might throughout the twentieth century. Strong and reliable domestic production capacity remains crucial to maintaining military superiority. MEP Centers across the country are assisting small defense manufacturers to deliver weapons and supplies cheaper and faster.

BOLSTERING A SAGGING ECONOMY

The U.S. economy is mired in an economic slowdown. Unemployment stands at 5.7 percent and is expected to get worse. GDP is growing at less than 3 percent and is expected to slow further. Consumer confidence and the stock market have followed the trends of the manufacturing sector. When manufacturing reports are down, so is the market, and weakness in the manufacturing sector is blamed for the contagion.

MEP Centers are serving small manufacturers across the country—one by one—to reverse this stagnation. In a collaborative program, the Wisconsin MEP Center assists 270 suppliers to six OEMs, including John Deere, Harley-Davidson, and Oshkosh Truck, to drive down costs while improving quality and production time. Deere and Harley-Davidson have been so impressed with the improvements in their supply chains that they are leading a state initiative to focus on supply chains as the prime economic development strategy for the state of Wisconsin.

The House and the Senate passed the Enterprise Integration Act (H.R. 2733) which encourages the electronic linkage of manufacturers, assemblers, suppliers, and customers for exchanging product, manufacturing, and other business data among partners in a product supply chain. By developing and adopting electronic standards and protocols, supply chains will operate more efficiently and profitably. Under the pending legislation, NIST will have the responsibility for developing standards and protocols and promoting them. MEP would represent small manufacturers' interests in the development phase, collaborate in pilot projects, train MEP field staff in the latest efforts, and assist companies and industries in implementing the new standards and protocols.

More rural counties today depend upon manufacturing than on any other segment of the economy, according to the Federal Reserve

Bank of Kansas City. Manufacturing wages in rural areas tend to outpace average earnings for all other rural jobs by about 50 percent.

Manufacturing's share of employment is higher in rural areas (15 percent) than in urban areas (11 percent), and its share of personal earnings is also higher in rural areas (21 percent) versus urban areas (15 percent).

In rural communities, MEP Centers are often the only source for the types of services that the Federal Reserve Bank cites as the key to rural manufacturers' competitiveness—computerized methods of inventory management, production automation, and improved communication flows within factories.⁶

⁶ SMEs Need MEP to Help Lead Economic Recovery (ModForum, 2002). <http://www.modforum.org/prioritiesrecovery.htm>

COMPETING SUCCESSFULLY IN A GLOBAL ECONOMY

Although we live in a global economy where trade barriers continue to fall, the U.S. is losing jobs and production capabilities because its small manufacturers are having difficulty competing with foreign suppliers, especially China's. According to a recent Cornell University study,⁷ most of the U.S. companies moving production to China intend to serve a U.S. and global market, not China. China is emerging as our leading competitor, and MEP is the Administration's primary weapon to provide America's small manufacturers with a fighting chance to compete in a global market.

The U.S. trade deficit with China reached \$84 billion in 2000, nearly 20 percent of the total U.S. trade deficit. It grew by an average of 31 percent per year between 1986 and 2001 and continues to grow. Our trade deficit with China is by far our largest. Recognizing the growing threat of Chinese competition,

The Wall Street Journal noted that "the success of Chinese furniture makers follows a familiar pattern. In industry after industry—such as toys, machine tools and personal computers—China is sucking in foreign investment for new factories, with each business in turn breeding legions of Chinese competitors."

In Michigan alone, tooling companies report a significant loss of sales and jobs to foreign outsourcing competition, including China. Since 1998, Michigan tool and die jobs have fallen from 67,000 to 52,000, and 15 percent of the plants have shut down in the last two years. Of greater concern is that downstream sectors such as forming and injection molding tend to follow migrations of the tooling sector.⁸

Surprisingly, 50 percent of the jobs lost to China are higher wage and skilled manufacturing jobs. According to a recent Economic Policy Institute study, "To make matters worse, although U.S. workers are five times as productive as their Chinese counterparts, average compensation in the United States is at least 10 and maybe even 20 times larger than that paid by U.S. multinationals to Chinese workers."⁹

The United States' competitive advantage, therefore, lies in productivity—producing more per worker through greater knowledge and skills. MEP was created to help America's small manufacturers remain competitive in the face of open, foreign competition. Its clients experience productivity gains more than four times greater than comparable firms that did not receive MEP assistance.

⁷ Bronfenbrenner, Kate, PH.D. Impact of U.S.-China Trade Relations on Workers, Wages, and Employment. June 30, 2001.

⁸ Small manufacturers need MEP to compete globally, especially with China. (ModForum, 2002). <http://www.modforum.org/prioritiescompete.htm>.

⁹ Small manufacturers need MEP to compete globally, especially with China. (ModForum, 2002). <http://www.modforum.org/prioritiescompete.htm>.

CENTER PROFILES

MEP Centers use their own in-house experts as well as enter into partnerships with thousands of independent consultants and local economic development organizations to help clients become world-class, high-performance firms. Through the Centers, even the smallest firms can avail themselves to the expertise and knowledge of specialists in manufacturing floor layout, plant operations, process improvement, information technology, and best business practices.

Evaluation is a key element of all NIST MEP programs and activities. Results are used to assess the effectiveness of Center services and their impact on the performance of client firms as well as on the local and state economies. In a survey of NIST MEP clients served from October 2000 through September 2001, 4,800 companies around the country reported that, as a result of NIST MEP services, they:

- created or retained 25,000 jobs
- increased or retained \$2.2 billion in sales;
- realized \$442 million in cost savings; and
- invested \$681 million in modernization, including plant and equipment, information systems, and workforce and training.

In addition, researchers at the Center for Economic Studies, U.S. Census Bureau, found that Center clients experienced between 3.4 percent and 16 percent more growth in labor productivity over a five-year period than similar non-client firms. The productivity growth of the 1,559 firms studied translates into \$484 million in additional value-added at client firms.

The Center Profiles on the following pages are representative of how all MEP Centers generate impacts that contribute to the national defense, bolster the economy, and enable the U.S. to compete successfully throughout the world.

CALIFORNIA MEP CENTER OFFERS A HIGH RETURN ON INVESTMENT

California is home to more than 80,000 manufacturers, about one-eighth of the U.S. total. There are over 53,000 small and mid-sized manufacturing businesses in California Manufacturing Technology Center's (CMTC) service area that covers the five-county Los Angeles Basin, Ventura/Santa Barbara and the Central Valley. The Los Angeles region, for example, hosts a high concentration of more than 6,000 known defense suppliers and is also characterized by diversity in many industries, reflecting the area's rich cultural heritage.

CMTC was established in 1992 to provide high-value consulting services to California's small and mid-size manufacturers to increase their competitive advantage through improved methods of management and manufacturing.

CMTC's staff speaks a total of 11 different languages so it can work effectively with any manufacturer, such as those in the targeted industries of aerospace, electronics, and bio-medical as well as in the apparel, food processing, entertainment, paper, plastics, wood, and the automobile after-market.

One company that benefited from CMTC's breadth of services is KGS Electronics. Operating for 35 years in a plant in Arcadia, CA, the 88-employee company produces a full line of airborne 400Hz and 60Hz static inverters, voltage/frequency converters, AC to DC power converters, light dimming power supplies, and AC to DC power supplies designed for aviation and military applications. When the company determined that it needed to automate its manufacturing planning/scheduling and inventory control functions and integrate these processes with other areas of the company, the task was more confusing and difficult than expected. Because KGS had used CMTC services to achieve ISO 9000 registration, it turned to them for assistance in selecting an enterprise software system.

CMTC managed scripted demonstrations of software products to assist KGS in determining which product best fit its needs. CMTC then conducted negotiations with the selected vendor and was able to reduce the purchase price by nearly \$27,000 and negotiated a payment plan that spread the cost over several years. KGS's positive experience with CMTC has been repeated by many California small manufacturers.

According to a recent NIST survey conducted in 2000, 164 CMTC clients identified the following impacts:

- Total annualized sales increase and retention of \$80.2 million
- Total annualized cost saving of \$26 million
- Typical ROI of 3 to 8 times depending on the service provided
- 1,683 employees at 62 client companies received workforce training delivered by Centers for Applied Competitive Technologies' colleges
- 12,322 clients participated in CMTC workshops and seminars from 1997-2001
- 1,617 satisfied new clients, with over 166 new clients in FY 2001

ILLINOIS MEP CENTER SAVES THOUSANDS OF DOLLARS AND JOBS

Ninety-eight percent of Illinois manufacturing establishments have fewer than 500 employees. Companies of this size typically have great potential but face formidable challenges such as competition from foreign suppliers, lack of internal resources to continuously improve, demand for higher product quality, and difficulty attracting and retaining skilled labor. The Illinois Manufacturing Extension Center (IMEC) works with these companies to ensure that they can compete and meet the challenges of an international economy.

In total, IMEC clients reported that the \$6 million they invested in IMEC projects resulted in \$292.6 million of increased sales, over \$120 million of additional capital investment, and \$100 million in cost savings. The 12,204 jobs created or retained annually pump nearly \$28 million of salaries and wages into the Illinois economy (after taking into account regional input-output multiplier relationships). Last fiscal year, IMEC helped more than 500 smaller manufacturers to adopt better production techniques, bring new technologies into their production processes, implement improved business practices, and plan for the long-term futures of their companies.

Types of projects included Lean manufacturing, product development, process optimization, quality registration, marketing and sales, waste reduction, and information systems/e-business implementation. The companies assisted by IMEC reported that they expect to achieve more than \$345 million in sales and cost-saving benefits and to create 500 new jobs as a result.

Homeshield, a 250-employee manufacturer of residential building products such as suffix, downspout, guttering, and rainwear and engineered products such as cladding, screen frame, glass frame, insulated glass spacer, and minting for window and door manufacturers, joined the cadre of Illinois manufacturers that rely on IMEC for assistance. Homeshield was preparing to secure a new piece of business in the furniture industry. However, the company knew that in order to do so it would have to purchase a large piece of machinery and integrate it into existing space in its Chatsworth, IL plant. IMEC evaluated the company's plant and processes and facilitated a kaizen blitz where all aspects of screen production were analyzed for improvement opportunities. The company immediately realized a 40 percent improvement in the number of screens being manufactured per hour. Best of all, Homeshield reclaimed the floor space needed to bring in the furniture product line, improving sales by 6 percent with potentially more sales to follow.

Building on the success of the screen improvement project, IMEC coordinated six other Lean implementations for other Homeshield product lines and administrative processes and anticipates \$2.2 million in sales and cost saving benefits. Results such as these have been experienced and documented by other Illinois manufacturers. Based on 961 client companies surveyed by the Bureau of the Census through May 2001, IMEC's clients reported that the Center's projects produced the following impacts:

- \$304,513 average increase in sales
- \$104,005 average cost savings
- \$119,925,903 average capital investment
- 12.7 jobs, on average, created or retained per project

NEW JERSEY MEP CENTER HELPS COMPANIES BOUNCE BACK

The New Jersey MEP (NJMEP) has assisted more than 850 manufacturers with 1,450 projects in over five years. The most recent survey conducted by MEP over a three month period shows that NJMEP gave companies that it served a multi-million dollar boost for the last reported three-month survey period.

According to the survey, manufacturers reported \$6 million in increased and retained sales, \$3 million in investment in plants, equipment and workforce, and \$700,000 in cost savings because of assistance from NJMEP.

One company, Manville Rubber Products Inc. (MRP), headquartered in Manville, NJ, is a rubber industry leader that has over \$5 million in annual sales. Founded in 1969, this 30-person company is a supplier to the aerospace industry. MRP manufactures custom molded rubber products and rubber covered rollers for a variety of industries including: automotive, electrical and electronics, pharmaceutical, railroad, and fiber optics. The company has earned a reputation for total dedication to quality, efficiency, and attention to detail.

Intrigued when it heard of NJMEP's marketing services, MRP contacted NJMEP to learn how NJMEP could help with its corporate ISO program, sales and marketing initiatives and process control practices. NJMEP worked with MRP to prioritize its programs and presented the company with a plan for becoming ISO 9001: 2000 registered within a one-year time frame.

This nine-month program concluded when MRP was recommended for registration in September 2002. TUV America audited MRP and found the company to be compliant with the requirements of the ISO 9001: 2000 standard.

MRP has seen a 15 percent reduction in costs and 25 percent business retention and anticipates 30 percent in business growth as a result of implementing the ISO program and achieving registration. Other benefits include improved teamwork and communication within the facility and new initiatives in place to reduce scrap and improve process control.

OKLAHOMA MEP CENTER KEEPS JOBS AND THE STATE'S ECONOMY FROM GOING SOUTH

Enardo Manufacturing, like most small and mid-sized Oklahoma manufacturers, had to overcome pricing pressures from domestic and foreign sources while expanding market share and profits. "Because of that pricing pressure we had to look at ways of reducing the cost of our products," said Mark Tomer, owner of the Tulsa-based manufacturer of safety and environmental vapor safety control products such as pressure vacuum relief valves, gauge hatches, emergency pressure relief vents, inline detonation flame arrestors, and other industrial vapor recovery units used primarily in the oil, gas, and processing industries.

Late last year, Enardo began the process of shifting the operations south of the border. During that time, Tomer met with The Oklahoma Alliance for Manufacturing Excellence (The Alliance) to discuss how the Center could help the company incorporate Lean Enterprise.

Tomer knew that The Alliance had a network of extension agents and applications engineers that provided hands-on resources for improving productivity, increasing sales, and reducing costs. The Center supported modernization and change in five areas: technology, marketing, human resources, financing, and inter-firm collaboration.

Enardo decided to work with The Alliance on a Lean pilot project for its vent valve product line. Through the project, Enardo's improvements included a 50 percent reduction in work-in-progress and a 75 percent reduction in lead time, enough increased efficiency to keep its operations in the state.

The Alliance has made a positive difference for the state's manufacturers and Oklahoma's economy. Often working behind the scenes, the Center builds beneficial, lasting relationships that lead to beneficial, lasting results. In the past five years, The Alliance assisted 1,816 manufacturers as well as improved the state's economy by increasing sales, profits, and profitability.

In FY 2002, The Alliance served more than 415 Oklahoma companies with the following results:

- 1,204 jobs created and retained
- \$24,190,068 increase in capital investments
- \$162,887,410 increase in sales
- \$60,706,800 economic impact of the jobs created and retained

SOUTH CAROLINA MEP CENTER HAS A POSITIVE INFLUENCE ON CLIENTS AND THE ECONOMY

Despite last year's downturn in the economy, SCMEP has shown an increased sales impact of \$88.7 million for its clients in 2001. This increase of about \$4 million in new and retained sales by manufacturers over the prior year's report can be directly attributed to SCMEP's services performed in 2001 for the state's manufacturers.

Economic impact numbers are important because they show how SCMEP has been able to positively affect South Carolina's economy through its work with manufacturers. Out of 355 manufacturers surveyed in 2001, the results showed that SCMEP's services created additional sales for its clients, translating into \$31 million of additional income in workers' paychecks. SCMEP's services also helped create or retain 567 jobs with an estimated payroll impact of \$17 million. This 2001 economic impact has the potential to affect the entire economy over the next several years because most of the additional income will probably be spent within South Carolina's boundaries.

Another indicator of SCMEP's impact is the capital investment made by manufacturers last year. For building expansions, training investments, and procurement of equipment and software, SCMEP clients invested a total of \$49 million into their facilities. This economic stimulation affects employers across the state—increasing

payrolls through added jobs, increased sales tax revenues, repeat business, and additional services provided by companies serving the manufacturing sector.

But the benefits do not stop there. SCMEP's manufacturing clients reported achieving an additional \$89 million in sales as a result of SCMEP's services. This sales increase is likely to result in an additional \$5 million of state sales tax revenue.

Another economic impact of SCMEP's services is value-added to manufacturing, which equaled \$38 million in 2001. Value-added to manufacturing is defined as the value of net sales minus the cost of purchased inputs, including everything that is added in value from the time the parts or materials enter the plant until the value as a shipped product is computed. SCMEP's \$38 million is representative of the labor value that individual employees added to manufacturing operations in 2001. Overall, the economic impact ramifications for the state are positive and increasing year by year.

"Working with SCMEP, we have been able to increase sales by \$350,000 post-certification [ISO 9002]," says Bill Totten, president and founder of MI-TECH, Inc., a small minority-owned manufacturer, located in North Charleston, that repairs industrial and marine machinery.

In addition to new sales, SCMEP helped manufacturers increase their bottom lines through cost-saving measures.

In 2001, companies experienced \$20.6 million in cost savings as a direct result of working with SCMEP's dedicated and trained manufacturing specialists. "SCMEP saved us a potential \$100,000 outlay for an extra lathe we thought we needed but actually didn't, and they are helping us adapt our existing software rather than purchasing new software for a variety of purposes," says Brenda Duncan, owner of Oconee Machine and Tool, a full-service machine and tool shop in the Upstate.

Another company, Omnova Solutions, Inc., has realized cost savings via SCMEP's training programs. Glen Pellett, director of operations for Omnova, attended a one-day Lean manufacturing workshop at York Technical College and ended up saving \$76,000 at his plant in Chester. The workshop showed him how to increase the cycle time for a savings of \$63,000 and 240 hours per year; how to improve yield; and how to get more finished product for every pound of raw material, worth another \$13,000. And that doesn't count the reduced environmental impact and inventory reduction—worth \$60,000—and the money saved by not having to create storage capacity.

TEXAS MEP CENTER BRINGS BIG RESULTS TO SMALL MANUFACTURERS

The Texas Manufacturing Assistance Center (TMAC) exists to enhance the competitive position of the state's manufacturing sector. TMAC's manufacturing specialists work with small- to medium-sized manufacturers, providing technical support and implementing best business practices. Typical areas covered include cost management, productivity improvements, environmental assistance, software systems selection and application, and e-commerce issues.

Over the past seven years, TMAC has served approximately 2,400 different Texas manufacturing firms with at least one completed project or activity. This amounts to about 11.2 percent of all manufacturers in the state. The continued growth in repeat customers is a testament to the value of the Center's services to smaller manufacturers.

TMAC has compiled a strong record of service throughout the state. Through the end of 2001, the Center has assisted 246 rural Texas manufacturers (i.e., those located in counties outside the state's defined metropolitan areas), amounting to 8.5 percent of the rural manufacturing base. TMAC success stories in rural areas include Bruton Manufacturing in

Lamesa, Trinity Industries in Navasota, and Cibolo's Timber Tech, which was featured as a national success story by NIST.

The Texas-Mexico Border region also has been well served by TMAC. Since 1995, manufacturing specialists have worked with 472 companies in a 42-county area stretching from El Paso to Brownsville. TMAC's market penetration rate in the area is 25 percent, which is more than double the statewide rate.

An independent survey of TMAC customers nearly one year after project work is completed helps the Center to determine the impacts its services have. Over 90 percent of the TMAC customers responding to the survey in the past two years have reported some positive impact on their business, from increased profit margin to avoidance of unnecessary expenses. Over a period of six years, TMAC's efforts have helped Texas manufacturers to:

- Capture or retain nearly \$221 million in sales
- Realize over \$35 million in cost savings/cost avoidance on materials, labor, inventory, and equipment
- Invest \$67 million in capital improvements
- Create or retain nearly 2,000 jobs for Texans

These figures all represent direct impacts reported by TMAC's customers and not the indirect impacts on the economy. A study conducted in March 2000 by the Office of Applied Economics at NIST looked at the broader effects of just four years of survey data, when cumulative direct impacts were only about half the current level. The study concluded that TMAC's services to manufacturers had boosted the gross state product of Texas by \$252 million and added millions of dollars to state and federal tax collections.

- For every \$1.00 in federal funding provided to TMAC, the U.S. Treasury Department received \$1.48 in increased tax revenues
- For every \$1.00 in state funding expended on TMAC, the state and local governments gained \$1.68 in additional tax revenues¹⁰

¹⁰ TMAC Overview. Increasing the Global Competitiveness of Texas Manufacturers. (TMAC 2002). <http://www.tmac.org/index.cfm?PageID=110>.

MAMTC SERVICES GO OUTSIDE OF THE BOX

The Mid-America Manufacturing Technology Center (MAMTC) is a service organization that helps small and mid-sized manufacturers in Colorado, Kansas, and Wyoming increase their sales and productivity, reduce costs, and improve quality. MAMTC opened its doors in October 1991. It initially provided services to Kansas' small manufacturers and then gradually expanded into Colorado and Wyoming in the mid-1990s.

MAMTC provides low-cost technical assistance, mostly through on-site consultation, to manufacturers in the areas of engineering, operations, management, and marketing. In addition, it conducts seminars, industry roundtables, and objective demonstrations of equipment and software.

When Bryan Pulliam, owner of Canter L.C., based in Wichita, KS, found himself caught between the proverbial “rock and a hard place,” he asked MAMTC for assistance. In 1999, less than two years earlier, Pulliam had conceived an idea for a portable electric fence system that virtually has no equal. By February 2000, after producing and improving a number of prototypes, he finally had a product ready for market.

“It’s an amazing system, which seems to have the potential for worldwide impact,” says Pulliam, admitting that he conceived the idea while searching for a better system for rotational grazing. Only after developing the concept did it turn into a portable paddock.

About the time Pulliam was starting to develop a market for the portable electric fence system, he had to step back in and take over management of Postal Presort, his other company. As a result, the GRAZIER system sat virtually stagnant for an entire year.

When Pulliam discovered MAMTC, he found a way to continue the marketing effort on the GRAZIER product, while still managing the mailing business. “In essence, they stepped in and helped me in a number of different ways to get the whole marketing plan back on track by the fall of 2001.”

MAMTC surveyed 25 to 30 customers who purchased the system to determine who Pulliam’s customers were and how they perceived the value of the product. The survey results showed that the GRAZIER

system had a 100 percent customer satisfaction rating. It also showed that 92 percent of the company's customers were women who were looking for a system that was simple to use.

The original goal with MAMTC was to get the GRAZIER system ready for dealerships and help write dealer contracts. However, after the project got underway, it took a different direction. The first contract was rewritten for website development which included the production of a five- to six-minute streaming video that showed how easy the product was to use.

According to Pulliam, the new website, which includes the streaming videos, as well as the information found on the original web pages, has already generated positive results. "One customer called and told me that what he had read about the system sounded good," he relates.

"But when he saw the video on the website and realized how easy it was to set up and use, he knew right then that he had to have one."

It's clients like Canter that drive MAMTC to assist the just over 13,000 manufacturing firms in the three-state region of Colorado, Kansas, and Wyoming. While the average client is a company with 30 employees, others range in size from one-person shops to 500-employee plants. In terms of industry or product, these companies manufacture everything from complicated electronics to chicken-salad sandwiches with the largest concentrations of clients have been in machinery, metal fabrication, transportation, electronics/electrical equipment, plastics, commercial printing, and food processing.

FOR FY 2001, MAMTC (KANSAS, WYOMING, AND COLORADO) REPORTED THE FOLLOWING IMPACTS

- Anticipated annual sales increases. \$43,477,200
- Anticipated annual cost decreases¹¹. \$7,201,498
- Increased capital investment for modernization \$5,275,410
- Jobs created or retained. 946
- Payroll from additional jobs \$32,046,696
- Client \$ impact per state \$ invested \$34.76
- Customer satisfaction rating 96.6 percent
- Number of projects initiated 948
- Number of clients assisted in projects 609
- Counties served 57 percent

¹¹ Economic impact and customer satisfaction are based on surveys of MAMTC Technical Assistance Project clients conducted 30 days after the project is completed. No multipliers have been added. Payroll from additional jobs is based on an average wage of \$33,876 (average US manufacturing wage in 1997, per US Census Bureau).