SUSTAINING THE DEFENSE SUPPLY CHAIN

DRIVING INNOVATION AND MARKET DIVERSIFICATION THROUGH TEAM FOCUSED, DATA SUPPORTED, STRUCTURED PROJECTS

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in partnership with

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Program Designed to Secure the Defense Supply Chain is Innovative and Capable of Supporting the Needs of our Military

Midwest communities and the defense supply chain companies that are located in them are economically intertwined. The Midwest's manufacturing supply chain is embracing the challenge of scaling production up to meet the technical and production demands in support of national defense. As our warfighters prepare to combat new, emerging adversaries, it is of paramount importance that our supply chain deliver what is necessary to secure our sustained military dominance.

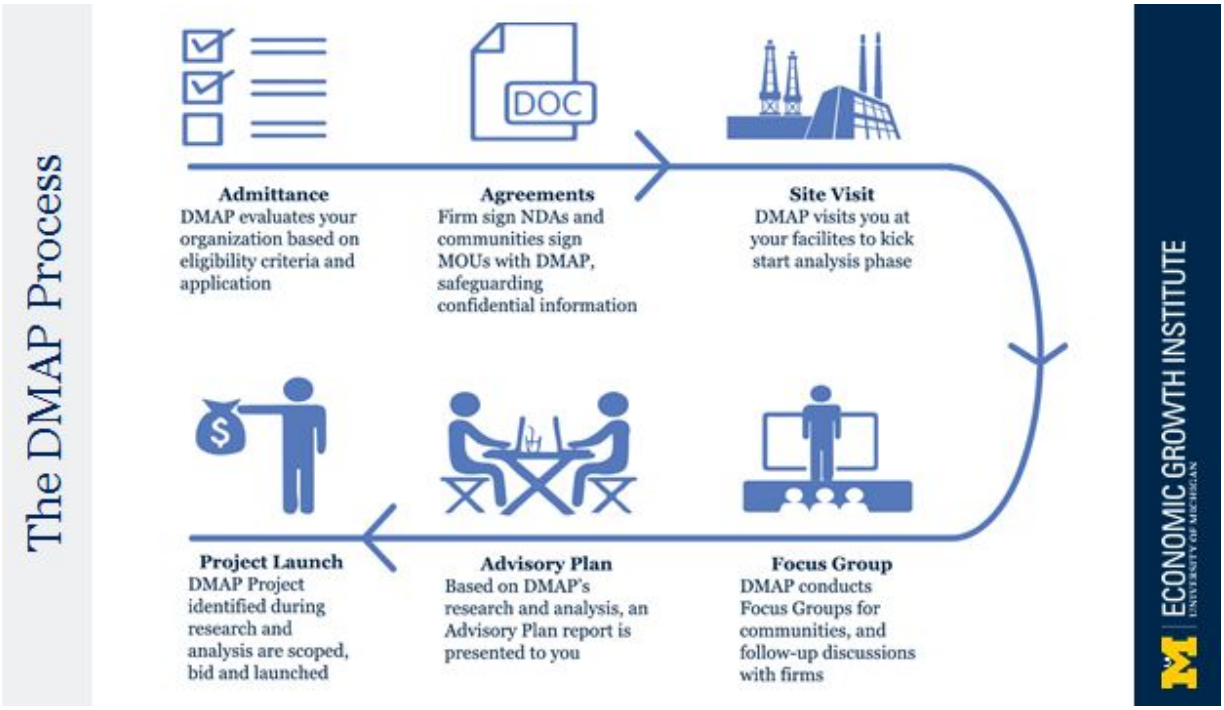
This new reality is a stark contrast from earlier this decade when the United States began the process of reducing troop levels in two conflict regions: Iraq and Afghanistan. Sequestration meant that a reduction in troops coincided with a reduction in all that is required to support a larger military force.

Domestic firms of all sizes that had based their strategies on how to best support the warfighter were challenged to abruptly pivot to other markets in order to survive. Small to medium sized manufacturing firms (SMMs), in particular, were weakened financially. Lacking the resources or network to remain viable while their largest customers decreased orders and suspended contracts, these firms faced an uncertain future, threatening the outlook of the communities in which they resided.

Looming job loss, reduction in manufacturing capacity, and talent drain, combined with decreased capital investment foreshadowed the disappearance of critical capabilities and evaporation of our pool of defense suppliers. The critical lesson imparted should remind us that we ignore the health of our supply chain at our peril. The production demands we face today (and potentially in the future) would simply not be met, and our exposure in such a scenario could have proven catastrophic to our national security.

Department of Defense's, Office of Economic Adjustment (DOD-OEA) correctly anticipated this impending situation and outlined a forward-looking program within the Defense Industry Adjustment (DIA) program, with a goal to enable communities and companies to remain viable despite reductions in defense spending.

Program Background



The DOD-OEA chose the U of M's Economic Growth Institute model for the DMAP's process based a series of high-impact programs (identified below), which were previously administered to address other situations faced by SMMs and their communities over three decades.

- The Community Economic Assistance Program (CEAP) assisted communities adversely impacted by automotive plant closures during the great recession.
- The automotive supply chain assistance program 'Surviving to Thriving' diversified automotive suppliers into markets with greater potential.
- The EDA-funded Great Lakes Trade Adjustment Assistance Program (GLTAAC). Conducted continuously for 35 years, serves companies injured by imports.
- Small Company Innovation Program (SCIP) evaluates technical skill-sets, processes, and products, locates experts across multiple universities for technical support.
- The First Customer Program (FCP) identifies critical gaps in business development for advanced technology firms and helps bring their products to market.

DMAP combined characteristics of these established programs, confirming that the the tenets of all programs can be combined to achieve great results are found in the metrics of the SMMs who were enlisted to participate. U of M partnered with Purdue University and The Ohio State University to deliver services to companies where they reside. Job growth, expanded customer base, new market entries and the commercialization of newly developed intellectual property all offer proof the OEA hit its mark across multiple platforms with an aggregated 18x return on investment. Types of projects executed under the DMAP program are as follows:

Examples of Company Projects

Examples of Community Projects

Program Data & Impact

The program was highly successful, as demonstrated by the key outcomes below.

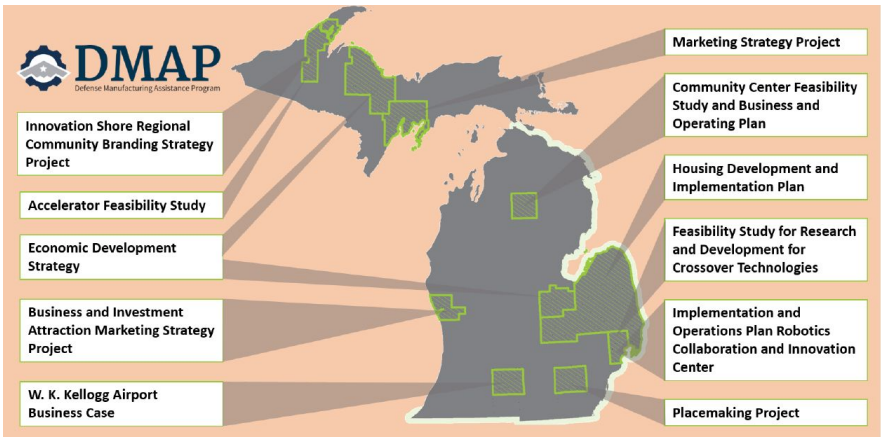
Company Impact

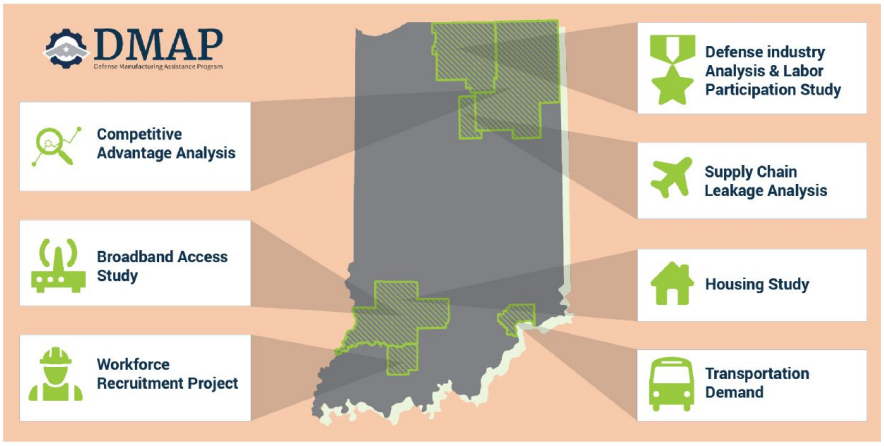
Across Michigan, Indiana, and Ohio, 125 client companies were assisted and 212 projects received program funding. Companies were surveyed for program impact. Participating firms reported 380 new customers. Furthermore, the program drove company innovation, leading to 139 new products, 26 IP and commercialized technologies, and 93 new markets. The program's engagements impacted 13,555 jobs

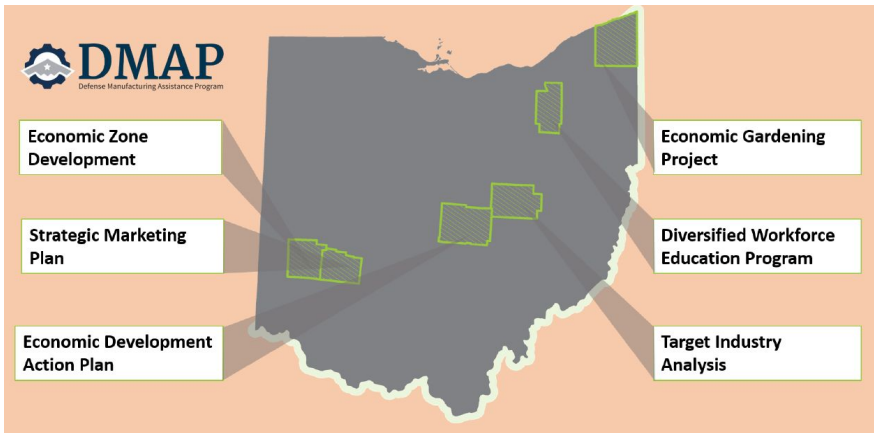
and drove $183 million in new revenue. These numbers are particularly striking given the challenges faced by the supply chain. Overall, the program achieved an ROI of 18X.

Community Impact

Communities were assisted across all three states. The program supported a wide range of engagements that improved community planning and long-term viability. As shown below, engagements stretched across the region. Projects included economic development strategy planning, competitive advantage analysis, community marketing and branding, workforce development, and accelerator planning.







Case Studies

- As part of the Federal Government's Base Realignment and Closure (BRAC) process, Grissom Air Force Base, located in North Central Indiana, was realigned. Since that announcement, Grissom needed a deeper understanding of their business assets and the benefits gained through greater local supply chain connectivity.

  Purdue Center for Regional Development (PCRD) partnered with the North Central Indiana Regional Planning Council (NCIRPC) to provide research targeting recruitment of private companies to invest in Grissom and the wider region as a base of operations.

  A comprehensive supply chain analysis was developed to identify growth opportunities in the manufacturing and agribusiness sectors of the economy. A sectoral database of participating companies was established as an online

engagement tool to organize procurement opportunities and strengthen local industry sectors. This tool encourages businesses looking for opportunities to identify them on-line based on a number of criteria aimed at further promoting local interactions.

> *"DMAP served as a great initial step furthering the development of relationships between existing businesses and local economic development organizations. This supply chain analysis has sparked renewed interest in business retention and expansion efforts at the local level by LEDOS throughout the region."*
> Steven Ray, Executive Director of NCIRPC.

- Defense supplier Cobra AERO, a privately owned, vertically integrated engineering and production facility in rural Hillsdale, Michigan, expanded its product lines from high performance, gas powered motorcycle engines into hybrid drone engines required by the US Navy.

  While the company identified this need, it lacked the full internal engineering expertise to design and meet all criteria stipulated by the US Naval sourcing program. The Economic Growth Institute was able to bring university research as well as private sector expertise to bridge the gap and successfully fulfill the specifications. The result was a product that combined an internal combustion engine and an electric motor in order to efficiently power vertical takeoff and landing, while also increase the drones' distance capability.

  The high level of engineering and additive manufacturing design and its successful implementation produced a new defense contract for Cobra, allowing them to increase sales and hire new employees.

  > *"The engagement with the Economic Growth Institute connected us with the right partners to propel us forward in needed product innovations. This program allowed us to grow as a business."*
  > Sean Hilbert, President, Owner of Cobra AERO

- Saline Lectronics, Inc. (Lectronics) is an electronics contract manufacturer serving the commercial, medical, aerospace and telematics industries. Their portfolio of electronic products and services currently includes: PCB assemblies, surface mount technologies, soldering, conformal coating, electro-mechanical box building, and testing and inspection.

Lectronics needed to establish a strategic leadership and management plan to effectively implement a quality management system. Much of the current leadership team had been promoted up throughout the organization, but had not developed the skills within their management aptitudes to consistently produce quality products, impacting both customer and employee satisfaction.

Lectronics worked with the Defense Manufacturing Assistance Program (DMAP) to evaluate the current challenges with their core quality management principles and to execute a strategic plan to address these challenges. The company developed a quality focused culture that is vital to the core-strengthening of the organization. The second project Lectronics chose to undertake was to improve cybersecurity by becoming compliant with the NIST 800-171 Guidelines, Protecting Controlled Unclassified Information in Non-Federal Information Systems and Organizations.

Since the completion of these projects, Lectronics has seen a dramatic improvement in company communication and culture that has positively influenced daily work functions, quality, and efficiency. Lectronics has also seen and improvement in customer communication, leading to an additional $6 Million in new product orders.

Lectronics achieved compliance to the NIST 800-171 Guidelines by implementing the 110 security controls to be more agile to both prevent and react to a potential security breach. Lectronics verification of compliance now allows them to maintain current defense contracts and also opens them up to new business opportunities in the defense sector.

> *“In the last 6 months I’ve seen a dramatic improvement in each manager’s awareness of their own communication style as well as a better understanding of the dynamic within their own teams. They’ve come to better understand others - how they think, their differing personalities, their management approach - and adapted their own communication to best fit the situation. Daily production strategy meetings flow more efficiently with clearer communication. We’re eager and well prepared for new defense and aerospace opportunities.”*
> Mario Sciberras, President & CEO

Observations

SMMs are unique within the US economy. Their needs and the challenges they face each day are not always aligned with those of the larger original equipment manufacturers; nor with Defense Department's Prime Suppliers. They also do not share the same issues an investment fueled, technology based, start up encounters.

The program team found that, although most private firms operate across multiple industries, geographies, and markets, they share some of the same challenges. They struggle each day to motivate their current employees and attract new talent. They constantly need to address cash flow issues, which may hinder the ability to make payroll each week, much less invest in new technology. Their equipment is old and maintenance is a constant factor. They overextend themselves to keep current with their own supply base in order to deliver on time and receive payment in return. Many have not yet been able to recoup the cash reserves they built up prior to the great recession - the same cash reserves that allowed them to weather the last economic downturn. **When the country needs these companies to rapidly scale up production or transition to new parts, most are not prepared and need access to technical and financial support to respond.**

Conversely, each client leverages a unique combination of characteristics and circumstances, which includes location, industry, talent, traditional skill set, market potential, manufacturing equipment and ownership culture among other factors to remain viable and build sustainability.

Critical to achieving a successful DMAP project was the foundational work exemplified in the deep dive research and analysis of those aforementioned factors. Each category told a different story and was crucial to leading our team toward identifying the project most likely to deliver the largest significant positive impact.

More than 35 years of experience working with SMMs provided the framework the DMAP Project team used to work in partnership with the clients, agree upon a need, develop a way forward, identify solution providers, build selection criteria and then launch the transforming project plan.

Recommendation: Encourage Manufacturing and Product Innovation as a Forward Thinking, Continuous Strategy

SMMs are the heartbeat of the US economy and fertile ground for innovative problem solving. True innovation best occurs amid a networking hub that includes an identified need, institutional research sources, and private firms with the culture, talent, agility and opportunity to see what embracing that innovation can become.

Forward thinking program funders like the OEA who choose experienced partners like the University of Michigan and its partners to launch initiatives such as the DMAP support this proven model. The successful performance of the DMAP has resulted in a solid roster of defense companies employing strong core business functions, the acquired ability to utilize innovative manufacturing processes, develop next generation products and diversify into successful commercial ventures, resulting in additional private investment and new defense-related products manufactured in the U.S.

This process used in DMAP is an established, efficient platform capable of forging a convergence of high potential, early-stage technologies with immediate and future defense needs. Implementation of this "technology push-pull" methodology yields an inventory of deployable technologies, allows Technology Readiness Level (TRL) and Manufacturing Readiness Level (MRL) to run in tandem. This program has proven to be both replicable and scalable.

Funded support of the defense supply chain should not require an economic crisis. Programming to address supply chain issues would be even more effective and efficient if deployed proactively. Implementation of programs funding innovative, technology based manufacturing processes and products can yield great results if enacted before decreased cash flow reaches critical mass. The partnership of U of M, OSU, and Purdue found many more defense companies that could have been diversified or expanded to meet additional defense needs, but for program timing and funding constraints.

Focusing on the convergence of needs, research, innovative technologies, agile firms and tech-to-market potential provides a sustainable, foundational structure for not only the US Military to remain dominant, but the commercial sectors in the US to outpace the rest of the world.