

U. S. Department of Defense – Office of Economic Adjustment High Velocity Metal Forming (HVMF) Project Involvement and Assistance

In June of 2014, Allen County, Ohio was awarded a small grant from the Department of Defense Office of Economic Adjustment (OEA) to create a Plan for Collaborative Growth for Allen County. The Allen County Commissioners, and their project manager, Denis Glenn, chose Future IQ Partners to conduct community-wide workshops and stakeholder meetings to identify the county's needs for collaborative growth.

Their tasks included:

1. Expand the Allen County regional network platform.
2. Provide a comprehensive gap analysis of the region.
3. Conduct an analysis of local product innovation opportunities and needs.
4. Create an Allen County Plan for Collaborative Growth.
5. Facilitate the development of a Community Action Response Team.

The final Action Plan represented the collective knowledge and vision of the regional stakeholders who were engaged in the three-month Allen County Defense Initiative. The strategic community vision and action planning process culminated in two day strategic planning "think tank" in April 2015. The results of those conversations are represented in the strategic recommendations provided by the consultant.

The primary organizations specifically referenced in the Allen County asset inventory and readiness analysis and the action plan recommendations included:

- Allen Economic Development Group
- Lima Automotive Task Force
- LINK Lima
- Ohio Energy and Advanced Manufacturing Center
- Task Force L.I.M.A.
- West Central Ohio Manufacturing Consortium

Utilizing the results and recommendations from the Allen County Plan for Collaborative Growth, in the summer of 2015, Allen County, Ohio applied for and was awarded a Phase II OEA grant in the amount of \$3.6 million. The grant specifically addressed three paths forward which remained consistent with the Phase I objectives. The paths identified were:

1. The implementation/execution of the Community Action Plan,
2. The refinement of Task Force Lima / Joint Systems Manufacturing Center (JSMC) Social Media/Communications Plan, and
3. The refinement and technology insertion of High Velocity Metal Forming / Joining to reduce manufacturing costs and commercialize an underused technology.

Community Projects / OEA Grant Deliverables included:

1. Create an Allen County Plan for Collaborative Growth which builds on the capacity of existing organizations and identifies the means for future collaboration.
2. Conduct a comprehensive gap analysis of the region that includes an analysis of local process and product innovation opportunities and needs.
3. Coordinate the sharing of information with small to medium-size businesses (SME's) regarding opportunities for growth.
4. Create a coordinated Regional Economic Development Communications Plan for internal and external media markets.
5. Promote the development of a pilot adult apprenticeship program in conjunction with Ohio Means Jobs.
6. Establish a Regional Center for Innovation Excellence.
7. Create a regional innovation and entrepreneurship website.
8. Develop innovations in the area of High Velocity Metal Forming (HVMF).
9. Retain consulting expertise to create regional awareness of Allen County's position as a manufacturing hub.
10. Develop a comprehensive and inclusive communications plan to ensure all stakeholders are engaged throughout the defense adjustment process.
11. Implement the communications plan by developing and releasing online and traditional information dissemination and engagement tools.

Inclusion of task #8 above represents the second federal endorsement of the OEAMC's High Velocity Metal Forming (HVMF) Commercialization Center. The OEAMC was awarded a 3-year EDA Regional Innovation Strategies (RIS) grant in 2015 to facilitate the initial steps for the development of the HVMF Commercialization Center. The OEAMC was one of only twelve RIS grants recipients in the nation in 2015. The OEA funds are allowing the OEAMC to expand the scope of the HVMF project and fast track the results.

The OEAMC's focus on the commercialization of High Velocity Metal Forming (HVMF) evolved from a long-standing relationship between Dr. Glenn Daehn, Professor of Metallurgical Engineering at The Ohio State University, and Stephen Hatkevich, Director of R&D at American Trim LLC in Lima, Ohio. Dr. Daehn has published many papers and received several patents on this subject. American Trim began working with Dr. Daehn and integrating HVMF technology development into their company a few years ago. More recently, American Trim has decided to partner with the OEAMC on further development of this technology.

The Board of Directors and President of the OEAMC feel the technology of High Velocity Metal Forming (HVMF) is an emerging opportunity due to the transformative ability of the technology to reduce manufacturing costs. This can happen in several ways: single die tooling is cheaper by 50%; turnaround time for retooling is usually under six weeks compared to six-twelve months; a reduced floor print can accommodate the HSRMF processing line; energy costs are reduced up to 99% during production; materials can be selected for performance over

formability; materials do not require the time and effort to remove machining marks from the finished product and, part design can be enhanced due to increased forming precision.

Barriers to industry-wide adoption include lack of coordinated commercialization efforts; the supply chain is not widely known to would-be HVMF manufacturers; modeling and simulation software has only recently gained a desired level of predictive accuracy; and materials' behavior under high strain rate processes have not been comprehensively characterized and validated.

The OEAMC is privileged to enjoy an excellent working relationship with Dr. Daehn and his engineering team. Several members of Dr. Daehn's staff had internships at American Trim in Lima, which has provided an immediate sense of compatibility between the two organizations.

Recent collaborative activities between OSU and the OEAMC include:

- In mid-2016, the OEAMC commissioned OSU's Center for Design Manufacturing Excellence (CDME) to fabricate a 4.2 kJ Ultrafast Capacitor Bank for use in its HVMF Commercialization Center.
- The OEAMC was recently awarded \$400,000 from the Ohio Capital Budget under the Ohio State University line item. We will be working with Ohio State to utilize these funds in a way that shows benefit to both the OEAMC and OSU.
- Dr. Daehn and members of his team have visited the OEAMC on multiple occasions. During a visit on July 18, 2016, Dr. Daehn and the OEAMC President began conversations about partnering on a federal grant to fund VFA scale-up for a military supplier within Ohio.
- During the same visit, discussion was held about utilizing some of Dr. Daehn's students as interns at the OEAMC's HVMF Commercialization Center. This would provide the interns with hands-on experience in HVMF processes.