



Project Profile: Colorado

Impact Statement

Colorado IR team increased awareness of the defense industrial base in the state, promoted defense company commercial diversification, curated a vibrant ecosystem for manufacturing entrepreneurs and startups, encouraged new technology development and deployment, and helped bring R&D developments to domestic and international markets. Additionally, the IR team developed a supply chain database and is in the process of developing career pathways in collaboration with community colleges and universities and implementing an apprenticeship program which connected 99 students to apprenticeships in 2017 and 168 in 2018.

Key Project Takeaways

Through its Industry Resilience (IR) grant, the Colorado IR team has helped increase awareness of the defense industrial base in the state and promoted commercial diversification of defense companies to sustain the industrial base. The FourFront Fuse Impact Centers, Manufacturing Advancement Centers, have created a more vibrant ecosystem for the entrepreneurial and startup community for manufacturers. The FourFront Fuse Impact Centers provides resources for the development and deployment of new technologies and help accelerate the process to bring R&D developments to domestic and international markets. Furthermore, Direct Assistance Program has helped several companies, mostly small businesses, to improve their competitiveness in both the defense and commercial market through innovation vouchers.

With funding support from OEA, the IR team developed a supply chain database, Manufacturers Marketplace, where companies are able find suppliers locally, thereby shortening the supply chain. In addition, the IR grantee team is developing career pathways to ensure that DOD has access to a robust workforce through collaboration with community colleges and universities to develop a curriculum based on the needs of the defense-impacted workforce and implementing the CareerWise program, an apprenticeship program where a total of 99 students became apprentices in the 2017 cohort.

Project Description

Rationale

The Department of Defense has long been a major contributor to the Colorado economy. For decades, Colorado has been the site of numerous military installations including the U.S. Air Force Academy which attracts roughly a million tourists each year. The Defense industry is both a significant contributor to total state output and wages as well as a major component of the state's workforce and innovation system. According to the U.S. Bureau of Economic Analysis (BEA), in 2007 the Department of Defense was the largest common-purchaser of products from Colorado's advanced manufacturing industries. A related state-funded analysis of SBIR and STTR awards to Colorado companies revealed that more than half of all awards, by dollars, originate from DoD. Bloomberg data from 2012 suggests that federal defense spending comprises more than 4.3% of state GDP. These data are based on clear contracting relationships between Colorado firms and DoD, using the Federal Procurement Data System.



There is concern that fluctuations in DoD aerospace, energy and bioscience procurement may lead to significant impacts to the Colorado economy; particularly as much of the state's defense industry are Tier 2 and 3 suppliers to major prime contractors. Recent experience has shown that suppliers are more susceptible to Defense procurement changes, and that job losses among these firms are difficult to both anticipate and track without an advanced defense supply chain analysis. Typically, these firms are lean and have the potential to adopt emerging technologies. To this end, Colorado proposed to OEA examining the potential for vulnerable defense suppliers to enter new commercial markets.

Program Activities

Colorado's Office of Economic Development and International Trade (OEDIT), the Colorado Advanced Manufacturing Alliance (CAMA), and the Southern Colorado Technology Alliance (SCTA) are working together to provide immediate and sustained assistance to Colorado firms impacted by reduced Department of Defense procurement, primarily impacting the aerospace sector as well as Colorado's advanced industries manufacturing base. The group coordinates assistance to the regions where these firms are predominantly located. The Colorado IR team has focused their activities around strategic planning and Fuse Center development.

Strategic Planning

1. FourFront Regional Strategic Development and Communication- form a statewide executive team, four regional committees and one statewide organizational collaboration team that meets regularly and with regional economic development partners to align strategies and develop a strategic operational plan for FourFront.
2. FourFront Regional Team Development & Summit- identify regional FourFront Center representatives for Northern Colorado, Southern Colorado and Metro Denver. Add resources to create a regional infrastructure (Fuse Centers) which promotes regionalism across the state, the infrastructure can be used to host events where industry experts assist manufacturers with adapting to new manufacturing realities.
3. Colorado Digital Manufacturing Commons Planning- coordinate various state stakeholders to create an unsolicited proposal for the outreach, education and training of Colorado manufacturers on the digital technologies and tools emerging from Digital Manufacturing and Design Innovation Institute (DMDII).

Fuse Centers Development:

1. FourFront Supply Chain- create and promote an online supply chain tool (Manufacturers Market) for manufacturers to let other companies know who they are, what they can do, what products they produce, and where they are located. It's also a way for companies to find suppliers who can produce the products they need.
2. Startup Work and Development of Fuse Impact Centers- establish four Manufacturing Advancement Centers across Colorado the needs of the regional industry community.
3. Fuse Impact Center Training Assistance - create a financial assistance program for those firms requiring services and training through a Manufacturing Advancement Center.



4. Fuse Impact Center Workforce Training- develop and implement a systematic program that entrenches industry in the education system through CareerWise Colorado.
5. Supply Chain Direct Assistance- offer assistance via innovation vouchers to companies that have been or will be negatively impacted by reduced defense spending.

FourFront Colorado, previously named Strengthening Manufacturing by Accelerating Research and Technology (SMART), is a public-private partnership focused on accelerating the growth and resiliency of manufacturers across Colorado's Advanced Industries, with a focus on advancing and assisting all businesses within Colorado's defense sector. FourFront is an engagement strategy that brings together industry, government, and academia across four regions in Colorado to create a collaborative ecosystem that supports the growth of Colorado's Advanced Industries. The initiative seeks to grow and bolster the state's manufacturing base by connecting businesses through four regional Manufacturing Advancement Centers, which serve to train and develop business opportunities while promoting business-to-business information sharing.

CAMA supported the development of four regional leadership teams, each associated with the creation of Fuse Center, that are comprised of private/public universities, community colleges, venture capitalists, members of the manufacturing community, and members of the local community. Each regional leadership team is responsible for meeting and administering programs in their specific region, and thus creating a Fuse Center to respond to that region's needs.

Resiliency Impacts

Increasing Awareness of the Defense Industrial Base

To increase the awareness of the defense industrial base, the FourFront team has used the OEA funding to develop a supply chain database, host digital operations events for the manufacturing community, and create a website on the FourFront project initiatives.

The FourFront team found the benefits from an in-depth awareness of the supply chain dynamics and competencies would be invaluable to Colorado's defense sector. During Phase I, the FourFront team consulted with the Colorado Manufacturing Extension Partnership (MEP) to determine the most cost-effective method to improve suppliers' visibility in existing and emerging markets, in which the MEP suggested collaborating with the Colorado State University on an existing platform (eRAMS) to build a tool called Manufacturers Connect. Manufacturer's Connects is a web-based platform serves as a geocoded database of defense contractors, businesses, and suppliers as well as related advanced industries businesses and suppliers. The purpose of this tool is to indicate where companies are to help companies find supplier locally, thereby shortening the supply chain.

The FourFront Team received feedback from Colorado manufacturers that the Manufacturer's Connect database was not functioning properly, therefore not meeting the needs and goals for this community. Recognizing the need for a solution, the FourFront Team joined an effort started by the National Association of Manufacturers which has led to the creation of a new search engine, Manufacturer's Marketplace, to Colorado. The Marketplace is a national version of the eRAMS application with



extended search features and functionality - revenue size, employee size, location parameters, supported manufacturing processes, equipment, and certifications, and it was built in response to manufacturer's requests to be able to search for companies based on criteria that extend beyond the standard SIC/NAICS criteria. Manufacturers Marketplace is currently populated with 300,000+ companies, and it is designed to allow members to expand upon baseline profiles in the database which is maintained weekly.

In addition to the online supply chain tools, the FourFront Team also developed the Colorado Manufacturers Resource Guide that includes information about State and Local Economic Development Offices, State Workforce Development Centers, local government offices, Federal Agencies, Chambers of Commerce, and Community Colleges.

The FourFront team is using the Fuse Centers as a regional infrastructure that promotes regionalism across the state, making these centers a perfect venue for event hosting and information dissemination. The Fuse Centers is where industry experts assist manufacturers with adapting to new manufacturing realities. The FourFront Team brought in PricewaterhouseCoopers' expertise to speak on how the Internet of Things is impacting the supply chains and workforce of manufacturers. Strategy&, a part of the PricewaterhouseCoopers network, has presented two programs to Colorado manufacturers with a focus on Digital Operations.

To further spread awareness, the FourFront team developed a website (<http://fourfrontco.com>) to promote the FourFront initiatives and to market FUSE Centers to local businesses. To continue the engagement of the manufacturers, contract or full-time employees of the FourFront project, Fuse Center Directors, were tasked with a specific number of face-to-face meetings on a weekly basis with companies in their region. Each Director was armed with a checklist of questions that made up the Manufacturing Visit Report. The questions focused on the characteristics of a resilient business.

Commercial Diversification of Defense Companies to Sustain the Industrial Base

To provide startup assistance, the FourFront team built four Fuse Impact Centers (Metro Denver MAC, Southern Colorado MAC, Northern MAC & EWI Applied Research Center, and Western Slope MAC) across Colorado to provide equipment and assistance to existing and startup manufacturers looking to diversify from the defense sector and access new markets domestically and internationally. The Fuse FourFront Impact Centers are a physical space providing regional meeting space for manufacturers, a hub for networking and business-to-business development, and training programs targeted for manufacturers around the state. Each of the four regional Fuse Impact Centers contain a visual collaboration solution that links locations, teams, content, and devices in an immersive, shared workspace. The centers support the development and deployment of new technologies and help accelerate the process for bringing R&D developments to market. The initiative also seeks to advance small businesses through assistance with market research, operational process improvement, and business growth services. The centers will be outfitted based on the needs of that region (research and development, workforce development and training, business growth and advancement, and market diversification), identified through the supply chain competencies of aerospace and adjacent markets.



Furthermore, Fuse Impact Centers hold InFusions, educational forums developed to deliver the content for each of the regional centers, where small groups of like-minded individuals gather for a topic-specific training presented by industry experts. InFusion participants also have the chance to share and compare their experiences, best practices, and solutions to the topics during the forum.

The EWI, an applied research organization designed to assist manufacturers, has taken the role to develop the business model for innovation assistance to Colorado manufacturers. EWI launched a new program, the Advanced Manufacturing Implementation Strategy (AMIS), where the EWI Project Team conducts a comprehensive on-site assessment of the selected manufacturer's operations. With this information, EWI provides recommendations to help the vendor move toward their future vision. The AMIS program has served 3 companies.

The FourFront Team developed and implemented the Defense Assistance Program (DAP) targeted towards Colorado small and medium-sized aerospace and defense contractors that have been negatively impacted by past DOD budget cuts and/or will be susceptible to impacts in the current budget cycle. The goal of the DAP was to provide financial assistance through an Innovation Voucher, with a match, for DoD impacted companies to pivot some or all their products or services towards the commercial, non-DoD arena.

Presently, at least 13 companies have received direct technical assistance via the innovation voucher and 12 companies have been enrolled and processed. These companies were identified through collaboration with Colorado jurisdictions, partners, and the supply chain mapping effort. Vouchers reduced the cost for participating companies to purchase strategic planning, consulting, and marketing services to more easily enter new commercial markets. For example, innovation vouchers were applied towards retaining consultants to guide participant companies through market research, software training, software testing and validation (including cyber), strategic planning, ITAR certification, new capital training, the purchase of new software geared towards commercial use, and assistance with the expansion of a non-DoD customer base.

Readiness Impacts

Training and People Support

The Colorado IR team has been collaborating with community colleges and universities to develop a curriculum based on the needs of the defense-impacted workforce and the Colorado sectors where they are likely to be employed, including apprenticeships. The effort known as CareerWise Colorado, formerly known as Business and Schools in Collaboration (BASIC). Additional funding for the Department of Labor (DOL) and the Bloomberg Foundation has pushed for need of manufacturing programs geared towards students, through community colleges, to focus on critical skill gaps within Advanced Manufacturing.

CareerWise's model for apprenticeship, like the Swiss model, creates tangible benefits for both industry and students, resulting in a skilled workforce development pipeline for Colorado's industry and a clear career and education pathways for students through valuable work experience, nationally-recognized



industry certification, and debt free college credit. CareerWise students, as young as juniors in high school, are learning and earning by spending time in both school and industry¹.

Apprenticeships in the 2017 CareerWise Cohort included:

- Advanced Manufacturing: 25
- Business Operations: 26
- Financial Services: 29
- Information Technology: 19
- Total: 99

Expected numbers for the 2018 CareerWise Cohort (beginning summer 2018) are:

- Advanced Manufacturing: 30
- Business Operations: 51
- Financial Services: 26
- Information Technology: 35
- Healthcare: 26
- Total: 168

Cybersecurity Preparedness

The FourFront team, in conjunction with the Digital Manufacturing and Design Innovation Institute (DMDII), sponsored a workshop at the Southern Colorado Fuse Center for manufacturers centered on the topic of “Cybersecurity for Manufacturing: Securing the Digital Thread” to combat the concerns surrounding cybersecurity. The workshop included speakers from DMDII, DoD, Industrial Control Systems Cybersecurity Vendor, and a Senior Policy Advisor for Advanced Manufacturing Whitehouse Office of Science and Technology Policy.

¹ FourFront Final Report – April 30,2018