



Project Profile: North Carolina

Impact Statement

The thirty companies served by the North Carolina Defense Industry Diversification Initiative (NCDIDI) project directly contribute to the lethality, resiliency, and readiness of the Department of Defense (DoD) and its warfighters. Following the successful implementation of a Phase I planning grant, progress in Phase II includes targeting twenty more companies working in aerospace and other sectors, addressing cybersecurity risks and helping NC defense suppliers innovate in products and services to become more cyber secure. In addition, companies are being educated on the applications and benefits of additive manufacturing technologies and preparing them to integrate those technologies into their own production facilities. The opportunities presented to companies through the program contribute to their long-term health and sustainability and to the health and resiliency of the entire state. Moreover, the overall set of project activities have contributed to greater awareness about the size and importance of the defense industry in NC and facilitated efforts to support the state's defense manufacturers and professional service providers.

Key Project Takeaways

One-on-one technical assistance to participating companies has yielded significant benefits to DoD, the warfighter, and NC's local economies. A structured process like Technology Driven Market Intelligence (TDMI) is helping companies identify new technologies and products, facilitating their movement into new customer markets. The extensive and proactive statewide communications strategy is being widely recognized for building awareness among stakeholders about best practices and industry engagement. Partnerships have been critical to building a sustainable statewide ecosystem to support the defense industry.

Project Overview

Rationale

North Carolina has a strong military presence including six major Department of Defense (DoD) installations, the largest military ocean terminal in the world, National Guard facilities, and Army Reserve facilities. However, despite the available aggregate information, the state lacked clarity in the specifics of industry and business engagement with the defense sector and dependence on DoD spending. Moreover, the state had limited knowledge of strategies to work proactively with defense and aerospace suppliers to enhance their ability to meet DoD needs, respond to cybersecurity requirements, and opportunities to identify and address challenges faced by the warfighter.

Program Activities

In March 2017, North Carolina State University's Industry Expansion Solutions (IES) and the North Carolina Department of Military and Veterans Affairs (NCDMVA) received a Phase I Industry Resilience (IR) planning grant and launched the NC Defense Industry Diversification Initiative (NCDIDI). A strong Project Advisory Board consisting of local universities, colleges, military business organizations, business services providers, manufacturers, and state agencies was established to inform and drive statewide



efforts. NCDIDI leverages the services of the North Carolina Manufacturing Extension Partnership (NCMEP), a statewide partnership comprised of the North Carolina Community College System, the Economic Development Partnership of North Carolina (EDPNC), the Polymers Center of Excellence (PCE), The Manufacturing Solutions Center (MSC), and the Department of Industrial and Systems Engineering at North Carolina A&T State University. Together, partners provide comprehensive quality management training programs, Lean manufacturing training, market intelligence and a variety of other services that assist companies in meeting customer and regulatory requirements, minimizing risks, strengthening market position, improving organizational efficiency, and reducing costs.

Via the planning grant, the program increased awareness of the defense industry, gathered valuable new data on defense business supply chains and economic impact, and enhanced the competitive position of suppliers to the Department of Defense. Ten small to medium-sized businesses identified as receiving significant revenue from DoD contracts comprised a Strategic Growth Pilot Project designed to receive training and technical assistance based on comprehensive assessment findings. Services offered focused on developing and implementing strategies to identify new customers and product lines, cost-saving measures and other operational improvements. The project team hired Strategic Development Group (SDG) through a competitive process to conduct an economic analysis study including the development of a supply chain map, SWOT/Gap/Competitive analyses, and a written action plan to assist defense contractors.

Upon receipt of a Phase II implementation grant, NCDIDI launched the written plan for gathering and presenting data on the defense industry and continuing to build relationships and awareness of diversification efforts. An expansion of the Strategic Growth Pilot Project continued to support the initial group of ten companies while accepting an additional 20 companies into the program. Cybersecurity workshops, trainings, and follow-up services, provided through a partnership with NC State's Office of Information Technology (OIT), served as a catalyst for addressing cyber requirements. Additional strategies at the forefront of the work included: technology roadmaps for cybersecurity and additive manufacturing, expanded communications efforts using multimedia outreach products, the production of a Social Network Analysis Map, and dissemination of data and findings from the Phase I Planning Grant.

The following sections outline program outcomes and feature outstanding case study descriptions from companies engaged in Phase I (Planning) and Phase II (Implementation) of this program. Company profiles for Phase I companies have been expanded to reflect expanded services available in Phase II.

Resiliency Impacts

[Increasing Awareness of the Defense Industrial Base](#)

NCDIDI spread awareness of the defense industrial base among service providers and various defense contractors through its communications plan, advisory board, supply chain mapping study and economic impact analysis findings. Through a concerted communications effort, North Carolina built a presence at defense-related events across the state and used a website and social media to stay in contact with stakeholders, including businesses and local service providers. New partnerships and ecosystems were



built among defense-related organizations, businesses, and local service providers that will support the defense industry for years to come.

Commercial Diversification of Defense Companies to Sustain the Industrial Base

K2 Solutions specializes in canine security screening services with a focus on explosives detection in support of critical cargo, high profile events and facilities, and overseas facilities in areas of high risk. A family business from Southern Pines that had once experienced 100% annual growth in its first eight years, growing to a \$42 million company, K2 experienced revenue losses of nearly 75% due to the withdrawal from Afghanistan, putting it on the edge of bankruptcy. K2 Solutions applied to the Strategic Growth Pilot Project to diversify their product offerings.

Working with K2 Solutions, North Carolina's Small Business and Technology Development Center (SBTDC) completed a canine services business diversification/opportunities class project with a team of graduating MBA students from Fayetteville State University. The major alternative revenue source the students identified involved likely Department of Homeland Security directives for privatizing canine screening, as the TSA was not able to acquire the number of dogs or dog handlers necessary to ensure quality services. Thus, while K2 Solutions would be working with private clients such as airlines, shippers, and freight forwarders, their operations now would require them to follow Homeland Security requirements. Via assessments and services, NCDIDI recognized that K2 Solutions was one of two companies best positioned across the country to capture this market space.

K2 Solutions more than doubled its workforce (now around 150 employees). The company provides services for football and basketball games and Hoover Dam. K2 provided services for the 2018 Super Bowl. They are now a certified TSA vendor and provide dogs to a significant number of airports. The company has been awarded the canine security contract for 13 National Football League teams for two years to include all special events (Super Bowl, Pro Bowl, Hall of Fame Bowl, etc.).

Located in Asheville, North Carolina, Mills Manufacturing produces highly engineered, technical sewn products including approximately 60 percent of all parachutes used by US armed forces. Every F16 fighter who ejects during flight floats to earth below a Mills parachute. Therefore, the loss of this business would have a significant impact on the DoD and the warfighter. In search of diversification opportunities, Mills Manufacturing received vital services to reduce reliance on military spending.

Phase I of NCDIDI helped the company identify opportunities based on their technical and engineered sewing capabilities, narrowing potential new opportunities to a few markets and companies that were most promising. Mills completed a Technology Driven Market Intelligence (TDMI) project with RTI International while IES led ISO update and LEAN training opportunity. A transition was also made from the old ISO 9001 standard to the current ISO 9001:2015 QMS standard which allowed the company to satisfy demands for new military contracts and improve marketability for new products. Mills underwent a cybersecurity penetration test from a third-party vendor and hired Epsilon Technology, a DoD grant recipient, to verify cybersecurity compliance with NIST and DFARS requirements.



However, as military spending ramped up, the timing wasn't right for diversification activities and the company found itself struggling to meet increased demand. Where there were once five suppliers for the types of products Mills manufactures, sequestration and other market pressures reduced that number to two – and these two parachute suppliers now must accommodate the needs of the Department of Defense. Thus, Lean training from IES has been particularly effective in ensuring that Mills can efficiently and profitably respond to new opportunities and increased demand, especially because Mills lost many lean-trained employees during their years of declining sales.

Survival Innovations in Mills River provides design and development services and critical safety item production for military customers in the aviation life support industry including ejection seat components, head and neck restraints, flotation collars, and parachute system components. In the Phase I project, the company underwent a TDMI project conducted by RTI International and an ISO gap analysis and a Lean training project led by IES. Currently they are undergoing an AS9100 project, delivered by IES, to strengthen credentials necessary to work in the aerospace sector of the DoD and prime contractors. Survival Innovations will have increased opportunities with Lockheed, Boeing and other prime defense contractors once the company is certified in February - March 2020. Recently, Survival Innovations was selected to be profiled in a DoD success story.

Growler is a designer and manufacturer of special purpose vehicles for the U.S. military. Over the years, Growler acquired additional facilities and currently owns four sites in Star, NC. Growler's business comprises 95 percent government/military and 5 percent commercial sector; the project sought to expand the commercial side of the business to 30 percent of total sales by finding alternate uses and new customers for some of the trailers and vehicles manufactured. A partial list of products includes munitions trailers, maintenance trailers, munitions lifting assemblies, ground support equipment for Munitions build-up operations, the M1161, used by the United States Marine Corps (USMC) Special Operations Command (USSOCOM) and fielded as a light attack vehicle to support expeditionary forces; the M1161 Prime Mover used by the United States Marine Corps (USMC) Special Operations Command (USSOCOM); the C-130 Propeller Dolly Trailer is used to secure and transport C-130 (E/B Aircraft) propellers and position the propeller for maintenance and is air transport; and the Tactical Trailer Subsystem, developed to support the Cerberus Security Sensor Systems.

Lethality Impacts

[Innovation Through the Development of New Intellectual Property or New Technologies](#)

Babington Technology in Rocky Mount produces military field equipment including a world class disaster relief mobile kitchen trailer (DRMKT) that carries an airtronic/flexfire burner, a high-pressure burner that uses a unique liquid fuel combustion technology for atomizing liquids that modulates heat output better than competitors' burners. The product is of great benefit to DoD because it works off-grid, it tolerates different and dirty fuels, and can use biofuels. The military has been working to get high-pressure burners to work in a field environment, which is difficult for several reasons including fuel contamination by dirt, sand, and water.



DoD has indicated that they view this burner as a critical component to military feeding solutions for several decades. But Babington needs to be able to survive military spending downturns. The project is helping them explore and test residential and commercial options as the heating industry is trying to adopt liquid biofuels blends. With assistance from the National Oilheat Research Alliance, Babington is undertaking trials to introduce burners and has identified an investor. Commercial success will help DoD because it will ensure a reliable supply chain during downturns and will reduce unit costs through increased production volumes. And given the unique characteristics and technologies inherent in the DRMKT, it has multiple additional military applications including humanitarian applications for DoD assisting with relief efforts and addressing its humanitarian mission.

In the Phase I project, Babington sought diversification and process improvements through NCDIDI via a TDMI project with RTI International and Lean manufacturing process improvements with IES. While this effort has led to new commercial opportunities with companies such as Chipotle and Trimark, these partnerships have not been satisfactory in terms of profit. However, there are other opportunities to identify new markets and the company has undertaken field tests in residences nationwide for home heating applications and sought new investors through the TDMI.

Carolina Unmanned Vehicles (CUV) manufactures and markets unique proprietary, high-quality unmanned systems and related components in selected niche markets. CUV's core competencies are innovative design, exceptional engineering capabilities, a thorough understanding of the military and law enforcement environments, and the ability to build strong focused teams to solve problems. CUV's tethered blimps, along with their required ground equipment and payloads, provide a versatile long endurance platform for a variety of military, Homeland Security, law enforcement and other missions. Their systems are more mobile than traditional aerostat systems and operate in much higher winds, improving mobility, mission utility and capability in adverse weather. CUV systems can detect and identify people up to five miles, vehicles up to 10 miles and out to 25-30 miles offshore. Their systems can stay aloft for as long as seven days without needing any attention, providing a very persistent, consistent, and low maintenance system. To advance CUV's innovation in their product lines and to assist incorporating new technologies, the project enabled CUV to engage a Core Value assessment and strategic analysis and is projected it will undergo a TDMI project with RTI International. The company is also a candidate for a SBIR/STTR project, all geared toward development and deployment of new technologies and intellectual property.

Improving 'Force Overmatch'

Amidon Inc. is a provider of several products and services including training facilities and ranges, construction, historic preservation, professional services, and ballistic concrete. The company has been forced to restructure because of sharp downturns in defense spending in recent years. During Phase I, NCDIDI enabled Amidon to evaluate the company objectively, looking at the firm's competitiveness and deficiencies and conducted a comprehensive review of competing firms in their markets. Amidon has reinvested in research and development, and the company now holds three patents for Amidon Ballistic Concrete (ABC). The product uses a unique forming technology for concrete curing that provides superior ballistic performance to valuable hard targets (e.g., seismic applications, protective solar



transformers, etc.) compared to established ballistic concrete products. The ABC catches bullets (no ricochet), cures in a fraction of the time of standard concrete and is 50% lighter than the competition. Amidon is exploring options to continuously update their patents — for example by patenting a method of integrating carbon fiber into their ballistic concrete. Because of the technical superiority of ABC, survival of Amidon has implications for DoD’s ability to protect critical infrastructure. ABC has proven to be the only ballistic concrete capable of replicating successful installations by being tested and used in the field with zero failures, with over 50,000 ABC units produced. It also has been used in lane divider walls as well as for building retrofits to provide ballistic protection without the need for complete reconstruction.

AEGIS is a privately held, women-owned small business, located in Murphy, North Carolina. The company is ISO 9001:2015 certified and International Traffic in Arms Regulations (ITAR) registered. Since 1995, the company has manufactured power conversion products for standard and special applications which meet military, industrial, and heavy-duty commercial power system requirements. AEGIS currently relies on military orders for almost all its business. The company is known for manufacturing rugged power supply units which can stand up to the harsh environments experienced with military applications and recently (Nov 2018) won the “Gold Innovators Award” from Military & Aerospace Electronics for its CTA803 power supply unit. Defense and military single phase, three phase, and DC-DC power supplies are a core competence of the Aegis Power Systems team. The company’s innovative designs have been used in a variety of defense applications including communications systems, various weapons to include the Patriot missile system, mobile field operations, aircraft and shipboard control systems, rack mount technology, and perimeter security operations. Aegis is currently completing a TDMI project with RTI International to research options for new, non-defense markets which would match AEGIS assets and expertise base. Aegis will also undergo a Technology Scouting project. Additional program services that NCDIDI will provide to Aegis will include a cybersecurity compliance assessment, a Lean Manufacturing evaluation (VSM or other), and a gap analysis. Aegis is also a strong candidate for a SBIR/STTR project with Eva Garland consulting. These services will likely lead to Aegis broadening its commercial base, identifying new areas of demand that show potential for innovation and development. These innovations may prove useful to DoD in its mission and will likely lead to increased economic resiliency for Aegis.

Saab Barracuda LLC engages in the design, testing, and manufacture of signature management and camouflage products for the U.S. armed forces and government agencies in the United States. The company’s products include an ultra-lightweight camouflage net system (ULCANS) and Signature Concealment Personnel Suit. It also offers Gun-Mounted Vehicle, a system with multispectral characteristics that allow small vehicles to blend with the surrounding background environment; the Two Man Collapsible Tent; and the Solar Shading and Concealment System. Saab Barracuda LLC provides aviation units with an effective and convenient solution to improving maintenance and the unit’s readiness status. Each cover utilizes Saab’s unique ULCANS material to reduce solar loading in key areas of the platform such as the cockpit and avionics bay. Intense heat due to solar loading and ultraviolet light damages critical electronics, reduces equipment life expectancy, and affects operational readiness.



Saab Barracuda Aviation Covers mitigate the effects of the sun and physical environment by providing a tailored system that combines technology with simplicity.

SAAB Barracuda is undergoing a Technology Driven Market Intelligence (TDMI) project with RTI International located in the Research Triangle Park in Durham. The TDMI project will consider the technical and market viability of SAAB Barracuda's mobile camouflage systems and will identify alternative market opportunities and barriers. As SAAB Barracuda faces a significant decline in DoD contracts at the end of 2020, it is vital to locate other market opportunities, to include international markets, to ensure SAAB Barracuda is available when called upon to protect the lethal equipment and weapon system platforms within the DoD.

Readiness Impacts

Training and People Support

Numerous companies receiving IR services have significant impacts on training and people support, and those are explained elsewhere in this Profile. Another example, Mills Manufacturing, is in the process of hiring technical sewers and training them to meet the increased demand from the DoD. The Lean training that has been afforded via NCDIDI has equipped new employees with the skills to meet DoD's needs efficiently.

As part of their Phase I project, K2 underwent ISO 9001:2015 training/certification, ISO 18788/PSC1 training and received certification as a Service-Disabled Veteran Owned Small Business (SDVOSB). In addition, pending certification of approval to receive GI Bill funding for canine training courses, IES has completed a comprehensive update of the K2 canine training curriculum. These opportunities helped K2 acquire the certifications required to conduct trainings for the Department of Defense.

Cybersecurity Preparedness

NCDIDI has established partnerships with several NIST MEP Centers conducting leading work in cybersecurity order to leverage resources, develop best practices and plan for long-term cybersecurity services. Partners have positioned NCDIDI to identify cybersecurity difficulties commonly faced when serving small and medium-sized businesses, such as procuring quality third party assessors; however, this has not proved to be a problem in NC due to NCDIDI's close relationship with the state's higher education partners. The program has conducted cybersecurity workshops and engaged many companies through regional awareness campaigns.

Leveraging partners' resources, a Cybersecurity Toolkit has been developed for manufacturers and service providers so companies can learn about the basics of cybersecurity preparedness, DFARS requirements, and NIST standards. OEMs in the state have indicated that cybersecurity compliance will be a priority for their suppliers, and NCDIDI is connecting defense manufacturers and professional service providers with resources to meet these requirements. NCDIDI is working to build the capabilities of the local technical workforce in cybersecurity and spread awareness among companies about their vulnerabilities. A partnership with the NC State Office of Information Technology (NCOIT) positions NCDIDI to conduct NIST 800-171/DFARS cybersecurity compliance assessments. NCOIT staff provide



subject matter expertise, assessment services and support in the area of cybersecurity, specifically as it aligns to the NIST 800-171 and DFARS standards. This initiative supports the objectives of the IR implementation grant to determine the cybersecurity needs of participating defense contractors and provide the appropriate services to ensure that each is compliant and secure. In addition, to leverage MEP Technology Acceleration Center grants, NCDIDI is partnering with stakeholders to share information about Manufacturing 4.0.

Core Technology Molding, J2 Associates, and IOMAX are receiving these cybersecurity services. Core Technology Molding competes in the medical device, automotive, aerospace (DoD and commercial), Biological Pharmaceutical, and consumer goods markets and has customers in over 150 countries. J2 Associates is a Service-Disabled Veteran-Owned Small Business providing comprehensive program, project management, and information technology services to clients including US Army and Air Force aviation units/commands. IOMAX is a Service-Disabled Veteran Owned Small Business, providing design and support for sophisticated wireless technology and engineering techniques for the US military, intelligence agencies, and the Drug Enforcement Administration (DEA). IOMAX has successfully equipped, trained, and supported its Archangel aircraft to customers for light attack/armed reconnaissance missions.

Lessons Learned

Greatest Challenge

The project team experienced challenges in the cybersecurity work related to identifying and qualifying third party assessors and vendors to deliver services. While they had the benefit of in-house expertise through NCOIT, they have expressed interest in participating in a more formal learning community among OEA grantees working on cybersecurity awards. This effort could accelerate progress on establishing best practices for engaging companies and setting up third-party assessment programs.

Most Important Lessons Learned

There are at least three other key lessons learned in the project: 1) the partnerships established have enabled NCDIDI to deliver a wide range of valued services to companies across the entire state; 2) state support and the NCDIDI infrastructure has helped the project team succeed in all aspects of its work, from the research to producing roadmaps to delivering services; and 3) the proactive communications and outreach strategy has raised visibility and support for the defense sector and will enable the effort to continue beyond the grant period.

Sustainability

NCDIDI has worked with colleges and universities located across the state to develop a sustainable and flexible network of resources and experts for NC businesses to use. These experts provide valuable insights and consultation both to NCDIDI and to partner companies. Cybersecurity experts from the state university system have provided context and training for program administrators and support for development and implementation of a Cybersecurity Toolkit. NCDIDI's relationship with North Carolina State University Office of Information Technology (NCSU OIT) has afforded opportunities to evaluate companies, ensuring cybersecurity compliance.



Additionally, experts have greatly expanded the team's understanding and knowledge of additive manufacturing processes. A partnership with Protolabs, the largest additive manufacturing facility in the state, has given the team access to a wealth of industry knowledge and support and resources for providing services to other companies.

The proactive communications and outreach strategy taken by NCDIDI has been very beneficial, raising awareness of the program and helping to construct regional linkages via conferences. Regional conferences and convenings have given the team the opportunity to raise awareness of the crucial need for cybersecurity compliance and to clarify what that compliance looks like to stakeholders. The team has taken a regional approach with its recruiting efforts, focusing on areas in the state with fewer contractors and addressing regional gaps with tailored programming. The Defense Contractor Academy (DCA) is a unique and huge boon for the team's outreach strategy. DCA gives a large platform to NCDIDI to reach defense contractors and is crucial to the program's success. Science and technology conferences held via North Carolina State University provide a large platform as well.

Project administrators have established contact with a cohort of leading MEPs, allowing them to share knowledge and best practices. They are looking to their peers for examples of how to establish a sustainable framework and have found their own method of partnership with local colleges and universities to be a leading example to others.