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Legal Affairs

North Tennessee Workforce Board (LWIA 8)

2014 Labor and Education Alignment Program (LEAP)

Manufacturing and Mechatronics for Soldiers and Students (M^2S^2)

IN PARTNERSHIP WITH

1. Higher Education Institutions:	LEAD-Nashville State Community College TN College of Applied Technology @ Dickson Austin Peay State University
2. LEA/School District Name:	Clarksville-Montgomery County School System Dickson County School System
3. Employer Partners:	Bridgestone Metalpha U.S.A., Inc. Hankook Tire Tennessee Dal-Tile Fort Campbell 101st Airborne A.O. Smith
4. Regional Partners:	Cheatham County Government Dickson County Government Montgomery County Government Clarksville-Montgomery County Ec. Development Council North Tennessee Workforce Board Workforce Essentials, Inc

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Funding requested: $999,037

President, Nashville State Community College

Project Director

ORIGINAL

M^2S^2 ABSTRACT

Manufacturing and Mechatronics for Soldiers and Students (M^2S^2) is an innovative approach to solving a regional workforce shortage of skilled applicants in the manufacturing sector. M^2S^2 meets LEAP requirements by serving the three middle Tennessee counties of Cheatham, Dickson and Montgomery. What sets this project apart is the unique and honorable component of extending services to transitioning soldiers stationed at Fort Campbell, Kentucky. This prosperous region has been blessed with economic growth with over 3,300 jobs created in the manufacturing sector during the last three years. The recent announcements by Hankook Tire and Dal-Tile further justify the need to increase training opportunities to supply the workforce demands.

To truly address the deficiency, M^2S^2 proposes to expose students in high school to career training in mechatronics and skilled trades through partnerships with the Clarksville-Montgomery County and Dickson County School Systems. Developing a Career Pathway is an integral component to success. M^2S^2 uniquely aligns in partnership K-12, TCAT Dickson, Nashville State Community College and Austin Peay State University. The grant will fund equipment to start new classes through NSCC at Kenwood High School in Clarksville and TCAT training at Creekwood High School and a new advanced manufacturing campus (former solar campus) in Dickson. Through M^2S^2, the steering committee will explore opportunities to create a degree program in mechatronics engineering at APSU. Furthering the pipeline of available workers, NSCC will provide over $300,000 in equipment to establish a Mechatronics training program on-site at the Fort Campbell Education Center for transitioning soldiers to obtain Siemens Level 1 certification, a portable credential for soldiers regardless of location across the U.S.

The M^2S^2 project, a multi pronged approach to address the stated skill shortage promotes education, work experience and on-the-job training in the manufacturing sector which ultimately creates a competitive edge for Tennessee manufacturers in today's global market place and aligns with the Governor's Drive to 55 campaign to advance education and credentials of Tennesseans.

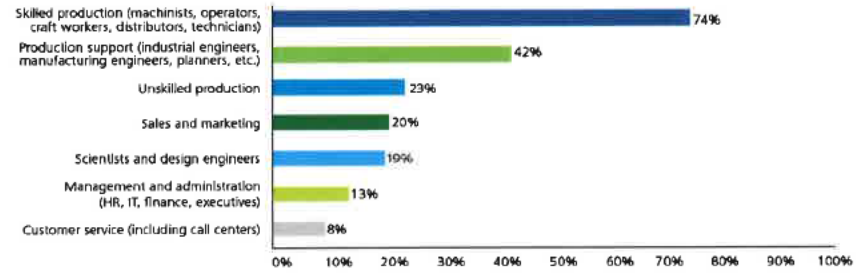
SECTION 1: Program Needs

The Advanced Manufacturing industry is identified as a key cluster in regional economic development and recruitment activities in middle Tennessee. The Manufacturing and Mechatronics for Soldiers and Students (M^2S^2) proposal addresses the needs of area employers who have identified skill gaps in the local labor force. These positions are going unfilled because there is a the lack of skilled applicants entering the workforce with the qualifications for these technical positions. The problem is only going to get worse due to a high percentage of skilled workers that are 55 years of age and older nearing retirement. This has been reported as a national trend.

- Skilled people ready for the workforce are not available.
- Traditional methods of recruiting and retention are not working.
- This is a national and global problem.

*"Defying the high national unemployment rate, as many as **600,000** skilled manufacturing positions in the United States are unfilled due to the nagging shortage of qualified workers, a new survey concludes." Josh Cable (Shortage of Skilled Workers Taking Its Toll on U.S. Manufacturers, Industry Week, Oct. 17, 2011)*

Figure 3: For which employee segments have workforce shortages or skill deficiencies had a significant negative impact on your company's ability to expand operations or improve productivity?



Note: This is a multiple selection question, percentages may not add to 100%. Base used is 1123.

Source: Copyright 2011
Deloitte Development LLC and
The Manufacturing Institute

The Manufacturing Institute's Survey, shown in the chart above indicates that 74% of the respondents feel that workforce shortages or deficiencies in skilled production roles have a significant impact on the company's ability to expand operations or improve productivity.

Local Data Linkages and M^2S^2 Alignment:

Over the past year alone the Nashville MSA has experienced an increase of 2,200 jobs in advanced manufacturing of durable goods with wages averaging $17.81 per hour. With the increase of major manufacturers arriving such as Hankook Tire and Dal Tile the need for a workforce trained in mechatronics (mechanics, technology, electronics) will continue to increase and stress the training and education system to produce qualified, in-demand workers. According to the UT Center for Industrialized Services, the manufacturing employment levels for durable goods in TN will continue to increase between 2010-2022 by close to 20,000 skilled individuals. This along with an aging workforce will continue to stress the availability of manufacturers to find the needed workforce to compete in today's global economy. The M^2S^2 program is designed to increase the supply of skilled applicants in mechatronics and industrial maintenance fields in middle Tennessee. Fabricated metal production, machinery, electrical equipment, and transportation equipment will produce the largest market sector of the manufacturers in middle TN. These four areas will require the most automation and robotics resources throughout the manufacturing process. According to Bureau of Labor Statistics manufacturing in the M^2S^2 area makes up between 20-29% of the total employment within the region. Couple this with a projected increase in advanced manufacturing jobs; it is crucial that skilled workers are available to fill the region's workforce pipeline. Even more critical is that this projected growth of manufacturing as compared to a percentage of GDP is estimated to increase 42.8% in durable goods alone within TN. Such an increase further emphasizes the importance of a mechatronics skilled workforce. The proposed regional cluster

Company	New Jobs
Shiloh Industries	153
Hankook Tire	1800
Agero	500
Akebono	124
Florium	33
Bridgestone	45
Jostens	300
Zinc Oxide	50
Dal-Tile	320
Propper Inter.	60
Total	3385

of Cheatham, Dickson, Montgomery and Christian County, Kentucky which includes Fort Campbell has been a magnate for industrial growth and development over the last few years as depicted in the chart above. The M^2S^2 proposal is aligned to address the industrial growth by creating a pipeline of highly skilled applicants in mechatronics and industrial maintenance by targeting high school students, soldiers, incumbent workers, unemployed and underemployed individuals.

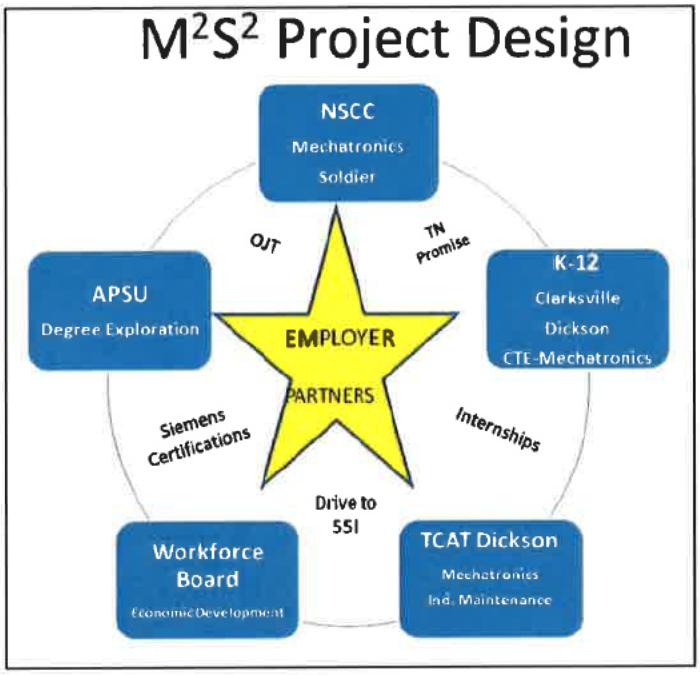
SECTION 2: Program Plan: Project Overview

M^2S^2 is seeking $1,000,000 in LEAP funding to establish career pathways in advanced manufacturing to meet the high demand for a skilled workforce in middle Tennessee. The training programs located in area high schools, Fort Campbell and a new advanced manufacturing center in Dickson will provide state-of-the-art training in Mechatronics through an interdisciplinary format by combining mechanical, electronic, electrical, and computer science skills into a comprehensive Mechatronics training program.

The M^2S^2 project is to extend educational pathways and to standardize coursework for students and soldiers seeking entry in Advanced Manufacturing and Mechatronics occupations. To meet the anticipated demand for advanced Mechatronics skilled technicians, M^2S^2 will provide a training pathway for the existing workforce, displaced workers, veterans, and future employees. The shortage in industrial maintenance technician positions as well as robotic technicians, process control technicians and electronic technicians shows the necessity for training in the Advanced Mechatronics field. This increased workforce capacity will help alleviate the existing and critical emerging shortage of skilled workers occurring from industry use of complex equipment and the concurrent aging/retirement of experienced technicians. This training initiative is a strong incentive to start-up businesses and industry looking to relocate to Tennessee. It will allow companies greater flexibility and aid in making location-based decisions on a fully trained, available workforce. This standardized program will allow for an assertive regional outreach effort to attract and retain students and increase opportunities for unskilled and marginally skilled individuals to secure high paying, high skilled Advanced Mechatronics jobs

throughout middle Tennessee and the United States.

M^2S^2 is proposing to purchase two sets of mechatronics equipment for this project (Appendix B Budget Detail). One set of equipment would be placed in a new Advanced Manufacturing Center in Dickson County offering training through TCAT-Dickson. High school students will be afforded the opportunity to take classes in their junior and senior year at the Advanced Manufacturing Center located adjacent to the Tennessee Career Center in Dickson. TCAT-Dickson will also provide training to Creekwood and Dickson County students in their freshman and sophomore year in principles of advanced manufacturing, welding and other identified skilled trades in order to prepare future workers at an early age.



A set of mechatronics trainers will be placed in Kenwood High School in Clarksville. Through this partnership, students can begin post-secondary work while in high school to earn early college credit in a high demand field with tremendous growth potential. This partnership would create a pipeline for students to move into highly skilled careers. The Mechatronics Technical Certificate program will be offered to junior and senior students as dual enrollment. Upon high school graduation and successful completion of the program, the students would have a 16 credit hour Technical Certificate and would be eligible to sit for the Siemens Level 1 Certification Exam as Certified Siemens Mechanics System Assistant. The graduating students would be ready for the Level 2 Mechatronics by enrolling in NSCC's A.A.S. in Mechatronics degree program. The dual enrollment option at Kenwood High School would be extended to other high schools in Montgomery County as well.

NSCC plans to offer accelerated courses for transitioning military servicemen providing them the skills needed for immediate employment upon exiting the service. NSCC's will provide over $300,000 worth of mechatronics equipment which they already own to the Ft. Campbell Education Center. With 450-600 transitioning military each month, it is vital that they have skills needed for employment not only in middle Tennessee but also throughout the U.S. According to a recent study over 50% of the transitioning soldiers indicated they would stay in the area if they were qualified for desirable job opportunities. Under this scenario, soldiers and students would obtain a Mechatronics Technical Certificate (16 credit hours) and include the option of Siemens Level 1 Certification.

The Mechatronics program will be made available to long-term unemployed and area businesses for incumbent workers that require upskill training. Kenwood High School and Ft. Campbell Education Center will be available to hold evening classes to accommodate this sector. The paperwork has been submitted for WIA approval for the Level 1 Mechatronics program. Upon approval, the long-term unemployed would be eligible for WIA funding for the program.

Program Plan: M^2S^2 LEAP Grant Timeline

Timeframe	Action	Responsible Party
December, 2014	Grant Announcements	THEC
January, 2015	Execute MOU with Fort Campbell	NSCC
January, 2015	Procure Mechatronics Equipment	NSCC-Fiscal Agent
January, 2015	Execute MOU between NSCC and TCAT Dickson	NSCC, TCAT
February, 2015	Issue Purchase Orders for Equipment	NSCC
February, 2015	Siemens Instructor Training @ Motlow CC	NSCC Instructors
February-March, 2015	Installation of current equipment @ Fort Campbell	NSCC-Fort Campbell Education Center
March, 2015	First Class Begins @ Fort Campbell	NSCC
May, 2015	Begin exploration with APSU on Advanced Manufacturing degree	WE, Ec. Dev,
June, 2015	Siemens Instructor Training @ Motlow CC (2 weeks)	NSCC

June-July, 2015	Receive and Install purchased equipment at Kenwood High School, Creekwood High School and TCAT Dickson Career and Advanced Manufacturing Training Center	NSCC, TCAT, CMCSS, DCSS
June, 2015	Fort Campbell Classes End – Employer Outreach OJT Projected new class to start every 12 weeks. Repeat process	NSCC, Employer Partners
August, 2015	Classes begin at Kenwood & Creekwood High Schools	NSCC, TCAT, CMCSS, DCSS
May, 2016	Summer work experience for graduating Seniors with partner employers (Mechatronics Technical Certificate-16 hours)	NSCC, TCAT, WE, CMCSS, DCSS
May, 2016	Adults and Incumbents complete from NSCC and TCAT. Job Placement-On-the-job Training starts. Repeat process upon class completion.	NSCC, TCAT, WE, Ec. Dev., Chambers

Measurable M^2S^2 Objectives:

In order to assure M^2S^2 program success, a steering committee will establish, monitor and report monthly outcomes toward the achievement of M^2S^2 goals and objectives. The committee will review and finalize the measurements of which the following objectives will be measured:

Goal	Measurement	Measurable Outcome
Increase the number of high school students that pursue CTE courses in Advanced Manufacturing	Number of Enrollments in CTE skilled trade courses provided through the M^2S^2 grant	CMCSS Enrollment Goal 25 DCSS Enrollment Goal 100
Prepare soldiers to transition into civilian careers in advanced manufacturing	Number of Soldiers that enroll in NSCC Mechatronics Level 1	NSCC Soldier Enrollment Goal 156
Align and promote Drive to 55 Initiative	Number of people that complete certificate training at NSCC/TCAT	NSCC Completers 140 TCAT Completers 60
Close skill gap by completing training and obtaining certification therefore increasing the skilled labor supply	Number of people obtaining Siemens Certifications	Number of individuals obtaining Siemens Certification 140

In addition to certificate based training, provide work experience through summer internships and on-the-job training	Number of Summer Internships and On-the-job training opportunities offered to partner employers	Summer Internship Goal 25 On-the-job training Goal 50
Provide employers with skilled workers to meet partner employers labor force shortage	Percentage of program completers that enter full time employment	Employment Goal 85%
Provide training and certification that leads to self sufficient wages	Entry level Wage	Wage Goal $15 to $25 per hour

Program Plan-Governance and Accountability:

Nashville State Community College under the direction of educational institution project leader, Marc Starrett will provide the accountability and drive the direction of the M^2S^2 project along side of Project Director, Marla Rye of the North Tennessee Workforce Board and Workforce Essentials. Fiscal accountability for the project will be the responsibility of NSCC. Their fiscal department will account and disburse all funding, per the attached budget, using the internal processes guided by the TBR. A steering committee comprised of one member from each of the M^2S^2 partners (defined on Appendix A) will provide oversight and accountability of program's goals and performance objectives. An assessment of the metrics and goals will be conducted quarterly and dispersed to the steering committee. Quarterly steering meetings will be held to ensure the project remains on course and that processes can be monitored for continuous improvement which meets or exceed expectations of business and industry. The Steering Committee will follow Roberts Rules of Order and decisions affecting grant operations will be approved through majority vote by the members.

Role of Equipment: The proposed equipment, which will allow the establishment of new training program in Dickson and Clarksville, is a complete system of mechanics, pneumatics, PLC technology, handling technology, electrical engineering, electronics, robotics and hydraulics. Each station facilitates challenging exercises on automation and mechatronics. The system is particularly suited to the areas of

handling, PLC (includes 10 Siemens mountable PLCs) and robot technology due to its close industrial orientation.

- The system enables 15 – 30 students to be trained in mechatronics.
- The Distributing and Conveyor project kits provide an introduction to the project work.
- Actuation is performed by using a programmable logic controller.
- The system layout can be changed using the project kits. More than 30 different combinations can be created using the system thus simulating industry needs.
- Production planning, reduction of set-up times, FMEA and TPM – the system offers solutions for the hot topics of production optimization.

M^2S^2 is proposing stand-alone Siemens Step 7 PLC Training System with Mechatronics Connections and Real-time Simulation which includes devices and instructions encountered in industry: the Real-Time Simulation provides real hands-on PLC Training without the Dangers of the Industrial Environment. All components are Prewired, Preprogrammed with Demo Applications, and Mounted on non-conductive black textured panel in a heavy duty case. The Mechatronics trainer and supports for TCAT-Dickson will be integrated with all components of the mechatronics curriculum including: fluid power (hydraulics & pneumatics), electrical controls, basic electrical & circuits, motor controls, programmable logic controls, mechanical systems and robotics.

SECTION 3 – Strength of Partnerships

Partner	Description of Role	Capability
NSCC	The lead educational institution and fiscal agent for M^2S^2. Marc Starrett will serve as Project Director of soldier training while Meghan Oliver will coordinate K-12 dual enrollment.	NSCC is part of the TBR system. They have experience administering numerous workforce grants and will provide over $300,000 in equipment which they already have to support M^2S^2.
TCAT Dickson	Will serve as an educational partner to provide Mechatronics and industrial maintenance to DCSS, adults and incumbent workers. Laura Travis, Interim Assistant Director will serve as project coordinator for	TCAT Dickson is part of the TBR system. They are the skilled workforce trainer of choice in Dickson, TN. As a part of the grant, they will establish a Center for Advanced

	M^2S^2.	Manufacturing at the site of their former Solar Training Campus to address the workforce needs of Dal-Tile and other industries.
CMCSS and DCSS	Will serve as M^2S^2's K-12 CTE education partner. Both school systems are front runners in innovate practices. Karen Pitts, CTE Director will serve on the steering committee from CMCSS and Cindy Gilliland, likewise from Dickson.	Both school systems will open up their doors for M^2S^2 and provide on-site training for high school students. They will coordinate with Perkins funding to enhance the project while leveraging Hope funding to pay for duel enrollment fees.
APSU	Will serve as the University partner. Dr. Alicia White will serve on the steering committee. APSU is an experienced provider of workforce training as evidenced by the implementation of a chemical engineering training program to meet the needs of Hemlock Semiconductor.	Leaders from APSU will be responsible for research to determine the feasibility of a bachelor's degree in Advanced Manufacturing or Mechatronics Engineering.
Workforce Essentials NTWB	Marla Rye, will serve as the Project Director for the lead entity, NTWB and W.E. As the provider of local WIA funding, WEI will make available $50,000 for on-the job training wages for partner employers which will provide funding for 50% of the trainee's wages.	WE and NTWB are leaders in Workforce Development in the State of Tennessee. For the last five years, LWIA 8 has been one of the top earners of Incentive funds. WE is an innovative company that provides workforce development services in 37 middle and west Tennessee counties. They also provide business services to over 400 employers in Tennessee.
Employer Partners	Six employers (Cover sheet for list) have committed their support for the M^2S^2 Partnership. The employers ranging from the Bridgestone Metalpha to recently announced Dal-Tile have indicated a need for advanced manufacturing or Mechatronics training. The companies will participate by providing summer internships and providing on-the-job training. The employers who hire grant trainees will take advantage of WIA eligible OJT reimbursement at a rate of half the entry level wage. Employers have committed over $98,000 in wage reimbursement. Each partner employer will designate an employee to serve on the steering committee.	All of the indentified employers are committed to workforce training and have existing partnerships with grant partners. AO Smith and Dal-Tile have created employee apprenticeship programs to promote education and employee career advancement. Fort Campbell worked in partnership with Workforce Essentials to establish a Career Advancement Center on post several years ago. Hankook Tire is currently working with the Clarksville Career Center in hiring and recruitment efforts.

Section 4--Budget Plan (See Appendix B)

M^2S^2 is requesting $999,037, split between NSCC and TCAT to establish FOUR new advanced manufacturing training programs at Kenwood High School, Creekwood High School, Fort Campbell and

the Advanced Manufacturing Campus in Dickson. A line item and detailed budget can be found in Appendix B.

SECTION 5 – Sustainability

Once approved, the M^2S^2 project sustainability is infinite. With the establishment of the curriculum and equipment, the only costs incurred going forward would be equipment maintenance, utilities and instructor salary. This will easily be covered through school budgets, tuition and fees and most, if not all equipment maintenance will be covered by student upkeep or equipment donations pledged by business and industry. Dal Tile has already stated they would donate additional equipment to the Advanced Manufacturing campus to mirror its industrial facility. The Siemens trainers have an extremely long shelf life and are built to industrial standards. With the industrial demand for mechatronics trained personnel continuing to grow through 2020, high school students, existing business along with service personnel will provide a steady stream of trainees providing tuition, fees and dual enrollments which will provide sustainability. Tuition and fees will cover instructor costs, and educational institutions will cover utilities in normal budgetary processes. The Fort Campbell Education Center will provide through an in-kind donation space on the military base. The local school systems have identified Perkins fund to sustain the vocational training within each school system upon completion of the grant.

Transitioning military and non-military will continue until 2020 with approximately 19,000 soldiers entering the workforce. NSCC plans to continue the Mechatronics program at Ft. Campbell Education Center as well as dual enrollment at Kenwood High School improving employment and educational outcomes for both adults and youth. In addition, specialized non-credit courses developed for industry clients will allow current employees to gain the advanced skill sets needed to meet individual company's needs. Equipment will need to be upgraded as technology advances in that field. Maintenance and new equipment purchase will be budgeted based on projections and school revenues.