East Tennessee Development District

2014 Labor and Education Alignment Program (LEAP)

Advanced Manufacturing and Workforce Center (Phase 2)

In Partnership with

Roane State Community College
Tennessee College of Applied Technology at Harriman

Oak Ridge Schools/Oak Ridge High School
Anderson County Schools/ Career and Technical Center
Morgan County Career and Technical Center
Roane County Schools

SL Tennessee, Dienamic Tooling Systems (DTS)
Capstan Tennessee, AISIN
and other employers (see attached letters)

Local Chamber of Commerce Organizations
East TN Human Resource Agency/Local Workforce Investment Area 4

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Funding: $1,000,000

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Dr. Markus Pomper, Project Director

Abstract

The Advanced Manufacturing and Workforce Center is a regional collaborative initiative comprised of a number of training opportunities to ensure the skilled workforce needs of Anderson County (including Oak Ridge & Clinton), Roane and Morgan Counties and the surrounding area are met. Phase 1 was to identify training offered through Roane State Community College (RSCC), Tennessee College of Applied Technology (TCAT) – Harriman, Oak Ridge High School, and Anderson County Career & Technical Center and others that addresses industry needs. As seen in this proposal, Phases 1 and now 2 are supported by local business/industry and economic development organizations as a strong targeted solution to meeting the current and future workforce needs in Advanced Manufacturing.

Funding for Phase 2 is being requested herein and includes supportive private industry efforts. The goal is to enhance the Mechatronics (Mech) training to prepare workers for a host of advanced manufacturing/industry maintenance and technician jobs. Phase 2 will focus on the following:

- Significantly enhance the current RSCC Mech Certificate to ensure it is flexible to meet changing industry and specific employer needs, for example, to add an injection molding class designed to meet the need of two large/growing employers (AISIN & SL) with industry donated equipment.
- Enhance training to include Siemens® Level 1 and 2 certifications (requested by industry).
- Add mechatronics elective courses to the AAS General Technology (Gen Tech) Degree. (As demand grows, we plan to expand to offer a separate Mechatronics AAS that is articulated to MTSU's 4 year Mechatronics Technology degree.)
- Develop/implement Prior Learning Assessment policies to award academic credit for skills that were acquired outside of the context of academic classes.
- Enhance the Mech training components to include more internships and job readiness components. This initiative is in progress and will be further enhanced in Phase 2. (As demand increases we will transition internships to registered apprenticeships.)
- Purchase of required training equipment and materials in order to be able to offer a curriculum that aligns with the industry certifications.
- Enhance the delivery of RSCC Mech training through flexible scheduling and targeted recruiting to accommodate dual enrollment, incumbent workers from area industry, low-wage and part-time workers, dislocated workers, as well as recent high school students pursuing a full-time program of studies. This includes offering training in a proven cohort design as well as à-la-carte course offerings more customized to incumbent workers.
- Design and implement dual enrollment opportunities beginning with Oak Ridge High School and Anderson County Career and Technical Center. Dual enrollment classes in Roane and Morgan counties will be offered in collaboration with TCAT-Harriman. This will be expanded in the future to other secondary programs in our region.
- Develop a clear pathway for TCAT students to articulate from the Industrial Maintenance to the RSCC Mech program. This will begin with the Harriman TCAT including Morgan County and Roane County High School students that attend the TCAT – Harriman. Other TCATs will be engaged in this process once initial design and implementation are complete at Harriman.
- Assess and develop bridge programs to ease transition from programs that are not fully aligned.

The project will be managed through the RSCC Division of Math and Science under the auspices of Dean Markus Pomper. A project director will be hired with grant funds. Internships, recruitment, case management, placement components, etc. will be supported by the college with internal and U.S. Department of Labor grant funding. Most importantly, business and industry will be engaged in curriculum development, project oversight, internships, donations of equipment, participation as subject-matter experts, and in job readiness skill development components.

Section 1. Program Need

Labor Market Data: Tennessee's (TN) Advanced Manufacturing Industry is growing and is a key focus of TN's Economic and Community Development division as demonstrated on their website where they indicate 'training today's and tomorrow's workforce for advanced manufacturing is a top priority'. [1] University of TN work supports this current/projected growth and concludes that "Tennessee is enjoying the strongest manufacturing employment gains in decades" and indicates future growth will drive the need for a more educated workforce.[2] The UT Center for Business and Economic Research projects a number of STEM/Advanced Manufacturing Careers that will not have adequately trained/credentialed workers in the years leading up to 2025 including the Manufacturing Production Process Development and the Maintenance, Installation & Repair Career Clusters. It also identifies gaps in the availability of training for Mechanic and Repair Technologies, Mechanical Engineering/Technology, Robotics Technology and Industrial Electronics Technology. [3] The TN Dept. of Labor and Workforce Development projects an average annual state growth rate of 1.5% for maintenance and production workers which is much higher than the overall average.[4] Most important to this proposal are the projections (in the attached letters and articles) of regional employers and economic development experts demonstrating the workforce training/skilled-worker needs based on growth in existing industry, new industry announcements and future industry development and growth on the horizon.

Linkages between grant activities and local needs: Today's manufacturing relies largely on automation for machining and assembly of parts. The interplay between electro-mechanical, pneumatic/hydraulic and electronic manufacturing systems is known as a mechatronic system. These systems rely on trained workers who understand this interplay, but are also able to troubleshoot and

[1] "Tennessee Department of Economic and Community Development" Accessed November 4, 2014. http://www.tn.gov/ecd/multimedia_center/pdf/2012AdvancedManufacturing.pdf
[2] Matthew N. Murray and Vickie C. Cunningham, Tennessee's Manufacturing Sector Before and After the Great Recession, March 2014, 18.
[3] LeAnn Luna, Matthew N. Murray, and Vickie C. Cunningham, Academic Program Supply and Occupational Demand Projections: 2012-2025, January 2014, Appendix 4, 6.
[4] "Tennessee Department of Labor and Workforce Development" Accessed October 1, 2014. https://www.jobs4tn.gov

repair individual components. This project seeks to enhance/create a training program for precisely this workforce. The program was developed based on local, regional and national industry input. It was initially funded through the U.S. Dept. of Labor National STEM grant where key national industry leaders participated with multiple community colleges in providing input into the curriculum. RSCC is currently enhancing the program by adding elective courses to meet the specific needs of employers, such as a course in Injection Molding for SL TN and AISIN. This includes the donation of a mold injection machine that will be used to train in processes that combine aspects of mechatronics systems and injection molding. At SL's and other employers' requests (see attached letters), internship components are being added to better prepare graduates for the workplace. With grant funding, the components listed below will be added that specifically meet employer requests/needs. (A) *Mech Training Systems (3) and Robots (3)*: The training systems simulate a mechatronics system and include a variety of sensors, electro-pneumatic actuators, stepper-motors, and a robot. Each system consists of 7 modules, which are controlled with Siemens® PLCs and linked with Profibus® technology. Area employers stated specifically that training in Siemens® technology (Step 7® programming language and Profibus® technology) is sorely lacking in this this area. Modern production techniques rely heavily on this technology for interfacing of machining centers in production lines and for product traceability. (B) *A PLC Training Station, Process Control Training Station, CNC Mill and Motor Control Station*: Each of these training stations is intended for specific in-depth training on individual components of a mechatronic system. For example, the motor control training station allows for study and troubleshooting of three-phase motors and their controllers. However, a mechatronic system is more than the sum of its part. Industry representatives repeatedly stated that prospective employees need to have an in-depth understanding of the system as a whole, as well as the individual parts in order to succeed at troubleshooting a downed production line. The combination of the mechatronics trainers and the individual training stations allow for the study of the entire system and the study of the individual parts. (C) *Industry certifications* are an

important component to be added to the Mech training (currently includes OSHA®) with grant funding. This not only meets employer requests, but also helps position graduates to be more marketable upon graduation and well into the future. The development of faculty to be certified to teach the most requested certification, Siemens®, is included in this proposal.

Project Management: The project manager will be a faculty-credentialed leader. They will ensure the needs of employers/industry, grant outcomes/goals, grant requirements, timeline, high-quality training, cost effective purchases, etc. are met. RSCC will fund a success coach to ensure the internship process is implemented and managed effectively with employers/industry and that students are well-prepared with the job readiness skills for internships and post-graduation employment.

Alignment with state Drive to 55 goals: The project is aligned with and enhances the current support of the Drive to 55 initiative with the following components:

Enhancing the involvement of employers/industry in the RSCC and TCAT's advanced manufacturing related training that will result in better industry aligned curricula and certifications. This will drive employment/job need which will drive the number of interested students. The proposed project will allow RSCC to add a workforce training in industrial programs to its curricular offerings. This program is designed to serve a group of the population who would otherwise not pursue a college degree. Therefore, the program will increase the proportion of the population in RSCC's service area who are seeking post-secondary education.
Increase the number of secondary education students that seek RSCC's Mech training through clear pathways from high schools and the TCATs (initially TCAT – Harriman) that offer both secondary and post-secondary training. With the key component of working first with Oak Ridge High School and then others, this proposal will be well aligned with the State of Tennessee Department of Career and Technical Education's newly revised Advanced Manufacturing and current STEM pathways. It will also provide a smooth implementation for students to graduate from Oak Ridge High School and move on to RSCC for a Mech Certificate and/or Gen Tech AAS Degree. The implementation of dual enrollment will further

strengthen and shorten this pathway for students to achieve an industry recognized credential and secure employment. These projects will be expanded to other TCATs and secondary institutions in the future.
Enhance the capacity/# of students that can be trained in RSCC's Mech Certificate program.
Create new mechatronics courses for RSCC to be offered as electives in the General Technology AAS degree, and encourage appropriate students to follow this path.

See Measurable Objectives below for specific numbers related to the above.

Section 2. Program Plan/Timeline

Month	Grant Mgmt	Training Components	Internships
14-Dec	*Dr. Pomper (Interim) Project Director (PD)	*Plans/recruiting for Spring 2015 Mech certificate training finalized.	Details for first internships finalized
15-Jan	*PD position posted for Mar 15 hiring Contract finalized	*TCAT/RSCC articulation agreement complete (Harriman 1st, others to follow) *Next Mech Cert. Cohort begins/continue	*First Internships (approx 15 weeks) from current Mech cohorts and grads.
15-Feb	*Grant Implem. Continues *PD Interviews Completed	*OR High School/RSCC dual enrollment courses and processes complete - Ready for Fall 2015 & Recruiting Begins (other schools to follow) *Focused recruiting for HS Seniors begins	*Internship Oversight and Management
15-Mar	*New PD begins	*Employer Tours Begin (ongoing) to drive June 15 Internships/Future Employment	*same as above
15-Apr	*Qtrly reporting complete	*Additional Mech Adjunct Faculty Recruited *Recruiting ongoing to high schools, dislocated workers, incumbent workers, etc.	*same as above
15-May	*Prep for equipment complete	*PD and Adjunct Siemens® Level 1 Instructor Training complete *Employer driven elective courses developed	*same as above
15-Jun	*Equipment ordered /installed	*Gen Tech AAS mech courses complete - Ready for Fall 2015	*Internships Start (approx. 8 wks)

15-Jul	*Quarterly reporting & Prelim. Eval. Plan Review Complete	*Mech Cert. training continues *PD to finalize new course outlines and conduct internal training with adjunct faculty	*Internship Oversight & Mgmt continues
15-Aug	*Grant Implementation continues	*PD/Adjunct Siemens® Level 2 Training T complete *1st Cohort Starts Gen Tech AAS incl. mech courses *New Cohort Starts Mech Cert Training *2nd year AAS Training starts *Mech Cert. training continues *TCAT articulated students begin AAS program *OR High School dual enrollment (1st yr Mech) classes begin (others to follow)	*Internships Start (approx.15 wks) from current Mech cohorts and grads. *Might also do internships with TCAT and dual enrollment students planning on articulating to RSCC Mech Cert/Gen Tech AAS
15-Sep	*Grant Implementation continues	*Mech Job Readiness Component Enhanced and Implemented (on going) *Mech Cert and AAS training continues	*Internship Oversight and Management continues
15-Oct	*Quarterly program/financial reporting complete	*Employer Tours Begin (on going) to drive Jan 16 Internships/Future Employment *Mech Cert and AAS training continues	*same as above
15-Nov	*Implementation continues	*Job/Internship Fairs held at least twice/year *Mech Cert and AAS training continues	*same as above
15-Dec	*Implem. continues	*Training continues	*same as above
16-Jan	*Quarterly program/financial reporting complete	*New Cohort of AAS students start *Depending on demand a new cohort of Mech certificate students start	*Internships Start (approx.15 wks) from current Mech cohorts and grads.
16-Feb	*Prelim. Eval. Plan Review Complete	*Training including tours and job readiness continues	*Internship Oversight and Management

16-Mar	* Implementation continues	*Training including tours and job readiness continues	*same as above
16-Apr	*Quarterly reporting complete	*Training including tours and job readiness continues	*same as above
16-May	*Implementation continues	*Training including tours and job readiness continues/graduation	*same as above
16-Jun	*Prelim. Evaluation Plan/Metrics Review Complete	*Training including tours and job readiness continues	*Internships Start (approx.15 wks) from current Mech cohorts and grads.
16-Jul	*Quarterly reporting complete	*Training including tours and job readiness continues	*Internship Oversight and Management continues
16-Aug	*RSCC to begin sustainability by funding PD from RSCC funds	*New Cohort Starts AAS Training/Cert. *2nd year AAS training continues *TCAT articulated students begin AAS program *High Schools start new dual enrollment programs	*Internships Start (approx.15 wks) from current Mech certificate and AAS cohorts/grads.
16-Sep	*Implementation continues	*Mech Job Readiness Component Enhanced and Implemented (on going)	*Internship Oversight and Management continues
16-Oct	*Quarterly reporting complete	*Employer Tours Begin (on going) to drive Jan 17 Internships/Future Employment	*same as above
16-Nov	*Implem. continues	*Mech Cert and AAS training continues	*same as above
16-Dec	*Implem. finalizes	*Mech Cert and AAS training continues	*same as above
17-Jan	*Final grant reporting and Final Evaluation Plan/Metrics Review Complete**	*New Cohort starts and training continues in sustainability phase *Continue to assess offerings to include a Mech AAS and registered apprenticeships	*Internships Start (approx.15 wks) from current Mech certificate and AAS cohorts/grads.

**The placement portion of the Final Evaluation Plan cannot be completed with placement data until Summer 2018

Measurable objectives for each phase of the project: Objective 1: Establish an infrastructure to support student education and training (Metrics: Qualitative). Objective 2: Develop a training system

that allows for a seamless transition from K-12 to higher education and into the workforce (Metrics: Qualitative). Objective 3: Increase the number of citizens who have earned a post-secondary credential. Enrollment metrics: # 1st-time students in Mech program (certificate or AAS) [Goal: 75, including 10 incumbent workers]; # of TCAT-Harriman students transferring credit into Mech program [Goal: 10]; # students enrolled in dual studies Mech courses [Goal: 50]; # of dual studies students enrolled in Mech program [Goal: 15]. Retention metric: % of students retained from first semester to second semester of study in Mech program [Goal: 75%]. Completion metric: % of enrolled students earning a certificate or Gen Tech AAS degree Mech emphasis [Goal: 65%]. Objective 4: Enhance student engagement with employers through participation in internships. Metric: # of internship hours provided [Goal: 600 hours]. Objective 5: Create a workforce that is able to maintain and enhance automated manufacturing equipment. Metrics: % of program graduates employed in a related field or enrolled in post-secondary institution per THEC's performance funding guidelines [Goal: 90%]; % of employers who are satisfied with Mech program graduates, as measured by employer survey [Goal: 95%].

Project governance and accountability plan: The grant/training will be housed within the RSCC division of Math and Science. Decisions about academics, such as program development, development of articulation agreements, dual enrollment, etc. will be made within this division with critical input from private industry and other partners. The Dean of Math/Science will act as interim project director (PD), until the PD is hired. The PD will report to the Dean and will oversee the day-to-day operations of the program, such as hiring and supervision of adjunct faculty, procuring equipment, scheduling, organizing faculty training, and identifying candidates for internships. Both the dean and the PD will work with existing positions within RSCC and within the community (Career Centers, business, industry organizations) for recruiting students, placing/management of interns and tracking performance measures related to the internships. During Spring 2015, RSCC will appoint a 4–6 member advisory committee (small but efficient), consisting of industry leaders. We will approach representatives from SL

TN, AISIN, Eagle Bend, Y-12 U.S. Dept. of Energy facility and some of the smaller manufacturers in Roane, Anderson and Morgan counties to serve as members of this board. The board's purpose is to act as a continuing liaison to industry, and to provide guidance in the design, enhancement and implementation of the Gen Tech AAS with mech elective courses and Mech Certificate programs.

Internally, an oversight steering committee will ensure the project is on task, schedule and budget. The Project Director will conduct project management, coordinate efforts with educational, industry and economic development partners, and report outcomes to the granting agency, East Tennessee Development District and the Advisory Committee. This internal steering committee will include Dean, Math and Sciences (Markus Pomper); Project Director (To be hired); Director, Institutional Research/Grants Development (Shelley Esquivel); and Grants Accountant (Marsha Mathews).

Role of equipment request: With grant funding, the equipment detailed below will be added to specifically meet employer requests/needs and help achieve the goal of growing the skilled workforce demanded by industry. *Mechatronics Training Systems (3) and Robots (3)*: Two of these will be located at RSCC's Clinton Higher Education and Workforce Training facility to expand the current Mech training. This location is critical since growing/new manufacturers in the Clinton industrial parks such as SL Tennessee are nearby. One will be at Oak Ridge High School to enhance the secondary training, support dual enrollment opportunities and encourage students to pursue post-secondary education opportunities in the field. This is also an important location to meet the needs of the Y-12 U.S. Dept. of Energy facility and future growth in the area. The team plans to expand this secondary partnership to other high schools in the future. *A PLC Training Station, Process Control Training Station, CNC Mill and Motor Control Station* will be added at the Clinton facility to accommodate the growth in students participating in the training as RSCC offers more on-site dual enrollment to the nearby Anderson Career and Technical Center, works with employers to flexibly accommodate incumbent worker training and increases the outreach and availability of the Mech one year certificate and initiates the two year Gen

Tech AAS degree with mech elective courses. The purpose of the purchase of the systems is to provide specific training on mechatronic systems as a whole, as well on its individual components. This is detailed above in Section 1.

Section 3. Strength of Partnership

The proposal has been developed by a strong partnership of institutions of higher education, economic development/chambers of commerce, secondary education, employers and industry representatives. Each partner has roles and strengths that are key to ensuring success. These are documented in the attached letters and summarized below.

Roane State Community College (Inst. Higher Ed): Overall project management, student recruitment, curriculum development/delivery, assessment of objectives/metrics
East TN Development District (Econ Dev): Project Management Oversight
SL TN, Aisin & other employers: Perform a strong role on the Advisory Board to ensure the program is aligned with workforce needs, provide internships, donate equipment & subject matter expertise/curriculum development, and support job readiness/related soft-skills components
TCAT – Harriman and other TCATS (Inst. Higher Ed) Perform a critical role to articulate the TCAT – Harriman Industrial Maintenance program to RSCC's Mech and recruiting students
Oak Ridge, Anderson, Morgan and other schools (Sec. Ed): Will ensure dual enrollment courses are implemented, students are encouraged to participate and transfer to RSCC's Mech Program
Anderson, Roane and other Chambers (Econ. Dev): Play an important role in linking potential/new/growing industry with skilled worker training, promoting training and more.

Section 5. Sustainability

Detailed plan for sustaining the program: The key to program sustainability is to ensure that it is developed based on employer and industry needs. This will not only ensure students enroll due to the high placement rates but it will demonstrate to employers that we are responsive to their needs, value their input and are developing workers with the skills they require. In turn, this will drive their future

support of the program. A major employer engagement role was included from the very beginning of the RSCC Mech program. The attached letters clearly demonstrate that employers are engaged and supportive of this work to meet their needs for a skilled workforce. RSCC is demonstrating a commitment for sustainability by funding resources to support this project and plans to fund the Project Director in Fall 2016 and beyond. The Mech program was initially funded with a U.S. Department of Labor grant and RSCC is confident, with the partnerships that have been developed and the demonstrated need for such a program, that future grant funding can be attained to fund further growth. In addition, prior to this project employers/industry have been supportive by donating equipment, subject-matter expertise, serving on the Advisory Board, etc. They have committed in the attached letters to ongoing support and are expected to continue that well beyond the grant.

Detailed plan for maintaining communication and sharing resources among all program partners beyond the grant: The sole purpose of The Advanced Manufacturing and Workforce Development Center regional collaborative is to share resources and optimize the delivery of training to students to meet employer demand. Leaders from the secondary schools, RSCC and TCAT-Harriman have listened to business and industry in developing this plan for Phase 2 and will continue to do so well after this grant as additional phases are designed and implemented. The Advisory Committee established in this proposal is expected to continue after grant completion. Their input will be valuable to maintaining an up-to-date and viable program responsive to business and industry needs and rapid developments in the field of Advanced Manufacturing. The Project Director will ensure regular contact with other key partners at the chambers/economic development, schools systems and East TN Development District.

Detailed plan to maintain and/or repair equipment: RSCC plans to budget for equipment maintenance and repair. All new equipment comes with a one year warranty. Additionally, RSCC's Mechatronics program and TCAT's Industrial Maintenance students and faculty will be maintaining the equipment as part of the curriculum.