

Advanced Manufacturing Centers of Excellence Status Q1 - Q4 FY 2015/16

TRRC Education Committee Meeting September 20, 2016

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Background and purposes

Tobacco Region Revitalization Commission (TRRC) Advanced Manufacturing Centers of Excellence (CoE) project has established a network of advanced manufacturing training resources providing training and support for economic development that spans the majority of the TRRC region bringing manufacturing training to some communities for the first time. The network consists of 3 CoE's with technologically advanced equipment, 4 satellite sites, 7 distance learning centers, collaborations with 8 community colleges and the Commonwealth Center for Advanced Manufacturing (CCAM). The training network provides students the highest quality training possible with a focus on nationally recognized industry certifications such as those offered by the National Institute for Metalworking Skills (NIMS), the American Welding Society (AWS), Siemens SMSCP and others. It has the flexibility to provide training to transitioning workers, transitioning military and incumbent workforce seeking to upgrade skills. An offshoot from the synergies in this network created the Transitioning Military program in Greensville County, VA is operated jointly between CCAM, the SVHEC SoVA CoE, Southside Virginia Community College and Fort Lee. The network is also helping in the development of the CCAM Advanced Manufacturing Apprentice Academy (CCAM-AMAA). The proposed CCAM-AMAA will serve as the hub and a world-class advanced manufacturing benchmark supporting the entire network of training centers.

The map below shows network sites and locations



TRRC Region Manufacturing Training Resources Added

Advanced Manufacturing Training Sites

A network of advanced manufacturing training resources has been created by the implementation of the Advanced Manufacturing Centers of Excellence Project. This project is vital to reach across the vast area of the TRRC region. It offers flexible, responsive and condensed training with innovative online and lab training of the highest quality with a focus on industry and nationally recognized portable certifications such as those offered by the National Institute for Metalworking Skills (NIMS), the American Welding Society (AWS), Siemens SMSCP and others. It also has the flexibility to provide training to transitioning workers, transitioning military and incumbent workforce seeking to upgrade skills that are not served well by traditional 16 week semester schedules typically offered for this type of training. This network helps the TRRC Region become the location of choice for advanced manufacturing companies by offering this unique responsive and flexible advanced manufacturing training network.

- TRRC Centers of Excellence (CoE's) – 3
 - SoVA CoE located at SVHEC South Boston VA.
 - NCI CoE, located at New College Institute Martinsville VA.
 - SVAM CoE, located in Abingdon VA.
- Satellite Training Centers (Associated with CoE's) 4 to date. These are necessary to reach out across the TRRC region with advanced manufacturing training resources.
 - SVCC Greensville County Training Center in Emporia VA. Associated with SoVA CoE, training in machining technology supporting Transitioning Military from Fort Lee and other SVCC programs.
 - Pioneer Center serving Duffield/Scott County VA. Associated with the SVAM CoE, training in advanced welding and Fab Lab to support local manufacturers.
 - Bluestone Workforce Training Center serving Bluefield/Tazewell County VA. Associated with the SVAM CoE, training in advanced welding and Mechatronics to support local manufacturers.
 - Wytheville Community College serving Wythe County, VA. Associated with the SVAM CoE, training in machining technologies.
- Distance Learning Sites (Associated with SVAM CoE); 7 sites, many of which are existing sites for community colleges and universities. The CoE's are adding online Machining, Mechatronics, Lean Manufacturing and several other manufacturing-related subject areas. It is necessary to reach out across the TRRC region to areas with little or no manufacturing training resources. They include;
 - Pioneer Center serving Duffield/Scott County.

- Dickenson Center for Education and Research serving Clintwood/Dickenson County.
- Booth Center serving Grundy/Buchanan County
- Bluestone Workforce Training serving Bluefield/Tazewell County
- The Summit serving Marion/Smyth County
- The Crossroads Institute serving Galax VA.
- Tri-County Driving Academy Serving Hansonville/Russell County
- Community College Partnerships: the CoE's are working with 8 community colleges to increase capacity for foundational training in advanced manufacturing training in machining, welding and mechatronics. These are necessary to provide sufficient pipeline for advanced industry certifications.
 - Mountain Empire Community College (MECC): new equipment for machining program, 1 instructor trained to teach Siemens SMSCP Level 1.
 - Southwest Virginia Community College (SwVCC): 2 instructors trained to teach AWS welding in 4 advanced areas of certifications.
 - Virginia Highlands Community College (VHCC): new equipment for welding program, 2 instructors training to teach Siemens SMSCP Level 1
 - Virginia Western Community College (VWCC): 2 instructors trained to teach Siemens SMSCP Level 1 and 1 instructor to teach Siemens SMSCP Level 2.
 - Wytheville Community College (WCC): new equipment for machining program, 2 instructors trained to teach Siemens SMSCP Level 1.
 - Patrick Henry Community College (PHCC): new equipment for machining, mechatronics and welding programs. 2 instructors trained to teach robotic welding technologies. 2 instructors trained to teach Siemens SMSCP Level 1.
 - Southside Virginia Community College (SsVCC): new equipment for machining and mechatronics programs. Creation of machining program for transitioning military from Fort Lee.
 - Danville Community College (DCC): new equipment for machining program located at Halifax County High School.

Instructor Training and Development

A vital aspect of increasing the skills and abilities of the TRRC manufacturing workforce is finding qualified instructors and certifying them to teach the required curriculum that leads to the industry-recognized certifications from NIMS, AWS, NCCER and Siemens. The existing number of qualified and credentialed instructors is not sufficient to support large-scale training in foundational and advanced industry certifications. The CoE network has made great progress this past year in increasing the capacity of qualified instructors by facilitating the training and

certifications of more than 24 full time and adjunct instructors. This will also need to be an ongoing activity for the CoE's and their training partners, although at smaller numbers.

Equipment for Advanced Manufacturing Instruction

Over \$5 million-plus match has been invested in equipment to support the CoE project. Much of this equipment doesn't exist in the vast majority of other training centers in the Commonwealth. Currently, the following equipment is in place: 5-axis CNC machining centers, CNC turning machines with live tooling and programmable Y-axis capabilities, CNC coordinate measuring machines, touch probe technologies, CAD/CAM software, new generation welding equipment, virtual welding training units, robotic welding units, mechatronics training units for Siemens MSMCP Level 1 and 2 certifications. In addition, it was necessary to upgrade equipment for foundational training programs at many of the associated training partners. We found that many existing training centers lacked some equipment required for training and awarding many of the foundational industry certifications making it impossible to train and achieve the advanced certifications required. The equipment is strategically placed predominately at the three CoE's but in some cases placed at satellite centers and community colleges creating an ecosystem of manufacturing training resources that addresses the geographical challenges of the TRRC region while meeting the needs of its citizens and employers.

Training Outcomes FY 2015/16

Pipeline of Foundational Industry Certifications

In order to train toward advanced industry certifications there must be a base or pipeline of foundational or entry level certifications. These industry certifications were identified in the Boston Consulting Group (BCG) Report commissioned by the TRRC and published in January of 2013. A case could be made that the BCG report overlooked the lack of ability and capacity of existing training providers to deliver a sufficient base or pipeline of foundational certifications. In launching the TRRC CoE project we have had to devote a greater amount in time and resources to bolster the region's capacity to produce foundational certifications. This does not in any way discredit the BCG recommendations to use the certifications as a training objective as witnessed by the huge increase in demand since 2013 for these certifications by industry. As a result workforce training in manufacturing has shifted their attention to increase the focus on these certifications. Community colleges are now using these industry certifications as a measure of success. This is a necessary shift and one that should benefit manufacturing in the TRRC region. However, it presents an unintended pitfall in creating an unproductive

atmosphere of competition between training providers. Greater cooperation and agreement between training providers will be needed to truly benefit from the CoE project. Creating collaboration and alliances between training providers to increase this base or pipeline will be a high priority for the CoE project going forward.

The foundational pipeline from community colleges currently available to feed the CoE's in FY 2015/16 includes the following.

- 252 students completing training for foundational certifications in the 3 subject areas
- 292 foundational certifications awarded

To meet the stated goals of 70+ advanced certifications for each of the 3 CoE's, we will have to train 83% of students completing foundation certifications for advanced certifications. 30% is a more realistic number which will require a pipeline of base of 700 students with foundational certifications. So there is significant work to be done. The chart below shows the current sources and number of foundational certifications for FY 2015/16.

FY 2015/16 Foundational Training for Pipeline to Advanced Certifications - Community Colleges						
Subject area	Training provider/location	Students enrolled	Students completing	Credentials awarded	Conferring organization	Notes
Machining Technologies	Mountain Empire Community College	0	0	0		New program to start 2016
	Southwest Virginia Community College	48	9	58	NIMS (level 1)	12 expected to complete Dec 2016, multiple NIMS certs earned by enrolled and completing students
	Virginia Highlands Community College	0	0	0		New program to start Fall 2016
	Wytheville Community College	40	10	Unknown		
	Patrick Henry Community College	0	0	0		New program to start 2016
	Southside Virginia Community College	18	18	82	NIMS (levels 1 & 2)	Transitioning Military from Fort Lee in collaboration with SVHEC CoE and CCAM
	Danville Community College	Unknown	Unknown	Unknown		Agreement and MOU pending
Sub-totals		106	37	143		Total Machining Technologies
Industrial Maintenance/Mechatronics	Mountain Empire Community College	72	12	0		12 expected to start in Dec
	Southwest Virginia Community College	29	10	0		12 expected to start Fall 2016
	Virginia Highlands Community College	0	0	0		
	Wytheville Community College	0	0	0		New program to start Fall 2016
	Patrick Henry Community College	28	28	28	Siemens SMSCP level 1	Now marks 4th cohort with 100% completion and certification pass rate.
	Southside Virginia Community College					
	Danville Community College	Unknown	Unknown	Unknown		Agreement and MOU pending
Sub-totals		129	50	0		Total Industrial Maintenance/Mechatronics
Welding Technologies	Mountain Empire Community College	78	20	Unknown		
	Southwest Virginia Community College	74	59	Unknown		New cohort to start August
	Virginia Highlands Community College	16	15	0		New cohort to start August
	Wytheville Community College	0	0	0		New program to start Fall 2016
	Patrick Henry Community College	58	58	115	AWS	Multiple AWS certs earned by enrolled and completing students
	Southside Virginia Community College	167	Unknown	21	AWS/NCCER	
	Danville Community College	Unknown	Unknown	Unknown		Agreement and MOU pending
Sub-totals		393	152	136		Total Welding Technologies
Grand Totals		628	252	292		

Out of necessity, the CoE's are facilitating foundational training which improves the numbers for transitioning for training in advanced certifications. It is important to note this activity has value beyond bolstering the pipeline or base of foundational training which is unescapable at this point. It also provides the CoE's with time and experience in training for these very specific certifications. This increases the instructor's knowledge and abilities to deliver the highest quality training in these specialized areas.

Training done by CoE's in FY 2015/16 consisted of predominantly foundational certification training and includes the following.

- 212 students completing training for foundational certifications in the 3 subject areas
- 271 foundational certifications awarded

It could be said that the added students with foundational certifications brings us to 65; 70% of our target pipeline number, but the transition to advanced certifications cannot be made if we have the CoE consistently building their own pipeline. The chart below shows the number of foundational certifications for FY 2015/16 as trained by the CoE's. It is important to note that these numbers are expected to more than double with the NCI and SVAM CoE's coming up to speed.

FY 2015/16 Training for Industry Certifications Facilitated by CoE's and Satellite Sites						
Subject area	Training provider/location	Students enrolled	Students completing	Credentials awarded	Conferring organization	Notes
Machining Technologies NIMS Certifications	SVHEC SoVA CoE	8	8	8	NIMS	
	New College Institute CoE	0	0	0		New Director hired Sept 22, 2016 will now allow training to proceed at the NCI CoE
	SVAM CoE	0	0	0		SCHEV approval still pending, site inspections due week of Sept 12. Waiting for SCHEV certification is causing delays in training to industry certifications
	Greenville County, Emporia Training Center	18	18	82	NIMS (levels 1 & 2)	Transitioning Military from Fort Lee in collaboration with SVHEC CoE and CCAM
Sub-totals		26	26	90		Total trained to machining certifications
Welding Technologies AWS and NCCER Certifications	SVHEC SoVA CoE	178	158	158	NCCER	NCCER is compatible with AWS certifications
	New College Institute CoE	0	0	0		New Director hired Sept 22, 2016 will now allow training to proceed at the NCI CoE
	SVAM CoE	5	3	0		SCHEV approval still pending, site inspections due week of Sept 12. Waiting for SCHEV certification is causing delays in training to industry certifications
	Sub-totals	183	161	158		Total trained to welding certifications
Mechatronics Siemens SMSCP and NCCER Certifications	SVHEC SoVA CoE	30	25	23	Siemens NCCER	Siemens SMSCP Level 1 and NCCER Industrial Maintenance Certifications
	New College Institute CoE	0	0	0		New Director hired Sept 22, 2016 will now allow training to proceed at the NCI CoE
	SVAM CoE	0	0	0		SCHEV approval still pending, site inspections due week of Sept 12. Waiting for SCHEV certification is causing delays in training to industry certifications
	Sub-totals	30	25	23		Total trained to mechatronics certifications
Grand Totals		239	212	271		

Total foundational or base certifications for the current conditions of the CoE network totaled:

- 464 students completing training for foundational certifications in the 3 subject areas
- 563 foundational certifications awarded

Custom Contract Training

This is not-for-credit, fee-based or sometimes grant-funded training designed to address specific industry needs or individual employer needs. These training sessions can be open to the public where individuals can attend to add new skills and knowledge or in cases where employers want to send 1 or 2 employees. Training sessions open to the public are usually based on training to new technologies or new industry standards. A common example of such an offering would be for Computer Aided Design (CAD) software. There are times when new CAD software is released, experienced engineers and designers who may have advanced degrees and experience with other CAD software will need to be trained to use the new CAD software. In this case the traditional 16 week semester offerings are not practical. Two to four week sessions are often sufficient for these individuals to learn the software. These custom training sessions can also be contracted exclusively by an employer for their employees. Again CAD/CAM software is a good example but subjects such as Lean/Six Sigma, Geometric Dimensioning and Tolerancing (GD&T), OSHA standards and many others are in demand by employers.

In FY 2015/16 the CoE's trained 130 individuals with custom training offerings

FY 2015/16 Custom Contract Training Facilitated by CoE's					
Subject area	Training provider/location	Company	# Students completing	# hours of instruction	Subject area and/or training objectives
Custom Contract Training	SVHEC SoVA CoE	Sunshine Mills	44	324	Lean Manufacturing
	SVHEC SoVA CoE	Sunshine Mills	10	354	Programmable Logic Controllers (PLC)
	SVHEC SoVA CoE	Open to public and multiple small business	5	219	Work Ready Foundations, entry level manufacturing skills
	New College Institute CoE	Eastman	7	140	MSSC Certified Production Technician
	New College Institute CoE	Eastman	17	N/A	Summer internship with mentoring by Eastman Senior Staff Engineer and NCI adjunct.
	New College Institute CoE	Open to public and multiple small business	35	20	Training and certifications in Web Dynamics helping small business improve websites to generate more business transactions
	SVAM CoE	Utility Trailer	12	50	MIG Welding
Totals			130	1107	

Several custom contract training opportunities are in negotiation now for FY 2016/17 some of them include the following.

The SVHEC SoVA CoE

- Beach Mold in Emporia, VA is looking to train technicians in PLC programming and other mechatronics related training for up to 12 existing employees and up to 50 new employees to support the expansion of their plastic injection molding operations.
- Up to 5 more sessions of the 13 week hybrid online/lab Mechatronics training program piloted in FY 2015/16 are planned for FY 2016/17

- *Siemens SMSCP Level 3 training* – the SVHEC SoVA CoE was designated by the Siemens Technical Academy in Berlin, Germany to be the first institution in the US and only 1 of 3 in the world to offer the Siemens SMSCP Level 3 training and certification on a not-for-credit bases. This level of training and certification is only available in US university degree programs. This exclusive agreement was due to the hard work and innovative approach to Siemens Mechatronics training by the SVHEC SoVA CoE staff. This should prove to be a popular training program that has the potential to train hundreds of students per year.

New College institute CoE

Note: as of September 22, 2016, after a nearly 2 year search we have a Director, Pamela Carter-Taylor, on board for the NCI CoE. The NCI CoE has some of the most advanced manufacturing equipment in the Commonwealth. With its central location in in the CoE network and its advanced equipment it has been a long standing plan to hold advanced manufacturing training for instructors. Pamela has already started scheduling training sessions for the remainder of FY 2015/16 and well into FY 2016/17. Some of them include.

- Instructor training by Haas – machine tool manufacturer
 - Programming, setup and operation of Haas VMC and Turning centers
 - 4th axis milling operations
 - Turning applications using programmable Y axis
 - Live tooling applications on turning centers
 - Touch probe applications on Haas machining centers
- Instructor training by Mazak – machine tool manufacturer
 - Programming, setup and operation of Mazak 5 axis machining centers
 - Advanced tool pathing for 5 axis milling operations
- Instructor training by Mitutoyo – inspection tool manufacturer
 - Programming, setup, operation of CNC Coordinate Measuring Machines (CMM)
 - Surface finish inspection instrumentation and techniques
 - Geometric Dimensioning and Tolerancing (GD&T)
- Instructor training by Sandvik – cutting tool manufacturer and CCAM member
 - Calculating speeds and feeds for optimum material removal
 - Drilling and boring best practices
 - 3D surfacing tools and techniques
 - Turning tools best practices
- Others TBD

SVAM CoE

- Custom contract training for Zenith Power Products for SolidWorks CAD software applications for 12 employees.
- Geometric Dimensioning and Tolerancing (GD&T) fee based, open to public

- Programming, setup and operation of Mazak machining centers
- Others TBD

Project Timeline

Major milestones for CoE selection and funding



Detailed timeline of the CoE project to date

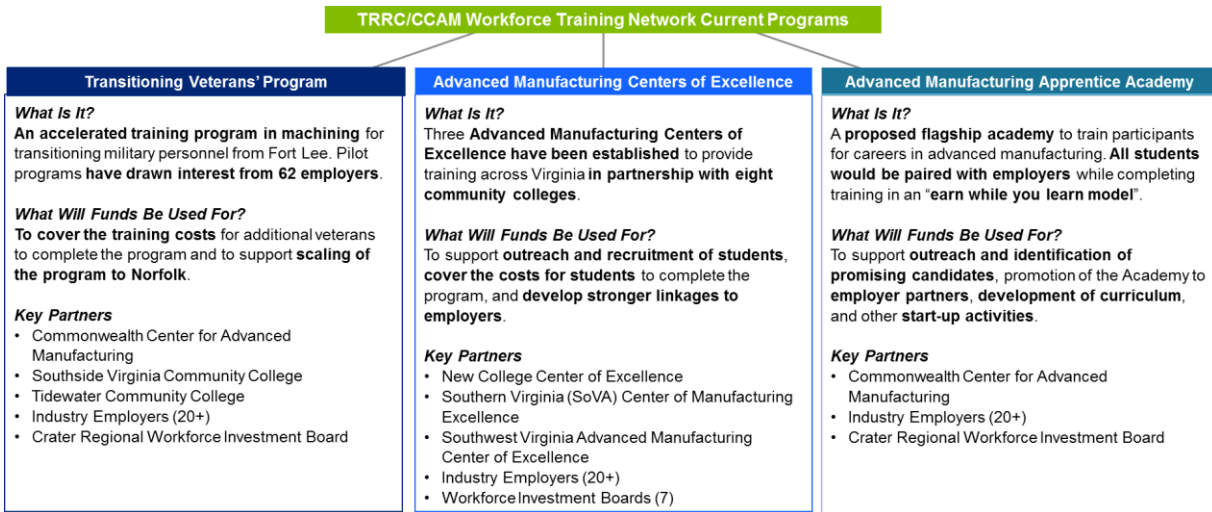
- **Jan 2013** – Boston Consulting Group (BCG) report published citing the need for the CoE project and serves as the foundation for implementation
- **Oct 2013** – Director of Workforce Development hired in cooperation with the Commonwealth Center for Advanced Manufacturing (CCAM) to oversee planning and implementation of the CoE project on behalf of the TRRC
- **Nov 2013** – Meetings held in multiple locations creating the overall framework for the CoE project and the RFP requirements. 3 committees were formed addressing curriculum, marketing and resources with 10 members each made up of representatives from TRRC region government, education and industry.
- **Jan 2014** – Request for Proposal (RFP) published by TRRC and CCAM.
- **April 2014** – Scoring of the 4 proposals received by 11 independent readers, 7 representing industry and 4 representing education.
- **May 2014** – Face-to-face interviews and site visits with representatives from the 4 organizations that submitted proposals by TRRC and CCAM staff.
- **May 2014** – Results of the independent scoring and further vetting by TRRC and CCAM staff were presented to the TRRC Education Committee. The Education Committee recommended awarding SVHEC and NCI partial funding in the amount of \$2m each and requested a special advisory committee be formed to further review and make recommendations for the two remaining proposals from the southwest.
- **July 2014** – Multiple site visits made to 2 remaining organizations and area employers after which a special committee made up of representatives from TRRC, government, education and industry met at CCAM. The recommendation was to award the SVAM CoE funding with the condition they add another satellite site in Scott County.

- **Sept 2014** – At the TRRC Education Committee meeting the recommendations of the special committee was accepted and the SVAM CoE was awarded partial funding in the amount of \$2m.
- **May 2015** – First year progress reports and proposals for 2nd round funding were submitted by all 3 CoE's.
- **Sept 2015** - At the TRRC Education Committee meeting 2nd round funding was awarded in the amounts of \$2m for the SVAM CoE, \$2m for the NCI CoE and \$3.17m for the SVAM CoE.
- **Oct 2015 thru Jan 2016** – Multiple TRRC Commission Members made visits to all 3 CoE sites and some partner organizations to review progress.
- **Jan 2016** - At the TRRC Education Committee meeting the observations made in the Oct thru Jan site visits were shared by participating TRRC Commission Members, recommendations were to continue but quarterly performance reports be implemented
- **Sept 2016** – Presentation of FY 2015/16 performance, status and challenges

Sustainability

FY 2015/2016 marks the first year in which equipment and staffing are in place and training has begun. The training came from the SVHEC SoVA CoE and the Transitioning Military program. These programs combined to train 212 students and facilitated the conference of 271 industry credentials in machining, welding and industrial maintenance related careers. An additional 130 student were trained in custom contract sessions which brings the total trained by CoE's and affiliates in FY 2015/16 to 342. The NCI CoE contributed to the contract training total. The NCI CoE should start to contribute significantly more now that a Director has come onboard Sept 22, 2016. The SVAM CoE is still awaiting their SCHEV certification and once it is granted they will also start contributing significantly. It is not unreasonable to predict that the total numbers trained will be more than double in FY 2016/17. The CCAM AMAA may start pilot programs in FY 2016/17 as well.

Programs in place and proposed are represented in the chart below



Workforce Investment and Opportunities Act (WIOA)

We are currently using funding from the Federal Workforce Investment and Opportunities Act (WIOA) at the SVHEC CoE and Transitioning Military program in Emporia, VA. Now that NCI has a director onboard and as soon as the SCHEV is approved at the SVAM CoE they will also use these funds. WIOA funding is only for displaced workers so its use will be limited. Sources for across the CoE network funding include the following:

- Crater Regional Workforce Investment Board
- South Central Workforce Development Board
- West Piedmont Workforce Investment Board
- New River Mt Rogers Workforce Development Board
- Southwest Virginia Workforce Development Board
- Capital Region Workforce Partnership
- Opportunity Inc. WIB

State and Federal Grants

In recent years federal and state grant opportunities have been offered in large sums usually between \$1m to \$5m per award. Large regional collaborations are required to compete and win these awards. The 3 CoE's with their satellite sites and partner colleges, combined with the Transitioning Military program, CCAM and the developing CCAM Apprenticeship Academy is well suited for pursuing these larger scale opportunities. Collectively we cover a region that spans across more than half the Commonwealth. Resources as a group represents an impressive pool of equipment, staff, educators, industry partners and state and local government agencies that

is well suited for these large scale opportunities. Pursuing grant opportunities large and small will be a high priority in our efforts for sustainability. Some recent proposals submitted include the following.

- DOL TechHire - Grant was submitted asking \$4.6m awards announced June 2016. Out of the 215 applicants, 39 were awarded we were among the 176 that were not.
- DOL America’s Promise - Grant submitted August 25, 2016, asking \$3m; results pending.
- Gene Haas Foundation – Submitted July 2016, asking \$70k; results pending.

Other upcoming opportunities include but will not be limited to the following:

- The New Economy Workforce Industry Credentials Grant
- DOL Apprenticeship USA
- Other opportunities as they come available

Employer Support

One of the greatest strengths of the CoE project is the extensive and growing number of manufacturing companies associated with the CoE’s and CCAM. These companies have hired employees training in our programs and pledge to hire more. Additionally they are committing to aiding in program development, instructor development, lending technical expertise and continuing to write letters of support for our grant applications. They are also contracting fee-based custom training sessions that is and will continue to provide revenue for sustainability. A list of some of the employers and the types of commitment can be seen in the chart below.

Types of Employer Support	Employer Partners	
<ul style="list-style-type: none"> • Commit to consider hiring candidates for full-time positions after completion of training programs • Provide opportunities to be selected for paid work experience, paid internships, on-the-job training, and Registered Apprenticeships during enrollment in training activities • Provide career/industry mentors to advise participants on career goals, job placements, and professional development opportunities • Donate equipment to support participants’ training in advanced manufacturing skills and techniques • Provide qualified instructors for training programs • Assist training programs in certifying candidates’ skills or validating the completion of industry-recognized credentials • Provide staff or materials to support the development of curriculum and other programming 	<ul style="list-style-type: none"> • Rolls Royce North America • BGB Technology • Oceaneering Marine Services • Kosmo Machine • Enclos Corporation • Jewett Machine • American Buildings • Somic America • L & R Precision Tooling • Aerojet Rocketdyne • Comfort Systems USA 	<ul style="list-style-type: none"> • Eastman • A2 Speed • Bristol Compressors • General Engineering • Joy Global • Scholle • Utility Trailer • Steel Fab • Tempur Sealy USA • Universal Fibers • Pepsi • And more