



SpaceTEC Partners, Inc. 2015/2016 Annual Report



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EXECUTIVE SUMMARY

As we complete our fifteenth year as a National Aerospace Technical Education Center and enter the final months of our current grant, we've seen a period of significant accomplishments and unexpected opportunities. Throughout all the changes the past four years have produced we've continued to focus resources where we feel they offer the greatest yield for our customers. We're generating interest across the country as we bring new programs and initiatives online. Our message of pathways to good paying jobs and higher education for those interested in careers in the aviation and aerospace continues to resonate.

Our nation is seeing rapid change and technological advancement across the board in the transportation sector:

- In aviation/aerospace manufacturing, a trend to automation to improve production rates, reduce rework and compensate for a shortage of skilled workers is being adapted from the automotive industry. This will drive the need for technicians with new skill sets to ensure the investment in automation is sustainable.
- With Avionics now accounting for over 60% of the value of modern aircraft, more emphasis on innovative training and credentialing for developing these skill sets is essential to future safe and economical operation of the global air transportation system.
- In the Aviation/Aerospace Maintenance, Repair and Overhaul (MRO) industry sector, more emphasis on qualifications of journey-level technicians to enable companies to grow and prosper is evident.
- The commercial space industry is now seeing resurgence following years of limited growth. It is estimated by the year 2020, five human space flight programs will be operating out of the Kennedy Space Center and many more commercial space ventures will be coming online to provide access for humans, equipment and new satellite technology to low earth orbit and beyond.

By supporting educator professional development, assisting with the creation and validation of aerospace curriculum and administering third-party performance-based credentials to those qualified to sit for them, we're offering solutions for aerospace companies in the way of a proven multi-skilled technician of the future. Establishing and administering credentials proving competences of those interested in careers in a dynamic aerospace industry matters now probably more than at any time in recent history.

Of note, interest in performance-based certifications as an indicator of the effectiveness of academic and workforce training programs also appears to be emerging. For students, adding certifications to a college degree or workforce training certificate is not only an indicator of what they know but also what they can do. For companies seeking qualified employees in a tightening labor market, performance-based certifications become an important consideration for reducing risk in the hiring process as well. Economic and workforce development agencies seek to build talent pipelines to better attract businesses with the promise of skilled workers, which then spurs additional economic growth.

Military partners continue to remain committed to providing service members the opportunity to earn industry credentials as well, offering promotion points and better preparing them for life after military service. Through the VetTEC[®] program, veterans can find information and resources to translate their military skills to civilian careers. Those who engage in non-traditional and distance learning are finding programs available through our training partners that, coupled with military training and experience and third-party credentialing, provides a measure of credibility for their achievements along with pathways to employment.

Schools-to-Space has been found to be applicable to not only traditional education but to non-traditional and distance learning. The program continues to grow in popularity by offering STEM resources for educators and students in grades 7-12 to promote and excite them about all things aerospace.

Credential Testing Service, our newest venture, provides a computer-based testing platform to our industry training partners who are developing online aerospace training programs. Underemployed and unemployed workers interested in preparing and positioning themselves for aerospace careers can seek these opportunities as indicators of a measure of knowledge which may offer opportunities for internships and cooperatives.

A common thread, critical to growth and success in the industry sectors we support, particularly in the current environment, is the need for well-trained and highly-skilled workers. The most recent development, MakerTEC[®], is a new venture funded through the NSF ATE division. Called “Coordinating Networks”, this program was proposed to attract attention of regional economic development agencies and state workforce boards to provide additional capability to ensure industry is getting the employees they want. Funded through FY21, MakerTEC will incorporate fresh ideas into workforce development through

We're excited momentum is building and the staff at SpaceTEC[®] HQ is working hard to ensure all programs are fully operational while continuing the work of building acceptance of industry-defined, third-party credentials as indicators of the knowledge and skill of those earning them.

Sincerely,

A handwritten signature in black ink, appearing to read "Steve Kane". The signature is fluid and cursive, with a long horizontal stroke at the end.

Steve Kane, PI and Managing Director

KEY PERSONNEL AND ORGANIZATIONS

SpaceTEC Partners, Inc. Board of Directors

Marshall Heard, President

Board Chairman

Aerospace Consultant;
Former VP, Int'l Sales
The Boeing Co.

Adrian Laffitte, Vice President

Aerospace Consultant;
Former Director, Florida Government Relations,
Lockheed Martin

George Hauer, Secretary

Principal Consultant, GHauer and Associates:
Former Executive, Wyle Laboratories

Richard Laird, Treasurer

Vice President, Finance and Technical Services,
Eastern Florida State College

Jerry Moyer, Director

Director, Engineering and Space Programs,
Bionetics Corporation

NSF National Visiting Committee

Stewart Harris, Chair

Former Director of Technology Programs,
NASA Langley Research Center (LaRC)
Hampton, VA

Richard Beagley

Former VP – United Space Alliance
Kennedy Space Center, FL

GEN Ben Robinson – USAF (Ret.)

Former Vice Commander, 8th Air Force
Former director Boeing Aerospace Operations, OKC, OK
Owner/President, Sentry One LLC Aerospace Consulting
Oklahoma City, OK

RADM Jim Underwood – US Coast Guard (Ret.)

Business Development, Management Services Group
AECOM (formerly URS Corp.)
Merritt Island, FL

Dr. Ellen Gordon

Director, Aviation programs
South Seattle Community College, Kent, WA

Scott Henderson

Orbital Launch Site Director, Blue Origin,
Exploration Park, Kennedy Space Center, FL

CAPT Winston Scott – US Navy (Ret.)

Former NASA Astronaut
Florida Institute of Technology, Melbourne, FL

Robert Herman

Orbital ATK

Patricia Harris

Retired, Thomas Nelson Community College, Hampton, VA

Jim Swindell

Retired, Calhoun Community College, Decatur, GA

External Evaluator

Albert Schwabenbauer

NSF Program Officer

Dr. V. Celeste Carter

National Aerospace Technology Advisory Committee (NATAC)

Mark Gaedcke – Chair (A)
SpaceTEC HQ

Mike Ennis*
Harris Corp

Jeff Manning*
STC - Langley

Kevin Vega
NASA

Mark Bontrager
Space Florida

Dale Nash
Virginia Space Authority

Rick Serfozo
Orbital ATK

Keith Davis
Calhoun Community College

Larry Ostarly
AECOM

Mike Powell
Titusville-Cocoa Airport Authority

Dan Ciccateri
Dan Gearinger
Sierra Nevada

Pam Underwood
FAA Office of Commercial Space
Transportation

***Joint NATAC/CITAC Committees**

Commercial Industry Technology Advisory Committee (CITAC)

Kevin Gulliver – Chair

Nida Corporation
Chair, Avionics, Electricity and Electronics
Joint Subcommittee

Teresa Maher

Electronics Technician Association -
International (ETA-I)

Jeff Manning

STC - Langley

Mike Hoke

Abaris Training

Lou Dorworth

Abaris Training

Greg Mellema

US Army
Chair, Composites Joint Subcommittee

Earl Thomas

US Army
Chair, Aviation Structures Subcommittee

Jim Hall

Wichita Area Technical College
Chair, Aviation Mechanical Assembly
Subcommittee

Mark Miller

Discovery Aviation

Shane Enman

American Airlines

Jeff Lowe

Tulsa Technology Center

Anita Brown

AAR Corp.

Brenda Cooley

180 Skills

Cliff Archer

Global Educational Support

Shirley Brown

Tennessee Colleges of Applied Technology

Ken Payton

Francis Tuttle Technology Center

Walt Carter

Greenville Tech

Neill Fullbright

Embry-Riddle Aeronautical University

SpaceTEC Co-PIs and Affiliates

Dominic Dal Bello
Allan Hancock College

Laureano Flores
Antelope Valley College

Keith Davis
Calhoun Community College

Jason Smith
Community College of the Air Force

Dr. Kristin Frady
Clemson University

Sandra Castillo
Doña Ana Community College

Terry Thornton
Dothan Technology Center

Bill Fletcher
Eastern Florida State College

John Floyd
Eastern Shore Community College

Mel Cossette
Edmonds Community College

Dr. Diane Howard
Embry-Riddle Aeronautical University

Richard Stark
Francis Tuttle Technology Center

Pat Hoppe
Gateway Technical College

Howard Carter
George T. Baker Aviation College

Walt Carter
Greenville Technical College

Bill Labby
Leeward Community College

Tim Fannin
Metro Technology Centers

Tim Kissel
MIAT Technology Center

Jonathan Beck
Northland Community and Technical
College

Robert Sompolski
Oakton Community College

Dr. Sallie Kay Janes
San Jacinto College

Kim Alexander
South Seattle Community College

Shirley Brown
Tennessee College of Applied Technology

Jean Frank
Thomas Nelson Community College

Chris Blow
Tidewater Community College

Robert Walker
Trident Technical College

Jeff Lowe
Tulsa Technology Center

James Hall
Wichita Area Technical College

SpaceTEC Headquarters

Steve Kane
Managing Director

Carolyn Parise
Certification Manager

Heather Kogut
Office Coordinator

Tracy Priebel
Certification Specialist

Sue Peterson
Documentation Coordinator

BROADER IMPACTS

SpaceTEC continues to offer professional development support for educators and practitioners with emphasis on assessments, career pathways and stackable credentials. Considering the rapidly expanding nature of aerospace/aviation manufacturing and operations, and the relatively long time period required to academically prepare a student for entry into the field, a “just-in-time” solution is indicated. In particular, for under-served populations, building excitement and interest in affordable aerospace and aviation programs for technicians and the attendant career opportunities available across a wide array of STEM fields may well open up the chance of a life time for them.



In 2015, SpaceTEC expanded value for certified technicians even more by partnering with Aerotek Aviation, Inc., the nation's largest aerospace staffing agency. Aerotek Aviation is focused on assisting employers find highly qualified technicians using a contract-to-direct employee model. Since applicants could be offered direct employment, Aerotek is only interested in technicians who meet or exceed the knowledge and skills required by the employers they serve. SpaceTEC and CertTEC - certified technicians have demonstrated knowledge and skills as identified by industry leaders. Employers can look at the standards industry demanded and have confidence the knowledge and skills certified technicians have meet or exceed those standards. Beginning with a formal partnership, the next step is to grow a pool of certified technicians in aerospace-related fields that Aerotek can promote and employers can hire. Certified technicians are strongly encouraged to allow Aerotek to add their name to the database, whether currently looking for employment or just as a means for opening doors for the future and there is no commitment for them to accept any job offer.

Major Activities

Major activities of the SpaceTEC National Center for Aerospace Technical Education over the past year included broadening the user base, strengthening industry support through Memorandums of Understanding (MOU's), co-ops, internships, workshops and operating resource sharing programs through the web interface. Specific activities involved:

- Sponsorship level at the National Coalition of Advanced Technology Centers (NCATC) Conference in St. Louis, MO.
- Sponsorship for Whitehall, MN event organized by Alcoa - Howmet, a producer of ceramic turbine engine components, GE Aviation and David Ruck, National Oceanic and Atmospheric Administration (NOAA) videographer and President of Rubang Films, producer of the "I want to be an Astronaut" movie. SpaceTEC- supplied Astronaut Ice Cream to the students, SpaceTEC logos were on t-shirts handed out at the event and SpaceTEC's Schools-to-Space Coordinator traveled to the event to provide insight on what it was like to work on the Space Shuttle.

- Hosting MatEdU's Materials-in-STEM (M-STEM) [conference](#) in Cocoa Beach, FL. Sponsorship included conducting a "Space" track and an exhibit booth displaying SpaceTEC and CertTEC products.
- Sponsorship of a booth in the "Credentialing Corner" at the American Career and Technical Education (ACTE) Career Tech Vision 2015 conference in New Orleans, LA
- Sponsorship of a secondary student Aerospace Technician Apprentice DACUM at St. Augustine High School in St. Augustine, FL
- Sponsorship of a Journey level (3-5 years' experience) Aviation Structures Technician DACUM hosted by AAR Corp. in OKC, OK
- Sponsorship of a space-themed teacher recognition event in St. Augustine, FL
- Presentation of SpaceTEC National Resource Center programs applicable to developing a Lightweight Innovations for Tomorrow (LIFT) Resource Hub at a meeting of invited NSF Resource Centers hosted by ASEE in Washington, DC.
- Presentation of SpaceTEC and CertTEC programs to 32 educators from [Howard T. Baker Aviation Technical College](#) in Miami, FL.

Significant Activities across the Consortium Supported or Sponsored by the SpaceTEC National Resource Center in 2015 Included:

- **Lancaster, CA:** Antelope Valley College ([AVC](#)) instructors began testing candidates for SpaceTEC and CertTEC credentials again. SB 850 was passed by the CA legislature and signed by the Governor in 2014. As a result, AVC is approved for Airframe Manufacturing Technology and there is an opportunity for CertTEC to make contacts with regional manufacturing centers at colleges in the state. A CertTEC Basic Electricity and Electronics (BEE) testing station was provided to AVC and a test proctor capability was established for delivery of the BEE certification exams.
- **Decatur, GA:** Calhoun Community College ([CCC](#)) Aerospace program enrollment is 181 and has seen the most graduates in program history. 6 students are currently in the NASA Community College Aerospace Scholars (NCAS) program; 25% of aerospace program are veterans. Calhoun has a 100% hiring rate for its co-op program with 19 currently participating. SpaceTEC opened the door with the participating companies (Boeing and Lockheed Martin). CCC's Aerospace Instructor is also enrolled in SpaceTEC's Professional Development Opportunity program, enabling improvements in composite instruction.
- **Lynnwood, WA:** MatEdU at [Edmonds Community College](#) continues to share information on SpaceTEC and CertTEC activities. SpaceTEC hosted MatEdU's M-STEM workshop in Cocoa Beach, FL and 3 Boeing interns from EdCC recently completed CertTEC Basic Composites certifications. All are interns at Boeing's Everett facility.
- **Cocoa, FL:** [Eastern Florida State College](#) Aerospace Program sent a team sponsored by SpaceTEC to the Aerospace Maintenance Competition in April 2016. EFSC Aerospace has begun an apprenticeship program with Lockheed/ASRC on the Orion Project at the Kennedy Space Center. Five students have been hired full-time and a second round of

hiring is set to begin. There are currently 55 students enrolled in the EFSC Aerospace program. Two EFSC students are supporting SpaceTEC each semester through the college Service Learning Program and students in the program helped SpaceTEC develop the spacecraft fuel loading even for the Aerospace Maintenance Competition Event.

- **Melfa, VA**: The VA Community College System has renewed its focus on industry credentials and Eastern Shore Community College ([ESCC](#)) has moved from piloting CertTEC Basic Electricity and Electronics certifications to actively certifying students. Presently five students have attained some level of certification. The ESCC faculty also attended professional development at Nida Corporation coordinated by SpaceTEC. SpaceTEC sponsored an ESCC adjunct faculty member to HI-TEC and provided promotional materials for the Career Night Out/Women in Technology Exposition. ESCC was awarded a LEAN Internship Project providing internships in aerospace and improving the internship model. At present, seven interns from ESCC are working at the Mid-Atlantic Regional Spaceport (MARS) at Wallops Flight Facility.
- **Kenosha, WI**: [Gateway Technical College](#) purchased 24 Nida student trainers and CertTEC provided five Basic Electricity and Electronics (BEE) card sets to establish BEE testing capability for students in Gateway's Electronics Technology, Electrical Engineering Technology, Biomedical Electronics Technology and Sustainable Energy System programs. Five instructors have completed BEE certification and proctor agreements/proctor training has been finalized. A voucher system is under development for the Gateway bookstore to issue to students seeking certification.
- **Thief River Falls, MN**: [Northland Community Technical College](#) is pursuing the capability for delivering CertTEC Basic Electricity and Electronics (BEE) and Basic Composites examination. Five BEE card sets have been shipped to Northland and efforts are underway securing proctor agreements, with instructor certifications and with instructor professional development. Northland's Avionics and Electronics instructor also serves on CertTEC's BEE/Avionics certification subcommittee. Composites Instructors are underway with professional development opportunities which will culminate in CertTEC Basic Composites examination qualification. Northland will assist SpaceTEC with development of a Large Unmanned Aerial System (UAS) Maintainer and small Unmanned Aerial System (sUAS) operator certifications in spring 2016.
- **Charleston, SC**: [Trident Technical College](#) is underway developing capability to administer CertTEC's third-party Basic Composites and Aviation Electrical Assembler certifications as part of the aviation manufacturing training supporting Boeing's Charleston 787 Dreamliner manufacturing.
- **Hohenwald, TN**: At the [Tennessee College of Applied Technology](#), 25 students are enrolled in the Electronics Technology and Electro-Mechanical Technology programs. The program has a 91% placement rate and the average wage is \$19.54/hr. Students must pass the CertTEC Basic Electricity and Electronics (BEE) DC and AC certifications to be awarded the Electrical/Electronic Tester certificate. Electronics Technology students must also pass the CertTEC BEE Analog and Digital certifications plus ETA-I's CETa certification to be awarded an Electronics Engineering Technology diploma. Electrical-

Mechanical Technology students must pass the CertTEC BEE DC and AC certification exams to be awarded the Maintenance Associate diploma. The current success rate for all students in the program is 80%.

- **Hampton, VA:** [Thomas Nelson Community College](#) is a testing site for SpaceTEC Certified Aerospace Technology Core, CertTEC Composites and CertTEC Basic Electricity and Electronics (BEE).

Specific Objectives Relating to NSF Goals:

1. Expand the national repository for aerospace technical education to include industry Subject Matter Experts (SMEs) and supporting materials, implementing a system that matches information/assistance requests to relevant experts and data.
 - SpaceTEC proposed to obtain NASA and industry Space Shuttle Program materials, training curricula, testing and certification protocols, and relevant collateral data plus develop registries of SMEs who would consult/assist. SpaceTEC partner colleges further agreed to work with local and national groups, industry representatives, and government organizations to invite practitioners to access materials and available experts. The Center also planned to develop and implement methods that matched requests for assistance with relevant resources and where appropriate, develop enabling agreements with FAA, NASA, leading aerospace companies, and other entities.
2. Promote STEM opportunities to increase enrollments/certifications for special needs groups, including returning veterans and unemployed/underemployed technicians regardless of gender or national origin.
 - SpaceTEC proposed to articulate appropriate elements of the national core curriculum and core certification examination process to stackable credentials of immediate use in STEM-related technician jobs by leveraging existing programs to develop test banks, lab/shop capabilities, and prep courses in related technologies. Certification exams were to be offered at new locations for qualified returning Veterans and unemployed/under-employed technicians seeking hands-on work. SpaceTEC colleges planned to work with their local placement groups and area industries to implement new performance certifications in technical fields hiring in their area. In all, SpaceTEC proposed to offer certifications at six partner sites by 2015. Presently there are 20 sites nationwide capable of delivering SpaceTEC and CertTEC credentials.
3. Offer skill-based STEM-related professional development for educators and practitioners with emphasis on assessments, career pathways and stackable credentials.
 - SpaceTEC focused on adapting/developing/implementing workshops, course materials and skill-related credentials to update/educate teachers, examiners and practitioners with relevant data and qualified SMEs. SpaceTEC colleges agreed to work to strengthen the links between the workplace and classroom. Facilities where faculty/practitioners and shops/labs are available will serve as host sites. Workshops will be designed for new partners and to qualify examiners.

Participation is sought at certification training sessions with performance exams provided in conjunction with workshops where needed.

4. Strengthen/expand the national infrastructure to increase articulation and the availability of performance-based technician credentialing that is fee-bearing and sustainable.
 - SpaceTEC proposed to manage a national system linking post-secondary education programs to workplace credentials, implement tuition/fee systems that include all SpaceTEC partners in sustainable funding initiatives and establish nationwide articulation agreements, which will be managed by SpaceTEC. For sustainability, SpaceTEC would encourage partner colleges to fund programs through tuition fees and industry partners to sponsor/support these programs through endorsements and job postings. SpaceTEC also proposed to expand management and outreach systems to recruit new partners and extend the variety and use of prep courses and certification examinations to broaden the nationwide infrastructure, providing pathways to link STEM job needs with individual capabilities. Articulation agreements, which will be managed by SpaceTEC. For sustainability, SpaceTEC would encourage partner colleges to fund programs through tuition fees and industry partners to sponsor/support these programs through endorsements and job postings. SpaceTEC also proposed to expand management and outreach systems to recruit new partners and extend the variety and use of prep courses and certification examinations to broaden the nationwide infrastructure, providing pathways to link STEM job needs with individual capabilities.

Additional Objectives Undertaken in 2015 Included:

American Council on Education (ACE) College Credit Recommendation Service (CREDIT®) Renewal

SpaceTEC credentials approved for college credit through ACE's CREDIT® program are scheduled for review in April 2016. A supplemental funding request to NSF ATE set the stage for the review. If successful, the 76 semester-hour college credits awarded for SpaceTEC Certified Aerospace Technician® family of certifications will be renewed through 2020.

Following the ACE review, an application to the National College Credit Reporting System (NCCRS) for the CertTEC family of certifications will be undertaken.

Renewal as a result of the supplemental ATE funding award enables college credit by certification across a broad array of technical fields.

Aerospace Apprentice Certification DACUM

On Nov. 30, 2015 SpaceTEC sponsored an Aerospace Apprentice Technician Design a Curriculum (DACUM) event at St. Augustine High School Aerospace Academy in St. Augustine, FL. Successful capture of the knowledge and skills of an Aerospace Technician Apprentice by SpaceTEC's Community College Consulting Group facilitator laid the foundation

for industry representatives Northrup Grumman Corporation and Carlyle Interconnect to offer internships to students achieving certifications. Work is underway creating the curriculum plan and topic/subtopic structure from the DACUM chart to create the certification standard. Inclusion of the certification on the State Continuing and Professional Education (CAPE) funding list and registration as a recognized apprenticeship program through the State of Florida are also underway.

Teachers-in-Space and Airbus Perlan 2 World Altitude Record Attempt

In collaboration with Teachers-in-Space ([TIS](#)), a non-profit educational organization headquartered in New York State, SpaceTEC is sponsoring development of the basic flight hardware required for developing experiments to fly aboard Perlan 2, a high- altitude glider, as it attempts a world record for unpowered craft from Patagonia, Argentina in the fall of 2016. The unique glider is designed to soar at altitudes over 90,000 feet in stratospheric conditions using mountain waves.

In December, SpaceTEC's PI participated as one of 15 judges, selecting eight primary and two alternate teams who will build, test and fly experiments. The selected teams are now actively engaged in building hardware, programming data sensors and writing test and operations procedures the educator ground crew will follow to ensure experiment flight readiness.

In April, a team of pilots, engineers, scientists and educators will travel to Minden, Nevada for the final phase of the Perlan glider's test flights. The Perlan team will complete the test flight cards for the glider while the educator ground crew tests the integration of the CubeSat experiments into the vehicle and operation of the atmospheric sampling system developed to support some of the experiments.

In May and June, the educator ground crew will correct any procedural errors revealed during the test flight period. In July, procedures will be finalized and the team will travel to Argentina the first week of August to support the flights, which will occur between August 7th and October 1st, 2016. The program will allow the ground crew educators to spend two weeks working with top scientists, engineers and pilots managing real experiments and scientific data onboard the world's first stratospheric glider as it attempts the world record

In the coming months the ground crew educators will continue to post lessons, photos, videos, and data from the program so students from around the country can follow along.

The Perlan Project and its outcomes will be submitted to the National Science Teachers Association (NSTA) during the 2016/2017 school year for publication in its peer-reviewed journal.

Aerospace Maintenance Competition (AMC)



The 2015 Aerospace Maintenance Competition was held in Miami Beach, FL in April 2015. The competition highlights training, knowledge and skill required in the aerospace field and 39 teams representing aircraft manufacturers, airlines, Maintenance, Repair and Overhaul (MRO) and aviation maintenance schools from all over the world participated in the competition. One Suborbital Vehicle Operator, Virgin Galactic, also sponsored a team for the 2015 competition.

With the roles of the Reusable Aerospace Maintenance Technician (RAMT) and Aviation Maintenance Technician (AMT) converging with emergence of suborbital flight, competition organizers looked to SpaceTEC to design an event highlighting the role of an RAMT compared and contrasted with the role of an AMT.

Of note, Eastern Florida State College's Aerospace Technology program team member Brandon Dubberly, a 4th semester student at the Cocoa, FL campus, won the competition's Charles E. Taylor Professionalism Award as determined by votes from the 16 event judges. It was the first time in the event's history a student had won the prestigious award.

The 2016 Competition will be held in Dallas, TX April 4th-8th, 2016 in conjunction with MRO Americas, the largest commercial air transport maintenance, repair and overhaul conference in the country. The SpaceTEC event will once again be featured as part of the competition and an exhibit booth at the conference will promote performance-based credentialing to conference attendees.

SpaceTEC Schools-to-Space Program

In August 2015, SpaceTEC introduced the [Schools-to-Space](http://www.schools-to-space.com)[®] Program. Coordinated by the nation's only nationally-certified Aerospace Technician and licensed STEM educator, the program was initiated to develop and disseminate space education resources to middle and secondary school educators. Resources have been captured on the Schools-to-Space website at www.schools-to-space.com and provides a turnkey resource for educators, enabling teaching of space topics in their classrooms.

In addition, a series of interactive workshops were created for presentation at educator professional development conferences using aerospace-related materials and curricula to build capability for fostering student interest in STEM fields. An initial workshop was held at SpaceTEC Headquarters in Aug. 2015 with 19 STEM educators in attendance, followed by a second three-day workshop at the M-STEM conference in Cocoa Beach, FL Nov. 1st-3rd, 2015. Additional workshops have been scheduled for Miami Dade Schools hosted by George T. Baker Aviation College in May 2016 and for Houston, TX area schools hosted by San Jacinto College Aerospace Academy in June 2016.

Schools-to-Space activities include a website resource; teaching Human Space Flight in secondary schools; "I want to be an Astronaut" movie screening; and the "Classroom at the Edge of Space" MiniCube program. The initiative also includes a STEM educator interactive workshop on "Classroom at the Edge of Space" and information on how to bring the MiniCube low-cost space experiment program to middle and high school students.



Veterans Technical Education Connection (VetTEC®)/Tidewater Community College Center for Military and Veterans Education (CMVE)

As the US military reduces the active duty force, assisting service members and unemployed/underemployed veterans with pathways to civilian occupations through the Veterans Technical Education Connection ([VetTEC](#)) initiative provides employers a work-ready, disciplined, highly trained, experienced, motivated workforce. SpaceTEC established partnerships in key areas at DoD, VA and educational institutions such as Tidewater Community College's Center for Military and Veterans Education (CMVE) to assist in aligning technical military occupational specialties with industry-endorsed certifications. By providing funding solutions, examination equipment and credit for prior learning, SpaceTEC and *CertTEC* accredited certifications continue to be the primary areas of focus.



The VetTEC portal was designed to support transitioning military and veterans with information on funding sources and credentialing opportunities aligned with their military skills as they exit active duty and seek living wage jobs was implemented in Aug. 2015 at the Center for Military and Veterans Education (CMVE) at Tidewater Community College in Virginia Beach, VA and Thomas Nelson Community College, Hampton, VA. Discussions on plans for implementing aerospace-related assessments is underway. Additional efforts to expand funding sources through Army/Air Force/Marine Corps/Navy COOL and VA were also undertaken.

By linking credentials to military skill sets that match employer needs, career pathways are established. The CMVE is the largest and most active Veteran's Education Office in the country and the greater Norfolk area has the largest collection of military aviation technical specialties in

the country. VetTEC was created to support qualified candidates as they prepare for industry-recognized certification exams in aviation and related fields.

National Aviation Consortium (NAC) Peer to Peer Conference

SpaceTEC was invited to attend the National Aviation Consortium (NAC) Peer to Peer Conference at Guilford State Technical College in Greensboro, NC. The NAC presented results of the successful CertTEC Aviation Mechanical Assembly certification implementation at Wichita Area Technical College to training center representatives and representatives from the National Association of Manufacturers Manufacturing Institute.

National Aviation and Aerospace Workforce Summit

SpaceTEC supported the National Aviation and Aerospace Workforce Summit at the Newseum in Washington, DC. The summit presented results for the National Aviation Consortium (NAC), a Department of Labor Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant which created a five-state regional aviation manufacturing training network which concluded in 2015. Through the three-year program, over 2500 aviation manufacturing technicians were trained and many certified in five career pathways: Aviation Mechanical Assembly, Aviation Composites, Aviation Electrical Assembly, Quality Assurance and Tooling. SpaceTEC's CertTEC division provides credentialing support in Aviation Mechanical Assembly and Composites presently and an additional certification for aviation electrical assembler is planned for 2016.

FAA COMSTAC

SpaceTEC continues to support the FAA Office of Commercial Space Commercial Space Transportation Advisory Committee (COMSTAC) for development of policies providing emerging commercial space transportation companies engaged in commercial space resources for professionalizing the industry.

Florida State Career and Technical Education Avionics Curriculum Revision and Review Workshop

SpaceTEC Partners Inc. CertTEC division supported the Florida State Career and Technical Education Avionics Curriculum Revision and Review Workshop in Punta Gorda, FL to revise and update the state's Avionics Frameworks, which will be available in the 2016/2017 academic year.

Boeing Commercial Space Division Training Plan

SpaceTEC assisted Boeing Commercial Space Division's efforts to develop a Training Plan supporting technicians engaged in construction of the Boeing CST-100, a human space transportation vehicle under development at the Kennedy Space Center in FL. The craft is being built for ferrying astronauts to and from the International Space Station. The first flight of the CST-100 is slated for late 2017.

Brevard County, FL Public Schools STEM Mini-Conference

The SpaceTEC Certified Aerospace Technician and CertTEC family of performance-based certification programs were presented to 320 middle and high school STEM educators.

Infrastructure Improvements:

Over the past year:

- The SpaceTEC National Resource Center significantly strengthened the ability to support question bank development, certification program updates in near real-time and timely certificate delivery nationwide through addition of a full-time Certification Specialist and reclassification of the Document Specialist to Document Coordinator with added responsibilities supporting database maintenance and certificate preparation/delivery across multiple certification products.
- The SpaceTEC certification process powered by Questionmark's Examination Management System was converted from a licensed, server-based program to OnDemand, a cloud-based, scalable certification examination delivery application with expanded bandwidth and 24-hour technical support.
- The SpaceTEC and CertTEC robust recertification process was expanded to the CertTEC Basic Electricity and Electronics certification as technicians certified under this program reach expiration of the initial three-year certification period.
- Added value through a partnership with Aerotek Aviation Inc., the nation's largest aerospace job placement service. Through the program, when technicians are certified through any of the SpaceTEC and CertTEC programs, they are offered the opportunity to "opt in", allowing SpaceTEC to share their contact information with Aerotek.
- SpaceTEC expanded both industry advisory panels, the National Aerospace Technology Advisory Committee (NATAC) and Commercial Industry Technology Advisory Committee (CITAC), with inclusion of partner college educators with expertise in the associated areas.

INTELLECTUAL MERIT

Training and Professional Development Opportunities

Eastern Florida State College (EFSC) Service Learning Program

Each semester SpaceTEC selects two students from the [EFSC Aerospace Technology Program](#) to serve as unpaid interns through the college's Service Learning Program. Through the program, students work at SpaceTEC HQ, receiving real-world experience in prompt attendance, proper dress, timekeeping, lab/shop safety, inventory control, Lean/5S and basic applied mechanical shop skills through light manufacturing of composite and aluminum coupons, plus electrical,

pneumatic, and fluids testing components. The EFSC Service Learning Program is a teaching method and educational experience that blends both service and learning to help students learn and develop through active participation in thoughtfully organized activities that provide the opportunity to experience the aerospace workplace. The program fosters academic learning, on-the-job training and helps develop a sense of responsibility and civic duty. SpaceTEC was also able to hire one EFSC Aerospace program student as temporary part-time for certification exam question bank and database development from June 2015 through May 2016.

Northland Community Technical College/Clemson CA2VES Large Unmanned Aircraft System (UAS) Maintainer Certification and the Virginia Space Grant Consortium/Virginia Polytechnic University Small UAS Operator Training and Certification Initiative

SpaceTEC provided Letters of Support to Northland Community Technical College and the Virginia Space Grant Consortium for project proposals each successfully submitted to develop large UAS maintainer and small UAS operator training and certification programs. Plans are being finalized for a Design a Curriculum event at Northland in Thief River Falls, MN in spring 2016. Additional support from CA2VES at Clemson University for potential to create simulations for hybrid training is underway as well.

New Partner College Examination Testing Sites

Over the past year SpaceTEC and CertTEC continued implementing credentialing capabilities at new partner sites across the country through pilot testing, exam proctor training and examiner certification. In 2015/2016 additional examination testing sites and/or partnerships leading to testing capability were added at [Leeward Community College](#) in Pearl City, HI; [Gateway Technical College](#) in Kenosha, WI; [Metro Technology Center](#), Oklahoma City, OK and [Trident Technical College](#) in Charleston, SC.

Recertification Process for Certified Technicians

Over the past year SpaceTEC continued implementation of the recertification process for SpaceTEC and CertTEC certified technicians to ensure currency and relevance as the three-year limit is approached for certifications.

NASA Internships

Presently NASA's Langley Research Center in Hampton, VA offers paid internships to graduates of SpaceTEC partner Thomas Nelson Community College's Engineering Technology program who successfully complete the SpaceTEC Certified Aerospace Technician Core exam.

In addition to Thomas Nelson Community College, SpaceTEC continues to support education partners at Eastern Florida State College in Cocoa, FL; Calhoun Community College in Huntsville/Decatur, AL; Dona Ana Community College in Las Cruces, NM and Eastern Shore Community College in Melfa, VA with curriculum development, educator professional

development, credentialing and information for local workforce boards and decision-makers at the respective NASA centers as opportunities and requests for information arise.

National Dissemination

Enhanced partner college student success is a primary goal of aligning learning outcomes with national credentials. Partners report with increasing frequency student achievement is improved when industry-recognized credentials are embedded in technical training and education programs. This is being communicated to interested parties at conferences and meeting nationwide.

Professional Organization Memberships and Participation

Memberships/sponsorships through the National Coalition of Advanced Technology Centers ([NCATC](#)) and the National Materials Education in STEM (M-STEM) Educators Workshops significantly extends information on SpaceTEC and CertTEC programs to hundreds of community and technical colleges nationwide. In addition, SpaceTEC is strengthening existing relationships through updated partner agreements and has added new partners to better support development of a national aerospace STEM technician workforce.

Activities for the Coming Year

1. Broaden the membership through conferences, Career Days and by leveraging working groups (COMSTAC, Commercial Space Conference, Space Congress, Soldier for Life, ASEE, LIFT, etc.).
2. Promote Memorandums of Understanding (MOUs) and Letters of Understanding (LOUs) for specific projects such as curriculum/credential development, screening tools, end-of-course verifications and credentialing pilot opportunities.
3. Continue strengthening partner program links to SpaceTEC and CertTEC credentials and expanding the consortium with those who seek performance testing as added value to STEM education programs.
4. Seek industry support through credentialing recognition/endorsement from commercial space operators, NASA, military aviation manufacturers, Maintenance/Repair/Overhaul (MRO) companies, others.
5. Continue building career pathways in STEM-related disciplines through performance-based credentialing as a measure of technician knowledge and skill.
6. Focus on education/outreach to Boys and Girls Clubs, middle/high school educators, colleges, and technical training centers to build excitement for aerospace STEM technician careers.
7. Build on initial support to veterans through the VetTEC program by providing linkages/pathways for transitioning military and veterans between military skills and experience and opportunities for living wage jobs.
8. Ensure a sound infrastructure through strategic planning to better support ongoing and planned activities.

9. Continue working to strengthen NATAC/CITAC certification subcommittees with new partner members/Chairs.
10. Continue certification QA efforts through audits, psychometrics (bias, validity and reliability), revisions/updates and development of a Certification Manual.
11. Continue emphasis on developing performance-based certifications in Advanced Composites, Journey-Level Aviation Structures, Aviation Electrical Assembly and Mechatronics for companies who may benefit from industry-endorsed performance-based credentialing as a qualification for employment.
12. Investigate and support developing new credentials in evolving specialties in emerging industries such as large and small Unmanned Aerial Systems.

Other Publications

CertTEC (2015). *CertTEC - Certifying Technical Employee Competence*. Handout describing the *CertTEC* performance-based certification program for certifying technical employee competence. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

SpaceTEC (2015). *Pathways Banner*. Model depicting pathways to employment and focusing on assessments, gap training, industry-endorsed certifications and ultimately technician jobs. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

SpaceTEC (2015). *SpaceTEC Certified Aerospace Technician Program*. Handout describing the *SpaceTEC Certified Aerospace Technician* certification program. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

SpaceTEC (2015). *SpaceTEC Schools-to-Space Program*. Flyer describing *SpaceTEC's Schools-to-Space* program, which provides resources for middle and high school educators to excite students about space and aerospace STEM careers. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

SpaceTEC (2016). *VetTEC Flyer*. Handout with description of *VetTEC* program. Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Technologies or Techniques

1. Aviation Mechanical Assembly Technician Certification Standard
2. Aviation Structures Technician Certification Standard
3. Avionics Technician Certification Standard
4. Basic Composites Certification Standard
5. Impacts

Future Technician Credential Development

SpaceTEC continues to develop relationships with subject matter experts nationwide qualified and willing to consult and advice on the uses and strengths of the body of information contained

within the certification programs administered by the National Resource Center. These SMEs represent a deep and rich knowledge asset that is not available through other means. Their knowledge and experience is key in preparing educational materials and credentialing processes that are readily and quickly customized and deployed in almost any STEM field requiring technicians who do hands-on work.

Meanwhile, through CertTEC, VetTEC, Schools-to-Space and now [Credential Testing Services](#), the body of information contained within these programs is finding a wide range of applications well beyond their aerospace heritage. Many more far-ranging applications are expected to follow. As additional requests for support are received from sectors where hands-on skills and competencies are essential for successful job performance, new programs will be developed and deployed.

Additional credentials under development for use in aerospace/aviation manufacturing and related technical fields presently, or within the next year, include:

1. Intermediate DC, AC, Analog and Digital Electricity and Electronics (IEE)
2. Aviation/Aerospace Electrical Assembly
3. Journey-Level Aviation Structures Technician
4. Avionics
5. Advanced Composites
6. Large Unmanned Aerial Systems (UAS) Maintainer
7. Small Unmanned Aerial Systems (sUAS) Operator

South Carolina Technical College System and 180 Skills Maker Support

At the request of SpaceTEC educational partner Trident Technical College, efforts are underway to support the South Carolina Technical College System with assessment delivery and national stackable credentials aligned to short-term training programs for state workforce development agency instructors, secondary school students in underserved areas and incumbent workers interested in upskilling.

180 Skills Maker (www.180skillsmaker.com) provides convenient online pay-as-you go technical education in 16 career training programs. Photorealistic illustrations, animations and simulations for full immersion training are available in a “stackable credentials” concept and third-party exams requested by State of Indiana are administered by Credential Testing Services (CTS), SpaceTEC’s newest division, with proctor agreements in place with Ivy Tech testing sites at 24 locations across Indiana. The program’s real value is the certificate may open doors to job interviews for underemployed, shift workers; distance learners and includes courses in aerospace

structures, composites, electrical assembly, machining, NDT, quality assurance, human factors, lean six sigma Green Belt and bonding/sealing. Individuals earning them will have achieved an “aviation manufacturing intern” level credential providing employers assurance those earning them have knowledge in the fields of interest and therefore are deserving of an opportunity to interview for internships or employment. Once earned, the certificates qualify technicians who have gained practical skills through on-the-job experience to sit for SpaceTEC and CertTEC performance-based certifications in related fields.

SpaceTEC Internships

Through Eastern Florida State College's Service Learning Program, unpaid interns from the Aerospace Technology program receive on-the-job training, experiencing light manufacturing, lean concepts, FOD, inventory control, laboratory/machine shop operations and safety to bolster their educational program and to provide for resume development and job interview success. To-date, over 400 hours has been accumulated by students in the program and successful job interviews have resulted in successful placements in industry both locally and nationally.

Employment Screening Tools

The concept of credentialing as a qualifier for employment is becoming ever more relevant as companies seek strategies to increase competitiveness in the global economy. With today's technology, and a blossoming job market, resumes have become weak decision points for assessing technical skills due to the ability for anyone to access information and templates to create a record of accomplishments, whether accurate or not. For many companies, managing risk in the hiring process starts with ensuring those selected have the “right stuff”. As gains in productivity are sought to control operating costs, more employers are turning to credentialing as a means of validating technician capabilities. Thanks to continuing support from partner colleges, military training organizations and industry leaders in key economic sectors across the country, SpaceTEC continues to see increasing interest in performance-based credentialing as a means of proving technician capability and therefore enabling informed decisions in the hiring process.

Over the past year, the SpaceTEC National Resource Center for Aerospace Technical Education has continued its focus on developing credentials in areas we think align with the developing technologies that are the most compelling for US industries today.

Certified Technician Placement Assistance

As work to professionalize the STEM technician career field and onshore manufacturing continues, SpaceTEC is partnering with Aerotek Aviation, Inc. the nation's largest aerospace placement agency, to provide placement support for SpaceTEC and CertTEC-certified technicians. By providing hiring managers evidence-based employment tools which identify basic knowledge and skill levels adaptable to virtually any STEM field, risk in the hiring process can be substantially reduced.

Knowledge and Skill Inventories (KSIs) and Industry Aptitude Surveys (IASs) are intake assessment tools which use derivatives of SpaceTEC and CertTEC certification examination question banks tailored for specific purposes. These inexpensive assessments are easily scaled and can be applied anywhere Internet access exists with results immediately available. KSIs and IASs are being used as an objective third-party screening tool to narrow the field in selecting potential employees for job interviews, as an internal assessment for selecting incumbent employees for additional training and promotion and as a method for tailoring education and training to more effectively account for what individuals already know rather than employing a "one size fits all" approach with training resources. Web-based employer-endorsed third-party assessments are more efficient and cost effective human resource tools than traditional approaches. Candidates for employment can be screened quickly and objectively with targeted training solutions developed to accelerate workers to the shop floor.

Education Program Assessments

The KSIs and IASs derivatives are also instruments that can be employed as "before-after" assessments in educational programs. When these tools are administered at the start of a course or program, a "baseline" of knowledge is obtained. When applied as an exit assessment, it is possible to determine which course objectives were achieved and also where improvement in pedagogies can be implemented.

Formal Accreditation

As the aerospace industry becomes increasing global in nature, the aerospace workforce must maintain a level of competence required to successfully compete with other countries.

SpaceTEC remains committed to supporting students working to become technicians, unemployed and underemployed Veterans and incumbent workers wishing to upskill through programs formally accredited to International Standards Organization (ISO) 17024: General Requirements for Bodies Operating Certifications of Persons. This achievement opens many doors for opportunities to support organizations seeking formally-approved technician education and credentialing programs in aerospace and related fields.

Examination Delivery Infrastructure

In addition to human resources, physical resources SpaceTEC has developed and provides to consortium members and others upon request includes surplus/excess equipment; promotional materials such as fliers, brochures, and banners; examiner training; including examination manuals, practical testing supplies in standardized certification test kits and examination pilot programs for partner colleges, all at no charge. The estimated value of these contributions exceeds \$150,000 annually.

Examiner and Test Proctor Development

With over 20 practical exam testing sites currently existing nationwide and formal agreements in place with many more test proctoring sites, the SpaceTEC National Resource Center continues to expand the capability to deliver computer-based testing and performance exams supporting a wide variety of military bases and aerospace/aviation industry locations nationwide. Following completion of SpaceTEC, CertTEC or Credential Testing Services onsite survey checklists, Certified Examiner training and test proctor qualification, formal recognition is granted to test administration sites. Included are configuration-controlled test proctor and test administrator guides, examiner manuals, and promotional materials such as wall banners, wall plaques and window shade banners.

National Aerospace Consortium

The most vital and important asset SpaceTEC has developed is the national consortium of partners in education, business/industry, government and the resources and processes under their management and control. In order to support partners locally, nationally and even globally, SpaceTEC continues to sustain a broad and powerful national aerospace infrastructure. Each partner technical training center, college and university has a local advisory function that provides the focus for education and training program development.

Throughout its history, SpaceTEC has invited selected representatives from local advisory committees to meet as part of the National Aerospace Technology Advisory Committee (NATAC) and Commercial Industry Technology Advisory Committee (CITAC), linking education partners and their supporting industry together in an effective national infrastructure. NATAC and CITAC representatives join in quarterly teleconferences and are invited annually to attend the National Visiting Committee (NVC) meeting.

Consisting of an assemblage of over 30 education partners, more than 50 industry and commercial training providers, government agency representatives, and many others across the nation, the National Consortium continues to grow and thrive.

Aerospace Training/Certification Repository

In the past year SpaceTEC continued to adapt credentialing programs developed through work with commercial space partners to non-aerospace applications that serve technicians in a wide variety of industries. Work to improve the NASA database of technical training and certification materials to enable education and credentialing services to STEM technicians in related fields remained underway as well. SpaceTEC continued developing the aerospace training/certification repository in support of US Commercial Space activities and STEM education programs over the past year. Additional SME's were added and SpaceTEC staff actively links SME's to developing programs and new Web inquiries as the opportunities arise.

SpaceTEC Educational Resources

SpaceTEC continues to provide a national focal point for aerospace technical education available upon request to educational, business/industry and government agencies directly.

As a recognized authoritative source, SpaceTEC provides important elements of a national aerospace information resource organized in three categories:

Web-based Resources

SpaceTEC websites (www.spacetec.org, www.certtec.com, www.schools-to-space.com and www.vet-tec.us) are extensive and include information on the structure of SpaceTEC and makeup of its participating partner organizations; information on the nature and extent of certifications, including qualifications for program participation, and access to preparatory courses, sample exams, registration processes and payment options; access to curricular materials, including reference sources and background information; recommended sources of educational support for meeting certification competencies; contact information for further inquiries and specific questions; real-time chat and helpdesk functions; links to blogs and social networking activities related to careers in aerospace; current information on space launch activities; certification activity, including names of certified technicians and job placement support through national placement agencies.

Video, including links to interactive readiness courses, created and maintained by the SpaceTEC specifically for aerospace technicians and related information of value to emerging commercial aerospace companies. Specialized workshops, clinics, courses, and seminars provided by SpaceTEC partner colleges and, in some cases, partnering training industry providers and professional organizations are also available to partner college instructors through the SpaceTEC Professional Development Opportunity Program.

Databases and reference materials comprising a digital library; links to relevant materials from civilian and military programs providing aerospace-related information; lessons learned and best practices; and access via specific request to the information contained in the NASA database of information from human spaceflight activities outlined in the section on the impact on other disciplines, above.

CertTEC Computer-Based Practical Testing

In conjunction with Nida Corporation, in 2004 SpaceTEC developed the first practicum-based computer-delivered testing protocol for the Basic Electricity competency in the SpaceTEC Certified Aerospace Technician Core exam. By connecting a Nida student trainer to a laptop linked to SpaceTEC's Questionmark testing platform, proprietary HTML coding drives the system, which requires candidates for certification to answer questions and troubleshoot circuit faults with common electronics measurement equipment such as digital multi-meters, oscilloscopes and function generators.

Taking the technology a step farther, in 2010, SpaceTEC[®], through its CertTEC division, created the only known performance-based examinations for DC, AC, Analog and Digital electronics. Now in use at industry partners, community colleges, technical training centers and military bases across the country, the CertTEC Basic Electricity and Electronics (BEE) performance-based certification has become the most requested, active credential in the CertTEC inventory.

Beginning in April 2016, CertTEC will be introducing the only known performance-based Avionics exam for aerospace technicians. Following the same protocols, the CertTEC Avionics exam will require a candidate to demonstrate not only knowledge of Avionics theory, but also demonstrate the ability to measure, troubleshoot, fabricate and repair the complex Avionics equipment found in today's technology-driven aviation platforms.

Credential Testing Services

SpaceTEC's Questionmark OnDemand Examination Management System enables assessment authoring, secure delivery and reporting analytics available worldwide on a scalable, cloud-based testing platform. The platform has been incorporated into a new division, Credential Testing Services ([CTS](#)), developed for fee-based delivery of proctored, computer-based, non-practicum assessments and stackable credentials to students, instructors, incumbent workers and others world-wide.

Credentialing Process Continuing Improvement

As part of SpaceTEC's Quality Management System (QMS) and in an effort to ensure SpaceTEC and CertTEC certifications are fair and legally defensible, an initiative is underway to identify and mitigate any potential bias (ethnicity, gender, ADA). As the reviews are completed, potential bias is identified and mitigation strategies recommended by the reviewer. Proposed changes are then presented to the SpaceTEC advisory board subcommittees for ratification before changes are undertaken in the examination question banks. Review of the CertTEC Basic Composites, Aviation Structures Technician and Aviation Mechanical Assembly question banks are complete and results have been ratified and incorporated. Basic Electricity and Electronics and Avionics question bank reviews will be undertaken in 2016.

INDEPENDENT REVIEWS

SpaceTEC External Evaluator Report

The SpaceTEC External Evaluator Report was submitted to SpaceTEC in January 2016. The report was prepared by Albert Schwabenbauer, who has been the SpaceTEC external evaluator since 2005, and highlights progress over the past year in achieving the goals set forth in the NSF ATE grant.

Specific examples include:

- SpaceTEC education partners increased by nearly 100% in the past two years, from 13 in 2013, to 18 in 2014, and to 25 in 2015
- SpaceTEC's national industry advisory council, (NATAC) and national visiting committee (NVC) representatives are comprised of aerospace industry leaders, including the FAA's commercial space flight office. All are committed to supporting the goals and vision of SpaceTEC.
- Certificates awarded increased from 108 in 2013 to 580 in 2014, and to 1140 in 2015, a 10-fold increase in 3-years.
- Partnerships with the Community College of the Air Force, all branches of the Department of Defense, NASA and its various laboratory and aerospace manufacturing and launch sites around the United States, and with the FAA and the new emerging commercial space activities, critical to the mission of developing new education systems and standards-based certifications for US aerospace technicians.
- ISO 17024 accreditation by the International Certification Accreditation Council (ICAC).
- Education partners and affiliates are located in states with NASA, DOD, and/or commercial aviation, aerospace manufacturing, and space launch centers.
- SpaceTEC attended a mini-conference for 300 Brevard Public School educators and co-sponsored a week long STEM event with Alcoa in Michigan, which reached 1300 middle school students. Future plans are to partner with high school aerospace/aviation technology programs and establish dual enrollment and credentialing programs for high school students.
- The Certified Aerospace Technician Core certification continues as a formal requirement for entry into NASA's Langley Research Center paid internship/cooperative student program. Thomas Nelson Community College prepares students to enter NASA careers. The model program is the only community college apprenticeship program model in NASA. All NASA Langley-TNCC CO-OP students must complete both their degree and also pass the SpaceTEC certification. The program has enjoyed strong support from NASA Langley, which assigns mentors for all students in the program and has maintained an outstanding 100% student completion rate.
- SpaceTEC affiliates include 50 principal DOD, NASA, and commercial space launch companies and formal agreements exist with all key US Government aerospace agencies: Department of Defense (All DOD Service Branches—Army, Navy, and Air Force), NASA, and FAA (Commercial Space Office).
- Veterans Technical Education Connection (VetTEC) supports transitioning and unemployed and underemployed veterans with information on funding sources and credentialing opportunities.
- The American Council on Education (ACE) is a tremendously valuable incentive allowing technicians to be life-long learners. A survey of SpaceTEC certified technicians showed that 66% plan to continue their formal education.
- Job placement support is now available with AeroTEK, the nation's largest aerospace placement agency

- Credentialing exam prep courses and expanded funding sources for education opportunities for active duty US military—Army, Navy, Air Force, and Marines through Credentialing Opportunities On Line (COOL) were implemented.
- Support requests for NASA training materials from SpaceTEC's data base containing over 30 years of specialized human spaceflight training and certification documentation, including courseware, On-the-Job (OJT) training packages, test requirements, hands-on skills demonstration and links to NASA Lessons Learned information were processed for 5 education partners in 2015.

SpaceTEC 2015 National Visiting Committee Report

The SpaceTEC National Visiting Committee report prepared by Stewart Harris, SpaceTEC NVC Chair was submitted to SpaceTEC in February 2016. The report stated "The National Resource Center for Aerospace Technical Education (SpaceTEC) continues as an outstanding Center for NSF-ATE. The extensive network of national education and industry partners and their combined success in enhancing technology education and certification demonstrate the success of the Center in fulfilling its role as a resource and model Center. Commendations for SpaceTEC's work and recommendations of the committee going forward were:

Commendations:

Steve Kane's leadership as PI of SpaceTEC ATE has been instrumental in the overall success of this Center. Steve has managed multiple activities (SpaceTEC, CertTEC, and VetTEC), as well as growing the partner and college affiliate network. In addition, he has assembled diverse advisory groups (NATAC, CITAC, and NVC) whose members have a broad range of experience.

- Kudos to the SpaceTEC team for orchestrating an outstanding event well attended by the NVC, college partners and affiliates, NATAC and CITAC. The networking and sharing of best practices and perspectives by the 52 participants was valuable for all partners who develop and support technician education programs and certification.
- SpaceTEC's strategic plan is approximately 75% complete and the organizational charts demonstrate the comprehensive planning that is under development.
- SpaceTEC continues to expand its network of college partners growing from 11 in the previous year to its current list of 25 that are located across the United States in 15 states.
- SpaceTEC has successfully added four (4) members to the National Visiting Committee, providing an excellent mix of government, industry and academia.
- VetTEC provides veterans and military transitioning into civilian careers with a pathway for transforming technical skills and experience into job-ready credentials.
- CertTEC certifications increased by approximately 80% i.e. 571 in 2014 versus 1020 in 2015.
- The Certified Aerospace Technician Apprentice DACUM to create a credential applicable to secondary school students in aerospace programs who do not qualify for the

SpaceTEC exam without completion of the 2 year technical degree is very encouraging for development of future opportunities and career pathways.

Recommendations:

- The number of partners has grown significantly and there is concern the current staff cannot respond to partners in a timely manner if this growth rate continues. Business development must be aligned with the capability of the existing infrastructure to ensure quality.
- Continue to make industry aware of the advantage of third party performance based certifications.
- Maintain a balance between certification goals and expansion of the partner network. Developing and leveraging additional funding sources, including opportunities provided by the partner colleges, may alleviate the stress on expansion with existing resources.
- Develop a strategy for maintaining and sustaining performance based third party certifications. The aerospace industry is evolving rapidly post-shuttle and the SpaceTEC certification strategy needs to follow current aerospace technical and business models.
- Continue to explore all opportunities for intern & co-op programs. The SpaceTEC/NASA Langley/Thomas Nelson Community College partnership with certifications, co-ops and apprenticeship is proven model. Eastern Shore Community College's model with Wallops Flight Facility and their contractors is another.
- Continue to develop a UAS Strategy as an opportunity for expansion of aerospace technician education and certification.
- Consider embedding workplace skills into the third party certification process.
- With the expansion of new members (NVC, NATAC, CITAC, education partners and affiliates), create a one-page document explaining the roles and responsibilities of the various groups to help clarify each entity's role and eliminate any confusion of overlapping responsibilities