TRANSITIONING VETERANS TO ENGINEERING-RELATED CAREERS – WAY FORWARD SUMMIT REPORT

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WASHINGTON, D.C.

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• We support engineering education locally, regionally, and nationally, by forging and reinforcing connection between academic engineering and business, industry, and government.

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Transitioning Veterans to Engineering-Related Careers – Way Forward: Summit Report
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EXECUTIVE SUMMARY

A day-and-a-half educators’ summit May 1 and 2, 2014 generated practical ideas and clarified steps needed to train veterans entitled to GI Bill benefits for careers in engineering and engineering technology. Funded by the National Science Foundation, the summit was hosted by the American Society for Engineering Education.

Administrators and faculty members from 11 two-year and 15 four-year colleges and universities – mostly public and all nonprofit – looked for ways that veterans could take full advantage of a relatively low-cost pathway into engineering: starting at a community college and completing a bachelor’s degree at a four-year college or university. They examined impediments to a smooth transition from active duty to college and from two-year to four-year programs; skill gaps common among servicemen and women; how to count military training and experience toward academic credit; and ways that institutions could become more veteran-friendly.

Among key ideas requiring action by multiple institutions and/or government were: forming consortia of two-year and four-year colleges to compile best practices and share data; transfers both within and between states; common articulation mechanisms and standards; advisory panels comprising representatives of academic institutions, the military, and industry; an online offering of engineering requirements that could be fulfilled while on active duty; and closer involvement of ABET accreditors in veterans’ engineering education. Despite the relative affordability of community colleges however, cost remains a potential obstacle. Many veterans simply may not have a sufficient academic background to complete an engineering degree within the 36 months of GI Bill payments.

Steps within institutions that attendees generally considered important, if not essential, included: support from senior administrators; improved services and advising, begun before a veteran arrives on campus and sustained with designated staff; efforts, including training if needed, to increase faculty awareness of and sensitivity to veterans’ needs; clearly defined pathways to degrees, certifications, and careers; “bridge” programs to bolster math and science skills; and improved, consistent methods for assessing and granting credit for prior learning.

Attendees were expected to disseminate results of the workshop among leaders of their home institutions. Contact among organizers and attendees will continue with an eye toward turning the ideas into plans for action.

INTRODUCTION

On May 1 and 2, 2014, the American Society for Engineering Education (ASEE) convened a summit of educators with the aim of developing a national model for transitioning veterans from two- to four-year engineering programs (the event agenda is shown on Appendix A). Funded by the National Science Foundation (NSF), the day-and-a-half meeting in Washington, D.C. drew administrators and faculty members and from 11 two-year colleges and 15 four-year institutions, along with staff from NSF, ASEE, the American Council on Education (ACE), and the American Association of Community Colleges. The executive director of ABET and one official each from the U.S. Office of Naval Research and the White House Office of Science and Technology Policy also attended. Speakers’ biographies and summit attendee list are shown on Appendices B and C, respectively.

The summit followed a 2013 ASEE workshop that produced a dozen recommendations on ways to smooth veterans’ transition from military service to careers in engineering and related fields. Both events reflected a belief among the organizers and sponsors that veterans, including hundreds of thousands who served in Iraq and Afghanistan, represent a pool of talent that would benefit the country and bring worthwhile experience and diversity to the engineering and engineering technology workforce.

Expected summit outcomes were:

- highlighting of successful partnerships among 2-year and 4-year degree granting institutions that support veterans’ transition to engineering related careers;
- development of a preliminary framework, including effective articulation and advising documents, for efficient transition of veterans to engineering-related careers;
- commitment from attendees to advocate for the adoption of the proposed framework at their institutions and in their states.

In the months leading up to the summit, ASEE produced and circulated a short concept paper for a national program that would simplify and standardize veterans’ pathway to a general engineering technology associate’s degree offered by a consortium of authorized colleges (see Appendix D). The summit was facilitated jointly by ASEE and ACE, drawing on the Society’s institutional knowledge of engineering schools, faculty, and educational practices and the Council’s study of campus veterans’ services and experience assessing programs for nontraditional students.
Welcoming attendees, ASEE Executive Director Norman Fortenberry said their task of working out pathways into engineering for veterans was “extremely important for ASEE, NSF, and the nation.” He added: “We’re not here to deal with nuances. We’re here to come up with something workable.”

Theresa Maldonado, Division Director, Engineering Education and Centers, National Science Foundation, stressed the importance both of highlighting the “E” in STEM and providing opportunities for veterans. More broadly, strategies for veterans could be adapted to other nontraditional student populations - including those with disabilities - and thereby increase diversity in engineering. She noted as well that funding was available to support programs that involve veterans in research. When students are engaged in research, she said, “You tend to retain them all the way to a degree.”

Nicholas Maynard, Assistant Director for Telecommunications Innovation at the White House Office of Science and Technology Policy, said that with 1 million service members due to transition out of the military in the next several years, the Obama administration was encouraging public private partnerships to improve veterans’ employment prospects, “particularly in the IT space.” One example was a pilot effort announced in April, 2013, to provide training sufficient for veterans to secure industry-recognized certification in 12 technology occupations. That program was expected to reach up to 161,000 service members. With numerous organizations wanting to support veterans, he suggested attendees find ways to leverage existing resources and scale up successful efforts.

Setting The Stage

Two ASEE staff members then described how thinking had evolved on moving veterans into engineering careers. William Kelly, director of External Affairs and a decorated Vietnam-era Marine, provided an overview of a 2013 ASEE-led workshop. That meeting looked for ways to build early awareness of careers as engineering technicians, engineering technologists, and engineers (ETETE) and the pathways that lead to them; ensure academic recognition of service members’ prior experience; define and propagate supportive academic environments; and provide seamless support from government agencies, academic institutions and industry. Workshop participants recognized that veterans’ success meant maximizing credit accumulation and minimizing time to degree. They also saw a need for alternate pathways. One route would be an open-ended AA or AS degree designed for veterans. This could serve either to train veterans as engineering technicians or as the first stage in preparing for careers as engineering technologists or engineers.

“The issue we struggled with was recognition of non-traditional learning,” Kelly said, referring to the difficulty of assigning academic credit to technical knowledge and experience acquired during military service. That challenge, however, dovetailed neatly with ACE’s interest in post-traditional students. “There are a lot of opportunities out there” in engineering fields, Kelly said, but they demand “a minimum” of two years beyond high school. If a veteran can make the shift to an academic setting at a two-year school, he or she is “halfway home.”

Model Career Pathway

With the aid of a diagram (see Appendix E), Ashok Agrawal, ASEE’s managing director for Professional Services, explained the variety of ways veterans might acquire an engineering or engineering technology credential and enter the workforce. They could start with online courses and/or classroom instruction at a two-year college, earning technical credits that could be combined with credit for prior experience. These credits could provide stackable certificates or lead to either an Associate of Science (A.S.) or an Associate of Applied Science degree. Those degrees, in turn, could enable a veteran to a four-year program leading either to a bachelor’s in engineering,
engineering technology, or supervising/management and beyond that to pursue graduate study. None of these degree outcomes would be closed off.

“None of the steps is terminal in nature,” Agrawal said. “The idea is to show them a broader pathway.” For instance, although an A.A.S. degree ordinarily would be a route into engineering technology, a student could enter a four-year engineering program through a “bridge” program. The overall intent would be “a national program that serves all veterans in a seamless way.” He concluded by quoting an exchange between rapper will.i.am and Dean Kamen, the entrepreneur and founder of FIRST (For Inspiration and Recognition of Science and Technology) on promoting the FIRST Robotics competition. “I can’t make this cool,” the musician told Kamen. “It’s already cool. But I can make it loud.” Agrawal exhorted workshop participants to promote veterans’ engineering on their campuses the same way: “Make it loud.”

**Summit Attendees**

Introductions around the room revealed a patchwork of veterans’ education programs at various stages of development across the country. Some institutions represented had substantial experience both with veterans’ services and with two-year, four-year articulation agreements. Others had new or limited veterans’ programs and were looking to expand them and learn from others. A few had connections with military bases. Courses of study ranged from broad to specialized, such as petroleum engineering and cybersecurity. Policies and approaches vary, underscoring one of the findings of an ACE study of 20 that received Success for Veterans grants from the Walmart Foundation: “There is no ‘one size fits all’ model.” The University of Pittsburgh, for instance, has a special admissions board for veterans empowered to waive the SAT requirement. San Diego State University’s Troops to Engineers SERVICE (Success in Engineering for Recent Veterans through Internship and Career Experience), initially funded by NSF, claims 91 percent of student veterans get permanent job offers where they intern. Syracuse University has an entrepreneurship boot camp for veterans with disabilities. Returning military are among the target audiences of the University of Florida’s plan to offer 30 online degrees—including engineering—by the fall of 2018. Up to now, the University of Nebraska–Lincoln has been focused on graduate education. Participants also described challenges faced by veterans, including navigating pathways and weak or eroded math skills.

Attendees said they wanted to learn about, among other things, what kinds of support veterans need; how to encourage more interest in engineering; and granting first-year course credit to accelerate time to degree.

During the introductions, ABET Executive Director Michael Milligan, a former career Air Force officer, applauded the attendees’ efforts and said the accrediting agency wanted to facilitate their work and “innovate as much as possible.”

**ACE CREDIT EQUIVALENCY REVIEW SYSTEM**

Mary Beth Lakin, ACE director of college and university partnerships, opened a series of four ACE staff presentations with a capsule history of her organization. It was founded toward the end of World War I to coordinate educational institutions’ contributions to the war effort. In 1930, it began operating the Cooperative Test Service, which later merged with the College Board. During World War II, ACE evaluated a number of military training pro-
tion noted that evaluators must be current college-level instructors and undergo training and apprenticeship. In the course of an evaluation they check course outcomes and verify that these are assessed, determine hours of instruction, and verify what college level a particular course would fit. ACE won’t give credit solely based on hours of instruction, Wear said, but instead wants to know “What are the learning objectives?” Also, “They’ve got to show they’re assessing. We’re really picky on that.” Course evaluations are often conducted by teams. “Usually by the time we leave, there’s a consensus recommendation.” Virtual course reviews follow a similar procedure without an on-site visit, conducting multiple conference calls, using document-sharing software, and achieving a consensus among three evaluators.

A discussion followed on involving ABET in the process and having “an ABET label on an ACE-accredited course” for added credibility. Milligan noted that ABET doesn’t evaluate courses, only programs, and that “it’s up to an institution to show us how they meet our criteria.” Nonetheless, it was argued that “taking the word of ACE” might not be acceptable to accreditors of university engineering programs and that, even if ABET had to adjust its practices, “it would make a difference.” One participant contended that ABET evaluators often “do in fact end up with a recommendation on a specific class,” to the dismay of administrators. Another contended that the “vast majority” of veterans say credit transfer is a problem.

An example of how an ACE evaluation works in practice was offered by Gary Crossman, a professor emeritus and past chair of engineering technology at Old Dominion University (ODU). ODU’s mechanical engineering technology bachelor’s program — with a nuclear option — accepts students with prior training from the Navy Nuclear Power School. The degree enables returning sailors to seek jobs at nuclear plants, which don’t accept Navy nuclear training alone. Sailors can take an online course while serving aboard a nuclear aircraft carrier or submarine. ACE assesses the training for credit.

Tanya Ang, ACE’s associate director of veterans’ programs, offered highlights of the council’s online Toolkit for Veteran-friendly Institutions and findings from surveys. “Without proper support from outside, veterans are not as successful” in college, Ang said. The toolkit lets colleges post their own successful practices, but cautions that “ACE has not made any independent determination that any institution is indeed ‘veteran friendly.’”

**A CALL TO ACTION**

A rousing speech by Maj. Gen. Michael Lehnert (USMC, ret.) capped the first day’s sessions. A combat engineer who command ed forces during the 2003 invasion of Iraq and before that in Panama and Kuwait, Lehnert is vice chair of Student Veterans of America. He began by asking how many attendees were themselves veterans. About half raised their hands. He declared that veterans, a diverse group, represent “the best hope of our nation”; their talents can be leveraged “to fix America.” It’s “baloney” to think rusty math skills disqualify a Marine who can tear apart an F-18 and get it ready to fly the next day. Student veterans are now graduating at the same rate as traditional students. “With your help they’re going to bring America back.”
SUMMIT DAY 2
EFFECTIVE TRANSITION FOR
STUDENT VETERANS

Second day’s first session, facilitated by Mary Beth Lakin and Ashok Agrawal, was devoted to four small-group roundtable efforts to come up with a framework for effective veteran transitions to college. Two-year and four-year college representatives worked separately. Lakin called on the groups to look at current practices and identify what works and doesn’t work. Specifically, they were to consider how institutions handled testing out of required courses; how veterans find out about credit for prior training or experience; who helps veterans and how; and whether helping veterans is part of an institution’s mission.

At a table of two-year college representatives, attention focused on gaps in assessing the skills and needs of incoming veterans. One participant said students can get required courses waived by means of an exam, but “other than that it’s hit and miss.” How to equate practical battlefield skills and academic knowledge poses a challenge: “They can put a Humvee back together. I respect that. But that’s not going to catapult them into level 10 math,” an attendee said. However, another said military courses were “harder than anything I had in college (because) if you don’t get this right, someone is going to get killed.” A lack of faculty awareness of veterans’ needs was seen as a problem. One participant noted the absence of a pay incentive for faculty to review a veteran’s portfolio. The table generally agreed that a single point of contact for veterans was important, along with a checklist. At Middlesex County College in New Jersey, the veterans’ center is run by two young veterans – “they’re fabulous.” But funneling them to careers is harder. Monroe Community College in Rochester, N.Y. has an individually tailored military mentoring program. Ohio, by linking state funding to retention and completion, has forced community colleges to be more attentive to students’ progress and provide more tutoring. “It changed the whole ball game.”

Feedback from the separate tables identified common problems at two-year colleges. Key issues raised were lack of data and of faculty awareness, a fragmentation of services, and difficulty in certifying veterans’ prior learning and skills. In the military, service members have an incentive to earn an associate degree fast because it leads to promotions. They need an incentive to get a foundation in STEM coursework. Improvements put forward included a veterans’ orientation packet; career centers with dedicated staff; job fairs for veterans; and student advising at the point of enrollment. There also needs to be top-down endorsement of veterans’ assistance. A veteran on the Board of Trustees would help keep the effort going.

Feedback from four-year schools noted the frequent absence of an office that advocates for veterans and “a gap between what we say and do to help veterans.” Advanced Placement has wide acceptance as a measurement for prior learning. Faculty may not trust other evidence. Evaluation of credit for prior learning should occur three or four weeks before enrollment. A “central tool” is needed to inform students how their coursework will be applied.
for credit. Common numbering of courses between two-year and four-year schools is helpful. An appeal process should be in place. Faculty training and pro-active advising are needed. Likewise, veterans need to make a real-world adjustment. They need to know what questions to ask a prospective school and be aware of appeals processes. Whereas in the service they train for the next duty station, now they “have to be aware that come graduation they might not have a job.” While some participants stressed preparing veterans for the workforce, one cautioned against over-emphasizing job-training. Instead, the emphasis should be: “They’re learning a new profession.”

The cost of engineering education poses a serious challenge, one table’s notes indicated: “Students do not have the academic background to enable finishing engineering degree in 36-month GI Bill window.”

**THE TRANSFER PROCESS**

The morning’s second session combined two-year and four-year schools at the same tables to discuss transfer and articulation agreements and memoranda of understanding (MOUs). Discussion at one table showed how advanced the process can be. Virginia’s Old Dominion University has 20 agreements with community colleges and hired someone to facilitate the process, easing the burden on faculty. Likewise, Montgomery College, a community college in Maryland, has articulation agreements and less-specific MOUs with universities both in and outside the state. It also has advisers assigned to help students in the transition to four-year schools. Annual conferences allow schools to update agreements and insert changes in course offerings.

Impediments to interstate cooperation were cited. In Alabama, for instance, schools are barred from advertising online courses unless they first register with the state.

Reporting to the full group on their discussions, the four tables brought to light gaps and drawbacks in articulation and offered ways to improve it. Procedures for awarding prior-learning credit are fragmented. Some community colleges are reluctant to grant credit for prior learning out of concern that a four-year school won’t accept it for transfer credits. Lack of upper-administration understanding can weaken the effort, and there aren’t incentives for faculty members to cooperate. Data sharing is insufficient. There is also a danger in accepting too many credits, since this could jeopardize financial aid. Few articulation agreements reach beyond state boundaries.

Here is what can help veterans succeed: visits to community colleges by personnel from four-year schools; educating veterans intending to transfer on what questions to pose at a four-year school; summer bridge programs; transfer guides, new-transfer orientation, or even a one-credit course on transferring; priority registration for veterans; a clear pathway to a degree, with checkpoints along the way; and veterans support that includes families. Once a student has transferred, he or she is aided by: soft-skills training, plus training in entrepreneurship; paid internships; ties between the institution and potential employers under-graduate participation in research. Consortia that include two-year and four year schools should be encouraged, as well as advisory committees comprising representatives of institutions, the military, and employers. A data repository would help institutions figure out how military training fits into college coursework. Another idea offered was to take faculty off site to train on prior learning assessment.
A common statewide articulation formula or a consortium-wide articulation agreement were suggested. At the same time, it was stressed that two- and four-year schools need to be “a good fit” for articulation to work.

Worthwhile existing or planned programs include hundreds of Yellow Ribbon schools, private colleges that commit to matching what a veteran gets through the GI Bill; professional certificates accepted by employers; industry-paid graduate school; Ohio’s one-stop articulation, and Florida’s mandate for online education, which in five years is supposed to include all ABET-accredited courses in engineering and lead to a degree at the University of Florida. Arizona State already has ABET-accredited programs online as well as on-site. The University of Pittsburgh has two-year colleges within its five campus system but also has articulation agreements with Allegheny Community College. California has an alumni mentoring program. San Diego State allows veterans to apply while on active duty. Emerging themes included multi-institutional articulation schemes modeled on the State University of New York, which has agreements with many community colleges in the SUNY system; consistency among articulation agreements; and transfers between states.

**FINAL OPEN FORUM AND NEXT STEPS**

There seemed to be broad agreement with the conclusion that “tremendous potential” exists for schools to collaborate in adopting best practices. Consortia, guided by advisory committees, would look at academic programs and house the all-important data. Along with agreements among institutions, employers, and government, it would be helpful to have a set of national courses acceptable to consortia – e.g. introductory calculus – to be taken online during active duty. However, faculty and ABET evaluators will need to gain sensitivity and awareness, and veterans need to be accorded a higher profile on campuses. Faculty should be encouraged to join ACE teams. ACE and ASEE could convene academic leaders to suggest best practices and issue a national statement that declares: “We’re committed; here’s what needs to be done.”

Written “Next Steps” submitted by participants offered a number of concrete ideas for institutions to pursue individually or collectively:

- Educating faculty through the Faculty Senate; and involving registration software developers and ACE in better data tracking.
- A guide as to what data should be tracked, as well as a clearing house for data and a repository for best practices.
- A training vehicle for faculty and administrators.
- Pending states’ approval, all institutions represented at the Summit could enter into transfer partnerships, ideally by the summer or fall of 2015.
- Form regional consortia by the spring of 2015.
- College partnerships could advertise steps being taken to assist veterans.
- Develop relationships with other colleges and universities for ensuring pathways for industry-certified technicians.
- Develop a set of credit-for-prior-learning best practices that colleges and universities can adopt.
- Develop model articulation/transfer agreements for engineering technology and engineering. Align credit hour values to certain military training & industry certification develop agreement that cooperating colleges and universities can sign.

In closing, attendees were asked to compose next steps, answering the question posed by NSF’s Theresa Maldonado: “What do you want to come up with by Veterans Day?” This was a reference to the possibility that the White House Office of Science and Technology Policy will announce a veterans’ education initiative timed to coincide with the Nov. 11, 2014 holiday. Maldonado’s final words: “Let’s build on the momentum.”
APPENDIX A:
SUMMIT AGENDA

THE HAMILTON CROWNE PLAZA
WASHINGTON, DC

THURSDAY, MAY 1, 2014
2:00 PM - 2:30 PM
Registration

2:30 PM - 3:00 PM
Welcome and Opening Remarks
Norman Fortenberry, Executive Director, American Society for Engineering Education,
Theresa Maldonado, Division Director, Engineering Education and Centers, National Science Foundation,
Nicholas Maynard, Assistant Director, Telecommunications Innovation, White House Office of Science and Technology Policy

3:00 PM - 3:30 PM
SETTING THE STAGE
Briefing on February 2013 Workshop
William Kelly, Director, External Affairs, American Society for Engineering Education

Briefing on Conversations with Federal Agencies and Model Career Pathway
Ashok Agrawal, Managing Director, Professional Services, American Society for Engineering Education

3:30 PM - 4:15 PM
Introductions
Summit attendees share:
• Special services offered at their institutions to the veteran population
• Transfer articulation agreements/successful partnerships with two- and four-year institutions

4:15 PM - 4:30 PM
Break

4:30 PM - 6:00 PM
ACE REVIEW
Process Overview
Mary Beth Lakin, Director, College and University Partnerships, American Council on Education

ACE Review from a Faculty Perspective
Larry Wear, Professor Emeritus and Chair, Electrical and Computer Engineering, California State University – Chico

Implementation Example from Old Dominion University
Gary Crossman, Professor Emeritus and Past Chair, Engineering Technology, Old Dominion University

Toolkit for Veteran Friendly Institutions
Tanya Ang, Associate Director, Veterans’ Programs, American Council on Education

6:00 PM - 6:15 PM
Break

6:15 PM - 7:30 PM
Dinner

National Imperative to Transition Veterans to Engineering Related Careers
Theresa Maldonado, Division Director, Engineering Education and Centers, National Science Foundation,
Major General Michael R. Lehnert, USMC (Ret.), Board Member, Student Veterans of America
FRIDAY, MAY 2, 2014

7:30 AM - 8:00 AM
Breakfast

8:00 AM - 9:00 AM
Framework for Effective Transition for Student Veterans
Facilitated small group discussion: Breakout by two- and four-year institutions

9:00 AM - 10:45 AM
Framework for Successful Transfer Programs and Partnerships
Facilitated small group discussion: Collaboration between two- and four-year institutions for establishing articulation agreements and partnerships

10:45 AM - 11:00 AM
Break

11:00 AM - 12:00 PM
Developing a Consortium to Support Veterans Transition to Engineering Related Careers
Facilitated large group discussion: Logistics to initiate and sustain a Consortium for transitioning veterans to engineering related fields.

12:00 PM - 1:30 PM
Lunch and Next Steps
Individual reports: New ideas and issues to take immediate action at local institutions/organizations.

1:30 PM - 1:45 PM
Closing Remarks
Theresa Maldonado, Division Director, Engineering Education and Centers, National Science Foundation
ASEE Staff
APPENDIX B: BIOGRAPHY OF SPEAKERS

Ashok Agrawal
Managing Director,
Outreach and Engagement
American Society for Engineering Education

Ashok Agrawal, D.M., P.E., is the managing director for professional services and director of outreach and engagement at the American Society for Engineering Education. Agrawal holds a Doctorate in Management degree from the University of Maryland University College, an MS degree in Materials Science, an MS degree in Mining Engineering from the University of Kentucky, and a BS degree in Metallurgical Engineering from Nagpur University in India. Prior to assuming his present position he was the vice president for Academic Affairs, dean of the Math, Science, Engineering, and Technology Division at St. Louis Community College at Florissant Valley. Over the last 35 years Agrawal has served as a faculty member and administrator of engineering science and engineering technology Associates and Baccalaureate programs and has many professional and academic positions. Agrawal has served as a Program Officer at the Division of Undergraduate Education at the National Science Foundation, and has served on the 2004 Committee of Equal Opportunities in Science and Engineering (CEOSE). Agrawal has also served on the National Academy of Engineering (NAE) Committee on Community Colleges Role in Engineering and Education and the National Research Council (NRC) Board on Engineering Education. An ASEE Fellow, Dr. Agrawal is the recipient of 2012 James H. McGraw Award and 1996 Frederick J. Berger Award, and also the 2003 Governor’s Award for Excellence in Teaching. He has served ASEE in numerous offices of the Engineering Technology Council and Division, and on the Technology Accreditation Commission of ABET.

Gary Crossman
Professor Emeritus and Past Chair,
Engineering Technology
Old Dominion University

Gary Crossman is a Professor Emeritus of the Department of Engineering Technology at Old Dominion University where he served as a full-time faculty member for 38 years. He received his BSME from the U.S. Merchant Marine Academy in 1964. Upon completion of his MSME through Old Dominion University in 1970, he joined the engineering technology faculty and served in many capacities, ending as Engineering Technology Department Chair in 2008. He developed and has taught several on-line courses and was instrumental in the development of articulation agreements with the Navy Enlisted Nuclear Power School and other Navy rates. He is a registered professional engineer in the Commonwealth of Virginia.

He has been very active in the ASEE, participating in activities of ETD, ETC, CIEC, and ETLI. He served on the ASEE Board of Directors as Chair of Professional Interest Council II. He has also been active in ASME and as a Commissioner on TAC of ABET.

Professor Crossman is the recipient of ASEE’s Frederick J. Berger Award in 1993, the ASME dedicated service award in 1992, ASME’s Ben Sparks Award in 1997, and ASEE’s James McGraw Award in 1998. He was elected a Fellow of ASEE in 2000.

Tanya Ang
Associate Director,
Veterans’ Program
American Council on Education

Tanya Ang is the Associate Director of Veterans’ Programs at the American Council on Education. In this role, Tanya oversees ACE veterans initiatives such as the Toolkit for Veteran Friendly Institutions and the Severely Injured Service Members program. She also works collaboratively with institutions of higher education and other organizations to disseminate and promote best practices in serving military and student veterans on campus. Prior to her role in Veterans’ Programs, Tanya served as a Senior Program Manager in ACE’s Military Programs working with evaluation teams to provide credit recommendations on service member’s military transcripts. Tanya has worked in higher education for over 13 years in a variety of roles including Administrative Analyst for the Vice President of Student Affairs Office at California State University, Fullerton and Associate Registrar at Vanguard University where the majority of her work focused on the non-traditional student including military and student veterans. She was the certifying official at her institution for student veteran GI Bill benefits and worked hand-in-hand with the various offices on-campus to ensure students received the benefits and support they needed to successfully navigate their academic career.
Norman Fortenberry  
**Executive Director**  
American Society for Engineering Education

Norman L. Fortenberry, Sc.D., is the executive director of the American Society for Engineering Education (ASEE), an international society of individual, institutional, and corporate members founded in 1893. ASEE is committed to furthering education in engineering and engineering technology by promoting global excellence in engineering and engineering technology instruction, research, public service, professional practice, and societal awareness. Previously, Fortenberry served as the founding Director of the Center for the Advancement of Scholarship on Engineering Education (CASEE) at the National Academy of Engineering (NAE).

He served in various executive roles at the National Science Foundation (NSF) including as senior advisor to the NSF Assistant Director for Education and Human Resources and as director of the divisions of undergraduate education and human resource development. Fortenberry has also served as executive director of the National Consortium for Graduate Degrees for Minorities in Engineering and Science, Inc. (The GEM Consortium) and as a faculty member in the department of mechanical engineering at the Florida A&M University – Florida State University College of Engineering. Dr. Fortenberry was awarded the S.B., S.M., and Sc.D. degrees (all in mechanical engineering) by the Massachusetts Institute of Technology.

William Kelly  
**Director, External Affairs**  
American Society for Engineering Education

William E. Kelly, 1st Lt USMC (Ret), Ph.D., P.E., F. ASCE, F. ABET is Director of External Affairs at the American Society for Engineering Education (ASEE). At ASEE, his responsibilities include the Engineering Deans Council, international activities, and ASEE’s ABET accreditation responsibilities. Prior to joining ASEE in September of 2007, he was a Professor of Civil Engineering at the Catholic University of America in Washington, D.C. where he served as Dean of the School of Engineering from 1996-2001. Dr. Kelly was on the ABET Engineering Accreditation Commission (EAC) from 1993-2003 and was chair in 2001-2002. He is currently a member of the NAE Center for Engineering, Ethics, and Society Advisory Group, the ASCE Committee on Sustainability and the Board of Directors of the Civil Engineering Certification Board. He served as a combat engineering officer in the United States Marine Corps including a tour in the Republic of Vietnam.

Mary Beth Lakin  
**Director, College and University Partnership**  
American Council on Education

Mary Beth Lakin is the Director of College and University Partnerships (CUP) in the Center for Education Attainment and Innovation at the American Council on Education (ACE). With close to 10 years at ACE, Lakin has concentrated on expanding educational pathways for adult learners, including military service members and veterans. Lakin’s office capitalizes on statewide, regional, and national initiatives to raise awareness, acceptance and application of credit for prior learning and boost postsecondary credential completion rates. Currently Lakin is the Center’s lead for several initiatives focusing on the mapping of ACE credit recommendations and other credit for prior learning experiences to postsecondary credentials.

Lakin has more than 25 years of experience as a faculty member, academic advisor, and program administrator. In her previous position at Old Dominion University in Norfolk, Virginia, she developed and directed the University’s Experiential Learning program and an interdisciplinary degree program geared to adult learners, offered in a blended format. Her published articles and presentations center on credit for prior learning, adult learning, and lifelong learning trends. Lakin has an M.A. degree in human development, with a specialization in college teaching and teaching adults, from Pacific Oaks College in Pasadena, CA.

Theresa Maldonado  
**Division Director, Engineering Education and Centers**  
National Science Foundation

Theresa Maldonado Ph.D., P.E., is the Division Director of Engineering Education and Centers in the Directorate for Engineering at the National Science Foundation (NSF). Before joining NSF in Jan. 2011, Dr. Maldonado was inaugural Director of the Energy Engineering Institute, since its inception in Oct. 2009, and Associate Vice Chancellor for Research of the Texas A&M University System. Dr. Maldonado served as Interim Vice President for Research and Executive Associate Vice President for Research from Oct. 2008 to Oct. 2009 at Texas A&M University. Previously, Dr. Maldonado held dual positions as Associate Dean for Research in the Dwight Look College
of Engineering and as Deputy Director of the Texas Engineering Experiment Station. Before joining Texas A&M in 2003, Dr. Maldonado served as Associate Vice President for Research at The University of Texas at Arlington (UTA). In 1999-2001, Maldonado served as Program Director of Engineering Research Centers in the Engineering Directorate at NSF, where she was recognized with the Director’s Award for Program Management Excellence, the Director’s Award for Collaborative Integration for her services on the CAREER Coordinating Committee, and the Deputy Director’s Certificate of Appreciation for Distinguished Service in the development of the ADVANCE Program, all in 2001. She was a Member of Technical Staff at AT&T Bell Laboratories in 1981-1986. Dr. Maldonado earned the Ph.D., M.S.E.E., and B.E.E. with Highest Honors degrees in Electrical Engineering, all from the Georgia Institute of Technology, and she is a registered Professional Engineer in Texas. She is the recipient of numerous awards including the NSF Presidential Young Investigator award in 1991 in support of her work in electro-optics and nonlinear optics as well as the Halliburton Award for Teaching Excellence (1992) and the Halliburton Award for Outstanding Young Faculty (1993), both from the College of Engineering at UTA. She is a Senior Member of IEEE and member of the Optical Society of America, SPIE, AAAS, ASEE, and Sigma Xi.

Larry Wear
Professor Emeritus and Chair, Electrical and Computer Engineering
California State University, Chico

Dr. Wear is currently the Chair of Electrical and Computer Engineering at California State University, Chico, a position he held previously for 6 years. He is responsible for curriculum development for undergraduate and graduate programs in electrical and computer engineering. In addition to being the graduate coordinator, he is responsible for accreditation activities at Chico. Previously as Professor and Associate Director of the Institute of Technology at the University of Washington, Tacoma, Dr. Wear taught in such areas as software process improvement, software engineering, operating systems, C/C++ programming, assembly language programming, logic and digital design, introductory engineering courses, and senior project courses.

Dr. Wear received his B.S. and M.S. degrees in Electrical Engineering from the University of Washington, Seattle and both his M.S. in Applied Mathematics and Ph.D. in Electrical Engineering from Santa Clara University. He has over 30 years of experience in teaching and distance learning in addition to 10 years of industry experience and was an ABET program evaluator for electrical and computer engineering.

Nicholas Maynard
Assistant Director, Technology & Innovation Division
White House Office of Science and Technology Policy

Dr. Nicholas Maynard is assistant director in the Technology & Innovation Division at the White House Office of Science and Technology Policy (OSTP). Previously he served as a senior advisor for technology and innovation policy at OSTP. Before joining OSTP, Dr. Maynard served as a member of the National Broadband Taskforce where he led analysis on business broadband usage and launched a public-private partnership for small business technology training. Prior to the Taskforce, he was a researcher at the RAND Corporation where he focused on technology acquisition and Research & Development management. Dr. Maynard also spent six years in the telecommunications industry, where he was a consultant to global carriers and vendors on fiber networks and services.

Dr. Maynard received a B.A. in political science and an M.A. focused on international development from the University of Chicago as well as a Public Policy Ph.D. from the University of North Carolina at Chapel Hill.
### APPENDIX C: SUMMIT ATTENDEES

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Role</th>
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<tbody>
<tr>
<td>Abhijit Bhattacharyya</td>
<td>University of Arkansas at Little Rock</td>
</tr>
<tr>
<td>John D. Abbitt</td>
<td>University of Florida</td>
</tr>
<tr>
<td>Stephanie Adams</td>
<td>Virginia Polytechnic Institute and State University</td>
</tr>
<tr>
<td>Debra Anderson</td>
<td>Missouri University of Science and Technology</td>
</tr>
<tr>
<td>Tanya Ang</td>
<td>American Council on Education</td>
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<tr>
<td>Maria Brinson</td>
<td>Middlesex County College</td>
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<tr>
<td>Walter Buchanan</td>
<td>Texas A&amp;M University</td>
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<tr>
<td>Rory Cooper</td>
<td>University of Pittsburgh</td>
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<tr>
<td>Gary Crossman</td>
<td>Old Dominion University</td>
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<tr>
<td>Richard DeChant</td>
<td>Cuyahoga Community College</td>
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<tr>
<td>Robert Ehrmann</td>
<td>Pennsylvania State University</td>
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<tr>
<td>Chris Fall</td>
<td>Office of Naval Research</td>
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<tr>
<td>Venny Fuentes</td>
<td>County College of Morris</td>
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<tr>
<td>Mary Heiss</td>
<td>American Association of Community Colleges</td>
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<tr>
<td>Mark Jackson</td>
<td>Kansas State University</td>
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<tr>
<td>Ronald Jackson</td>
<td>Spartanburg Community College</td>
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<tr>
<td>Steve Kane</td>
<td>SpaceTEC®</td>
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<tr>
<td>Muhammad Kehnemouyi</td>
<td>Montgomery College</td>
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<tr>
<td>Mary Beth Lakin</td>
<td>American Council on Education</td>
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<tr>
<td>Michael Lehnert</td>
<td>Student Veterans of America</td>
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<tr>
<td>Stephen Long</td>
<td>St. Louis Community College</td>
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<tr>
<td>Nicholas Maynard</td>
<td>White House Office of Science and Technology Policy</td>
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<tr>
<td>Michael Milligan</td>
<td>ABET</td>
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<tr>
<td>Bill Morrow</td>
<td>Delaware Technical Community College</td>
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<tr>
<td>Scott O’Connor</td>
<td>Alfred State College</td>
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<tr>
<td>Lance Perez</td>
<td>University of Nebraska, Lincoln</td>
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<tr>
<td>Kurt Preston</td>
<td>University of Nebraska, Lincoln</td>
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<tr>
<td>Jeffrey Ray</td>
<td>Southern Polytechnic State University</td>
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<tr>
<td>Patricia Reily</td>
<td>San Diego State University</td>
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<tr>
<td>Charles Sasaki</td>
<td>University of Hawaii – Kapi’olani Community College</td>
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<tr>
<td>Laura Steinberg</td>
<td>Syracuse University</td>
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<tr>
<td>Julia Strawder</td>
<td>Stark State College</td>
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<tr>
<td>Larry Wear</td>
<td>California State University, Chico</td>
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<tr>
<td>Eric Wheeler</td>
<td>Monroe Community College</td>
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<tr>
<td>Corrine Zoli</td>
<td>Syracuse University</td>
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### NATIONAL SCIENCE FOUNDATION STAFF

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
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<tbody>
<tr>
<td>Dorothy Jones-Davis</td>
<td>AAAS Fellow</td>
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<tr>
<td>Theresa Maldonado</td>
<td>Division Director, Engineering Education and Centers</td>
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<tr>
<td>Donna Riley</td>
<td>Program Director, Engineering Education and Centers</td>
</tr>
<tr>
<td>Laurie Stepanek</td>
<td>AAAS Fellow</td>
</tr>
<tr>
<td>Bevlee Watford</td>
<td>Program Director, Engineering Education and Centers</td>
</tr>
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### AMERICAN SOCIETY FOR ENGINEERING EDUCATION STAFF

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
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<tbody>
<tr>
<td>Ashok Agrawal</td>
<td>Managing Director, Professional Services</td>
</tr>
<tr>
<td>Rocio Chavela</td>
<td>Manager, Faculty Development</td>
</tr>
<tr>
<td>Norman Fortenberry</td>
<td>Executive Director</td>
</tr>
<tr>
<td>William Kelly</td>
<td>Director, External Affairs</td>
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FAST-TRACKING VETERANS TO AAS DEGREE IN ENGINEERING TECHNOLOGY

With the draw-down of the wars in Iraq and Afghanistan, a large cohort of military veterans will be seeking to take advantage of the Post-9/11 GI Bill for collegiate education in preparation of (re)entry into the workforce. For many of the enlisted veterans, their most practical and expedited path to earning college credentials and a degree is likely to be an AAS degree in engineering technology. Veterans are likely to have very diverse technical background, experience and academic preparation. Therefore in order to maximize on their past experiences, academic preparation, interest and employment potential, it would seem logical to provide all veterans with a degree that is easily understood by all in the market place but still provides them the flexibility to tailor their degree requirement to match their background.

There would be great value in helping veterans to avoid the frustrations of identifying colleges that will accept their credentials. We envision a national portal and a national program that serves all veterans in a consistent and seamless way, walks them through the process to college academic system, and facilitates their degree earning process. We also see value in concurrently developing a program in General Engineering Technology which is offered by one or a consortium of colleges. The requirements and structure for such a program could be similar at all colleges.

The program of study for this program should be such that veterans can either tailor the technical component of the program to meet their future career and occupational needs and/or earn credits for their past experiences. Technical core credits for such a program may be earned by a combination of technical course work, formal technical training while in military and on-the-job experience, and nationally and/or regionally approved certifications.

STEPs NECESSARY TO FACILITATE VETERANS EARNING AN AAS DEGREE IN GENERAL ENGINEERING TECHNOLOGY

- Transitioning military and veterans should be made aware of the multiple educational pathways and careers in engineering technology/engineering fields and industry-recognized certifications. Ideally this should happen during transition programs in each of the services.
- Transitioning military and veterans need to be provided concise, correct and comprehensive information on how their military MOS programs can lead to earning college credentials and subsequently an engineering/engineering technology or related Associates and/or Bachelor’s degree.
- A national organization with a focus on engineering/engineering technology education should be established to assist the veteran population in maneuvering through the maze of higher education institutions and industry certifications.
- A consortium of colleges should be established that will develop a pilot for a nationally recognized AAS degree program in General Engineering Technology that can be accredited by ABET, the nationally recognized accrediting agency for engineering and engineering technology programs, at a future time. The consortium colleges will become the authorized credentialing and degree-granting institutions for this veteran-focused AAS degree program in General Engineering Technology.
- Organizations focused on the roles of community colleges in engineering and engineering technology should be collaborators in this activity.
- An industry advisory council should be established to provide input on industry-recognized certifications and credentials.
- The national organization should be the focal point for the academic record keeping and advising for military personnel while they are on active duty and are engaged in academic activities to ensure that their academic work is in congruence with their career aspirations upon separating from the military.
- Ongoing and timely communication will help active-duty personnel earn a college credential on an expedited schedule upon leaving the military. In some cases, active advising and guidance could facilitate earning a two-year degree in as little as 12 or 15 months.
- The national organization should work with the consortium colleges, organizations such as the American Council on Education, and credentialing agencies to analyze how a veteran’s active-duty experience and training can be applied toward college credit.
- Working in collaboration with consortium colleges, the national organization should identify and select a cadre of engineering technology faculty from ABET-accredited engineering technology programs who will review the credentials and experiences of veterans to determine the number of credit hours a veteran could earn from a partnering ABET-accredited engineering technology program towards an AAS degree.
- The national organization should function as the clearing house and repository of student veterans’ information, including academic records and credit hours, to facilitate their progress in earning degrees, diplomas, and other industry-recognized credentials from consortium colleges.
The Career Pathways flowchart lays out a plan for the variety of ways veterans might acquire an engineering or engineering technology credential and enter the workforce.