

TME

The Military Engineer

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REMARKS

from the President

The Society of Choice

Let me start by saying thanks to Jane Penny for her leadership over the last year, to the rest of the national leadership team for their teamwork, to our government and industry partners for their unwavering support, to the national office staff for their dedication and hard work, and, most importantly, to our Regions and Posts, who *are* SAME. It has been an amazing year of progress towards achieving unity of direction as One Society, especially with regards to the *2020 SAME Strategic Plan*.



Our plan recognizes SAME's opportunities for growth and expanded service to our nation. I am excited to build on the momentum we have achieved.

DELIVERING SUCCESSFUL PROJECTS

This issue of *TME* offers an in-depth look at how industry and government rely on, and leverage, effective project management to ensure facilities and infrastructure are delivered on time and within budget—despite often having to endure a host of unforeseen challenges.

Industry-government collaboration is another crucial aspect of project delivery. This issue features articles by two U.S. Army engineers on their Training with Industry assignments. The perspective these engineers gleaned from working in the A/E/C industry is valuable for them, and their insights into what makes the industry-government relationship work are equally valuable for the rest of us.

We have started to adjust to provide a program that is not only relevant and compels existing members' participation, but will attract new membership! SAME offers in networking all the relevant players needed to develop real solutions for our nation's infrastructure-related issues. And our education and outreach programs are focused on delivering what our members want while being beneficial to their "day jobs." During my tenure, I will strongly support the four goals of the *2020 SAME Strategic Plan*: Relationships; Leadership and Mentoring; Professional Development and Personal Growth; and Resilience. There are a few particular areas where we can really drive momentum this year.

Industry-Government Collaboration. In the A/E/C community, only SAME fills the unique role of being the multi-disciplined integrator of military, public, private and academic capabilities. We must work industry-government collaboration at all levels and focus not just on business development, but on solving real issues.

Education and Outreach. We will develop robust programs to enhance members' knowledge of infrastructure independence and resiliency. One way we will do this is by enhancing the partnerships established by TISP (now an SAME Council) to build a larger network and bring awareness to and help develop solutions in communities across the country where resilience is most critical.

STEM Programs. Our Posts have long done great work in supporting STEM. But our nation faces a shortfall in meeting its future A/E/C profession needs. We can do even more!

Support to Veterans. We need to sustain our support to wounded warriors, and be there for our servicemembers while they are in uniform and when they transition out.

Succession Planning and Mentoring. We have to increase efforts to facilitate mentoring of Young Members and attract and develop future leaders. That means establishing good succession planning. I recently learned the Houston-Galveston Post's Board is nearly all Young Members. The future is now!

We are a Society of professionals; and every professional needs to be registered, licensed or certified in their field. A professional also should belong to a society or association that supports their chosen field. SAME is the professional society for architects, engineers, constructors, scientists, marketers, and many others who work to identify and develop solutions to national security infrastructure-related challenges. There is no other!

I look forward to serving you and SAME this year!

Capt. Michael L. Blount, P.E., LEED AP, F.SAME, USN (Ret.)
SAME President 2016-2017



OUR HISTORY

is rooted in our foundation.



OUR FOUNDATION



will help lead us
into the future.



In December 2014, the SAME Board of Direction approved a motion to establish a Foundation that would build upon the success of the Education & Mentoring Fund and enable a broad range of individuals and organizations who desire to leave a legacy in support of military engineering and our nation's future.

The SAME Foundation is now a reality.

The SAME Foundation will serve to give back by paying it forward—to afford opportunities for Society members and for America's youth; to enable professional development and to support personal growth; to provide a means to recognize the passing of members through acts of memorial while helping Posts and partner organizations to inspire, develop and mentor the next generation of STEM professionals and leaders.

America's future is bright. Let's help make it brighter.

Contributions for the SAME Foundation are currently being accepted through the Education & Mentoring Fund.
Visit www.same.org/donate for more information.



PHOTO BY COL. MIRO KURKA, USA (RET.), MEAD & HUNT

53 FEATURED IN THIS ISSUE: PROJECT MANAGEMENT

This issue of *The Military Engineer* looks at how the public and private sectors are working together to ensure that projects carried out in support of the nation are managed efficiently, expeditiously, and responsibly.



PHOTO COURTESY AHTNA ENVIRONMENTAL INC.

ON THE COVER

Helicopters were the only means to reach the site of a complex remediation project at Military Ocean Terminal Concord due to the sensitive habitat. **Story begins on page 60.**



U.S. COAST GUARD PHOTO BY PETTY OFFICER 3RD CLASS MYEONGHI CLEGG

SPOTLIGHT ON COAST GUARD ENGINEERING

The U.S. Coast Guard is working to increase the resilience of its facilities and infrastructure following the significant damages that occurred as a result of major hurricanes over the last decade. **Story begins on page 44.**

Building for the Future

Learn about the new SAME Foundation and nomination qualifications for serving on its Board of Directors. **Pages 70-71**



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Designing solutions to stay "Always Ready"

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Featured In Society News

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Blount Sworn in as SAME President

Capt. Michael Blount, P.E., LEED AP, F.SAME, USN (Ret.), officially took the reins as SAME National President on May 26 in Phoenix.



SAME Launches E-Newsletter

Real TIME is designed to give members a consolidated look at all they need to know from SAME nationally for the month ahead.



Student Chapters Build Future Leaders

At 60 colleges and universities across the country, SAME Student Chapters are helping inspire the next generation of A/E/C leaders.

EXCLUSIVELY AT TME ONLINE

July 18, examine the value of commissioning both from an owner's perspective and a general contractor's perspective—
by Glen Thieszen, P.E., CxA, CEM, M.SAME

August 8, go inside the commissioning process for the P060 Marine Corps Reserve Center at Yakima Training Center, Joint Base Lewis-McChord, Wash.—*by David B. Howard, CCP, M.SAME*

www.same.org/TME



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TME

The Military Engineer

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Michael Baker

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Cpl. Milton J. Thatcher, USMC, a Combat Engineer with 1st Combat Engineer Battalion, Marine Rotational Force - Darwin, leads the way through thicket at Hidden Valley Motor Sports Complex, Northern Territory, Australia, in May 2016. U.S. Marine Corps and Australian Army combat engineers conducted clearing training to find improvised explosive device and caches. Marine Rotational Force - Darwin is a six-month deployment of Marines into Darwin, Australia, where they are conducting exercises and training with the Australian Defence Forces, strengthening the U.S.-Australia alliance.

U.S. MARINE CORPS PHOTO BY CPL. MANDALINE HATCH

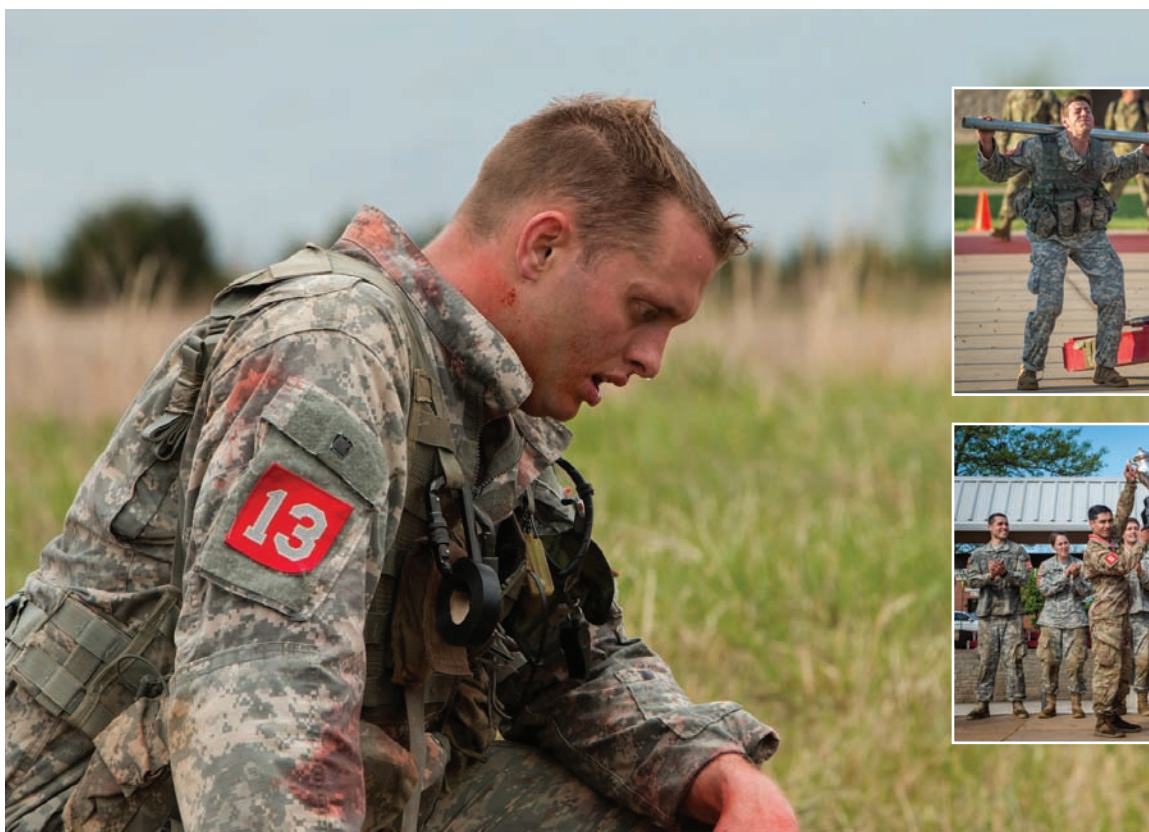




Staff Sgt. Manoj Williams, USAF, 375th Civil Engineer Squadron Electrical Systems Craftsman, greases substation framework knife blades and addresses tightening loose conductor connections at Scott AFB, Ill. The substation required a scheduled power outage to repair critical high voltage electrical components.

U.S. AIR FORCE PHOTO BY AIRMAN DANIEL GARCIA





U.S. Army engineers compete at the Best Sapper Competition, April 19-21, at Fort Leonard Wood, Mo. (Clockwise left to right) Capt. Michael McLaughlin studies his knot while conducting a prusik ascent up a 45-ft tower (U.S. ARMY PHOTO BY COMMAND SGT. MAJ. DANIEL D. KELCH, 3RD ARMORED BRIGADE COMBAT TEAM PUBLIC AFFAIRS OFFICE, 1ST CAVALRY DIVISION); Capt. Matthew McGuire takes a knee after moving a simulated patient and equipment nearly 200-m to a casualty evacuation point (U.S. ARMY PHOTO BY COMMAND SGT. MAJ. DANIEL D. KELCH, 3RD ARMORED BRIGADE COMBAT TEAM PUBLIC AFFAIRS OFFICE, 1ST CAVALRY DIVISION); Capt. Gregory Shepard and 1st Lt. Christopher Price conduct a bangalore carry at the first stop during the X-Mile Run (PHOTO BY MICHAEL CURTIS, FORT LEONARD WOOD); Capt. Jason Bahmer and Sgt. 1st Class David Rizo, representing the 82nd Airborne Division, hold high the winning trophy, the third time in a row engineers from the 82nd Airborne have won the competition (PHOTO BY MICHAEL CURTIS, FORT LEONARD WOOD); 2nd Lt. Leah Mullenix, who was the first female, Army-wide, to complete the three-day competition and place in the top 10 teams, crawls under barbed wire with her individual assigned weapon during a low crawl event of the X-Mile Run (U.S. ARMY PHOTO BY SGT. SAMANTHA STOFFREGEN, 1ST BRIGADE COMBAT TEAM, 101ST AIRBORNE DIVISION).



CARTER ADDRESS DEFENSE BUDGET

Secretary of Defense Ash Carter highlighted his budget priorities this spring while warning he would recommend a veto of the *National Defense Authorization Act* if it contains a "raid on war funding" that puts national security at risk.

The Department of Defense's (DOD) budget request includes key investments in cutting-edge equipment and new technologies, Carter told an audience in May at the Navy League's Sea-Air-Space Exposition at National Harbor, Md. He said the United States faces no fewer than five emerging challenges: Russian aggression, particularly in Europe; Chinese actions of concern, notably in the South China Sea; North Korean continued nuclear pursuits and provocations; Iranian aggression and "malign influence" in the Gulf; and terrorism and countering the Islamic State of Iraq and the Levant. Defense investments are critical in staying ahead of global challenges, the secretary said, adding that he is concerned about versions of the defense bill in Congress. He said that he wants to work with Congress to achieve a better solution, adding: "Our warfighters deserve nothing less."

The Senate version of the defense funding bill, Carter said, extensively reorganizes the functions of the Undersecretary of Defense for Acquisition, Technology & Logistics. Separating research and engineering from manufacturing could introduce problems, he said, adding that procurement and sustainment are tightly coupled to technology, engineering and development.

The House version of the bill, Carter said, contains "budget gimmickry" that threatens readiness, putting the warfighter at risk. It also threatens budget stability and the readiness of the force, he said, noting that it proposes underfunding DOD's overseas warfighting accounts by \$18 billion.

(Contributed by Lisa Ferdinando, Defense Media Activity)

CORPS SEEKS COMMENTS ON PERMITS

The U.S. Army Corps of Engineers (USACE) is seeking comments on its proposal to renew and revise 50 nationwide permits for work in wetlands and other waters that are regulated by Section 404 of the *Clean Water Act* and/or Section 10 of the *Rivers and Harbors Act of 1899*.



Defense investments are critical for staying ahead of global challenges and maintaining the finest fighting force in the world, Secretary of Defense Ash Carter said in May while speaking at the Navy League's Sea-Air-Space Exposition in Maryland. PHOTO BY SENIOR MASTER SGT. ADRIAN CADIZ

In addition, USACE is proposing to issue two new nationwide permits that pertain to authorizing the removal of low-head dams and the construction and maintenance of living shorelines. The nationwide permits authorize activities that are similar in nature and cause only minimal adverse environmental impacts to aquatic resources separately or on a cumulative basis. Activities range from work associated with aids to navigation and utility lines, to residential developments and maintenance activities.

Many of the permits being proposed remain unchanged from 2012, the last time they were authorized.

USACE division commanders may add, after public review and consultation, regional conditions to nationwide permits in order to protect local aquatic ecosystems, or to minimize adverse effects on fish or shellfish spawning, wildlife nesting or other ecologically critical areas.

A public notice to solicit comments was published in the June 1, 2016 issue of the *Federal Register*. USACE will accept written comments for a 60-day period ending Aug. 1, 2016. Comments may be submitted through the Federal eRulemaking portal at www.regulations.gov at docket number COE-2015-0017. The current set of nationwide permits expires on March 18, 2017. (Contributed by USACE)

NEW WEB-BASED LEASING TOOL

The General Services Administration (GSA) is launching a new web-based leasing tool—the Automated Advanced Acquisition Program (AAAP)—that allows the general public and businesses to electronically submit offers to lease space to the federal government.

The offer submission process is completely web-enabled. Registered participants can submit and update offers to lease space to the federal government within specified time frames, in response to a Request for Lease Proposal.

GSA is the largest tenant in the United States, with 80 percent of leases less than 25,000-ft² and over 8,000 space requirements nationwide. AAAP will handle office space requirements ranging from 500-ft² up to \$2.85 million net annual rent.

For more information, visit www.gsa.gov/aaap.

(Contributed by GSA)

INFRASTRUCTURE CAUCUS FORMED

In June, Rep. Ryan Costello (R-Pa.) and Rep. Dina Titus (D-Nev.) announced the formation of the bipartisan House Public Works and Infrastructure Caucus.

Public works are important services and projects that communities across the country depend on, such as drinking water, flood

Collaborating



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With over 100 years of experience serving the U.S. military, AECOM brings in-depth knowledge to managing large-scale programs, overseeing operations, and providing logistics support. Our complete portfolio of services, combined with a connected global presence that spans every continent, enables AECOM to deliver visionary turnkey solutions to the challenges facing our clients.

AECOM's network of employees is united by a shared commitment to creating, enhancing and sustaining the world's built, natural and social environments. Our work on some of the largest infrastructure projects on the planet has helped AECOM become the #1 ranked design firm — in the U.S. and globally — by ENR.

Top left to right: Elmwood Pump Station, Jefferson Parish, Louisiana; Olmsted Dam, Olmsted, Illinois; Ft. Sam Houston Medical Education Training Center, San Antonio, Texas. Bottom, left to right: Department of Homeland Security Headquarters, Washington, D.C.; Small Arms Range Practice Training, Wright Patterson Air Force Base, Dayton, Ohio; Mine Resistant Ambush Program (MRAP) Military Vehicle, United States.



The new House Public Works and Infrastructure Caucus will raise awareness on the importance of America's drinking water, flood control, recycling, waste removal, roads, bridges, waterways and other infrastructure systems. Above, the Frenchtown Brook Bridge replacement project under construction in Rhode Island. FHWA PHOTO

control, recycling, waste removal, and roads and bridges. The caucus was established to raise awareness of the importance of these services because they are critical to every community's health and safety.

Said Rep. Costello: "Americans utilize different forms of public works, including recycling, drinking water, roads, and sidewalks in their daily routines, so we must ensure these services are reliable. I am committed to prioritizing public works

to keep our communities safe and healthy, and the efforts of this bipartisan caucus will focus on advancing the important goals of these services."

"The nation's economy, health, and future are put in harm's way when we don't prioritize our infrastructure projects," said Rep. Titus. "We must be active in securing the funding to advance a bipartisan, 21st-Century agenda that will prepare our communities for new growth and keep our workforce strong. This bipartisan caucus is committed to ensuring our roadways, runways, and waterways are safe, secure and ready for the future."

(Contributed by the Office of Congressman Ryan Costello)

EFFORTS WITHIN ASIA-PACIFIC

The rebalance to the Asia-Pacific is a "whole program of enhanced activities" intended to maintain peace and security in the region, and a lot more than "freedom-of-navigation" operations, Defense Secretary Ash Carter said while speaking

this spring at Naval Submarine Base New London, Conn. The rebalance efforts encompass political, economic and military efforts, including modernization of forces.

The United States supports freedom of navigation around the world, not just in the South China Sea, Carter said, noting that DOD's concern is "not just about any one country, including China."

Claims in the South China Sea need to be "settled in a peaceful way, not by militarizing them, not coercion; but settlement in a peaceful [way]," he said. That is a principle the United States stands for all over the world, Carter added.

Peaceful resolution of territorial disputes is important around the globe, from "the South China Sea to the Arctic," he said.

The secretary said the United States and other countries have been standing up for freedom of navigation for hundreds of years, and the United States will continue to enforce that freedom all around the world. *(Contributed by Lisa Ferdinando, Defense Media Activity)*



To preserve and protect.



Benjamin P. Grogan and Jerry L. Dove Federal Building

Design Build Institute America (DBIA): 2015 National Award of Merit, 2015 National Award of Excellence, 2015 Design-Build Project of the Year

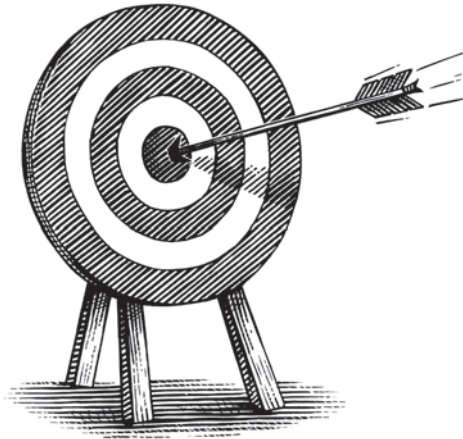
How do you meet the needs of a storied American institution while restoring precious natural wetlands?

Resilience is key – striking a balance between human concerns (cost, health, comfort) and energy and environmental concerns (resource use, ecological degradation) requires inventive solutions that, at their core, address natural infrastructure.

Located just a few miles from the iconic Everglades, 20 miles northwest of downtown Miami, the site for the Federal Bureau of Investigation's new hub for South Florida operations was originally part of an immense wetland. The native swamp that existed less than a century ago was destroyed by developers who filled it with gravel.

Restoring 20 acres of natural wetlands to their original condition, including several ponds, a marsh and a canal provided us the opportunity to reuse, repurpose and renew to preserve and protect.

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A handwritten signature in black ink, appearing to read 'G Baker'.

Gwen Baker
Federal Services Unit President
CDM Smith



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SAME MEMBER NEWS

Rear Adm. Louis V. Cariello, P.E., CEC, USN, has been selected for assignment as Directory, Energy and Environmental Readiness Division, Office of the Chief of Naval Operations.

Larry Cash, AIA, NCARB, RIM Architects, was elected to fellowship by the 2016 College of Fellows Jury of the American Institute of Architects.

Thomas J. Collins, P.E., S.E., is assuming a new role with Collins Engineers as the firm's Executive Chairman.



COLLINS

Suzanne DiGeronimo, FAIA, F.SAME, DiGeronimo Architects, was one of eight jurors selected to judge the Port Authority of New York & New Jersey Bus Terminal Design + Deliverability Competition.



DIGERONIMO

Barbara J. Gundy, Ph.D., Vice President of Cultural Resources Services, Skelly and Loy Inc., was named Office Manager of the firm's Pittsburgh office.

Brig. Gen. Richard G. Kaiser, USA, has been selected for assignment as Commander, Combined Security Transition Command-Afghanistan.



KAISER

Gregory Kelly, WSP|Parsons Brinckerhoff, was appointed to the CEO Council for Growth in Philadelphia.

Brig. Gen. Jeffrey L. Milhorn, P.E., USA, has been selected for assignment as Assistant Chief of Staff, G-3, U.S. Army Pacific, Fort Shafter, Hawaii.



MILHORN

Maj. Gen. John Peabody, P.E., USA (Ret.), has joined Mott MacDonald as Senior Vice President and Director of Federal Programs, based in the firm's Arlington, Va., office.

Brig. Gen. R. Mark Toy, P.E., USA, has been selected for assignment as Commander, USACE Great Lakes & Ohio River Division.



TOY

Lt. Gen. Todd T. Semonite, P.E., USA, became the 54th U.S. Army Chief of Engineers and Commanding General of the U.S. Army Corps of Engineers on May 19. He previously served as the first Director of the Army Talent Management Task Force. Additional assignments include Commanding General for Combined Security Transition Command-Afghanistan and Deputy Chief of Engineers and Deputy Commanding General of the U.S. Army Corps of Engineers. Gen. Semonite, an SAME member since 1997, is a 1979 graduate of the U.S. Military Academy at West Point, N.Y. He holds a Master of Science in Civil Engineering from the University of Vermont, and a Master of Military Arts and Sciences from the Command & General Staff College at Fort Leavenworth, Kan.



SEMONITE

YOUNG MEMBER SPOTLIGHT

Capt. Luke Johanson, USAF, who attended the SAME/U.S. Navy Seabee Engineering & Construction



JOHANSON

Camp in 2003 and served as a mentor at the SAME/U.S. Air Force Academy Engineering & Construction Camp in 2010, now teaches Air Force ROTC at the University of Colorado-Boulder.

Claudia Penny, an Atlanta Post member who is an Assistant Project Manager at HCR Construction



PENNY

Inc., served as a mentor at the 2015 SAME/U.S. Marine Corps Engineering & Construction Camp and this year is serving as registrar and travel coordinator.

Lt. Jay Shirey, USCG, who was a Flight Leader at the 2008 SAME/U.S. Air Force Academy Engineering & Construction Camp and then a camp mentor in 2015, is currently serving as Force Manager in the Office of Civil Engineering, U.S. Coast Guard.



SHIREY

Do you know of an SAME Young Member who should be featured? Email editor@same.org.

RECOGNITIONS & HONORS

Cardno received an Honor Award from the American Planning Association's Federal Planning Division for Outstanding Area/Site Development Plan at Marine Barracks Washington as well as an Outstanding Environmental Planning Project Merit Award for the Military Ocean Terminal Concord Environmental Impact Statement.

Dewberry received the *Climate Change Business Journal* award for Consulting and Engineering: Climate Change Adaptation and Resilience.

The firm also has been designated a certified commissioning firm by the Building Commissioning Certification Board.

Hannah Solar Government Services recently installed a solar photovoltaic system on the Visitor's Center and Museum at the Centers for Disease Control's Roybal Campus in Atlanta, Ga., the agency's first solar photovoltaic system.

ACQUISITIONS & EXPANSIONS

GEI Consultants Inc. announced that Franklin, Mass.-based Bourne Consulting

Engineers, a coastal and waterfront engineering firm, has joined the firm.

International Facility Management Association and the Royal Institution of Chartered Surveyors announced a collaboration to join strategic resources.

Mortenson Construction opened a new office in McLean, Va., to support its operations around Washington, D.C.

SWCA Environmental Consultants acquired New England Environmental Inc., an environmental consulting firm based in Amherst, Mass.



Time Tells You Who to Trust

Great decisions last for generations. With decades of military and civilian contracting experience behind us, we're helping our clients solve complex environmental, design and engineering challenges around the world, today.



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CONTRACTS & AWARDS

AECOM was awarded a \$52.8 million firm-fixed-price contract for A-E services by USACE Middle East District to repair the bottom outlet of the Mosul Dam, Iraq.

Amec Foster Wheeler was awarded a \$48.1 million firm-fixed-price contract by USACE Seattle District to design and construct the Central Treatment Plant upgrade and groundwater collection system at Bunker Hill, Idaho.

Applied Research Associates, Booz Allen Hamilton and **Leidos** are three of four firms awarded a \$249.7 million cost-plus-fixed-fee, IDIQ multiple award task order contract by Army Contracting Command for persistent surveillance - intelligence, surveillance, and reconnaissance analytic software research and development.

Blue Cord Design and Construction LLC and **Doyon Project Services LLC** were among those awarded a \$249 million firm-fixed-price, multiple award task order contract by USACE Little Rock District for design and construction services.

Booz Allen Hamilton and **AECOM** are two of four firms awarded a \$122.5 million cost-plus-fixed-fee, IDIQ multiple award task order contract with options to support the National Defense Center for Environmental Excellence primarily to address environmental, safety, occupational health and energy needs.

Burns & McDonnell was awarded a \$9 million firm-fixed-price, multi-year, IDIQ contract for A-E services for Air Force Reserve and military projects within USACE Great Lakes & Ohio River Division.

CATLIN Engineers and Scientists was awarded a \$5 million IDIQ contract for A-E horizontal design services within USACE South Atlantic Division.

CB&I Federal Services was awarded a \$9 million firm-fixed-price, multi-year, IDIQ contract for A-E services to provide environmental support within USACE Great Lakes & Ohio River Division.

CDM Smith was awarded a \$9.8 million design-build project by the General Services Administration Denver Special

Projects Division to upgrade infrastructure at the U.S. Customs and Border Protection's Piegan Land Port of Entry and Border Patrol Station near Piegan, Mont.

CH2M was selected as design-build partner by the City of Houston for the \$1.2 billion Northeast Water Purification Plant Expansion project and by the City of San Jose, Calif., for the \$85 million Cogeneration Facility Project.

Dewberry was selected by the U.S. Geological Survey for a five-year, maximum \$750 million IDIQ contract in support of the National Geospatial Program.

Eustis Engineering Services was awarded a \$15 million firm-fixed-price contract by USACE New Orleans District for geotechnical engineering.

Hanson Professional Services was awarded a \$3 million, five-year contract by USACE St. Louis District to perform field and automated hydrographic surveys.

HB&A LLC was awarded a maximum \$10 million firm-fixed-price, IDIQ contract for A-E services at multiple U.S. Air Force

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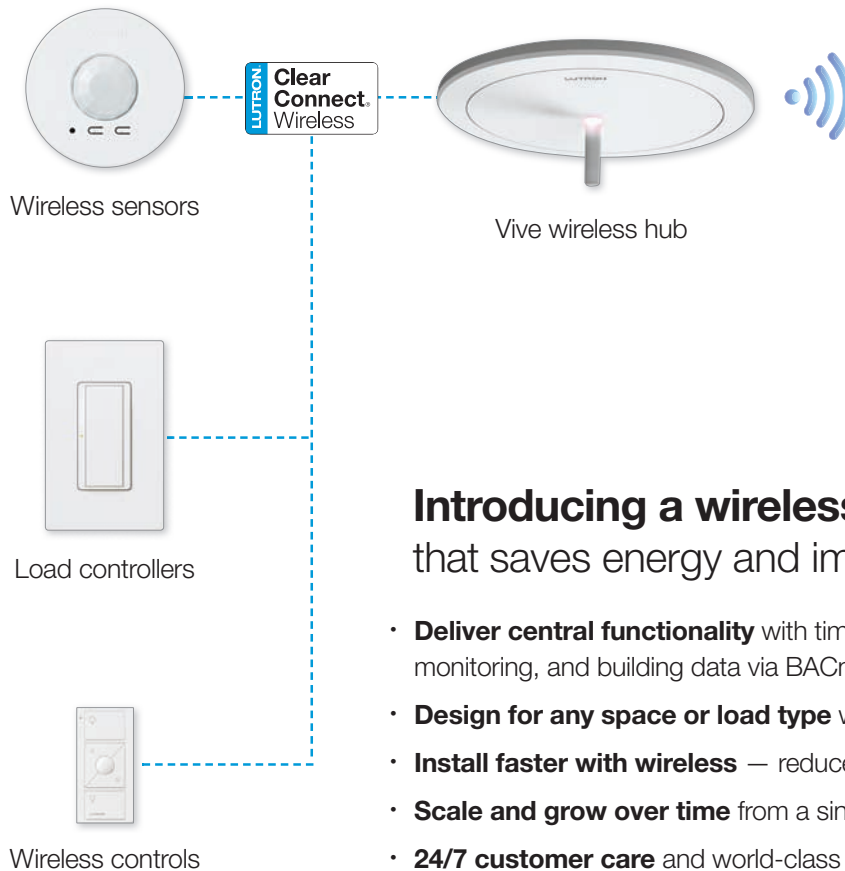
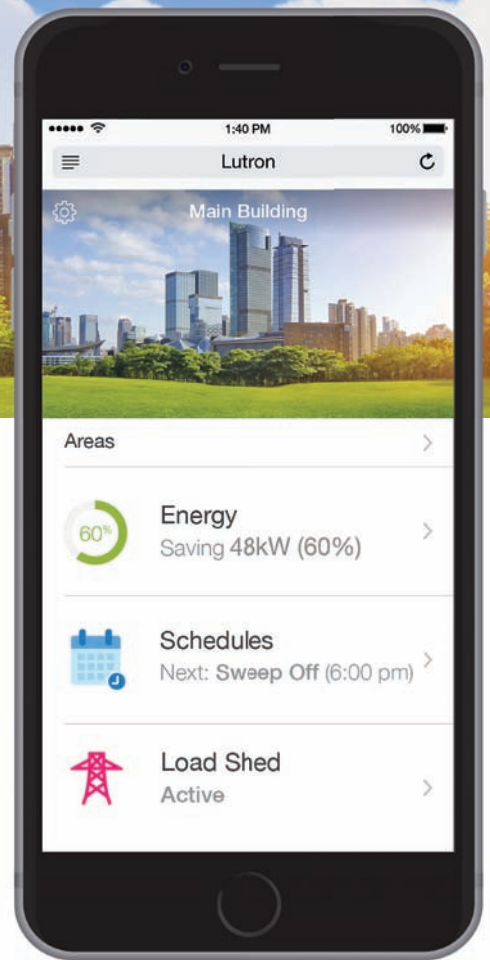
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Iron Mike Construction was awarded a \$7.3 million firm-fixed price contract to build a clubhouse for the Eisenhower Golf Course at the U.S. Air Force Academy, Colo.

Fort Hill Infrastructure Services, in a joint venture with Architectural Engineers Inc.—Minuteman Design Ventures LLC—was awarded a five-year, \$4.5 million, IDIQ small business contract with USACE New England District.

Leidos was awarded a \$10 million firm-fixed-price, indefinite-delivery contract to support U.S. Army Medical Command in medical treatment and medical research facilities-related operations.

Mabbett & Associates was awarded a \$15.4 million cost-plus-fixed-fee, cost-plus-incentive-fee contract for environmental planning, compliance and technical support services to the Missile Defense Agency.

Makers Architecture and Urban Design was awarded a maximum \$15 million firm-fixed-price, IDIQ A-E contract for architectural projects within NAVFAC Northwest.

Mott MacDonald was selected by the Washington Metropolitan Area Transit Authority as the prime engineering firm to provide A-E and consultant services for rail systems over a three- to five-year period.

Parsons was awarded a five-year, IDIQ construction management services contract by the Architect of the Capitol to upgrade, restore, and maintain facilities in the federal portfolio, including the U.S. Capitol campus.

Schneider Electric-Black & Veatch JV was awarded a \$19.2 million firm-fixed-price contract to design and build an energy security microgrid for critical facilities at Marine Corps Air Station Miramar, Calif.

Straub Construction Inc. was awarded a \$46.3 million firm-fixed-price contract for F-35C hangar modernization at Naval Air Station Lemoore, Calif.

Swinerton Builders was awarded a \$26 million firm-fixed-price contract to build a health clinic parking structure at Schofield Barracks, Hawaii.

Terra Construction Inc. was among those awarded a \$70 million firm-fixed-price,

multi-year, IDIQ multiple award task order contract by USACE Fort Worth District for construction in the Laredo, Del Rio, and Big Bend Border Patrol Sectors.

Tetra Tech and Pond & Company in a joint venture were awarded a \$9 million firm-fixed-price, multi-year, IDIQ contract for A-E services in the design of Air Force Reserve and military projects within USACE Great Lakes & Ohio River Division.

Weston Solutions was awarded a \$33.3 million contract by the Riverbank Redevelopment Authority to implement the remediation plan it developed for the Riverbank Army Ammunition Plant, Calif.

Woolpert and Magnolia River Geospatial received a one-year, \$10 million capacity contract supporting the coastal mapping and charting requirements of the U.S. Army Corps of Engineers and the Naval Oceanographic Office.



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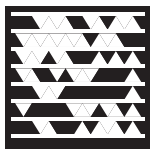
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PUTTING FAILURE (AND TRAINING) TO WORK

During a recent conversation, I was discussing with some colleagues the best way to assess and develop resiliency within an organization. While it is difficult to determine how your people will respond when things really go wrong, one may get a small glimpse if an adverse environment is simulated through training.

Of course, the idea of “training like you play” has been around a while and can be taken a bit too far. In the early years of Red Flag, the oppositional forces were accused of training soldiers to die, not to fight. Adversity may have its limits, but there is something to be said for the value of failure. Tim Harford addresses this idea in his book “Adapt: Why Success Always Starts with Failure.”

As we discussed methods for developing resiliency, competition within an organization was brought up. If done correctly, competition creates an environment that forces people to train harder while simultaneously creating the illusion of failure. I use the phrase “illusion” because a team may not best their peers; but the organization stands to benefit greatly from the shared experience of the competition and the lessons learned of the failures.

The idea of competition and training like we play is not lost on military engineers. The following stories illustrate the pursuit of resilience and excellence. As you ponder their training, how would you assess and develop resiliency within your organization?—T.S.

TRAINING HONES SAPPER SKILLS

Marines with 7th Engineer Support Battalion, 1st Marine Logistics Group, conducted training in preparation for upcoming deployments with Special Purpose Marine Air-Ground Task Force Crisis Response Central Command, Marine Rotational Force-Darwin and Koa Moana.

The convoy training consisted of three phases: Marines performing crowd control while refueling a patrol base; immediate action drills from hostile fire; and casualty evacuation from a helicopter landing zone.

“These are skills that need to be constantly maintained and perfected during a time of peace so it can be executed in the chaos of combat,” said 1st Lt. Steven J. Bernard, Training Officer with 7th Engineer Support Battalion. “These skills can atrophy if not constantly practiced.”

Role players were used to help create realistic training so the Marines will be prepared to properly handle chaotic crowds. As the convoy progressed down a dirt trail, the Marines hit a simulated improvised explosive device followed by enemy fire from hostiles. Once they eliminated the simulated insurgents, the Marines conducted IED sweeps to ensure there were no secondary explosions.

With the area cleared and their Marine casualties accounted for, the convoys moved on to their final objective, a helicopter-landing zone. The team grabbed the simulated casualties from the back of the tactical vehicles and moved them to the ground, while a Marine signaled for a notional helicopter using smoke grenades. (Contributed by Lance Cpl. Justin Bowles, I Marine Expeditionary Force)



Marines with 2nd Combat Engineer Battalion breach a door during the assault breaching portion of the battalion's sapper squad competition at Camp Lejeune, N.C. U.S. MARINE CORPS PHOTO BY CPL. PAUL S. MARTINEZ

TO BUILD AND BREACH

Marines with 2nd Combat Engineer Battalion competed against one another in a series of training exercises to determine the best sapper squad at Camp Lejeune, N.C.

The internal competition challenged squads in their proficiency at executing engineer-based tasks, while simultaneously determining those who will represent the battalion at a competition against other units. Marine Sappers are specially trained to breach enemy defenses utilizing various types of demolition and are required to earn certification upon completion of a six-week-long course. The competition included an assault breaching exercise that challenged squads to safely and efficiently

breach a door using explosives and the Mossberg 500 shotgun; to sweep a set path for improvised explosive devices and determine a response; engage targets at distances up to 800-m on a machine-gun range; and build and breach wire obstacles.

The training is beneficial in multiple ways. “I’m able to evaluate my Marines and determine what skills we may need work on,” said 1st Lt. Ian Simpson, a Platoon Commander with the battalion. “At the same time, it builds confidence in these squads because in a real-world environment they will have to work together to find the solution to an obstacle and employ it.” (Contributed by Cpl. Paul S. Martinez, II Marine Expeditionary Force)

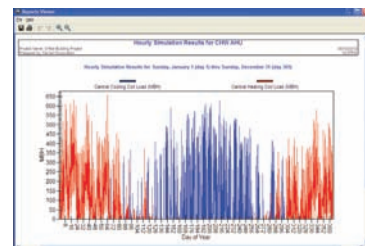
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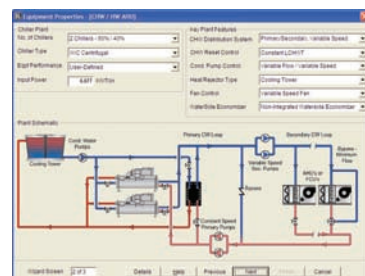
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Pvt. Meosha Morris, a Combat Engineer with the 3rd Combat Engineer Company, Regimental Engineer Squadron "Pioneer," 3rd Cavalry Regiment, uses a handheld mine detector during training at Fort Hood, Texas. U.S. ARMY PHOTO BY STAFF SGT. TOMORA CLARK, 3RD CAVALRY REGIMENT PUBLIC AFFAIRS

PREPARING FOR AFGHANISTAN

A convoy of different variants of Mine-Resistant Ambush Protected Vehicles slowly made its way down a dirt road at Fort Hood, Texas, kicking-up dust along the way, as soldiers cautiously searched for improvised explosive devices (IEDs).

Soldiers with 3rd Combat Engineer Company, Regimental Engineer Squadron "Pioneer," 3rd Cavalry Regiment, attended a

five-day training course in April at Phantom Run Range in preparation for an upcoming deployment to Afghanistan. The training lasted five days and consisted of three phases: the crawl, the walk and the run.

The training forced the engineers to use their vehicles and hand-held equipment to detect possible IED threats while enabling the older soldiers to mentor younger troops and develop more cohesive teams.

Capt. Ben Cox, Commander of 3rd Combat Engineer Company, explained the purpose of this training: "This is one of the last training exercises that we will conduct at Fort Hood before we deploy to Afghanistan. The training is focused on counter-IED training, and our very specific engineer vehicles and hand-held equipment we use to detect the possible threats."

"Being a combat engineer in Afghanistan is extremely important," Cox added. "Our route clearance operations make it safe for other soldiers to complete their missions." (Contributed by Staff Sgt. Tomora Clark, 3rd Cavalry Regiment Public Affairs Office)

REHEARSING AIRFIELD REPAIR

A two-day exercise at Kadena AB, Japan allowed airmen with the 18th Civil Engineer Squadron to demonstrate and then guide Marine Wing Support Squadron combat engineers and Seabees with Naval Mobile Construction Battalion 4 through a hands-on demonstration of the U.S. Air Force method to airfield damage repair. The exercise helped build interoperability among the multiple services on Okinawa.

For Master Sgt. Steven Cordova, 18th Civil Engineer Squadron Expeditionary Engineering Flight Chief, the focus of the training was understanding the differences while learning to operate together. "The main focus is to close the gap between services," he said. "Right now, everyone kind of operates on their own terms and has their own way of doing things. When push comes to shove we need to be able to work together and that's what today is all about."

Although there may be differences between the training of the services, their object is the same: fill craters and get the

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airfield operational again. “The steps are a little bit different, but in essence the steps are the same,” said Staff Sgt. Justin Luk, a Combat Engineer with Marine Corps Support Squadron 172. “Assess the crater, make it flat and from there we fill it in.”

The first day of the exercise was mainly spent watching the airmen perform the damage repair and the second day the Marines took over and performed the repairs the same way. “We had multiple objectives coming out here,” Staff Sgt. Luk said. “One was to reaffirm that we are capable of doing it. Another was to learn what we could from our Air Force counterparts.”

Said Petty Officer 3rd Class Darcel Tinner, with Naval Mobile Construction Battalion 4, performing airfield damage repair for the Navy involves more manual work than heavy machinery. “We’ll fill holes by hand compared to us using machines,” he said. “If there’s anything we’ll take away from this, it’s to use more machines.”

(Contributed by Senior Airman Omari Bernard, 18th Wing Public Affairs)

GAINING HANDS-ON EXPERIENCE

The 672nd Engineer Company is spending five months performing repairs at Kaweah Oaks Preserve in Tulare County, Calif., and constructing a permanent restroom facility for visitors. The engineers are working as part of the Innovative Readiness Training program in which the Army Reserve provides services for community programs and entities.

“Soldiers get a chance to learn their skills in the classroom and apply those skills with hands-on experience,” explained 1st Lt. Renn Scott, Executive Officer of the 672nd Engineer Company.

Innovative Readiness Training takes advantage of civilian skills and gives experienced lower-ranking soldiers the chance to teach higher-ranking soldiers new skills. This is unique in the Reserve; typically in the active component, skills and experience come with rank. The civilian experience in the Reserve adds to the unit’s capability.

(Contributed by Capt. Dan Marchik, 318th Press Camp Headquarters)



Soldiers from the 672nd Engineer Company check the level of a wall for a new restroom during Innovative Readiness Training at Kaweah Oaks Preserve in California. U.S. ARMY PHOTO BY CAPT. DAN MARCHIK, 318TH PRESS CAMP HEADQUARTERS

PARTNERING IN INDONESIA

Seabees assigned to Naval Mobile Construction Battalion (NMCB) 4 conducted an Engineering Civic Action Project this spring with engineers from Asia-Pacific partner nations in the 2nd Multilateral Naval Exercise Komodo.

Komodo is a multilateral naval exercise hosted by the Indonesian Armed Forces, Tentara Nasional Indonesia-Angatan Laut.



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First organized in 2014, this year marks the first time U.S. engineering forces participated. The exercise focuses on maritime peacekeeping and strengthening naval partnerships across the Pacific. A total of 35 countries participated in fleet, medical and engineering cooperation scenarios. As the only U.S. engineering forces on the ground, NMCB 4 had the opportunity to interact with engineers from multiple countries.

NMCB 4 left its mark by improving the Tua Pejat Road from a dirt road to a concrete road. The reconstruction of the 500-m road helped strengthen the multinational relationship and directly improved social and economic growth on the island. In a region with prolonged rainy seasons, the improved road enables over 1,000 local families year-round access to community services, schools and a medical clinic.

“Even though our construction means vary, we quickly learned that we have a lot more in common than not,” said Construction Mechanic 3rd Class Jeremy Colbert. “Exchanging construction and



Construction Electrician 1st Class Bryan Pelangka, with Naval Mobile Construction Battalion 4, discusses a 500-m road reconstruction project in Indonesia during Multilateral Naval Exercise Komodo. U.S. NAVY PHOTO BY CONSTRUCTION ELECTRICIAN THIRD CLASS SANTIAGO GUZMAN JR.

cultural knowledge with them is something I will take with me the rest of my naval career and I hope I get the chance to work

with them again in the future.”

(Contributed by Petty Officer 1st Class Rosalie Chang, NMCB 4)

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“MONGRELS” TRAIN FOR WARTIME

Airmen from the 51st Civil Engineer Squadron went through a series of training stations covering various wartime skills this spring during Exercise Beverly Herd 16-01 at Osan AB, Korea.

The primary mission for the “Mongrels” in a wartime scenario is keeping the base runway active and in the best condition possible, along with maintaining infrastructure throughout the rest of the installation. The different training stations during Exercise Beverly Herd gave the Mongrels a chance to hone skills they do not utilize normally, such as donning Mission Oriented Protective Posture gear, decontaminating themselves, and proper weapon handling and safety.

“I would argue that more than anywhere else in the world, this matters, that we do it regularly and that we take it as seriously as possible,” said Maj. Je Raley, 51st Civil Engineer Squadron Deputy Commander. “When my junior airmen and officers are



U.S. Air Force Staff Sgt. Henderson Anthony, a Structural Craftsman with the 51st Civil Engineer Squadron, stands in a cloud of decontamination powder while his Mission Oriented Protective Gear is decontaminated during Exercise Beverly Herd. U.S. AIR FORCE PHOTO BY SENIOR AIRMAN VICTOR J. CAPUTO

going through this, especially with this potentially being their first assignment, it should hit home and help to secure that muscle memory on what they’re supposed to be doing.”

The training stations included unexploded ordnance identification, learning how to identify chemical attacks and protect

mission-critical gear, and decontamination checks and procedures.

(Contributed by Senior Airman Victor J. Caputo, 51st Fighter Wing Public Affairs)



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ENHANCING CYBER SECURITY

Cyber security has rapidly emerged as a high priority across the spectrum of activities within the Department of Defense (DOD).

Recognizing the threat to U.S. security, President Obama in 2013 issued Executive Order 13636: Improving Critical Infrastructure Cybersecurity. The Executive Order requires the National Institute of Standards and Technology to "lead the development of a framework to reduce cyber risks to critical infrastructure." The order also directed that this "Cybersecurity Framework" include a set of standards, methodologies, procedures and processes that align policy, business and technological approaches to address cyber risks.

Federal agencies have been required to meet stringent cybersecurity standards for traditional information technology systems since 2002, when the Federal Information Security Management Act was passed. However, the same level of protection and analysis is just beginning to be developed for building control systems.

Following the release of Executive Order 13636 and the understanding of the significant threat to national security, DOD announced a new Cyber Strategy in April 2015 to address the emerging threat and guide development of its cyber forces and to strengthen its cyber defense and deterrence posture. And with good reason, as cyber risks are only going to increase.—E.L.

DRIVING A CULTURE CHANGE

In 2012, President Obama directed the Department of Defense (DOD) to organize and plan to defend the nation against cyber-attacks of significant consequence, in concert with other government agencies. DOD then established a Cyber Mission Force to carry out its cyber missions to address the president's directive. These actions, along with the increasing severity and sophistication of the cyber threat to U.S. interests—to include defense networks, information, and systems—were the major drivers behind DOD's new Cyber Strategy announced in 2015.

DOD's Cyber Strategy focuses on building cyber capabilities and organizations in its three cyber missions: defend networks, systems, and information; defend the United States and its interests against cyber-attacks of consequence; and provide integrated cyber capabilities to support military operations and contingency plans.

Identifying Key Challenges. In December 2014, Market Connections, a market research provider to the government, in conjunction with SolarWinds, conducted its second annual blind survey of 200 IT and IT security decision-makers in the federal government, military and intelligence communities to uncover their most critical IT security challenges and to determine how to make potential security threats visible so they can be confronted.

A total of 53 percent of DOD respondents cited careless/untrained insiders as the primary source of security threats, more than foreign governments (48 percent), terrorists (31 percent) or the general hacking community (35 percent). Malicious



Open-source technologies being used in the Defense Department's High Performance Computing Modernization Program include Bro Intrusion Detection System, Elasticsearch, Apache Kafka, Apache Spark, Docker, and Kibana (above). DOD IMAGE

insiders were not left out, however, being cited by 26 percent of respondents.

The biggest threat sources for civilian agencies were: general hacking community (55 percent), careless/untrained insiders (35 percent), hacktivists (27 percent), foreign governments (24 percent), and terrorists and for-profit crime (both at 13 percent). Only 6 percent of military respondents were worried about for-profit crime.

In January 2015, James Comey, Director of the Federal Bureau of Investigation, addressed the International Conference on Cyber Security at Fordham University. He cited statistics from Cisco that showed in 2010 there were 6.8 billion people on the earth and 12.5 billion devices connected to the Internet. Cisco projected that in 2020 there will be 7 billion people and 50 billion connected devices.

Educating Defense Personnel. In an effort to educate DOD personnel and foster collaboration across the services, several workshops have been held and technical articles published.

According to an article in the fall 2015 Association of the United States Navy magazine, *Navy*, cyber security is the U.S. Navy's single greatest threat to its ability to accomplish its missions. The article stated that DOD experiences about 41 million cyber-attacks each month—and attacks against U.S. infrastructure have increased by a factor of 17 over the past three years.

The U.S. Army, during the Installation Innovation Forum 2016, dedicated a special session to the cyber security vulnerabilities of installation-related control systems, DOD's strategy for deterring malicious attacks on those systems, and possible



roles the installation community can play to secure control systems. Control systems on installations often are configured for remote access over the internet, increasing efficiency for vendors but at the same time creating vulnerabilities for the device controllers and the supported computer networks. One primary target could be energy production and delivery systems,

which are critical to the functioning of installations. An attack on any control system could disrupt military operations and readiness. A more serious intrusion would occur if the control system was used as a gateway into the IT system or DOD's broader information networks.

Developing Training Materials. The military services have developed training



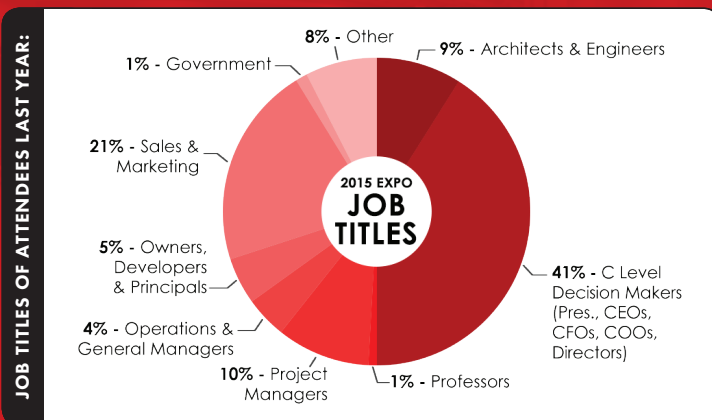
Federal agencies have been required to meet stringent cyber security standards for their information technology systems since 2002. The same level of protection and analysis is just now being developed for building control systems. Above, U.S. Army Aviation and Missile Command at Redstone Arsenal, Ala. U.S. ARMY PHOTO



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materials as a practical way to deal with the issue of untrained insiders. One example is the Army's new graduate-level certificate in the Fundamentals of Cybersecurity at Aberdeen Proving Grounds, Md., coordinated by the Communications-Electronics Research, Development and Engineering Center of the U.S. Army Research, Development and Engineering Command. The Fundamentals of Cybersecurity Certificate provides advanced training through a three-course sequence.

The U.S. Air Force, in association with the Joint Threat Assessment and Negotiation for Installation Infrastructure Control Systems Quick Reaction Test, and the Joint Test and Evaluation Program under the Director, Operational Test and Evaluation, Office of the Secretary of Defense, created the "Handbook for Self-Assessing Security Vulnerabilities & Risks of Industrial Control Systems on DoD Installations."

The handbook is intended for use by installation commanders as a management tool to self-assess, prioritize, and manage mission-related vulnerabilities and risks that may be exposed or created by connectivity to industrial control systems.

Addressing External Threats. Despite the lack of internal training and apathy being big issues, the more dynamic and long-term concern is more likely to be external threats. An example of how the long-term threats are being addressed in the research, development, testing and evaluation communities can be seen in the DOD High Performance Computing Modernization Program (HPCMP).

The Defense Research and Engineering Network is provided by HPCMP as a

platform enabling scientists and engineers to conduct leading edge research and development in support of current and future warfighter requirements. As cyber threats continue to grow in complexity, HPCMP's protection of the Defense Research and Engineering Network and its more than 200 sites has never been more critical.

Within the past year, HPCMP in collaboration with service stakeholders has initiated numerous efforts to enhance the cyber security posture of the network by applying a defense-in-depth strategy to protect the wide area network. Through initiatives such as modernizing intrusion detection platforms, enhancing network boundary protection, secure authentication, and auditing of systems, HPCMP is applying cyber security technologies to foster a productive environment for DOD's research, development, test, and evaluation community. The innovative and novel technologies are relevant to other domains within DOD, and can be employed to military engineer activities.

Tailored and Adaptable. As with any network that hosts sensitive data, it is imperative to monitor for intrusions or unauthorized access to information systems. HPCMP is employing modernized technologies to establish a flexible, agile intrusion detection platform capable of being enhanced and improved at the pace of the cyber threat. By tailoring proven, open source technologies, HPCMP is advancing its ability to defend and operate its networks. Open-source technologies being used include: Bro Intrusion Detection System, ElasticSearch, Kibana, Apache Kafka, Apache Spark, and Docker.

In addition to the use of proven, open source technologies, HPCMP is using a measures-of-effectiveness framework to quantify the performance and utility of technologies in use. Understanding the use cases and desired capabilities of the platform, the framework allows for a constant evaluation of platform components and their ability to achieve the intended results.

Given the increasing and evolving cyber threats, protecting a network from adversarial attack is paramount to its sustainment and continued operation. A variety of technologies are available commercially to utilize in securing a network.

It is often a challenge for organizations to determine the optimal type and placement of security technologies to maximize their utility in protecting a network. HPCMP has formed a capability maturity model-like program to formally evaluate a multitude of security products and their capability to enhance the security of the Defense Research and Engineering Network. The

initiative consists of cyber security evaluations of domain name service protection tools; distributed denial-of-service attack prevention tools; full packet capture tools; security analytics; malware detection and preventions; web content filtering; and secure socket layer break and inspect tools.

Evaluation and Collaboration. The technology evaluations require extensive

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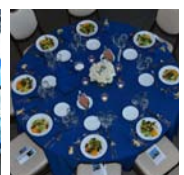
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YubiKey is a one-touch, capacity-loading hardware device used for authentication to many non-Windows systems and infrastructure.

collaboration with stakeholders and industry to ensure proper installation and configuration of each capability. Much like the measures-of-effectiveness framework, repeatable use cases drive the evaluation of technologies and their ability to achieve the desired results in protecting the network.

Within HPCMP, the technology evaluations are actively being conducted in a technology laboratory with network traffic replicated to emulate a “real-world” environment. The capability maturity model

approach is one that can be shared and adopted by any organization seeking to evaluate and implement cyber security technologies for their network. It is also essential to maintain strict access controls and visibility into those accessing and authenticating to systems. With a diverse and geographically dispersed computing environment it is challenging to implement access guidelines to control which users can authenticate to which systems (all requiring two-factor authentication). HPCMP employs a standard public key infrastructure implementation, as well as YubiKey as a two-factor authentication for many non-traditional systems. YubiKey is a one-touch, capacity-loading device used for strong authentication to many non-Windows systems and infrastructure.

Assessing Endpoint Systems. To effectively protect and defend a network, an organization must regularly assess the configuration and security state of endpoint systems. As with secure authentication, a diverse computing environment adds

complexity in continuously monitoring and maintaining situational awareness of the security posture at the host level.

HPCMP has developed a custom, lightweight scanning capability that effectively evaluates a system for known vulnerabilities or misconfigurations. The technology is designed to scan a high performance computing system—consisting of thousands of cores—in less than 90 seconds and deliver a report to allow appropriate mitigation and remediation actions. The scanning technology is capable of running Security Technical Implementation Guide checks on various platforms to ensure that the endpoint is properly configured.

For more information, contact Krisa Rowland, Associate Director, Security, High Performance Computing Modernization Program; krisa.w.rowland@erdc.dren.mil.



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PUTTING POLICIES INTO PRACTICE

An increasing number of projects and programs highlight greater adoption of incentives, procedures, and documentation related to the uptake of energy and sustainability practices in government. Whereas a decade ago, the topics were addressed infrequently and often with a certain attempt at fanfare, now they seem rather routine.

Energy efficiency and renewable energy now receive as much commentary for their job creation contributions as for their climate mitigation merit. Science is being recognized as a powerful tool to manage natural resources, including our food supply: applications range from supercomputers generating powerful weather forecasts for guiding farmers to monitoring of field conditions supporting fish population recovery. The Environmental Protection Agency and Department of Defense are promoting efficient use of energy and water within their own facilities, with high performance results.

Is efficient resource management and advance planning for climate resilience the new normal? Not for everyone quite yet. But the array of examples continues to broaden, with a ripple effect of increased awareness and buy-in.

In addition to Congressionally appropriated funding, some projects financed by third parties pay for themselves through cost savings throughout their lifecycle. Others are accomplished through private investment, such as integrating renewables into the power grid. Rather than being seen as an additional cost or burdensome distraction from "business as usual," energy and sustainability policy implementation has entered standard decision processes related to assuring mission continuity and safety both for humans and the ecosystems we depend on.

Seen as uncomfortable, infeasible, or potentially impossible a few short years ago, environmental policies have entered the realm of attainable, and even essential.—W.G.

2016 HURRICANE SEASON OUTLOOK

The National Oceanic and Atmospheric Administration's (NOAA) Climate Prediction Center forecasts the 2016 Atlantic hurricane season, which runs from June through November, as having a 45 percent chance of being near-normal. However, forecast uncertainty in the climate signals that influence the formation of Atlantic storms will make predicting this season particularly difficult.

NOAA predicts a 70 percent likelihood of 10 to 16 named storms (winds of 39-mph or higher), of which four to eight could become hurricanes (winds of 74-mph or higher), including one to four major hurricanes (Category 3, 4 or 5; winds of 111-mph or higher). There is a 30 percent chance of an above-normal season and a 25 percent chance of a below-normal season.

NOAA also issued its outlook for the eastern Pacific and central Pacific basins. The central Pacific hurricane outlook calls for equal 40 percent chances of a near-normal or above-normal season, with four to seven tropical cyclones. The eastern Pacific outlook is for a 40 percent chance of a near-normal season, a 30 percent chance of above-normal, and a 30 percent chance of below-normal. There is a 70 percent probability of 13 to 20 named storms, of which six to 11 are expected to become hurricanes.

For more information, visit www.hurricanes.gov.

(Contributed by NOAA)



Hurricane Ivan shown approaching the United States in 2004. The National Oceanic and Atmospheric Administration forecasts a 45 percent chance of a near-normal Atlantic hurricane season in 2016. NOAA IMAGE

ENERGY EMPLOYMENT ANALYSIS

The Department of Energy this spring released its first analysis of how changes in America's energy profile are affecting national employment in multiple energy sectors. The inaugural U.S. Energy and Employment Report (USEER) provides a broad view of the national energy employment landscape by using existing energy employment data along with a new survey of energy sector employers,

USEER will annually examine four

sectors of the economy (electric power generation and fuels; transmission, wholesale distribution, and storage; energy efficiency; and motor vehicles), which cumulatively account for almost all of the United States' energy production and distribution system and roughly 70 percent of its energy consumption.

Key findings of the report include:

- 3.64 million Americans work in traditional energy industries, including production, transmission, distribution,



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and storage; of these, 600,000 employees contribute to the production of low-carbon electricity, including renewable energy, nuclear energy and low emission natural gas.

- An additional 1.9 million Americans are employed, in whole or in part, in energy efficiency activities.
- Roughly 30 percent of the 6.8 million employees in the U.S. construction industry work on energy or building energy efficiency projects.

USEER also found several industries with projected job growth. Responding to the report's survey of employers, the energy efficiency sector predicted hiring rates of 14 percent in 2016, or almost 260,000 new hires. Projected hiring rates were at 5 percent in the electric power generation and fuels sector. Transmission, wholesale distribution, and storage firms anticipate 4 percent employment growth in 2016. Solar energy firms predicted 15 percent job growth over the next year.

Even as the report found opportunities for job growth in many energy sectors, over 70 percent of the employers surveyed found it "difficult or very difficult" to hire new employees with needed skills.

(Contributed by DOE)

CONDITION OF AMERICA'S WETLANDS

The Environmental Protection Agency (EPA) this spring released the first-ever National Wetland Condition Assessment, showing that nearly half of the nation's wetlands are in good health, while 20 percent are in fair health and the remaining 32 percent in poor health.

The National Wetland Condition Assessment is part of a series of National Aquatic Resource Surveys designed to advance the science of coastal monitoring and answer critical questions about the condition of waters in the United States.

Said Joel Beauvais, Deputy Assistant Administrator for EPA's Office of Water: "We know that protecting our wetlands is a critical component of adapting to climate change impacts like flooding and managing pollution and nutrients damaging our country's water quality."

Physical disturbances to wetlands and their surrounding habitat such as compacted soil, ditching, or removal of



Nearly half of the nation's wetlands are in good health according to a new assessment from the Environmental Protection Agency. EPA IMAGE

plants, are the most widespread problems across the country. Nonnative plants are also an issue, particularly in the Interior Plains and West.

EPA conducted the National Wetland Condition Assessment in partnership with state environmental agencies and other federal agencies, including the Natural Resource Conservation Service and U.S. Fish and Wildlife Service.

For more information, visit www2.epa.gov/national-aquatic-resource-surveys. *(Contributed by EPA)*

BOOSTING BROWNFIELD GRANTS

EPA has announced the selection of 218 new grant investments for brownfield redevelopment, totaling \$55.2 million to 131 communities across the country.

These Assessment, Revolving Loan Fund and Cleanup Grants go to underserved and economically disadvantaged communities, including neighborhoods where environmental cleanup and new jobs are most needed. EPA's Brownfields Program strives to expand the ability of communities to recycle vacant and abandoned properties for new, productive reuses. The investments will provide the funding to assess, clean up and redevelop contaminated properties.

There are an estimated 450,000 abandoned and contaminated waste sites in America. Since the inception of EPA's Brownfields Program in 1995, the cumulative investments have leveraged over \$20 billion from public and private sources for cleanup and redevelopment activities.

This equates to an average of \$17.79 leveraged per EPA brownfields dollar expended. These investments have resulted in more than 108,000 jobs nationwide.

(Contributed by EPA)



EXAMINING ENERGY CORRIDORS

The Bureau of Land Management, DOE, and the U.S. Forest Service in May released a new report "Section 368 Corridor Study" that provides a foundation for upcoming regional reviews of energy corridors on western public lands.

The work will help to assess the need for revisions and provide greater public input regarding areas that may be well suited for transmission siting. The regional reviews will begin with priority corridors in southern California, southern Nevada and western Arizona. They will provide opportunities for collaboration with the public and federal, tribal, state and local government stakeholders.

The joint agency corridor study examines whether the energy corridors established under Section 368(a) of the *Energy Policy Act of 2005* are achieving their purpose to promote environmentally responsible corridor-siting decisions and to reduce the proliferation of dispersed rights-of-way crossing federal lands.

The corridors address a national concern by fostering long-term, systematic planning for energy transport development in the West; by providing industry with a coordinated and consistent interagency permitting process; and by establishing practicable measures to avoid or minimize environmental harm from future development within the corridors.

For more information, visit www.corridoreis.anl.gov.

(Contributed by BLM)

ENERGY NEEDS IN RURAL ALASKA

DOE this spring announced 13 recipients of Remote Alaska Communities Energy Efficiency (RACEE) technical assistance, and released its "Sustainable Energy Solutions for Rural Alaska" report.

The RACEE competition is a \$4 million joint effort between DOE's offices of Indian Energy and Energy Efficiency & Renewable Energy to accelerate efforts by remote Alaska communities to adopt sustainable energy strategies. During the first phase of

the competition, 64 communities pledged to reduce per-capita energy use by 15 percent by 2020 and were designated as Community Efficiency Champions, incorporating them into a peer network and making them eligible to apply for technical assistance to prepare implementation plans.

DOE is providing \$600,000 to the Alaska Energy Authority to deliver technical assistance to 13 communities selected in the second phase. The communities are the City of Akutan, Village of Chefnak, City of False Pass, City of Galena, Village of Holy Cross, Village of Kiana, Village of Klawock, City of Kotlik, City of Noorvik, City of Port Lions, City of Ruby, City of Sand Point, and the City of Shishmaref.

The communities will work with Alaska-based technical assistance providers to develop project plans to meet or exceed their pledged 15 percent energy reduction. This assistance is intended to position the communities to obtain loans or compete for funding to fully implement their plans. (Contributed by DOE)

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- Argonne National Laboratory – *Self-Assembled Nanocellular Composites with Super Thermal Insulation and Soundproof for SinglePane Windows* (\$3,102,671)
- Arizona State University – *Single-Pane Windows with Insulating Sprayed Particulate Coatings* (\$2,197,800)
- Aspen Aerogels Inc. – *Aerogel Insulated Pane as a Replacement for Panes in Single-Pane Windows* (\$2,751,377)
- Eclipse Energy Systems Inc. – *Eclipse Shield* (\$1,249,791)
- Oak Ridge National Laboratory – *Low Cost, Multilayer, Highly Transparent and Thermally Insulating Hybrid Silica-Polymer Film* (\$2,540,000)
- PARC, a Xerox Company – *Scalable Transparent Thermal Barriers for Single-Pane Window Retrofits* (\$2,887,312)
- Regents of the University of California, Los Angeles – *Thermally Insulating Transparent Barrier Coatings for Single-Pane Windows* (\$1,200,000)
- SRI International – *Window Retrofit Applique Using Phonon Engineering* (\$2,968,501)
- University of California, San Diego – *Thinner Than Air: Polymer-Based Coatings of Single-Pane Windows* (\$1,400,000)
- University of Colorado Boulder – *Advancing Insulation Retrofits from Flexible Inexpensive Lucid Materials for Single-Pane Windows* (\$1,800,000)
- Virginia Commonwealth University – *Fabrication of Inexpensive, Transparent Aerogel Panes* (\$859,891)
- IR Dynamics LLC – *Dynamic IR Window Film to Improve Window Energy Efficiency* (\$1,950,000)
- NanoSD Inc. – *Retrofittable and Transparent Super-Insulator for Single-Pane Windows* (\$3,000,000)
- Triton Systems Inc. – *Energy Efficient Window Thermal Control* (\$3,224,500)

INNOVATIONS IN WINDOW DESIGN

DOE's Advanced Research Projects Agency-Energy announced \$31 million in funding for 14 projects as part of the Single-Pane Highly Insulating Efficient Lucid Design (SHIELD) program.

The SHIELD program will accelerate the development of materials that could cut in half the amount of heat lost through single-pane windows without replacing the full window. Project teams are developing innovative window coatings and windowpanes that could significantly improve the energy efficiency of existing single-pane windows in commercial and residential buildings. Many buildings have single-pane windows that do not insulate well. However, complete replacement of single-pane windows with efficient, modern windows is not always feasible due to cost, changes in appearance, and other concerns.

Retrofitting, rather than replacing windows, can reduce heat loss and save the amount of electricity needed to power 32 million homes each year.

The 14 SHIELD project teams (see table above) are developing applied products and manufactured windowpanes.

These technologies will improve thermal insulation, reduce condensation and enhance occupant comfort. The materials also could produce corollary benefits, such as improved soundproofing, that will make retrofits more desirable.

(Contributed by DOE)

IMPROVING SOLAR INTEGRATION

DOE has announced \$25 million in available funding through the Enabling Extreme Real-Time Grid Integration of Solar Energy (ENERGISE) initiative to help software developers, solar companies, and utilities accelerate the integration of solar energy into the electric grid.

Since President Obama took office, the amount of solar power installed in the United States has increased from 1.2-GW in 2008 to an estimated 27.4-GW in 2015, with 1 million systems now in operation. One of the challenges to further solar deployment



is integrating distributed generation sources like rooftop solar panels into the grid while balancing that with traditional generation to keep reliable and cost-effective power flowing to homes and businesses.

ENERGISE specifically seeks to develop software and hardware platforms for utility distribution system planning and operations that integrate sensing, communication, and data analytics. These solutions will help utilities manage solar and other distributed energy resources on the grid and will be data-driven, easily scaled-up from prototypes, and capable of real-time monitoring and control.

“Our ongoing grid modernization work will help accelerate the widespread adoption of the clean energy resources that will define our low-carbon future. This funding will help that mission by supporting industry partners working to integrate, store, and deploy solar energy throughout our electric grid,” said Lynn Orr, Energy Department Under Secretary for Science and Energy. *(Contributed by DOE)*



The Department of Energy has announced \$25 million in available funding through the Enabling Extreme Real-Time Grid Integration of Solar Energy initiative to help software developers, solar companies, and utilities accelerate the integration of solar energy into the grid. Above, a 600-kw solar electric system installed on the Minneapolis Convention Center. DOE PHOTO



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MITIGATING WILDFIRE IMPACTS

The Department of Interior in May announced \$10 million in funding as part of the Wildland Fire Resilient Landscapes Program to help increase the resiliency of critical landscapes across the country to better mitigate the impacts of wildfire and climate change. The Wildland Fire Resilient Landscapes Program, launched in 2015, is a new approach to achieve fire resiliency and help restore public lands through multi-year investments in designated landscapes.

Through a competitive evaluation process in 2015, Interior selected 10 projects and provided an initial \$10 million in funding when the Wildland Fire Resilient Landscapes Program was first announced. The approved proposals, known as Resilient Landscape Collaboratives, received funding at a scale to provide results in five to 10 years. The new funding will support the second year of work for the 10 projects: Bi-State Sage-Grouse (\$1,029,616); Bruneau-Owyhee (\$500,000); Grant Grove Peninsula (\$313,000); Greater Sheldon Hart

Mountain (\$404,000); Longleaf Pine, South Atlantic (\$980,000); Santa Clara Pueblo (\$800,000); Southern Arizona (\$414,150); Southern Utah (\$3,500,000); Southwest Colorado (\$1,029,618); and Valles Caldera (\$1,029,616).

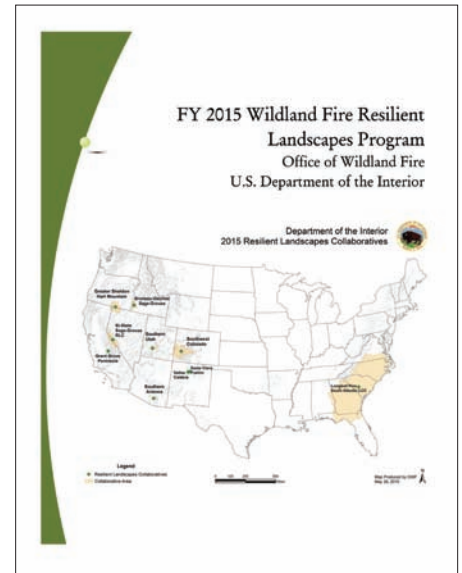
"These projects will protect the nation's diverse landscapes making them more resilient to wildfire for future generations, with help from our partners who also recognize that this challenge is too great for any one organization to tackle on its own," said Secretary of the Interior Sally Jewell.

For more information, visit www.doi.gov/wildlandfire.

(Contributed by DOI)

GLOBAL ENERGY USE THROUGH 2040

World energy consumption is projected to increase by 48 percent over the next three decades, led by increases in the developing world, especially in Asia, according to "International Energy Outlook 2016" (IEO2016), released in May by the U.S. Energy Information Administration (EIA).



The Wildland Fire Resilient Landscapes Program works to achieve fire resiliency and help restore public lands through multi-year investments in designated landscapes. DOI IMAGE

Rising incomes in China, India, and other emerging Asia economies are a key driver of the global energy outlook. "Developing Asia

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Following the 2016 Post Leaders Workshop, being held Aug. 28-30 at the Loews Don CeSar Hotel in St. Pete Beach, Fla., the SAME Academy of Fellows will host a golf tournament on Aug. 31 as a fundraiser for the new SAME Foundation.

Note: All golfers are welcome; players do not need to be SAME members or Fellows.

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accounts for more than half of the projected increase in global energy use through 2040,” said EIA Administrator Adam Sieminski. “This increase will have a profound effect on the development of world energy markets.”

Clean energy technologies also play an important role in the global outlook, with renewables expected to be the fastest-growing energy source.

IEO2016 presents updated projections for world energy markets through 2040. Outside of the United States, projections are based on current laws, regulations, and announced policies, where such indicators have historically been reliable guides. For the United States, the projections are generally based on existing laws and regulations but do not include the effects of the recently

finalized Clean Power Plan regulations.

Key findings of IEO2016 include:

- World energy use increases from 549-quadrillion-Btu in 2010 to 815-quadrillion-Btu in 2040. The increase mainly occurs in the developing world, driven by long-term growth in economies and populations. More than half of the total increase in energy consumption is attributed to developing Asia.
 - IEO2016 projects renewables as the fastest-growing energy source—increasing by 2.6 percent per year through 2040—but fossil fuels still supply more than three-quarters of world energy use.
 - Although petroleum and other liquids remain the largest source of energy, the liquid fuels share of world marketed energy consumption falls from 33 percent in 2012 to 30 percent in 2040.
 - Natural gas is the fastest-growing fossil fuel in the outlook. Global natural gas consumption grows by 1.9 percent per year. Abundant natural gas resources and robust production—including rising supplies of tight gas, shale gas, and coal-bed methane—contribute to the strong competitive position of natural gas.
 - Coal is the world’s slowest-growing energy source, rising by 0.6 percent per year through 2040. By 2030, natural gas surpasses coal to become the second-largest energy source after liquid fuels.
 - Worldwide electricity generation from nuclear power increases from 2.3 trillion-kWh in 2012 to 4.5-trillion-kWh in 2040, as concerns about energy security and greenhouse gas emissions support the development of new nuclear generating capacity. Virtually all of the projected net expansion in the world’s installed nuclear capacity occurs in the developing world, led by China’s addition of 139-GW of nuclear capacity from 2012 to 2040.
 - Global energy-related carbon dioxide emissions rise from 32-billion-metric-T in 2012 to 36-billion-metric-T in 2020, and then to 43-billion-metric-T in 2040.
- For more information, visit www.eia.gov/forecasts/ieo/.
(Contributed by EIA)



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Resilience and the Coast Guard

The U.S. Coast Guard, having experienced significant asset damages and losses as a result of several major hurricanes over the last decade, has been working to increase the resilience of its facilities and infrastructure by increasing collaboration and enhancing design standards.

By Capt. John Healy, P.E., M.SAME, USCG, Cdr. Robert Hueller, P.E., M.SAME, USCG, Cdr. Edward Wieland, P.E., M.SAME, USCG, Lt. Cdr. John-David Lentine, P.E., M.SAME, USCG, and Lt. Cdr. Mark Braxton, P.E., USCG

In the last decade, the U.S. Coast Guard has experienced significant loss of infrastructure following several major hurricanes that devastated regions of the United States. In August 2005, Katrina made landfall in southeastern Louisiana as a Category III hurricane and caused \$108 billion in property damage and killed 1,833 people on U.S. soil. Hurricane Ike made landfall in September 2008 in Galveston, Texas, as a Category II hurricane and caused \$29.5 billion in property damage and killed approximately 135 people in the region.

In late October 2012, Superstorm Sandy made landfall near Atlantic City, N.J., as a post tropical-cyclone and caused \$68 billion in property damage and killed 112 people in the United States.

With critical coastal facilities destroyed or severely damaged and unable to support mission objectives, the Coast Guard implemented a plan to rebuild its shoreside



A Coast Guard Station Boston crew transits between the Coast Guard Cutter *Escanaba* and Coast Guard Cutter *Spencer* in fall 2014. Over the past 20 years, the Coast Guard has continued to improve its facility resiliency and incorporated innovative methods to facilitate expedited post-storm operational recovery, meet mission objectives, and provide safer shelters for its crews.
U.S. COAST GUARD PHOTO BY PETTY OFFICER 3RD CLASS MYEONGHI CLEGG

infrastructure with more resilience in order to withstand the negative effects of wind and surge loads inflicted by hurricanes. Fortunately, Congress provided special appropriations to rebuild Coast Guard infrastructure after each of those natural disasters, totaling just over \$700 million.

Working closely with field units, planners, and local communities, regional plans were implemented to enhance the resiliency and sustainability of new shore facilities in order to meet mission demands and provide superior structures to support Coast Guard personnel.

PREPARED IN ADVANCE

Although the Coast Guard is the primary federal maritime responder during and after a storm event, the service does not

design nor expect its facilities to remain operational during all storms. The Coast Guard requires each unit to establish a Continuity of Operations Plan in the event of a hurricane or other natural disaster. Based on weather predictions, the Coast Guard determines whether to “shelter in place” or evacuate from areas where a hurricane is expected to make landfall. If a unit is evacuated, active duty personnel are expected to return to their facilities and resume operations, with the assumption that facilities have survived the storm event with minimal repair effort needed.

Coast Guard missions are generally accomplished through Command and Control Centers (Districts and Sectors) and Operational Sub-Units—Sector Field Offices (SFO), Air Stations (AIRSTA),



Forward Operating Bases (FOB), Maritime Security and Strike Teams (MSST), Small Boat Stations (STA), and Aids to Navigation Teams (ANT). The Command and Control Centers are expected to remain operational regardless of weather conditions and their day-to-day missions of marine pollution response and the management of maritime commerce are not strictly location driven, which provides greater flexibility to site their facilities on inland real-estate within their zone of responsibility. Small Boat Stations are comprised of search and rescue vessels and require shore side accessibility. These stations are optimally positioned within their area of responsibility for responding to missions. However, they also typically reside in zones that are subject to the heaviest storm conditions.

The new Coast Guard facilities and infrastructure delivered in response to the recent hurricanes' impacts were executed through design-build contracts and they include resiliency features to address wind, flooding, construction materials and emergency power concerns.

These specific resiliency features were incorporated to minimize the time and effort required to return a unit to full operational capacity following a significant weather event.

WIND RESILIENCE SPECIFICATIONS

For wind design, the Coast Guard specified a combination of commercial standards and the Unified Facility Criteria for the construction of new facilities. Review of the design specifications used following

Hurricanes Katrina, Ike and Sandy showed variability in wind speed requirements and design standards.

As shown in Figure 1, three project specifications (Station Gulfport, Base New Orleans and SFO Galveston) directed the contractor to use Coast Guard-specified wind speeds to design the new facilities. The Coast Guard-prescribed wind speeds were determined by rounding up the American Society of Civil Engineers (ASCE)-required wind speed to the nearest 10.

Three project specifications (SFO Galveston Armory, ANT Dulac, and MSST Galveston) directed the contractor to use Coast Guard-specified Occupancy Categories to determine the ASCE 7 design wind speeds to construct the new facilities. The Dulac design-build contractor on its

Wind Speed Resilience Design Requirements

Project	Specified Design Standard	IBC Occupancy Category	Wind Speed (mph)			
			As-Built	ASCE 7-05	ASCE 7-10	
					Risk Category	
					II	III & IV
Station Gulfport ^K	IBC 2006 & ASCE 7-05	IV	160	136	<i>160</i>	<i>175</i>
Base New Orleans ^K	IBC 2006 & ASCE 7-05	II	130	127	<i>144</i>	<i>153</i>
Sector New Orleans ^K	IBC 2006 & ASCE 7-05	II	160	126	<i>144</i>	<i>154</i>
SFO Galveston Armory ^I	IBC 2009 & ASCE 7-05	II	133	132	<i>150</i>	<i>159</i>
ANT Dulac ^I	IBC 2009 & ASCE 7-05	III*	155	135	<i>157</i>	<i>168</i>
Station Sabine ^I	IBC 2009 & ASCE 7-05	II	130	130	<i>145</i>	<i>155</i>
SFO Base Galveston ^I	IBC 2009 & ASCE 7-05	II	140	132	<i>150</i>	<i>159</i>
Station Houston ^I	IBC 2009 & ASCE 7-05	IV	150	110	<i>138</i>	<i>147</i>
AIRSTA FOB Great Inagua ^I	IBC 2009 & ASCE 7-05	II	150	145	<i>165</i>	<i>175</i>
Sector Houston-Galveston ^I	IBC 2009 & ASCE 7-05	IV	115	114	<i>141</i>	<i>150</i>
SFO Galveston Industrial ^I	IBC 2009 & ASCE 7-05	II	140	132	<i>150</i>	<i>159</i>
MSST Galveston ^I	IBC 2012 & ASCE 7-10	II	141	114	<i>141</i>	<i>150</i>
Station Atlantic City ^S	IBC 2012 & ASCE 7-10	II	127	115	<i>127</i>	<i>138</i>
Station Manasquan ^S	IBC 2012 & ASCE 7-10	II	123	113	<i>123</i>	<i>134</i>
Station Sandy Hook ^S	IBC 2012 & ASCE 7-10	II	118	110	<i>118</i>	<i>126</i>

^K = KATRINA, ^I = IKE, ^S = SANDY, **Bold** = RFP specified, * = Exceeds RFP Requirement, *Italic* = Code not applicable

Fig. 1: Wind Speed Resilience Design Requirements. SOURCE: U.S. COAST GUARD

own increased the Occupancy Category from the Coast Guard-specified Level II and provided a facility that was designed to Occupancy Category III.

Six project specifications (Sector New Orleans, Station Houston, Sector Houston-Galveston, SFO Galveston Industrial, Station Sandy Hook, and AIRSTA Great Inagua in The Bahamas) directed the contractor to use both a Coast Guard-specified wind speed and Occupancy Category. Of these projects, the specified wind speeds of 160-mph and 150-mph at Sector New Orleans and Station Houston greatly exceeded the minimum ASCE 7 requirements incorporated into the design. Specifications for the remaining three projects did not direct a design wind speed or Occupancy Category. The contractor was directed to design the facilities in accordance with the ASCE 7 and International Building Code (IBC) requirements.

Based on the analysis of these projects, the best method of defining a consistent and appropriate design wind speed is to direct the contractor to provide a facility that meets an IBC/ASCE 7 Risk Category,

as all appropriate loading requirements are built into these categories.

Providing additional wind data or specifications may conflict with minimum design requirements and add unnecessary cost to the design and construction effort. Additionally, since most of these units are in vulnerable coastal environments and serve maritime emergent and law enforcement services to the public, these Coast Guard facilities should be built to meet Category IV requirements.

FLOOD ZONE CONSIDERATIONS

For facilities built in coastal environments, the Coast Guard specified that finished floor elevations be based on Federal Emergency Management Agency (FEMA) Flood Zones where applicable to mitigate water damage. In some designs, it was not practical to elevate the foundation to a level above the published flood elevation. There it was decided that noncritical operations equipment and portable assets would be placed within the flood zone elevation.

The Coast Guard also stipulated that critical operational spaces, electrical switch

gear, emergency power generators and fuel tanks be elevated higher than or placed on floors above the published flood zones. Figure 2 provides an outline of the 15 subject projects and how building elevations were laid out to mitigate flooding of operational space.

Eight of the 15 specifications directed the design-build contractor to address flooding as part of the design. In four of these (ANT Dulac, Station Sabine, SFO Galveston Base Rebuild, and SFO Galveston Industrial), contractors were to build critical operational floors to an elevation that exceeded the 100-year flood elevation. Three of the specifications directed the contractor to build 1- to 2-ft above the 500-year flood plain. All three of these projects were related to Superstorm Sandy and the intent of the extension above the 500-year elevation was for sea level rise.

One specification (Station Houston) provided direction to “minimize damage though construction materials,” leaving the resiliency flood design up to the contractor. The ground floor elevation of the Station Houston Boathouse was built 5-ft below the

100-year flood plain to meet operational requirements and space limitations. The contractor incorporated the electrical and telecom rooms on the boathouse mezzanine, which is 5-ft above the 100-year flood plain. The shop air compressor also was placed on the mezzanine and a compressed air distribution system was routed through the boathouse. The HVAC equipment was placed on the roof. Additionally, flooring was either sealed or polished concrete, and concrete block walls made extensive use of water resistant plaster.

Six specifications did not consider flooding when examining site location since the projects were either above the FEMA-specified flood zones, there was no established flood zone at the time, or the second floor elevation (first occupied floor) would be elevated to a height much greater to meet operational requirements.

The specifications appropriately addressed flooding and progressively increased critical operational floor elevations with respect to time. In the most recent specifications, potential sea level rise was addressed and incorporated into the flood design requirements.

All buildings were consistently built to ensure critical operational infrastructure remained above the flood plain. However, due to regional site requirements, Coast Guard specifications allowed the design-build contractors flexibility to design to local codes, conditions, and climate. This led to a diverse range of facilities. For instance, Station Sandy Hook is located within a national park and is part of an historic landmark district. Therefore, the design team was required to match surrounding architecture, which ultimately forced the inclusion of breakaway walls for buildings in the flood zone.

EMERGENCY POWER RELIABILITY

As the Coast Guard modernizes, technology is paramount to increase operational efficiency and is required to maintain expected mission functionality. Usually this equipment is essential for operations and it needs to remain powered and protected during the storms.

Through technological advancements, temporary power equipment such as generators and battery back-ups have



The U.S. Coast Guard's missions are imperative to providing daily maritime safety and security. Maximizing that operational commitment resides in providing facilities that can withstand environmental occurrences through resilient design. Above, Coast Guard Station New Haven, Conn.

U.S. COAST GUARD PHOTO

greatly evolved to become a top resilience feature. To mirror that evolution, primary transformers, primary switch gear, emergency generators and fuel tanks, utilities, and HVAC systems have been relocated to protected areas on elevated floors or above potential damaging floodwaters.

As software replaces hardware, electronics have been moved away from potential water infiltration threats. These efforts protect vital equipment and allow mission crews to continue to function efficiently during storms or return immediately following an event and resume operations.

Emergency power reliability after a storm is critical for reconstituting operations. The current Coast Guard Configuration Standard Technical Order Facility Requirements List includes the authorized emergency power electrical loads.

Anecdotal evidence indicates that personnel conducting operations watches after a storm event often become uncomfortable due to heat and humidity. Other environmental concerns, such as mold growth, also can come into play. These conditions can become such a concern that units rewire the vital electrical power panels

to include HVAC systems. This happened at Sector New Orleans during Hurricane Isaac in 2012. The addition of vital circuits resulted in excessive loads on the generators, significantly reducing generator run duration due to increased fuel consumption and unexpected encumbrance on the designed wiring system.

To address this issue, the Coast Guard Facility Requirements List indicates that a permanently installed generator connection, supported by an external temporary generator package, is authorized for non-vital electrical loads that are negatively impacted during an extended power outage if they cannot be relocated or replicated elsewhere. Historically, generator fuel systems were left in flood zone locations for ease of maintenance and refueling purposes. But they, too, have been elevated to avoid tank water intrusion, dislocation, and/or becoming a source of contamination.

To preserve continuity of Coast Guard operations, it is recommended all units be outfitted with an external generator connection for both vital and non-vital loads. This allows designers to minimize the size of the installed generator and reduce

Building Design Floor Elevations

Project	FEMA Zone	100-Year Flood Elevation (ft)	RFP Reference to FEMA Flood Requirement	Ground Floor Elevation (ft)	Second Floor Elevation (ft)
Station Gulfport ^K	VE	24	Not Clearly Defined	8.25*	24.6
Base New Orleans ^K	A1	0	Not Clearly Defined	5.8	20.5
Sector New Orleans ^K	B	0	Not Clearly Defined	11	26
SFO Galveston Armory ^I	AE	11	Not Clearly Defined	15.1*	n/a
ANT Dulac ^I	A15	9.9	2nd floor 100-year + 5-ft	7.9*	24.4
Station Sabine ^I	V15	14	Not Clearly Defined	12	29.5
SFO Base Galveston ^I	VE	15	Not Clearly Defined	10*	20.3
Station Houston Boathouse ^I	AE	12	DOR Responsibility	9*	19
AIRSTA FOB Great Inagua ^I	n/a	n/a	Not Clearly Defined	11	n/a
Sector Houston-Galveston ^I	X	n/a	n/a	37.75	53.75
SFO Galveston Industrial ^I	VE	14	Not Clearly Defined	13.6	27.1
MSST Galveston ^I	X	n/a	n/a	37.75	n/a
Station Atlantic City ^S	V10	10.7	500-year + 2-ft	8.5	15
Station Manasquan ^S	AE	10	500-year + 2-ft	8.4	16.1
Station Sandy Hook ^S	V	14	500-year + 1-ft	20	33

K = KATRINA, I = IKE, S = SANDY, **Bold** = RFP specified, * = Exceeds RFP Requirement

Fig. 2: Building Design Floor Elevations. SOURCE: U.S. COAST GUARD

the onsite fuel storage capacity to support the vital facility loads, while providing the option of full facility power generation for extended power outages should commercial power be unavailable. Additionally, if the installed facility generator is damaged during an extreme weather event, the external generator connection allows for quick facility reconstitution.

STAYING ALWAYS READY

The Coast Guard's varied missions are imperative to provide daily maritime safety and security to the American people. Being able to maximize that operational commitment resides in having facilities that can withstand environmental occurrences through resilient design.

Designing to coastal flood zones standards has progressed steadily over the last decade and now incorporates future potential flooding due to storm surge. When it is

impractical to build above the flood zones, first floors are designed to survive flood effects and resilient features are incorporated to facilitate post-storm recovery. Critical equipment has been moved to protected locations inside the facilities or elevated, and building materials are specified so that minimal water intrusion and physical damage is realized.

To preserve the continuity of operations through all phases of an extreme weather event, it is recommended that all future command and control units and operational sub-units be built to the ASCE/IBC Risk Category IV standards. Each unit should also be outfitted with an external generator connection for both vital and non-vital loads for full facility power generation during extended power outages.

As an added benefit, the external connection provides support redundancy and allows for quick facility reconstitution

should the installed generator be damaged during an extreme weather event.

Over the past 20 years, the Coast Guard has continually worked to improve its facility resiliency, and that work continues today as it incorporates innovative methods to facilitate post-storm operational recovery, meet mission objectives, provide safe shelters for its crews, and remain "Always Ready."

TME

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Implementing a Cyber Security Plan

Extending the type of cyber security program implemented for critical infrastructure at Naval District Washington to other agencies and industries in the private sector could dramatically reduce the types of intrusions that continue to be detected.

By Benga Erinle, M.S.A.M.E.

In December 2015, following a series of high-profile cyber intrusions on critical infrastructure, the U.S. government seemed to signal a higher priority level for control-system security by issuing guidance to better secure industrial control systems (ICS).

The Department of Homeland Security (DHS) released advice for better ICS security the same month that a power outage in Ukraine left over 200,000 residents in more than 100 cities without power for two days. The advice came in the form of guidance for protecting ICS that, if followed, could have prevented 98 percent of incidents that the ICS Cyber Emergency Response Team responded to throughout 2014 and 2015.

The DHS guidance clearly notes that network firewalls are insufficient for securing control-system networks. It outlines seven steps to "quickly and effectively detect, counter, and expel" an attack against common exploitable weaknesses:

- Implement Application Whitelisting
- Ensure Proper Configuration/Patch Management
- Reduce Your Attack Surface
- Build a Defendable Environment
- Manage Authentication
- Implement Secure Remote Access
- Monitor and Respond

MITIGATING VULNERABILITIES

While often there is resistance related to concerns about complexities surrounding implementation specifics, a program that is



The U.S. Navy's assets are vast, including the Navy Yard in Washington, D.C. (above), with many buildings built at different times over several decades. As a result, these various facilities often lack common controls and contain unique security vulnerabilities. U.S. NAVY PHOTO

part of Naval District Washington's ongoing Smart Shore Initiative is a prime example of addressing and complying with the DHS recommendations and it includes an enterprise-level sensor network that integrates cyber-secure technologies to intelligently monitor and respond to ICS threats.

The program's cyber objectives and outcomes parallel the DHS recommendations, and the system implementation shows how the guidance can be executed in a real-world, high-stakes context.

This case-based illustration begins with the U.S. Navy's decision to establish aggressive goals for better energy security and efficiency. After extensive evaluation, the Navy selected a system built using technologies and products from Ultra Electronics, 3eTI.

The program offers a close look into securing a uniquely complex, as well as mission-critical, military ICS. From the experience, lessons were learned that align well with implementing the seven DHS strategies in a practical manner.

DIVERSE ASSET PORTFOLIO

The Navy's assets are vast, with many buildings built at different times over several decades. As a result, they lack common controls and contain unique

security vulnerabilities. The Navy required a cost-effective and accredited network capability to monitor legacy supervisory control and data acquisition and direct digital controls systems associated with more than six installations that include 3,129 buildings, 2,822 non-building structures and 1,029 utility locations.

The Navy team understood the impacts if vulnerabilities were not addressed, such as denial of view, denial of control, manipulation of view, and manipulation of control. The threats of greatest concern have played off of weaknesses that are both non-ICS and ICS-specific. Notable malware intrusions exploiting these vulnerabilities include Conficker, Slammer, Duqu, Shamoon, Stuxnet, Havex and BlackEnergy.

At the program's outset, the Navy performed a comprehensive risk management analysis. The effort prioritized which assets required greater protection; evaluated the most serious vulnerabilities the assets might face; and quantified impacts associated with securing them.

The Navy then evaluated the risks and recognized that vulnerability management was key to its new secure architecture. The solution was to incorporate multiple complementary layers of controls into the



The Department of Homeland Security has released guidance to help owners better secure industrial control systems. Recommendations include "Manage Authentication," "Implement Secure Remote Access," and "Build a Defendable Environment." PHOTO COURTESY ULTRA ELECTRONICS, 3ETI

facilities to securely monitor and respond to potential physical and cyber intrusions. This approach would allow for more efficient management of energy utilities while containing any threats that do get through the security layers.

LEVERAGING TECHNOLOGY

The Navy's Middleware Panel is a key component of the architecture that underpins the Smart Shore Initiative. It utilizes an array of industrial control technologies for secure monitoring and control of equipment like HVAC systems, generators and water treatment pumps. Middleware Panel integrates supervisory control and data acquisition and other control systems into a local monitoring, management and reporting architecture.

In essence, Middleware Panel keeps Smart Shore information and control in the right hands to meet energy management objectives while maintaining required levels of security. The technology integrated into the device incorporates all seven recommended DHS strategies:

Application Whitelisting. The only way to truly detect and prevent attempted execution of malware uploaded by adversaries is through application whitelisting. The Navy sought strict control over end-user systems through thorough deep packet inspection. With native protocol parsing and deep packet inspection, the Middleware Panel offers whitelisting to the networked connections between ICS devices. In the event an application is compromised, any attempted action will be limited to pre-approved operations. This helps prevent an attack from spreading, in turn, improving

system reliability and integrity.

Ensure Proper Configuration/Patch Management. Fully certified to highest security-implementation standards by government agencies and their recommended third parties, the Middleware Panel has been tested extensively for its effectiveness in allowing Navy managers to safely monitor, control and optimize energy across facilities from one central location using energy dashboard applications. In this way, unauthorized access beyond an initial entry point is blocked, as are man-in-the-middle and other attacks. Such access control facilitates effective configuration and patch management control, ensuring that only authorized personnel have access to key management systems.

Reduce Your Attack Surface Area. The Navy's solution employed technology with end-to-end encryption that effectively creates a segmented network for its ICS devices. They are rendered invisible to unauthorized devices that also are prevented from accessing the segmented network to attack or interfere with critical controls. The approach applies advanced certificate-based authentication at the in-building device level to block unauthorized access (such as an unapproved contractor laptop) or port re-use, and assures that only necessary and approved communications occur between known devices.

Build a Defendable Environment. The Navy-selected technology was designed to provide both cryptographic and network isolation solutions to segment a control system into smaller functional groups without impacting normal system activity. Validated cryptographic protections ensure that critical control traffic is isolated from other traffic even when transported over the same physical network. Through device-level firewall functionality and command-level whitelisting, all host-to-host communications are monitored and restricted. With this architecture, adversaries are immediately detected and easily constrained, helping expedient system remediation and recovery.

Manage Authentication. The Navy's implementation allows the segmenting of network and security management data from ICS data using centralized public key infrastructure security. To breach

the Navy system, an attacker would have to simultaneously compromise security frameworks on two network segments. To prevent breaches that occur when attackers use key loggers to steal credentials used to authenticate into systems, the Navy's security devices use unique certificates stored in each unit. This ensures that no keystroke logger or domain controller stores the private keys for those certificates. Nothing is left for an attacker to steal or reuse.

Secure Remote Access. The Navy's solution, validated to Federal Information Processing Standard Publication 140-2 and Common Criteria-certified, is trusted to provide secure access over its encrypted connections using public key infrastructure-based authentication. It also provides monitoring-only modes to allow valid and authorized data to be exported without opening a link that an attacker can use to send traffic in, or tunnel data out.

Monitor and Respond. The Navy's technology incorporates advanced monitoring built into each system device and managed in a central command center. When unauthorized activity is detected, the system blocks access and then sends an alert to approved personnel.

A MODEL TO FOLLOW

The positive outcomes of the Naval District Washington program include fully secured ICS infrastructure that is affordably maintained and contributes to reduced energy output across the agency's portfolio.

Extending this type of implementation to other agencies and industries in the private sector could dramatically reduce the types of intrusions that DHS has cited while also helping to reduce energy usage.

In analyzing the Navy project alongside each DHS strategy, it is encouraging to see a close alignment of the implementation with the agency's best practices.

Beyond demonstrating that sound security strategies can be efficiently and feasibly operationalized, the implementation stands as an example to the wider ICS community that critical systems security is readily accomplished both for the greater good and an improved bottom line.

TME

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The Value of Data in a Resilient Enterprise

Identifying the value of an organization's data is essential to a robust cyber security posture and helps align strategic investments with the appropriate defense strategies.

By Phil Owen, PMP, CISSP-ISSAP, ISSEP, ISSMP, CISM, and Richard Johanning, CEH, CISSP, CERM, CWNP

How do we know what to protect when it comes to cyber security? Where do we begin with defense in depth? Most cyber security discussions focus on assessing risk and integrating controls to reduce risk to a tolerable level. But this can drive organizations to miss a key component to their risk management process: the value of what makes them money.

At the core of every business or government entity is the data it uses to make operational, financial, or manufacturing decisions. However, all this data is often not given a value. The key to a resilient enterprise is identifying the value of an organization's data. Valuated data is essential to a robust cyber security posture and helps to align strategic investments with the appropriate defense strategies.

Data is what differentiates one enterprise from another. Most have similar networking, computing and communication equipment. It is the data that is unique.

Data exists in three states—Data at Rest, Data in Use, and Data in Motion (DRUM).

Data at Rest is stored data, which is used for audit, authorization, comparison, reporting, and operational purposes. Data in Use is data being acted upon by a person, application, or process. Data in Motion is typically signals, control, or communication data.

Each DRUM state presents contextual vulnerabilities that are further quantified by the relative value associated with the data. Several recent ransomware attacks against U.S. hospitals demonstrate the notion of data valuation being performed during a crisis. One California hospital paid attackers more than \$16,000 to have one day of its operational data unencrypted after the data had been encrypted and rendered useless. Was this price too high, too low, or an accurate valuation? The hospital never performed data identification, characterization, or classification tasks to properly value its data. It was at the mercy of the attacker naming its price.

What impact would one day's data being ransomed have on a Department of Defense (DOD) component? What value would the U.S. Navy's Combined Tactical and Training Ranges assign to one day's training data? What value would U.S. Pacific Command assign to one day's worth of its signals traffic? What if the data unavailability lasted a week, or longer? What if, instead of a ransom

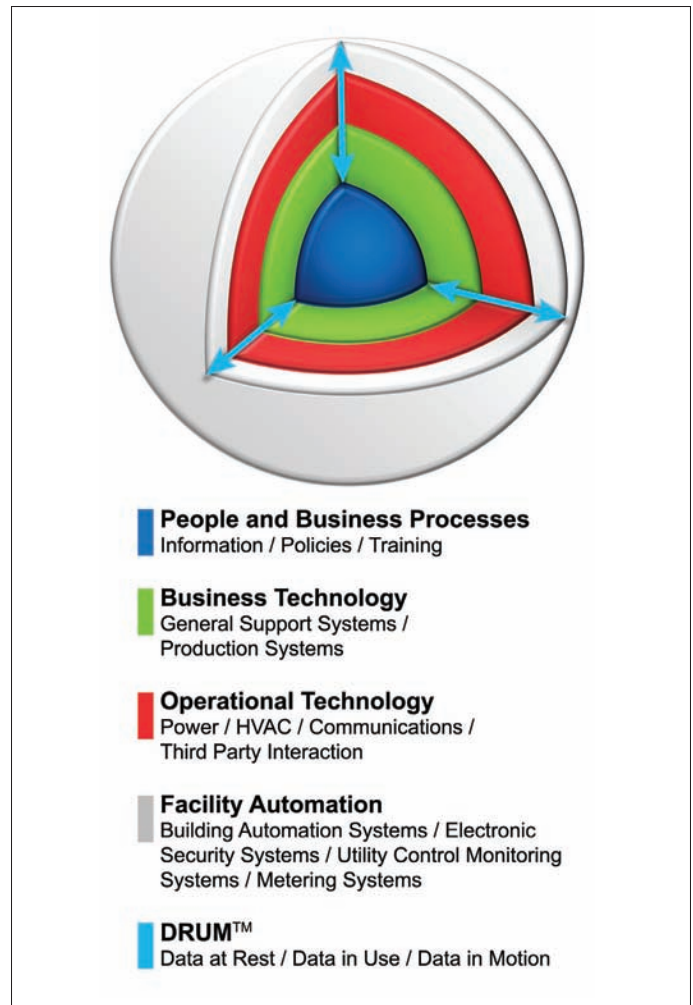


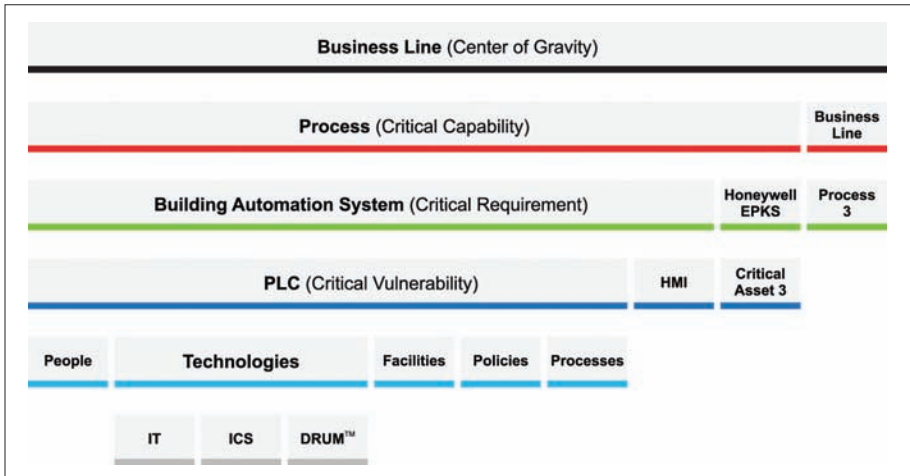
Fig. 1: Identification, characterization and classification of data and assets informs the risk management process, helping lead to enhanced resilience. AECOM IMAGES

scenario, an attacker could manipulate or destroy data?

DRUM traverses every layer of the sphere and can be shared—intentionally or unintentionally—beyond an enterprise's boundaries. As depicted in Figure 1, data in all states can be found across the enterprise. Network devices, servers, personal computers, programmable logic controllers, personal communication devices, cloud services—all of these are points of vulnerability or attack surfaces. The resilient enterprise is one where value and criticality have been assigned to enterprise data and requisite security controls have been implemented to protect and safeguard it.

IDENTIFY AND CHARACTERIZE

Enterprises float on a sea of data. All systems and processes require data to operate: human resources, accounting, payroll, customers, trading partners, process controls, building automation



Scale of 1 to 10	Critical Asset 1	Critical Asset 2
Criticality	8	5
Accessibility	4	5
Recoverable	6	9
Vulnerability	2	5
Effect	4	5
Recognizable	6	7
Total	30	36

(Top) Fig. 2: Center of Gravity analysis decomposes the enterprise. (Bottom) Fig. 3: CARVER is an assessment tool that provides a ranking and scoring mechanism for data and assets.

systems. Whether pre-programmed environmental controls, employee records, weapons systems, or architectural drawings, it is all data. Most enterprise data is stored for a predetermined amount of time. The stored data can be used for trend analysis, reporting, or any archival purpose.

Not all data are the same and each should be assigned different criticality values. Engineering design data and employee personally identifiable information, for instance, are vastly different datasets.

To determine the criticality values, there are three key steps.

- *Data must be identified:* What are the data associated with this specific process?
- *Data must be characterized:* What are the behavioral characteristics or potential uses of these data?
- *Data must be classified:* What level of protection do these data require?

INFORMING DECISION-MAKING

To effectively identify, characterize and classify data, the resilient enterprise should perform Center of Gravity (CoG) analysis as shown in Figure 2. CoG analysis is simply a top-down decomposition of an enterprise,

leading to successively smaller and more discrete components of the enterprise.

A key element of the decomposition is the data associated with the enterprise. CoG helps to identify data specific to systems or processes and demonstrates the logical behavior of the data. Once the impact attributes associated with the data are defined, actual value and criticality can be assigned, which inform data classification decisions.

The resilient enterprise understands the value and criticality of its data. Investment in data protection should be aligned with criticality and value. This alignment helps the enterprise understand where its critical and valuable resources reside, and also shows where to make investments in employee awareness and training efforts.

The ransom attack on the California hospital occurred in part because personnel had not been made aware of, or trained for, what to do upon receipt of phishing emails. Malicious links embedded in the phishing emails were clicked by untrained recipients, opening the system for the attacker. The attacker then held the data hostage by encryption. CoG analysis would have identified the data, people, processes, and

technology vulnerable to attack.

Data valuation and management are critical in enterprise cyber security and compliance. Conceptually, cyber security exists to protect enterprise assets and information, as well as the people and intellectual capital associated with an enterprise. Data must be stored, used and communicated safely and securely. Data is what differentiates one enterprise from another. Most have similar networking, computing and communication equipment. It is the data that is unique.

DOD's adoption of the Risk Management Framework provides an excellent starting point for securing enterprise data. The Risk Management Framework also establishes a compliance baseline, which is used to assess the efficiency and effectiveness of DOD component information systems. These assessments, and enterprise compliance or non-compliance, have direct impacts on funding levels.

Proper data valuation allows enterprises the ability to make informed spending decisions. In most instances, it makes no sense to spend two dollars to protect a one-dollar asset. Criticality and value assignment provide the foundation for efficient use of funds. Vulnerability ranking and scoring tools such as SHOCK and CARVER (shown in Figure 3) build on this foundation, providing greater granularity and focus on the true value of data and processes.

LEVELS OF PROTECTION

Data is the lifeblood of every resilient enterprise. Every organization has computing equipment; most employees have mobile devices; and massive amounts of data are stored, used and communicated daily. But not all data are the same. Some data are disposable. Some data are highly sensitive. All require a certain level of protection. Without assigning value and criticality to data, it is impossible to accurately discern what the proper level of protection is.

DRUM may require planning, assessment, protection and management, but mission execution and success depend on it.

TME

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Solving an Old Problem

How Cities Can Address Mounting Infrastructure Challenges

To overcome aging and underfunded assets, forward-thinking cities are retrofitting facilities and infrastructure with high-efficiency equipment and then using the energy and operating cost savings to fund the improvements.

By Rob Duncan

It is no secret that infrastructure needs have become a top priority for local governments. Many reports have shed light on the financial challenges impacting infrastructure funding. Recently, the 2015 Menino Survey of Mayors reported aging and underfunded physical infrastructure as the most pressing challenge that mayors across the United States face.

Municipalities deferred infrastructure projects to balance budgets during recent lean economic years. This backlog and lack of funding is significant. According to “The City Fiscal Conditions 2015” report from the National League of Cities, without a steady funding stream from other levels of government, cities become not only responsible for existing infrastructure but resolving the backlog of infrastructure needs and effectively providing new infrastructure for future economic growth. The report also notes that for 48 percent of all cities nationwide, infrastructure needs represent the issue weighing most negatively on city budgets—above pension costs (38 percent) and benefits costs (36 percent).

THE COSTS OF WAITING

Resource demands have outpaced resources for an extended period of time. The cause-and-effect relationship of insufficient funding and mounting deferred infrastructure improvements is obvious.



Since 2010, Kissimmee, Fla., has funded more than \$80 million in infrastructure investments and just received an AA Bond Rating for new capital projects. PHOTO COURTESY CITY OF KISSIMMEE

However, the challenge may not be limited to the recent past and the impact of the recession. New studies show the public service demands in local government have outpaced the ability to raise revenue for quite some time. A recent white paper “Walking a Tightrope: Are U.S. State and Local Governments on a Fiscally Sustainable Path?” estimates the nationwide per capita trend gap has been on a growing path over the last three decades.

While an uptick in new revenues are providing some relief for local governments, true financial sustainability includes being able to proactively address necessary infrastructure, which will not be possible without additional sources of funding.

Perhaps the most critical step to jump starting investment in infrastructure will be new debt issuance. According to *Moody's Investor Service*, municipalities, due to an environment of economic uncertainty and severe revenue constraints, dramatically reduced new money borrowing for capital purposes—reflecting a widespread

reluctance to commit to expensive projects. Concern over new debt is commonplace in local governments. Public officials continue to prioritize a conservative financial approach and avoid long-term spending commitments. The challenge with this approach has been the excessive annual costs the cities are facing because of inefficiency stemming from lack of investment.

Deferred maintenance and infrastructure projects add reactive and unbudgeted spending costs. In many cases, these actually cost local governments more on an annual basis than to implement improvements on a structure program. In these instances, fear is serving to increase the trend gap as costs of services are increasing at an artificially faster rate.

IDENTIFYING FUNDING SOURCES

The first movers are the cities with diversified revenue streams, development partnerships, and strong economic development results. A great example is the City of Kissimmee, Fla. Since 2010, the city has



The town of Georgetown, Mass., is utilizing an innovative financing solution to help create guaranteed annual energy and operating costs reductions. PHOTO COURTESY TOWN OF GEORGETOWN

funded more than \$80 million in infrastructure investments and just received an AA Bond Rating for new capital projects.

The new bond dedicates \$37.2 million to various improvement projects, including road improvements (\$9.7 million); Lakefront Park improvements (\$13.5 million); parking garage and utility relocation (\$7.0 million); and facility improvements (\$7.0 million).

For cities that have not been able to implement these types of infrastructure improvements, the first step is to identify realistic funding sources. There are many potential sources, including some the local government can specifically impact and others that are well beyond the municipality's control. State and federal tax sharing and grants are preferred by elected officials at the local level; but these have been fairly limited in recent years and can only be used for a specific purpose. Cities need to be autonomous and direct funding toward the specific needs of the city. This requires a close look at the long-term outlook and uncovering new opportunities to fund programs. In recent years, many cities have focused efforts on implementing new revenue diversification tax plans. This can reduce a dependence on property

A more specific method for funding infrastructure can be found in identifying overlooked efficiencies available in the current budget. Aging infrastructure simply costs more.

tax revenue, which is subject to home value fluctuations. In practice, however, the diversification has typically led to new fees on residents, such as assessment fees for emergency services or public service taxes on utility bills. The ability to raise sufficient funds to address the backlog of infrastructure demands from these resources is dependent on quite a few variables.

A more specific method for funding infrastructure can be found in identifying overlooked efficiencies available in the current budget. Aging infrastructure simply costs more. The costs to maintain and repair outdated facilities and equipment are higher than comparable new equipment. Likewise, the cost of fuel, water and electricity is also higher on older or poorly maintained infrastructure and equipment. Since budgeted general fund expenses can be reduced with the implementation of

some specific infrastructure improvements, the "savings" become a legitimate funding source that can be used to pay for the actual infrastructure improvements.

This untapped well is relatively straightforward. Legislation at the state level exists in most states to help local governments qualify, select and implement programs with third-party providers that have the specific expertise required to identify, measure, verify and guarantee the savings that can be achieved. While it is not necessary to use outside providers for this type of service, most cities do not have the resources to properly develop and implement a program without outside assistance.

GENERATING SAVINGS

A creative example of using general fund efficiency as an infrastructure investment source is happening in Georgetown, Mass. The town partnered with ABM on an innovative financing solution (through ABM's Bundled Energy Solutions program) to help create over \$147,900 of guaranteed annual energy and operating costs reductions.

Over the contract's 15-year span, the program will generate more than \$2.2 million in savings that will be used to fund Georgetown's infrastructure improvements. To achieve the guaranteed savings on energy and operations costs, ABM managed an extensive overhaul of the town's seven facilities, including:

- Town-wide lighting retrofits.
- Re-commissioning of all three schools and four government buildings.
- Installation of new high-efficiency boilers and HVAC systems.
- New state-of-the-art building controls with central management systems.
- Improvement of building envelopes throughout the town.

To ensure that guarantees and goals are met, ABM conducts annual audits of its Bundled Energy Solutions clients. Georgetown's guaranteed annual savings was initially set at \$147,903. When the first year's audit was completed in 2014, the town achieved actual energy and operational savings of \$213,914—an excess of \$66,011 in cost savings.

TME

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The Contract is Not a Finish Line

While sometimes years of effort goes into seeking and procuring work with the U.S. Army Corps of Engineers, for consultants, it is crucial to realize that once the ink is on the contract, in many ways, the real work is just beginning.

By Col. Miro Kurka, P.E., PMP, M.SAME, USA (Ret.), and Jeff Sorenson, P.E., CFM, DBIA, M.SAME

This is a true story. We spent a good deal of four years preparing and aggressively marketing our consulting/design firm for work with the U.S. Army Corps of Engineers (USACE).

These efforts included meeting and working with numerous teaming partners as a sub-consultant; designing a USACE design-build project with a well-liked contractor; writing articles for industry publications; presenting scores of capabilities presentations to numerous USACE districts; and proposing on dozens of architecture-engineer (A-E) indefinite-delivery, indefinite quantity (IDIQ) solicitations. After this multi-year pursuit, our firm was finally awarded a USACE A-E IDIQ.

It would seem like it was time to relax. Mission accomplished, right? Wrong.

SHARP LEARNING CURVE

Working for USACE can be as challenging as winning the contract. The agency has many requirements for its contractors and consultants. Successfully navigating those requirements greatly influences its perception of the consultant as well as the consultant's ability to carry out task orders (the real work), and with that, the opportunity to win additional A-E IDIQs.

Working as a sub-consultant on USACE task orders along with working on other non-USACE federal projects can prepare a firm for many of these requirements. However, actually being the prime consultant entails a very sharp learning curve.



A worker readies to clear a permit-required space in keeping with the confined space entry plan. Safety is a critical issue in working with the U.S. Army Corps of Engineers. PHOTO BY COL. MIRO KURKA, USA (RET.), MEAD & HUNT

ATTENTION TO DETAIL

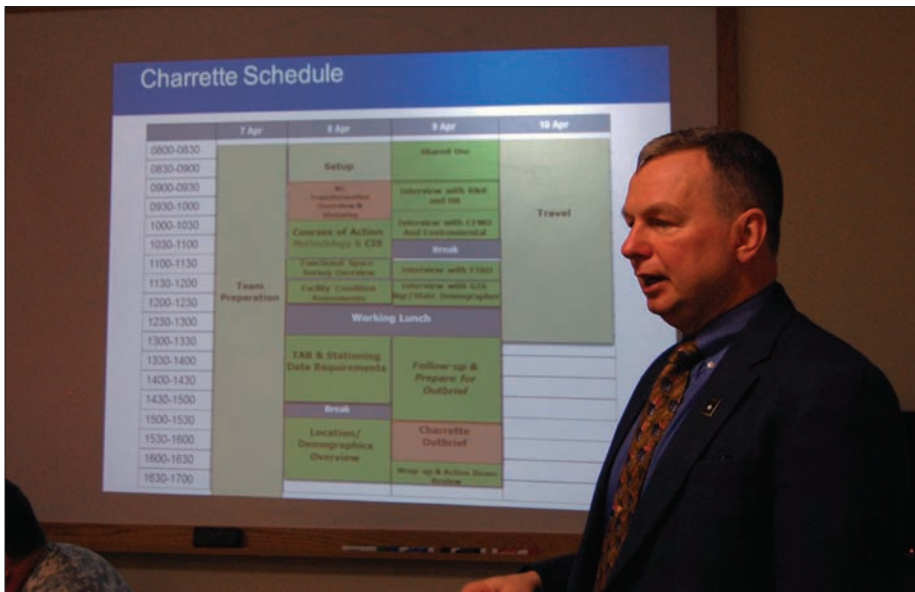
Whether you are performing as the prime or a sub-contractor, USACE wants quality work delivered on-time—and a project that is constructible within budget. No firm wants its first task order to be the last one it wins, so attention to these performance factors will help position a consultant as a “go-to” firm.

The learning curve is tied closely to several key success factors: execution; safety; communication; small business utilization; and meeting numerous administrative, training and security requirements such as cyber and information security, affirmative action/equal opportunity, and anti-terrorism/force protection (AT/FP) training. Execution and safety are by far the most important.

Execution. USACE generally has its pick of consultants. It expects excellent performance in terms of cost, schedule and quality. USACE project managers, engineers and scientists who interact with consultants are generally very knowledgeable in both agency and industry technical criteria and standards—including USACE Engineering Manuals, Engineer Technical Letters, Engineering & Construction Bulletins,

Engineering Circulars, and Unified Facility Criteria. These criteria and standards are complex and the consultant will be expected to understand and comply with them without extensive training by USACE staff. Additionally, studies and designs are often reviewed by one of the Corps' specialized centers, such as the Risk Management Center or the Hydroelectric Design Center. The subject matter experts who review these documents are exacting. A consultant's performance directly impacts ratings in the Contractor Performance Assessment Reporting System. “Exceptional” and “Very Good” ratings are critical to winning additional USACE contracts.

Safety. USACE takes safety seriously and expects consultants to have mature safety programs instilled in their work force. Consultants with extensive construction experience usually have robust safety programs. However, A-E firms focused primarily on design sometimes lack the necessary safety emphasis. Serious safety issues will get a consultant fired. USACE consultants should be prepared to submit formal safety plans for site visits, especially those that include confined spaces, diving, or over-the-water operations. For recent work



Keeping open communications with government officials is critical to project success. PHOTO BY DAVE THOMAS

investigating the low-level outlet facility on a dam, Mead & Hunt developed a comprehensive safety plan that included a dive plan, an emergency rescue dive plan, and a permit required confined space entry plan. The safety plan was more than 350 pages. Also, an activity hazard analysis should be prepared for every aspect of a site visit.

Consultant Communications. Frequent communication with the designated USACE project manager is imperative. Documenting communication is important, as is asking questions and even admitting an occasional knowledge gap. USACE is an engineering organization and enjoys helping to solve problems. Furthermore, admitting there is a question or some lack of knowledge is much better than wasting time and money on a study or designing based on incorrect assumptions. Along these same lines, it is best to avoid waiting until the formal milestones to show your analysis. By reviewing over the phone you often can prevent a lot of unnecessary work. Another successful technique is the “over-the-shoulder” review, during which consultants meet with and discuss the project or study with engineering and operations staff.

Small Business Utilization and Reporting. USACE requires large businesses under contract to submit a small business contracting plan that meets or exceeds the district’s small business goals. USACE also requires use of the Electronic

Subcontractor Reporting System, and may evaluate subcontractor involvement on each individual task order. Given their varied nature and often the short time for task order request-for-proposal responses, it is worthwhile to have a large number of key small businesses on call through the use of master services agreements. Small business utilization is a specific evaluation criteria on the Contractor Performance Assessment Reporting System. It is usually a secondary evaluation criteria on proposals, but given the extremely competitive nature of most USACE pursuits, it is not something to ignore. Not meeting the stated goals in a subcontracting plan during contract execution may result in increased scrutiny and reporting, and even financial penalties (liquidated damages).

AT/FP and Operations Security. Work that entails a project site visit at a USACE facility or work on a military installation demands complete AT/FP, Operations Security, and iWatch training. This training is available online, and takes about four hours per person to complete. Operations Security training must be retaken annually.

Cyber Security. In 2015, the Department of Defense published interim rules on cyber security. The guidance directs all federal agencies to increase cyber security protections for “products or services that generate, collect, maintain, disseminate, store, or provide access to CUI (Controlled Unclassified Information) on behalf of the

Federal government.” Much of this is still being worked out by the government; however a new Unified Facilities Criteria on cyber security was set to be issued in June and a new guide specification on cyber security is due in September.

Information Security. Consultants and contractors are also required to protect unclassified controlled technical information, such as engineering drawings, specifications and technical reports concerning federal facilities. These items must be safeguarded to protect them from falling into the hands of unauthorized persons.

Office of Federal Contract Compliance Programs Requirements. Reporting requirements—including Affirmative Action and Equal Opportunity Reporting—change frequently, need regular monitoring, will generate the need for company programs, and may entail periodic audits of hiring and employment practices. Most companies have some form of these programs in place already just to comply with these far-reaching laws. But federal contracts raise the bar. As with all other requirements, it is important to pay careful attention to the Federal Acquisition Regulation clauses in the contract.

DEDICATING TIME AND RESOURCES

USACE consulting is graduate school work. It takes time and effort to gain the opportunity to work. And a consultant is expected to perform at a high level technically and administratively. A firm can prepare for this by working as a sub-consultant to a reputable A-E, and by attending one or more of the many seminars offered by the USACE small business community.

It is good to live by the adage, “anything worth doing is worth doing well.” By dedicating time and resources to these strategies for learning how to work, and then encouraging staff to implement what has been learned, a firm can establish an excellent partnership with USACE and be prepared for future opportunities to continue that partnership in support of the nation.

TME

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At Marine Corps Air Ground Combat Center Twentynine Palms, Calif., a significant infrastructure expansion program was undertaken at the previously undeveloped 200-acre North Mainside area to support future build-out as a result of the Grow the Force initiative. PHOTOS COURTESY MICHAEL BAKER INTERNATIONAL

Looking Back to Move Forward

The Lifecycle of a Military Infrastructure Program

The North Mainside Infrastructure Expansion at Marine Corps Air Ground Combat Center Twentynine Palms encompassed eight different projects that transformed an undeveloped 160-acre site into an extension of the main cantonment area for future build-out as part of the Grow the Force initiative.

By Rick Rubin, P.E., AICP, F.SAME, Capt. Bob Schlesinger, P.E., LEED AP, F.SAME, USN (Ret.), and Trudi Lim, P.E., LEED AP, M.SAME

When the Grow the Force initiative was announced in 2007, proposing a buildup of the U.S. Army and U.S. Marine Corps by a combined 101,000 troops, there suddenly

became an immediate need for new facilities to improve the training experience. To ensure timely and sustainable success, infrastructure improvements would be a critical piece of the program.

At Marine Corps Air Ground Combat Center Twentynine Palms, in California's Mojave Desert, the 200-acre North Mainside area was developed to accommodate an additional 1,700 active duty Marines. A number of military construction projects were required to design and install all of the roads and utilities necessary to support the facilities and future building projects that were tightly scheduled.

The North Mainside Infrastructure Expansion ultimately became a \$140 million construction contract—encompassing eight different projects that would transform a previously undeveloped 160-acre site into an extension of the existing main cantonment area for future build-out as part of the Grow the Force initiative. The infrastructure

development consisted of major earthmoving, storm drainage facilities, utilities, roadways, a telecommunications facility, wastewater treatment facility upgrades, a 2,500-gal central oil/water separator, and a 4.5-million-gal water tank. Of particular concern during construction was the method of handling drainage, as Twentynine Palms has an arid climate, where high-intensity, short-duration storm fronts produce flash floods that can lead to runoff issues.

EARLY PLANNING PHASES

The life of this significant military infrastructure development effort began with site selection and modification of the base master plan. An evaluation of the existing available facilities was conducted to prepare a plan that would accommodate new facilities to support logistics, communications, barracks, a dining facility, vehicle tank storage site operations centers, and related site improvements to serve the facilities.



The laydown/site work team designed pad grading, haul routes, storm drainage channels and detention basins, stock pile areas, and construction staging, and performed earthwork calculations.

A major “Grow the Force Facility Charrette,” which gathered all of the key stakeholders, finalized the plan for the multiple infrastructure projects and facilities required to support the additional 1,700 Marines to the base population of 21,000, which included 13,500 active duty personnel. Environmental assessments to evaluate the potential environmental effects of the projects were compiled per the *National Environmental Policy Act*. Preliminary design, cost estimates and project budget documentation were completed to obtain approval and project funding by Congress.

Naval Facilities Engineering Command Southwest also contracted a number of studies in late-2008 and 2009 to identify necessary modifications or additions in support of the planned future growth.

- A sewer study gathered background information and identified future loads, provided a conceptual site plan and profile, performed hydraulic modeling, and identified cost estimates.
- A water study provided planning and preliminary design for the expansion of the potable water infrastructure using a 12-in piping grid and 4.5-million-gal

To minimize the risk of schedule slippage, the team identified creative and innovative infrastructure development solutions that combined both design-bid-build and design-build components.

tank for storage and redundancy.

- A hydrology study examined stormwater flows and recommended detention facilities to reduce peak flow in a 100-year flood event.
- An updated traffic study addressed traffic congestion and Levels of Service at key intersections. The study also considered the impact of military operational vehicles, including M1 Abrams tanks, Amphibious Assault Vehicles, Light Armored Vehicles, and numerous other wheeled tactical vehicles.
- A geotechnical investigation report evaluated subsurface soil conditions and developed initial geotechnical engineering parameters for use in future designs.

GAINING PROJECT CONSENSUS

Full technical design began after completion of required environmental reviews. Technical studies expanded upon the preliminary studies to provide further detail on traffic, hydrology and utilities (sewer, water, wastewater, electrical and communications) to assess pre- and post-development conditions that affected usage, capacity and sizing of infrastructure for current and future scenarios.

The design included critical infrastructure elements incorporating functionality, technology, maintainability, security, sustainability, cost effectiveness and accommodations for future growth. To ensure these critical elements were being captured, numerous design charrettes were conducted to present infrastructure alternatives that identified additional alignments—but more importantly, they were held to gain input from the stakeholders, including the occupants/users and Twentynine Palms base engineers who will maintain the facilities over the long-term.

The North Mainside program was schedule- and budget-driven, and had numerous projects in the queue. To accommodate these challenges, infrastructure needed to be in-place to support the many projects either already under construction or slated for the future. As a result, the design and construction schedules were compressed.

To minimize the risk of schedule slippage, the team identified creative and innovative infrastructure development solutions that combined both design-bid-build and design-build components. The construction contractor was able to begin construction immediately upon award to commence grading operations and other underground work. Later phases of work, such as water tank design, were handled as design-build elements.

By dividing various elements, the critical path and overall construction schedule was shortened while still providing the government the benefit of a project completed on time and under budget.

DESIGN TEAM ORGANIZATION

The design team was organized into four sub-teams, each focused on different infrastructure elements. The water improvements team addressed the water

tank, which also included a retaining wall to support the access road leading to the tank. This was initially a preliminary design, as this portion of the work would ultimately become a larger design-build element. The team also developed the potable/fire water line plans and profile, and provided for appurtenances, including thrust blocks, fitting designs, fire hydrants and pipe sizing.

The sewer team defined alignments, created the plan and profile, designed manholes and spacing, checked invert and rim elevations, and determined pipe sizing. The roads team defined alignments, profiles, sections and details, including curbs, gutters, sidewalks, pavement markings and traffic signals.

The road system was designed to follow the already established grid system in place. Provisions for design-build elements were included that would allow the later construction of steam line crossings through the use of properly sized sleeves.

The laydown/site work team designed pad grading, haul routes, storm drainage channels and detention basins, stock pile areas, construction staging and performed earthwork calculations. Quality control, specification writers, and computer-aided design and drafting technicians were employed to support the entire operation.

The drainage team effectively met a number of challenges along the way. North of the site there was a concurrent design occurring for an interim facilities project that had already been awarded to a separate design-build team. That project had a complicated drainage design, which provided retention and a tie-in to the “undeveloped” North Mainside area. As the details of the North Mainside drainage concept became further developed, it was clear that modifications to the interim facilities design would need to be made for proper connection. These items were effectively coordinated, facilitating the final design that tied into an open channel and led to a downstream new box culvert at the major road crossing. Access to each lot was handled by a series of small “bridge” driveways, so that future development did not need to address this requirement.

With many concurrent activities taking place and the overall hastened design schedule, close coordination between the various



Of particular concern during construction work was the method of handling drainage, as Twentynine Palms has an arid climate, where high-intensity, short-duration storm fronts produce flash floods that can lead to runoff issues.

design sub-teams and the adjacent design-build contract helped expedite a resolution of any issues that were encountered.

The harsh desert environment also required special attention to the types of materials and construction methods used during the design phase. Given the remote location of the base in Twentynine Palms, availability of trades and materials was limited, and had to be taken into account when developing the specifications. One such example was the research required to identify sources and availability of aggregates in the region to ensure there would be adequate supply to provide for the road bedding and ancillary improvements within the accelerated construction timeframe.

CHALLENGES OF CONSTRUCTION

The specific technical solutions to move the project forward created one set of challenges, while the construction phasing of the North Mainside development presented a different set of challenges.

During this critical time, as Marines trained for ongoing combat missions, base operations had to be maintained throughout the duration of construction with minimal disruption to the intended usage of the facilities.

Training operations, maneuvers, and movement of armored vehicles were constant. Step-by-step construction phasing had to be developed and considered

during the design process. The effort put into this element of the project paid dividends, however, as training continued while infrastructure was put in-place that allowed future projects to expeditiously proceed.

A PROCESS THAT WORKS

The lifecycle of a military infrastructure program is comprised of many stages and challenges from start to finish—some more than others depending on the complexity.

Understanding the challenges of schedule constraints, budgets, and the overall current and future construction program goals was essential in developing an effective approach to the North Mainside expansion at Twentynine Palms.

As the work unfolded, the team was built to adapt. The key to project success entailed the continuous collaboration between the government and the design team to find creative and innovative solutions to meet the needs of the stakeholders. These lessons now can be applied to other projects, knowing there exists proven positive results. Indeed, looking back to move forward is sage advice to consider.

TIME

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Helicopters were the only means to mobilize operations to the complex project site at Military Ocean Terminal Concord due to the sensitive habitat. PHOTOS COURTESY AHTNA ENVIRONMENTAL INC.

Nine Days in California

A Complex Remediation at Military Ocean Terminal Concord

What began as a 60-day window to perform the second phase of a complex remediation at Military Ocean Terminal Concord was significantly compressed by mission and weather constraints, yet undaunted, the project team completed the work in just nine days.

By Karina Quintans, M.S.A.M.E.

When faced with a barrage of complex site conditions that are preventing the completion of a long-pending remedial action, effective project management and a solid partnership between the public and private sectors are crucial for success.

Since 1986, two contaminated sites at the U.S. Army's Military Ocean Terminal Concord (MOTCO) in California had experienced multiple phases of investigation, risk assessment and remedial design before

Constant dewatering operations on the project were completed using a series of pumps.



the most appropriate and cost-effective remedial construction approach was finally identified in 2015. Ahtna Environmental Inc., with its considerable experience resolving long-standing environmental problems at Army installations across the southwest United States and Alaska, worked closely with the government to complete remedial action at MOTCO Sites 32 and 33.

At the project kickoff, an initial 60-day schedule for the second phase of a two-phase field plan was approved by the government. However, changed conditions (driven by an Army mission to process, ship and receive military general cargo and ordnance) compressed the schedule to 30 days. Inclement weather further complicated this 30-day window.

Site conditions were re-evaluated and the work approach revised. The remedial action for Phase Two ultimately was completed in just nine days. Here's how it was done.

PROTECTING WILDLIFE

The overall goal of the project was to place an in situ cap (clean soil on top of contaminated soil) within Site 32 (Mosquito Abatement Ditches) and Site 33 (Lost Slough) to protect the diverse wildlife.

The sites are located in a tidally influenced brackish wetland that was purchased to serve as a buffer zone for military operations. The wetland is transected by a natural slough, tributaries, and an extensive network of mosquito abatement ditches. Semidiurnal tides in the adjacent Suisun Bay cause the slough and ditches, which are generally partially filled with water, to flood and drain twice daily. The sites are contaminated with copper, arsenic, cadmium, and zinc as a result of historical spills from adjacent industrial facilities. Field observations also had shown the wetland area would completely saturate when high tides coincide with storm events.

To complicate the remedial action, the Army prohibited using vehicles to mobilize to the site because the wetland is a critical

Site conditions also changed daily, and at times, hourly, due to tide schedules. The field team experienced hailstorms, king tides, and intense rainfall due to El Niño. Strict security requirements complicated base access for locally hired field labor.

habitat for many federal and state-listed endangered species, including the Salt Marsh Harvest Mouse, California Black Rail, and Western Pond Turtle. All ingress and egress had to be performed using helicopters. Site conditions also changed daily, and at times, hourly, due to tide schedules. The field team experienced hailstorms, king tides, and intense rainfall due to El Niño. Strict security requirements complicated base access for locally hired field labor.

COMPRESSED SCHEDULE

Given almost daily variability in site conditions—and with a field schedule highly compressed on the front end due to the nesting season for wildlife and on the back end due to a scheduled base mission that put the timeline constantly at risk—managing the project was akin to hitting a moving target, while on a moving platform.

Successful completion relied on three tiers of management with the right set of skills. A senior project manager brought the technical and leadership skills to design the project and keep it moving at all times without delay in coordination with the government, as well as proven problem-solving skills to address constantly changing field conditions “on the fly.” A dedicated field manager was assigned to direct field production in accordance with the work plans and in coordination with the senior project manager. Additionally, two field leads assigned from Ahtna's Alaska headquarters were key for managing helicopter



The field team placed a total of 1,700 super sacks, each filled with 2,500-lb of dried Bay Mud, to create the in situ soil caps on Sites 32 and 33.

operations. The use of helicopters is rare for a remedial action in the Lower 48, and called for only under the most unique circumstances—all of which were present at MOTCO's Sites 32 and 33.

The two field leads brought 22 years of experience at hard-to-reach government sites in Alaska where the use of helicopters is an everyday occurrence. Their knowledge of aircraft procedures and safety; understanding of the tools and supplies needed for slinging operations; and a familiarity with the physics of flight and safely handling loads of up to 2,500-lb hovering overhead were of critical importance.

CAP CONSTRUCTION ON SITE 32

Prior to the Phase One placement of the in situ cap at Site 32, a biological survey and unexploded ordnance survey were performed. The caps were designed to isolate the contaminated sediments from benthic organisms and were constructed using helicopters to airlift bulk super sacks, each filled with 2,500-lb of dried Bay Mud.

The helicopter was guided by a spotter on the ground who communicated with hand signals to ensure placement of each sack on a target not much more than 1-yd². Once placed, a "boxcutter team" would cut an opening around the bottom of the sack. The helicopter then lifted the sack, allowing for controlled discharge of cap material through the opening. Following discharge of

To complete the cap within the revised nine-day period instead of 60 days, resources were tripled, for a total of three helicopters and 22 field crew and aircraft support personnel.

the Bay Mud, a "raking team" leveled out the cap material to the required thickness using hand rakes while the helicopter returned to the staging area to retrieve another sack.

SITE 33: THE BIGGER CHALLENGE

Prior to starting Phase Two work at Site 33, MOTCO requested an early completion due to an upcoming mission. This immediately reduced the schedule from 60 days to 30. With El Niño conditions present, bringing intense rainfall, and a work window that coincided with unusually high tides (king tides) in November, on-time completion was at risk. A new plan had to be devised.

The tide schedule was mapped out to determine when tides would be lowest to ensure maximum control of the site. A nine-day period in November was identified and formed the basis for a revised operations plan. To complete the cap within the revised nine-day period instead of 60 days, resources were tripled, for a total of three helicopters and 22 field crew and aircraft support personnel. The work day

was extended to 11 hours. And lessons learned from the Site 32 cap placement were incorporated to enhance efficiencies.

With such a shortened schedule, senior project management ensured every stakeholder, from the government to field laborers, was on board with the plan and focused on completing the mission. It was "all hands on deck" for nine days in a row to do whatever it would take to ensure on-time completion. This mindset was established from the get-go, after communicating and demonstrating that failure in any aspect of the plan would result in total project failure.

SUCCESS THE ONLY OPTION

With three helicopters running soil airlifts for Site 33, pilots coordinated daily with base operations on flight paths that were at times modified based on wind direction. Helicopters ran in an assembly-line fashion, with pilots in active communication to ensure sufficient spacing within the flight path. Each helicopter had an approximate 90-minute flight time before needing to refuel. A dedicated person performed all "hot refueling" (refueling while the helicopter engine is running) to keep operations moving.

Despite the detailed plans, once operations commenced at Site 33, the main slough was not dewatering as expected—again putting the project at risk. Aerial surveys were immediately performed to determine the source of water infiltrating the main slough. Work areas were then isolated using two additional 20,000-gal bladder dams and a series of temporary earthen dams. A dedicated team maintained constant dewatering operations. Within three days, 775 super sacks of cap material had been dropped and raked into place, completing the project on Nov. 13, 2015, ahead of the scheduled MOTCO mission by 17 days—and 48 days before the initially approved deadline.

In spite of the multiple obstacles, Ahtna, together with MOTCO, the U.S. Army Corps of Engineers and U.S. Army Environmental Command, formed a partnership with a commitment to harness all the resources needed and to never lose sight of the end goal, in order to finally complete a remediation 30 years in the making.

TME

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At Shaw AFB, S.C., military family housing is privatized. Hunt Military Communities own 633 homes and is responsible for maintaining, repairing and managing the community. U.S. AIR FORCE PHOTO

Project by Project—20 Years of Air Force Housing Privatization

Two decades after the 1996 Military Housing Privatization Initiative provided the authority to use private sector expertise and funding to eliminate inadequate housing, the U.S. Air Force and project owners continue working to maintain a program widely considered the greatest quality-of-life improvement for airmen and their families.

By Robert E. Moriarty, P.E., SES, F.SAME

By the mid-1990s, the U.S. Air Force realized its aging housing infrastructure desperately needed modernization. More than half the homes in its family housing inventory fell below established Air Force standards. While there was abundant support to overhaul housing, limited Military Construction appropriations and competing requirements were preventing the service from taking action.

Following the Military Housing Privatization legislation in 1996, the Air Force directed Air Education & Training Command to establish a process and execute a project for privatization.

In August 1998, the inaugural project at Lackland AFB, Texas, delivered 420 brand new housing units and solidified the Air Force's commitment to establish a housing

privatization program that set a new standard of living for airmen and their families.

PROGRAM EVOLUTION

The housing privatization program has gone through as much of a transformation over the past 20 years as the housing inventory. Following success at Lackland, the Air Force designated the Air Force Center for Engineering and the Environment (AFCEE) as the Center for Housing Excellence.

In 2003, privatization was delegated to major command vice commanders who served as source selection authorities while AFCEE led concept and proposal development, solicitation and acquisition. The intent was to streamline and centralize the acquisition process. However, projects were not being awarded quickly enough.



Contractors work on the framing of a house under construction at Eglin AFB, Fla. The home is part of a new privatized base housing neighborhood opening at the installation that includes a 12,000-ft² community center. U.S. AIR FORCE PHOTO BY CAROLE CHILES FULLER

In 2006, the Air Force centralized the program, to include source selection, with AFCEE. This provided consistency and leveraged the skills and advantages of a business-minded team. Under AFCEE the program grew and took on execution, portfolio management and operations. In 1997, AFCEE began awarding projects as groups rather than individual bases. This increased the rate of awards and ensured that bases in less desirable markets were on equal ground with marketable locations. The agency also implemented a key scoping strategy in 2010. By setting the number of base units at 80 percent of market requirements, the Air Force helped prevent overbuilding and reduce vacancies. The program was well on its way to benchmarking against the private sector when, in 2012, the Air Force activated a single unit to execute civil engineering mission worldwide—the Air Force Civil Engineer Center (AFCEC).

Today, the Air Force depends on AFCEC to centrally manage the program and protect long-term viability—from overseeing design and construction, to evaluating portfolio health and recommending necessary program and policy changes

With a majority of projects now beyond initial development, the inventory will soon face the first cycle of replacements. This will place the first demands on capital repair and replacement resources. To avoid a potential accumulation of deferred maintenance, AFCEC has organized regular planning meetings throughout 2016 to collaborate with project owners and develop integrated, long-term sustainment plans.

PARTNERING FOR SUCCESS

Although program management is centralized at AFCEC, program success depends on proactive base involvement. At Peterson AFB, Colo., the 21st Civil Engineer Squadron can boast of one of the strongest projects. In addition to sound financials, the installation received the highest resident satisfaction score for 2015,

rating “exceptional.” The strong performance is attributed to regular interaction between the project owner—LendLease Communities—the base, and AFCEC.

In addition to participating in a quarterly management review committee with AFCEC, 21st Civil Engineer Squadron leadership conducts monthly partnering meetings with LendLease to stay informed on issues that impact residents or the projects. The Housing Management Office also meets weekly with LendLease to manage day-to-day activities.

MAKING ADJUSTMENTS

With AFCEC and base leadership tuned into project operations, LendLease has leveraged support to create more resources to fund additional scope, such as using the Other Eligible Tenant priority list to maximize project revenue.

Though program policy recommends that commanders allow project owners to rent to Other Eligible Tenants when target occupancy falls below 95 percent, Peterson allows LendLease to rent to them beyond the 95 percent threshold. Peterson’s 98.4 percent occupancy in 2015 earned

the project an estimated \$445,000 more revenue than at 95-percent occupancy.

The additional revenue goes directly back into the project to fund maintenance, renovations, expanded services and new amenities along with out-year development and sustainment plans.

PROACTIVE PROGRAM MANAGEMENT

A challenge of managing 50-year project agreements is adapting policies and procedures to fit the changing environment. Reductions and changes to Basic Allowance for Housing, additional expenses, and fluctuating occupancy rates greatly impact the project owner's ability to complete initial development plans, continue modernizing, perform mid-term improvements, and maintain the superior service Air Force families have come to expect. An outdated utility allowance policy, for instance, has chipped away at the program's long-term sustainability. Historically, the Air Force relied on a five-year-rolling average of utility consumption, plus a 10 percent buffer, to configure utility allowance within like-type homes. This methodology set rates above utility costs—meaning projects paid out hundreds of thousands of dollars in annual rebates to residents with above-average utility consumption.

Based on AFCEC's recommendation, the Air Force re-evaluated its utility allowance policy. Recently approved, the new policy calculates allowance at 100 percent of the monthly average consumption within the same like-type-home groupings. This more closely mirrors residents' actual energy consumption and eliminates project funds being diverted to unearned rebates. The new policy still rewards below-average energy consumption.

PRESERVING A HIGH STANDARD

Preserving the new standard of Air Force living for future generations will require even more responsive program management, today and in the future.

In the near term, AFCEC is focusing on projects where resident feedback and project owner performance is low and project financials cannot support new, mid- or long-term requirements. AFCEC also began providing one-on-one training for new wing commanders and monthly

The Value of Community

In 1996, when Air Education & Training Command was in the midst of program development, Texas A&M Cadet Scott Bryant was completing his summer internship in Landscape Architecture at Davis-Monthan AFB, Ariz.

During his internship, Cadet Bryant stayed with a friend who lived on base in family housing. He said the internship taught him more than landscape architecture. It also immersed him into the military lifestyle and showed him the value of living in a military-focused community.

Today, Lt. Col. Scott Bryant, USAF, is Commander of the 375th Civil Engineer Squadron at Scott AFB, Ill. Prior to his arrival, a tax dispute between Hunt Properties and the local county contributed to weak housing project financials, low occupancy and, ultimately, an overall scorecard rating of "unacceptable." Bryant attributes teamwork from the base, Hunt Properties and AFCEC for maintaining a viable project until a favorable tax resolution was reached in January 2015.

Following the reduced taxation decision, Hunt worked alongside the base to prioritize funds to enhance community appearance and accommodate customer service initiatives, like "smile bucks," which is money set aside for Hunt staff to spend on individual customer needs. The combination of improved financials, occupancy and resident satisfaction raised the base's rating to "marginal" in 2015.

The team at Scott AFB continues to work with AFCEC to mitigate challenges and improve the project's financial health.

Across the Air Force, AFCEC project managers work alongside private sector partners and base personnel to track financial performance and assess long-term project viability. This allows AFCEC to intervene with low-rated projects or recommend policy changes necessary to protect program sustainability. In Hawaii, the Hickam AFB housing project scored significantly below target with an "unacceptable" rating for a number of years. AFCEC intervened in 2012 and initiated a restructure that deferred a portion of the construction scope of work into the out-years, reduced developer fees, implemented an extended change of occupancy maintenance for homes originally planned for complete renovations, and subordinated payback of project-owner equity to the out-years until sufficient funds were generated by the project. The restructure eliminated a development funding deficit of \$44.8 million and raised the project rating to "acceptable," indicating the project meets program expectations.

housing management training to improve stakeholder education and advocacy.

With a majority of projects now beyond initial development, the inventory will soon face the first cycle of replacements. This will place the first demands on capital repair and replacement resources. To avoid a potential accumulation of deferred maintenance, AFCEC has organized regular planning meetings throughout 2016 to collaborate with project owners and develop integrated, long-term sustainment plans.

At Peterson AFB and other Tri-Group installations, AFCEC is collaborating with LendLease to prioritize capital repair and replacement items during those years where

there is an anticipated shortfall in revenue. LendLease will determine capital repair and replacement priorities using a combination of resident survey results, internal asset evaluation, and Air Force feedback.

This collaborative approach to evaluating potential overhead and expense reductions will close short-term gaps and enable projects to repay the preferred return balance sooner and begin making contributions to the reinvestment account, which is critical to maintaining a quality program for future generations of airmen and their families.

TME

Robert E. Moriarty, P.E., SES, F.SAME, is Director, Installations Directorate, Air Force Civil Engineer Center; 210-395-9503, or robert.moriarty.3@us.af.mil.



SAME 2016 Joint Engineer Training Conference & Expo

May 24-26 • Phoenix, Ariz.





"This year's JETC proved to be an excellent opportunity to advance my professional knowledge through interaction with leading A/E/C professionals in both the public and private sector... Several of my discussions with the Fellows provided insight as well as experienced perspectives on professional opportunities that I am currently faced with." — Matthew Turner, SAME Young Member





"As you see here in the Exhibit Hall there's a lot of camaraderie... We're partners one day, competitors the next day, but we all have this common bond of national security, supporting our veterans and really STEM—trying to get kids into architecture, engineering and construction so it's that that kind of holds us together. We all come from different Posts. We all have our own story as far as why we decided to get engaged in the Society of American Military Engineers and this is really like our annual family reunion."
 —Jane Penny, SAME Fellow







Building a Foundation for the Future

By Brig. Gen. Joseph Schroedel, P.E., F.SAME, USA (Ret.)

In December 2014, the SAME Board of Direction approved the establishment of a National Foundation. After more than a year of deliberate and careful planning that was guided by the Founding Board, the SAME National Foundation was formally announced in May at the 2016 JETC in Phoenix, and is now incorporated in Washington, D.C. But still there remains significant work ahead—principally, establishing the first full Board of Directors.

The establishment of the SAME Foundation is a major step toward achieving the 2020 SAME Strategic Plan goals and objectives. We now have an enormous opportunity to support the development of the next generation of military, government civilian, and A/E/C industry leaders.

The primary intent of the Foundation is to be able to provide for philanthropic needs separately from the national office operating budget. There are a number of envisioned purposes that will benefit our members and our profession

- Fund professional development opportunities aligned with the SAME mission through the use of grant-making programs.
- Develop restricted and unrestricted community endowments that shall be used to develop, facilitate and coordinate services to meet the changing needs of the A/E/C community.
- Memorialize important contributions to SAME by its members, including acts of memorial such as coordinating attendance at services by SAME members, floral recognitions when appropriate, and providing a member's SAME service record.

- Provide a tax exempt repository for gifts in memoriam, estate planning bequests, and gifts made by individual donors and corporate contributors to SAME for its inherent purposes.
- Provide a secure repository as a trustee for charitable trust bequests, endowments, trust and estate distributions, and gift annuities directed in their purpose by individual donors and their own unique philanthropic focus. Posts also can use

the National Foundation in lieu of creating their own foundations (they would retain total control over use of their funds).

- Provide convenient and effective ways so that donors can contribute assets to charitable purposes.

- Advocate for the development of endowment funds and provide appropriate means by which permanent endowment funds can be built and managed to provide long-term support of an unrestricted corpus fund, sufficient to ensure the on-going operations of the SAME Foundation and

the Society through any adverse economic impacts.

There are many individuals to thank for helping bring the SAME Foundation to reality. The initial task force of Jennifer Fogg, F.SAME, Tony Leketa, F.SAME, and Maj. Gen. John Peabody, USA (Ret.), as well as Lt. Gen. Robert Van Antwerp, F.SAME, USA (Ret.), Vice Adm. Mike Loose, F.SAME, USN (Ret.), Maj. Gen. Del Eulberg, F.SAME, USAF (Ret.), Roger Wozny, F.SAME, and Col. Bud Griffiths, Ph.D., F.SAME, USA

★ ★ ★
***The establishment of
the SAME Foundation
is a major step toward
achieving the 2020
SAME Strategic Plan
goals and objectives.***
★ ★ ★



(Ret.), who also comprised the Founding Board, put in tremendous work. Sincere thanks as well to SAME General Counsel Hal Rosen, F.SAME, and Finance & Administration Director Allison Ingram who shouldered the incorporation and Internal Revenue Service submission.

The Foundation Founding Board and SAME Board of Direction approved the Foundation Board Nominating Procedures in May 2016. The Founding Board had already approved the bylaws, business plan, logo, initial investment management strategy and key development milestones. These documents can be viewed on the SAME website. The Foundation webpage will be established by the beginning of 2017.

While the Founding Board continues work on establishing the Council of Trustees to plan and guide fundraising efforts, the immediate task at hand is ensuring that the first full Board of Directors is set by January 2017. There is no doubt given the dedicated and experienced individuals in our membership, who have spent a lifetime serving others, that we will achieve this goal. If you are interested in serving as a Foundation Board Director or want to nominate someone, nominations are being accepted online at www.same.org/foundation until Sept. 1, 2016.

As SAME nears its Centennial in 2020, we are positioned for growth. America's future is bright. Let's help make it brighter.

TME

Brig. Gen. Joseph Schroedel, P.E., F.SAME, USA (Ret.), is SAME Executive Director.; jschroedel@same.org.

Foundation Board Nominations

Individuals need to meet the following criteria to be qualified to serve as a Foundation Board Director:

- Active SAME member of substantial tenure who is distinguished in her or his service to the Society (Fellow desired).
- Unquestioned ethics, behavior, loyalty and integrity.
- Strong multi-level communications skills (speaking and writing).
- Complete understanding of and commitment to the Society's mission, vision and strategic plan.
- Complete understanding of the Foundation's purposes.
- Preferably, experience with other philanthropic organizations.
- Preferably, diverse backgrounds within the full spectrum of Society membership.
- Willingness to actively participate in fundraising activities.
- *Exceptions:* The Foundation Board will likely encounter the desire to offer persons such as well-known philanthropic figures and major donors the opportunity to participate in the Foundation Board. These and other exceptions will be addressed by the SAME Executive Committee.

Nominations will be accepted online until Sept. 1, 2016. Visit www.same.org/foundation for more information.



America's future is bright.

Let's help make it brighter.

COMMENTS

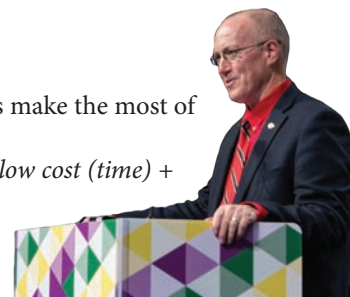
from the Executive Director

Now is the Time!

Time is the most valuable resource of any volunteer. Helping members make the most of the time that they have to give to SAME is our top priority.

The simple metric I use to measure volunteer time-saving methods is *low cost (time) + high payoff (impact) = high value!*

So how are we working to save you time? Here are just some of the initiatives we are implementing and more are on the way!



SERVING OUR SOCIETY

Let me congratulate Jane Penny for an inspiring and impactful year as SAME President and welcome retired Navy Captain Mike Blount as our new National President! Our journey to 2020 gained momentum with Jane and continues to pick up speed with Mike. Thanks to both of you, and to AECOM and Balfour Beatty for supporting your commitment over the last year.

As was stated in the inaugural issue of *The Military Engineer* in 1920, “this society will serve no selfish ends.” Both of you, and all our volunteer leaders across the globe epitomize this ideal each and every day. Our founders would be proud!

COMMUNICATIONS

“Real TiME” E-Newsletter. Communications from the national office are being streamlined into a monthly e-newsletter, *Real TiME*, that contains what you need to know for the month ahead, including event updates and registration links, education offerings, feature articles, Committees & Councils news, and more.

National and Post Websites. The SAME national office now hosts 65 post websites (for free!) and they are integrated with our national website. Events that these Posts are holding show up in the national calendar of events. Some large Posts that have well-developed websites are even opting in to save money...and time!

NETWORKING

Post Issues Workshops. A fundamental direction of the 2020 SAME Strategic Plan is industry-government collaboration. The Post Issues Workshops are supported by agency leaders and intended to build stronger relationships at the local level by getting the right people from industry and government together to resolve real issues.

Small Business Conference. We have been working with the Department of Veterans Affairs to integrate its engineering and construction folks into our Small Business Conference. The efforts are paying off. This fall in Atlanta (Nov. 16-18) all A/E/C small businesses can go to one conference: SAME's!


POST LEADER TRAINING AND RESOURCES

Post Leaders Workshop. We will have an expert at this year's Post Leaders Workshop in St. Pete Beach, Fla., Aug. 28-30, to train Post leaders on recruiting, managing and retaining volunteers. Attendees are expected to return to their Posts and train other leaders—to pay the knowledge they get forward! The end result: more of our members will become active when you put to use what you learn. That means less time per member is needed!

STEM Outreach. Our STEM Committee, led by Scott Prosuch, has produced a model program that began through a national partnership with the Army Educational Outreach Program and the Technology Student Association. The committee is now coordinating opportunities for volunteers (inside and outside SAME) to judge K-12 competitions. The time investment of volunteers is minimal, but the payoff to the kids is huge!

Best Practices System. Our online best practices system now has more than 600 samples and templates you can utilize. Visit the Post Resource Center at www.same.org under “Get Connected” to access Post Best Practices.

SAME is built on its vibrant Posts that serve their local communities. So give us your ideas—we are here to listen. And let me know your ideas as I get around the Society. Have a great summer!


Brig. Gen. Joseph “Joe” Schroedel, P.E., F.SAME, USA (Ret.)
SAME Executive Director

BLOUNT SWORN IN AS SOCIETY PRESIDENT

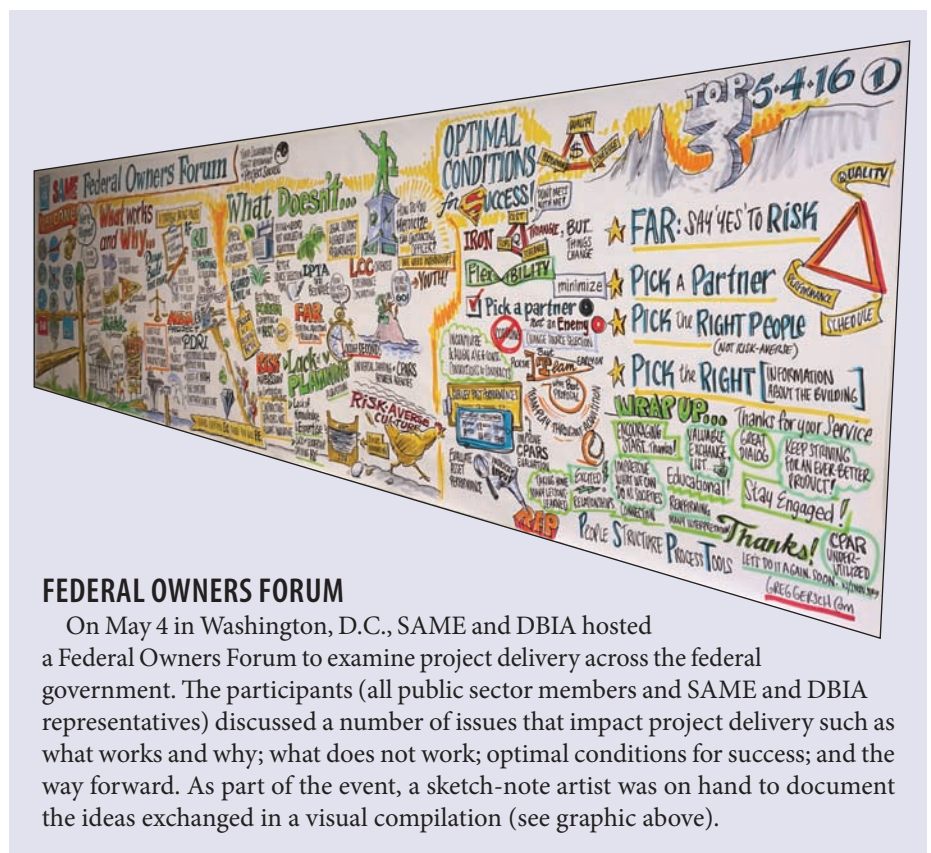
Capt. Mike Blount, P.E., LEED AP, F.SAME, USN (Ret.), was sworn in as SAME National President on May 26 at the 2016 JETC in Phoenix. Capt. Blount, who first joined SAME in 1984, served this past year as President-Elect. Additional SAME volunteer leadership positions include South Atlantic Regional Vice President, Chair of the Energy & Sustainability Committee, and Jacksonville Post President. He was invested into the Academy of Fellows in 2012. Capt. Blount served 26 years in the U.S. Navy Civil Engineer Corps, including command tours as Commodore of the 30th Naval Construction Regiment and Commanding Officer of NAVFAC Southeast. He retired in 2008, joined Balfour Beatty, and is now Vice President of Navy Programs with AECOM. A graduate of the University of Florida, where he earned a bachelor's in Environmental Engineering, Capt. Blount holds a master's in Environmental Engineering from Georgia Tech and a professional degree in Water Resources from The George Washington University.



SAME LAUNCHES E-NEWSLETTER

In May, the SAME national office debuted a new monthly e-newsletter *Real TiME*. Designed to provide valuable information, updates, event reminders, and news and notes about goings-on across the Society, *Real TiME* also is intended to help reduce the volume of emails that members receive because much of what you need to know from SAME each month will be consolidated in the e-newsletter.

You can ensure you receive *Real TiME* by subscribing to it at www.same.org/realtime.



FEDERAL OWNERS FORUM

On May 4 in Washington, D.C., SAME and DBIA hosted a Federal Owners Forum to examine project delivery across the federal government. The participants (all public sector members and SAME and DBIA representatives) discussed a number of issues that impact project delivery such as what works and why; what does not work; optimal conditions for success; and the way forward. As part of the event, a sketch-note artist was on hand to document the ideas exchanged in a visual compilation (see graphic above).



CAMP ALUMNI RECONNECT

A number of alumni, camp mentors and staff of the SAME Engineering & Construction Camps gathered at the 2016 JETC in Phoenix. Each year, more than 100 high school students planning to pursue a career in a STEM-related field attend the SAME national camps, which are co-hosted with the U.S. Army, U.S. Marine Corps and U.S. Air Force Academy, as well as the Engineering Explorer Academy, which is co-run by the Atlanta Post and held at Georgia Tech. For more information on the SAME camps program, visit www.same.org/STEMcamps.



PROGRAMS UPDATE

What a fantastic week at JETC! The conference offered 59 education sessions, aligned in seven very diverse tracks: Architecture-Engineering, Environmental, Energy and Sustainability, Joint and Overseas Engineering, Business Development and Leadership, Facility Management, and National Security. Including moderators, 195 subject matter experts presented to attendees either as individual speakers or in panels. This included the four-session “Setting the Contingency Theater: A Total Joint Force Engineer Table Top Exercise,” which brought together military engineers literally from across the globe as well as industry representatives. The new U.S. Army Chief of Engineers, Lt. Gen. Todd Semonite, USA, provided kick-off remarks for the exercise and both he and Air Force Director of Civil Engineers, Maj Gen. Tim Green, USAF, participated in parts of the exercise and were present for the outbrief.

We measured the total impact of the entire JETC education program at 3,677 contact hours over three days: in other words, that’s how many collective hours attendees spent in seats during the sessions!

Looking ahead to the SAME Small Business Conference—Nov. 16-18 in Atlanta—we are working to ensure the education program will offer many options related to small businesses and the federal marketplace. The Call for Presentations went out May 20 with a deadline for abstract submissions of July 25. For more information, visit www.same.org/sbc.

All ideas are welcome to me at ndesport@same.org.

*Col. Nick Desport, RA, LEED AP, F.SAME, USAF (Ret.)
SAME Director of Programs*



WORKING TO BUILD RESILIENCE AWARENESS

On April 25, SAME’s TISP Council, supported by the Washington DC and Northern Virginia Posts, held a one-day Resilience Roundtable titled “Designing and Building 22nd Century Infrastructure” at George Mason University’s campus in Arlington, Va. The event brought together leading practitioners from

government and industry to discuss key issues facing resilience awareness and implementation approaches across the country. SAME’s 105 Posts are uniquely positioned to help broker relationships and develop solutions for America’s resilience challenges in the local communities and regions where they are needed most.

Presenters at the Resilience Roundtable included: Lt. Col. Steven Hart, Ph.D., P.E., USA (Ret.), Hart Engineering; The Honorable William Anderson, former Assistant Secretary of the Air Force; Eric Halpin, P.E., HQ USACE; Alan Hecht, Environmental Protection Agency; David Kaufman, Center for Naval Analyses; Sarah Gambill, Office of Infrastructure Protection, Department of Homeland Security; Nancy Skinkle, Architect of the Capitol; Dave Wegner, Jacobs; Maj. Gen. Mike Walsh, USA (Ret.), Dewberry; and Thomas Massey, AIA, Gannett Fleming.

For more information on the TISP Council, visit www.same.org/tisp.



2016 NATIONAL EVENTS

Post Leaders Workshop
Aug. 28-30 • St. Pete
Beach, Fla.

Fellows Invitational
Aug. 31 • Bay Palms Golf
Complex - Tampa, Fla.

Fellows Conclave
Aug. 30 • St. Pete Beach, Fla.

Small Business Conference
Nov. 16-18 • Atlanta, Ga.

WWW.SAME.ORG/CALENDAR

SOCIETY TRIVIA: DID YOU KNOW?

1 Which SAME President also served as Vice President of the United States?

3 Where are the six SAME international Posts located?

2 What are the three largest SAME Posts in terms of number of members?

*Answers to May-June “Did you Know”
(1) Maj. Gen. William Black, USA (Ret.); (2) San Antonio, 1995; (3) General of the Army Douglas MacArthur*

SAME Student Chapters: Growing Our Future Leaders

By Corey Weaver, P.E.

The SAME College Outreach Committee strives to organize programs and present opportunities to future military and civilian members of A/E/C professions that will build their leadership skills; foster networking within the professional community; and assist with job placement for recent graduates.

Distinguished Student Chapters. Annually, the College Outreach Committee awards Distinguished Student Chapter Streamers to recognize outstanding efforts and achievements. This year, 18 Student Chapters were recognized as Distinguished Chapters (see below). Thank you to the Post Mentors and Faculty Advisors of all SAME's Student Chapters for the time they volunteer to support and mentor the future leaders of our Society and the nation.

- | | | |
|--|--|---|
| • Alabama A&M University (Huntsville Post) | • Saddleback College (Orange County Post) | • University of South Alabama (Mobile Post) |
| • Colorado School of Mines (Denver Metro Post) | • Texas A&M University (Houston-Galveston Post and San Antonio Post) | • University of St. Thomas (Minneapolis-St. Paul Post) |
| • Georgia Southern University (Savannah Post) | • The Citadel (Charleston Post) | • University of Texas at Austin (San Antonio Post) |
| • Kansas State University (Greater Kansas City Post) | • U.S. Air Force Academy (Pikes Peak Post) | • Virginia Military Institute (Virginia Peninsula Post) |
| • Marquette University (Lake Michigan Post) | • University of Missouri - Kansas City (Greater Kansas City Post) | • Virginia Tech (Hampton Roads Post) |
| • Marshall University (Huntington Post) | • University of Nebraska (Omaha Post) | |
| • Sacramento State University (Sacramento Post) | | |

Student Leaders Conference. While SAME student members enjoy a well-deserved break from their academic pursuits this summer, the College Outreach Committee is working diligently with the SAME national office on the 2017 Student Leaders Conference, scheduled for Jan. 19-21, 2017 at Disney's Coronado Springs Resort in Orlando, Fla. This year's event will encompass two days of facilitated sessions and panel discussions focused on the recruiting, retention and empowerment of Student Chapter members and their future professional and military careers. The committee also is working with the Young Member Council and national office to invite local Young Members and Fellows for networking and mentoring opportunities with the students.

Corey Weaver, P.E., USACE Huntington District, is Chair, College Outreach Committee; ctweaver87@gmail.com.



SAME student members at Saddleback College (top) and Virginia Tech (left). There are currently 60 Student Chapters across the country.



DISTINGUISHED POSTS

Congratulations to the 35 SAME Posts that were named Distinguished Posts for 2015. In addition, four regions were named Distinguished Regions: Middle Atlantic, Missouri River, South Central, and TEXOMA.

- Anchorage Post
- Big Sky Post
- Buffalo Post
- Cape Fear Post*
- Central Virginia Post
- Charleston Post
- Dallas Post
- Denver Metro Post
- Emerald Coast Post
- Fort Leonard Wood Post
- Fort Worth Post
- Greater Kansas City Post
- Guam Post
- Honolulu Post
- Houston-Galveston Post*
- Japan Post
- Kittyhawk Post
- Nashville Post
- Northern Virginia Post
- Oklahoma City Post
- Omaha Post
- Panama City Post
- Pensacola Post
- Pikes Peak Post
- Pittsburgh Post
- Rhein-Main Post
- San Antonio Post
- San Francisco Post
- Savannah Post
- Southern Arizona Post
- Space Coast Post
- Tampa Bay Post
- Tulsa Post
- Virginia Peninsula Post*
- Washington DC Post

*Named Top Small, Large and Medium Posts for 2015.



MEMBERSHIP & POST REPORT

For the first time, the SAME Academy of Fellows is holding a Fellows Conclave the afternoon of Aug. 30 in St. Pete Beach, Fla., following the Post Leaders Workshop. The outcome of the Conclave is to reinvigorate the Academy of Fellows and get buy-in on some large-scale projects that align with the 2020 SAME Strategic Plan. Professional speaker and facilitator Cynthia D'Amour will work with the Fellows for an afternoon workshop. It will be a great event and all Fellows are welcome to attend.

The Fellow's charge asks members to support SAME's mission and strategic plan; be a role model; be a mentor; be patriotic and respectful; and support SAME Posts. There are more than 800 Fellows and they represent the most experienced members within the Society. We believe this highly charged group can do a tremendous job of bringing our Posts together and take the lead on some new and exciting mentoring and leadership programs. Some of the ideas we have heard already from Fellows include an SAME Leadership Development Academy for Young Members potentially as early as 2017, and a Fellows Directory that could be used as a resource to find speakers and mentors for our membership.

The Conclave will be followed the next day by a golf tournament, the inaugural Fellows Invitational, to benefit the new SAME National Foundation. The event will be played at the Bay Palms Golf Complex at MacDill AFB. For more information, visit www.same.org/fellows.

I'm all ears for great ideas; you can reach at mbialek@same.org.

Marc Bialek
SAME Director of Membership

RECOGNIZING POST PRESIDENTS

SAME's 105 Posts are the foundation of the Society. Thanks to all the Post Presidents around the world who volunteer to lead at the local level, where SAME makes its greatest impact. (List as of June 6, 2016)

THANK YOU
FOR MAKING SAME
A HIGH-ACHIEVING
SOCIETY!

POST.....PRESIDENT

Albuquerque Maj. Jason Melchior, USA
Anchorage Timothy Gould, P.E.
Arkansas Wallace Smith, P.E.
Atlanta Beth Harris, CPSM
Baltimore Carrie Ann Williams, CPSM
Big Sky Capt. William Bentley, USAF
Blue Ridge Col. Vincent Quarles, USA
Boston William Naughton, PG
Buffalo William Lorenz
Campbell Monica Sartain
Cape Fear Jacob Wessell, P.E.
Carolina Midlands Chris Carter
Central Virginia Col. Charles Boaz, USA
Charleston Col. Patrick Miller, FSAME, USAF
Chesapeake William Baker Jr.
Chicago Anna Culcasi
Cincinnati Mark Hayden
Coastal Bend Lt. Cdr. Scott Harris, P.E., CEC, USN
Coastal Carolina Cdr. Christopher Hodrick, P.E., CEC, USN
Dallas Bonnie Tinsley
Delmarva Dustin Brown
Denver-Metro Kenda Enney
Detroit Tricia Muxlow
Dolomiti Lt. Col. Dennis Phillips, USAF
El Paso Robert Ortega
Emerald Coast Alison Smith, P.E.
Fort Benning-Columbus Col. Frederick Clapp Jr., P.E., FSAME, USA (Ret.)
Fort Bragg Jack Roberts
Fort Drum Thomas Wight
Fort Hood Lt. Col. Robert Kimmel, USA
Fort Leonard Wood Lt. Col. Hugh Darville, USA
Fort Worth Meloni McDaniel
Frontier Lt. Col. James Duke, USAF
Gem State Lt. Col. Eric Fajardo, USAF
Great Basin Jonathan Oldham
Greater Kansas City Melissa Kelley
Guam Noel Enriquez
Hampton Roads Capt. Jorge Rios, P.E., CEM, USN (Ret.)
High Plains Capt. Jonathan Laughrun, USAF
Honolulu Col. Scott Warner, USAF
Houston-Galveston Elizabeth Parent, P.E.
Huntington Corey Weaver, P.E.
Huntsville John Matthews
Illini Leslie Gioja
Inland Empire Paul Peterson
Jacksonville Capt. Steve Hamer, P.E., CEC, USN
Japan Lt. Col. Robert Grainger, P.E., USAF
Kaiserslautern Col. Laura Johnson, P.E., USAF
Kentuckiana Karen Tenfelde
Kittyhawk Michael Howe
Korea Col. Michael Geer, USAF
Lake Michigan Aina Vilumsons
Lewis & Clark Lt. Col. Jason Campbell, USAF
Los Angeles Col. Kirk Gibbs, USA
Louisiana Col. Richard Hansen, P.E., USA
Memphis Lt. Cdr. Bobby Kendall, P.E., CEM, CEC, USN

POST.....PRESIDENT

Mid-Maryland Carlos Sanchez, LEED AP
Minneapolis-St. Paul Jon Gustafson
Mississippi Gulf Coast Cdr. Brian Nottingham, CEC, USN
Mobile Angela Nocera, P.E.
Moody-Valdosta Lt. Col. Patrick Albritton, USAF
Mount Tacoma Lt. Col. Charles Markham, PMP, USA (Ret.)
Narragansett Bay Cdr. Joshua Fant, P.E., USCG
Nashville Mark Luskin
New Jersey Michael Hanlon
New York Capital District Keith Lashway, P.E., FSAME, FNSPE
New York City Robert Hoffmann
Northern Virginia Col. Joe Manous Jr., Ph.D., P.E., FSAME, USA (Ret.)
Oklahoma City Aruna Abhayagoonawardhana
Omaha Col. John Henderson, USA
Orange County Sharon Bison
Oxnard-Ventura Capt. Glenn Hubbard, P.E., CEC, USN
Panama City Col. Anthony Higdon, USAF
Pensacola Capt. Stanley Wiles, P.E., CEC, USN
Philadelphia Capt. Willington Lin, P.E., CEC, USN
Phoenix Emery Layton, P.E.
Pikes Peak Col. Bryan Truesdell, USA
Piscataqua David Abrahamson
Pittsburgh Lt. Col. Christopher Riemer, USA
Portland Col. Jose Aguilar, USA
Red River Col. Richard Houghton, USAF (Ret.)
Rhein-Main Aaron Justice
Robins AFB Lt. Col. Michael Coats, P.E., FSAME, USAF (Ret.)
Rock Island Col. Thomas Heinold, P.E., FSAME, USA (Ret.)
Sacramento Col. Michael Herman, FSAME, ARNG (Ret.)
San Antonio Steven Holt Sr.
San Diego Gita Murthy, Ph.D., FSAME
San Francisco John Jones III
Savannah Lt. Col. R. Daren Payne, USA
Scott Field Lt. Col. Steven McCollum, USAF
Seattle Thomas Booth, P.E.
South Florida Lt. Cdr. John Berry, P.E., USCG
Southern Arizona Melissa Lewis
Southern Nevada Brian Christ
Space Coast Lt. Col. Jason Glynn, USAF
St. Louis Jamie McVicker-Little
Tampa Bay Col. Vernie Reichling Jr., USA
Tennessee Valley Col. Barry Totten, USA (Ret.)
Tularosa Basin Lt. Col. Kevin Mares, USAF
Tulsa Col. Richard Pratt, USA
Vicksburg Henry Dulaney, P.E., FSAME
Virginia Peninsula Col. Jennifer Kilbourn, USAF
Washington DC Cdr. Craig Clutts, P.E., CEC, USN
Wichita Mountains Keith Maxwell, P.E.
Yuma Ronald Kruse, P.E.

POST NOTES

ENGINEER APPRECIATION DINNERS

On April 22 in Colorado Springs, the **Pikes Peak Post** hosted the 12th Annual Engineers Banquet to welcome graduating seniors from the U.S. Air Force Academy into the Air Force Civil Engineering community. The event was attended by local SAME members from the Colorado Front Range, faculty members from the Air Force Academy, and other invited guests.

The banquet featured a keynote address from Maj. Gen. Tim Green, USAF, Air Force Director of Civil Engineers. SAME Pikes Peak Post President Col. Bryan Truesdell, F.SAME, USA, served as the evening's host. Also in attendance were SAME Executive Director, Brig. Gen. Joe Schroedel, F.SAME, USA (Ret.), who provided opening remarks; Brig. Gen. Andrew Armacost, USAF, Dean of the Faculty at the Air Force Academy; and Maj. Gen. Tim Byers, F.SAME, USAF (Ret.), formerly The Air Force Civil Engineer and currently an executive with CH2M.

• • •

The 2016 Engineer Dinner for graduating cadets at West Point who will enter the Engineer Branch, co-hosted by the **New York City Post** and the Army Engineer



Association, was held April 21 at the U.S. Military Academy. During the dinner, Lt. Gen. Tom Bostick, P.E., USA, then-U.S. Army Chief of Engineers and Commanding General of the U.S. Army Corps of Engineers gave a keynote address emphasizing the importance of the young engineers taking on uncomfortable tasks, and that the Army—and the nation—need them to lead, and serve.

During the dinner SAME Vice President Col. Kurt Ubbelohde, F.SAME, USA



(Ret.), presented the David M. Fraser Award to Cadet Blake Bequette, who hails from Nebraska City, Neb., and is ranked number one in his class. The Fraser Award is presented annually for engineering excellence and leadership. It is named after David Fraser, a 2004 West Point graduate who was killed while deployed to Iraq.

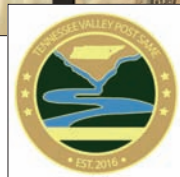


WELCOME TO POST 105!

On April 19, the **Tennessee Valley Post** held its official chartering ceremony to become the 105th SAME Post. What started as a Field Chapter of the Nashville Post has grown into a dynamic group of members and stakeholders located in an area of the country with several important engineering-related organizations, including the Tennessee Valley Authority and Oak Ridge National Laboratory.

Congratulations to Post President Barry Totten and all the individual members and Sustaining Members of SAME's newest Post!

For more information, visit www.same.org/tennessee-valley.



SUPPORTING FUTURE ENGINEERS

The **Denver Metro Post** recently marked its seventh year sponsoring and operating Engineering Explorer Post 827, which seeks to interest youth in engineering, science and architecture careers. During the

2016 spring session, the Denver Metro Post registered 28 young women and men (ages 14 to 18) from seven schools in the area.

This year's program covered Pole-to-Pole Engineering, Aerial/Terrestrial LIDAR, Geology/Mining Engineering, Water & Wastewater, Environmental Analytical Chemistry, Astronautics/Aerospace, Architecture, and Environmental Engineering. Highlights of the program included an evening with an astronaut, and tours of the Aurora Griswold Water Treatment Plant, a TestAmerica environmental analytical laboratory, and the Colorado Mineralogy Museum.





STEM Corner

STEM: Together We Can Do More

The gap in our nation's STEM production is sizable. We produce 300,000 STEM graduates annually—but with needs in excess of 400,000 per year across the STEM fields. In addition to the pure quantitative need for engineers, many STEM graduates do not work in a purely technical field. They enter other positions that benefit greatly from having a person with a technical background. Developing STEM graduates for these positions only increases the demand, and the gap in meeting it.

As a Society—from the Post level to the national level—we have been contributing to feeding the “STEM pipeline” and building our nation's future engineers long before STEM was a concept. So what are we doing? And what else can we do?

Posts Supporting STEM. More than 95 of SAME's 105 Posts report they are engaged in K-12 STEM activities and 73 participate in college outreach. Some of the most popular activities and partnerships include:

- West Point Bridge Design
- Boy Scout badge programs
- MATHCOUNTS
- Future City
- Judging for Technology Student Association and National Science Teachers Association events, and local science fairs
- Mentoring programs
- Robotics, Rockets and Lego competitions
- SAME STEM Camps

Scholarships. Providing scholarships to deserving high school students who are on a STEM track has been the cornerstone of SAME Posts in our nearly 100-year history. The estimated value annually is over \$1.1 million and 600 scholarships.

More than 97 Posts are providing students on a STEM track with financial support.



(Top) The Emerald Coast Post is supporting teachers at Woodlawn Beach Middle School through a STEM grant. (Bottom) More than 4,000 middle school and high school students have participated in the Omaha Post's mentoring program since it began over 20 years ago.



REHTIN

Here is an example of how it should work:

In 2011, Cydney Rehtin received a four-year scholarship from the Coastal Carolina Post to support her education through school. She attended the University of North Carolina and was tracked and mentored by her Post along the way. After graduating in 2015, Cydney began working as a Chemical Process/Project Engineer – Pulp & Paper, for Georgia Pacific. This combination of financial support and mentoring is the standard for all Posts to follow. Under the *2020 SAME Strategic Plan*, we ask Posts to not only award scholarships but to assign a mentor to the student and track their performance and results and, when possible, help steer them to careers in our industry.

STEM Camps. With a 16-year track record, impacting over 2,000 high school students and supported by 70 Posts, the annual SAME STEM Camps program—including the SAME/U.S. Army Engineering & Construction Camp, SAME/U.S. Air Force Academy Engineering & Construction Camp, SAME/U.S. Marine Corps Engineering & Construction Camp, and the Atlanta Post's Exploring Engineering Academy (and previously the SAME/U.S. Navy Seabee Engineering & Construction Camp)—has helped produce more than 600 engineers and/or military leaders for our country. The successes are incredible (see sidebar at right). Not only are our campers highly successful, but many return to the camps each summer either in a support roll or as mentors.

Boy Scout Merit Badging. Todd Cartwright of the Pikes Peak Post holds a full-day event for over 70 scouts, resulting in 95 percent receiving their Engineering Merit Badge. Daphne Gurri of the South Florida Post conducts a similar full-day event for Girl Scouts. Many other members and Posts do likewise. SAME Fellow Jack Seibert has helped build the Exploring Engineering Academy in Atlanta with Boy Scouts of America; Jack is a great source for Posts to connect with. Additionally, SAME recently signed a Memorandum of Support at the national level with Learning for Life, a subsidiary of Boy Scouts of America, to explore ways to support STEM.

SAME in the Classroom. SAME members performed 24,342 volunteer hours last year supporting STEM, visiting schools, talking about subjects from structures to the environment to what it means to be an engineer. This is a critical link for SAME. These schools and the relationships with teachers are our source for scholarship applicants, campers and mentoring. Many Posts reach out to schools mostly during Engineers Week. The 2020 SAME Strategic Plan challenges Posts to connect with STEM schools year-round, develop long-term relationships, and invite teachers and administrators to an SAME event.

WHERE ARE THEY NOW?

SAME Posts each year sponsor dozens of high schoolers to attend the SAME Engineering & Construction Camps. Over the last 16 years, hundreds of camp alumni have gone on to become engineers in the private sector and leaders in the U.S. military. We will spotlight former campers each issue going forward. Know of a former camper who has gone on to great things? Email Scott Prosuch at sprosuch@earthlink.net.



CAPT. KORY CARPENTER, USAF

- SAME/U.S. Air Force Academy Camp, 2004
- U.S. Air Force Academy graduate, 2011
- Currently serving as Air Advisor/Project Manager for the 571st Mobility Support Advisory Squadron at Travis AFB, Calif.



LAUREL ENSTRÖM

- SAME/U.S. Navy Seabee Camp, 2004
- SAME/U.S. Air Force Academy Camp Mentor, 2013-2015
- Currently a student at St. Cloud State University, Class of 2017 (Mechanical Engineering)



ALEX MULLANS

- SAME/U.S. Air Force Academy Camp, 2004
- Rose-Hulman Institute of Technology graduate, 2013 (Software Engineering & Computer Science)
- Currently working for Microsoft as a Program Manager in Redmond, Wash

SOTEM Corner

For example, the Emerald Coast Post recently presented a STEM grant to teachers at Woodlawn Beach Middle School for their creativity. Great Basin Post also runs a STEM small-grant program. And for 22 years, the Omaha Post has been conducting one of the most successful STEM mentoring programs in the Society, involving 300 middle and high school students each year.

Connecting with other STEM Programs. If SAME's goal is to connect with children and help put them on a track to becoming an engineer, then why not team with other successful STEM organizations? That is what we are doing.

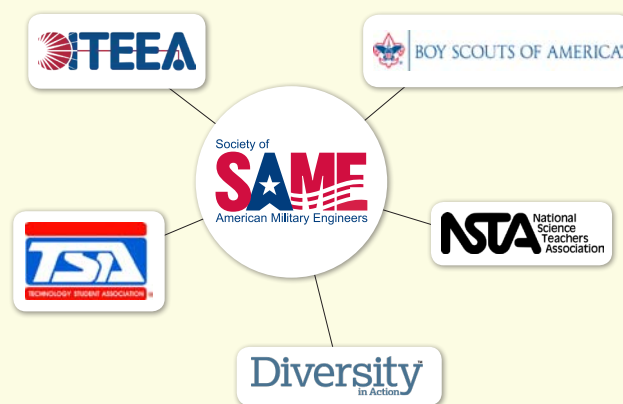
Recently, SAME had more than 100 members from over 30 Posts support the Army Educational Outreach Program through the National Science Teachers Association (NSTA) and the Technology Student Association (TSA) by providing online judges for their STEM competitions. These are strong programs (NSTA comprises 40,000 teachers; TSA has 250,000 student members). They also are active in all states and offer a perfect alignment for our Posts. This is a new frontier, as we are looking to forge relationships with these organizations at the national and local level.

Building a Better STEM Program. SAME Posts have had a tremendous impact in the life choices of thousands of students. Our Posts are at the vanguard in promoting STEM and "building our future engineers." We are amazed at the incredible work our members do around the world and we learn something new almost daily.

How can you continue the evolution at the Post level? Assign a STEM chair and then connect all the parts of the equation—inspiration, scholarships, outreach, camp recruiting, and mentoring. That is how we build solutions.

The SAME STEM Committee is here to provide information and discuss ideas. You can learn more at www.same.org/stem.

TME



BUILDING COLLABORATION

Our Society, as outlined in the new 2020 *SAME Strategic Plan*, is committed to lead "collaborative efforts to identify and resolve national security infrastructure-related challenges." STEM outreach and developing future engineers is essential for America's future and our global competitiveness. Nationally, SAME has been establishing partnerships with STEM-related organizations to bring key stakeholders together and open up opportunities for Posts to support the initiatives locally, because together we can do more.

Army Educational Outreach Program. SAME signed a memorandum of agreement with the Army's STEM program to provide judges for its competitions and events, which are carried out by the National Science Teachers Associations and Technology Student Association.

Learning for Life. SAME signed a memorandum of support with Learning for Life (a subsidiary of Boy Scouts of America) to support mutually beneficial efforts intended to foster and promote education, awareness and achievement to young adults.

Diversity in Action. SAME has signed a memorandum of understanding with Diversity in Action, a publisher of a STEM-focused magazine and website, to bring increased awareness nationally of SAME's efforts to support STEM outreach, inclusion, and develop future engineers.

International Technology and Engineering Educators Association. SAME has signed an agreement with the International Technology and Engineering Educators Association to sponsor 25 low-income schools in the Washington, D.C., area to help support their STEM efforts.



ENGINEERING & DIVERSITY AT THE SERVICE ACADEMIES

The four service academies that provide leaders for the U.S. Army, Navy, Air Force, Marine Corps and Coast Guard continue to attract well qualified, motivated young men and women who desire to serve the nation. The classes of 2016 graduated in late May and will be entering the service at a time of depressed defense budgets and increased requirements for the War on Terrorism.

SAME members can be proud of the new officers graduating from the academies as well as those entering the service through

the Reserve Officer Training Corps or Officer Candidate School.

We now look ahead. This Education & Training News column profiles the incoming classes of 2019 (those just finishing their freshman year) and the wide variety of engineering programs offered to cadets and midshipmen. This column also highlights the diversity of the new student population. A major goal for all the service academies is to increase their diversity to better represent the diversity in the military services and the nation.—R. W.

U.S. MILITARY ACADEMY

The incoming Class of 2019 to the U.S. Military Academy at West Point, N.Y., totaled 1,263 students. The breakdown includes 985 men, 278 women, 23 combat veterans, 190 African Americans, 99 Asian Americans, 144 Hispanic Americans, 10 Native Americans, and 15 international students. Only about 2,400 of the nearly 14,000 who applied were qualified for admission.

West Point offers nine engineering majors. All programs except Engineering Psychology are ABET accredited.

- Civil Engineering offers a number of disciplines, including Structural, Geotechnical, Water Resources, Construction, Infrastructure and Transportation.
- Mechanical Engineering offers courses in Aeronautical, Automotive, Biomechanics, Power & Energy and Mechatronics (the study of control of robots, unmanned aerial vehicles and other autonomous systems).
- Environmental Engineering contains courses that apply science and engineering principles to protect public health.
- Systems Engineering teaches the structured progression of a system design throughout its lifecycle.
- Engineering Management examines the engineering relationships between the management tasks of staffing, organizing, planning and financing the human element involved in production, research and service organizations.
- Electrical Engineering provides students with an opportunity to focus on robotics, communications, information assurance, optoelectronics or alternative energy.
- Nuclear Engineering prepares cadets to provide appropriate nuclear and radiological engineering expertise to the Army.
- Engineering Psychology is an empirically based discipline that requires its graduates to critically and systematically apply their knowledge of human behavior to the design of complicated systems.
- Chemical Engineering teaches cadets to design materials at the molecular level, optimize the design for specific applications, and develop efficient methods for production, packaging, and distribution.

The mission of the U.S. Military Academy is "To educate, train, and inspire the Corps of Cadets so that each graduate is a commissioned leader of character committed to the values of Duty, Honor, Country and prepared for a career of professional excellence and service to the Nation as an officer in the United States Army."

For more information, visit www.usma.edu.



Of the more than 16,000 applicants to the U.S. Naval Academy Class of 2019, 1,300 were offered an appointment and 1,191 entered the academy, including 867 men and 324 women. U.S. NAVAL ACADEMY PHOTO

U.S. NAVAL ACADEMY

For the Class of 2019 to the U.S. Naval Academy at Annapolis, Md., there were more than 16,000 applicants, of whom 1,300 were offered an appointment, and 1,191 entered the academy, including 867 men and 324 women. The ethnic diversity in the class included 142 Hispanic, 97 Multiple Races, 80 Asian American, 77 African American, and 13 International students. The class also included 54 enlisted sailors and 11 enlisted Marines.

While the majority of midshipmen will choose their majors freely, the needs of the Naval Service take precedence. For the Naval Academy Class of 2013 and beyond, at least 65 percent of those graduates commissioned into the Navy must complete academic majors in science, technology, engineering, or mathematics disciplines. This institutional requirement applies as well to Navy ROTC programs at other colleges. At the end of plebe year, midshipmen choose a major course of study with counsel from academic and military advisors.

The Naval Academy offers nine engineering majors. All except Nuclear Engineering are ABET accredited.

- Aerospace Engineering involves the implementation, operation, and functional evaluation of complex aerospace systems while serving as technical subject-matter experts in team-based naval applications.



- Electrical Engineering involves circuit analysis, digital logic systems, semiconductor device electronics, power systems and rotating machinery, communications, electromagnetism, and the design of microprocessor-based systems.
- General Engineering is interdisciplinary, and broadly focused. The relatively large number of electives permits a student to seek depth in one area of interest and seek exposure to a variety of science and engineering disciplines.
- Mechanical Engineering involves the design of naval systems and ability to supervise the operation of these systems.
- Naval Architecture and Marine Engineering involves designing ocean transportation of the future. The many

types of ships, boats and vehicles needed to operate on, under, or above the ocean's surface provide the broad field in which the designer is to work.

- Systems Engineering comprises automation: the design and construction of systems or devices that work with little or no direct human control.
- Ocean Engineering involves ocean materials, power systems, acoustics, wave mechanics, life support systems, and the design of a wide variety of ocean vehicles and structures.
- Computer Engineering incorporates electrical engineering and computer science and includes electives in embedded systems, computer operating systems, digital signal processing and more.

The mission of the U.S. Naval Academy is "To develop Midshipmen morally, mentally and physically and to imbue them with the highest ideals of duty, honor and loyalty in order to graduate leaders who are dedicated to a career of naval service and have potential for future development in mind and character to assume the highest responsibilities of command, citizenship and government."

For more information, visit www.usna.edu.

U.S. COAST GUARD ACADEMY

The Class of 2019 of the U.S. Coast Guard Academy, New London, Conn., includes 291 cadets from 50 states and 12 foreign nations. A total of 1,948 applied for admission and 388 were offered appointments. Of the incoming class, 35 percent were women and 32 percent were minorities.

The Coast Guard Academy has four ABET accredited engineering majors: Civil, Electrical, Mechanical and Naval Architecture and Marine Engineering. In 2014, approximately 40 percent of Coast Guard Academy graduates earned engineering degrees: 39 in Civil Engineering; 29 in Electrical Engineering; 28 in Mechanical Engineering; and 25 in Naval Architecture and Marine Engineering.

- Civil Engineering teaches students to apply knowledge in the areas of structural, construction, environmental, and geotechnical engineering.
- Electrical Engineering includes expertise in the areas of command, control,



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computers, communications, and information technology systems.

- Mechanical Engineering teaches students to apply scientific principles in the design and analysis of mechanical and energy conversion systems.
- Naval Architecture provides a strong program in engineering, mathematics and the sciences, with a heavy focus on ship design and ship systems.

The mission of the U.S. Coast Guard Academy is "To graduate young men and women with sound bodies, stout hearts and alert minds, with a liking for the sea and its lore, with that high sense of honor, loyalty and obedience which goes with trained initiative and leadership; well grounded in seamanship, the sciences and amenities, and strong in the resolve to be worthy of the traditions of commissioned officers in the United States Coast Guard in the service of their country and humanity."

For more information, visit www.uscga.edu.

U.S. AIR FORCE ACADEMY

The U.S. Air Force Academy in Colorado Springs, Colo., offers seven engineering programs, all ABET accredited.

- Aeronautical Engineering offers studies in aerodynamics, flight mechanics, propulsion, aircraft structures and experimental methods in aircraft design or aircraft engine design.
- Astronautical Engineering offers courses in aerospace operations with emphasis on astrodynamics, aerospace systems design and control systems.
- Civil Engineering includes courses to plan, design and supervise the construction of facilities such as space stations and launching facilities, offshore structures, bridges, buildings, tunnels, highways, transit systems, dams, airports, irrigation projects, distribution facilities for water, and collection and treatment facilities for wastewater and hazardous wastes.
- Computer Engineering offers an interdisciplinary approach that mixes courses from computer science with electrical and computer engineering.
- Electrical Engineering offers areas of study in electronics, communications, computer systems and controls.
- Mechanical Engineering addresses the

engineering of systems, the interactions of components, power and information.

- Systems Engineering considers the entire lifecycle of the system, from design and development to verification, manufacturing, deployment, training, operations, support, and disposal.

The mission of the U.S. Air Force Academy is: "We educate, train, and inspire

men and women to become officers of character motivated to lead the United States Air Force in service to our nation."

For more information, visit www.usafa.edu.



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Construction on the Salt Waste Processing Facility at the Savannah River Site near Aiken, S.C., was completed in April 2016. The project is now in the commissioning and testing phase. PHOTO COURTESY PARSONS

A New Perspective for an Army Engineer

For engineer officers that will be assigned to utilization tours with the U.S. Army Corps of Engineers, the Training with Industry program provides unique and valuable lessons they cannot get anywhere else.

By Maj. Andrew Olson, P.E., PMP, M.SAME, USA

In 2002, the Department of Energy awarded a contract to Parsons to design, construct, commission and test a Salt Waste Processing Facility at the Savannah River Site near Aiken, S.C. The facility is critical to properly disposing of 36-million-gal of Cold War-era nuclear waste. It will replace the only two operational radionuclide decontamination facilities for liquid wastes in the nation, increasing the current processing rate by a factor of six.

Construction of the facility was

completed in April 2016. The project is now in the commissioning and testing phase.

While participating in the U.S. Army Engineer Regiment's Training with Industry (TWI) program, I was assigned to Parsons and to work on the Salt Waste Processing Facility project. I participated in the final 20 percent of construction and the transition to commissioning and testing. I worked closely with the lead construction manager and other key players and actively managed part of the process.

The Engineer Regiment's TWI program provides experience, insights and training that simply cannot be gained anywhere in the Army. For engineer officers headed to a utilization tour with the U.S. Army Corps of Engineers (USACE), 12 months of experience on a complex project with a large construction firm is extremely valuable.

MAKING DECISIONS MATTERS

When a decision needs to be made by an Army commander, it is second-nature for the commander's staff to conduct mission analysis and follow through the other steps of the Military Decision-Making Process

(MDMP), culminating with orders production. The fact that the Army's planning processes are codified and formalized, taught to all leaders, and often practiced, leads to an efficiency rarely matched in the civilian sector. There is not as great a need to formalize the process and enforce training on mid-level managers and leaders within industry given the different operating environments. In some cases, though, an Army officer, well-versed in MDMP, would add value in a corporate environment by formalizing and expediting the existing decision-making process.

My involvement at Parsons included participating in decision-making that altered the task organization of foremen, superintendents and engineers to better align with the final processes leading to system turnovers. As the project progressed, final tasks leading to system turnovers grew while the number of other construction tasks began to decrease. Leadership started to consider how to increase efficiency with the shifting work focus. Across the organization, managers informally voiced opinions, desires and concerns either as

part of routine meetings or in private discussions with upper management. Yet no consensus emerged. At this point, I was able to implement a hasty and condensed version of MDMP (albeit late) and provided the decision-maker with a course of action comparison and later with a plan to publish. In retrospect, this process might have been improved by a more formal, timely implementation. In the aftermath of this decision, I created a step-by-step model patterned after the MDMP to assist with future decisions where appropriate. Having a formal process is likely to expedite fact-gathering (and decision-making); provide more transparency to all stakeholders; and ensure a more objective or less biased analysis and comparison of solutions.

QUALITY CONTROL EMPHASIS

Working on a nuclear project through the TWI assignment has deepened my appreciation for quality control and quality assurance like no experience in the Army ever could. Achieving quality standards on a large construction project requires a significant effort to plan and execute quality control activities and processes.

This textbook statement could pass as common knowledge or a “no-brainer” for anyone in the industry. However, hard copy and digital records for 80,000 pipe welds; verification of placement and proper torque values on more than 30,000 flange bolts and other connections; and ensuring traceability for 50,000 bolts, gaskets, valves, and other safety material from the factory to the point of installation all attest to the hard truth of that simple textbook statement.

The processes established to achieve the high standards required by the American Society of Mechanical Engineers Nuclear Quality Assurance Regulation are incredibly thorough. Having been a part of the contractor’s preparation for these inspections, I am certain I will be able to help ensure more effective partnerships with contractors for Construction Quality Management in the future.

SAFETY IS PARAMOUNT

Safety and risk management principles are paramount in both the Army and the private sector. There are many parallels between Parsons’ safety program on the

AN INVALUABLE EDUCATION

Living the life of a government contractor in the construction industry has broadened my perspective and deepened my understanding of the construction contracting and management process. I had learned many of these processes and theoretical concepts in the classroom and had gained some practical experience applying them while assigned to USACE Europe District and USACE Afghanistan District-South.

Applying these concepts inside a large firm, however, and living with the results over a year’s time has allowed me to transition the book knowledge to a working understanding on a practical level.



Maj. Andrew Olson, USA, inside the Salt Waste Processing Facility while assigned to Parsons as part of the Training with Industry program.
PHOTO BY CHRISTOPHER GOOD, PARSONS

I believe in the adage, that unless you apply it, you do not understand it.—A.O.

Salt Waste Processing Facility and a typical Army brigade or battalion. Just as an Army unit has a practical need and a real desire to protect the health and safety of its soldiers, a construction firm wants to ensure the safety and wellness of its skilled laborers throughout varied and dangerous operations. At Parsons, the Job Hazard Analyses parallel the Army’s Risk Management Worksheets, ensuring that all work controls and mitigation measures are tailored to the specific site and circumstances.

When circumstances or activities change at the construction site, the pertinent hazard analysis is updated with input from the workers and foremen directly involved. Both the Army and Parsons hold regular safety briefs and emphasize safety around the clock. Each organization reinforces that safety is everyone’s responsibility.

In November, the Salt Waste Processing Facility project was recognized for achieving Voluntary Protection Program Star Status by the Occupational Health & Safety Administration. The most notable factor leading to this distinction is not the excellent safety record from the recent past, but the positive and pervasive safety culture in place. The keys to establishing a positive safety culture include leaders at all levels taking responsibility for safety; ensuring everyone is included and involved in preventing and addressing hazards; and having leaders consistently enforce established standards and model safe practices.

“EARNED VALUE” MUST BE MANAGED

Federal Acquisition Regulation specifies that all cost-incentive contracts over \$20 million must use the Earned Value Management System to track and report progress. I spent one month observing and assisting in the schedule and cost management processes that lead to this reporting.

Seeing and dealing with the details of the systems as they match raw data to required reports, as well as accounting for recent progress and schedule adjustments by leveling resources has helped me to understand the “story” behind the numbers.

While I may never be a cost engineer, scheduling expert, or project controls manager, I can appreciate the critical role they play on large projects.

PROVIDING UNIQUE VALUE

TWI provides unique and valuable lessons for engineer officers who will be assigned to utilization tours with USACE.

When I transition to a utilization assignment I will be much better prepared to negotiate and partner with construction contractors on projects and help deliver quality work that benefits the nation. The Engineer Regiment should continue TWI precisely because it infuses officers with knowledge and understanding that we simply cannot get anywhere else.

TME

Maj. Andrew Olson, P.E., PMP, M.SAME, USA, is a Training with Industry Fellow assigned to Parsons; andrew.l.olson.mil@mail.mil.

Becoming Better Partners with Industry

By better understanding the architecture and engineering industry, federal procurement and project management personnel can become better stewards of resources and enable more innovative solutions in support of the nation.

By Lt. Col. Cullen A. Jones, P.E., PMP, CFM, M.SAME, USA

Author's Note: The following article serves as a primer for personnel preparing for their first exposure to conducting procurements and projects while working with the A-E industry in support of federal projects. It is the result of insights gained during my U.S. Army Training with Industry fellowship at Dewberry and discussions with industry leaders working in the federal arena.—C.J.

By establishing a greater understanding of the architecture-engineering (A-E) industry and the requirements to use their services, federal procurement and project management personnel can become better stewards of government resources. This will result in the construction of better infrastructure while forging an improved working relationship with industry partners.

Ultimately, that will enable the design and construction of more innovative, resilient, and sustainable solutions to support the needs of the nation. We can accomplish this through removing misconceptions, executing effective communication plans, integrating the development of quality request-for-proposals (RFPs), and following scope management throughout the process.

REMOVING MISCONCEPTIONS

Through interviewing A-E industry leaders and my own observations, I have identified there is sometimes an adversarial undertone among federal project owners and industry that can be detrimental to both sides. The tension may be the result of previous bad experiences; misconceptions that for-profit organizations focus solely on increasing their bottom line; friction due to lengthy federal acquisition process; or a combination of these and other factors. Such a mindset is self-defeating. To reduce this, we need to understand that A-E industry firms are human organizations. Just as we do not attribute the isolated errors of individuals within our formations to the entire unit, we should not generalize about our supporting industry partners based on the errors of a few.

Even though an organization requires revenue for its growth and sustainment of personnel and owners/shareholders, continued success and existence is contingent upon the successful delivery of the customer's requirements within the established scope, budget, and schedule. A better approach would be to cultivate an understanding of the need of for-profit organizations to obtain a fair

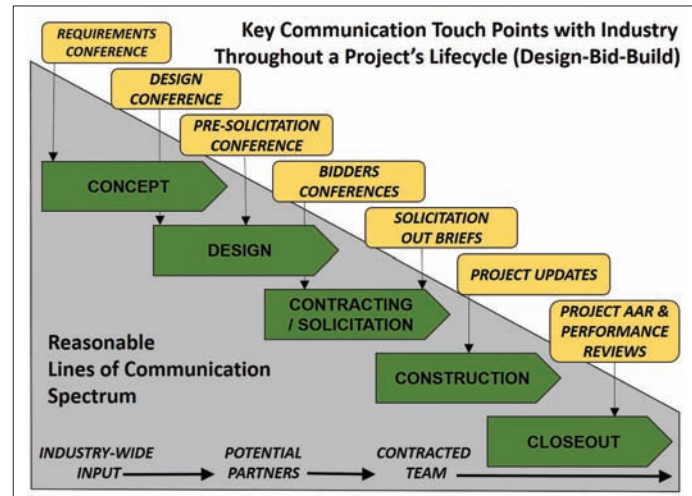


Fig. 1: Regular communication is critical to project success as well as to developing relationships for future opportunities. IMAGES BY LT. COL. CULLEN JONES, USA

return for quality efforts. Depending on the situation, organizations can institute formal partnering agreements signed by all parties that delineates the expectations of the federal and industry teams. This will enable a shift to view industry partners as organizations composed of professionals motivated by a sense of commitment, advancement, and opportunity. The result will be a better partnership with industry allowing us to “open the aperture of cooperation” and meet deliverables in a timely manner for the public good. To reduce friction in the lengthy federal acquisition process, quality communication and requirements development are key.

EFFECTIVE COMMUNICATION

There are significant differences between the procurement of A-E services and the larger federal acquisition process and its large-scale purchases of materials, bulk services, and technologies. For example, prior to the procurement of a weapon system, significant upfront costs and checks occur before system production. The majority of infrastructure solutions are “one-off” items.

During a project's lifecycle, federal teams can best serve the constituents by utilizing the A-E industry as a resource during development and execution. While project planning, it is critical that the communication plan identifies opportunities and touch points to receive feedback from industry subject matter experts and leaders at appropriate periods depending on the method of execution, be it design-bid-build or design-build. The project manager, using ethical and appropriate judgment, should maintain a spectrum of communication that starts out broad to solicit industry-wide input, narrowing to potential partners, and eventually focused on the contracted team. This will ensure dissemination of time-sensitive information and rapid answers to requests for information, allowing industry partners to maintain momentum.

In the early stages, during concept development and design, this helps the project team better collect requirements, define scope, and identify opportunities. Throughout development of the RFP, contract and solicitation, industry's feedback and dialogue allows it to better develop and present proposed solutions. Finally, as the projects progress through construction and closeout, regular communication, a thorough audit, and performance review of the supporting industry teams facilitates improvement, the recognition of achievements and challenges, and the maintenance of relationships for future opportunities as shown in Figure 1.

WHOLE TEAM CONCEPT

Project managers working closely with their design, procurement, and contracting organizations ensure that the requirements are well-defined and available throughout the development of a comprehensive contracting and acquisition strategy.

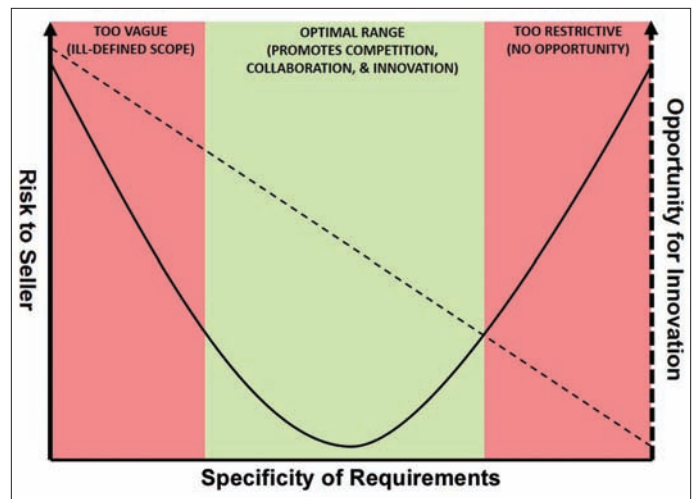
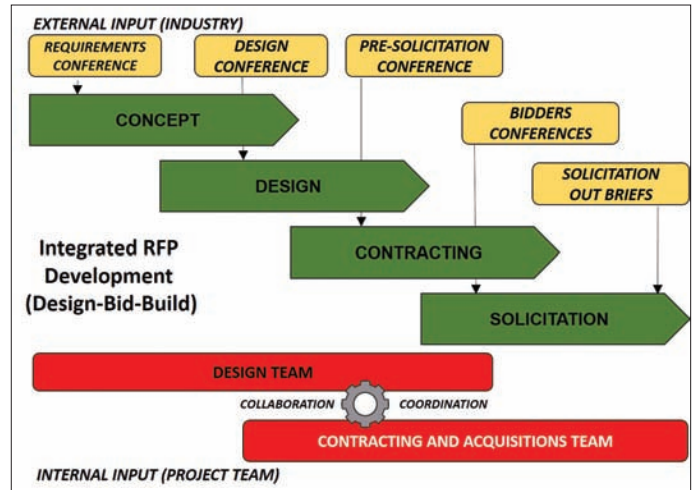
Typically, once the design team has completed plans and specifications it turns them over to the contracting department for the rapid development of an RFP. Instead of conducting a handoff to the next party during contracting and acquisition, project managers may have the opportunity to conduct it as a continuum that brings together the design and contracting/acquisition teams earlier in the process. This would enable the development of plans and specifications and RFP documentation to occur concurrently. As shown in Figure 2, concurrent development helps identify and eliminate areas of ambiguity and contradictions, establishes expectation management, and ensures proposal requirements match the evaluation criteria while including the ability to articulate what else possible partners can bring forward.

This internal coordination and external collaboration acts as another layer of vetting during the development of quality contracting and solicitation documentation. The end-product provides the clearest communication of the requirements, reduces amendments and updates, and facilitates a more rapid review and response cycle. Project managers can further reduce friction by ensuring the clear communication of requirements stems from a tenable scope.

DEFINE SUCCESS EARLY

RFPs that are too vague and do not clearly define the client's requirements and expectations present inherent risks to potential partners. At the same time, a too-specific scope provides no latitude to industry to apply innovation or value engineering. It also presents the hazard of having an untenable project scope due to overly specific requirements as shown in Figure 3. Over-specification of requirements may result in a loss of common sense and a project that potential partners would be leery to pursue.

The balancing act of specificity is an art and science. The project team working with industry can identify what items require completion in an exact fashion and where industry has latitude to develop unique methodologies. To be successful, this must occur during the collection requirements and definition of the project's scope. Furthermore, the project manager, as a good steward of federal resources, needs to enforce the control and validation of the scope through integrated change control—reducing potential scope creep and costly budget overrun due to change orders.



(Top) Fig. 2: Instead of conducting a handoff to the next party during contracting and acquisition, project managers may have the opportunity to conduct it as a continuum that brings together design and contracting/acquisition teams earlier. (Bottom) Fig. 3: Request-for-proposals that are too vague and do not clearly define the client's requirements and expectations present risks to partners. However, a too-specific scope provides no latitude for industry to apply innovation or value-based engineering.

MAKING AN IMPACT

Those personnel given the opportunity to manage federal procurements and projects while working with the A-E industry can make a lasting impact on infrastructure development in support of the nation. Understanding how to remove misconceptions, execute communication plans, integrate RFP development, and follow scope management is critical to improving that impact.

When viewed through a broader lens, the major elements of success—in federal operations and private practice—are the same: good relationships, communication, planning, and follow-through.

TME

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The opinions expressed in this article are the author's own and do not reflect the view of the U.S. Army, Department of Defense, or the U.S. government.

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NEW CONTRACT FORECASTING TOOL

The General Services Administration (GSA) recently announced the launch of a Forecast of Contracting Opportunities tool, a new GSA-engineered product that will make it easier for small businesses to find potential contracting opportunities with the federal government.

This tool is a key element of GSA Administrator Denise Turner-Roth's focus on strengthening the agency's role as a catalyst for economic development in communities where the federal government is present. Empowering small businesses to more easily identify available contracting opportunities is integral to GSA's mission.

The dashboard is the beta version of a worldwide database of upcoming potential federal contracting opportunities. With the tool, small businesses can filter the contracting opportunity data by agency; contact award status; place of performance; NAICS code; and contract value.

For more information, visit <https://gsaforecast.gsa.gov/>.
(Contributed by GSA)

ACCELERATING ENTREPRENEURSHIP

The Small Business Administration (SBA) launched a Growth Accelerator Fund competition from May 2 to June 3 for accelerators and other entrepreneurial ecosystem models to compete for prizes of \$50,000 each, totaling \$3.95 million. The competition aims to support the development of accelerators and startups in parts of the country where there are fewer conventional sources of access to capital.

New to this year's competition, SBA partnered with several other federal agencies—National Institutes of Health, National Science Foundation, Department of Education, and Department of Agriculture—to provide additional prizes to accelerators that assist entrepreneurs with submitting proposals for the Small Business Innovation Research and Small Business Technology Transfer programs.

Said Mark Walsh, Associate Administrator for the Office of Investment and Innovation: "Accelerators provide valuable resources to potential startups: a physical infrastructure to work in their

infancy, mentoring, business-plan assistance, networking, opportunities to obtain venture capital, and introductions to potential customers, partners and suppliers—all critical elements to ensuring that small businesses flourish and succeed. Last year's competition was so successful, we've added more federal partners including our very own Office of Native American Affairs and Office of Veterans Business Development to help bring more Native-American-owned, veteran-owned, women-owned and minority-owned small businesses into the fold."


For more information, visit www.challenge.gov.

(Contributed by SBA)

ASSISTING VETERANS IN BUSINESS




SBA this spring announced \$1.5 million in grant funding for six additional Veterans Business Outreach Centers (VBOCs), bringing the total number to 19 nationwide.



The funding, offered by SBA's Office of Veterans Business Development, enables each VBOC to provide entrepreneurial training, comprehensive business



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assessment, and mentoring to active duty servicemembers, veterans and service-disabled veterans, National Guard and Reservists, and military spouses interested in starting a small business. The six new VBOCs are the Center for Women & Enterprise, Providence, R.I.; University of Hawaii, Honolulu, Hawaii; Georgia Southern University Research & Services Foundation, Statesboro, Ga.; Cochise County Community College District, Sierra Vista, Ariz.; University of Texas at Arlington, Arlington, Texas; and MiraCosta College, Oceanside, Calif. Each award is made for a base project period of 12 months, with one 12-month renewal option.

"VBOCs are out front, synergizing the veteran small business ecosystem," said Barbara Carson, Associate Administrator, SBA's Office of Veterans Business Development. "We look forward to continuing to work with the centers to empower U.S. servicemembers, military spouses, and all eras of veterans in starting and growing small businesses."

VBOCs are responsible for supporting

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WBDC Chicago	Chicago, Ill.
Community Business Partnership	Springfield, Va.
Veterans Business Outreach Center at Mississippi State University	Starkville, Miss.
Hampton Roads Veterans Business Outreach Center	Norfolk, Va.
Veterans Business Outreach Center at Gulf Coast State College	Panama City, Fla.
Veterans Business Outreach Center at Fayetteville State University	Fayetteville, N.C.
VetBiz Central Inc.	Flint, Mich.
University of Texas Rio Grande Valley	Edinburg, Texas
New Mexico Veterans Business Outreach Center	Albuquerque, N.M.
Veterans Business Resource Center	St. Louis, Mo.
Business Impact NW	Seattle, Wash.
Veterans Business Outreach Center – Region IX	Sacramento, Calif.
Center for Women & Enterprise*	Providence, R.I.
University of Hawaii, Honolulu*	Honolulu, Hawaii
Georgia Southern University Research & Services Foundation*	Statesboro, Ga.
Cochise County Community College District*	Sierra Vista, Ariz.
University of Texas at Arlington*	Arlington, Texas
MiraCosta College*	Oceanside, Calif.

*New center, announced May 2016.



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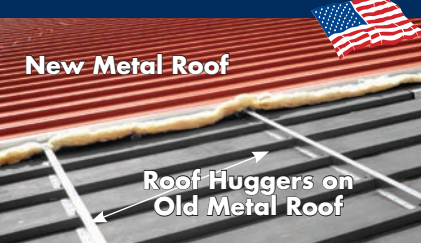
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transitioning servicemembers as they embark on self-employment or entrepreneurship. Part of the funding is used to cover costs involved in doing outreach to increase participation in the Boots to Business entrepreneurship training program on military installations.

Since 2013, Boots to Business has trained over 40,000 transitioning service members, Reservists and National Guard members, and military spouses. VBOCs also counsel and mentor 60,000 veteran clients each year.

For more information, visit www.sba.gov/vets.

(Contributed by SBA)

SUPPORTING SBIR & STTR PROGRAMS

Sen. Jeanne Shaheen (D-N.H.), Ranking Member of the Senate Committee on Small Business & Entrepreneurship, and Sen. David Vitter (R-La.), Committee Chairman, introduced legislation to make permanent the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs.

These programs, which help small

businesses develop innovative technologies that keep the U.S. economy competitive and address national security needs, are set to expire on Sept. 30, 2017.

The SBIR and STTR programs allow small businesses to support federal agencies in areas such as public health and national security. Before the programs were last reauthorized for six years, they endured 14 stop-gap extensions, which created unnecessary uncertainty.

(Contributed by Senate Committee on Small Business & Entrepreneurship)

PROVIDING ACCESS TO CAPITAL

Eligible small business owners now have more options to refinance eligible fixed assets and business expenses through the SBA 504 Refinance Program. SBA Administrator Maria Contreras-Sweet made the program permanent through an Interim Final Rule in The Federal Register released May 26, 2016.

This change will help small business owners ease their financial burdens while also creating incentives for potential

expansion and further job creation.

As outlined in the Interim Final Rule announcement, SBA began accepting applications from small business owners effective June 24, 2016.

Also, there is a public comment period for the public to make recommendations that SBA will review for further enhancements in the future. The comment period will end July 25, 2016.


“For some time now, we’ve been making the case for the 504 Refinance Program with lawmakers, and now small businesses will have access to \$7.5 billion under this program. Congress heard the combined voices of small business, lenders and SBA, and made the 504 Refinance Program permanent—a measure that I’m sure will prove essential in helping small business expand and strengthen the nation’s economy,” Contreras-Sweet said.

(Contributed by SBA)




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TeleEngineering Technology

By Larry Lynch, Rhonda Taylor and Jeff Williamson

Reprinted from: *The Military Engineer*
Vol. 91 / No. 600 • August-September 1999

Editor's Note: The following article "TeleEngineering Technology" by Larry Lynch, Rhonda Taylor and Jeff Williamson was first published in the August-September 1999 issue of *The Military Engineer*. The authors detail, just months before the Year 2000, the significant opportunity available to leverage "state-of-the-art communications technologies" to provide reach-back support to deployed engineers.

TeleEngineering is intended to link deployed uniformed engineers directly with non-deployed subject matter experts (SME) for the purpose of resolving engineering problems during the planning and execution of military missions. TeleEngineering exploits state-of-the-art communications technologies plus the expertise of SME's in the federal government—in its R&D and doctrine/training communities and in Corps of Engineers districts, divisions, and Centers of Expertise, for example—and the expertise in academia and private industry as well.

The U.S. Army Engineer Research and Development Center (ERDC), under the proponentcy of the U.S. Army Engineer School (USAES) is conducting a TeleEngineering operations technology demonstration.

TTP'S

One major objective of this demonstration is that of defining the tactics, techniques, and procedures (TTP's) needed for successful TeleEngineering Operations. The TTP's are being developed by providing the TeleEngineering support to specific warfighter exercises and limited real-world planning missions. Feedback from supported organizations is critical to assessing the value added by TeleEngineering. How requests for information (RFI's) are submitted to the TeleEngineering cell, who can submit RFI's, and how responses are sent to requestors are being addressed and refined as support is provided to deployed engineers. During planning of an operation, SME's can respond to requests only on the basis of assumptions and available data. Once an operation gets underway however, and assumptions can be verified with ground truth, the assistance of SME's can be both more "factual" and enlarged.

PACKAGES & DEVELOPMENTS

Another objective is to determine what types of investigative equipment or reconnaissance packages can be used, modified,

or developed and provided to the deployed engineer so ground truth data can be rapidly collected and provided to one or more SME's, thus increasing the confidence level of future responses.

The equipment and reconnaissance packages range from simple to sophisticated. For example, the dynamic cone penetrometer (DCP) is an easy-to-use device that provides data about the base course and subgrade strength of an airfield or a pavement. Such information is critical to determining the structural capability of airfields and pavements with respect to specific missions, and could be used to estimate the engineer effort required to sustain the mission.

The bridge reconnaissance data package, another example of a relatively non-sophisticated solution, contains definitions typically used by structural engineers to evaluate bridges, and guides photography of bridges, so needed measurement and construction information is gathered, allowing SME's to apply a more accurate military load classification to each evaluated/photographed bridge.

More sophisticated devices to assist TeleEngineering are in development. These include bore scopes and non-destructive evaluation devices that, due to their size, weight or construction, need to be made more portable and rugged. The Urban Robot (URBOT), a small robot for urban reconnaissance is another sophisticated, in-development device that shows great promise for TeleEngineering Operations.

CAPABILITIES

A broad spectrum of support can be accessed through TeleEngineering. These include expertise relevant to evaluations of flood and mud slide potentials and river and gap crossing sites, to stabilizing soils, predicting and mitigating cold regions phenomenology, assessing and repairing lines of communications, protecting forces from battlefield and terrorist threats, and site selection for logistics-over-the-shore.

The TeleEngineering research and development technology demonstration is now supporting the Corps' North Atlantic Division and the North Atlantic Europe District as they support U.S. Army Europe, the Army's V Corps, and the 1st Infantry Division in various planning missions. While the support has helped refine the way RFI's are submitted to and from TeleEngineering, the demonstration has confirmed that TeleEngineering does function on the Army's existing command and control architecture and it is scalable to meet requirements of deployed engineers.



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