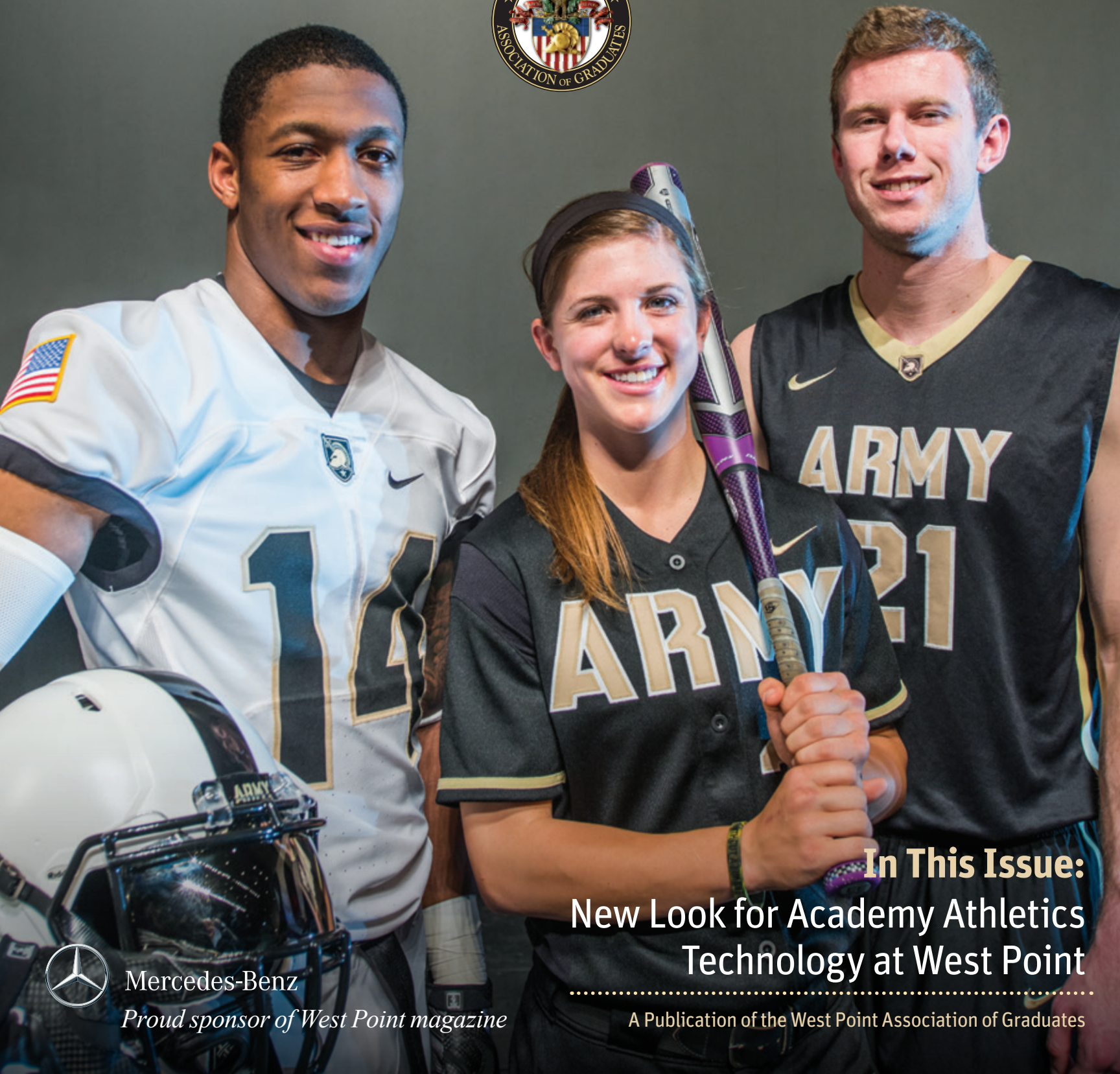


# West Point

SUMMER 2015



**In This Issue:**  
New Look for Academy Athletics  
Technology at West Point



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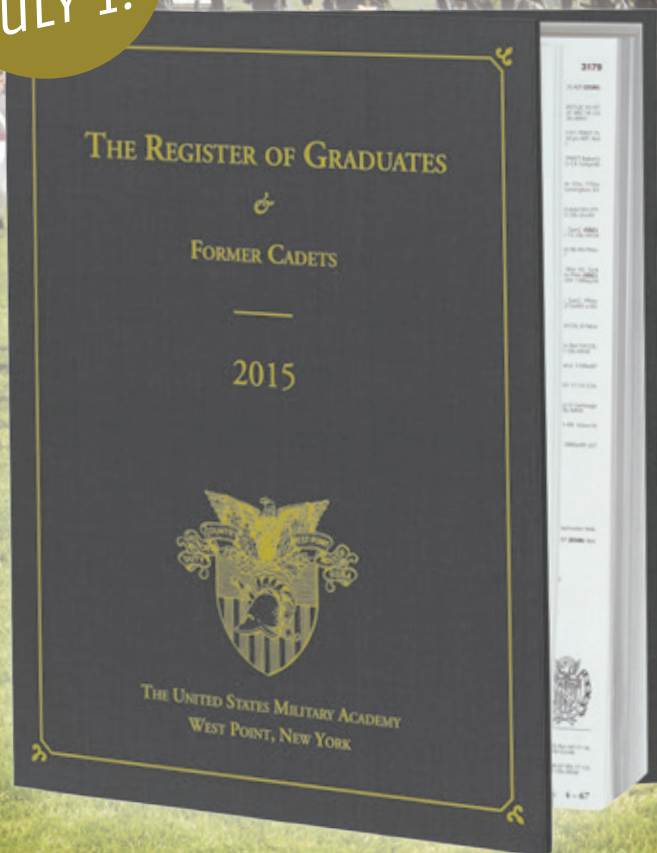
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# West Point

VOLUME 5, ISSUE 3 • SUMMER 2015

The mission of *West Point* magazine is to tell the West Point story and strengthen the grip of the Long Gray Line.

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## ON THE COVER

Chris Carnegie '15 (football), Kasey McCravey '16 (softball) and Kyle Wilson '16 (basketball) show off the new uniforms for their respective teams at the Army West Point Athletics unveiling of its new identity on April 13, 2015. Photo by Ted Spiegel.

## LETTERS

### Dear Fellow Graduates:

As you receive this magazine, the Class of 2019 will have just started its 47-month experience at West Point by reporting to the cadet in the red sash. Don't we all remember that day! We welcome them, and their families, to the larger West Point family, and I'm proud to say that WPAOG is now sending *West Point* magazine to all cadet parents, in addition to the Long Gray Line of graduates, free of charge. We look forward to your son's or daughter's graduation as much as you do, and hope you find the information we provide in this publication useful.

We particularly look forward to the Class of 2019 joining the West Point Association of Graduates, because on May 22, 2019, right around their graduation date, our alumni association will celebrate its sesquicentennial. What started out in 1869 as a small social and fraternal organization in New York City has grown to become a dynamic alumni association of more than 50,000 living graduates supporting West Point with their philanthropy and each other around the world with "The Grip"—that special shared bond of trust within the Long Gray Line. All graduates can expect to hear more about how we're going to mark our sesquicentennial as part of our strategic plan, which begins next year.

For over a century, one tangible example of The Grip among West Point graduates has been *The Register of Graduates*, a book that chronicles the entire Long Gray Line's collective history of service to our nation. George Cullum, Class of 1833, first published the *Register* in the late 1800s, and our most recent edition was printed in 2010. I'm proud to announce that later this year your WPAOG will again publish the *Register* and we hope you'll make plans to buy a copy. Going forward, we're also making plans to digitize all this historical data for researchers and future progeny to enjoy.

For the remainder of 2015, we're planning to FINISH STRONG in *For Us All: The Campaign for West Point*, by encouraging every grad to become a contributor to the Margin of Excellence at our alma mater. Since we began the campaign in 2009, more than 56 percent of all living grads have participated. That means over 40 percent of grads are missing out on being part of this historic campaign! I'm calling on everyone to help us push that percentage higher by finding someone—classmate, teammate or parent—who has not given and ask them to give to whatever fund, department, team or activity they want to support so we, the Long Gray Line, can ensure a strong finish to the campaign, as well as a stronger West Point in the future.

In closing, I want to officially welcome Elizabeth Barrett, who joined our staff in January, as our new VP of Communications and Marketing, and Rich Huh '94, who became our VP of Alumni Support in June. The venerable Jim Johnston '73 moved from his Alumni Support position to the newly-created WPAOG Secretary post in order to help the Board and me govern and manage your association. I know you'll enjoy getting to know each in their new roles, and we could not be more excited to have them on the team.

Again, welcome to the Class of 2019 and, as always,

West Point, for Thee!

Bob

Robert L. McClure '76  
Colonel, U.S. Army (Retired)  
President & CEO, WPAOG







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View the multimedia photo essay by Chris Pestel '03 about his fallen classmate Laura Walker '03.

From Your West Point  
Association of Graduates

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## West Point is on the cutting edge of educational technology and pedagogy, incorporating technology into each of our leader development programs, in particular our academic program.



Technology has become such an integral part of our daily lives that we don't even think about it. It's made our lives more convenient, both at work and at home. It has changed our lives, in ways too numerous to list.

For our cadets and even our younger graduates, this is the world they grew up in. They've never known a time without smartphones,

Twitter or YouTube. Instead of writing letters or making phone calls, they're more likely to text or videochat. Even the desktop computer is fast becoming a thing of the past with the popularity of ultra-thin laptops and tablets.

Technology has also changed how we learn, communicate and connect with the world around us, and it has certainly changed the nature of the profession of arms. So it's vitally important that, as the preeminent leader development and academic institution in the world, we understand how technology enables this generation to learn and leverage it, to prepare our graduates to lead and thrive in tomorrow's complex and technologically advanced environments.

West Point is on the cutting edge of educational technology and pedagogy, incorporating technology into each of our leader development programs, in particular our academic program. One such example is the very successful eBook *The West Point History of Warfare*. You may recall the popular large MilArt textbooks that found their way into many of our home libraries, and I bet many of you still have them in your homes. Today, we do not issue them any more. Instead, cadets are issued iPads with this digital, interactive eBook installed on them as part of the two-semester course "History of the Military Art." The eBook includes animated battle and campaign maps, interactive timelines and tactics, and embedded audio and video. It's changed the way cadets experience the history of the military art and has brought the way we teach military history into the 21st century. It's been very effective as we've seen a 46-percent increase of A's in the MilArt classes over the five-year average.

Not only has technology enhanced our curriculum, but also our curriculum has had to transform as a result of technology. Today's leaders are dealing with challenges we couldn't have imagined 20 or 30 years ago. Whether it's the use of social media in information warfare, the ethical considerations of using drones and other unmanned systems, or the increasing threat of cyber warfare, our graduates must be prepared to

face and overcome these challenges in an increasingly complex operational environment.

As the world's premiere leader development and academic institution, West Point provides innovative leadership for a number of the challenges facing both our Army and the nation. One of our strategic goals is to develop graduates who have the intellectual capacity, adaptability and agility necessary to understand and thrive in the Army's complex security environments. To that end, we often leverage the exceptional cadet and faculty talent resident at West Point to help solve problems of national significance and to assist in meeting the critical operational challenges and research requirements facing the Army and the Department of Defense. West Point is on the leading edge of finding solutions to many of these challenges, such as research projects aimed at advancing treatment for combat amputations or the Army Cyber Institute creating knowledge to enable effective cyber defense and cyber operations for the Army.

We've incorporated great tools to help educate and train our future leaders, but technology alone isn't enough. Our graduates must have the moral and ethical development necessary to ensure they are true leaders of character. While technology cannot replace character development, it can help enable its development. Technology can help us to communicate more effectively or learn another language, but it can't replace the ability to develop face-to-face relationships with other people. It can equip leaders to make them more effective toward mission accomplishment, but it won't replace the character our leaders need to make the decisions necessary to successfully accomplish a mission. So while understanding and using technology is important, developing leaders with a moral, ethical and values-based foundation remains the preeminent leader development task we continue to prioritize here. That's the true value we provide to the Army and our nation.

With the graduation of the Class of 2015, a new group of second lieutenants is now moving to their basic officer schooling and then on to their first assignments. Additionally, we received and welcomed the Class of 2019 on R-Day. Every graduate, whether in uniform or not, is important to the never-ending process of developing leaders of character. Whether you realize it or not, you are all role models for our cadets and ambassadors for this great institution. As always, thank you for all you do in supporting the Corps of Cadets and West Point.

Go Army! Beat Navy!

Robert L. Caslen Jr. '75  
Lieutenant General, U.S. Army  
59th Superintendent, U.S. Military Academy



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# Always Advancing: The Expanding Role of Technology at West Point

By **Keith J. Hamel**, WPAOG staff

The name “West Point” is synonymous with tradition. As Colonel Ty Seidule, Professor and Head of the Department of History, is fond of saying: “West Point has more history than any other school, period.” Although West Point honors its 200-year history and traditions, it is also constantly changing in its pursuit of excellence. Whether implementing curriculum innovations, eliminating mandatory chapel attendance, admitting women to the Academy, allowing cadets access to the Internet or introducing a new identity system for the sports teams of the United States Military Academy (read more about this development starting on p. 22), West Point’s “preserve/transform” dialectic always balances out in the end, because today’s change becomes tomorrow’s tradition.

Technology—a catalyst of recent disruptive change in education, society, the economy and the armed services—has also driven significant change at the Academy. Founded as America’s first

engineering school, West Point continues to pioneer a path in training cadet leaders to understand and use technology to keep up with the rapidly evolving needs of the Army and the nation.

As this issue of *West Point* magazine illustrates, technology now makes an impact on every pillar of cadet development. Academically, cadets are using cutting-edge technological equipment and processes (“Cutting-Edge Technology Helps Unlock Solution to Cadet Chapel Conundrum,” p. 34) or making an impact on technology innovations themselves in their capstone research projects (“Limb Preservation and Prosthetic Sensation,” p. 28). Militarily, cadets use educational technology to learn important counseling and leadership skills through the Emergent Leader Immersive Training Environment virtual program (“The ELITE Solution,” p. 11), while the Army Cyber Institute is supporting members of The West Point Cadet Competitive Cyber Team, which annually participates in several technologically advanced collegiate cybersecurity competitions

LTC William Schustrom, Director of the West Point Simulation Center, dons the Oculus Rift goggles.



## VBS3 supports the following training tasks and more:

1. Integrate indirect fire support
2. Conduct an attack
3. Conduct a defense
4. Enter and clear a building
5. Breach an obstacle
6. Conduct convoy security
7. Conduct a roadblock and checkpoint



**Inset:** The stereoscopic view inside the Oculus Rift goggles on a two-dimensional screen.

(“West Point’s Role in Shaping the Cyber Force,” p. 19). Physically, the Army West Point Football Team is using technology to measure and improve the performance of its players (“Using Big Data to Optimize Athlete Performance,” p. 38). And, ethically, several West Point officers are challenging cadets to consider the pros and cons of autonomous weapon systems (“West Point Debates Ethics of Autonomous Weapon Systems,” p. 14). But there is one place at West Point where technology touches all four of the above areas—the West Point Simulation Center.

The mission of the West Point Simulation Center (Sim Center) is “to educate, train and inspire the Corps of Cadets through the design, development and application of full-spectrum simulation training programs.” Officially housed within the Department of Military Instruction (DMI), the Sim Center’s primary focus is military training via simulated combat and field scenarios. Yet, the Sim Center also supports instructors and research across numerous academic departments, including the Department of Behavioral Sciences and Leadership, the Department of Foreign Languages and the Department of Geography and Environmental Engineering. The Sim Center even offers support to West Point Garrison organizations such as Keller Army Community Hospital, West Point Military Police and the USMA Band. As stated by Lieutenant Colonel William Schustrom, Director of the West Point Simulation Center, “The Sim Center provides a research platform to any cadet group, department or organization within USMA as a laboratory in pursuit of innovation and technology.”

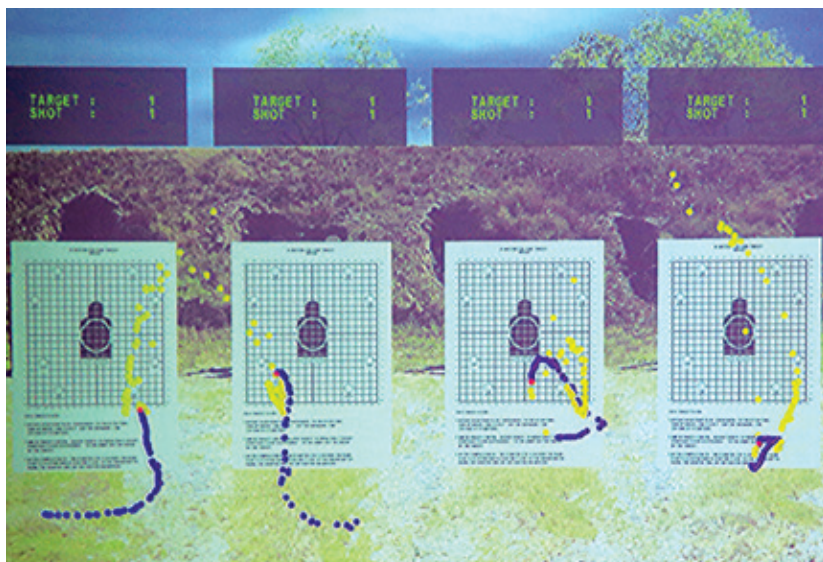
So, what technology does the Sim Center offer? At present, it offers a 2,100-square-foot computer lab in Washington Hall capable of hosting 40 computer terminals that run a variety of training simulation programs. The most used program is “Virtual Battlespace 3” (VBS3), the Army’s leading training game. According to Victor Castro, Simulation Manager for the West Point Simulation Center, VBS3 is akin to a “3D digital sandbox.” “I can create any scenario needed to train for a specific situation,” Castro says. “Furthermore, its real-time editor option allows me to alter the battlespace during the game’s mission in order to see how cadets react to certain stressors.” Promotional literature for Bohemia Interactive Simulations, the software developer of VBS3, states that VBS3 has a growing content library of more than 9,000 assets (avatars, equipment and environmental factors), realistic buildings and terrains, and more than 100 combined arms training tasks for both mounted and dismounted operations involving the individual Soldier up to company-level collective maneuvers (see graphic on p. 6). Given this level of design sophistication, realism is a hallmark of VBS3. The program even has the capability to allow customized modeling of human dimensions. While the Sim Center does not utilize this feature now, it could allow future cadets to personalize avatars with their individual characteristics, including height, weight, Army Physical Fitness Test scores and weapons qualification scores. Upon doing so, cadets will realistically see how their physical fitness level would affect their avatar’s fatigue level on the battlefield. Yet, according to Castro, what sets VBS3 apart from other realistic



Cadets in DS320: Landpower conduct a VBS3 mission.



battle games, such as those in the “Call of Duty” series, is the reality of consequence. “There is no ‘reset’ in VBS3,” he says, “If you get killed, the screen goes blank and says, ‘You’re dead,’ and you are not allowed to help your team fulfill its mission.” While VBS3 might be a game, it is training users to understand that war is not.



Marksmanship training on the EST2000. The yellow and blue dots show the position of a cadet's gun two seconds before and two seconds after target impact.

The Sim Center offers four additional training simulations. One of these programs is “Follow Me,” which is used in MS200: Fundamentals of Army Operations to teach military tactics by giving a cadet control of the icons for three squads and two machine gun teams on a 2D map surface. “The cadets maneuver these elements on a simulated battlefield to see what it is like to make critical decisions,” says Castro. Vincent “TJ” Tajeron, the former Chief of the Warfighting Simulations Center (or WARCEN, which is what the Sim Center used to be called) who introduced “Follow Me” to USMA in 2008, defined the program as challenging cadets to meet three objectives: “rapidly assessing a dynamic situation, making sound decisions and effectively directing subordinate units.” Following the 20-minute exercise, the instructor selects a number of cadets to brief the class on their decisions while these are screened for the class using the program's after-action review feature. The Sim Center also offers “Call-For-Fire Trainer II,” which teaches cadets the proper procedures for requesting indirect fire, and the “Virtual Battlespace Land Navigation Trainer,” which models West Point's terrain (based on global positioning system data and accurate within one meter) and allows new cadets to simulate traversing a plotted course before actually performing it as part of Cadet Basic Training. “It's a digital terrain walk,” says Castro, “and new cadets have a chance to see the exact grid they created in class and, with the help of their avatar, get an idea of what a hill looks like or what a spur looks like while virtually navigating to their plot points on that grid, which helps reduce potential injury, exposure or anxiety when they really conduct land nav.” The Sim Center's fourth training simulation is the ELITE Counseling trainer (see article starting on p. 11).

The Sim Center also runs a virtual weapon firing simulator, the Engagement Skills Trainer 2000 (EST), in a separate room from its

computer lab. Comprised of 10 firing lanes, high-resolution LCD projectors and two screens that run the width of its room's wall, the EST supports three modes of weapons training: marksmanship for individual and crew-served weapons, fire team collective core exercises, and judgmental use of force (shoot/don't shoot scenarios that challenge the understanding and application of rules of engagement). Typically, cadets training on the EST fire M4s and M16s that have been modified for digital shooting, but maintain the action, recoil, sound and feel of the real weapons. Yet, the EST can actually support 38 different weapons, nearly every weapon in the Army's arsenal, from the M9 pistol to the M2 .50 caliber heavy machine gun, and they all fire the same “ammunition.” All the weapons “shoot” an infrared laser beam that provides immediate hit-miss feedback to the shooter and, for training purposes, shows the instructor the movements of shooter's gun barrel two seconds before and two seconds after impact. Interestingly, weapons proficiency is not the only benefit to the EST. “It also teaches senior cadets how to secure a resource for training their units,” says Castro, “which is something they'll have to do in the Army as leaders.” Firsties often turn to the EST when they need to supplement the military development of their cadet company during the academic year, and they are required to do so when covering Preliminary Marksmanship Instruction during Cadet Basic Training. Castro says, “They have to negotiate the logistics of how to get all the new cadets in their company through the EST before heading out to the live-fire range: provide a plan, assign operators, block out parts for instruction and manage the timeline for the EST.” In this regard, the EST offers multiple levels of training simultaneously: it is a military exercise for new cadets as well as a leadership exercise for their cadre.

While the Sim Center's current training and virtual simulations are already impressive, technology at the Center is poised to evolve into something even more amazing. “We are moving more towards immersion at the Sim Cen,” says Castro. In other words, the Sim Center is looking at ways to move beyond the computer screen and blur the line between the physical world and the virtual world. One such technology is the Dismounted Soldier Training System (DSTS). According to Schustrom, “The DSTS is a virtual trainer focused on individual Soldiers and squad-level training that brings gaming technology into a virtual, 360-degree training environment using untethered weapons.” The Sim Center acquired DSTS in the fall of 2014, on loan from Fort Bragg, North Carolina. The system consists of a control center (which includes a network computer, two ultra-strong wireless nodes, and stations for staff and communication) and nine user modules. Each module includes a highly sensitive head gyro, a head-mounted display, a three-point arm sensor, a hip sensor, a voice command microphone and a computer backpack that processes and displays the 3D virtual environment to the user's headgear. “Given the weight of its four batteries, the computer is like carrying a rucksack,” Castro says. After putting on the system, the user stands on his or her own four-foot Haptic feedback pad (similar to those seen underneath barber chairs). DSTS works similarly to EST's three modes of weapons training, but it is more immersive. For example, thanks to a radio-frequency identification tracking system in the arm sensor, users can virtually throw grenades or employ Claymore mines. Users can also



# ENDURING LEADERSHIP



Boeing is proud to partner with the U.S. Military Academy at West Point, U.S. Naval Academy at Annapolis, and U.S. Air Force Academy at Colorado Springs on a program of leadership development and engineering education. By providing financial support and real-world engineering experience, we're committed to helping shape leaders of character to better serve our nation and the world.





“walk” in the program’s environment thanks to a joystick control on their weapon and interact with civilians and combatants, explore terrain, and perform tactical maneuvers to complete a particular mission. Right now, the Sim Center has not introduced DSTS to the military science program, but cadets majoring in Engineering Psychology have been using DSTS to conduct a study to see to what degree the Kevlar pads designed for the female warrior take into consideration Army regulations for female hairstyles.

Another immersive system waiting to be used is the Oculus Rift virtual reality head-mounted display and Omni treadmill. According to the Oculus website, “The Rift uses custom tracking technology to provide ultralow latency and 360-degree head tracking, allowing its wearer to seamlessly look around the virtual world just as he or she would in real life, with every subtle movement of the user’s head tracked in real time to create a natural and intuitive experience.” Paired with the Omni, a low-friction, concave-shaped treadmill that allows harnessed users to traverse virtual worlds by naturally using their own legs and feet, the Oculus Rift could revolutionize the way the military conducts its simulation training. “I am very excited about the possibilities afforded with this technology,” says Castro, “and with this system, affordability is the key.” While a DSTS suite runs a total of \$554,000, one can buy the off-the-shelf Oculus Rift for \$350 and the Omni treadmill for \$699. “The only thing holding this technology back right now from the Sim Center is programing specific to Army tasks,” says Castro, “but it’s coming.”

Another technology coming to the Sim Center is the CAVE, or Computer Assisted Virtual Environment. Instead of having to wear a cumbersome head-mounted display like with DSTS or the Oculus Rift, users of the CAVE wear simple 3D glasses and are placed in an environment where projectors are directed to screens that make up the sides of the room (floor and ceiling included). “Think of the holodeck from ‘Star Trek,’” says Castro. “It’s as close as we can get to that concept with technology we have today.” According to Castro, the CAVE is a Superintendent’s priority, and the Sim Center hopes to have all the equipment in place for this technology by the end of the year. With the CAVE, DMI will be able to conduct virtual staff rides. “Cadets will virtually be able to stand in the same spot as a field commander and see what he saw before a battle,” says Castro. What’s more, the Sim Center has approached technology from an immersive learning perspective so that nearly all the systems it uses will be able to interact. “Cadets in three different locations will be able to conduct the same ambush mission—those in the CAVE will be serving as the virtual TOC, platoon leaders and support

elements will be monitoring the mission on VBS3, and cadets in the EST will be shooting in real time,” Castro says. “They will all be interacting with the same images via their own particular technology.”

The benefits of simulation training cannot be overemphasized. “Cost and safety are the most easily defined positive attributes of simulations,” says Colonel Glenn Goldman ’84, the former Director of DMI. “When one considers the cost of transporting Soldiers to the field, the cost of ammunition, logistical requirements and additional training overhead costs, the benefits of simulations are readily apparent.”

Simulation also fits in well with the Army’s “crawl-walk-run” method of training, which rests on the principle that repetition leads to confidence, and confidence leads to mastery. “We are the middle step between the classroom and the field,” says Castro. “There’s a big difference between learning about tactics and actually performing them while on patrol, or seeing a terrain map of Afghanistan and actually negotiating its mountains, and the Sim Center helps bridge this gap by serving as the ‘walk’ stage.” The Sim Center can train cadets on nearly every pre-commissioning training task via simulation and do so efficiently. According to Castro, the Sim Center can train up to 1,200 individuals in just nine days. Given all that it is doing now and will do in the future, the Sim Center is a state-of-the-art facility that is helping to make “West Point” synonymous with technology. ★



U.S. Soldiers assigned to the 412th Aviation Support Battalion conduct training using the Dismounted Soldier Training System (DSTS) that is similar to the training USMA cadets will receive when the Sim Center introduces DSTS to USMA’s military science program.

# THE ELITE SOLUTION



## *High-Tech Simulation Solves a High-Touch Training Challenge*

**M**ilitary Leadership (PL300) is a required course designed to teach each cadet the fundamentals of leadership in an organizational context and to help “define and inform his or her own personal approach to leading.” In the past, cadets in PL300 learned leader counseling skills through role play, and the course director paired over 600 cadets per semester with volunteer officers and NCOs for mock counseling lab sessions. Each volunteer lab partner then had to provide feedback on the cadets’ performance to the instructor. This system proved impossible to standardize in order to deliver a uniform, structured learning experience for each cadet and to provide objective, fair feedback.

Although faculty agreed that cadets need to learn face-to-face techniques for counseling soldiers under their command, the uncertain learning value of this type of volunteer-assisted role playing exercise led to the cancellation of USMA’s counseling lab unit of PL300.

Today, an innovative educational technology has made it possible for the Department of Behavioral Science and Leadership to return counseling skills to the curriculum. They have discovered a high-tech solution to one of the most “high-touch” leadership interactions: counseling soldiers who face real-world problems.

In 2014, the current PL300 Course Director, Lieutenant Colonel Darcy Schnack ’96, introduced a developing technology into the

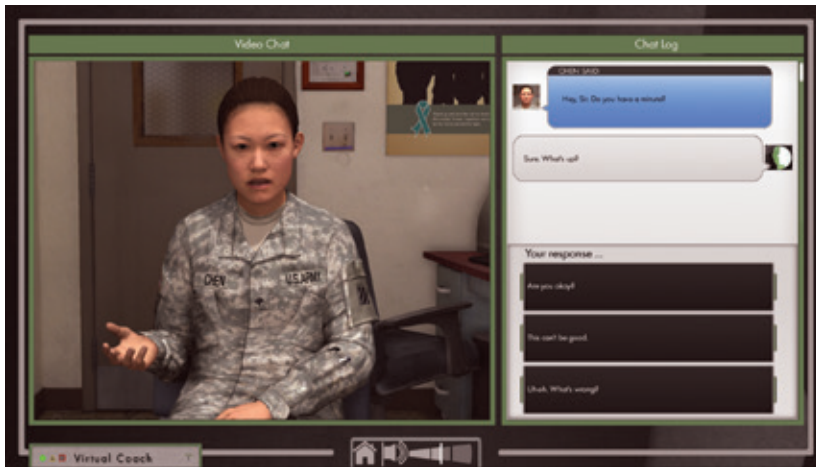
curriculum: a counseling simulation called the Emergent Leader Immersive Training Environment (ELITE). ELITE is a program developed by the University of Southern California Institute for Creative Technologies (ICT). ICT is an Army-sponsored University Affiliated Research Center, managed by the Army Research Lab, with a focus on creative technologies for training, education and health therapies. ELITE is an educational counseling simulation program developed in collaboration with the Army Research Lab’s Simulation and Training Technology Center, TRADOC Capability Manager for Gaming, Center for Army Leadership, Sexual Harassment/Assault Response and Prevention Program Management Office, and the Maneuver Center of Excellence at Fort Benning, Georgia.

ELITE offers an instructor-led program to help “young Army leaders learn, practice and assess interpersonal skills specific to basic soldier counseling, such as active listening.” ELITE was developed in 2010, and the first prototype was installed at Fort Benning’s Maneuver Center of Excellence in late 2011. With ELITE, West Point cadets can now interact and play the role of a commanding officer with virtual soldiers in order to practice their counseling and mentoring skills. ELITE instructional scenarios reflect real-world challenges faced by soldiers, such as financial troubles, post-deployment readjustment, substance abuse, and sexual assault and harassment.

**Above, left:** An introduction to the ELITE exercise explains the role of the “Virtual Coach.” **Right:** Cadets select their responses during a collective ELITE exercise.



With the traditional role-playing model, there were a wide range of unpredictable interpersonal dynamics that affected learning outcomes that are not present when dealing with a virtual soldier in the ELITE counseling simulation. According to ICT's review of pedagogy in this area, "There is high cognitive load on novices trying to remember the skills they have learned and use them in the correct way. The untrained role players may not engage in conversation that allows the skills to be used, and there is no way to control the interaction to provide a stable practice environment."



Screenshots of in-progress ELITE counseling scenarios and an after-action review.

The virtual human soldiers in the ELITE simulation provide this critical "stable practice environment" for cadet learners and offer a way to "demonstrate complex interpersonal skills and track them in a structured way." ELITE provides a more efficient way to teach leader counseling skills and to objectively measure learning outcomes. Instructors can benchmark cadet progress by conducting a baseline interaction exercise at the beginning of the semester and measuring progress against that baseline. After a class on active listening skills, cadets will have a second practical exercise, and by the end of the course, they should become measurably better counselors.

There are two different counseling models built into ELITE: I-CARE for soldier performance problems, and LiSA CARE for personal problems (see graphic on page 13). According to Rich DiNinni (West Point's resident ICT representative) the underlying principles can be mapped back to learning goals in Army-approved doctrine in *FM 6-22, Army Leadership*. During the simulation, an "intelligent tutor" will pop up on the screen to mentor the cadet to correct inappropriate responses or to indicate when the session is heading in an undesirable direction. Structured after-action reviews at the end of the session then provide instant feedback, showing where the cadet could have performed better.

The instructor introduces ELITE in a classroom setting via an interactive demonstration that works like a multiple choice test. At each interaction with the virtual soldier, the cadets choose one of three possible programmed responses. Often one response is an obviously poor—if not outright silly—choice, but even a 'wrong' response serves to make cadets think about how they could respond appropriately. Independently, the cadets use a remote control device to "vote" or choose a response in the scenario and together, in real time, they can see class choice percentages for each selection and discuss them. Pauses in the game are potential points for class discussion. For example, if there is a near tie between responses chosen, or when they don't like any of the responses, it makes them think harder about what they would say and, even further, why they would respond that way. There is even value in picking the wrong answers. ELITE makes the cadets think about how they would perform in a counseling situation.

Simulated body language and facial expressions of the soldier in the ELITE animation help it seem more real and cadets get a real-time response from the system.

In addition to the group classroom exercise, cadets also work individually with ELITE in the West Point Simulation Center. An added benefit is that ICT programmers can gather data to improve future iterations of the program. DiNinni says, "The experience of the instructors and cadets is fed back to our team and helps inform enhancements to the system."

When Schnack wanted to bring counseling back into the Military Leadership curriculum, she explored different approaches to support the instruction. She credits Engineering Psychology Program Director Colonel James Ness for introducing her team to DiNinni and ELITE. Ness was working with DiNinni and



Cadets discuss the suitability of the proposed responses in an ELITE scenario.

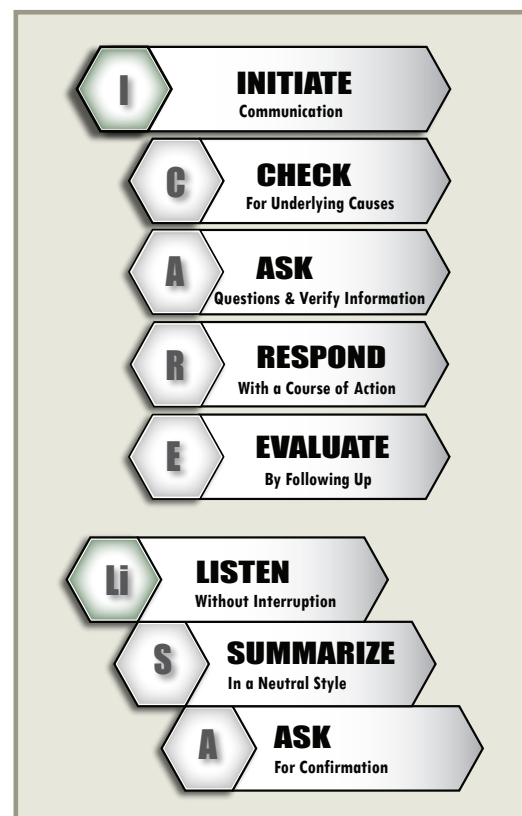
ICT on several other projects, and Schnack says “none of this would have happened without him.” DiNinni adds that Ness has been “instrumental in providing access to the Sim Center for an entire week during each of the lab assignments and helping get ELITE loaded and maintained on all the computers.”

In a colloquium to present ELITE to her colleagues in the department, Schnack presented a brief historical summary of the mixed record of the cadet counseling lab, and then led a demonstration of the new ELITE counseling simulation. Rather quickly, it was clear to see how passionate the faculty was about teaching leadership. After initiating their remote controls, the group went through a brief run of the program. Even among a roomful of experts, ELITE generated stimulating and informative discussion about counseling soldiers. Schnack likes to point out that ELITE is designed to enhance existing training, not serve in a primary role.

Says DiNinni, “Working with Colonel Schnack and her team has been a great experience. Her approach to employing ELITE to supplement classroom instruction is a model for how this type of instructional technology can be very effective.” ★



Watch a video about the ELITE program as presented at Fort Benning.



Mnemonic devices for the two counseling models built into ELITE. I-CARE and LiSA CARE are based on doctrine in FM 22-6, Army Leadership.





# West Point Debates Ethics of Autonomous Weapon Systems

By Keith J. Hamel, WPAOG staff

This summer, millions of moviegoers will hear Arnold Schwarzenegger utter his signature line, “I’ll be back,” in “Terminator Genisys,” the fifth film in the science fiction franchise that pits humans against successive models of the title cyborg assassin. Ever since the original “Terminator” hit screens in 1984, people have pondered the possibility of future autonomous killer robots. Some believe that such weapons are already a reality, especially since the military has started to replace humans with machines on the battlefield. Drones, for example, have been used in 456 strikes during the War on Terror, and many experts believe that fully autonomous weapon systems, ones that could select and engage targets without human intervention, could be deployable in 20 to 30 years. Militaries may turn to these systems because they require less manpower and keep Soldiers out of harm’s way. On the other hand, critics like Human Rights Watch (HRW), an international non-governmental human rights organization, believe that replacing humans with robots would make it easier

for nations to go to war and would remove accountability for unlawful actions.

Which side is right? For the past year, several officers and cadets at the United States Military Academy have taken different paths to explore each side of this debate in an effort to answer this very question.

Last summer, Major Sean Dansberger ’02, from the Department of English and Philosophy, led Cadets Andy Foster ’16 and Rachel Kenagy ’16 on a two-week Advanced Individual Academic Development (AIAD) trip that explored the potential of autonomous systems and considered how these systems will impact the ethical dimensions of warfare. The husband and wife team of Paul Mango ’81 and Dawn Rucker ’82 funded this AIAD as part of West Point Academy Scholars Program, which offers experiential learning opportunities that enhance cadets’ education and leadership. The cadets travelled to Carnegie Mellon

University's Robotics Institute in Pittsburgh, PA, to the Defense Advanced Research Projects Agency (DARPA) in Arlington, VA, and to Boston Dynamics in Waltham, MA. Before this AIAD, the cadets admit that they didn't know much about robotics and had only briefly touched on the ethical arguments involving drones during the "just war theory" lesson of Philosophy 201. "I had very little knowledge about the topic going into the AIAD," says Kenagy, "but I learned so much at each of the locations we visited." Regarding the potential of autonomous systems, Foster says that he learned the most from the Robotics Institute, "especially how robots have military applications." For the ethics portion of their AIAD, the cadets read and discussed literature from figures such as HRW's Bonnie Docherty, who regularly briefs members of the United Nations on the topic and who gave a presentation titled "The Ethics of Killer Robots" at USMA in 2013. At the end of the AIAD, the cadets wrote a white paper that synthesized what they had learned. "In general, our thesis is that autonomous weapon systems will drastically change the everyday tasks of Soldiers and challenge how they make ethical decisions," says Kenagy. Foster also reached his own personal conclusion: "Autonomous weapon systems have great advantages for any military, but there should always be a baseline level of human control to mitigate the chance of the machine making a wrong decision."

Dansberger became interested in the ethics and autonomous weapon systems topic after working with defense contractors on the battlefields of Afghanistan. "A weapons threshold seems to have been crossed given the newness of drones and the like," he says, "and while part of the debate concerns how far this technology can actually go, it is unwise to bet against technology, so it is useful to argue the sides now." According to Dansberger, who also credits P.W. Singer's 2009 book *Wired for War: The Robotics Revolution and Conflict in the 21st Century* for his interest in the topic, the current debate is analogous to the decades-old debate over the use of nuclear weapons and asks the same questions posed by every new technology that ups the ante in the game of war: that is, asking not only what is possible but what is proper. But whereas the atomic bomb changed the "how" of war, Singer suggests, and Dansberger agrees, that robots and autonomous weapons systems will also change the "who" of war. It is assumed that human operators will remove themselves from the kill/no-kill loop and grant these weapons systems the capability to make lethal decisions on their own. "And critics believe there is something undignified about an emotionless machine being able to make kill decisions or to inflict violence on its own," says Dansberger.

To familiarize more cadets with the terms of this debate, Dansberger helped organize "Killer Machines: A Faculty Panel on the History, Law, Strategy and Ethics of Drone Warfare," which was hosted by the Philosophy Forum last October. "It is important

to impress upon cadets how this is a different world, with different capabilities, and how actions on the battlefield have changed as a result of autonomous weapons systems such as drones," he says. Approximately 50 cadets and faculty members attended the panel, which Dansberger says is on the high end for attendance to a Philosophy Forum event.

Yet, Major Matt Cavanaugh '02, Assistant Professor of Defense & Strategic Studies, who was one of the presenters on the panel, believes there is room for more cadets to get involved with the topic. Cavanaugh also believes that cadets who are involved need to become more self-critical to adequately understand the ethics involved with autonomous weapons systems. "They need to understand that the rest of the world does not share the same rosy view of technology as they do," he says. During the panel, Cavanaugh told cadets that when he was down range his units must have looked like aliens to local populations. "It was hard to get locals to trust us while we were wearing 30 pounds of gear and carrying massive weapons of war," he says, "and it will be even

**"Autonomous weapon systems have great advantages for any military, but there should always be a baseline level of human control to mitigate the chance of the machine making a wrong decision."**

— CDT Andy Foster '16



**Previous page:** Carrying Hellfire missiles and capable of nearly 24 hours of flight, General Atomics MQ-1 "Predator" drones have logged more than 1 million flight hours for the U.S. Air Force and CIA since being introduced in 1995 and have seen combat in Afghanistan, Bosnia, Iraq, Somalia and five other countries. **Right:** COL Lisa Shay '89 examines ARIBO-IH (Applied Robotics for Installation & Base Operations-Industrial Hygiene), a robot that senses environmental hazards, which was a capstone project for cadets from the Electrical Engineering & Computer Sciences (EE&CS) program.





MAJ Sean Dansberger '02, CDT Andy Foster '16 and CDT Rachel Kenagy '16 with Tartan Rescue's CHIMP at the Carnegie Mellon University's Robotics Institute in Pittsburgh, PA.

more difficult to get them to accept the narrative we want them to adopt when we are using robots to engage them." To counter this, Cavanaugh believes that the Army needs to move beyond the cumulative effect operations (individual actions that are not sequentially interdependent) seen with drones and couple them with a sequential military or informational operation (a series of actions in which the success of one depends on the action that preceded it). "Drones are just another in a long line of technical weapons that increase standoff ability and should neither be glorified nor demonized," he says, "and while drones have been effective in killing certain agents, they haven't achieved the desired end state, often times inspiring two new enemies for every one killed." Going forward, Cavanaugh says that the cumulative effects of any autonomous weapon system, or its technological ability to destroy, must take a backseat to a sequential strategy that considers how these agents of war are achieving their goals. Putting it another

way, Cavanaugh says, "The Army has and will have in the future the technology to effectively destroy enemy equipment and combatants, but technology alone is useless when it comes to coercing or compelling a group's willingness to carry on the fight in the first place."

Looking to combine Dansberger's ethical concerns and Cavanaugh's strategic ideas with his own interest in the technical aspects of autonomous weapon systems, Lieutenant Colonel Chris Korpela '96, Assistant Professor of Electrical Engineering and Computer Science, formed a working group in December 2014 that seeks to collaborate across all of USMA's departments on this topic. "There are lots of interesting projects involving autonomous weapon systems, such as drones and robots, happening within various departments at USMA," Korpela says. Tentatively titled "The Unmanned Systems Working Group," his team is exploring

**"... 43 other countries, such as China and Russia, have replaced a Cold War-style arms race with a high-tech algorithm race."** — LTC Chris Korpela '96





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the possibility of incorporating robotics across the USMA curriculum, much like the way the Core Interdisciplinary Team introduced energy security into plebe and yearling courses approximately three years ago. “Robotics has the potential to be interdisciplinary,” Korpela says, “and it is important to get more cadets involved with the designing, building and testing of these systems, as well as with their social, economic and political implications.” Even though Korpela believes it is unlikely that the world would ever experience the nightmare scenarios depicted in movies like the “The Terminator,” he thinks it is important for the Army to start considering all the factors involved now. “If for no other reason than 43 other countries, such as China and Russia, have replaced a Cold War-style arms race with a high-tech algorithm race,” he says, “with each country working furiously to see whose technology can anticipate potential conflict situations faster and more efficiently.” Korpela also believes that there is no better place to debate the merits of unmanned weapons systems than at the Academy, which has the resources and thinkers in place to take the lead in reaching unbiased conclusions about these systems. It is a curriculum change that cadets would seem to welcome too. “I think autonomy or robotics would be a great topic to discuss at USMA because it spans so many fields,” Foster says. With more cadets and faculty involved, perhaps West Point could help resolve the autonomous weapon systems debate before Hollywood turns Schwarzenegger, the now 67-year old actor, into an actual robot just so “he’ll be back” for more “Terminator” sequels. ★



Another team of cadets from EE&CS presents their capstone project: The VTOL/ISR Quadcopter. This “vertical takeoff and landing” platform is capable of autonomous patrolling, landing and recharging.

MAJ Matt Cavanaugh '02 demonstrated EE&CS's DJI Phantom 2, a quadcopter capable of taking crisp pictures and smooth video, near the Plain.







# West Point's Role in Shaping the Cyber Force

By CPT Brent Chapman '09 and  
MAJ James Finocchiaro '99, Guest Writers

A commitment to cadet education in the engineering and science disciplines has been a hallmark of the United States Military Academy since its inception. Driven by the West Point Mission, faculty at USMA have been educating, training and inspiring cadets to become leaders and world-class experts in the cyberspace disciplines for almost two decades. In recent years, as the nation and the Army have increased their dependence on information systems, West Point quickly realized that the security of those information systems was critically important.

**Above:** Cadets monitor network traffic for evidence of intrusion during the 2015 National Security Agency Cyber Defense Exercise.



The study of computer and network security at USMA formally began in 1999 via the Information Technology Operations Center (ITOC), a research center devoted to cybersecurity studies in the Department of Electrical Engineering and Computer Science (EE&CS). This center was well positioned to enhance the cadet experience through capstone projects and Advanced Individual Academic Development (AIAD) opportunities. ITOC received significant support from EE&CS, the Department of Social Sciences, and a wide variety of departments and centers across the Academy and had tremendous success, earning recognition from senior Army leaders and agency partners such as the National Security Agency (NSA), the National Reconnaissance Office and the Defense Advanced Research Projects Agency. In 2012, the Dean of the Academic Board, Brigadier General Timothy Trainor '83, approved renaming ITOC as the Cyber Research Center (CRC) to parallel the newly formed U.S. Cyber Command and Army Cyber Command.

The CRC consists of educators dedicated to researching and teaching information assurance as well as computer and network security. One initiative in cyber education is the sponsorship of cadet cyber teams. The West Point Cadet Competitive Cyber Team (C3T), for example, is an all-volunteer club that participates in national-level collegiate cybersecurity competitions. In these competitions, team members use their skills in computer network attack and defense to recover their opponent's digital tokens, or flags, while denying their opponents the ability to do the same. Winning these competitions requires technical skills and teamwork. West Point's C3T team recently reached the final round of the New York University's Cyber Security Awareness Week

Capture-the-Flag competition, keeping pace with leading institutions such as MIT, Carnegie Mellon University, Rensselaer Polytechnic Institute, Georgia Tech and the University of California, Berkeley. While educational exercises, these events also serve to expose cadets to the latest cyber challenges and prepare these future officers to conduct cyber operations while in the Army. The CRC's efforts in providing continual advancement in cyber education through course design and team support have enabled West Point to earn the designation as an NSA Center of Academic Excellence for cyberspace operations, a designation held by only a handful of undergraduate institutions.

The dynamic nature of cyber security demands nothing less than a continuous effort to evolve techniques, tactics, procedures and user education. As cyber attacks become an increasingly regular occurrence, understanding the mechanism and motivations behind such aggression becomes critical. Already postured to address these challenges after decades of forward-thinking research and education, in 2012 USMA answered the Army's recent call to create the Army Cyber Institute (ACI), a strategic initiatives group located at the south end of post. In October of 2014, the Secretary of the Army, the Honorable John McHugh, delivered the keynote address during the ACI's ribbon cutting ceremony. "In the past few years cyber has escalated from a [Department of Defense] issue of moderate concern, to one of the most serious threats facing our national security..." McHugh said. "That's why at this institution, the Army Cyber Institute is so welcome and vital to our Army and our nation." The ACI, under the direction of Colonel Gregory Conti '89, employs doctorate-level experts in cyber operations, members of the Cyber Mission Force, political scientists, lawyers,

ethicists and even historians. The ACI has been raising the overall level of cyber competency in the Army, the DoD and the nation by conducting focused long-term research and outreach to academia, government and industry partners. The organization's interdisciplinary approach brings a fresh perspective to national-level policy issues. "I think we're building a unique team," Conti said during the grand opening ceremony. "People think of technology, and maybe policy, but it's never been done before in this holistic way." Members of the ACI have teaching roles in multiple academic departments. These members not only bring the most recent cyber experience from the force to cadets and faculty, but also benefit from a broader understanding of the issues in cyberspace by being immersed in various disciplines. In this model, Conti achieves what

Secretary of the Army Hon. John McHugh, ACI Director COL Gregory Conti '89 and USMA Superintendent LTG Robert Caslen '75 cut the ribbon in the official opening ceremony for the Army Cyber Institute.



he describes as a “cyber constellation” of expertise in academia, industry and the operational force focused on Army and National-level cyber security problems. Considering the long history that USMA has in growing experts in this field, it’s no wonder that West Point was chosen as the home for the ACI.

Secretary McHugh’s presence at USMA signaled something more than just the formation of a first-rate research organization. Just one month earlier, McHugh had signed into effect General Order 2014-63, which established Cyber as a basic branch of the Army. Given the unique requirements of the new branch, the accession model would have to consider several skills with which the Army was traditionally unfamiliar. Development of the requisite knowledge, skills and attributes had, in fact, already been underway at West Point. For decades, cadets that showed interest in cybersecurity found informal mentorship with experienced technical officers in the CRC and ACI. By helping cadets select the appropriate major, participate in AIADs and attend computer security conferences and training, mentors prepared these cadets for future success in technical fields. Given the success of the informal program, the ACI and CRC recently worked to formalize the pre-commissioning effort into an Army-level program called the Cyber Leader Development Program (CLDP). The CLDP aims to align West Point and ROTC cadets that demonstrate potential and interest with a branch that can best leverage their technical skills. The program is currently integrated with the existing USMA and ROTC branching processes, allowing cadets to more easily pursue Cyber as a branch. Cadets who complete

CLDP are also eligible to receive the Additional Skill Identifier of C1, indicating to the Army their preparation and aptitude for further advancement in the cyber disciplines.

This summer, the United States Military Academy graduated and commissioned 15 Cyber second lieutenants. Those cadets of the Class of 2015 who selected Cyber branch did so as the first in history. When selecting Cyber, they trusted that the officers who laid the foundation for them did so in a careful and thoughtful manner. These young graduates will be pioneers and help develop a critically important branch in the Army. They will enjoy stability in their field while ensuring that their cyber skill sets remain current. Thanks in part to the vision of the founders and supporters of the CRC and the ACI, cadets may feel confident with another career field, complete with professional military education and a path for promotion. In creating this route for success, West Point used the very same values that have ensured success in every other area of effort: uncanny vision and a resolute dedication to cadets. Perhaps one of these graduates may see a day when stars are pinned upon their shoulders as the first Cyber officers grown from the rank of second lieutenant. ★

*CPT Brent Chapman '09 is a Research Scientist with the Army Cyber Institute and Instructor in the Department of Electrical Engineering & Computer Science. MAJ James Finocchiaro '99 is a Research Scientist with the Army Cyber Institute and typically mentors cadet capstone projects in the Department of Electrical Engineering & Computer Science.*

COL Jennifer Buckner '90, Army Cyber School Commandant, BG Patricia Frost, deputy commanding general for Army Cyber Command, and CSM Rodney Morris pose with the fifteen members from the class of 2015 who branched Cyber, the first cadets from USMA to enter the Army's newest branch.





# Every Cadet an Athlete: Academy, Army Traditions Inspire Classic New Look for Athletics

By **Anthony DiNoto**, WPAOG staff

By now, most West Point alumni, faculty, staff and community members have heard about the recent launch of a new athletic identity and logo that the United States Military Academy (USMA) has adopted for its sports teams. The new “Athena Shield” logo and the “Army West Point” moniker were developed to provide a clearer image and a fresh new look for one of the most iconic names in all of intercollegiate athletics.

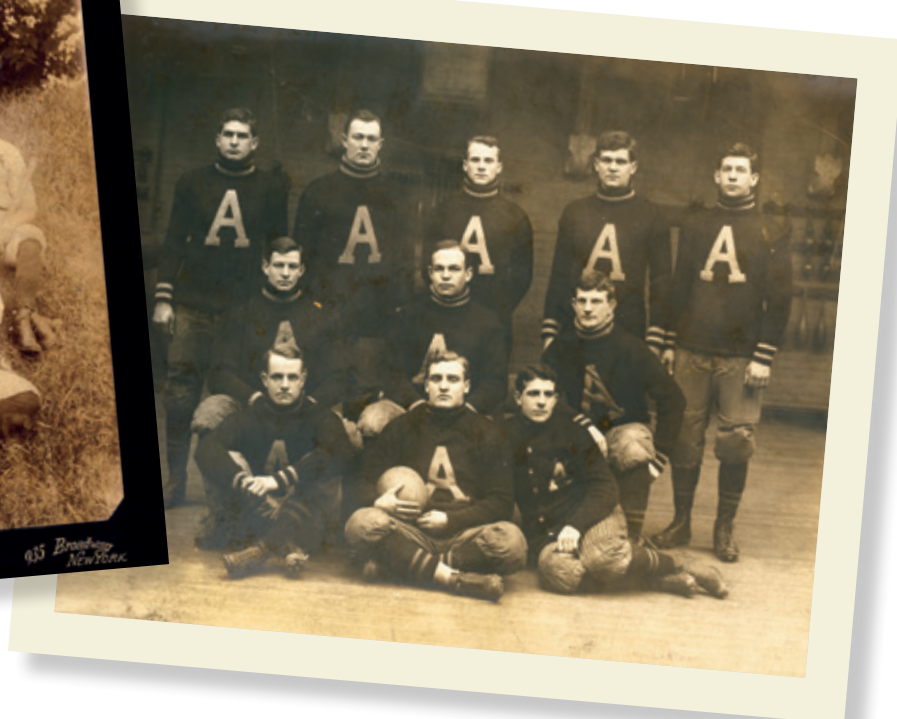
Although many in the West Point community have been talking about the new athletic identity since its April unveiling, what about those Americans who are not so familiar with West Point? Have they heard about the recent rebranding? Do they understand that “Army” is “West Point”? Does John Doe, the star high school lacrosse player from Ohio, know that West Point is where lacrosse hall of famers “Lighthorse” Harry E. Wilson ’28 once played and where John “Jack” Emmer coached? Will he know that same player went on to be a top officer in the U.S. Army? Research says probably not.



This lack of public awareness of the connection between West Point and the Army has created a growing strategic challenge for the Academy and its mission. Each year, USMA Admissions officers, coaches, and West Point graduates nationwide work to recruit the strongest possible class of incoming cadets. Increasingly, they find that many high school students and their families are unaware of West Point’s connection to the Army and of the Academy’s mission to train commissioned leaders of character. To reach these Americans, especially prospective cadet-athletes and their parents, USMA chose to undertake a strategic rebranding effort in order to raise awareness of the Academy and its mission, through the high-profile ambassadorship of its athletic teams.

At the onset of the rebranding effort, Lieutenant General Robert L. Caslen ’75, 59th Superintendent of USMA was asked, “Are we Army, or are we West Point?” He soon realized that the answer to the question varied widely, depending on who you asked and in what part of the country you asked the question. “People living in

The 1891 Baseball team jerseys (left) displayed “USMA” while the 1904 team (right) wore “West Point” jerseys. The 1908 Football jerseys (center) sported what is now known as the “Classic A.”



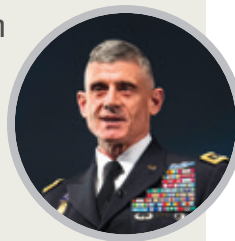
the western part of the country did not understand that West Point was part of the Army, and thought the Army football team works for General Odierno. We realized there is a lot of confusion in how the American people perceive the United States Military Academy,” said Caslen.

Those familiar with West Point may find it surprising, but market research showed that the further away from the Hudson Highlands you go, the weaker the knowledge of the link between “United States Military Academy,” “West Point” and “Army Athletics” becomes, especially in states west of the Mississippi. Take, for example, the countless Americans who thought the Army-Navy game was a group of enlisted soldiers playing football against a bunch of sailors. Or the Wisconsin High School student whose conversation with a West Point athletics recruiter ended in utter astonishment, upon his realization that he would graduate as a U.S. Army officer after his 47 months at West Point. Maybe the term “United States Military Academy” should have tipped him off, but that’s just it: West Point’s historical reputation and distinction as the nation’s first military academy can sometimes overshadow its modern ranking as a premier academic institution which is also home to Army West Point Athletics.

When they hear the words “West Point,” many people unfamiliar with the modern Academy might only think of Civil War generals or Revolutionary-era fortifications. It’s not surprising, as USMA was founded not as the U.S. “Army” Academy, but as the U.S. Military Academy at West Point, located on a landmark site dating back to the American Revolution. Although the other four federal service academies are identified by their service names, West Point alone remains the original United States Military Academy. Thus, the current initiative to explicitly link “Army” to the existing

“The profession of arms is both mentally and physically demanding, so leadership development must include physical as well as academic training. When America puts its Army in harm’s way, they don’t expect us to just ‘look good’ or ‘do our best.’ They expect us to accomplish our mission and win—but to win in accordance with our values and to win honorably. The concept of “every cadet an athlete” ensures that we prepare our graduates for the physical demands of leading in the 21st century Army.”

—LTG Robert L. Caslen '75, 59th Superintendent



hallowed image of “West Point” seems fitting to clarify its 21st century identity.

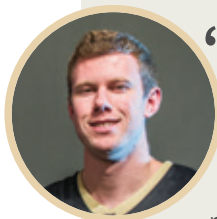
To be clear, the historic educational and leadership training institution is still West Point, The United States Military Academy. The rebranding pertains only to the Academy’s athletic teams. Grads, your alma mater is still “West Point.” You can still sing “On Brave Old Army team” and wear the beloved USMA “Kicking Mule.” It’s still going to be the Army-Navy game. It’s still “Go Army! Beat

Navy!” All those traditions remain unchanged, and the new name and Athena Shield logo, inspired by both West Point values and U.S. Army traditions, incorporate elements of the original USMA crest along with lettering and symbols found on World War II-era tanks, trucks and airplanes.

Colonel Ty Seidule, Professor and Head of the USMA Department of History, served as the historical consultant for the new logo design. He believes that “the symbol represents who we are, and the name links ‘Army’ and ‘West Point’ together in a way we’ve never done before.” According to Seidule, because West Point’s traditional parade uniforms haven’t changed much in over two centuries, it’s sometimes easy to believe in an ideal of West Point untouched by change over the past 200 years. But he reminds us that in fact, the athletic logo has changed numerous times throughout the academy’s history,







“There is so much history at West Point, and to have a logo that symbolizes and embodies that history makes it that much more special when I wear it. Every time I put on that jersey or uniform I’m representing both my team and West Point itself, and it really helps illustrate what a special place West Point is.”

—CDT Kyle Wilson '16, Army West Point Men's Basketball

along with many other aspects of cadet life at USMA. In fact, “everything has changed *but* parade gray. We’ve progressed not only in athletic uniforms, but with more Ph.D.s on faculty, more women and more minorities enrolled, we’re stronger than we’ve ever been both academically and militarily” he says. He goes on to explain that while “Black Knights of the Hudson,” was the nickname given by a 1930s journalist during the golden age of Army Football, the name was not officially adopted until the late 1990s, when the stylized Black Knight (“Capeman”) logo was introduced as the most recent of the many USMA team logos.

Although fans today identify Army Athletics with the now-retired “Swiss A” and the “Capeman” logo, both of those designs are relatively new, 1990s-era marks. Now with the rebranding effort, the revival of the “Classic A” letter—which has been around since the late 19th century, and is still worn by cadet-athletes when they receive a letter as a sign of achievement and excellence—brings USMA athletics back to its roots. As Caslen notes, “This new branding effort provides a unified and simplified appearance and plays off the historic brand attributes of the United States Military Academy, while showcasing the symbols and historic traditions of the institution.”

In more recent years, USMA’s athletic identity continued to evolve. The 2012 Hockey team jerseys featured the Black Knight helmet and stars on the sleeves.



Previously, some USMA athletic teams displayed “Army” on their uniforms, while others preferred “West Point.” In fact, more than a dozen different logos represented the various athletic teams and club sports. It had become confusing and difficult to discern a single or consistent identifying symbol for West Point’s sports teams. The new identity presents a more unified look across all Academy sports, and now Directorate of Cadet Activities teams and clubs will wear the same “Army West Point” identity as the NCAA teams, starting in the fall 2015 season.

For USMA Athletic Director Boo Corrigan, the same confusion was common for fans, as some cheered for “Army,” and some “West Point.” By combining the two into “Army West Point,” the new brand aims to alleviate that confusion and has already inspired cadets. “Unveiling the Athena Shield and the resurgence of the Classic A was one of the highlights of the year for our cadet-athletes,” says Corrigan, who is excited about the future of Army West Point Athletics and the direction in which they are going with the new logos. “We are returning to the roots and traditions of our storied institution, to help us better connect to the American public. This was a great opportunity to create a traditional and consistent look that will unify each of our 28 teams, and ‘Army West Point’ unifies who we are as we tell our tremendous story.”



“Personally, I think the new logo represents a fresh start for all of Army West Point Athletics. It is a way for the athletes to take ownership of what we represent and build a new legacy, while remembering those who set the stage for us. I think the unity in having both ‘Army’ and ‘West Point’ goes along with the ‘one team, one fight’ attitude. Though we all have our own respective teams, we support one another in everything, and thrive off of one another. We are Army and we are West Point, and to be able to wear both those names on our jerseys is an honor.”

—CDT Kasey McCravey '16, Army West Point Softball

In the end, the ultimate goal of West Point is to produce leaders of character to support the U.S. Army and the nation, and as Caslen puts it, “to separate the Army from West Point is to take away the purpose of the Academy. Since its founding in 1802, West Point has produced soldier-scholars and leaders of character for America. This innovative new look perfectly portrays the ideal of the soldier-scholar. It respects and elevates the Academy’s history and heritage, reflects the unique qualities of Army West Point Athletics, and ties the service to the Academy.”

For those of you still wondering what to call our teams at the next sporting event, all of the team names from the last two centuries remain—nothing was changed except for the retiring of the



In 2014, Women's basketball wore "West Point" on their jerseys, but they had also worn "Army" during previous seasons.

"Capeman" logo design. You may choose between the classic "Cadets" or the nostalgic "Black Knights," in the same way a professional baseball commentator uses "Bo Sox" vs. the "Bronx Bombers" or "Sox" vs. "Yanks" interchangeably when referencing the New York Yankees vs. the Boston Red Sox. At the collegiate level, "Army West Point" is similar to the pattern at many other schools across the country whose identity encompasses both the institution's name and its location. The University of California, Berkeley is just one of many examples. With a fresh new look and identity, West Point is beginning to write a new chapter in its long and illustrious athletic legacy. ★

*For details on the rebranding symbolism and a look at the new uniforms, visit: [goarmywestpointrebrand.com](http://goarmywestpointrebrand.com).*

Football uniforms varied considerably in both graphics and identity each year. During the 2014 season, these camouflage uniforms reading "Army" made an appearance vs Air Force.



## Academy Athletics Identity

# Then *vs.* NOW

Black Knights

Black Knights

Team nickname



Primary Athletics logo

Go Army!

Go Army!

E-mail sign off



On your sweater

Army-Navy Game

Army-Navy Game

Classic rivalry



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Army Mules

Army Mules

Mascot



"Upon the fields of friendly strife  
are sown the seeds  
that, upon other fields, on other days,  
will bear the fruits of victory."

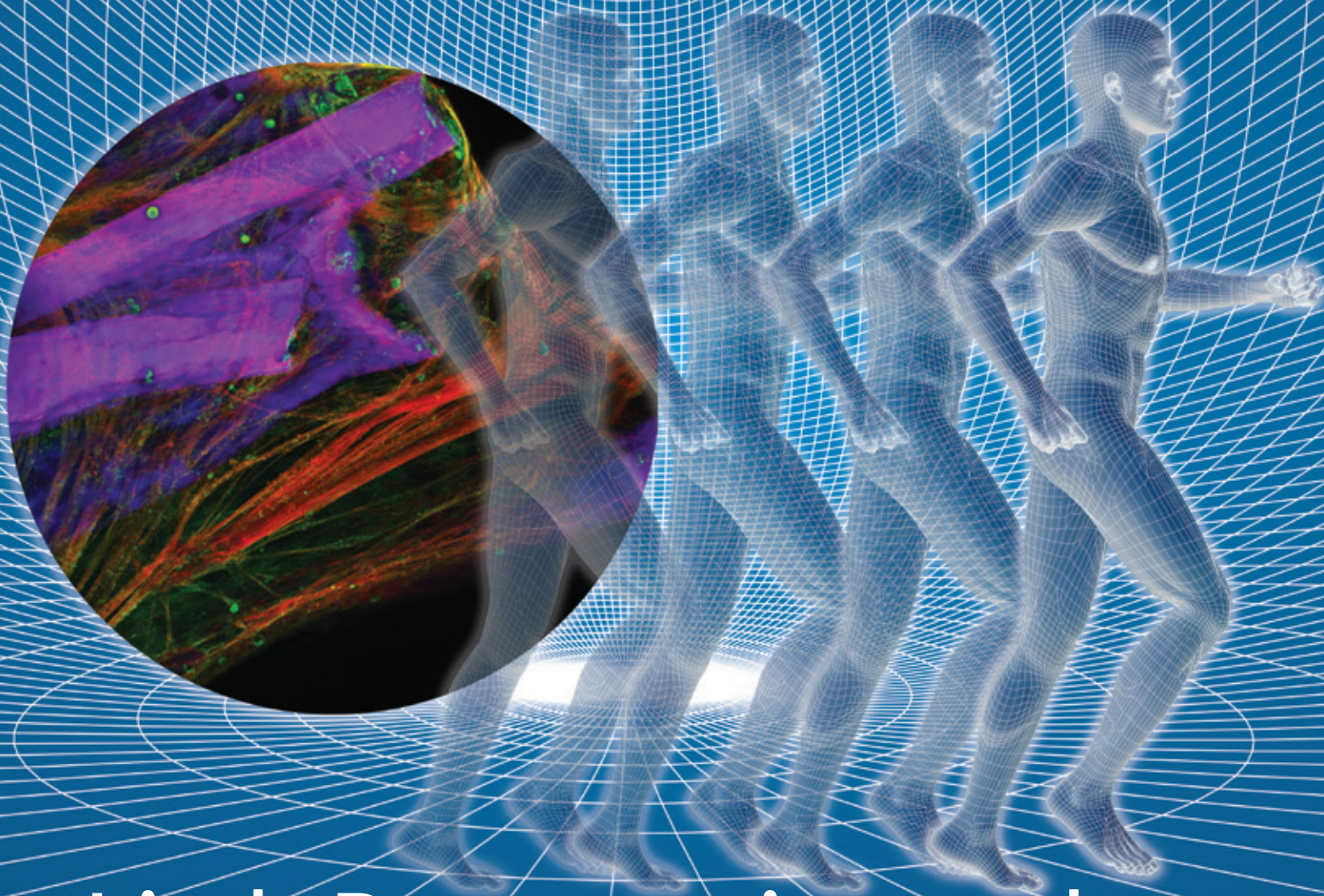
—General Douglas MacArthur, Class of 1903











# Limb Preservation and Prosthetic Sensation:

## Two USMA Capstone Projects Advance Treatment for Severed Limbs

By Keith J. Hamel, WPAOG staff

**T**wo capstone teams from the United States Military Academy's Department of Chemistry and Life Science (C&LS), supported by the Academy Scholars Program and led by Lieutenant Colonel Luis Alvarez '97, are working on different research projects to address a common problem: major limb amputations. Due to the prevalence of improvised explosive devices (IEDs) in Operations Iraqi Freedom or Enduring Freedom, approximately 1,600 Soldiers who fought in either Iraq or Afghanistan have undergone amputation procedures. Advancing the treatment of wounded and amputee Soldiers is a key research initiative for the Department of Defense and U.S. Army.

One of the cadet teams, working on what is known as the "Biostasis" Project, is investigating a new low-temperature preservation method that could keep limbs lost to blunt force combat trauma viable for at least 24 hours, which would be enough time to medevac the casualty to a vascular surgery team that could reattach the limb. The other team, working on the "SENSA" Project, aims to create a neuro-sensory interface that could give prosthetic limbs the sense of touch.

**Above, inset:** A confocal micrograph shows 0.05mm collagen fibers (violet) guiding sensory neuron axons (red).



## The Biostasis Project

When a Soldier loses a limb in combat, time is the main enemy. Due to the typically remote location of the battlefield, there is usually not enough time to move the wounded Soldier from the front lines to a hospital with the resources to reattach the limb. For example, it takes more than six hours to fly a casualty from Afghanistan to Landstuhl Regional Medical Center in Germany, but the optimal time window for reattachment is under three hours. The goal of the Biostasis Project is to “stop” biological time and preserve a lost limb for a long enough time period to allow advanced trauma intervention to occur. The key to this seemingly impossible endeavor is an isochoric chamber that the team received on loan from Dr. Boris Rubinsky of the University of California, Berkeley’s Mechanical Engineering Department. As explained by the Biostasis Project’s team leader, Cadet Marco Dela Cruz ’16, the chamber follows Boyle’s Law and uses pressure to maintain cooling in a liquid phase to preserve living tissue without damage. “Unlike what is seen in movies, you just can’t place a severed limb on ice and expect to reattach it without problems,” Dela Cruz says. “The temperature drop causes the water in the cells to freeze, freezing causes expansion, expansion causes the cell to rupture and rupture kills the tissue.” He likens this effect to freezer-burned meat. By working at a high pressure, the chamber will prevent freezing and mitigate any tissue damage during the cooling process. This will significantly lengthen the time the limb can survive without blood circulation from the current 3 hours to beyond 24 hours, extending the crucial time window during which a limb can be successfully reattached.



CDTs Marco Dela Cruz '16 (foreground) and Sean McGivney '16 assemble the isochoric chamber for an experiment while LTC Luis Alvarez '97 observes.



Biostasis finished in the top three among all service academy teams at the DARPA SAIC competition and won an honorable mention from Dr. Steven H. Walker, Deputy Director of DARPA.

To test the chamber’s effectiveness, Dela Cruz and two other team members (Cadets Sean McGivney '16 and Daniel Fullmer '16) performed a series of analytical techniques—including a basic live-dead assay, a metabolic function test and a cell stress protein analysis—to measure cell survival and function. With support from Dr. Joseph Loverde and Dr. Kevin O’Donovan, both neuroscientists in the C&LS’s Center for Molecular Science, the team began the project by working with HeLa cells, an immortal line of cancer cells often used in research, in order to perfect their lab techniques: pipetting cells, growing cultures, working under a sterile hood and using microscopes. From there, the team worked with chick heart cells and finally beating human heart cells generated from induced pluripotent stem cells (iPSCs), which are adult, not embryonic, human stem cells. Their goal was to cryopreserve these cells in the isochoric chamber for varying periods of time and, in a first-in-the-field type of demonstration, successfully rewarm them to their functional beating state. “We just adjusted our independent variables—cooling temperature, cooling rate and the duration of cooling—to see which gave us the highest recovery by comparing the living cell count of the control group to our experimental group,” Dela Cruz says. Team Biostasis worked closely with collaborators Dr. Gary Carlson and Mr. David Fisher from UC Berkeley on the experimental design and data collection.

The Biostasis Project’s research opens the door to larger model isochoric chambers which could be permanently kept on medical Blackhawk helicopters or Armored Medical Evacuation Vehicles. For these larger chambers, Dela Cruz envisions a seamless canister/circular-refrigerator combo. “It would be low cost and low maintenance,” he says, “and best of all it will greatly increase the successful reattachment rate of severed limbs.” Because of its research and application potential, the Biostasis project was one of three projects chosen from more than two dozen to represent the United States Military Academy at the 2015 Defense Advanced Research Project Agency’s Service Academy Innovation Challenge (DARPA SAIC), where it placed third out of nine teams. Now in its second year, the DARPA SAIC encourages service academy students to develop practical, transformative technologies that could successfully address the challenges facing the U.S. military. By allowing an injured Soldier to possibly retain his or her severed limb, the Biostasis project certainly qualifies in this regard.



## The SENSE Project

Of course, not all severed limbs can be saved, and sometimes a prosthetic is the best option for injured Soldiers. In these cases, offering a prosthetic that replicates the lost real limb as closely as possible would be ideal. Thanks to advances in prosthetic technology, there are now natural-looking artificial limbs and even ones with motor capability that allow the user to pick up objects or lift his or her prosthetic arm. Yet, at this time, modern prosthetics are not able to confer a sense of touch to the user. This is where Team SENSE comes in.

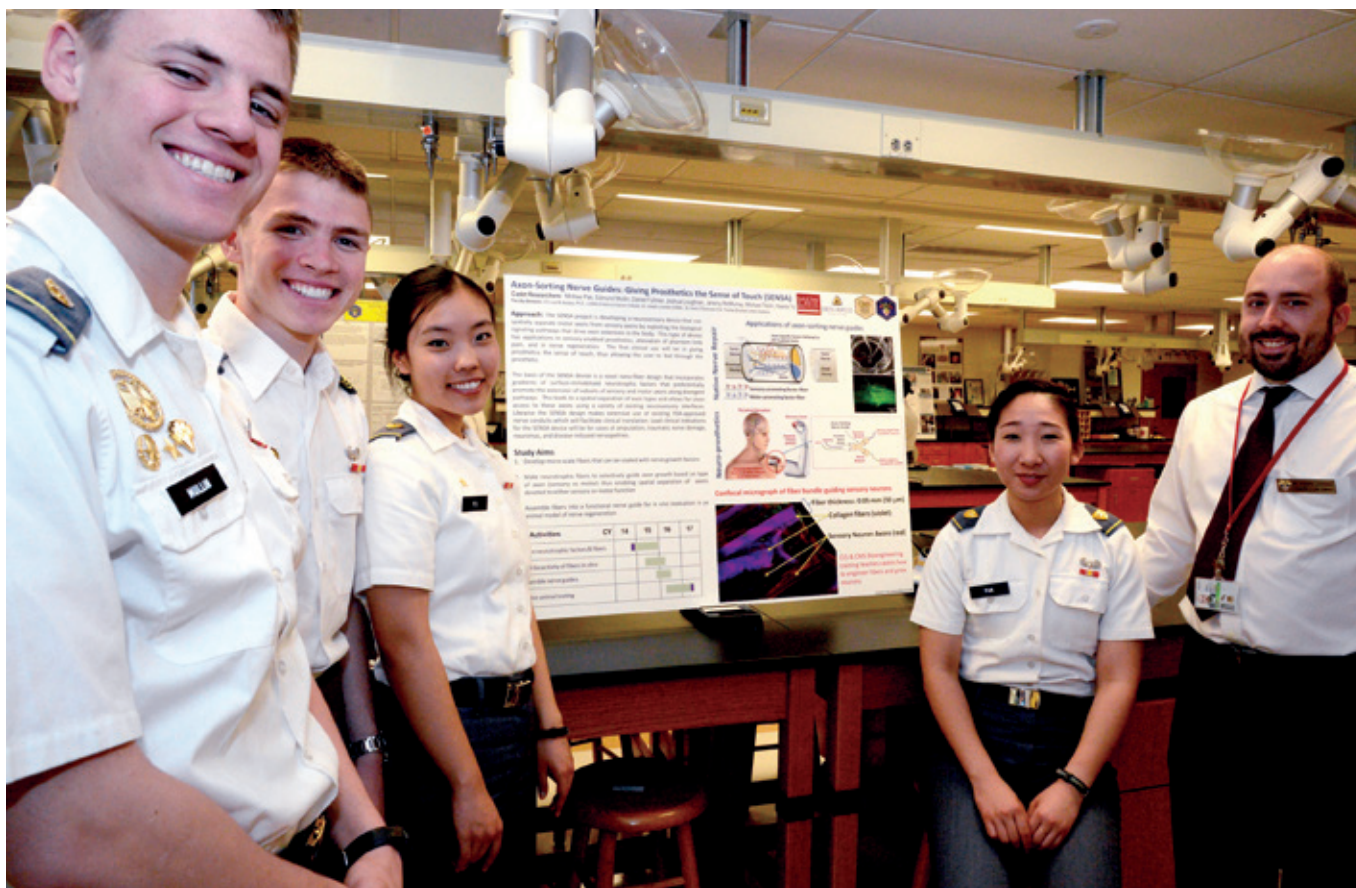
Led by Cadets Minhee Pak '17 and Edmund Mullin '17, Team SENSE is creating a method for fiber-guided neuroregeneration, or the re-growing of nerves, which would be applied to develop sensation-generating prosthetics of the future. Conferring sensation through a prosthetic is entirely possible to achieve, but it requires separating sensory nerve cells from motor nerve cells at the site of amputation. The team's final product vision is a Y-shaped fiber array that contains the appropriate nerve growth factors on each of its branches so that it can bridge the gap between damaged neurons and either sensory input from prosthetic sensors or motor output to a myoelectric system.

Like the cadets of the Biostasis Project, members of Team SENSE began their project by learning how to work in the lab. They were in the lab two to three times per week refining their skills and learning how to perform complicated culturing techniques on

sensory neurons from chick tissue. Afterwards, the team divided into three groups: one continued culturing nerve cells for experimentation, one performed growth factor testing and one focused on constructing the fiber array. Team SENSE experimented with five nerve factors (proteins that signal neurons to grow), three of which showed promise: 1) nerve growth factor, 2) brain-derived neurotrophic factor and 3) pleiotrophin. In another important step, Team SENSE began growing type-I collagen fibers as a platform on which neurons will grow and assembled these into fiber "bundles." Lastly, the team tethered the

**“While the final products are impressive, it is the overall process that counts the most... Having research that truly allows our cadets to learn through guided inquiry, now that would be the greatest advancement.”**

—LTC Luis Alvarez '97



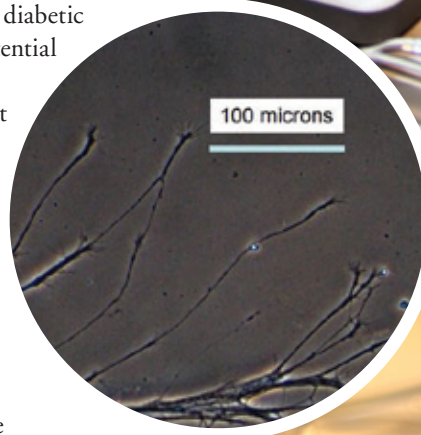
**Left to right:** CDTs Edward Mullin '17, Jerry McMurray '15, Haana Yu '17 and Minhee Pak '17 stand in front of a poster for the SENSE Project, along with Dr. Joseph Loverde, on Projects Day 2015.



**Clockwise:** Isolating neurons (nerve cells) from a chick embryo. Looking at neurons through a microscope in the new Center for Molecular Science lab. A custom-made fiber bundle used to guide neuron growth along desired paths. **Inset:** Neurons growing in a culture.

fibers with the corresponding nerve factor. The hope is that their fiber array can be implanted wherever it is needed to allow a prosthetic with sensors to ‘plug into’ the sensory nerve branch. Such research is at the very cutting edge of the field of regenerative medicine, and Team SENSE believes its project will not only benefit veteran amputees, but could also help alleviate other medical conditions such as phantom limb pain, neuroma, diabetic neuropathy and more. Because of the groundbreaking potential of its research, Team SENSE was invited to present its findings at the 12th annual Soldier Design Competition at the Massachusetts Institute of Technology in Cambridge, Massachusetts, where it won the Gore Innovation Prize.

Participation in this rigorously high level of research as undergraduate students represents a unique opportunity for West Point cadets. Yet despite its academic benefits and potential for applied use in saving limbs or enhancing the function of prosthetic limbs, the research for the Biostasis and SENSE Projects did not come without cost. Alvarez estimates that the materials needed to conduct the research for these projects totaled more than \$35,000. “Cell lines, cell culture media and nerve factors alone cost nearly \$10,000,” he says. Donors who would like to know more about contributing to the Academy Scholars Program, which benefits experiential learning opportunities for cadets, or the Cadet Pre-Medical Education Fund, which prepares cadets for medical school and careers as Army physicians, are welcome to contact the West Point Association of Graduates Development Office. Not only would they be supporting potentially groundbreaking advancements for Soldiers such as those offered by projects Biostasis and SENSE, but they would also be directly enhancing cadet education and leadership development. “While the final products are impressive, the overall process is a tremendous teaching opportunity,” says Alvarez. “Having research that truly allows our cadets to learn through guided inquiry, now that is powerful.” ★





# POP OFF!



With all the gadgets, gizmos and drones out there, it seems every day there is another advancement in technology. We asked our social media followers: "What was considered 'high-tech' during your USMA days?" Like a slide rule, the answers shift back and forth through USMA generations.



**Giselle Richards Calame**  
The Clickerboard.



**Kukui Photography**  
When we changed from sliderules to the Ti-50 calculator! Class of 1976.



**Gery Donovan**  
Calculators.



**Terry Meehan**  
Key Punching or mark-sensing computer cards and turning them in to be run by the Gold Coats.



**John Culpepper**  
DVD drives in the Plebe (c/o 2000) computers. Upperclassmen would swap and cadet borrow our drives to watch movies.



**Diane Kinney**  
CS105 class where we programmed in Pascal. Never get stuck in a "while... do...." loop.



**Archie Elam**  
Slide rule and typewriters.



**John P. Gilmer**  
Writing computer programs on IBM punchcards in FORTRAN.



**Timothy Volkmann**  
Having a hard drive in our computers. '94 was the first class to have computers with hard drives. A smokin' hot 40MB hard drive.



**Andrew Kerber**  
The first Macintosh PC. The VAX 11/750 mini computer was a new acquisition in G&CS (the Department of Geography and Computer Science). The Ada compiler.



**Kristin Sonne Knight**  
Getting a phone in my room.



**Todd Justman**  
The Class of '94 got computers with color monitors and hard drives.



**Andre Pauka**  
Phones in the rooms??? The Corps Has!



**Joel W Gray**  
The "stars and bars" we wore for IOC...



**Griff Norquist**  
When I was a firstie, the plebes' computers had the first web browsers. I recall getting sports scores that way. Cutting edge!



**Wes Haun**  
Ventilated boots.



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# Cutting-Edge Technology Helps Unlock Solution to Cadet Chapel Conundrum

By **Keith J. Hamel**, WPAOG staff

Recently, USMA Chaplain (Colonel) Barbara Sherer was holding an informal conversation with Colonel Daisie Boettner '81, Head of the Department of Civil and Mechanical Engineering (C&ME). Chaplain Sherer was explaining how she was in a bind. Her supply of keys to the 105-year-old West Point Cadet Chapel was critically low. Many of these handcrafted, turn-of-the-century keys have been lost or broken during the course of the Chapel's existence. The original manufacturer of the keys had long since ceased doing business, and West Point no longer had any contracts with civilian shops to replace the keys. Furthermore, because the key features a combination of English and metric units, it would be very expensive to outsource them for replacements. Fortunately, Boettner told Chaplain Sherer that C&ME could help. She put a call out to the department, and members of C&ME's Vehicle Steer Performance Team stepped up for the task, believing that reverse engineering techniques and the department's 3D printers could resolve Sherer's dilemma.

As a volunteer side venture to their capstone project, Cadets Mark Hesford, Richard Glover, Michael Deschene and Christina Cox, all from the Class of 2015, went to work in January developing a process for creating functional and durable duplicate keys for the Cadet Chapel. After taking measurements of the original key's dimensions and creating a 3D model of it in the design software

(Left to right) Richard Glover, Mark Hesford and Michael Deschene, all from the Class of 2015, stand in front of C&ME's sPRO SLS 3D printer, which printed the metal version of the Cadet Chapel's key. Glover is holding the engineering template for the key's handle, Hesford is holding the 3D-printed plastic key, and Deschene is holding the original key.



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### ***Start Everything Finish Nothing: The Curse of Modern Management***

by Rolfe G. Arnhyim

Whether you are active Army or retired, Rolfe Arnhyim's book will provide you with relevant examples of how bold, creative, effective leadership can accomplish what others say cannot be done. The book is a detailed case study of how Arnhyim (USMA '53) pulled off what was the largest peacetime movement in history: the relocation of the Army-Navy game from Philadelphia to the Rose Bowl in Pasadena, CA, in 1983. Achieving your objective against all odds is the theme of this enjoyable read as Arnhyim's shares lessons he's learned for effective delegation, accountability and execution in the face of significant challenges.



SOLIDWORKS, the team used one of the department's four Dimension Elite 3D printers, which uses fused deposition modeling (FDM) to create a plastic prototype of the key. According to Rod Wilson, one of C&ME's engineering technicians, this printer works by spraying two strands of material—an ABS filament (a production-grade thermoplastic) and a support material—onto a base according to the team's coded printing instructions. "It's basically 2D printing done over and over again," he says, "with the tray on which the object is being built dropping 1/0.007ths of an inch on each pass." At the end of printing, the ABS and support material combination is placed in a lye bath, which melts away the support material, leaving the finished plastic object. "Since the support material fills the joints, even objects with gears and such

can printed in one job rather than as separate parts needing to be assembled," Wilson says. Because of this, C&ME's 3D printer is able to print finely detailed models up to 8x8x12 inches. The Chapel key is approximately seven inches long.

**"I try to encourage every cadet to use the department's 3D printers, and no matter what they design, I can print it."**

—Rod Wilson, C&ME engineering technician



After testing their prototype key in the Chapel door's lock, which worked after some minor filing of its rounded teeth, the cadets designed an engraving for the key's handle (an Athena's Helmet). "We wanted a key that was both functional and aesthetic," says Deschene. The final step of their project involved the 3D printing and polishing of a metal key. For this, the cadets turned to C&ME's sPro SLS (Selective Laser Sintering) printer. This printer has two feed chambers and one build chamber, and spreads a paper-thin layer of powdered metal composite from the feed chambers across the build area. "Following a build file that cadets design, a high-powered 200-watt fiber optic laser then shoots into the powder," says Wilson, "and the laser beam fuses the powder into a homogeneous, impact-resistant metal composite, but any place it doesn't hit stays powder." At the end of the print job, Wilson places a cube-shaped plexiglass chamber over the build area containing the laser-fused object and surrounding powder, slides a tray underneath the cube and moves both to a cleansing station. "I then become an archeologist and dig for the part in the powder," he says. After finding the object, he places it in an oven to cure. For the Chapel key, he also wicks bronze from ingots into the final product. The SLS printer is more expensive to run than the FDM printer—a pail of powder costs about \$1,000, while a cartridge of ABS is \$250—but it creates a stronger product (SLS prints every 1/0.004ths of an inch) that, once polished, is not grainy like the plastic object. At the end of its process, the Cadet Chapel key gleamed as it awaited its "turn" in the Chapel's lock.

"I try to encourage every cadet to use the department's 3D printers," says Wilson, "and no matter what they design, I can print it."

"The 3D printers had a profound effect on our project," says Deschene. "Without them, we would have had to machine the teeth, and making the key's rounded edges would have required using a lathe and shaving 1/0.001ths of an inch off over and over again, which of course would have been very labor-intensive."

Thanks to the cadets of Vehicle Steer Performance Team and to C&ME's 3D printers, the West Point Cadet Chapel will now be able to replace its keys quickly and cheaply on demand. ★

**Left:** COL (CH) Barbara Sherer tests the new 3D-printed Chapel key in the Chapel door's lock for the first time. **Inset:** The new key's handle features a silhouette of Athena's helmet.



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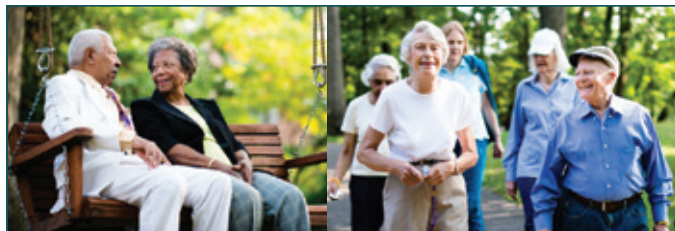
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In order to create the best possible training conditions for Army West Point Football players, head strength coach Tim Caron employs Catapult, a high-tech system of wearable motion sensors that collect data on each athlete. Designed to leverage micro-technology in new ways, Catapult is used worldwide to train and protect elite athletes by analyzing evidence-based data to improve performance. Many NFL and major college football teams now use Catapult to monitor athletes' capabilities on the field.

Using global positioning system (GPS) technology, Catapult can track and measure an individual player's performance metrics, such as distance travelled, velocity, direction changes, accelerations, decelerations and overall workload. The wearable sensors enable athletes to be tracked in their "natural environment" (the playing field) and give coaches empirical data at their fingertips to assess athletic readiness.

It all starts with the raw material—players. Caron says that the Catapult technology helps coaching staff "gain insight into what we are asking our athletes to do, to ultimately prescribe the necessary amount of volume and intensity [of workouts] to maximize results." The Catapult metrics also assist coaches with understanding how much each position group needs to run in the off-season. By observing and recording the physical demands during regular practice, they can create a blueprint for training in the off-season.

This past winter, Caron presided over "the winter of speed." Coach Jeff Monken realized that the program lacked critical speed and set a goal to push every player to realize their maximum performance potential. He says, "We will be faster than we were, if we keep working on it." Wide receiver Cadet DeAndre Bell '16 told a local reporter, "We just took it down to the basic fundamentals of running and movement." During the entire off-season, Caron and his staff worked on the "right ways to run." Conditioning focused on perfecting technique and building leg strength with repetitive drills.

Repetitive movement drills are necessary to develop speed and precision in play execution, but can also increase the possibility of injury. By reporting individual player workload and intensity metrics to coaches, Catapult can help reduce soft-tissue injuries such as sprains and tears. Caron explains, "Once coaches learn the amount of work that is expected during a practice, they can watch for standard

## Using Big Data to Optimize What (running)





deviations from that. For instance, if a player has increased repetitions during individuals or special teams, that can lead to an increased workload. The intensity of some of these drills might be increased as well, such as kickoff coverage which requires several repeated sprints. When players exceed the expected amount of workload, there is a potential for injury. Our goal is to find a reference point and disseminate the information to position coaches and coordinators so that in future practices they can manage repetitions and yardage.”

Prior to using the Catapult system, coaches relied primarily on a player’s self-reported rate of perceived exertion (on a scale of 1-10) to assess the difficulty of workouts. Coaches could also factor in amount of sleep and body mass/body composition to paint a picture of overall conditioning. Now, Catapult can fill in the picture of athletes’ conditioning with more details. Catapult eliminates guesswork by measuring and providing quantifiable data on player exertion, rather than relying on players’ or coaches’ subjective observations. Coaches can now know the exact intensity of the practice workloads for each player.

The Catapult system is small, lightweight and simple to use. Players wear a small unit that tracks movements, including distance and speed, during a practice. At the end of practice, individual tracking units are collected and player data gets uploaded onto a computer. Caron is then able to extract, organize and structure the data for presentation to the position coaches. Caron provides information to athletes as well as coaches, producing printouts for both to see how the players worked in practice.

Like all technology, Catapult has its limits, and doesn’t seek to change how coaches work with players. Caron says, “Coaching is about

correcting and motivating. The data is information to better program workouts and structure practices; it doesn’t change the need to be able to communicate and instruct your athletes.” If anything, he adds, “the information creates opportunities to do our job better.” The team looked good during spring practice, but “the results came from hard work by the guys and the coaches. We just use Catapult to track what they are doing.”

On Caron’s wish list of things to track in the future? *Heart rate variability*—to assess autonomic nervous system tone. *Sleep quality*—to assess how many hours were spent in REM sleep. And *saliva analysis*—to assess cortisol levels throughout the day. Given how



Football head strength coach (left and above) Tim Caron analyzes data downloaded from Catapult units (seen at right).



# Athlete Performance: right looks like

By Kim McDermott '87, WPAOG staff





fitness tracking technology is advancing, this could soon be possible. Currently, even novice athletes can wear a fitness tracker device that continuously monitors heart rate, steps taken, calories burned, acceleration, altitude, and yes—even sleep quality. What could once only be measured in laboratories can now be delivered right to a phone or computer.

No matter what technologies the future brings, some things in sports will never change. The success of the program will always be based on a combination of the best possible recruits, effective coaching and hard work. Caron says, “Coach Monken and his staff work tremendously hard at getting the best recruits for the program. The job of my strength team is to help them reach their maximum potential when they get here.” The strength coaches must monitor and assess all players, at each practice, at each position, to ensure they are working to capacity, while doing all they can to avoid injuries. “West Point has some of the hardest working student athletes in the country,” he says. “They are coachable, high character, smart and gifted athletes that maximize each day.” ★



**“Coaching is about correcting and motivating. The data is information to better program workouts and structure practices; it doesn’t change the need to be able to communicate and instruct your athletes.”**

— Football head strength coach Tim Caron



**Top and above:** Cadets perform individual drills during football practice.





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FOOTBALL

## 2015 HOME SCHEDULE

Sept. 4	Fordham	7:00 p.m.
Sept. 19	Wake Forest	12:00 p.m.
Oct. 10	Duke	12:00 p.m.
Oct. 17	Bucknell	12:00 p.m.
Nov. 14	Tulane	12:00 p.m.
Nov. 21	Rutgers	12:00 p.m.



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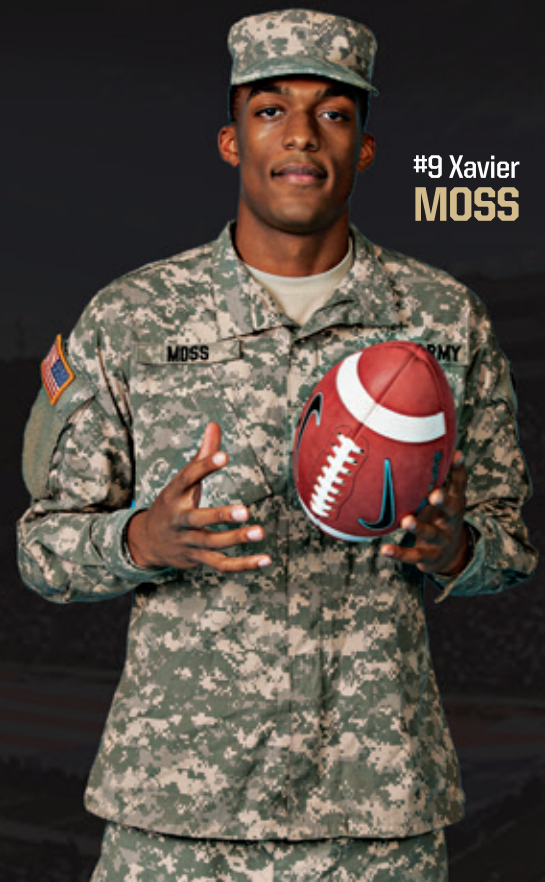
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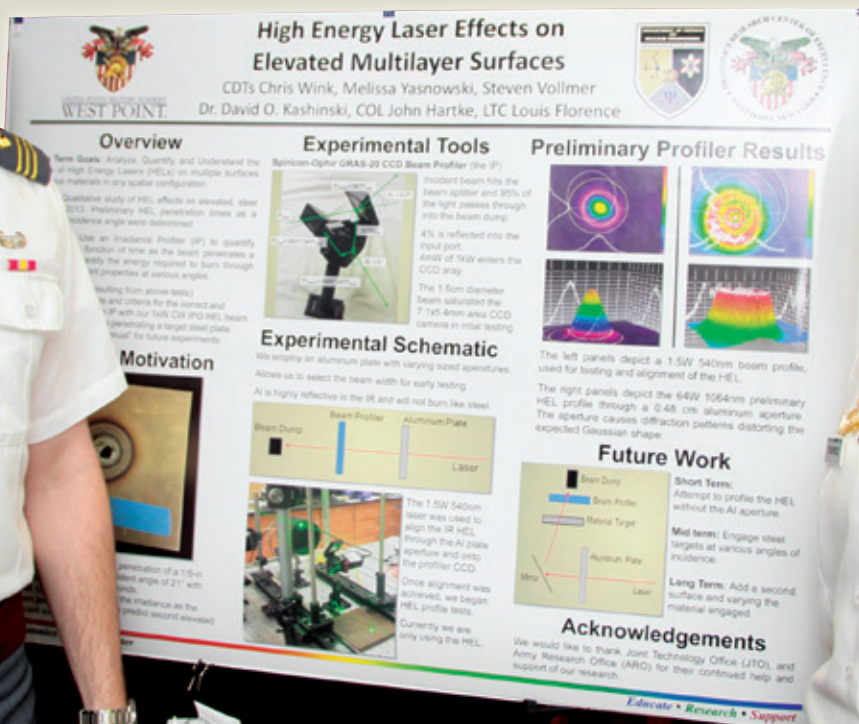


#9 Xavier  
**MOSS**





Clockwise from left: Concrete Canoe; ARIBO: Applied Robotics for Installation & Base Operations; Academy Idol Performance; Smart Grid Test Bed: Develop a Small-Scale Replica of Power Grid to Test Control Algorithms.







**Clockwise from left:** Trebuchet; SIP Hut 4.0; SAE Baja Vehicle; Allison Transmission.



# 2015 PROJECTS DAY

## PROMOTING ACADEMIC EXCELLENCE

The United States Military Academy at West Point held its annual Projects Day on April 30, 2015. Projects Day began in 2000 when one academic department invited external guests to view the applied research its cadets had done in support of the Army and the Department of Defense. This year, Projects Day featured over 275 capstone projects from 15 academic departments and four other colleges. From the ballroom of the West Point Club to the 4th floor of the Kimsey Athletic Center, and in the rooms and through the halls of Bartlett, Thayer and Washington Halls, Projects Day dominated the day at West Point. Donors to the Academy, graduates, local high school students, special guests and undergraduate cadets were treated to various poster displays, interactive demonstrations and presentations, and even performances by cadets (including a full theatrical production of Shakespeare's "Much Ado About Nothing"). "The only thing that disappoints me about Projects Day is that you just can't see everything," said Brigadier General Timothy Trainor '83, Dean of the Academic Board. ★





# MAILBOX



If you would like to submit a comment or question, send it to [Editor@wpaog.org](mailto:Editor@wpaog.org). You are always welcome to chat with us on one of our social media channels!

**FROM: George Hegedus '93**

First of all, I love the magazine. Job well done. Second, concerning Keith Hamel's article "Be It Ever So Humble..." in the Barracks' section of the 2015 winter issue, he says on p. 23 that there are "no impromptu slip-n-slide parties in the hallways" at USMA. Well, I respectfully disagree. The B-3 Bandits once constructed a waterslide, made with approximately one inch of water, on the third floor hallway of Eisenhower Barracks. How did we get a solid inch of water up to the third floor? Well, West Point is an engineering school after all!

**RESPONSE:**

*Look at those pictures! Move over Wet 'n' Wild Waterpark! We stand corrected for assuming that West Point cadets would be prevented from partaking in this hallmark of dorm life at other colleges, and not only do your pictures show your active participation, they prove (once again) that West Pointers innovatively lead in such endeavors. (Hey, is that a TAC wearing the lifeguard whistle?).*



**FROM: COL Fred Meyer '84, Deputy Department Head, Department of Civil and Mechanical Engineering, USMA**

I want to tell you that *West Point* magazine is VERY well done. I thoroughly enjoy reading every issue. It is interesting, well thought out and visually appealing to the reader. I have to believe that the magazine is serving the Academy well.

**RESPONSE:**

*Thank you for taking the time to drop us this glowing note of praise. As you know from its mission statement, West Point magazine's goal is "...to tell the West Point story and strengthen the grip of the Long Gray Line," so its staff takes pride in hearing your assessment that it is serving the Academy well.*

*We welcome other readers to test COL Meyer's conclusion: "every issue...interesting...[and] ...visually appealing." Just visit [westpointaog.org/WestPointMagazinepastissues](http://westpointaog.org/WestPointMagazinepastissues) to view any issue from the magazine's four-year history. You can binge-read them all in one weekend!*

**NO EXCUSE SIR OR MA'AM:**

In the 2015 spring issue, the opening paragraph to Pop Off! states, "...shavings of steel from the World Trade Center were incorporated into the metal of all class rings for the USMA Class of 2016 and beyond." This is technically inaccurate. Class officers from the Class of 2016 presented the shavings from the World Trade Center separately to the representative from Jostens, the manufacturer making the Class of 2016's rings, after the rings from the 15th annual West Point Association of Graduates West Point Class Ring Memorial Melt ceremony were melted. They presented the shavings at the same time they handed over the gold ingot to Jostens. Thus, the shavings are only going into rings for the Class of 2016: they won't be in next year's West Point Class Rings nor those of any Class "beyond."

The 2015 spring issue's "Be Thou at Peace" shows COL (R) Arthur R. Marshall Jr. '70 among the graduate deaths reported from December 1, 2014 through February 28, 2015. He is, in fact, alive and well. Sadly, his father, COL (R) Arthur R. Marshall Sr. '44, passed away in this time frame, and this is what caused the confusion. Still, no excuse. We regret the error.





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# TECHNOLOGY AT USMA

## BY THE NUMBERS



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AT USMA



8 Gbps  
BANDWIDTH  
for  
CADET USE

2,300  
wireless access  
points at USMA

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classrooms/  
labs with  
projection  
capability

buildings  
covered  
by DREN  
Wireless

96

six  
outdoor  
areas  
covered  
by DREN  
Wireless

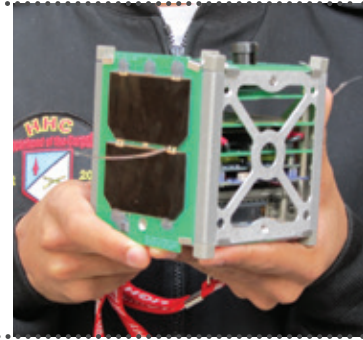




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Goldcoats

(7 Maintenance,  
2 Security)

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LAND NAVIGATION  
SIMULATOR AND  
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1,200  
Computers  
issued  
to cadets  
each year\*

162,000   
USMA Facebook "Likes"

40,000  
wired network  
ports at USMA

EMPLOYEES  
DEDICATED  
TO  
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100



800

staff & faculty  
mobile devices  
with secure  
email app



10,000  
computers  
at USMA

\*Charged to cadet account



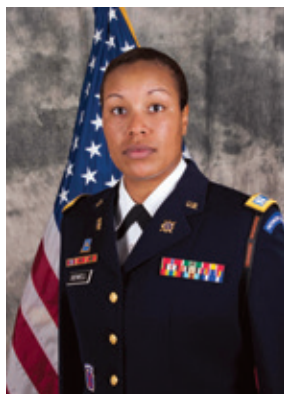
# Gripping Hands

*“Grip hands—though it be from the shadows—while we swear as you did of yore, or living or dying, to honor the Corps, and the Corps, and the Corps.” —Bishop Shipman 1902*

2007

## Bidwell to Command in Old Guard

Captain Marjana E. Bidwell '07 will be the first female to command a company in the 3rd U.S. Infantry Regiment (The Old Guard), the oldest active duty regiment in the U.S. Army. Captain Bidwell currently serves as the 1st Battalion, 3rd U.S. Infantry Regiment Intelligence Officer and will be taking Command of the Regimental Headquarters and Headquarters Company this summer.



Captain Bidwell's deployments include: Operation Iraqi Freedom-Camp Taji, Iraq (2009-2010) and Operation Enduring Freedom-FOB Orgun-E and FOB Sharana, Afghanistan (2013). Her awards include the Bronze Star Medal, Army Commendation Medal (w/ 3 OLC), Meritorious Unit Commendation Medal, Afghan Campaign Medal, Iraqi Campaign Medal, Global War on Terror Service Ribbon, Army Service Ribbon, Overseas Service Ribbon (2), and NATO Medal.



## General Officer Promotions

The U.S. Senate has confirmed the following General Officer nominations:

To the rank of Lieutenant General:

Major General Gary H. Cheek '80

Major General Joseph P. DiSalvo '81

To the rank of Major General:

Brigadier General (USAR) Robert D. Carlson '82

Brigadier General Edward M. Daly '87

Brigadier General John G. Ferrari '87

Brigadier General Daniel L. Karbler '87

Brigadier General Michael E. Kurilla '88

Brigadier General Joseph M. Martin '86

Brigadier General Andrew P. Poppas '88

Colonel Paul K. Hurley '84

To the rank of Brigadier General:

Colonel Ronald P. Clark '88

Colonel Brian J. Mennes '88

Colonel (USAR) Gerard L. Schwartz '86

1936

## New Barracks Named for Benjamin O. Davis Jr.



The newest cadet barracks, expected to be completed in late 2016, are named in honor of General (Retired) Benjamin Oliver Davis Jr. '36. Despite being “silenced” during his four years at West Point, where no cadets, faculty or staff members befriended or spoke to him except on an official basis, he persevered to become the fourth African-American to graduate from West Point. His ambition was to enter aviation but due to segregation, he would wait until 1941 to be accepted as one of the first Tuskegee Airmen,

earning aviation wings one year later. In 1947 he transferred from the Army to the newly-established U.S. Air Force, where he led the development of policy improvements for ethnic integration in 1948 and spent the next two decades as a prominent leader focused on ensuring equal treatment and opportunities for all. In 1995 he was a recipient of the WPAOG Distinguished Graduate Award.



Architect's rendering of future Davis Barracks.





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1960	1981	



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# Be Thou at Peace

Deaths reported from March 1–May 31, 2015.

COL Moody E. Layfield Jr., USA, Retired	1941	Mr. Gerrit J. Van Westenbrugge II	1949	LTC Earl C. Horan Jr., USA, Retired	1961
COL John K. Brier, USA, Retired	1943	COL Charles C. Cunningham, USA, Retired	1950	Mr. Dennis M. Rooney	1961
Maj Gen James O. Frankosky, USAF, Retired	1943	COL Thomas E. McBride Jr., USA, Retired	1950	COL James M. Acklin III, USA, Retired	1962
Col Gayle E. Madison, USAF, Retired	1943	Mr. John M. Murphy	1950	BG Marcial D. Samaniego,	
COL William J. Nelson, USA, Retired	1944	COL Marvin W. Rees, USA, Retired	1950	Paraguayan Army, Retired	1962
Col Howard N. Tanner Jr., USAF, Retired	1944	COL Richard A. Rein, USA, Retired	1950	Mr. Lawrence V. Anderson Jr.	1963
Maj Gen John T. Carley Jr., USA, Retired	1945	COL Peter A. Beczkiewicz, USA, Retired	1951	Mr. Gary K. Klauminzer	1963
Dr. Lawrence W. Fagg Jr.	1945	COL Alan C. Esser, USA, Retired	1951	LTC Roger D. Manning, USA, Retired	1963
COL Laurence L. Heimerl, USA, Retired	1945	Mr. Edgar C. Thomas Jr.	1951	Col Jacob C. Armstrong Jr., USAF, Retired	1964
COL Russell D. McGovern, USA, Retired	1945	Col Lawrence D. Johnson, USAF, Retired	1952	COL John F. Concannon III, USA, Retired	1965
1LT DeWitt A. Nunn, USA, Retired	1945	COL Daniel B. Knight Jr., USA, Retired	1952	LTC Paul S. Renschen, USA, Retired	1965
COL William E. Zook, USA, Retired	1945	Maj Thomas J. McClung, USAF, Retired	1952	Mr. Lance R. Stewart	1965
LTC Shirley S. Ashton Jr., USA, Retired	1946	Mr. Thomas J. Murphy	1952	Mr. Joe A. Weatherall Jr.	1965
COL Frederick C. Badger, USA, Retired	1946	Mr. John E. Hogan	1953	CPT Donald Campbell III	1966
Col Edward J. Brechwald, USAF, Retired	1946	Honorable Harold J. Sarbacher	1953	LTC George G. Peery III, USA, Retired	1966
Mr. Roland S. Catarinella	1946	Mr. Samuel M. Thomas Jr.	1953	LTC William A. MacDonald, USA, Retired	1967
Mr. James S. Elliott	1946	Mr. Marion G. Creath Jr.	1954	Mr. John N. Williams Jr.	1968
COL Richard L. Gruenther, USA, Retired	1946	COL Frederic J. Delamain, USA, Retired	1954	Mr. Michael Barszcz Jr.	1969
Col Merl G. Hutto, USAF, Retired	1946	Col Kendell O. Iverson, USAF, Retired	1954	Mr. Gary M. Fahl	1969
LTC Robert E. Kren, USA, Retired	1946	MAJ Daryl D. Jones, USA, Retired	1954	LTC Walter J. Ambrose Jr., USA, Retired	1970
COL Jack F. Matteson, USA, Retired	1946	Mr. Leroy T. Lunn	1954	COL Peter H. Jones, USA, Retired	1970
MG Wilton B. Persons Jr., USA, Retired	1946	COL William D. Old II, USA, Retired	1954	COL James S. McHone MD, USA, Retired	1970
COL Blucher S. Tharp Jr., USA, Retired	1946	GEN Joseph T. Palastra Jr., USA, Retired	1954	Mr. Robert B. Allaire	1971
COL Robert T. Winfree Jr., USA, Retired	1946	Mr. George C. Soos	1954	Mr. Robert G. Breznovits	1971
Mr. Paul J. Curry	1947	Col Ronald E. Rule, USAF, Retired	1955	COL James L. Bryan, USA, Retired	1973
Mr. James C. McKim	1947	COL Walter Urbach Jr., USA, Retired	1956	Mr. Nage L. Damas	1973
COL Robert F. Hallahan, USA, Retired	1948	LTC James J. Cortez, USA, Retired	1957	Mr. Philip Tumblin	1973
COL Robert M. Ward, USA, Retired	1948	Dr. William G. Liakos	1957	Mr. Brian W. Anderson	1974
Mr. John K. Withers	1948	LTC Austin E. Miller, USA, Retired	1957	Mr. John E. Boehmler	1975
COL John P. Chandler, USA, Retired	1949	CPT Thomas W. Roebuck, USA, Retired	1957	1LT Milan C. Dahlquist, USA, Retired	1978
Col Daniel Guyton, USAF, Retired	1949	LTC Edwin N. Dodd Jr., USA, Retired	1958	Mr. Jessie M. Hartman Jr.	1978
COL George C. Hoffmaster Jr., USA, Retired	1949	BG Claude E. Fernandez Jr., USA, Retired	1958	Mr. Dereck E. Lyons	1981
Mr. Robert W. Howell	1949	Mr. Gordon L. Goodman	1958	MAJ Kyle D. Petroskey, USA	2001
Brig Gen Willum H. Spillers Jr., USAF, Retired	1949	Mr. William C. Melnik	1958	CPT Benjamin P. Larson	2003
Lt Gen George H. Sylvester, USAF, Retired	1949	COL Courtney E. Prisk, USA, Retired	1959	1LT Byron J. Plapp, USA, Retired	2012
Col Joe B. Tye Jr., USAF, Retired	1949	MAJ William P. Ruedel, USA, Retired	1960		



# Past in Review

## The Goldcoats: Tech Experts Support Over Five Decades of West Point Computing

By Keith J. Hamel, WPAOG staff

The United States Military Academy at West Point entered the computer age in December 1962 with General Order Number 151. Signed by Major General William Westmoreland '36, Superintendent, this order established the Academic Computing Center (ACC) and the first of four stages of computing at West Point. According to the 1963 Annual Report of the Superintendent, the ACC was “an interdepartmental facility under the Dean of the Academic Board analogous to the Library.” The main feature of the ACC was a General Electric 225 digital mainframe computer consisting of a central processor, an IBM Selectric Typewriter, a card reader, a card punch, a line printer and four magnetic tapes.

In its first semester of existence, six academic departments used the Center. Writing in the May 1990 edition of *ASSEMBLY*, Colonel Lanse Leach '66 recalls being one of the approximately 700 Fourth Classmen “who received four hours of instruction and ‘hands-on’ training from the Department of Earth, Space and Graphic Sciences” on the GE-225. Upper class cadets—105 yearlings, 150 cows and 25 firsties—also occupied Thayer Hall room 104, the home of the ACC, to learn how to program the computer for courses such as Civil Engineering-Honors. A group of seven to ten extremely qualified Army technicians ran the ACC and assisted cadets and faculty with programing the computer. To signify that cadets should show them special respect, these enlisted specialists wore pale yellow lab coats over their uniforms. Over time, as word of these computer technology experts spread, they became known colloquially as the USMA “Goldcoats.”

As reflected in “A Two-Edged Sword: Computing at West Point,” written by a team of six West Point officers, the ACC started running in 1963 and never slowed down. By 1965, it moved into a new facility on the south end of the first floor of Thayer Hall and added two more GE-225 systems, “processing

approximately 3,500 cadet programs annually” (primarily math problems). By 1968, this number jumped exponentially “to more than 100,000 programs per year.” By 1971, “USMA was established as the largest time-share user of Honeywell-developed computer software in the nation,” according to the 1971 Annual Report of the Superintendent. Finally, by 1974, the ACC was processing “more than 450,000 programs annually.”

After a decade of crunching data, the Academy’s mainframe computers started showing their age. Leach states that the GE-635, which the ACC obtained from the Air Force in 1969 in an effort to increase remote access to 70 users, began to experience decreased reliability starting in 1976. Realizing that the era of mainframe computing was coming to an end, the Academy formed the Academic Automation Planning Committee to usher in the second stage of computing at West Point, the PC age. The result was a computer network linking

classrooms, labs, faculty offices and 120 work stations. Also, in 1983, the Academy purchased approximately 100 Terak microcomputers at a unit cost of \$8,935. The committee’s biggest impact came in May of 1985 when the Dean and Superintendent accepted its recommendation that every cadet have a networked PC. About a year and a half later, cadets in the Class of 1990 were the first required to purchase their own computer for use at USMA. They all bought Zenith 248s, which came with the Microsoft MS-DOS 3.2 operating system, one of the first to support Microsoft Windows 1.0. One of the benefits of the 248 was its network capabilities, so in 1987 the Academy completed the Cadet Barracks Local Area Network (CBLAN). The authors of “A Two-Edged Sword” note that CBLAN was one of the first networks extended to all the living spaces of a collegiate institution and eventually became “one of the world’s biggest.” Furthermore, they posit that Chief Goldcoat



Goldcoat working with computer system circa 1964.

# Past in Review

Master Sergeant John Junod implemented CBLAN as a localized version of ARPANET, the forerunner to the Internet. By 1990, computing at the Academy included more than 5,000 personal computers and 25 minicomputers, including 10 Unisys 5000/95 machines that provided email (more than 10,000 daily) bulletin board services (approximately 2,500 messages at any one time), newsfeeds and typical file and print operations to the West Point community.

The third stage of West Point computing began in 1996 when Lieutenant General Daniel Christman '65, Superintendent, approved a plan to allow cadet PCs access to the Internet (the domain name "usma.edu" appeared a year earlier). According to Colonel Ron Dodge, the current Director of USMA's Informational & Educational Technology

Division, which is the successor to the ACC, this stage saw a number of developments. First, more cadets started to enter the Academy with a background in computers, so the Goldcoats found themselves having to do less consulting and assisting work. Conversely, as laptop computers started to replace desktop ones, a problem with the contractor responsible for repairing cadets' computers forced the Goldcoats to take on the task of repairing hardware. Security also became a factor in this stage, and the Academy, recognizing that universities are some of the most hacked organizations in the country, slowed its innovations to concentrate on protecting its network. Ironically, one of West Point's biggest innovations debuted in this stage, the Common Access Card, which authenticated the user to the network.

West Point is now in its fourth stage of computing. Dodge defines each stage as "taking the functionality from the previous device and moving it to the next in miniature." The hallmarks of this latest stage are wireless capability and portable tablet computers. Because of their size, tablets don't have the same memory or computing power as earlier devices, but, according to Dodge, this is not a problem, given their ability to connect to the Cloud. "In some respects, we've returned to mainframe computing with the advent of the Cloud," says Dodge. "With wireless capability, our cadets are able do their computing any time and anywhere, and from a user's perspective this puts West Point miles ahead of any other university in terms of both security and functionality." ★

## STARTtheDAYS!

AUGUST	SEPTEMBER	OCTOBER
9-10 Grad Marchback	6 West Point Band Labor Day Concert	23-25 Parents Weekend
12-14 Class of 1967 West Point Alumni Leaders Conference	11 9/11 Remembrance Ceremony at Trophy Point	<b>FALL REUNIONS</b>  <b>SEP 17-20</b> Classes of 1980, 1985  <b>OCT 8-11</b> Classes of 1975, 1990  <b>OCT 15-18</b> <b>HOMECOMING</b> Classes of 1995, 2000, 2005, 2010
15 Acceptance Day—Class of 2019	13-19 Branch Week	
16 Affirmation Ceremony—Class of 2017	19 Army Sports Hall of Fame Induction	
28-30 Ring Weekend—Class of 2016		

Upcoming events suggested by West Point staff & faculty.

Events for Nov 2015—Jan 2016 should be sent to [editor@wpaog.org](mailto:editor@wpaog.org) by Aug 15, 2015.

For the entire calendar, go to [WestPointAOG.org/calendar](http://WestPointAOG.org/calendar)





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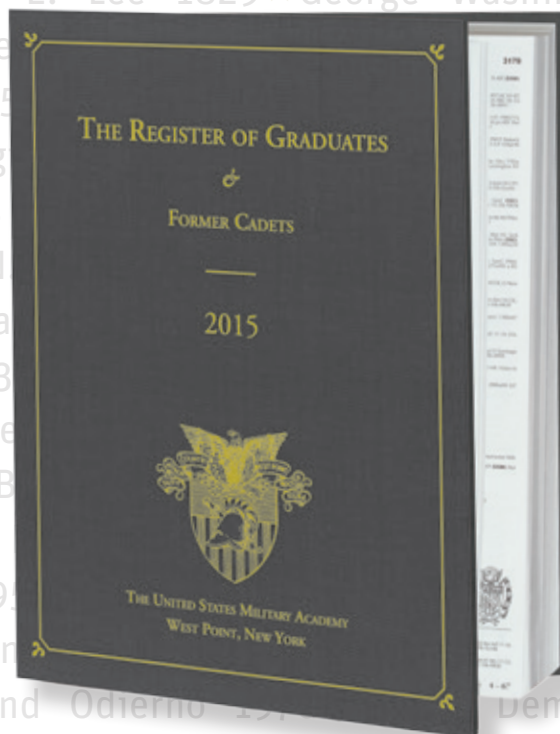
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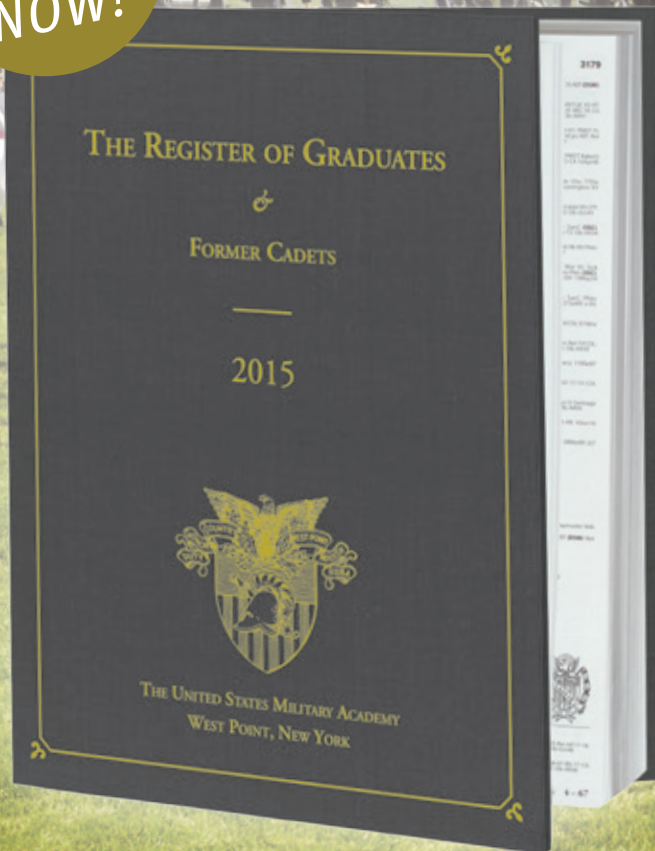




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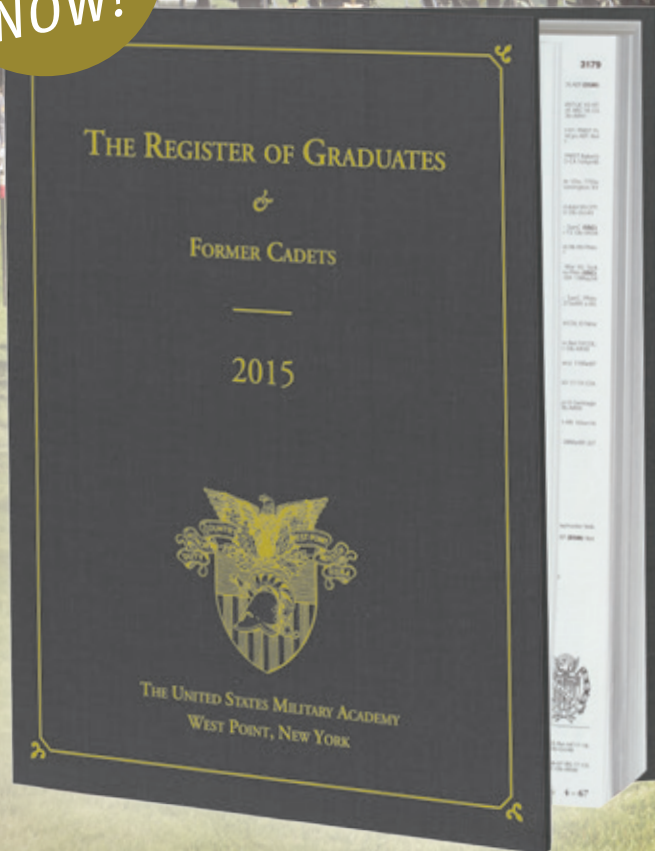
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