ABERDEEN TEST CENTER
THE POINT POSITION
Celebrating 100 Years of Testing Excellence, 1917 - 2017

*U.S. Army Aberdeen Test Center, APG, Maryland* *Volume 2, Number 4, October 2017*

## Fifty Years of Dedicated Service

**Mr. John Wallace, Technical Director, ATC**

COL Morris L. Bodrick
Commander, U.S. Army Aberdeen Test Center

As commander of the U.S. Army Test Center, it has been a pleasure to serve alongside such hardworking professionals. Each day presents new challenges requiring team members to consolidate their knowledge and experience. We have Pathway students; Army Civilian Training, Education and Development Systems (ACTEDS) interns; and 5- to 40-year veterans all pushing the technological envelope in testing to ensure the provision of safe, effective, and reliable equipment to our Soldiers. The knowledge base at ATC in 1967 was cultivated over the succeeding years by our Technical Director, Mr. John Wallace, who this month celebrated his milestone 50th year of service to the Federal Government. Mr. Wallace has shared his knowledge in testing, supporting ATC's mission during wartime, from Vietnam to our current battles in Afghanistan and Iraq.

Mr. Wallace began his federal career in 1967 with the U.S. Army Corps of Engineers before transferring to

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### *In This Issue...*



# SOMTE: Bridging the Gap Between Laboratory and Field


A showcase of current testing was presented during a visit by Sergeant Major of the Army Daniel Daily. Shown here at the Trench Warfare Bradley building are CSM Connette (ATEC), CSM McCoy (CECOM), CSM Tia (APG Garrison), SMA Daily, SSG Chuisano (ATC), CSM Angulo (RDECOM).

*SSG Hector J. Vega*

*SOMTE Soldier, Office of the Director, Command Staff Directorate*

***Soldier, Operator, Maintainer, Test and Evaluation--putting theory into practice.***

To Soldiers in the field, the priority is, and always will be, the mission. If a piece of equipment helps them to fulfill the mission, it is invaluable; if not, it becomes a burden and is left behind. Therein lies the gap--between the Engineer in the design laboratory and the Soldier in the field.

Engineers design military equipment according to specifications they understand and for the purpose they envision. Soldiers, on the other hand, do not think like engineers. Somehow, the gap between theory and practice must be bridged. Enter the Soldier, Operator, Maintainer, Test and Evaluation, known as SOMTE. These Soldiers have the unique opportunity for hands-on testing of new and improved equipment before it is fielded to the U.S. military. "SOMTEs have an early look at the equipment while changes to the equipment or manuals can be made," said Michael Singh, test officer in the U.S. Army Aberdeen Test Center (ATC) Warfighter Directorate. Singh added, "Engineers design the equipment in the lab with what they think the

*See **SOMTE**, page 5*

# We Test - You Survive

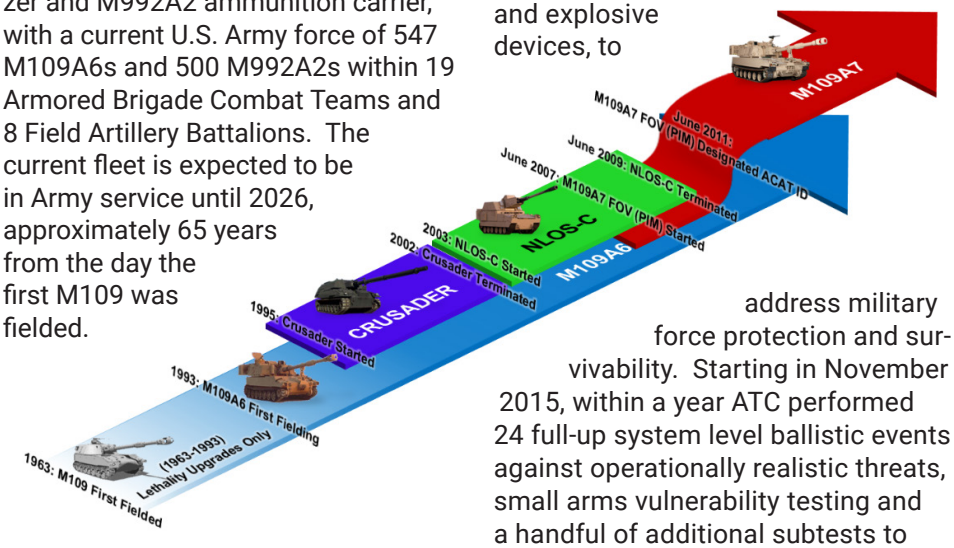
*Paul J. Kwashnak, Mechanical Engineer*

*Test Officer, Live Fire Branch, Survivability/Lethality Directorate*

***ATC—the Center for Excellence in Live Fire vulnerability and lethality testing***

Vietnam War-era M109 SPH.

The original 155 mm M109 self-propelled howitzer (SPH) was first fielded in 1963 during the Vietnam War era. By 1993, various improvements and iterations led to the M109A6 howitzer and M992A2 ammunition carrier, with a current U.S. Army force of 547 M109A6s and 500 M992A2s within 19 Armored Brigade Combat Teams and 8 Field Artillery Battalions. The current fleet is expected to be in Army service until 2026, approximately 65 years from the day the first M109 was fielded.




Evolution of the M109 SPH.

The mission of Product Manager Self Propelled Howitzer Systems is to provide Maneuver and Field Artillery Commanders with an advanced, survivable and affordable fleet while sustaining the current M109A6 fleet through 2026. That's where the M109 Family of Vehicles (FoV) rolls in, including the M109A7 Self-Propelled Howitzer and M992A3 Carrier Ammunition Tracked (CAT) vehicle. The updated M109 FoV will replace all M109A6 and M992A2 vehicles in the current fleet.

The M109A7 howitzer and M992A3 carrier provide endurance and resiliency via rapid, lethal and precision fires in adverse and hostile conditions. These vehicles incorporate agility and enhancements that are more typically seen in armored fighting vehicles. The goal of the M109A7 howitzer operating unit is to destroy, neutralize or suppress the enemy by indirect fire.

ATC has completed congressionally mandated Live Fire testing of the M109 FoV in accordance with Title 10, Section 2366, of the United States Code. Realistic ballistic testing encompasses a range of likely threats, including indirect and direct fire and explosive devices, to address military force protection and survivability. Starting in November 2015, within a year ATC performed 24 full-up system level ballistic events against operationally realistic threats, small arms vulnerability testing and a handful of additional subtests to characterize subsystem performance.

The M109A7 SPH demonstrates resilience during an artillery detonation.

ATC uses a wide spectrum of technologies to investigate crew and system response to combat threats. Anthropomorphic test devices and wooden mannequins simulate crew members during ballistic events and contain instrumentation to collect data on how the human body responds to blasts and blast overpressure, fragments, blunt injury, thermal radiation and toxic gas. Test vehicles are fitted inside and out with state-of-the-art equipment such as photographic devices, strain gauges, thermocouples and laser tracking to monitor the environment during testing.

The M992A3 CAT, the M109A7 SPH counterpart, is subjected to an underbody blast.

Vehicles are also equipped with an onboard data acquisition system to monitor functional status and real-time capability diagnostics of the vehicle during test events, and to better understand vehicle degradation to combat utility. Simulated fire support exercises are performed to assess the ability of the vehicle to continue its primary mission following an attack.

ATC, the Army's Center for Excellence for congressionally mandated Live Fire vulnerability and lethality testing, tirelessly supports the evaluation of the improved M109 FoV as an integral part of the Armored Brigade Combat Teams and Field Artillery Battalions.

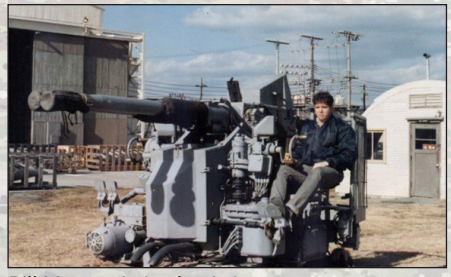
The M109A7 SPH and M992A3 CAT are flanked by the various members of the Integrated Live Fire Team, referred to as Team Paladin.

# THEN AND NOW

## Military Veterans Contribute to Paladin Program Success

William V. Morgan enlisted in the U.S. Marine Corps (USMC) in 1980. He attended Aviation Ordnance School at Naval Air Station in Millington, Tennessee, and then Marine Corp Air Station in Yuma, Arizona. Morgan was stationed in Iwakuni, Japan, for one year as an Aviation Ordnance system technician supporting USMC fighter squadrons in the Philippines and in South Korea. He deployed onto the USS Tarawa, supporting helicopter and Harrier attack squadrons. During that time, his deployment was extended to support United Nations peacekeepers in Beirut, Lebanon. Morgan was honorably discharged in 1984, and in 1985, he was hired at Combat Systems Test Activity as an artillery tester. Morgan has supported all aspects of weapons testing, foreign and domestic. He was named an international asset by the British Intelligence community and North Atlantic Treaty Organization (NATO) for his work on foreign weapon systems. During M109A7 Paladin testing, Morgan was an integral part of vehicle preparation and assessment. His command of fire control systems and turret mechanics proved invaluable, and he currently supports the Opposing Forces Technical Branch, Aviation & Foreign Systems Division, Warfighter Directorate. After 32 years at ATC, Morgan describes his personal mission thusly: "I hope I can help, even in the smallest way, to keep the Warfighter safe."

William Morgan



Bill Morgan in Iwakuni, Japan.

Christopher (Chris) J. Raab enlisted in the U.S. Army in September 1978 as a Heavy Equipment Operator, and he became proficient in operating heavy construction equipment. After basic and advanced training at Fort Leonard Wood, Missouri, Raab served for 18 months in Bravo Company, 3rd Engineer Battalion, at Fort Stewart, Georgia, and for two years in the 42nd Engineer Company, Berlin Brigade, West Berlin, Germany, where he was promoted to Sergeant. Raab worked closely with combat engineers on road obstacles and civil projects. In Berlin, at the height of the Cold War, while convoying the 110 miles from West Berlin to West Germany, Raab encountered tense situations and came face-to-face with Soviet and East German soldiers at checkpoints as they scrutinized paperwork. Before receiving an honorable discharge in September 1982, Raab was awarded the Army Commendation Medal.

Chris Raab


Sgt Raab at the Grafenwoehr Training Area in northern Bavaria, 1981

In 1985, after a short stint in private industry, Raab started at ATC as an artillery tester. After more than 32 years, Chris is now an engineering technician supporting fire control testing and survivability/lethality programs. He is considered a subject matter expert on foreign armored vehicles for the intelligence community. Raab received a Bronze Award in 1993, and a Silver Award in 2010, from the Baltimore Federal Executive Board.

# Unconventional Weapons Protection

*Daniel R. Hubbert*

*Chief, Force Sustainment and Chemical/Biological Protection Branch, Soldier Systems Division, Warfighter Directorate*

The Chemical-Biological Protective Shelter (CBPS) undergoes automotive durability testing on ATC's Munson Gravel Course.

Since sixth century BC, chemical and biological weapons have existed, developing into greater threats over the ensuing millennia. Some of the earliest references to toxic warfare include burning projectiles, poisoning water, catapulting plague-infected bodies and creating blinding smoke screens. The development of modern chemistry in the mid-19th century helped increase the sophistication of toxic weaponry.

Although outlawed by the 1972 Biological Weapons Convention and 1993 Chemical Weapons Convention, recent headlines have brought the shadow of chemical and biological warfare back into public consciousness.

The ongoing threat of chemical-biological attacks necessitates a broad mission for the DOD's Joint Program Executive Office for Chemical and Biological Defense (JPEO CBD). JPEO CBD exists to enable the U.S. Armed Forces to prepare, protect, prevent, respond and recover within the realm of chemical and biological, as well as radiological and nuclear, defense.

Although ATC is not the primary U.S. Army Test and Evaluation Command (ATEC) test center for chemical and biological defense systems, ATC plays a key role in the development and fielding of these systems. The systems undergo testing in environmental extremes such as low and high temperatures and blowing rain, sand and dust. ATC's test courses and vibration facility are used to assess the ability of the systems to withstand the shocks and vibrations of transport over some of the planet's roughest terrains, in varied environments.

At any moment, ATC's Force Sustainment and Chemical/Biological Protection (FS&CBP) Branch might be testing several chemical and biological defense systems. One system currently under test is the Next Generation Chemical Detector, designed to detect and identify chemical warfare agents in real-world scenarios. Subjecting the system candidates to high and low temperature extremes, as well as to extreme humidity, produces data necessary for the program manager to make an informed decision about system capabilities.

FS&CBP also answers the call for testing less common, but no less important, real-world needs. The Soldier-specific Dismounted Reconnaissance Sets, Kits, and Outfits system has undergone upgrades, including a change in radios that require speech intelligibility testing. On a reconnaissance mission for chemical, biological, radiological or nuclear weapons, communication is key—but the required personnel protective equipment includes a full face mask and gloves, making it difficult to handle a radio. Although rigorous and time-consuming, speech intelligibility testing ensures radios are compatible with all required protective equipment.

The CBPS undergoes reliability, availability, maintainability (RAM) testing.

The CBPS undergoes rain testing to determine the shelter's resistance to rain infiltration.

In addition to protecting personnel in theater, the DOD must be prepared to transport chemically or biologically contaminated human remains in a safe manner that protects all involved. FS&CBP supports this effort by performing tests on contaminated remains transport systems. Similar to the transport requirements for all hazardous chemicals and biological substances, these transport systems must pass rigorous hazardous material transportation requirements to comply with numerous international and federal regulations.

A human remains transfer system undergoes shock testing using the ATC Rail Impact Test Facility to induce test-specific shock loading.

As technology advances, chemical and biological threats become more sophisticated and dangerous, and the ability to protect and detect becomes ever more challenging. At ATC, the men and women of the FS&CBP Branch are proud to provide testing in support of this mission.

***SOMTE,*** *From page 1*

warfighter will use, but Soldiers have a different mentality. They are mission oriented." This real-world experience adds value to any test, as SOMTEs give feedback not only on whether the equipment works, but also on how they would use it in the field.

SPC Jose Mendoza wears an improved outer tactical vest, mission-oriented protective posture (MOPP)-4 clothing, and a life vest to simulate emergency egress of an amphibious vehicle.

SMA Daily checks the weapon of SOMTE Soldier SGT Mark Chuisano.

Each SOMTE belongs to a key military occupational specialty (MOS) from combat arms, such as 11B (Infantry), 19K (Armor Crewmen) or 12B (Combat Engineer), or to combat support 88M (Transportation). Noncommissioned Officer in Charge SFC Thomas Walter manages the ATC SOMTEs, reviews the SOMTE requests and assigns the personnel best fitted to the test. "It really feels like we make a difference," explains SFC Walter, "but [we] are capable of so much more." To maintain proficiency in their respective MOS, SOMTEs approach every test as a training exercise. For SFC Walter, the S and T in SOMTE really strike a chord: "We strive to be great Testers, because we are Soldiers and we know that we will be using this equipment in the near future." As of now, the SOMTE program is small, and scheduling can be a challenge. SFC Walter envisions the SOMTE program growing to support multiple tests with dedicated personnel to provide consistent feedback, similar to military line units.

SOMTE Soldiers are being timed on target acquisition with different optic candidates.

Whether as a stand-alone program or as an augmentation to an already established test community, SOMTEs are a great asset. The opportunity for Soldiers to give early feedback on new equipment that they themselves may eventually use is critical to its success.

***DEDICATION,*** *From page 1*

the Material Testing Directorate (MTD, which eventually became ATC). He has worked on a variety of automotive and fire control systems and has held technical management positions at ATC since 1987. Everyone knows

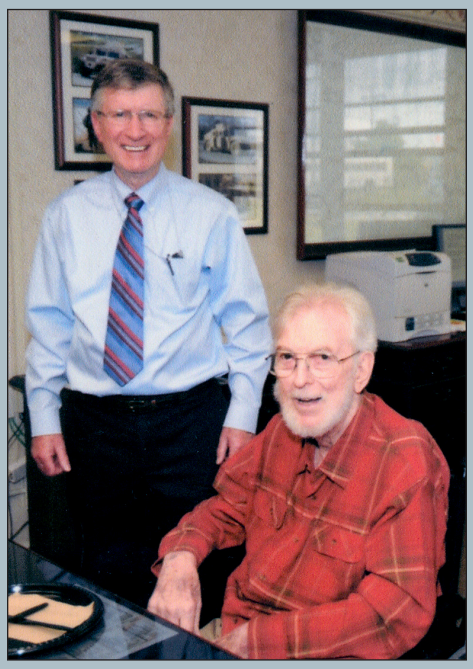
A young John Wallace, far right, lines up with other testers in front of an M1 Abrams tank.

Mr. Wallace as our Technical Director, a position he has held since 2004, but I call him my technical compass in navigating the tremendous amount of technology we engage in daily in our diverse portfolio.

Mr. John Wallace

Earlier this year at the 32nd Annual National Test & Evaluation Conference in San Diego, Mr. Wallace was recognized with the Walter W. Hollis Award for Lifetime Achievement in Defense Test & Evaluation, a well-deserved honor. The accomplishments mentioned in his award selection form the backbone of ATC and its capabilities. Mr. Wallace has been critical in pioneering and propelling many of the testing processes we use today. He was the Lead Instrumentation Engineer who worked to prove out the Moving Target Simulator (MTS, aka The Bubble); he also directed the development of the Black Box, used to collect crucial, real-time data in Afghanistan for the test community. He was also principal to the design, funding, and construction of the Automotive Technology Evaluation Facility (ATEF), our new high-speed test track. Many of these accomplishments have been huge successes for ATC and the Army and have shaped both how we test now, and will continue to test well into the future.

Mr. Wallace talks with fellow West Virginian WWII Medal of Honor recepient Hershel "Woody" Williams.



Mr. Wallace poses with his friend and mentor, past ATC Technical Director Mr. Jim Kelton.

At Mr. Wallace's 50th anniversary award ceremony, MG John W. Charlton, Commanding General of the U.S. Army Test and Evaluation Command, presented to Mr. Wallace a 2-Star Note and a Commanderís Coin. As Mr. Wallace will be the first to say, many people on his journey paved the way for him to do what he enjoyed doing: making a difference.

After 50 years of dedicated service, Mr. Wallace shows no sign of slowing down. Currently, he is facilitating a partnership between ATC and Aberdeen Proving Ground's High Performance Computing (HPC) team to build ATC's capabilities with autonomous systems and cyber testing. Both areas are primed to become major ATC efforts in the future.

It is interesting to reflect on the mere 66 years between the Wright Brother's first flight at Kitty Hawk and


Mr. Wallace on a TDY test assignment.

Neil Armstrong's first steps on the moon. In that brief period, the United States grew from having no powered flight to achieving arguably the greatest technological achievement of mankind. What will ATC look like when some of you reach the 50-year mark?

Please join me in congratulating Mr. Wallace, a consummate professional, on an extraordinary job well done!

***HISTORY,*** *From page 8*

engineers strived to fulfill the three main design areas: mobility, lethality and survivability. They succeeded in creating a tank that was faster and more maneuverable than earlier tanks and was suitably armored for greater crew protection. The advanced turbine engine provided reliability and quieter operation than the diesel tank engines of the preceding M60 tank series. Through arduous live fire testing at USACSTA, the M1 tank proved to be formidable, and it remains on the modern battlefield.

An early test of the M1Abrams Battle Tank.

The First Gulf War began in August 1990 and immediately boosted testing activity at USACSTA. The BFV proved its worth alongside the M1 tank. The war ended in February 1991, but in that short time, many weapons systems and vehicles tested at USACSTA proved competent in theater.


Automotive Tilt Table

In December 1991, the Automotive Tilt Table, a hydraulically powered platform device, was completed. This new technology tilted wheeled and tracked vehicles to determine roll and pitch stability under a number of load conditions, in a controlled setting. At Michaelsville, a covered, 300-meter, 60-foot-high firing range completed in March 1992 enhanced small arms weapons testing; the range could house a light combat vehicle for test firing and eliminate delays caused by surface winds and other outdoor adverse weather conditions.

On June 2, 1995, USACSTA became the present day Aberdeen Test Center. In its first year, ATC completed one of its largest projects ever. The Underwater Explosion Test Facility (UNDEX or UTF) officially opened on July 19, 1995. UNDEX is a large pond, 1,070 feet long by 920 feet wide by 150 feet deep, and is used by the Navy and Army to test underwater explosives without endangering marine life.

The Accelerated Corrosion Test Facility opened on January 6, 1999, at Munson Test Area. Vehicle corrosion testing was combined with durability testing so that the interaction between corrosion and the physical stresses acting upon a vehicle could be observed. A Fire Safety Test Enclosure (the Firebox) was opened later that year. In June 2001, the Bridge Crossing Simulator was officially opened to test fatigue-prone areas of bridging programs. These new facilities allowed tests that formerly took weeks or months to complete to be performed in a much shorter time period.

*Continued next issue*


An underwater explosion disrupts the stillness of the UTF.

# 100 Years of Excellence: The ATC Story, Part 7


*Excerpted from an article by Lauren Nelson*

In 1985, the Materiel Testing Directorate was reorganized as the U.S. Army Combat Systems Test Activity (USACSTA), testing combat weapons, systems and vehicles, other automotive equipment, ammunition components, munitions and general equipment, radioactive environment simulation and research and development programs for test instrumentation, methodology and facility performance requirements. USACSTA's purpose was to test and develop Army materiel, from the Soldier's uniform to the Main Battle Tank, to ensure the U.S. Soldier would have the best equipment possible on the modern battlefield.

As testing advanced, USACSTA became more environmentally aware, partially because of an incident in the late 1980s. Three senior Chemical Research Development and Engineering Center (CRDEC), employees were tried and convicted on charges of noncompliance with federal environmental laws. As a result, environmental impacts for all testing activities are assessed through the National Environmental Policy Act (NEPA).

In addition, the Noise Abatement Program monitored off-post noise levels and regulated test firing to limit effects on the community. The Chesapeake Bay Protection Program (CBPP) addressed the Spesutie Island Causeway Initiative, which had changed the flow of water along the APG coastline and caused channel sedimentation problems. A dredging project and the addition of culverts were proposed to mitigate sedimentation issues.

CBPP also addressed the test firing operations that had fired into the waters of the Upper Chesapeake Bay since 1917. Quite a collection of munitions exists along the shoreline, especially in the area around Poole's Island. At the time, it was not feasible to clean up the entire shoreline; the funds did not exist to move 70 years' worth of munitions buildup, and it would interfere with testing. The long-range artillery work was moved to Yuma Proving Ground.

120 mm gun firing test

A BFV undergoes survivability testing

A major development in the early years of USACSTA, live fire testing is the realistic firing of live rounds of ammunition of all shapes and sizes on vehicles and other systems to search for vulnerabilities. This process was launched into the spotlight with the controversy surrounding the Bradley Fighting Vehicle (BFV), a light, swift-moving troop carrier, in the mid-1980s. The BFV accrued a lot of scrutiny in Washington, D.C., because it was a troop carrier mounted with a large anti-tank weapon system.

In addition, the M1 Abrams tank underwent extensive live fire and vulnerability testing—designers and

*See **HISTORY**, page 7*

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*Thank you to everyone who contributed to this edition of The Point Position.*