



ABERDEEN TEST CENTER

# THE POINT POSITION



U.S. Army Aberdeen Test Center, APG, Maryland

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## Making a Difference

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

Soldier participation in developmental

testing and evaluation is crucial in building Warfighters' confidence in the systems we place in their hands.

The October 2017 issue of The Point Position introduced the Soldier, Operator, Maintainer, Test and Evaluation, known as SOMTE, program. Currently, along with three officers, we have 14 experienced, noncommissioned officers, or NCOs, between the ranks of Sergeant (E-5) and Sergeant First Class (E-7). This skilled group comprises a cross section of the Army's military occupational specialties, including infantry, armor crew, combat engineering, maintenance and motor transport. The NCOs continually advance their knowledge through leadership courses and other specialized programs, such as air assault, mountain warfare, explosive ordnance clearance and diving.

See **DIFFERENCE**, page 5

### In This Issue...

- 1 Making a Difference
- 1 Readiness, Modernization, and Human Capital: An Interview with MG Charlton
- 2 Warrior Injury Assessment Manikin (WIAMan) Live-Fire Tests Begin
- 3 ATC Designated as One of the U.S. Automated Vehicle Proving Grounds
- 4 Hiding in Plain Sight
- 8 The ATC Story, Concluded

## Readiness, Modernization, and Human Capital: An Interview with MG Charlton



Major General John Charlton

*The Point Position Staff*

***ATEC gives each test center a specific mission for testing and development.***

***Prioritizing the men and women of the civilian workforce promotes the needs of the Soldier.***

When asked how he spends his free time, MG John Charlton's answer is quick and self-effacing. "I got a boat this summer," he says. "I did more fishing than catching." It's an easy answer to an easy question.

In his role as ATEC commanding general, Charlton is faced with much

See **MG CHARLTON**, page 6

## Ceremony Marks Beginning of Next 100 Years of Testing



On January 2, 2018, ATC Soldier, Operator, Maintainer, Test and Evaluation, or SOMTE, Soldiers fire a commemorative shot from an M777A2 Lightweight 155mm Howitzer, recognizing 100 years of testing. Exactly 100 years earlier, in a blinding snowstorm at a ceremony celebrating the opening of the proving ground for testing, Mrs. Marion Stockholm, wife of retired Major Edward Stockholm, fired the first gun (a model 1905 3-inch field gun), marking the first test conducted at the new proving ground.

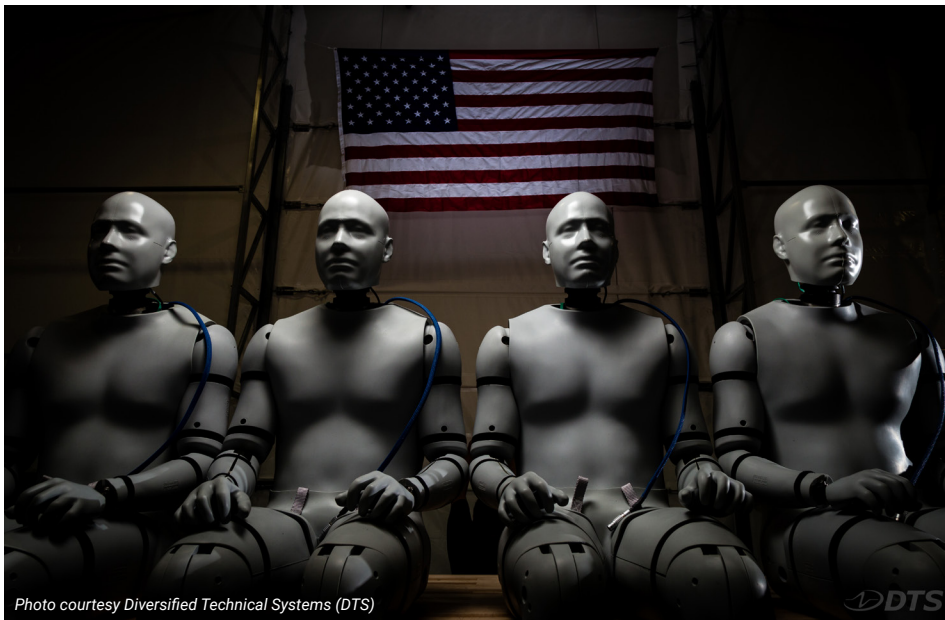


Photo courtesy Diversified Technical Systems (DTS)

## Warrior Injury Assessment Manikin (WIAMan) Live-Fire Tests Begin

Chris Monahan

*Mechanical Engineer, Data Acquisition and Crew Injury Branch, Ballistics Instrumentation Branch, Survivability/Lethality Directorate; ATEC Representative to WIAMan Engineering Office*

### **A smarter crash-test dummy for survivability.**

Recently, U.S. Army Aberdeen Test Center (ATC) executed the first live-fire tests in military vehicles with the U.S. Army Research, Development and Engineering Command (RDECOM)/U.S. Army Research Laboratory (ARL) Warrior Injury Assessment Manikin (WIAMan) Technology Demonstrator (TD) crash test dummy. WIAMan is the first anthropomorphic test device (ATD) that is purpose-built for military use—creating a scientifically valid injury assessment capability for underbody blast (UBB) testing of ground vehicles in Live Fire Test and Evaluation (LFT&E) and research, development, test and evaluation. Current UBB tests in LFT&E rely on Hybrid III, an ATD built for use in automotive frontal crash testing. However, because of Hybrid III limitations, LFT&E is unable to accurately assess survivability in UBB conditions. The new WIAMan will have a crucial role in improving protection of ground vehicle systems, evaluating the effects of UBBs on mission-critical tasks and quantifying risk to military personnel.

The WIAMan ride-along tests began in March 2017, when ATC executed a Medium Heavy Tactical Vehicle (MHTV) Cougar Floor Upgrade Developmental Test for the U.S. Marine Corps. Seated in the assistant driver's seat, the WIAMan TD sustained no damage, demonstrated human-like movement during the event and collected data on all channels.

In June, the WIAMan TD participated in a six-shot test series for an ARL/Survivability/Lethality Analysis Directorate (SLAD) study to investigate end-to-end variability in LFT&E. ATC used a heavily modified Mine Resistant Ambush Protected RG-31 vehicle that was up-armored to withstand multiple shots without permanent hull deformation or damage. WIAMan's participation was limited to a single seat per test, with Hybrid IIIs occupying the remaining seats. ARL/SLAD used only the vehicle and Hybrid III data in their analysis; the WIAMan data is being analyzed

independently to compare responses of WIAMan and Hybrid III.

These ride-along opportunities have been incredibly valuable to the WIAMan program. The WIAMan TD has demonstrated significant durability and reliability in these tests—remaining undamaged and collecting data on all fronts—observations during testing found WIAMan to be easier and faster to install and position in vehicles than the standard Hybrid III ATD.

To record and measure what the ATD experiences, WIAMan is designed with state-of-the-art sensor and data acquisition system (DAS) technologies that allow researchers to fully understand the physical stress a human occupant would endure. WIAMan ATD instrumentation is designed specifically to withstand large-magnitude events, and the DAS is the smallest of its kind, making WIAMan one of the most versatile ATDs in existence.

"The research, development and test communities have contributed tremendously to the WIAMan effort," said Fred Hughes, Director of the WIAMan Engineering Office. "The program anticipates successful transfer from ARL to Program Executive Office Simulation, Training and Instrumentation in summer 2018, with fieldable prototypes procured within two years, to support future live-fire tests beginning in 2020."



WIAMan TD participates in an MHTV Cougar test at Aberdeen Proving Ground.



## ATC Designated as One of the U.S. Automated Vehicle Proving Grounds

*Camille Robbins*

*Division Chief, Tactical Vehicles  
Division, Automotive Directorate*

**More than 40,000 persons died on U.S. roads in 2016.**

**Human choice or error factors into 94 percent of vehicle crashes.**

For car drivers logging even minimal time on U.S. roadways, the statistics quoted above, from Fortune.com and a Department of Transportation (DOT) report, are unlikely to shock.

Nor is it surprising that the trend toward highly automated vehicles (HAVs) is high-profile, both in the civilian world and in the military.

Sensor technologies such as vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I), show potential for reducing the number and severity of crashes, and their inclusion in HAV systems could enhance safety and performance. Moreover, while a human driver might duplicate mistakes made by countless drivers, an HAV can be programmed to avoid repeated errors.

As the lead tester for vehicle platforms within the DOD, ATC has made substantial investments and improvements in infrastructure, processes and procedures to prepare for the future of automated, autonomous and robotic vehicles. Part of that investment included the formation in 2015 of the Unmanned Vehicles Division, whose primary mission is to test new, current and emerging technologies that operate robotically or autonomously.

Connected vehicles leverage the high-speed ATC Automotive Technology Evaluation Facility course.

On January 19, 2017, former U.S. Transportation Secretary Anthony Foxx announced the DOT's designation of 10 proving ground sites from around the country as Automated Vehicle Proving Grounds. Designees were selected from a competitive group of more than 60 applicants, including academic institutions, state and local government agencies, and private entities and partnerships, each having the primary mission of supporting the advancement of automated and connected vehicle

the pace of safe deployment."

At the first Community of Practice meeting, held in February 2017 at the American Center for Mobility at Willow Run, each designee provided an overview of its site and potential collaboration areas related to policy, test standards and procedures, and community outreach. ATC hosted the second meeting this past summer.

As an Automated Vehicle Proving Ground designee, ATC receives access and support from DOT

for testing on public infrastructure. ATC is collaborating with the Federal Highway Administration on their platooning technology, known as Cooperative Adaptive Cruise Control, or CACC (see The Point Position, April 2017, page 2). In support of this testing and the advancement of V2I technology, ATC installed 11 Dedicated Short Range Communications radios around its Automotive Technology Evaluation Facility high speed test track.

As noted in the Federal Automated Vehicles Policy, September 2016, the benefits of HAVs extend beyond safety, potentially opening doors to people and communities that now have limited options—"people with disabilities, aging populations, communities where car ownership is prohibitively expensive, or those who prefer not to drive or own a car." HAVs might also potentially increase infrastructure capacity, save energy and reduce air pollution. As a designated Automated Vehicle Proving Ground, ATC is en route to the safe deployment of self-driving technology and the future transformation of military, commercial and personal mobility.

### Automated Vehicle Proving Grounds Designees

**City of Pittsburgh and the Thomas D. Larson Pennsylvania Transportation Institute**

**Texas Automated Vehicle Proving Grounds Partnership**

**U.S. Army Aberdeen Test Center**

**American Center for Mobility at Willow Run**

**Contra Costa Transportation Authority and GoMentum Station**

**San Diego Association of Governments**

**Iowa City Area Development Group**

**University of Wisconsin-Madison**

**Central Florida Automated Vehicle Partners**

**North Carolina Turnpike Authority**

technology. Among the 10 designees selected was ATC.

Selection criteria included demonstration of capable safety planning, willingness and ability to share and disseminate information, and evidence of consistent adherence to all applicable laws, regulations and policies.

"The designated proving grounds will collectively form a Community of Practice around safe testing and deployment," said Foxx. "This group will openly share best practices for the safe conduct of testing and operations as they are developed, enabling the participants and the general public to learn at a faster rate and accelerating



# Modernizing Army Camouflaging Technology

## HIDING IN PLAIN SIGHT

Glenn A. Rogers

*Chief, Signatures and Soldier  
Performance Division, Warfighter  
Directorate*

The U.S. Army Aberdeen Test Center (ATC) is preparing for an ambitious multiyear effort testing camouflage nets as part of a plan to upgrade from 1990s, and older, technology to a modern multispectral solution. Legacy nets were designed to provide protection in woodland, desert and snow environments.

Led by Product Manager Force Sustainment Systems (PdM FSS), the Ultra-Lightweight Camouflage

Netting System (ULCANS) Increment I will reduce the vulnerability of military personnel in conflicts around the globe. ULCANS Increment I will camouflage military systems in woodland, desert, urban, snow and alpine environments across six electro-optic imaging bands, in addition to radar.

The program was opened up to worldwide competition to bring the best possible solution to the U.S. Army. Testing consists of a three-phase program, beginning with a down-select, then competitive prototype testing, and finishing with developmental and operational testing.




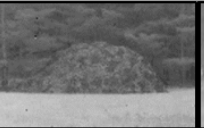

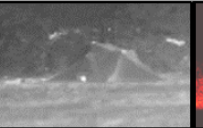
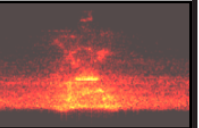
ATC has overarching responsibility for the test program with support from multiple U.S. Army Test and Evaluation Command (ATEC) subordinate organizations, research laboratories, and U.S. Navy partners to execute the down-select at three worldwide locations simultaneously. The test officer leading the effort holds a degree in physics, which is critical for oversight of sensor imaging and analysis. The test officer will be supported by an engineering psychologist, who will lead aspects of performance, assessed by Soldier-observers.

*Continued next page*



Legacy Woodland (left) and Desert (right) Camouflage Nets



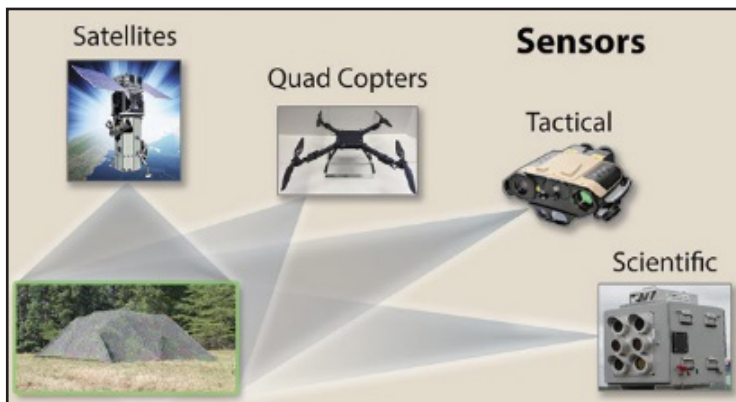
Ultraviolet	Visible	Near Infrared	Short Wave Infrared	Mid Wave Infrared	Long Wave Infrared	Radar
280-400 nanometers	400-700 nanometers	700-860 nanometers	0.9-1.7 micrometers	3 - 5 micrometers	8 - 12 micrometers	5-100 Giga Hertz
						

Camouflage Net Multispectral Performance Concept

Scientific sensors will be operated by the Night Vision Electronic Sensors Directorate, tactical sensors by the Naval Surface Warfare Center and Naval Research Laboratory, and unmanned aerial systems with multispectral sensors by the Target Management Office. Multispectral satellite imagery will be collected by the Cold Regions Research and Engineering Laboratory, and laboratory radar measurements will be made at the U.S. Army Research Laboratory.

By test program completion, more than \$2 million of test measurement instrumentation will have been developed, which will dramatically

enhance the Army's signature measurement capabilities and augment the current capabilities of ATC's Signature Measurement Test Facility. The facility is equipped with a turntable to rotate tactical vehicles in a natural outdoor environment for efficient data collection from various azimuths and elevations. Adding unmanned aerial systems and satellite measurements will dramatically extend ATC's global reach and provide the U.S. Army with data from relevant environments worldwide.



Multispectral Sensors (Satellite, Quad Copters, Tactical and Scientific)

## DIFFERENCE, From page 1

We rely on the SOMTEs' vast experience from combat and other assignments, inside and outside the continental United States, to help us determine if a system's form, fit, function and performance permits it to move from developmental testing to operational testing and, ultimately, fielding to Soldiers. Our SOMTEs perfectly complement ATC's engineers and test officers.

Traditionally, direct Soldier involvement did not occur until a program reached operational testing, which happened after design and user manuals were near completion and changes became more costly.

Our SOMTEs provide feedback on a wide range of systems, from vehicles and explosives, to firearms and helmets. For a chemical and explosives screening test, they reviewed an instructional video with printed

procedures and attempted to use the system based on the instructions. They identified shortfalls in the video and procedures that were corrected so that Soldiers in the field could be trained to effectively use the system.

In another test, SOMTEs compared the egress routes of a new vehicle variant and demonstrated how platform changes had negatively impacted a Soldier's ability to quickly and safely exit the vehicle. This invaluable test data led to vehicle modifications and ways to mitigate potential issues before the vehicle entered operational testing.

Our SOMTEs have been instrumental in working with Program Executive Office, Soldier, known as PEO-Soldier, on proposed designs and product improvements. Recently, the SOMTEs helped to test two variants of proposed bomb suit helmets to compare field-of-view, and they provided valuable feedback

to PEO-Soldier and evaluators early in the process. The SOMTEs were also involved in testing integrated ear and eye protection to determine which system will work best in operationally relevant environments.

These are just a few examples of how the SOMTEs enhance ATC testing and contribute essential insight within the acquisition life cycle in the design and development of equipment.

Every program that comes through the Army Test & Evaluation Command carries with it the goal of providing Soldiers with the equipment they need to fight and win on an ever-changing battlefield. The earlier we can shape design decisions and identify issues, the more efficiently we will provide capabilities that are safe, effective and reliable to our most important assets, the U.S. Soldiers, Sailors, Marines, Airmen and Coast Guardsmen.

# THE **POINT** POSITION

**MG CHARLTON**, *From page 1*

harder questions every day, and his success rate in handling these issues is much better than his luck with fish.

Overseeing multiple test centers spread across the United States, each with highly specific missions, is a complicated juggling act that MG Charlton manages by focusing on three priorities: readiness, modernization and the needs of both the Soldier and the workforce.

"Here at Aberdeen Test Center, we do testing of every M1 Abrams main gun tube, and every Paladin gun tube that goes out to the field comes here first," he says, listing only a handful of examples drawn from a long list of programs. "We do ammunition lot testing across all the test centers, [and] Dugway is heavily involved in Chem-Bio training of some of our most elite forces. So I think maintaining our ability to support readiness is very important. Structuring our tests so they not only satisfy our test requirements, but they also provide some training value to the FORSCOM (U.S. Army Forces Command) units, is part of that."

Then there's modernization. "Obviously, every new thing that comes out into the Army comes through ATEC first," he continues. "We play an instrumental role in making sure our Soldiers get the very best. So obviously we want to maintain our test capabilities. We want to make sure we have the best people to do the testing, and we want to make sure we are testing in ways that allow Army senior leaders to make good decisions on what systems and equipment to field to the force."

And, of course, there's the third point, described as "human capital" – the Soldiers, the people in their lives, and the workforce family. "This force is unique. You've got some experienced Soldiers [with] a lot of operational background, and the civilian workforce is very diverse with some amazing skill sets, some of which are probably underappreciated



MG John Charlton speaks to Program Specialist Christina McClung in his office at ATEC HQ.

or not recognized to the degree they should... Every test center you go to, you'll find a unique set of skills out there that are really impressive. In fact, one of the things I'm concerned about is, Are we keeping pace with the recruitment and retention of that high-quality workforce? They're really the lifeblood of this organization, when you get right down to it."

All of these elements need to find balance, both in terms of the test centers, and the wider mission. "Each test center has a certain focus area," he says, "and I want them to maintain that focus area. If they're going branch out into something new, I want it to be a conversation we have -- a deliberate decision-making process, so we're not inadvertently adding different missions and different capabilities and then having a bunch of excess. So that's something I've got to manage from an enterprise level."

Previous involvement with Army testing as the commanding general of the Brigade Modernization Command at Fort Bliss, Texas, poised MG Charlton for his current role. "We

supported the Network Integration Evaluation, which is arguably the largest operational test the Army does each year," he says. "That was my first exposure: working with the U.S. Army Operational Test Command (OTC), the ATEC organization, [and] working closely with the Director for Operational Test and Evaluation (DOT&E). I think that's what ultimately led me to coming here, because I had the operational background and some background in testing; so I think the Army looked at that and said, 'Yeah, he'd make a good choice for the ATEC command.'"

It's a role in which MG Charlton takes personal and professional pride. "When we finally get something tested and fielded, I think that's a great thing, because we contributed to the fielding of a great capability that the Army needs... and I think for many people who work here, when you see something go through all the trials and tribulations of testing but finally make it [through], and the Soldiers like it and they're saying good things about it: that's a great feeling."





The weight of a HMMWV is no challenge to the Roadway Simulator's 13-ton capacity.

## **HISTORY**, From page 8

of up to 120 miles per hour. Another important facility added, in 2006, was the Littoral Warfare Environment (LWE). At 400 feet wide and 450 feet long, LWE can create waves of up to six feet tall and handle underwater explosions of up to 500 kilograms of TNT equivalent.

The past decade has seen staggering changes in technology and warfare. Drones and robots (large and very small), microwave weapons, cyber warfare and artificial intelligence, concepts that were confined to the technological laboratory not long ago, have become part of the daily lexicon and global threats.

These developments, including the proliferation of conventional weapons and a rapidly evolving "battlefield," define the challenges the U.S. Army and ATC face moving forward.

ATC is well positioned to meet these challenges, testing new weapons such as the Modular Handgun System (MHS) in 2017 and innovative evaluation of protective body armor, including the Integrated Head Protection System helmet, torso protecting hard armor plates, soft armor for the torso and extremities, and combat eye protection.

Realizing that vehicle survivability data

may be different on a static vehicle than on one that is moving, ATC designed and built a unique test course enabling the conducting of "dynamic mine testing." On this course, the effect of a mine explosion under a moving vehicle can be quantified and analyzed, with significantly greater real-world relevance.

In addition, the testing of integrated communications and display technologies, unmanned ground vehicle and robotic systems and cyber defense has never been more challenging or critical. ATC is continually enhancing existing facilities and designing cutting-edge new facilities to meet those challenges.

While rapidly evolving technologies are the source of clear and present danger, they also provide the tools to streamline testing and acquire and analyze more detailed data, providing context and relevance to Army decision makers.

Over the past decade, ATC's test facilities and expertise have been sought out by other U.S. Government organizations, including the Department of Homeland Security, as they face similar threats and challenges.

ATC is poised to face the "battlefield" of the future, in whatever form it takes, testing to provide our military personnel with the most effective equipment and protection possible.

One hundred years have passed since the Army occupied the flat, fertile farmland on the northwest coast of the Chesapeake Bay. A century of changes have transformed that land from a few ranges dedicated to the firing of arms and ammunition, to a heavily wooded expanse where tests are performed on every piece of equipment the Soldier touches. ATC's mission is constantly expanding to adapt to the needs of the modern warfighter according to the current battlefield. Essentially, the work of this command is timeless. The tradition of excellence that has graced APG since the beginning has remained constant. The dedication and hard work of the people of ATC is steadfast and confirms ATC's place as a center of testing excellence.



An MRAP vehicle moving at 30 mph undergoes a dynamic mine underbody blast event at ATC.



## 100 Years of Excellence: The ATC Story, Concluded



*Excerpted from an article by Lauren Nelson, with additional comments by The Point Position Staff*

After the World Trade Center attacks on September 11, 2001, the United States entered into the Global War on Terrorism and a new era in testing at APG. ATC's mission was to plan and conduct developmental tests and joint developmental/operational tests; develop test procedures, methods and instrumentation to meet the needs of advancing technologies; and provide test and training support to the joint warfighter. ATC also began supporting the Future Combat Systems (FCS) Combined Test Organization Node, the second largest FCS test facility in the country. Major combat vehicle systems, munitions, small arms, components of uniforms, tents and even



An MRAP undergoes IED-inspired survivability testing.

vessels used by the Navy and Marine Corps were tested by ATC.

In Iraq and Afghanistan, U.S. troops faced a new type of guerilla warfare, in which improvised explosive devices, known as IEDs, and roadside bombs were the main threat. With the pressure of quickly providing safe, efficient equipment to the troops in theater came an attitude similar to that during WWII and the Vietnam War: "get it done." Testing needed to be performed quickly, efficiently and accurately.

New troop transportation vehicles providing optimum protection against insurgent attacks were brought to



A Stryker Mobile Gun System is equipped with slat armor designed at ATC.

ATC for extensive testing. The Stryker Mobile Gun System arrived in late 2002, followed by Mine Resistant Ambush Protected vehicles, known as MRAPs.

In April 2004, armor vulnerability was discovered in the Stryker vehicle. The ATC team led the effort to design, fabricate and test prototype add-on armor

for the tank. This immense undertaking was completed in only seven days. Charles Valz, then director of Survivability/Lethality, was a part of that effort: "I was golfing on a Sunday," he recalled, "when I got a phone call, 'Hey, we need to meet at our shop... the General [Major General George Armbruster] wanted to talk to us about what we could put on the Stryker vehicles to defend against rocket propelled grenades.'" Their conclusion was that slat armor would be the most effective measure to temporarily armor the Stryker.

The prototype was so successful that slat armor was put on all variants of the Stryker; by October, all field-ed Strykers were equipped with slat

armor. "The neat thing about slat armor," Valz said, "is we kept getting reports back from theater such as, 'Hey, this vehicle got six hits...but nobody died, because of the slat armor.' The slat armor performed the way it was supposed to...[and]...proved to be a very worthwhile intermediate

solution. ATC should be very proud of what was done with slat armor."

The Roadway Simulator was opened on April 16, 2003, for performance, safety and durability testing on military and commercial trucks with a gross vehicle weight of up to 13 tons at speeds

See *HISTORY*, page 7



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