

# INSIDE <sup>PEO</sup> STRI

SPECIAL EDITION: FIELDING LVC-IA

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*U.S. Army photo*

Soldiers at Fort Hood, Texas, prepare to participate in the “live” portion of the testing of the Live, Virtual and Constructive Integrating Architecture. The Soldiers are from the 2nd Brigade Combat Team, 1st Cavalry Division.

## PEO STRI Fields Much-Anticipated Revolutionary Training System

By Rick Gregory, APEO Business Operations Support Staff

When PEO STRI was formed in October 2002, the preparations for fielding a Live, Virtual and Constructive Integrated Training Environment (LVC-ITE) were in the crawl state. Today, it’s off and running with the first testing and fielding of the LVC-Integrating Architecture (LVC-IA) taking place at Fort Hood, Texas.

“For the first time, commanders up to brigade level will be able to oversee and direct mission planning and rehearsal using live, virtual and constructive assets that have the ability to communicate

with each other,” said Col. Wayne Epps, project manager for Constructive Simulation at PEO STRI. “Now, when conducting mission rehearsals, the common operating picture will be so realistic commanders won’t be able to distinguish live assets from virtual or constructive ones. As an example, the commander won’t know if it’s a real helicopter he is directing in the mission or one being operated by a pilot in the Aviation Combined Arms Tactical Trainer, one of the virtual simulators.”

With Soldiers being pulled out of Iraq, the urgency for fielding LVC-IA has increased. This means units would have more time at their home station, putting a strain on the limited ranges and training areas. Virtual and constructive environments integrated with live training help offset the competition for those live resources.

“In the recent past, a typical Army base had most of its units deployed. That gave the units in pre-deployment mode ample space to conduct live training,”

Epps explained. “Now that situation has been reversed. Where in the past they may have had two units deployed and one on home station, there are now more units at home station simultaneously. That gives them limited training space since they are competing for time on the same live training areas.”

He said by integrating virtual and constructive entities into live training, the commanders will need less real ground to train on because they can expand their

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## A Message from the Program Executive Officer



When speaking of teamwork, Henry Ford once said, “Coming together is a beginning. Keeping together is progress. Working together is success.”

His quote fits perfectly with the extraordinary teamwork that has gone into fielding the first Live, Virtual and Constructive – Integrating Architecture (LVC-IA) capability at Fort Hood, Texas, this year.

A dynamic, dedicated team from industry, government, military services and academia came together many years ago to begin exploring the possibility of creating a blended training environment. Keeping together through the various trials and tribulations in bringing this revolutionary training model to reality was a key element to ensure the steady progress we have enjoyed. Working together with a common, focused vision of providing our nation’s Warfighters a realistic, high-intensity training capability has led us to the success we have achieved with LVC-IA as the glue that makes the Integrated Training Environment (ITE) a reality.

While we have just fielded the first version of the LVC-IA, we are actively involved with all of our partners to steadily add more virtual and constructive simulations to the live elements, so commanders will have an increasing number of warfighting assets available to conduct their mission rehearsals.

I am extremely proud that PEO STRI played a leading role in this team effort and am honored to be part of such a hard working and devoted workforce that remains steadfast in our commitment to succeed in this extremely worthy endeavor. You can be proud to know you had a hand in ensuring our military men and women are the best trained Warfighters in the world.

As you read through this special edition of Inside STRI, I’m sure you will appreciate the amount of effort that went into procuring, fielding and sustaining each training device, system and hardware/software asset that collectively enable the LVC-ITE.

Dr. Jim Blake

# LIVE It is No Game. Real Soldiers. Real Action. Real Sweat.



By Rick Gregory, APEO Business Operations Support Staff

“Bang, bang! You’re dead,” the youngster playing a Soldier with a toy rifle would shout at his opposing force, usually his brother or a friend.

“No, I’m not, you missed me!” would be the “enemy’s” response. “Are too!” the argument would continue.

Fortunately, today’s real Soldiers training in the live domain of the Live, Virtual and Constructive-Integrating Architecture don’t have to spend time arguing with each other thanks to a system called the Multiple Integrated Laser Engagement System (MILES).

When originally fielded in the 1980s, the Soldier knew he had been shot by opposing forces when his MILES sensor made a beeping noise. A controller in the field training exercise would then tell the Soldier he was “dead” and no longer in that portion of the exercise. It was easy, however, for the Soldier to fudge a bit and reenter the mock battle by simply refreshing his MILES equipment. Additionally, the system did not capture any data, so commander’s had no way of knowing who shot whom. Those days are gone.

With the new MILES, when combined with the Homestation Instrumentation Training System (HITS), commanders and staff in the tactical operations center can track all the action, including Soldiers, vehicles and equipment, on the HITS exercise control (EXCON) stations, similar to EXCON stations at the maneuver combat training centers (MCTC).

“We have made tremendous strides in technology over the years to provide our Soldiers the most realistic live training possible,” said Col. Mike Flanagan, project manager for Training Devices.



U.S. Army photo

**Soldiers conduct training using the Multiple Integrated Laser Engagement System, an integral part of the “live” portion of the Live, Virtual and Constructive-Integrating Architecture.**

“With HITS combined with MILES, commanders can now track the activity of up to 2,000 live players and 8,000 constructive participants during live force-on-force and force-on-target exercises. Together, MILES and HITS are the vital facilitators for the live portion of LVC-IA.”

During mission rehearsal exercises, Soldiers, individual and crew-served weapons, and tactical vehicles are outfitted with MILES. The movement of each asset is then tracked through HITS providing commanders a picture of all the activity on the battlefield.

HITS not only shows commanders the real-time movement of the assets deployed, but also provides information on the casualty effects of the simulated weapons engagements such as direct fire from individual weapons



U.S. Army photo

**One of the Homestation Instrumentation Training Systems’ workstations.**

and the results of indirect fire from simulated engagements such as artillery and mortar rounds.

“Commanders now have an exceptional tool that provides them an at-the-moment assessment of what is going on during the mission rehearsal exercise,” Flanagan said. “Best yet, HITS also provides a full after-action review within 20 minutes of completion of the exercise.”

He added that HITS can

simultaneously monitor and record up to 16 tactical voice networks as well as use recorded live video feeds from field cameras.

“I speak for everyone on the PM TRADE team when I say we are extremely proud to work alongside our fellow PM teams to field LVC-IA,” Flanagan said. “With 26 years in the Army, I speak for myself when I say the PM TRADE team is one of the finest that I have had the pleasure and honor to lead.”

# **VIRTUAL** Putting the Power of Simulation Into the Hands of the Warfighter



By Rick Gregory, APEO Business Operations Support Staff

During battle, there are two sounds that put fear into the hearts of the enemy while eliciting a “hooah” from Soldiers. One is the clanking and heavy rumbling of an Abrams tank entering the battle with destructive fire power, while the second is the thumping sounds of an approaching helicopter preparing to rain down misery from the sky.

Training for synchronizing air and ground maneuver and fire for those tankers and aviators to bring an unfair fight to the enemy is extremely costly when done in a live environment. That’s where “virtual” plays a major role in the Live, Virtual and Constructive-Integrated Training Environment (LVC-ITE).

During fielding of the LVC Integrating Architecture (LVC-IA), the Aviation Combined Arms Tactical Trainer (AVCATT) and Close Combat Tactical Trainer (CCTT) will provide virtual air and ground assets to commander during mission rehearsals. When training on the AVCATT and CCTT for their real-world mission, Soldiers find the simulators extremely valuable.

In an article in Fort Rucker’s post newspaper, The Army Flier,

**"The use of AVCATT and CCTT has provided great cost savings, and enabled high risk, individual, and collective training while keeping Soldiers stressed but safe in a simulator."**



U.S. Army photo

**A pilot trains on the Aviation Combined Arms Tactical Trainer, one of the virtual trainers being used in the first increment of the Live, Virtual and Constructive-Integrating Architecture fielding.**

Lt. Col. Shawn Pricket, the deputy commander of the 10th Combat Aviation Brigade, referred to the AVCATT training as “the most relevant and needed training prior to being asked to conduct combat operations.” His unit, based at Fort Drum, N.Y., had trained at Fort Rucker prior to deploying to Afghanistan.

The AVCATT replicates the cockpit environments of the Apache attack helicopter, the Kiowa observation and direct support helicopter, the Blackhawk troop transport, resupply and combat assault helicopter, and the Chinook, a heavy-lift transport helicopter. The crews wear a Helmet-Mounted Display for “out-the-window” realistic virtual environments, based on the Synthetic Environment Core (SE Core) database products.

They engage with threat or friendly semi-automated forces that are integrated through OneSAF (One Semi-Automated Forces).

The transportable AVCATT suite is comprised of two trailers with six reconfigurable modules, a Battle Master Control room for role players and controllers or observers, and an after action review theater.

“When commanders use LVC-IA for mission training, they can bring any combination of virtual aircraft and ground combat vehicles as cohesive units into the same training exercise as live and constructive training elements,” said Col. Harry Buhl, project manager for Combined Arms Tactical Trainers. “The use of AVCATT and CCTT has provided great cost savings, and

enabled high risk, individual, and collective training while keeping Soldiers stressed but safe in a simulator. The power of LVC-IA brings those Soldiers training in a simulator on the same battlefield as other training domains.”

In a comparison conducted in 2010, the cost of 14,400 actual flight hours cost in excess of \$45 million, while using AVCATT for training for the equivalent number of hours cost \$13 million.

Buhl said that during the LVC-IA exercises, the crews in the AVCATT now, for the first time, have the ability to do air-ground integration with live forces, while expanding linkages with other virtual simulators to more accurately train in larger units.

“They can interoperate with

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# CONSTRUCTIVE Providing Constructive, Integrated Simulation Environments



By Rick Gregory, APEO Business Operations Support Staff

For years, military commanders have had to rely on a big table, lots of sand and little figures representing Soldiers, equipment and the lay of the land when conducting training for their units. The command staff would be huddled around the sand table, moving the friendly and opposing forces with their hands as they learned through radio communications how the mission was progressing. It was constructive simulation at its primitive stage.

In the 1980s and 1990s, the U.S. Army largely replaced these sand tables with computer-based constructive simulations to provide an unconstrained exercise environment, enabling multiple levels of command and staff to perform their normal warfighting tasks. Now, as the latest generation of constructive simulations comes of age, PM ConSim is delivering more intelligent, capable and flexible constructive simulations (e.g., OneSAF and WARSIM) and enabling components (e.g., SE Core) to update the older first generation systems.

“During training at their home stations, because of space and their given landscape, commanders can’t always replicate the operational environment for which they are training,” said Col. Wayne Epps, project manager for Constructive Simulation. “By incorporating constructive simulation in training exercises, we can add those realistic conditions in their virtual training simulators and through their Mission Command Systems.”

PM ConSim provides the “C” in the fielding of the Live, Virtual and Constructive-Integrating Architecture (LVC-IA). The current constructive component of LVC-IA version 1 is the Joint Land Component Constructive Training Capability (JLCCTC). To improve interoperability, PM ConSim will add the capabilities of OneSAF

and SE Core to the JLCCTC capability.

JLCCTC is the state-of-the-art technology that is a collection of simulations, data collection and after-action review tools. Basically, they provide the new sand table. Together, the JLCCTC components stimulate the commander’s Mission Command System to cause the command and staff to react to the incoming digital information they are receiving on the ongoing training exercise.

“JLCCTC creates a realistic training environment for commanders and their staffs from brigade to theater level,” Epps said. “The constructive simulation toolkit consists of a number of models, tools and interfaces that commanders can use based on the training audience. In the second version of LVC-IA, OneSAF, or One Semi-Automated Forces, will play the role of a constructive ground model.” In addition, it is expected that PM ConSim’s other flagship constructive model, WARSIM, will also be available to training audiences as a constructive model in LVC-IA.

OneSAF, when integrated with SE Core, or Synthetic Environment Core, simulates aspects of the urban operating environment with special attention paid to detailed buildings for urban operations including interior rooms, furniture, tunnels and subterranean features.

“OneSAF and SE Core generate the common virtual training environment that Soldiers see when they look through the helmet-mounted displays or out the window in virtual trainers such as the Aviation Combined



U.S. Army photo

Soldiers work in a command post with data provided by the Joint Land Component Constructive Training Capability (JLCCTC) during a training exercise.



U.S. Army photo

A Soldier monitors the constructive simulation provided by One Semi-Automated Forces (OneSAF) during a training exercise.

Arms Tactical Trainer or the Close Combat Tactical Trainer,” Epps explained. “The terrain, weather, buildings, equipment, weapons and other aspects of the battlefield are brought to virtual life through OneSAF and SE Core. The realism they generate for the virtual trainers is incredible.

“What is also incredible is the great work accomplished by the PM ConSim team since I have been here and long before I arrived,” Epps said. “Their knowledge, enthusiasm, dedication to the job at hand and continued professionalism give me great pride in being the project manager of ConSim.”

# Black Jack Brigade field tests new training systems

By Staff Sgt. Daniel Wallace, III Corps and Fort Hood Public Affairs

More than 600 Soldiers participated in a live training event as part of the field testing of the Army's Integrated Training Environment recently at Fort Hood.

Members of the United States Army Training and Doctrine Capability Manager have been the trainers and overseers while the Soldiers, members of the 2nd "Black Jack" Brigade Combat Team, 1st Cavalry Division, are the first to field test the equipment that integrates live training with computer-based virtual simulation programs and simulators.

Lt. Col. Shane Cipolla, United States Army Training and Doctrine Project Office – Integrating Architecture director, described how the system will tie together the Home Station Instrumentation Training System, a high-tech laser tag; the Aviation Combined Arms Tactical Trainer, a helicopter simulator; the Close Combat Tactical Trainer, a tank and infantry fighting vehicle simulator; and the ITE to make it possible to conduct a simultaneous live and virtual training exercise.

Cipolla said that while live training is always the best training to do, one of the great advantages that the ITE has is its ability to allow units to put whole brigade combat teams into the field through virtual play and simulated environments.

"It may not be as high fidelity as the live, but it's still good training for subordinate units without putting them all out in the field," Cipolla said. "The integrating architecture is currently designed to focus on the brigade combat teams, but we would like to be able to support division-sized elements in the future."

Before they bring the system Army-wide, Cipolla said they will complete the first fielding of the ITE by mid-December, and receive critiques from the Black Jack brigade afterward. He said



U.S. Army Photo/Staff Sgt. Daniel Wallace, III Corps and Fort Hood Public Affairs

**Bob Cohen, a Training Capabilities Management Live combat developer, discusses the Homestation Instrumentation Training System during a Live, Virtual and Constructive Integrating Architecture training exercise.**

they can go back to the team that makes the integrating architecture and implement any necessary changes before the system goes Army-wide.

Col. Robert Whittle Jr., Black Jack brigade commander, said they were happy for the opportunity to help the Army assess how the new system is working, as well as put his command teams and troops through their paces.

"The timing for us is perfect," Whittle said. "We just had a turnover of 80 percent of our staff and 100 percent of our commanders and command sergeants major, all within the last 90 to 120 days. Normally, these Soldiers are assigned for two or three years at a time. So we've got a new team, and this is an opportunity for us to train that team on mission command."

Whittle explained that trying to train an entire brigade combat



U.S. Army photo

**A tank crew departs to participate in the "live" portion of the testing of the Live, Virtual and Constructive-Integrating Architecture.**

team is an enormous task that would normally cost taxpayers an enormous amount of money, requiring the use of a large area or terrain and the many other factors evolved. Technology changes that, he said.

"By leveraging live training, virtual training and constructive

training we're able to bring everything together and make it a common operational picture for staffs at battalion, task force, squadron and brigade combat team levels," Whittle said. "That's the goal we set for integrated architecture, and that's what we're doing this week."

battle space with a synthetic environment. This will then allow more units to be trained while at home station.

When LVC-IA is fielded, Epps said it will provide commanders an opportunity to “plug and play” Increment 1 Training Aids, Devices, Simulators and Simulations (TADSS) for training purposes.

Here’s how it will work.

Based on their mission training objectives, commanders determine at which level (company, battalion or brigade) they want to run a training exercise using LVC-IA. They will also determine what combination of live, virtual and constructive simulations and simulators they need based on their training objectives.

Through coordination with the home station’s Mission Training Complex, the unit will coordinate availability of the

live, virtual and constructive assets, connectivity to the training aids, devices, simulators and simulations being used and the resources available to support the training event.

Based on the training objectives, a scenario is then developed that will mirror the operational environment in which the unit would be conducting the actual mission.

Once all of the training assets are in place, the commander will issue an operations order to the lower echelon commanders and the training exercise will begin.

During the exercise, with the LVC-IA stimulating the Mission Command System, the commanders and staff will have a common operating picture that is generated by live, virtual and constructive simulations and simulators. Commanders will be controlling the exercise using Soldiers in the field using

real equipment, Soldiers using simulated equipment, and semi-automated simulated forces. They all will appear as live entities.

“The training exercise can last hours or several days, based on the size of the exercise and how the exercise progresses. LVC-IA Increment 1 will facilitate training exercises lasting up to a maximum duration of four days,” Epps explained. “Following the conclusion of the exercise, LVC-IA provides commanders consolidated after action reviews.”

Just like any training enabler, the LVC-IA was put through a test period, called a First Use Assessment (FUA). The test was conducted with Soldiers from the 1st Cavalry Division at Fort Hood, Texas.

“In fielding the first LVC-IA system to Fort Hood, it is providing us great feedback

and lessons learned in order to continue improving the capability,” Epps said.

Col. Robert Whittle Jr., the commander of the brigade conducting the FUA, said in an article in the Fort Hood Sentinel that he was happy to help assess the new system, especially since it was at an opportune time for his unit.

“The timing for us was perfect,” Whittle said. “We just had a turnover of 80 percent of our staff and 100 percent of our commanders and command sergeants major, all within the last 90 to 120 days. Normally, these Soldiers are assigned for two or three years at a time. So, we’ve got a new team and this was an opportunity for us to train that team on mission command.”

Projected fielding sites for 2013 include Forts Bliss, Texas, Campbell, Ky., Drum, N.Y. and Korea.

**VIRTUAL** *continued from page 4*

other AVCATT systems or ground simulators to create a combined arms training environment,” he said. “For the LVC-IA exercises, some Armor and Mechanized Infantry Soldiers will be in the Close Combat Tactical Trainer (CCTT) performing the same mission as their other counterparts training live with Abrams and Bradley formations in the maneuver area.”

The CCTT supports training for infantry, armor, mechanized infantry, cavalry and armored reconnaissance units. The computer-driven manned modules replicate the Abrams Tank, Bradley Fighting Vehicle, Cavalry Fighting Vehicle, Bradley Fire Support Team Vehicle, Armored Personnel Carrier, Heavy Expanded Mobility Tactical Truck and the High Mobility, Multipurpose Wheeled Vehicle.

“Soldiers in the CCTT operate in a virtual battlefield environment that surrounds them with synthetic, realistic scenes, and replicates the

operational terrain on which their fellow Soldiers are conducting the mission in the live environment,” Buhl explained. “They can also see and coordinate with their teammates in separate simulators as they engage semi-automated forces generated by OneSAF.”

Buhl said that, though he has been leading PM CATT for just a short period of time, he’s impressed with the dedication and drive of the team.

“The power of LVC-IA to provide seamless training across domains, I think, will provide commanders with a robust and flexible set of training capabilities to meet their unit training goals. The success of AVCATT and CCTT with LVC-IA speaks highly of the daily commitment of the entire PM CATT team to ensure the virtual aspect of LVC-IA would interoperate so well with live and constructive,” he said. “I am extremely proud to be part of this team.”



Inside a Close Combat Tactical Trainer.

*U.S. Army photo*

# LVC-IA

## LIVE, VIRTUAL, CONSTRUCTIVE-INTEGRATING ARCHITECTURE



### INTRODUCTION

Live, Virtual, Constructive-Integrating Architecture is a program of record that establishes more persistent interoperability and integration of Live, Virtual and Constructive simulations and simulators with Mission Command Systems. LVC-IA will enhance the ability to replicate the operational environment allowing the commander to train his unit more effectively. LVC-IA is operationally-focused and will be the engine or glue for multi-echeloned collective training up to brigade level.

### FEATURES

- Mitigates the constraints inherent in single environment training by expanding interoperability and battlespace
- Commanders can customize the right mix of tools specific to their training requirements.
- Reduces required funding and manning resources
- Net-ready, user-friendly persistent capability
- Simulations control

