



MSIAC M&S Newsletter

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USJFCOM JOINS HIGH-TECH SCIENTIFIC RESEARCH

(SUFFOLK, Va. - Nov. 07, 2006) - U.S. Joint Forces Command (USJFCOM) will join five other local government and education partners on a high-speed, high-bandwidth network designed and engineered specifically for scientific and military research.

The Eastern Virginia LightWave Internetworking Technology Enterprise network (E-LITE) will be connected to the National LambdaRail (NLR) network, which is a unique nationwide network infrastructure that is owned and maintained by the U.S. research community. That community includes U.S. research universities, regional networking organizations and private technology companies.

The NLR is an 11,000-mile nationwide infrastructure that enables the simultaneous deployment of multiple networks for experimental and production purposes. The hope is that E-LITE's linkage to the NLR will allow USJFCOM and its partners to more openly share research data and finds.

E-LITE is in the final stages of service provisioning through a five year contract awarded to Verizon in December 2005 by Old Dominion University, who manages and funds the project. Verizon has installed 150 miles of fiber-optic cabling, as well as networking hardware at each of the E-LITE partner node locations at NASA Langley, College of William & Mary, Virginia Modeling and Simulation Center (VMASC), Jefferson Labs and USJFCOM's Suffolk complex.

USJFCOM's Mark Williams, the Joint Technology and Simulation division deputy chief, described the NLR as a research and development national super highway used to transport large amounts of experimentation research from one institution to another at extremely high speeds and at a reasonable cost.

E-LITE offers a comprehensive list of services to users, including;

- a multiple 10 gigabyte per second Internet Protocol (IP) network itself, offering significantly greater speed than the current system.
- a quick start facility for new research projects in support of data and computation intensive science projects,
- a capability to spare projects in case there is a channel specific failure,
- and a test bed facility for Internet2 shared by the universities.

"From the superhighway (NLR), you have these tributaries and branches that distribute connectivity to the local area, and E-LITE is that network that's going to distribute here in southeastern Virginia," he said.

"We're always looking at developing new technology and techniques to help train them better," he said. "We're developing products in the modeling and simulation world to help stimulate their real world systems in training environment.

"The result of this is a better warfighter, through better training and we're constantly improving them, developing new tools to help them achieve their mission." For complete article visit:

<http://www.jfcom.mil/newslink/storyarchive/2006/pa110706.html>

AIR FORCE EXPANDS TRAINING PROGRAM FOR PREDATOR OPERATIONS

A steady surge in the demand for unmanned aircraft operators in the Air Force has resulted in a tenfold increase in the number of students attending the Predator schoolhouse at Creech Air Force Base, Nev.

Just about a year ago, the school was offering four classes a year that could accommodate 12 Predator crews. Each crew consists of a pilot and a sensor operator. By mid-2006, classes grew to eight a year, and each class has 120 crews.

"It's an explosion around here," says Danny Broyles, site manager responsible for the Predator training program at Creech. Approximately 150 pilots and sensor operators graduate each year from the Predator schoolhouse, says Broyles, who works for CAE, the company selected by the Air Force in 2003 to manage the Predator training program under a five-year \$10 million contract.

Pilot students are assigned to Predator after serving at least one tour in another aircraft from active duty and the Air National Guard. Pilots from nearly every combat aircraft specialty have been assigned to Predator, Broyles says.

Most sensor operators — who are taught how to manage and manipulate the imagery downloaded from the aircraft — are first-term airmen and generally arrive at Predator training fresh from the Air Force intelligence school at Goodfellow Air Force Base, Texas. Some students come from the active duty senior enlisted and junior officer ranks of the intelligence community and the Air National Guard.

Flight training includes basic Predator operations for both pilot and sensor operator students. Each student must complete 11 flights and 22 hours of training. The basic Predator qualification course lasts 70 days.

The crews sit in a ground control station and operate the Predator using computers that are linked to the aircraft via satellite. This requires crews to think as if they were in the aircraft yet also operate computer resources that are not available to aviators in-flight, such as chats with units and agencies to coordinate missions, on-line weather, on-line flight planning and instant access to current intelligence. For complete article from National Defense Magazine Visit:

<http://www.nationaldefensemagazine.org/issues/2006/December/AirForceexpand.htm>

TROOPS SWEAR BY SIMULATION TOOLS

Training and simulation technology married with lessons learned in the Middle East over the past 18 months have improved dramatically enough to directly assist military forces set to deploy to Afghanistan later this year, a top military official said yesterday during a media briefing.

A rehearsal of a joint mission that was completed this week demonstrated the capabilities of the technology, said Maj. Gen. Jason Kamiya, director of joint training and commander of the U.S. Joint Forces Command's Joint Warfighting Center.

Advancements in the logistics area, for example, mirror the capabilities of a video game familiar to Kamiya's kids. The Joint Deployment Logistics Model was used during the exercise.

"I guess I would compare our logistics modeling and simulations capabilities to SimCity," Kamiya said, "where in the context of an urban environment you can know how much fuel your car has [and] what is the bed capacity of a hospital."

These kinds of details trigger various reports and action to make sure that the proper combat support systems are in place to support operational requirements, he said.

From Nov. 14 to Nov. 20, U.S. forces participated in a unified training endeavor along with multinational counterparts and inter-agency partners. The exercise focused on the continuing requirements of Operation Enduring Freedom in Afghanistan.

Being able to synchronize multinational forces for the exercise was a key success, said Brig. Gen. Joseph Votel, deputy commanding general of the 82nd Airborne based at Fort Bragg, N.C.

"Having watched several of these exercises in the past, the one thing that we have done very well in this exercise is use recent experience in theater, and take those events and build them into the exercise so that we are looking at very realistic situations on the ground," Votel said.

Working with U.S. partners in the operation also was a boon, he said.

"I had the opportunity to engage the other day with my Afghan counterpart in the Afghan National Army," Votel said. "We had an opportunity to talk about not only exercise related things, but other things that we expect to deal with on the ground."

Votel also had an opportunity to speak with his counterpart on the Pakistan Army side. "The individual that I will deal with on a day-to-day basis in theater was here supporting this exercise and is integrated into what we're doing," he said.

As a result of the interaction, Votel said was able to start building a relationship with his counterpart "that's going to carry us over the next 14 months." For original article by in Washington Technology by Doug Beizer, visit:

http://www.washingtontechnology.com/news/1_1/daily_news/29746-1.html

ARMY TRAINING EVOLVING TO DEVELOP BETTER COMBAT LEADERS

Traditional, hard combat skills are not proving decisive in Iraq. So Army and industry innovators are responding by focusing on cognitive training scenarios to resolve the complex array of challenges facing troops there.

In recent years, the ground force has recognized the growing importance of teaching troops, at increasingly lower echelons, how to take on leadership roles and how to make better decisions under fire — decisions that often have a crucial impact on operations, say defense officials and analysts.

Such an acknowledgment marks a change in the Army's approach to training. In the 1980s and 1990s, the thinking was that if soldiers "could do the top-end skills, we could do all the others," Lt. Gen. Thomas F. Metz, deputy commander and chief of staff of the Army Training and Doctrine Command, told reporters at the Association

of the U.S. Army annual convention, in Washington, D.C.

Iraq, however, has proved that concept wrong. "We learned that full spectrum is very challenging, particularly the cultural piece," he said.

To get at the "full spectrum," the service is developing training programs and revamping large-scale pre-deployment exercises to increase the soldiers' abilities to make decisions, essentially creating "pentathlete officers" who can adapt to multiple missions, said Metz.

The mission rehearsals at the National Training Center's simulated Iraqi villages in Fort Irwin, Calif., for example, are intended to build cognitive skills through realism, so that when troops go into actual combat, they feel they already have been exposed to the environment, said Metz.

But the initiative to improve combat leadership skills earlier in soldiers' careers, by better understanding the cognitive processes involved in decision-making, has gained momentum inside military academies and other academic institutions.

"Right now, there's an incredible premium placed on combat leadership, because soldiers and leaders are dying. So we feel very compelled, almost a moral imperative, to make sure that the graduates of the military academy and other people understand how to lead during in extremis situations," said Col. Tom Kolditz, head of the behavioral sciences and leadership department at West Point, N.Y.

He and a team of psychologists are researching the concept of in extremis leadership, or how leadership changes when lives are at stake.

Based upon observations of small units operating in Iraq in 2003 and two other West Point studies, Kolditz and his team concluded that in extremis leadership differs from business or academic leadership in non-dangerous settings in several ways. For complete article from National Defense

Magazine visit:

<http://www.nationaldefensemagazine.org/issues/2006/December/Armytraining.htm>

AMERICA'S ARMY GAME TO ADD 'REAL HEROES'

WEST POINT, N.Y. (Army News Service, Sept. 12, 2006) –"America's Army" online video game launched its newest version, "America's Army: Special Forces (Overmatch)".

The new addition features "America's Army: Real Heroes," a program that honors Soldiers who've shown heroism in the war on terror. So far, "Real Heroes" are modeled after eight Soldiers who've received an award for valor for actions in operations Enduring or Iraqi Freedom. In addition to being virtual in-game characters, the heroes are being modeled for action figures that will be sold in retail stores.

Chris Chambers, deputy director of the Army Game project, said the new characters were created to inspire Americans and highlight the values, teamwork and courage that are the fabric of today's Army.

"There are thousands of enlisted Soldiers who have been awarded medals for bravery and valor in combat, but their stories are largely unknown to the American public," said Chambers.

In the past century, most Americans were well aware of, and looked up to, Soldiers like Sergeants Audie Murphy and Alvin York, he added. "There is a great need for the public to learn the stories behind our current generation of Soldiers."

America's Army shows more than 7.5 million registered users what it's like to be a Soldier. Players assume virtual roles as Special Forces, infantry or medical Soldiers, explore individual and collective training, and eventually participate in simulated war on terror missions.

In the game's latest version, players will be able to meet and interact with the Real Heroes, and hear their stories told through a video and in the real Soldier's own words on the America's Army Web site,

<http://www.americasarmy.com/>. For complete article visit: http://www4.army.mil/ocpa/read.php?story_id_key=9559

SIMULATION ELUCIDATES ISSUES IN AIRPORT AUTOMATION

Some day, computers will control the movement of every plane and vehicle on the airport surface. If that makes you nervous, don't worry because the transition from human control to computer control will be gradual and cautious. NASA and other agencies working on the Next Generation Air Transportation System (NGATS) are developing the technologies and concepts to increase capacity, and surface automation is a key component.

However, researchers testing early concepts of how automation could work, have identified fundamental human factors issues that must be resolved before further concept definition. Using the advanced human-in-the-loop simulation facilities at NASA Ames SimLabs to replicate a realistic airport environment, the [Surface Operations Automation Research \(SOAR\)](#) concept was studied in September 2006.

Simulation data and air traffic controller feedback, acquired as part of the test, revealed that fundamental operational questions must be answered before proceeding down a design path. For example: What information is need by the controllers to use the automation tools effectively? What is the best way to present it and when? At what points should humans authorize automated directives? What should the automation do about non-conforming aircraft? And how can the system account for the variation in response time of pilots and controllers when the information is time-critical?

The experiment results were very informative and will help determine the requirements for surface automation in NGATS. Long-term benefits will be reduction or elimination of aircraft stopping or holding on the surface, enhanced safety through the accurate and timely prediction of impending conflicts, and increased capacity. For

original article visit: <http://www.simlabs.arc.nasa.gov/newsletter/news.html#ngats>

EXPECT A WARMER, WETTER WORLD THIS CENTURY, COMPUTER MODELS AGREE

Recent episodes of deadly heat in the United States and Europe, long dry spells across the U.S. West, and heavy bursts of rain and snow across much of North America and Eurasia hint at longer-term changes to come, according to a new study based on several of the world's most advanced climate models. Much of the world will face an enhanced risk of heat waves, intense precipitation, and other weather extremes, conclude scientists from the National Center for Atmospheric Research (NCAR), Texas Tech University, and Australia's Bureau of Meteorology Research Centre.

The new study, "Going to the Extremes," will appear in the December issue of the journal *Climatic Change*.

Many previous studies have looked at how average temperature or rainfall might change in the next century as greenhouse gases increase. However, the new research looks more specifically at how weather extremes could change.

"It's the extremes, not the averages, that cause the most damage to society and to many ecosystems," says NCAR scientist Claudia Tebaldi, lead author for the report. "We now have the first model-based consensus on how the risk of dangerous heat waves, intense rains, and other kinds of extreme weather will change in the next century."

The study is one of the first analyses to draw on extensive and sophisticated computer modeling recently carried out for the Intergovernmental Panel on Climate Change. The IPCC's next assessment report will be released early in 2007.

Tebaldi and colleagues based their work on simulations from nine different climate models for the periods 1980–1999 and

2080–2099. The simulations were created on supercomputers at research centers in France, Japan, Russia, and the United States. Each model simulated the 2080-2099 interval three times, varying the extent to which greenhouse gases accumulate in the atmosphere.

These three scenarios were used to account for uncertainty over how fast society may act to reduce emissions of carbon dioxide and other greenhouse gases over coming decades. For complete article from Science Daily visit:

<http://www.sciencedaily.com/releases/2006/10/061019162810.htm>

NEW SIMULATOR IS NEXT STEP ON THE ROAD TO DEVELOPING QUANTUM COMPUTERS

Scientists have proven theoretically a novel way to build a simulator that can recreate the way atoms and particles behave in a quantum system, says research published today. The proposed simulator is unique because it could let researchers control how individual particles move and interact with each other. This ability to control individual parts of a quantum system is key to the development of powerful quantum computers in the future.

The term 'quantum system' is used to describe a system which is governed by the laws of quantum mechanics, as opposed to being governed by the classical laws of physics such as mechanics, gravity and Einstein's general theory of relativity. Quantum mechanics comes into play when systems are the size of atoms or smaller, because on this very small scale the conventional laws of mechanics no longer apply. Quantum computing devices of the future, which have not yet been successfully created, will rely on scientists harnessing quantum behaviour to create systems that can far exceed the speed and processing capabilities of current silicon-based computers.

The study, published in Nature Physics, shows that a device can be built which is able to simulate the behaviour of atoms and other particles according to the laws of

quantum physics. The proposed simulator would consist of atoms and photons -- particles of light -- in an array of very small silicon cavities, measuring just 50 micrometres across. The researchers show that the atoms and photons inside the cavities would form a strongly-interacting many-body system, with photons jumping from cavity to cavity, and at the same time being scattered off each other -- all examples of quantum behaviour. For complete article from Science Daily visit: <http://www.sciencedaily.com/releases/2006/11/061127141303.htm>

NEW ROCKET ENGINE COMBUSTION CYCLE TECHNOLOGY TESTING REACHES 100% POWER LEVEL

The Air Force Research Lab (AFRL) researchers led the first Falcon Hypersonic Technology Vehicle (HTV-1) model wind tunnel tests. They conducted these tests to investigate localized aerodynamic heating and validate the accuracy of computational fluid dynamics (CFD) predictions. HTV-1 represents the first of three vehicle designs to be examined under the Falcon program. The Falcon program, a joint effort between Air Force Space Command and the Defense Advanced Research Projects Agency, is an initiative focused on developing and validating technologies needed for prompt global reach while demonstrating affordable and responsive spacelift.

Engineers from AFRL and Falcon prime contractor Lockheed Martin identified six HTV-1 flight configurations for experimental validation. The National Aeronautics and Space Administration (NASA) Langley Research Center manufactured six models representing these configurations. The models consisted of a ceramic base coated with phosphor paint, which when heated and exposed to ultraviolet light, emits radiant energy proportional to the model's surface temperature. During testing in the Mach 10 wind tunnel at NASA's Langley site, a charge-coupled device camera recorded the models' respective heating patterns.

Engineers used this recorded data to verify corresponding CFD predictions. The entire process—from initiation through testing—

took less than 2 months, a testimony to the team's skill. (Ms. A. Larson, AFRL/VAAA, (937) 255-6795) For original article visit: <http://www.afrl.af.mil/accomprpt/oct06/accompoct06.asp>

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