MSIAC M&S Newsletter

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SECOND ANNUAL MODELING & SIMULATION LEADERSHIP SUMMIT

The Congressional Modeling & Simulation Caucus, in conjunction with NTSA, will host the Second Annual Modeling & Simulation Leadership Summit on Monday, February 26, 2007, at the Chesapeake Conference Center in Chesapeake, VA. Leaders from government, industry and academia will convene to discuss issues facing the M&S industry and to make recommendations to the Caucus. Full details and registration are available via http://www.trainingsystems.org/.

USJFCOM HOSTS FIRST-RESPONDER FOCUSED MODELING & SIMULATION DEMONSTRATION EVENT

(SUFFOLK, Va. - Jan. 16, 2007) – The USJFCOM Joint Innovation and Experimentation (JI&E) Directorate's Joint Futures Laboratory (JFL) sponsored a modeling and simulation (M&S) capabilities demonstration event focused on military support for civilian agency homeland defense and security operations.

Event organizers showed how officials and first-responders can use M&S to prepare for a catastrophe: in this case a simulated 10-kiloton nuclear explosion in Washington, D.C.

In the scenario, intelligence sources also learned Norfolk, Houston, and Portland, Ore., are ports where terrorists might try to smuggle in more weapons of mass destruction (WMD). The demonstration showcased how M&S technology Breakthroughs could address these national challenges.

Demonstration experiment lead Sean Byrnes from the Joint Future Laboratory's M&S Division described the setup. "There are fourteen different systems, and they range from faster-than-real-time to... modeling in real time," he said.

Byrnes added the demonstration included engineer models depicting traffic flow and a panicky populace trying to flee the area, and where projected bottlenecks will occur. All models represented different consequences of this catastrophe.

The whole idea of this demonstration was to demonstrate what's available and to stimulate thought and collaboration, according to Byrnes.

An amalgam of government and civilian agencies and organizations as well as industry brought 14 models and tools to the demonstration. Participants focused on homeland defense tools, many of which already have been used in other operations.

For original article visit: http://www.jfcom.mil/newslink/storyarchive/2007/pa011607.html

NEW EVALUATION BRIGADE TO TEST EMERGING WARFIGHTER TECHNOLOGIES

A new brigade will test some of the most revolutionary concepts and systems being developed for future warfighters, report how they operate under field conditions, and

ultimately speed their fielding to troops on the battlefield.

The new evaluation Brigade Combat Team (BCT) will test 18 major systems being developed for the Army's future combat systems program (FCS), explained Col. Michael Wadsworth, chief of training and leader development for the future force integration directorate.

"This is the most ambitious and far-reaching modernisation the Army has had since World War II," he said.

The program's goal, Wadsworth explained, is to tap into the most advanced technologies possible "to enable soldiers and leaders to see the enemy first and understand his intentions."

"And once we understand what the enemy is going to do," he added, "we can act first and finish decisively, which is the whole notion of the future combat system."

The future force integration directorate is establishing a blueprint for that future force as it stands up the new evaluation brigade combat team and uses it as an operational test bed for new systems. Within the next six months, the brigade team is expected to reach its full strength of just under 1,000 troops.

"Basically, we're standing up an organisation to inform the Army if [the FCS program] is doing what we think it will do," Wadsworth said.

As the evaluation brigade, the future force integration directorate is developing the doctrine, organisational structure, training programs, and tactics, techniques and procedures it will need to operate. Like the systems the brigade is testing, this groundwork will be tweaked along the way to ensure it's on target, Wadsworth said.

"We'll hand the brigade the concepts, get feedback and move forward," he said. "The beauty of this is that we'll have actual soldiers on the ground with the equipment, and these soldiers will advise us as we move this concept forward."

The evaluation BCT will use a mixture of live training, experimentation and simulation to test systems ranging from sensors to automated systems to manned vehicles over the next ten to 12 years. Testing will be conducted, both here and at neighboring White Sands Missile Range, N.M., through four 'spinouts' that will enable the Army to build the new technology over time, Wadsworth said. For complete article visit: http://www.army-technology.com/news/news542.html

DEFENSE DEPARTMENT LACKS CLEARINGHOUSE FOR MILITARY VIDEOGAMES, SAY ANALYSTS

As the military begins to rely more on the so-called “serious” games to ready its fighting forces, the vendors selling the high-tech virtual trainers are voicing frustration with the Defense Department’s cumbersome acquisition process.

The government’s contracting cycle is so resource-intensive and lengthy that small game developers really have a hard time with it, especially if they don’t understand the acquisition process, said Brian Williams, research staff member at the Institute for Defense Analyses, which conducted a study for the Pentagon on the serious games market.

“This is where game developers butt heads with the Defense Department,” he added. Those selling guns, tanks, aircraft and other assorted nuts and bolts to the Pentagon have learned to live with the Pentagon’s bureaucratic ways. But video game developers, who may be used to the fast-paced consumer market, are encountering a classic case of culture clash, Williams suggested.

Get used to it, countered Roger Smith, chief scientist and chief technical officer at the Army’s program executive office for simulation, training and instrumentation. It’s the gaming industry that has to adapt to work with the government, he said.

“The military has a certain way of spending money,” he said. It goes out and purchases a tank that will last for 20, 40, even 50 years.

The same thing happens in training and simulations. When the government invests in simulations and trainers, it will maintain those technologies for 10 or 20 years.

“If we had built those simulators today, they would be filled with game technology. But we’re not going to throw away hundreds of millions of dollars because we can see a better way to do it now,” he said.

One solution that may help bridge the culture gap is an organized marketplace. The lack of a centralized procurement organization for gaming technology creates frustration among vendors, experts argue, and makes it more difficult for the Defense Department to grasp the latest technology at the best price.

“We don’t have an organized marketplace where buyers can meet sellers, where people can exchange information, where project managers can learn about development companies, where development companies can figure out what projects are out to be had,” said Bob Bates, an independent game developer. For complete article by Grace Jean, National Defense Magazine visit: http://www.nationaldefensemagazine.org/issues/2007/Febuary/DefenseDept.htm

AIR FORCE SETS SIGHTS ON ‘AIRMAN OF THE FUTURE’ VIDEO GAMES

The runaway success of military video games — particularly “America’s Army” — is motivating the Air Force to attempt even more sophisticated simulations. Gaming technologies, officials say, would allow the Air Force to broaden the training options available to airmen, and would help the service save money by shifting flying time from real aircraft to simulators.

The Air Force traditionally has relied on simulations for war planning, analysis and pilot training. But the service has lagged behind the Army and the Marine Corps in employing video games as educational tools that can be made widely available online.

That could change, if simulation technology advocates within the Air Force can persuade the top boss, Chief of Staff Gen. T. Michael Moseley, that the cost of developing the next-generation gaming systems could be offset by savings in flying hours and other efficiencies. They also assert that these technologies are key to the future of the Air Force because they would help airmen learn new combat skills and sharpen their ability to make tough decisions on the battlefield.

“We want to be able to empower the airman with tools to make decisions, and keep them educated without sending them to school,” says Keith E. Seaman, command-and-control modeling and simulation senior advisor to the secretary of the Air Force.

“We want to create the models and simulations for the airman of the future,” he says in an interview.

“Our simulators are good,” but they tend to be one-dimensional and don’t stimulate “out of the box” thinking, says Seaman. Everyone in the Air Force — from recruits in basic training to airmen, officers and non-commissioned officers training for combat — would stand to benefit from gaming technologies.

“The Air Force has not been engaged in the gaming community as well as the Army and Marines have,” he says. But the intent is not to copy what the other services are doing. “They primarily focus on the shooter. Our approach is holistic.”

The ideal simulation, he says, would be adaptable to suit many different audiences. Further, it would challenge airmen to tackle problems unconventionally. “Think of the Kobayashi Maru,” he says, referring to the complex training exercises that challenged Captain Kirk of Star Trek to contemplate seemingly no-win scenarios.

Gaming technologies could give airmen a competitive edge in their preparation for combat and in their overall education as they move up the career ladder, Seaman says.

Another piece of the long-term strategy to improve training technology in the Air Force is to introduce more advanced simulators

that not only can replicate a single aircraft model but also complex combat missions.

For complete article by Sandra I. Erwin, National Defense Magazine, visit: http://www.nationaldefensemagazine.org/issues/2006/December/AirForceSets.htm

NAVAL WAR GAME PROBES FUTURE ENEMIES

(NEWPORT, R.I.) — The war-gaming department at the Naval War College here has been conducting workshops to help the Navy determine options for a new maritime strategy.

One workshop in the fall revealed that the United States' strategic posture could drive how other nations react, which in turn would affect global security.

The five-week long game involved numerous experts playing the parts of China, Iran, Pakistan, North Korea, radical non-state groups and the United States.

There were four U.S. postures:

Selective engagement: in which the U.S. attempted to focus on key areas of the world to prevent conflicts;

Primacy: in which the U.S. attempted to maintain its unquestioned position as military, political and economic front-runner in world;

Cooperative security: in which the U.S. recognized it must rely on allies and international institutions;

Offshore balancing: in which the U.S. pulled back to allow other nations to arm themselves and provide their own security.

As the United States applied those postures to various scenarios, it encountered little hostility from the other countries, even on the parts of Iran and China, says Robert "Barney" Rubel, dean of the Naval War College's center for naval warfare studies. In certain circumstances, the interests of the two nations and that of the United States converged.

"You could see the surprise on everyone's part, as they came together and realized that China was actually acting very cooperatively in several futures," he says. The same was true for Iran, to an extent. "You could see where Iran seemed to have no national interest in disrupting global trade through Hormuz," he says. In fact, no nation state had an interest in disrupting global trade, with the exception of the Salafists, who showed interest in disrupting the flow of oil.

Those results "may end up having a profound impact on our strategy as we move forward," he tells National Defense. For the complete article by Grace Jean, National Defense Magazine visit: http://www.nationaldefensemagazine.org/issues/2007/January/NavalWarGame.htm

HUBBLE MAPS THE FIRST COSMIC WEB OF 'CLUMPY' DARK MATTER IN 3-D

An international team of astronomers using NASA's Hubble Space Telescope has created the first three-dimensional map of the large-scale distribution of dark matter in the universe.

Dark matter is an invisible form of matter whose total mass in the universe is roughly five times that of "normal" matter (i.e., atoms). It can be thought of as the scaffolding of the universe. The visible matter we see collects inside this scaffolding in the form of stars and galaxies. The first direct detection of dark matter was made this past year through observations of the Bullet Cluster of galaxies.

The new map provides the best evidence yet that normal matter, including all stars and galaxies, collect within the densest concentrations of dark matter.
Mapping dark matter's distribution in space and time is fundamental to understanding how galaxies grew and clustered over billions of years.

The map stretches halfway back in time to the beginning of the universe, and reveals a network of dark matter filaments, collapsing under the relentless pull of gravity and growing clumpier over time. This is

consistent with conventional theories of how structure formed in our evolving universe, which has transitioned from a smooth distribution of matter at the time of the Big Bang.

The researchers used data from Hubble Space Telescope's largest survey to date of the universe, the Cosmic Evolution Survey ("COSMOS"). The COSMOS field covers a sufficiently wide area of sky – eight times the area of the full Moon – for the large-scale filamentary structure of dark matter to be clearly evident.

To add 3-D distance information, the Hubble observations were combined with data from Europe's Very Large Telescope in Chile, Japan's Subaru Telescope in Hawaii, the U.S.'s Very Large Array radio telescope in New Mexico, as well as the European Space Agency's orbiting XMM-Newton X-ray Observatory.

The dark matter map was constructed by measuring the shapes of half a million faraway galaxies.

To reach Hubble, their light has had to travel through intervening dark matter, and the path of the light is slightly deflected by the dark matter's gravity. The observed, subtle distortion of the galaxies' shapes was used to reconstruct the distribution of intervening mass along Hubble's line of sight – a method called weak gravitational lensing.

For astronomers, the challenge of mapping the universe has been similar to mapping a city from nighttime aerial snapshots showing only streetlights. Dark matter is invisible, so only the galaxies can be seen directly.

This new map is equivalent to seeing a city for the first time during the day, where the major arteries and intersections of the asphalt roadways become evident, and a variety of neighborhoods are revealed. Because the survey looks back in time the deeper it looks into the universe, it is also like a time-lapse view of the growth of a city over decades. For complete article visit: http://www.nasa.gov/centers/goddard/news/topstory/2006/clumpy_darkmatter.html

U.S. COAST GUARD MODELING AND SIMULATION

History/Background

In a post 9/11 world more and more mission requirements are being thrust on the smallest of the five U.S. armed services and only military branch under the Department of Homeland Security. The Coast Guard is using every tool at its disposal to insure its people have the right assets and force mixtures to meet the requirements of this nation.

One such tool is Modeling & Simulation. The Coast Guard, within the past 8 years, started to discover the power of modeling and simulation and has used it heavily to assist in the evaluation of the new assets that are being built as part of the $24 Billion dollar acquisition that will replace the Coast Guard's aging Deepwater fleet of cutters, aircraft, and C4ISR equipment.

The Deepwater project has been a challenging undertaking, and the use of modeling and simulation has helped to point out operational shortcomings in certain proposed assets and shown that when the right systems become fully operational they will allow the Coast Guard to meet its mission demands faster and more effectively.

Additionally, the use of modeling and simulation has helped senior Coast Guard decision makers by giving quantitative reasoning for the growth of the system from a $17 billion dollar acquisition to a $24 billion dollar acquisition to meet post 9/11 demands. For info on project Deepwater: www.uscg.mil/deepwater

Compared to the Department of Defense, the Coast Guard does not currently have a centralized Modeling and Simulation directorate such as the U.S. Navy N81 division.

Much of the modeling simulation/operations research conducted within the Coast Guard comes from the Coast Guard Research & Development Center (RDC), the Office of the Deepwater Sponsors' Representative (CG-37RCD) in support of the Deepwater

Program Executive Office (G-D), the Office of Mission Analysis (CG-512), Deepwater Resources and Metrics (G-DRM) and the Office of Performance and Decision Support (CG-0931) all under the direct command of Coast Guard Headquarters in Washington, DC.

Other Coast Guard commands use modeling and simulation/operations research methods for supply chain management, workforce planning, inventory and warehouse modeling.

The Coast Guard Modeling & Simulation capability is rapidly growing but faces the hindrance of not having an officer career path in Operations Research/Modeling & Simulation.

Most of the officers with a BS and/or MS in Applied Math/OR/Engineering assigned to modeling and simulation billets will do their tour as an analyst (usually at CG Headquarters) then return to their individual officer specialties as Cuttermen, Aviators, Marine Safetymen, TACLET/MSST/LEDET COs/XOs, Boat Forces Commanders, Intelligence operatives and so forth.

Many officers with the background for M&S work will never actually assume an M&S/OR billet, thus, never fully exploit the Coast Guards ability to employ analysis. This shortfall is helped by the CG Civilian workforce that provides continuity at the Coast Guard Headquarters level.

Deepwater Sponsors' Representative

The Deepwater Sponsors Office (CG-37RCD) is very unique in that it is responsible for ensuring that the assets being built by the systems integrators meet the needs of the operators (The Sponsors) represented by the CG-3R (response), CG-3P (prevention), and CG-2 (intelligence) directorates at Coast Guard Headquarters.

The Coast Guard is using modeling tools to test the operational effectiveness of various assets in the Integrated Deepwater System. Currently CG-37RCD is using GCAM (General Campaign Analysis Model), Deepwater Maritime Operational Effectiveness Simulation (DMOES), Joint Systems Analysis Simulation (JSAS), ARENA, MATLAB and other smaller Excel based tools.

The DMOES tool is a campaign level discrete event simulation that illustrates all CG deepwater assets (known as a force laydown) operating in all CG regions to include domestic as well as overseas deployments and has them performing all CG missions on a 365 day basis.

The results of a DMOES run measures how well CG assets did at reaching operational effectiveness target goals such as percentage of saved lives (SAR), lbs of cocaine/marijuana/heroin seized (CD OPS), migrants interdicted (AMIO), ports and waterways coastal security events responded to (PWCS), assets available for overseas deployment (NATLDEF OPS), maritime pollution events responded to (MER), High Interest Vessels interdicted and boarded, Homeland Security efforts, etc., as defined by the historical data in the Deepwater Modeling and Simulation Master Plan (MSMP).

Based on asset operating parameters (radar range, probability of target detection curves, sea state, speed, weather, asset/target geometry, asset endurance, etc.) and CG tactics the new Deepwater assets (the System of Systems) are compared to the legacy system (current existing assets as of 2002) to determine if improvements are made across the various CG missions and operating areas.

Current/On-going Projects

1. Modeling assessment of the VUAVs (vertical unmanned aerial vehicle) contribution to the Deepwater System.

2. Joint Modeling Project with the Air Force Institute of Technology to illustrate intel driven Extended Offshore Security Boarding involving CG Deepwater Assets as well as MSRTs/MSSTs deployment (using ARENA).

3. Homeporting Study to illustrate the effects (or lack thereof) of changes in homeports of the new National Security

Cutters (WMSLs) to CG Operational Effectiveness.

4. Patrol Boat Gap Analysis to study the effects of losing 8 123' WPBs (structural problems associated with ICGS upgrades), 5 PC-179s (expired USN lease), a delayed Fast Response Cutter design/production and 6 110'WPBs (deployed to the Persian Gulf/IRAQ).

5. System of Systems level UAS way ahead study (GCAM)- Objective: look at all UAS proposed for the Coast Guard as part of the integrated Deepwater System.

6. CONOPS (Concept of Operations) update to include newly added Deepwater Assets and PWCS requirements for MSRT/MSST deployment/tactics.

The Way Ahead

CG is developing greater organic capability to conduct Modeling & Simulation. All work and models developed are regulated by Coast Guard's new Commandant Instruction on Modeling & Simulation managed by the Office of Performance and Decision Support (CG-0931). Also, the Coast Guard is in the process of developing its own M&S Resource Repository.

Senior leadership within the Coast Guard is starting to recognize the power of modeling and simulation and depend on it for decision making. Article By: LT Lee Stenson, USCG
DMOES/HLS Modeling Lead
Office of the Deepwater Sponsors' Representative.

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