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*Welcome to the March/April 2009 edition of the Modeling and Simulation Information Analysis Center (MSIAC) M&S Newsletter. This issue presents a variety of M&S articles and events from communities enabled by M&S within the Department of Defense and beyond. We hope you enjoy the March/April edition and look forward to your comments.*

*Although the wordings in the excerpts may not always correspond to official DoD usage, the full articles available through the links provide valuable insight into the applications of M&S technologies throughout the community.*

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## **ISSUE SPOTLIGHTS**

***Behavior studies may improve irregular warfare technologies***

***Collaboration is key to success***

***Computer wargaming for IED defeat***

***Updated training M&S plan***

***Testing means more survivable aircraft***

***Coalition Virtual Flag***

***War-gaming and serious games***

***Intensive medical training saves lives***

***Simulation of the Earth without its natural sunscreen***

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*The following article about behavior studies for irregular warfare technologies, originally appeared on DefenseLink.*

## **BEHAVIOR STUDIES MAY IMPROVE IRREGULAR WARFARE TECHNIQUES**

WASHINGTON, April 20, 2009 – Scientists in the Defense Department’s Modeling and

Simulation Coordination Office, or M&S CO, are doing their part to improve irregular warfare techniques by studying human social and cultural behaviors.

“Modeling and simulation is just the representation of the real world,” Jesse Citizen, M&S CO Director, said during an April 15 “Armed with Science: Research and Applications for the Modern Military” audio webcast on Pentagon Web Radio.

Modeling and simulations are enabling tools that improve our lives today and provides a means to meet national security challenges, Citizen said.

“Modeling and simulation is a technology that provides our warfighters, our operators, users, with the ability to understand complex interactions, to apply emerging technology capabilities as force multipliers and to imagine the yet-to-be-imagined, for providing innovative solutions to meet our national security challenges,” he said.

Army COL Michael Sanders, M&S CO’s Deputy Director, added that as they relate to irregular warfare, the human social and cultural behavior aspects of modeling and simulation are challenging to understand.

“We’re faced with many technological challenges in the 21st century,” he said. “How do we use all the knowledge we’ve acquired for standard conventional warfare in kinetics models and experiment? And how do we further apply that knowledge to do some of the social-science applications that’s associated with it? This is what M&S can do for the modern warfighter.

“Anybody who’s been in the [warfighting] business knows that we’re very good at modeling and using simulation to look at the kinetic effects of conventional warfare,” Sanders continued. “What we’re finding, though, is that understanding some of the algorithms and some of the technologies dealing with human social and cultural behavior - we’re just starting out trying to do that.”





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In addition to irregular warfare, Sanders said, M&S CO is studying how modeling and simulation tools can help with proprietary technology, the notion of systems of systems engineering environments, and protecting the cyberspace domain.

In 2007, the Congressional Modeling and Simulation Caucus declared that modeling and simulation is a critical national technology. Citizen added that universities across the nation are currently involved in advancing this technology.

"We are involved with universities in several arenas, and many of them are used as the performers for what we call our high-level tasks," Citizen said. "We have a lot of universities across the nation that are available and that participate in that level of activity." For the original article from DefenseLink, click [here](#).

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*The following article on DoDTechipedia was contributed by the Defense Technical Information Center (DTIC).*

## **COLLABORATION IS KEY TO SUCCESS**

The Department of Defense (DoD) has embraced the Web 2.0 evolution and launched its own wiki site – DoDTechipedia. DoDTechipedia, an online collaborative encyclopedia for the science and technology (S&T) community, is similar to Wikipedia or Intellipedia (a wiki-based site for the United States intelligence community). With its launch in October 2008, as a joint project of the Under Secretary of Defense for Acquisition, Technology and Logistics (AT&L), Director, Defense Research and Engineering (DDR&E), Defense Technical Information Center (DTIC), Networks and Information Integration and Department of Defense Chief Information Officer (NII/DoD-CIO), and Rapid Reaction Technology Office (RRTO), DoDTechipedia aims to foster communication and collaboration with greater

transparency among DoD scientists, engineers, the acquisition community, and operational warfighters.

Christopher Thomas, Chief Technology Officer, DTIC says, "This tool enables DoD personnel to collaborate on technological solutions, reduce costs, add capability and avoid duplication. DoDTechipedia aids in the rapid development of technology and the discovery of innovative solutions to meet critical capability needs and gaps."

DoDTechipedia is available to federal government employees and their contractors with a Common Access Card (CAC) or DTIC registration. Although this wiki site is limited access, it contains unclassified information only. A classified version of DoDTechipedia will be released Spring 2009.

DoDTechipedia is truly a collaborative effort and every contribution counts to ensure this collective knowledge base expands. Users are encouraged to participate by creating a page, asking a question, starting a blog or posting events relative to their organization on the site. "Gardening" -- performing small edits on wiki content to improve its overall quality and helping cultivate interaction and participation within the community of users – is also encouraged.

To get started, visit:

<https://www.dodtechipedia.mil> and complete the short registration process today. Tutorials are posted on the site to aid you with each aspect of getting started. DoDTechipedia workshops, hands-on training sessions, are also available; if you are interested in attending an upcoming workshop or hosting an internal workshop at your location, please contact Ms. Jessica Jones with DTIC Marketing at 703.767.8216 / [jjones.ctr@dtic.mil](mailto:jjones.ctr@dtic.mil).

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*The following article on computer war-gaming, originally appeared in the Virginia-Pilot, Newport News.*

### **FOR THE MEN AND WOMEN WHO PLAY IT, THIS GAME IS NO GAME**

They've never walked the dusty streets of an Iraqi town or laid eyes on Afghanistan's mountainous terrain. They've never manned the turret of a Humvee or scanned the horizon for a homemade bomb.

They've never served in uniform at all. But Zach Phillips and Olen Bruce have expertise the military covets. They're computer programmers who create an ever-changing virtual world where soldiers and Marines can practice searching for improvised explosive devices before setting foot in a war zone. Phillips, 23, and Bruce, 34, are among about 70 employees, mostly contractors, at the Joint Training Counter-IED Operations Integration Center in Newport News. The center, which started in 2007, is part of the Pentagon's Joint IED Defeat Organization and is managed by the Army's Training and Doctrine Command at nearby Fort Monroe. The center's budget this year is about \$5 million.

The seven-person simulation department works fast, using fresh intelligence from the field on the latest methods insurgents use to conceal and detonate their bombs. In four days, they can push out a new training scenario.

The scenarios are then added to an existing game engine the military uses for training called "Virtual Battlespace 2." Distribution is simple and quick: Units can download the new programs - which aren't classified - from any military computer.

To start each new scenario, one person in the simulation department develops a plot and maps it out.

A terrain developer creates a backdrop - maybe a midsized Iraqi city or a tiny Afghan village -

with the appropriate scenery: deserts or mountains, palm groves or apartment buildings. Phillips, the 3-D modeler, creates a virtual version of the troops' hardware, such as an M109 Paladin howitzer. The programmers devise "clutter," too - civilian vehicles, pedestrians and the like - to populate the screen.

Bruce, the lead software developer, brings the objects alive: He makes the wheels turn, the gun turrets swing and the machine guns shoot.

Another person puts together a story-board for how the game will look. Toward the end, the team stitches together the video and then "play tests" it. For complete article from the Virginia-Pilot, Newport News, click [here](#).

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*The following article about an updated training modeling and simulation plan, originally appeared in Inside the Army.*

### **IDA-LED TEAM PREPARES TO PROVIDE NEW MODELING AND SIMULATION PLAN**

An Institute for Defense Analyses-led project team is in the early stages of updating a modeling and simulation business plan for training that reflects both the changing threats in theater as well as the strides made by the Pentagon in the last two years.

The most recent version of the Training Community Modeling and Simulation Plan is the 2007 edition, which will be revised in a 2009 volume to be released in roughly a year, according to Frederick Hartman, an IDA employee who serves as project manager for updating and writing the plan.

In an April 7 interview with Inside the Army, Hartman said the training plan is one of a series of six modeling and simulation community business plans focused on different functional communities.



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The process of preparing the training plan starts with an understanding of the Defense Department's baseline capabilities, defined as "those simulations, tools or mechanisms for delivering learning content," and a requirements analysis with military stakeholders that then allows the project team to determine training needs, he said.

"It's kind of a three-tier process," Hartman said last week. "At the top, it's the operational requirements, and then we decompose those and have training needs. And within the training needs, we try to ferret out the detailed program budget inputs."

The 2009 edition is meant to influence the fiscal year 2011 budget and the program objective memorandum - the Pentagon's six-year spending plan - for FY-12 through FY-17, he told ITA.

In the new version of the plan, Hartman said the team intends to update the list of training gaps to reflect the changing threat as well as new training technologies now in place. Copyright Inside the Army, reprinted with permission. For complete article from Inside.Defense.com, click [here](#).

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*The following article on testing at NAWCWD, originally appeared on the NAVAIR website.*

### **ONE-OF-A-KIND TESTING AT NAWCWD MEANS MORE SURVIVABLE AIRCRAFT**

The Naval Air Warfare Center Weapons Division Weapons Survivability Lab (WSL) at China Lake, CA, recently developed and verified the capability to accurately and realistically test, evaluate, and document the effects of a Man Portable Air Defense System (MANPADS) impact on aircraft in an effort to make them more survivable. This capability is unique to China Lake, and is known as the Missile Engagement Threat Simulator (METS).

Our ultimate goal is to make sure the pilot completes the mission and returns home safely, said Ronnie Schiller, METS project manager.

MANPADS are shoulder-launched missile systems which are produced by more than 25 countries. MANPADS are relatively inexpensive and widely available to the world, making them a serious threat to U.S. and allied aircraft. METS will play an important role in developing a strategy to severely lessen MANPADS effectiveness by accurately simulating an impact and collecting the necessary data to help predict the vulnerability of aircraft.

For the last 20 years, Congress has mandated that new aircraft acquisition programs undergo realistic vulnerability testing before entering low rate initial production. METS was developed at China Lake to help aircraft acquisition programs comply with the Live Fire Test Law by providing a method of effectively evaluating an aircraft ability to tolerate MANPADS.

There has been a long chain of challenges throughout this project over the last 15 years, said Robert Gerber, lead mechanical engineer, with over 70 individuals contributing with very unique solutions. We have come a long way since the early days of black smoke and mangled missile debris exiting the barrel.

There are three components of METS. First is the portable, 6-inch, high-pressure gas gun. The gas gun provides for a mix of interchangeable barrel lengths and chamber volumes to achieve the desired acceleration profile. For example, a hovering helicopter requires a higher acceleration profile than a tail-chase fighter engagement due to the relative velocity between the MANPADS and the aircraft.

Second is the MANPADS itself. METS uses an actual MANPADS with two minor modifications to the fuze and fins. The foreign fuze is replaced with an exploding bridge wire (EBW) fuze. The fins are replaced with retractable versions that expand once the MANPADS exits the barrel.





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Third are the screens placed near the target. When the fins contact the charge screens, the current is transferred to the EBW fuze which in turn detonates the warhead. Different MANPADS provide for different fuze timings. By varying the charge screen location, METS has the flexibility to simulate a proximity, contact, or delayed impact detonation. For complete article from NAVAIR, click [here](#).

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*The following article on the Virtual Flag event, was contributed by WarCap Exercise Planner Frank Schwartzenburg.*

### **COALITION VIRTUAL FLAG AT THE PENTAGON**

Virtual Flag (VF), executed by the AF Distributed Mission Operations Center (DMOC), is a COMACC directed / Joint-accredited event that exercises the Theater Air Control System (TACS) elements. A typical VF incorporates Joint, Combined, Air, and Land combat assets and portrays a portion of a large-scale theater operation focused on joint integration.

Although the DMOC is at Kirtland AFB in New Mexico, VF is a distributed exercise that allows many players to participate from home station. Combat Air Forces provide comprehensive Aerospace Expeditionary Force preparation in a synthetic theater-level combat environment.

Coalition Virtual Flag 09-4 is the first VF that includes participants from air forces beyond North America participating on their own systems. In addition to Canadian participants, coalition players from Britain and Australia will provide an added degree of realism to the exercise by allowing US and multinational warfighters to work together at the operational and tactical levels.

As with typical VF events, Coalition Virtual Flag focuses on the interaction between Theater Air Control assets and shooters prosecuting time

sensitive targets in a realistic air environment. For those unable to attend in person, CVF 09-4 will be presented virtually on 23 Sep 09 at the Warfighter Capability Demonstration Center (WarCap) in the Pentagon.

The WarCap, under the leadership of SAF/XC, showcases emerging technologies, experiments and exercises like CVF 09-4 for senior leaders and action officers in the National Capital Region.

For more information about bringing an M&S event or technology demonstration to the Pentagon, or to attend CVF 09-4, contact the WarCap: Email - [WarCap@pentagon.af.mil](mailto:WarCap@pentagon.af.mil), Phone - 703-693-0410 (DSN 223) Public website - <http://www.safxc.af.mil/organizations/warcap/index.asp>

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*The following article on war-gaming, originally appeared in the Training Simulation Journal.*

### **WAR-GAMING**

#### ***Serious games meet military's demand for immersive learning***

The U.S. Army's newest training field manual includes a section on gaming that represents a watershed for the training and simulation community. For the first time, gaming is included as a training tool alongside the traditional live, virtual and constructive environments. It's no longer just LVC: Think LVCG.

Gaming helps improve training realism and fills the gaps not covered by virtual and constructive simulations, the Army believes. Therefore, it is included in the new field manual FM 7-0, Training for Full Spectrum Operations, published at the end of 2008.

The Army realized that the new generation, or Generation Y, is a significant percentage of the Army and that it learns more efficiently using a





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game than with PowerPoint, said Don Toliver, operations director at the National Simulation Center (NSC) at the Army Combined Arms Center and Training at Fort Leavenworth, Kan.

The other tipping point was technology that enables a gaming engine to be configured to a military environment.

Col. Gary Brown, director at the Combat Training Center Directorate at Leavenworth, said that greater use of blended live, virtual, constructive and gaming training tools will allow the Army to manage limited resources more effectively and efficiently. It allows trainers to do more with less, Brown said.

Gaming has been an integral part of militaries since armies were first formed. War gaming has become more sophisticated, and modern militaries rely on advanced modeling and simulation technologies to play out their wartime "what ifs."

But the use of so-called serious games in the military is a relatively new phenomenon that's still in its embryonic stages and only recently has been taken seriously by armed forces worldwide. The pace is picking up, however. In the same month as FM 7-0 was published, Program Executive Office for Simulation, Training and Instrumentation (PEO STRI), awarded a contract to a team consisting of Australian game development company Bohemia Interactive, U.S. firearms training and simulation company Laser Shot and Australian military training systems developer Calytrix Technologies. The contract gives PEO STRI a license to use and develop Bohemia's Virtual Battlespace 2, or VBS2, gaming engine into an Army training program known as Game After Ambush. For complete article from Training Simulation Journal (TSJ) Online, click [here](#).

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*The following article on C-STARS, originally appeared on the Wright-Patterson Air Force Base website.*

### **C-STARS: INTENSIVE MEDICAL TRAINING SAVES LIVES**

3/5/2009 - SCOTT AIR FORCE BASE, Ill. - It's utter chaos: a child injured by a roadside bomb is wheeled into surgery, another woman with half of her face charred black comes flying in on a stretcher, and a small boy with his bone sticking through his pant leg comes hobbling into the room. Who do you treat first? Who can help out? What medical supplies are on hand?

These are the questions that deployed medical personnel are taught in training by the Centers for Sustainment of Trauma and Readiness Skills program at the newly revamped C-STARS training site in St. Louis, Mo. The site recently opened a highly realistic Emergency Medicine Trauma simulation lab. It is one venue where medical personnel can sharpen their trauma care skills.

St. Louis is one of three C-STARS locations where intensive medical training takes place. The other two sites at Baltimore and Cincinnati, like the one in St. Louis, reflects a partnership between the Air Force and a civilian trauma hospital.

Each C-STARS site fulfils a unique training niche, program officials said. In Baltimore, trauma skills of physicians, nurses and technicians -- mostly active duty members -- are honed during three weeks of training. The St. Louis mission is similar, tailored for Guard and Reserve members and lasts two weeks.

Meanwhile, at the University of Cincinnati, C-STARS trains Critical Care Air Transport Teams, trains three-man crews over two weeks on the safe aeromedical evacuation of critically-ill patients. Its simulation room, unlike the other two centers, is modeled to represent the back of a C-17 Globemaster III aircraft that has been transformed into a flying intensive care unit.



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Lt. Col. Patricia Alvoet, director of C-STARS at the United States Air Force School of Aerospace Medicine in San Antonio, said the training and research program helps the Department of Defense safely treat and transport very seriously ill combat casualties through high-tech simulation and intensive care clinical experiences.

The experiences are essential for military medical personnel to have a complete and thorough understanding to respond quickly and effectively in situations where the lives of critically injured service members hang in the balance.

"The [emergency medicine trauma] lab can simulate multiple patient trauma and help medical personnel make the decision on what to do with a patient, whether to airlift them out, perform surgery or come up with an alternative plan," said Capt. Scott Fallin, C-STARS administrator at St. Louis.

The lab features life-like mannequins and provides an urban warfare training environment. For complete article from Wright-Patterson Air Force Base, click [here](#).

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*The following article on a simulation of the Earth's ozone layer, originally appeared on the NASA website.*

### **NEW SIMULATION SHOWS CONSEQUENCES OF A WORLD WITHOUT EARTH'S NATURAL SUNSCREEN**

The year is 2065. Nearly two-thirds of Earth's ozone is gone -- not just over the poles, but everywhere. The infamous ozone hole over Antarctica, first discovered in the 1980s, is a year-round fixture, with a twin over the North Pole. The ultraviolet (UV) radiation falling on mid-latitude cities like Washington, D.C., is strong enough to cause sunburn in just five

minutes. DNA-mutating UV radiation is up 650 percent, with likely harmful effects on plants, animals and human skin cancer rates. Such is the world we would have inherited if 193 nations had not agreed to ban ozone-depleting substances, according to atmospheric chemists at NASA's Goddard Space Flight Center, Greenbelt, Md., Johns Hopkins University, Baltimore, and the Netherlands Environmental Assessment Agency, Bilthoven.

Led by Goddard scientist Paul Newman, the team simulated "what might have been" if chlorofluorocarbons (CFCs) and similar chemicals were not banned through the treaty known as the Montreal Protocol. The simulation used a comprehensive model that included atmospheric chemical effects, wind changes, and radiation changes. The analysis has been published online in the journal *Atmospheric Chemistry and Physics*.

"Ozone science and monitoring has improved over the past two decades, and we have moved to a phase where we need to be accountable," said Newman, who is co-chair of the United Nations Environment Programme's Scientific Assessment Panel to review the state of the ozone layer and the environmental impact of ozone regulation. "We are at the point where we have to ask: Were we right about ozone? Did the Montreal Protocol work? What kind of world was avoided by phasing out ozone-depleting substances?"

Ozone is Earth's natural sunscreen, absorbing and blocking most of the incoming UV radiation from the sun and protecting life from DNA-damaging radiation. The gas is naturally created and replenished by a photochemical reaction in the upper atmosphere where UV rays break oxygen molecules (O<sub>2</sub>) into individual atoms that then recombine into three-part molecules (O<sub>3</sub>). As it is moved around the globe by upper level winds, ozone is slowly depleted by naturally occurring atmospheric gases. For complete article from NASA, click [here](#).

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**Please visit the [MSIAC Calendar](#) for a list of events taking place in the M&S Community.**

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MSSOC 09-03, Wright-Patterson AFB, OH, 12-14 May 2009

### **Modeling & Simulation Staff Officer Course**

This three-day course provides a broad overview of modeling and simulation (M&S) policy and activities of the Department of Defense (DoD), with discussion of how DoD employs M&S in support of training, analysis, acquisition of new products and systems, test and evaluation (T&E) and experimentation. The course focuses on M&S terms, concepts, applications, and information resources, preparing attendees for positions that require conversancy in these topics. Students will gain familiarity with major M&S concepts, policies, organizations, programs, activities, and issues within the Department of Defense. Two (2) Continuous Education Units (CEUs) are available for this course as well as twenty-one (21) Continuous Learning Points (CLPs). For more information about the MSSOC courses, click [here](#).

### **MSIAC M&S NEWSLETTER**

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