



MSIAC M&S Newsletter

July 2006

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The MSIAC also publishes the quarterly *MSIAC Journal On-line*. If you would like to see the current issue of the *MSIAC Journal On-line* visit: <http://www.msiac.dmsi.mil/journal>. If you would like to submit an article for the Journal On-line, please email your paper or article to msiachelpdesk@msiac.dmsi.mil at least 45 days prior to the next publication date.

UPCOMING EVENTS

9-13 July 2006

[INCOSE 2006](#)

Orlando, FL

13 July 2006

[M&S Capital Hill Exhibition](#)

Washington, DC

13 July 2006

[DoD CIO Forum for Communities of Interest \(COIs\)](#)

McLean, VA

25 July 2006

[NDIA Systems-of-Systems Engineering Guide Workshop](#)

Washington, DC

25-26 July 2006

[2nd Annual Systems of Systems \(SoS\) Engineering Guide Workshop](#)

Fort Belvoir, VA

31 July - 3 August 2006

[2006 Summer Simulation Multiconference \(SummerSim' 06\)](#)

Calgary, Alberta, Canada

31 July - 3 August 2006

[2006 Naval S&T Partnership Conference](#)

Washington, DC

8-10 August 2006

[Modeling and Simulation Staff Officer Course \(MSSOC\)](#)

Orlando, FL

FORBES ANNOUNCES CAPITAL HILL MODELING AND SIMULATION EXHIBITION

(Washington, D.C.) – Congressman J. Randy Forbes (VA-04) announced that the Congressional Modeling and Simulation (M&S) Caucus will host the 1st Annual M&S Capitol Hill Exhibition on Thursday, July 13, 2006, from 8:30 am – 2:00 pm. The event will be held on Capitol Hill in room 345 of the Cannon House Office Building. The purpose of the event is to showcase M&S applications to Capitol Hill leaders to promote the development of this high-tech tool in a growing number of fields and

specialties.

“This event will give decision-makers in Washington the opportunity to witness and experience hands-on the ability and potential of M&S. It will showcase innovative and safe solutions to complex circumstances such as hurricane evacuations, medical surgery, and even pilot training. The innovativeness, multi-use applicability, and affordability of M&S hold the possibility to maintain and enhance the economic competitiveness of this country,” said Forbes, Chairman of the Caucus.

The inaugural exhibition will include demonstrations from the medical, defense and engineering fields. Participants will be able to try their hand at a machine gun firing range, evacuate a major city from an impending hurricane, pilot a fighter plane, design their own sky-scraper, and perform hands-on surgery.

Modeling and simulation is a growing technology industry that provides readily available, operationally valid environments for training and simulation in a wide variety of industries. The Modeling and Simulation Caucus offers a distinctive opportunity to further investigate opportunities to improve in the areas of military preparedness and operations, homeland security, disaster preparedness and relief, energy management, and education.

For original article visit:

<http://www.house.gov/forbes/newsroom/presreleases/2006/06192006.htm>

ENABLING THE WARFIGHTER – MARKSMANSHIP IN COMBAT ZONE SIMULATIONS

The C-130 struck the tarmac hard, with tires screaming and engines whining. Everyone snapped awake. When the ramp opened, it revealed snow-capped peaks rising high above the valley floor. A cool breeze filled the back of the aircraft, a welcome relief from the oppressive heat of my last two locations, Kuwait and Qatar. I grabbed my rucksack and weapon and moved toward the ramp.

Sound like the opening chapter of an adventure novel? Not quite. But it was the

beginning of a very important venture for the Program Executive Office for Simulation, Training and Instrumentation (PEO STRI), located in Orlando, FL. Onboard the flight were three Soldiers who travel around the world, aiding other Soldiers in combat zones by fielding them with the Laser Marksmanship Training System (LMTS).

The LMTS uses modern technology to improve Soldiers' marksmanship fundamentals. It can be used to improve unit/institutional, indoor/outdoor, multi-lane, small arms, crew-served and individual marksmanship. LMTS is lightweight, low cost, easily transportable and uses self-sustained power sources. No fixed facilities support is required.

Using their own weapons in the dry-fire mode, Soldiers can improve their ability to engage and destroy the enemy by refining their marksmanship fundamentals through a series of exercises including the reflective target exercise, interactive dry fire, and grouping and zeroing. A computer scoring device is used during the grouping and zeroing exercise, combined with a visual display or shot placement and grouping. After these results are analyzed, a coach can then determine if the Soldier is properly implementing marksmanship fundamentals or if his or her technique needs to be refined.

Currently, a Soldier places a dime on his barrel during preliminary marksmanship instruction. If the dime stays on when the Soldier squeezes the trigger, that means he is doing well. If the dime falls off, it indicates failure to maintain a steady position or use proper trigger control. With the technology LMTS brings to marksmanship training, a Soldier can actually see where his rounds would have impacted on a properly scaled target, thus demonstrating much more accurately the proper application of all the fundamentals. For complete article from Army AL&T visit:

http://204.255.139.236/clients/asc/web/dev/pubs/alt_online/article.cfm?iID=0605&aid=03

JOINT NATIONAL TRAINING CAPABILITY GETS TACTICAL AT NORTHERN EDGE '06

(HICKAM AIR FORCE BASE, Hawaii – June 16, 2006) – U.S. Joint Forces Command's (USJFCOM) Joint National Training Capability (JNTC) initiative took another step forward at exercise Northern Edge 06 (NE06) June 5-16.

U.S. Pacific Command (PACOM) used distributed mission operations (DMO) to simulate a massive air and sea campaign in the Alaskan area of operations. It was the first time PACOM used the Pacific Air Operations Center here to conduct a tactical-level DMO event.

Phil Harvey, operations research analyst and assistant project officer for NE06 at the Distributed Mission Operations Center at Kirtland Air Force Base, N.M., heralded the exercise as a big step for furthering the development of the JNTC, reinforcing the value-added JNTC technology and processes bring to warfighter preparedness by broadening and deepening the reach of joint context to the tactical level.

"This is a tactical-level event that concentrates on the trigger-puller in the aircraft or onboard a ship to familiarize them with theatre operations and procedures prior to entering an actual combat situation," said Harvey.

USJFCOM is DoD's executive agent for developing and implementing JNTC globally. Military commands and agencies throughout the department use the capability to facilitate exercises and train forces.

"For the first time, PACOM and Alaska Command have integrated distributed training into an exercise so forces do not have to leave their duty stations to conduct this tactical-level training," explained Harvey. "We're able to integrate all of the joint players into a large-scale event using live training, virtual (people linked via simulators), and constructive (wholly computer generated) entities."

The center at Kirtland provided simulated enemy aircraft and air defenses to jets flying over the Gulf of Alaska and the Pacific-Alaska range complex.

"While we're unable to field a large-scale enemy force in real-life, the pilot in the cockpit will still see a similar threat picture that they would encounter in combat," said Harvey. "The live world and virtual battlespace appear identical to players operating in either environment. Joint troops are able to train side-by-side as though they were working in the real world, under real stress, in real-time conditions."

"Live fly is limited to the number of players you can bring to the fight," said Air Force 1st Lt. Christopher Evey, an acquisition engineer at the 505th Distributed Warfare Group and project officer for NE06. "Using simulations piped in from several different locations, we're able to provide warfighters a more accurate picture of an air and sea campaign."

Evey said that during the exercise, ships in the Gulf of Alaska see a data-linked battle picture on their scopes. "For them, there's an incredibly large battle taking place on their computer screens and they must react accordingly. At the same time, real Navy ships are acting as enemy forces while others are friendlies.

"We're able to paint a picture in the cockpit or onboard a ship, so that the person pulling the trigger or sitting at their terminal is able to train at the tactical level," he said. "To that warrior, they're surrounded by an environment that appears to have hundreds, even thousands, of entities around them — just like in combat."

Other units participating in NE06 included Pacific Air Forces, Air Combat Command, U.S. Army Alaska, Marine Forces Pacific, Special Operations Command Pacific and the U.S. Pacific Fleet.

Air Force Col. Leonard Moskal, the 505th Distributed Warfare Group's commander, said NE06 was a success as a proof-of-concept for forces in the Pacific theatre.

"Forces in the Pacific theatre are just beginning to stand up simulators that can be tied into a larger virtual battlespace," he said. "By proving that distributed training can work for a large geographically separated region more resources will be committed to virtual training — just as we're seeing in the continental United States.

"This is the only way to conduct a large theatre battle without actually going to war," concluded Moskal. For original article visit: <http://www.jfcom.mil/newslink/storyarchive/2006/pa061606a.htm>

VIRTUAL TRAINING HELPS SOLDIERS BOUND FOR IRAQ

For the next few weeks, 10,000 soldiers - including 2,500 from Schofield Barracks - will be going through a virtual training exercise as if they were already deployed to Iraq. It is the first major test of Schofield Barracks' \$38 million Battle Command Training Center, said Lt. Col. Mike Staver, who is in charge of the test. It is also the last major training before the 25th Infantry Division soldiers go to Iraq this summer.

About 7,000 soldiers, including 3,900 from the 3rd Brigade Combat Team, will deploy to Iraq in the largest deployment for the Tropic Lightning Division. A deployment ceremony is slated for July 7. The intent of the battlefield simulation, which involves 4,000 computers and a satellite network, is to better prepare Brig. Gen. Benjamin Mixon, commander of the 25th Infantry Division, and his staff.

Mixon will command 28,000 to 30,000 U.S. forces in northern Iraq - an area the size of Utah running north of Baghdad to the Syrian border. Staver, who spent one combat deployment in Afghanistan with the 25th Division two years ago, said this exercise gives Mixon "the opportunity to exercise (the division's) battle commands not only with his major subordinate units, but also with his higher headquarters - which is 3rd Corps at Fort Hood in Texas."

"It gets us practicing to what we will do in country, rather than take the first three months figuring out things like how do you

send a report, who do you talk to ... It's a warm up so we are not going in cold," Staver said.

That way Mixon, who served in Iraq during the 1991 Gulf War with the 101st Airborne Division, has some idea what he will be facing and the strengths and weaknesses of the units he will command. Participating in the two-week exercise are the commanders of the six brigades, three from Schofield Barracks - the 3rd Brigade Combat Team, 45th Sustainment Group and 25th Aviation Brigade - which will be part of Mixon's task force.

Also at Wahiawa for the exercise are the commanders and staff from units on the mainland - the 3rd Brigade from the 82nd Airborne Division in North Carolina, 3rd Brigade of the 1st Cavalry Division in Texas and 3rd Brigade from the 2nd Infantry Division in Washington. These three units could fall under the control of Mixon when he succeeds Maj. Gen. Thomas Turner, commander of the 101st Airborne Division, who now heads Multinational Division North - a region with a population of 10.2 million that extends north of Baghdad to the borders of Iran, Turkey and Syria. It includes Tikrit - the home town of Saddam Hussein - and the city of Kirkuk, where the 25th Division's 2nd Brigade Combat Team served in 2004.

Don Bennett, civilian director of the Battle Command Training Center, said the computer simulation exercise carries a "secret" label since the information being used comes from current active intelligence sources.

Staver, who served a combat tour in Afghanistan two years ago with the 25th Division, said that 54 computers are used in what the Army refers to as the tactical operations center or "TOC." The Schofield Barracks TOC was described to be about 75 percent the size of Forward Operating Base Speicher, where the 101st Division has established its headquarters.

The operations center is supported by smaller tents called "siccups," where staff members work on solutions for "battle drills" or problems presented to Mixon. For instance, on Friday, Mixon had his medical

officers assess the potential danger dealing with a breakout of spiral meningitis among his soldiers. At the same time a car bomb exploded at one of Mixon's Iraqi posts, injuring several soldiers, killing at least one. The war games were developed by the U.S. Army Training and Doctrine Command, Joint Warfighting Center in Virginia and the 25th Division.

Sgt. Maj. Daniel Alltop, the head enlisted soldier in the operations center, said it operates like it will in Iraq - 24 hours a day, seven days a week. "Every 12 hours," Alltop said, "there is a shift change - at 8 a.m. and at 8 p.m."

At every shift change, Mixon gets an update on what has happened during the past 12 hours and what he as a commander can expect to take place until the next shift change. "Every two days, his staff will give him a fuller briefing on current operations."

While Mixon and his headquarters staff refine their skills to control the battlefield in the two-story command center, nearby in air-conditioned trailers, his soldiers and aviators are training on the latest virtual reality equipment. They sit before monitors displaying three-dimensional color depiction of the roads and the skies over Baghdad to get a feel of driving truck convoys or flying over Iraqi cities.

Six helicopter crews each flying a different type of aircraft can train at the same time. Each of the six cockpits can be configured to provide virtual-reality training for the three types of helicopters flown by the 25th Division - UH-60 Black Hawks, OH-58 Kiowas and CH-47 Chinooks. About 100 helicopters were sent to Iraq from Schofield Barracks. The air crews all wear specially rigged helmets and the images gives the aviators a 360-degree view from the cockpit.

Two other trailers are configured to train six Humvee vehicle operators and gunners. On Friday, members of Headquarters & Headquarters Company of the 25th Special Troops Battalion practiced being part of a four-vehicle convoy driving through Baghdad. Behind the wheel of one Humvee was Spc. Cathy Mathes, accompanied by the vehicle commander, Sgt. Norma

Arellano. In front of their "Humvee" were three LCD screens projecting images of what they would see if they were in Baghdad. There is great attention to detail, including left and right rear-view mirrors on the bottom of two of the screens.

Their "gunner" was armed with a .50-caliber machine gun. He wore a virtual-reality display helmet. His view is what a Humvee gunner would see if he were standing in the turret of a Humvee on patrol. When he "fired" his simulated machine gun, the computer recorded his "hits" and "misses." During one of their exercises a roadside bomb took out one of their Humvees and Mathes was told by Staff Sgt. Maurice Marshallek that she had to turn her Humvee around to see what assistance her crew could render.

Also participating in the two-week exercise by satellite links and computers were Air Force jet fighters from the Davis-Monthan Air Base in Arizona and Marine Corps jets from Camp Lejeune in North Carolina. For original article visit:

<http://ebird.afis.mil/ebfiles/e20060612439775.html>

UNLEASHING A NEW BREED OF SIMULATION: THE INFANTRY WARRIOR SIMULATION

The Army has long used models and simulation to support materiel acquisition decisions. In recent years, it has become apparent that a robust, Soldier-centric modeling capability is needed to conduct integrated, multi-domain analyses that explore the complex relationships between Soldiers, their equipment and their battlefield environment. To meet this need, the Natick Soldier Center (NSC) and the U.S. Army Materiel Systems Analysis Activity (AMSAA) collaborated to develop the Infantry Warrior Simulation (IWARS).

Where applicable, IWARS uses Army standard algorithms, which include approved physics-based representations such as target acquisition, target engagement, munitions flyout and munitions effects. Environmental and psycho-physiological elements such as heat stress, fatigue, load, hydration, dynamic weather and terrain and

variable lighting conditions can also be played. IWARS allows the user to develop scenarios in open terrain, urban areas and inside buildings. Soldiers are represented by intelligent agents whose knowledge of their environment determines the Soldiers' decisions and behaviors. Soldiers' skills and actions are derived from Army field manuals, operational experiments and military subject matter experts.

IWARS has a multitude of potential uses including capability gap analyses; requirements determination studies; system and subsystem technical trade-off analyses; operational testing extrapolation; and doctrine, TTP (tactics, techniques and procedures) or basis of issue impact analyses.

For complete article from Army AL&T visit: http://204.255.139.236/clients/asc/web/dev/pubs/alt_online/article.cfm?ilD=0606&aid=03

ACHIEVING MODELING AND SIMULATION INTEROPERABILITY, REPUBLIC OF KOREA (ROK) AND UNITED STATES

Through combined exercises, ROK-US Combined Forces Command (CFC) trains ROK-US military services to establish combined defense system and to enhance combat readiness posture. In ROK-US combined exercises, the use of modeling and simulation applications are escalated to maximize the exercise effect through the description of real warfare in various battlefield environments.

Currently, the simulation support for ROK-US combined exercises is led by the US side and expenses are shared by the ROK side.

The fielded federation of US simulations does not allow interoperability with emerging indigenous ROK simulations for a variety of technical reasons. The ROK has developed their simulations with the intent to confederate them with modern US models.

Achieving interoperability of ROK and US models supports coalition training and the national military strategy. The ROK has made significant progress in developing

models and simulations for all services that are suitable for use in joint and combined exercises with the US.

With the 1995 Ground model at the head of the list, Naval, Air, and Amphibious models are under development by each ROK military service.

Since 2000, the development of these models is based on the open system HLA/RTI (High Level Architecture/Run-Time Infrastructure) used in US model federations. Through these processes, ROK models can support joint training independently and provide simulation support for combined exercises with the federation of US models.

However, the unfinished development of independent ROK models has resulted in the use of US simulation systems only for the combined exercises. This limits the effectiveness of ROK exercises and requires excessive preparation.

As a solution to this problem, CFC ROK side developed a simulation management and support system based on the HLA/RTI system called KSIMS (Korea Simulation System) in December 2004. KSIMS has gone through numerous ROK-US combined confederation tests and a federation test and it is reaching a stage where it can be applied to actual combined exercises.

In the future, the application of KSIMS should be extended to ACR (Advanced Concepts and Requirements), TEMO (Training, Exercises and Military Operations) and warfighter's experiments as well as the complete support of combined exercises through ROK-US model federation. In order to achieve these objectives, KSIMS including ROK war-game models must be continuously improved and the combined efforts between ROK and US are crucial.

Through numerous confederation tests and application to combined exercises, in the case of the ground and naval models, the modification requirements of the CBS model and RESA model have been identified for complete federation between ROK-US models. In order to achieve this, the efforts

to modify CBS are being pushed forward through CWP (Coalition Warfare Project). In addition, the modification requirements of RESA should be determined. To identify new KSIMS-JTTI+ interoperability requirements, continuous and periodic ROK-US federation tests and functional tests are required. Additionally, a more efficient combined FOM (Federation Object Model) development process should be agreed upon between ROK and US.

Since 2001, CFC ROK side continues to submit the Military Committee Meeting military requirements to solve the confederation issues. In conclusion, CFC continuously exerts efforts to resolve such issues via ROK-US consultation and agreement, aiming at more efficient promotions, positive participation and support from ROK-US related organizations.

Complete development and application of simulation support through more thorough design of advanced ROK-US combined exercise simulation architecture should not only improve the exercise effect and training of ROK and US forces, it should also reduce the required expenses and resources.

Above all, the ROK military will be able to apply the confederation techniques in combined exercises as well as various national defense operations. In a larger sense, these measures serve as a good example for preparing plans to achieve interoperability with other allies. For original article from FORSCOM Analysis M&S Newsletter visit:
<http://www.forscom.army.mil/>

SERIOUS GAME TEACHES EMERGENCY RESPONDERS: "INCIDENT COMMANDER"

Real-time "Incident Commander" is based on the National Incident Management System.

In testimony before the House Select Committee on Hurricane Katrina, Homeland Security Secretary Michael Chertoff lamented the lack of real-time situational awareness after Katrina hit New Orleans. "In any disaster, situational awareness requires

real-time access to accurate, firsthand information," Chertoff said.

The Federal Emergency Management Agency struggled to respond to Katrina because it lacked full situational awareness of areas with the greatest needs, Chertoff said. Without that knowledge, FEMA was unable to get aid into the most affected areas or track shipments of supplies to ensure that they reached the people who needed them most.

Real-time situational awareness is difficult to achieve, but a game known as "Incident Commander" could help public safety officials improve their response to emergencies. "Incident Commander" is based on the National Incident Management System (NIMS), a command and control infrastructure for emergency preparedness.

President Bush's Homeland Security Presidential Directive 5, issued in February 2003, authorized the creation of NIMS. The Justice Department's National Institute of Justice provided funding to BreakAway, a game maker based in Hunt Valley, Md., to develop the software.

"Incident Commander" represents a subgenre of real-time educational software that has begun to overtake traditional training videos and role-playing exercises. The subjects of serious games run the gamut from interactive teamwork exercises and nurses' training to specific aircraft landing crew protocols. The most widely known of these is a freely distributed Army training and recruitment game, "America's Army," which ranks among the top 10 most-played online games.

"You can apply your own procedures from a local department perspective, and you can implement those procedures," said Lucien Parsons, the game's producer. "Incident Commander" players manage almost all aspects of a crisis, including distributing resources, establishing a base of operations and controlling emergency workers. The game also forces players to deal with factors that are beyond their control.

BreakAway designed the game for multiple players, but one person can play it alone. Players respond to a chemical spill, a bomb in a federal building or a school shooting. "Incident Commander" has no hurricane scenario, but the company is developing one, Parsons said.

Parsons added that Justice wanted an affordable means for first responders to practice using NIMS. Live simulations are expensive and difficult to stage in populated areas. The low-cost game was BreakAway's answer to the agency's requirement. For complete article visit:

<http://www.fcw.com/article94706-06-05-06-Print>

NEW ISMT TRAINS MOVEMENT, SHOOTING AND COMMUNICATION

(MARINE CORPS BASE CAMP PENDLETON, Calif.) - Indoor Simulated Marksmanship Training has provided the Marine Corps with realistic training without the cost of live rounds to include heavy weaponry. But now the ISMT is no longer limited to infantry weapons.

The first ISMT for assault amphibious crewmen was introduced to the 3rd Amphibious Assault Battalion, 1st Marine Division in August 2002, but now a more realistic version is available to train the crewman for virtually everything they will encounter in Iraq.

"The old system was a very simple program, it was pretty much just a shooter," said Gunnery Sgt. Remi Rodriguez, a platoon sergeant with Company B, 3rd AA Bn. and a 33-year-old from Chicago. "Although no simulator will ever replace live fire, this new simulator allows Marines to train in movement, shooting and communication."

The ISMT used by the crewmen is an actual surplus turret from an amphibious assault vehicle in front of a screen depicting the battlefield.

"We had an extremely quick turnaround with the ISMT," said Capt. Clint C. Kappel, project officer for the Combat Vehicle

Training Systems at the Marine Corps Systems Command, Naval Air Systems Command branch in Orlando, Fla. "We went under contract for the ISMT in August 2005, and we just fielded three in Camp Lejeune in February 2006."

Kappel added that five trainers for the 3rd AA Bn. and the Assault Amphibian School Battalion, Training Education Command, were installed last month.

"Students getting hands-on experience manipulating the turret in simulation will have a significant impact on their training," said Master Sgt. Robert L. Jackson, the chief gunnery instructor for the schoolhouse and a 42-year-old from Harrisburg, Pa. "We're going to put the new Marines on the simulator before they head out to the range, so we can work out the problems they have before we even get to the range."

Jackson added that the new Marines will train on the ISMT after the range as well, so they can apply what they learned from live fire to ensure they retain the knowledge before they hit the fleet.

Although the simulator will make its mark in the schoolhouse, it will also have an impact in the fleet with its realism.

Just about everything that will be thrown at Marines in Iraq, including improvised explosive devices, will be present in the simulator.

"The simulator will show Marines how to react quickly to any situation while getting them familiar with the weapons systems and how to work together with fellow crewmen," said Sgt. Daniel Flores, who has been to Iraq twice and an assistant section leader with Company B, 3rd AA Bn. "You can get some good practice with this, especially in react drills." For original article visit:

<http://www.usmc.mil/marinelink/mcn2000.nsf/main5/3E15A8174CB99DF0852571860055C080?opendocument>

THE ARFORGEN SYNCHRONIZATION TOOL (AST)

The ARFORGEN Synchronization Tool (AST) version 1.0 was delivered to

FORSCOM in January 2006. Version 1.0 consists of Core ARFORGEN Model capability in simulating the flow of units through the force pools with a focus on predictive scheduling of the Combat Training Centers based on the latest arrival dates (LAD) in the force requirements.

Analysis capability includes inspection of the force requirements, the force inventory of units, and requirement shortfalls. Each of these categories can be segregated by a variety of filters such as component, branch, SRC, or force pool.

Version 1.5, due out in the fall of 2006, will incorporate the brigade type training templates. The objective is to synchronize training events and determine the ARFORGEN "R-Date" for the various type brigades responding to force requirements during the bridging phase of ARFORGEN. The capability can then be modified to synchronize the flow of brigades through ARFORGEN during the follow-on "steady-state" phase of ARFORGEN. For original article from FORSCOM Analysis M&S Newsletter visit:
<http://www.forscom.army.mil/>

'PRETTIER WORLD' OF COMPUTER MODELING PROVIDES KEY DETAILS

Taking issue with the perception that computer models lack realism, a Sandia National Laboratories researcher told his audience that simulations of the nanoscale provide researchers more detailed results - not less - than experiments alone.

The invited talk by Eliot Fang was delivered to members of the Materials Research Society at its recent semiannual general meeting.

Sandia is a National Nuclear Security Administration laboratory.

Fang derided the pejorative "garbage in, garbage out" description of computer modeling - the belief that inputs for computer simulations are so generic that outcomes fail to generate the unexpected details found only by actual experiment.

Fang not only denied this truism but reversed it. "There's another, prettier world beyond what the SEM [scanning electron microscope] shows, and it's called simulation," he told his audience. "When you look through a microscope, you don't see some things that modeling and simulation show."

This change in the position of simulations in science - from weak sister to an ace card - is a natural outcome of improvements in computing, Fang says. "Fifteen years ago, the Cray YMP [supercomputer] was the crown jewel; it's now equivalent to a PDA we have in our pocket."

No one denies that experiments are as important as simulations - "equal partners, in fact," says Julia Phillips, director of Sandia's Physical, Chemical, and Nanosciences Center.

But the Labs' current abilities to run simulations with thousands, millions, and even billions of atoms have led to insights that would otherwise not have occurred, Fang says.

For example, one simulation demonstrated that a tiny but significant amount of material had transferred onto the tip of an atomic force microscope (AFM) as it examined the surface of a microsystem.

"The probe tip changed something very, very tiny on the surface of the material," says Fang. "It was almost not noticeable. But the property of the surface became very different."

Laboratory observation couldn't identify the cause of the property change, but computer simulations provided a reasonable explanation of the results.

As for predicting the reliability of materials that coat surfaces, Fang says, "We find that when we compare our simulation models with data from the experiments, we get a more complete understanding."

Says Sandia Fellow and materials researcher Jeff Brinker, "We use simulations

quite a bit in support of Sandia's water purification program and the NIH Nano-Medicine Center program. In all these cases I'm working with theorists and modelers to guide the design of synthetic nanopores so as to develop transport behaviors approaching those of natural water or ion channels that exist in cell membranes."

How is this understanding achieved?

Models computationally link a variety of size and time scales to create an experimental design.

"We use as much experimental information as possible to validate our methods," says Alex Slepoy from Sandia's Multiscale Computational Materials Methods. "The trick is picking a correct modeling strategy from our toolbox of methods." For complete article visit: <http://www.sciencedaily.com/releases/2006/06/060613080755.htm>

SIMULATING THE SUN

Flight simulators cover just about anything a combat mission can throw at a pilot, but Italian engineers believe they are on the verge of accurately simulating one overlooked threat: blinding, direct sunlight.

The Sky Light Simulator, which was to be inaugurated in Turin in June, uses a dome lit with more than 4,000 bulbs, spread behind 151 panels, to create the most powerful natural-light simulator ever built, complete with a single-bulb, 12-kilowatt "sun" that roams the dome on a mechanical arm.

The 30-ton, 12-meter dome is designed not for pilot training but to aid engineers as they fine-tune illuminated cockpit displays and fight the glare that can make instruments unreadable midmission.

To avoid building cockpit mockups for natural-light tests, the dome has a 10-meter-wide, 5-meter-high aperture that allows the nose and cockpit of aircraft as large as a 737 to be physically shunted into the dome for tests.

But officials said the real novelties are the bulbs, which demand more than 230 kilowatts of power and create stronger and

more uniform light than traditional simulators that bounce light off the inside of domes.

And by using the mobile sun bulb, which is 750 times more powerful than the average car headlight, pilots can check the legibility of instruments with sunlight streaming in over their shoulders, from the side or front on, as it would be at 30,000 feet.

The simulator will also be used to test the night-vision goggles to be used by Tornado pilots. For complete article from Training and Simulation Journal (TS&J) On-line visit: <http://www.tsjonline.com/story.php?F=1729944>

HEATHROW AIRPORT LAUNCHES BEST 3D TOWER SIMULATOR

The advanced BEST 3D tower simulator was unveiled to the media at Heathrow Airport.

With demand for air travel continuing to increase, Heathrow is preparing for the future with the introduction of the latest 360 3D air traffic control simulator.

The cutting edge technology has been developed to support the move, in winter 2006/7, of the Heathrow tower controllers from their existing home to the new tower where they will handle up to 100 flights per hour.

Over 50 air traffic controllers are preparing for the move to the new tower and are receiving extensive training to familiarize themselves with the new view, operational procedures and equipment. The simulator, facilitates the training program helping to ensure that the move is safe and seamless. It almost exactly replicates the view, equipment and layout of the new tower cab and will enable controllers to practice in a realistic environment.

The simulator will be used for training - and for testing new concepts and equipment. It will cover all of the changes scheduled for Heathrow including: the new tower; terminal 5; the facilities for the A380 and all of the new ATC equipment and procedures.

Different models and databases will be used

so that different towers as well as different airports can be simulated. The simulator will be used for many tasks at Heathrow; followed by the other London airports and even international airports.

The simulation covers: day; night and dusk; reduced visibility; a wide range of weather conditions with rain, fog and snow; emergencies and unusual situations. The eye point can be jumped into different working locations as well as into aircraft and ground vehicles. Integrated area, approach, tower and ground operations can be trained and evaluated. Powerful data preparation tools allow the cover of different aircraft performance capabilities, traffic levels and operating conditions with full recording and replay capabilities. For complete article visit: http://www.asd-network.com/press_detail/7816/Heathrow_Airport_Launches_Best_3D_Tower_Simulator.htm

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