



Welcome to the January/February 2011 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 January/February 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 provided offer valuable insights into the applications of technologies throughout the M&S community.

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## **ISSUE SPOTLIGHTS**

***Virtual Earth Simulator***

***Air Force analysis portal***

***DoD M&S Body of Knowledge (BOK)***

***Modeling pirate behavior***

***Simulated mission to Mars***

***Landmine blast M&S***

***Yama Sakura 59 exercise***

***Simulation for user air traffic preferences***

***DoD MSSOC courses for 2011***

***M&S Journal accepting technical papers***

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The following article on a living Earth simulator, originally appeared on the Government Computer News (GCN) website.

## **SCIENTISTS' PLAN FOR REAL-TIME VIRTUAL EARTH WOULD SIMULATE...EVERYTHING**

Modeling and simulation has become a vital scientific tool capable of predicting weather patterns or charting chemical reactions. But a new effort launched by an international team of researchers plans to simulate everything that happens on the planet.

The Living Earth Simulator is part of a European program designed to collect, aggregate and fuse data from a variety of sources, such as NASA's Planetary Skin project, into one all-encompassing model. The simulator is part of the Future ICT Knowledge Accelerator program at the Swiss Federal Institute of Technology (ETH) in Zurich. The Future ICT effort seeks to team hundreds of the top scientists in Europe in a 10-year, 1 billion euro project to explore social life on Earth and everything it relates to. The effort is funded by the European Commission with the goal of becoming operational by 2022.

According to the BBC, the goal of the Living Earth Simulator is to further scientific understanding about events on the planet by looking at the human actions that affect societies and the environmental forces at work. Dr. Dirk Helbing, chairman of the Future ICT Project, told the BBC that many of today's global problems, such as wars, social and economic instability and the spread of disease, are related to human behavior. But he noted that there is a fundamental lack of understanding about how societies and the economy work, adding that we know more about the early universe than our own planet.

Borrowing a term from physics, Helbing described the modeling projects as a "knowledge accelerator" that will bring different branches of science together to produce data much in the same way (metaphorically





speaking) that a particle accelerator smashes atoms together to unlock scientific secrets. One of the key goals of the simulator is to model the behavior of entire economies or ecosystems in real time to detect and, hopefully, head off any crises.

MIT Technology Review compared the effort to a kind of Google Earth for society. But instead of using the map function to zoom into a home, a similar function could be applied to monetary transactions, health trends, global tourism patterns and carbon dioxide emissions. Helbing described this process as "reality mining."

For complete article from Government Computer News (GCN), click [here](#).

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*The following article on SARP was contributed by Ms. Linda Orlicky, AFSPC/A9FI (SARP Manager) and Ms. Kathie Reece, DSoft Technology, Inc. (SARP Developer and Administrator).*

### **AIR FORCE SPACE COMMAND'S ANALYSIS RESOURCE PORTAL (SARP)**

Higher headquarters guidance, the reality of constrained budgets, and a marked increase in efficiency gained by sharing knowledge are the motivations behind the need to distribute space data and information effectively. Air Force Space Command's answer to this need is the Space Analysis Resource Portal (SARP). It provides the modeling and simulation communities the ability to share information about space models and simulations, as well as the ability to respond to queries for space authoritative information and data from a centralized source.

SARP is a repository of space models and simulations HQ AFSPC uses and/or recommends for use. For instance, if you want to know about a space model, its metrics, versions, points of contact, verification and

validation, accreditations, user guides, data interfaces, model documentation, etc., use this tool. Key studies and analysis associated with each model are also available, providing a wealth of electronic library records. Additional tools are offered for identifying and locating models or studies based on their characteristics or the metrics they address. Furthermore, there are targeted forums to allow on-line collaboration on M&S topics such as model usage, bugs, issues and general suggestions. The forums provide a storehouse of practical experience gained by the user community.

SARP also holds an authoritative baseline of HQ AFSPC space data for the acquisition, test-and-evaluation, training, experimentation, planning-and-analysis communities that is consistent with the HQ AFSPC corporate process, products and current operations. Data is maintained for the current year, as well as planning data for future year. The data can be accessed via on-line reports, or it can be downloaded in several formats. Future integration with the Joint Rapid Scenario Generator is planned.

Visit the unclassified SARP at <https://halfway.peterson.af.mil/sarp> (NIPRNet needed). Access is granted to individuals utilizing government, Common Access Card enabled, computers or users with a Public Key Infrastructure "soft cert".

Additional space data is available on the SIPRNET SARP website. Its URL is available on the unclassified SARP, or it can be obtained by contacting the SARP contact below:

Mr. Glen Wiggy  
AFSPC/A9FI, 719-556-3803, DSN 834-3803

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The following article on the DoD M&S Body of Knowledge (BOK) was contributed by Mr. Gary Dahl and Mr. Christopher Herrmann, from the Army Simulation Proponent and School.

## **THE CONSOLIDATED M&S BODY OF KNOWLEDGE IS NOW ONLINE**

During his 2010 Interservice/Industry Training Education and Simulation Conference (I/ITSEC) keynote address, Dr. R. Bown Loftin, President of Texas A&M University, emphasized the importance of having a Body of Knowledge (BOK) in support of Modeling and Simulation (M&S) to better define the technology, standards, concepts, terms and activities that comprise M&S as a profession. The good news is that the DoD M&S Coordination Office funded an effort to start developing a M&S BOK in 2007 and has received approval for public release. That BOK is now available online.

This is the first time the DoD developed and published an M&S BOK. It is not all encompassing but does offer an initial starting point. The development of the BOK, which was sponsored by the Acquisition M&S community, occurred during FY 07. From March to June 2007, the BOK was staffed across all the Services and the recognized M&S Communities at the time (Acquisition, Analysis, Experimentation, Planning, Testing and Training). The BOK's publication was championed by the Acquisition Workforce Shaping Subcommittee. This published BOK reflects the communities and Services input and evaluations of M&S BOK content items, descriptors and usage levels.

Please send comments to the MSIAC helpdesk ([MSIACHelpDesk@dod-msiac.org](mailto:MSIACHelpDesk@dod-msiac.org) and phone 703-933-3323). By accepting comments from DoD Services, M&S Communities, academia, and industry, the intent is to improve this BOK as well as to keep the BOK up-to-date and relevant for the DoD workforce.

Please visit the BOK at <http://www.msco.mil/MSCO%20Online%20Library.html>.

For complete article on the DoD Body of Knowledge, click [here](#).

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The following synopsis of modeling pirate behavior, was adapted from an article which originally appeared in *The Seattle Times*.

## **MODELING PIRATE BEHAVIOR**

James Hansen, a mathematician at the Naval Research Laboratory (NRL) in Monterey, California, is using Modeling and Simulation (M&S) in an effort to protect shipping off the Horn of Africa. In recent years, pirates have made these waters incredibly dangerous. Last year alone, pirates executed approximately 450 attacks which captured 53 vessels, detained 1,181 crew members, and caused an estimated 10 billion dollars in economic impact. Hansen's effort is intended to protect ships traveling in this area and to assist the Navy's effort in securing peaceful waters.

Hansen's model considers specific weather data such as wind, waves and currents, and combines these with intelligence data on pirate behavior such as the size of their boats, how far they can travel, and assault tactics. Weather plays a pivotal role in the model because pirates can't operate their small crafts in rough seas.

This model also uses statistics and observations to provide captains and security forces information identifying high risk areas and suggesting countermeasures. The Navy will begin testing Hansen's model next month.

For more information about Hansen's model and to see the complete article from *The Seattle Times*, click [here](#).

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*The following synopsis of a simulated mission to Mars, was adapted from an article which originally was published by the Associated Press.*

## **SIMULATED MISSION TO MARS**

An international Modeling and Simulation (M&S) effort is replicating a mission to Mars. The Mars-500 experiment, being conducted in Moscow, is simulating the 520 day round trip to Mars. As of January 21, 2011, six researchers have already spent 233 days in a locked steel capsule that simulates the confinement, stress, and overall experience of an actual trip through space. This experiment takes every detail into consideration, from the canned food that would be provided on the actual mission to the crew's ability to shower only once a week. Mock emergencies are even enacted to observe the crew's reaction to potential problems. Although an actual trip to Mars may be well into the future, the Mars-500 experiment indicates that M&S can help prepare a crew now without spending a vast amount of resources.

For more information on the simulated mission to Mars and to see the complete article from the Associated Press, click [here](#).

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*The following article on blast M&S, originally appeared on TARDEC's GVSET News website.*

## **LANDMINE BLAST FIELD EVENT RECONSTRUCTION USING COMPUTATIONAL MODELING AND SIMULATION (M&S)**

Landmine and IED blasts pose significant threats to our warfighters, and developing technology and capabilities that will help Soldiers survive these events is a crucial focus area for Army researchers.

In 2009, TARDEC's Concepts, Analysis, Systems Simulation and Integration (CASSI)

Analytics Group developed a method to reconstruct an underbody blast field event using data gathered from theater. The explicit finite-element modeling technique used in the full-vehicle system analysis included all key blast phenomenon elements — soil, charge, air, vehicle and occupants — and analyzed the phenomena of charge detonation, blast wave propagation through soil and air, vehicle structural response, and crew injury and fatality risk probability.

"We've been able to reconstruct theater events so that once we know what has happened and have some of the pictures and videos for damage assessment, we can actually go back and compute the probable charge level and the location that caused the damage," remarked Dr. Ravi Thayagarajan, Research and Development (R&D) Engineer on TARDEC's M&S team.

The model provides a better understanding and interpretation of collected field data that can then be translated to represent mathematical loading and boundary conditions for computational models. The M&S method enables analysts to bridge the gap between controlled live-fire testing and actual field events for these complex and highly transient blast events. The work also allows product development teams to consider real-world scenarios that may not be reflected in existing test and evaluation procedures, ultimately improving existing systems and enhancing warfighter survivability across the tactical and combat vehicle fleets.

"Progress has been made so that we can now work with the platform and product development teams and recommend appropriate designs for survivability performance improvements," stated acting CASSI Analytics Deputy Associate Director Dr. Sudhakar Arepally. "It's great to receive this award, but there's a lot more work to be done. We're continuously exploring advanced concepts and technologies in various areas to mitigate blast loads." This article is reprinted with permission of TARDEC's GVSET News.



For original article from TARDEC's GVSET News, click [here](#).

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*The following article on the Yama Sakura exercise, originally appeared on the U.S. Army website.*

### **YAMA SAKURA 59 EXERCISE KICKS OFF WITH OPENING CEREMONY IN KUMAMOTO, JAPAN**

MP KENGUN, Japan - Yama Sakura 59, a scenario-based bilateral training exercise focused on improving military-to-military relationships and interoperability, officially began Jan. 27 during opening ceremonies at Camp Kengun, Japan.

The command post exercise underscores the United States' commitment to Japan's defense in accordance with a mutual defense treaty that was implemented in 1951 and revised in 1960. Yama Sakura was held first in 1982.

The premier bilateral training event for U.S. Army Pacific, YS 59 enables U.S. Soldiers to collaborate with units from one of five regions of the Japan Ground Self Defense Force each year. This year, USARPAC and the JGSDF's Western Army will respond to a simulated scenario in which Japan must counter-attack an enemy force that plans to isolate Kyushu, the country's most southern island.

During the Yama Sakura's opening ceremony, Lt. Gen. Shunzo Kizaki, commander of the Western Army, stressed the importance of the annual exercise in collaborating best practices between the two forces.

"I believe Yama Sakura is the best venue for us to improve joint and bilateral operations capabilities with the well-experienced U.S. forces," Kizaki said.

Lt. Gen. Benjamin Mixon, commander of USARPAC, agreed.

"Since its inception in 1982, Yama Sakura has focused on the development and reinforcement of bilateral planning, cooperation and interoperability of the Japan Ground Self Defense Force and the United States," Mixon said.

"Now in its 29th year, this bilateral exercise improves mutual capabilities, reinforces ties, and strengthens mutual support and friendship," Mixon added. "This exercise also underscores a continuous commitment by the United States and Japan to work shoulder-to-shoulder as dedicated partners in support of the U.S. and Japan security alliance, and for peace and stability."

Kizaki said his expectations for a successful operation by Western Army troops are to "share mutual understanding and build confidence with each other in order to accomplish our mission as one team."

For complete article from the U.S. Army, click [here](#).

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*The following article on simulation incorporating user air traffic preferences, originally appeared on the NASA Ames Aviation Systems Division website.*

### **HUMAN-IN-THE-LOOP SIMULATION OF MECHANISM INCORPORATING USER PREFERENCES INTO AIR TRAFFIC MANAGEMENT**

On December 15-17, 2010, a contractor team led by George Mason University conducted a human-in-the-loop simulation of a new mechanism for incorporating airspace user preferences into air traffic management decisions. The mechanism is based on "free-pass permits" that users can assign to their flights to exempt them from delays.

The number of permits allocated to each user is proportional to the number of flights scheduled by the user, and users can buy and sell permits



from each other. Simulation participants had experience working for, or studying, airlines that enabled them to buy, sell, and use permits as an airline would. Initial participant feedback indicates that this concept could be useful for airlines once they learned how to utilize permits effectively.

The contractor team demonstrated this concept and presented the results of this simulation to NASA researchers at a contract final briefing at Ames Research Center in January 2011.

For original article from NASA Ames Aviation Systems Division, click [here](#).

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### **TITLE CHANGE ANNOUNCEMENT**

Please note, Mr. Zachary Lemnios' title has been changed from "Director, Defense Research & Engineering (DDR&E)" to "Assistant Secretary of Defense for Research & Engineering (ASD(R&E))."

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### **DoD MSSOC course enrollment open for 2011.**

The DoD Modeling and Simulation Staff Officer Course (MSSOOC) is scheduled for the following dates/locations in 2011:

1-3 March Orlando, FL  
5-7 April Newport News, VA  
17-19 May Wright-Patterson AFB, OH  
21-23 June Fort Sill, OK

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. Continuous Learning Units (CEUs) are available for this course.

For more information on upcoming MSSOC Courses, click [here](#).

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### **THE M&S JOURNAL IS CURRENTLY ACCEPTING PAPERS**

The M&S Journal is a theme-based, quarterly publication of technical articles that highlight M&S technology, applications, prototype processes or products, points of view, or emerging philosophies. The M&S Journal is a valuable resource for the M&S community: across DoD, other government agencies, international partner organizations, industry, and academia. The M&S Journal occasionally publishes special issues devoted to a particular topic.

All submitted technical papers for the M&S Journal undergo rigorous peer review following an initial screening for conformance to basic requirements. Publishing in the M&S Journal affords authors both an online and print forum for their M&S technical papers, gaining recognition and publicity throughout the DoD M&S community. Authors also receive extended visibility for their ideas through free online access to their article on the MSIAC website.

### **Instructions for Authors**

- Submissions may be entirely new work, or previously published papers that would benefit from a wider exposure and would provide valuable resources for M&S users.



- Submission must be previously cleared material for open distribution, and should include reprint permissions.
- Manuscripts should be between five to fifteen pages, or 500 to 5,000 words.
- Manuscripts should be submitted in Microsoft Word format.
- The M&S Journal Editorial Board reserves the right to modify a paper for the purpose of typographical or grammar corrections.
- The author will be notified whether the submission has met the basic requirements for the M&S Journal, and will be notified again when the final acceptance/rejection decision has been made.

*The M&S Journal does not accept papers that are structured as commercial advertising, or as promotions of products or services.*

Please contact the [MsiacHelpDesk@dod-msiac.org](mailto:MsiacHelpDesk@dod-msiac.org) for more information, or if you would like to submit a technical paper to the M&S Journal.

To see the latest issues of the M&S Journal, click [here](#).

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

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If you would like to submit an article to be highlighted in the *MSIAC M&S Newsletter*, please forward the article (along with its source data and URL, if available) to the MSIAC Help Desk no later than 15 workdays prior to the publication of the next Newsletter. Potential articles as well as questions or comments on the Newsletter can be emailed to: [MsiacHelpDesk@dod-msiac.org](mailto:MsiacHelpDesk@dod-msiac.org).

The MSIAC also publishes the quarterly *M&S Journal*. If you would like to see the current issue of the *M&S Journal* visit: <http://www.dod-msiac.org>. If you would like to submit an article for the Journal, please email your paper or article to [MsiacHelpDesk@dod-msiac.org](mailto:MsiacHelpDesk@dod-msiac.org) at least 45 days prior to the next publication date.

The *MSIAC Calendar* is available on our website, <http://www.dod-msiac.org>. If you would like to submit a M&S Event for the Calendar, please email the event to [MsiacHelpDesk@dod-msiac.org](mailto:MsiacHelpDesk@dod-msiac.org).

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