...information for the Defense modeling and simulation community...

DMSO NEWS

Volume 4 Number 4 Winter 1999

INSIDE ...

Visit the DMSO exhibit, booth 720, at the Interservice and Industry Training, Simulation and Education Conference (I/ITSEC) in Orlando, Nov. 29-Dec. 3.

HLA supports first large-scale training exercise in October

By Capt. Carol Kanode, U.S. Air Force
16th Special Operations Wing Public Affairs
and Sherrel Mock
DMSO Public Affairs

Special Operations Forces (SOF), using the Synthetic Theater of War - Architecture (STOW-A), conducted a week-long, joint computer-assisted exercise (CAX) in October that was the first large-scale training exercise run in an environment using the DoD's High Level Architecture (HLA) for simulation.

The Army's Simulation, Training and Instrumentation Command's (STRICOM) STOW-A Program, the U. S. Special Operations Command (USSOCOM), the 160th Special Operations Aviation Regiment (SOAR) (Airborne), the National Simulation Center (NSC), and Fort Bragg, N. Car., SOF jointly sponsored the CAX, which was conducted at Hurlburt Field, Fla., and Fort Campbell, Ky.

This year's exercise brought together elements of the Air Force's 8th and 19th Special Operations Squadrons (SOS) and the Army's 2nd Battalion, 75th Ranger Regiment, 1st Special Forces Group and the 160th SOAR.

Run over the course of a week, the exercise actually consisted of two missions, executed Oct. 25-26 and 28-29. Each mission involved different military units, with each group doing their own planning prior to mission execution. Missions were classic infiltrate and assault using air and ground assets, requiring joint coordination between the Air Force and Army pilots, Ranger and the other SOF units.

Distributed simulation technology was used to develop a virtual battlefield to support training, development and validation of tactics, techniques and procedures, and to showcase mission rehearsal capabilities.

The exercise employed a unique mixture of real-world equipment linked to high fidelity flight and ground forces simulators via a synthetic environment. This provided planning and execution of a joint SOF mission involving air and ground operations, according to Maj. Kevin Jenkins, 19th SOS assistant operations officer for mission rehearsal.

Brig. Gen. David Johnson, Air Force Special Operations Command (AFSOC) vice commander, on hand at Hurlburt Field for the exercise, rated it a success.

"We can claim victory ... this was a big deal," he said. "Superb teamwork between the military and the contractors provided a superb product."

Observers at Hurlburt Field were able to watch the battle via the newly christened, high-tech Mission Rehearsal Observation Center (MROC) there. Battle managers, commanders and operators viewed the action in real-time on large-screen television monitors presenting a bird's-eye view of the battlefield. Observers could also see the aircrew's view inside the simulator as it flew through the area of operation, and movement of all other forces in the synthetic battle arena.

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M&S awards nominations close Dec. 10

By Larry Alexander
DMSO M&S Awards Project Lead

The two-month nomination period for the 1999 DMSO Modeling and Simulation (M&S) Awards will close on Dec. 10. Winners will be announced at the DMSO Industry Days in May 2000.

Detailed nomination procedures and forms are posted on the DMSO Web site at *www.dmso.mil/awards/*.

The awards program, now in it's second year, was initiated in 1998 by the DMSO to recognize both government and non-government achievement in support of Department of Defense (DoD) M&S objectives. Eight individuals or teams – one government and one non-government – are selected in each of four categories. The first three categories consist of the

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Director's Corner

By Col Crash Konwin, USAF

Photo by Steve Wilson

"After all is said and done, more is often said than done!!!"

I will guarantee you this will not be another article on the End of the Millennium or Y2K. However, as it is the end of another year and another decade and another ...

Conference after conference, magazine after magazine, newspaper after newspaper, many of us are in positions that require us to "talk the talk" for and about the potential and use of modeling and simulation (M&S) within the Department of Defense. Many of you actually have to "walk the talk" and it is to you that this Director's Corner is dedicated. Because of you, the Department has completed another fruitful year in pursuit of the exploitation of M&S for the warfighter. While not all ventures can ever be fully successful, a number of memorable and lasting activities and products did emerge. For those of you who may not have been aware, the first DMSO Awards for Outstanding Achievement in M&S were awarded in June 1999 for FY98 accomplishments. Please take for immediate action -- If you know of an outstanding M&S-related achievement by an individual or team completed in FY99, submit a nomination by visiting the DMSO home page at www.dmso.mil.

While not comprehensive, the following is my recollection of key 1999 activities consistent with strategic thrusts within the Department and aligned with the theme of the DMSO booth at the Interservice and Industry Training, Simulation and Education Conference (I/ITSEC) -- "Building Blocks of M&S Technology for the 21st Century" -- Nov. 29-Dec. 3.

" ... Building Blocks of M&S Technology for the 21st Century ..."

The **Joint Forces Command** (previously Atlantic Command) has been increasingly active in planning and execution of their strategy for Joint Experimentation. Maj Gen Peppe, USAF, the J-9, was our guest columnist in the last issue of this newsletter. His staff is building upon earlier M&S work developed within the Defense Advanced Research Projects Agency (DARPA) Synthetic Theater of War (STOW) program and the collaboration of the DMSO with the Services on a High Level Architecture (HLA) federation called Pegasus.

Distributed Mission Training (DMT) is both a program within the Air Force and a training philosophy that recognizes that we must find better and more effective ways to keep our combat forces ready. The DMSO teamed with the Air Force and Navy manned flight simulator communities through a technical transition and demonstration project called Tasmanian Devil. The project will demonstrate this year the efficacy of HLA federations for manned flight simulators using a community-developed federation object model to facilitate interoperability of

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Chief, Financial Operations
Mr. Waverly Debraux
Editor
Mr. Sherrel W. Mock
Photographer
Mr. Steve W. Wilson

DMSO News is published quarterly by the Defense Modeling and Simulation Office, 1901 North Beauregard Street, Suite 500, Alexandria, Virginia, 22311-1705.

Views and opinions are not necessarily the official views of, nor endorsed by, the U.S. Government or the Department of Defense.

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Perez accepts 1-year Integrated Natural Environment Program Manager assignment at DMSO, effective Nov. 1

By Sherrel Mock
DMSO Public Affairs

Juan A. Perez has accepted the position of Integrated Natural Environment Program Manager at the Defense Modeling and Simulation Office (DMSO) effective Nov 1. He is on loan from the Army Corps of Engineers' Topographic Engineering Center (TEC) for the one-year assignment.

As the program manager for the INE program he will be responsible for all aspects of the execution of the program and overseeing the management of its five projects: Master Environmental Library (MEL), Environmental Scenario Generator (ESG), Synthetic Environment Data Representation and Interchange Specification (SEDRIS), Environmental Books on the Shelf, Requirements/Common Data Models and Integration Experiments. A major part of Perez's responsibilities will be the integration of these activities with a vision toward the implementation of the Integrated Natural Environment Strategy (INES).

At the TEC Perez led overall execution of Advanced Concepts Technology Demonstrations -- the Joint Precision Strike Demonstration (JPSD) (Rapid Terrain Visualization, Theater Precision Strike Operations) and the Defense Advanced Research Programs Agency's (DARPA) Synthetic Theater Of War (STOW). He was also responsible for overseeing management and operation of the JPSD Integration and Evaluation Center and DARPA Synthetic Environments Evaluation and Demonstration Site.

Perez's previous modeling and simulation (M&S) experience includes serving as Chair for the Land Sub-group of the Simulated Environments Group of the 4th-6th Standards for the Interoperability of Defense Simulations Workshop (now Simulation Interoperability Workshop -- SIW); serving as the initial lead of the TEC Synthetic Environments Program Office, supporting the execution of the DARPA STOW Synthetic Environments Program; and serving as Chief of both the TEC's Modeling and Simulation Division and Standards Branch.

His areas of specialization include M&S terrain database generation, digital topographic data standards and requirements development, digital topographic data exploitation system development, coordinate conversions, analytical photogrammetry and remote sensing.

Contact Perez at (703) 998-0660, or *jperez@msis.dmso.mil*.

Director's Corner

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joint training participants. This should result in less risk and stimulate thinking in a variety of future training applications.

Simulation Based Acquisition (SBA) is a strategy for attacking the challenge of developing affordable needs for, delivering material solutions, and fielding and maintaining complex weapons systems and support structures. In an effort to leverage existing programs' ongoing M&S infrastructure, the DMSO has teamed with the Joint Strike Fighter (JSF) program office on a project to convert a complex multispectral database in proprietary format into the vendor neutral Synthetic Environment Data and Representation Interchange Specification (SEDRIS) format. This should make the database more easily exploitable by different acquisition programs as well as JSF activities in the next phases -- addressing the portion of the SBA vision that emphasizes "... across programs and phases ..."

Internationally, **NATO** has adopted the HLA as the technical architecture for simulations within the Alliance. As evidenced by NATO and national briefings at the first NATO M&S Conference held in Norfolk in October, the HLA is being embraced within the NATO Consultation, Command and Control Agency (NC3A) and the member nations. A multinational training support federation called the Distributed Multi-National Defense Simulation, or DiMuNDS 2000, was highlighted in the last newsletter. By the end of this fiscal year, this federation, involving France, Germany, the Netherlands, United Kingdom, United States, and the NC3A, will be demonstrated to help plan the technical way ahead in simulation support to training exercises.

Underpinning all these applications is the developing and transitioning of simulation and support technologies that will help make the exploitation of M&S even more attractive. You can expect Team DMSO to continue in our mission to make a difference in identifying the right technologies to help mature and work with our Service and agency partners. Then collectively we can make sure "building block" products and processes are available to make steady progress towards the M&S vision of the Department of Defense. That's the talk - let's get on with the walking!!!

Cheers,

Crash

Professional Postscripts - Congratulations are in order for **Mr. Dell Lunceford** who was recently selected to the Senior Executive Service and Director of the Army Model and Simulation Office (AMSO) in Crystal City. **Mr. Juan Perez** has joined the DMSO as Program Manager for the Integrated Natural Environment Program. We welcome his addition of Army field experience at the Topographic Engineering Center (TEC) at Ft Belvoir and have challenged him to help us make the "integrated natural environment" come together for those of you still in the field. Finally, my thanks to **Mr. Bill Dunn**, AMSO, who recently announced his retirement from the Army effective at year's end. Bill served the overall DoD M&S community in his capacity as Chair of the Verification, Validation, and Accreditation (VV&A) Technical Working Group. The VV&A TWG advanced the thinking and processes on this knotty subject and has a forthcoming update to the DoD VV&A Recommended Practices Guide.

We wish all these folks (and those I might have overlooked) well in their new endeavors - whatever they may be!!!

Guest's Corner

Bond sees unique opportunity for STRICOM to support training enablers in new digitized Army

[Editor's Note: The following are remarks presented to the press by BG William L. Bond, Commanding General, U.S. Army Simulation, Training and Instrumentation Command (STRICOM) on Oct. 13 during the annual meeting of the Association of the U.S. Army (AUSA) in Washington, DC.]

I was with the Army Digitization Office before I came to STRICOM. That probably gives me a different perspective on what I look at and what my vision is for STRICOM in the future. While we continue to support enablers and training like we've done in the past, I think we have a unique opportunity … to support the training enablers for the new digitized Army.

Some of the ways we think we can do that are by developing and leveraging some of the systems like the … the Close Combat Tactical Trainer (CCTT); the aviation combined arms trainer, which links now for the first time the ground maneuver and air maneuver forces so that now they can not only talk, but can train together using the same digitized terrain. They can see each other. They can kill the same targets. In the future we hope to add the Engineer Combined Arms Tactical Trainer (CATT), the Air Defense CATT, the Fire Support CATT, and I think even … a Logistics CATT to ensure we'll be able to support the force.

We're not looking to replace live training, but to enhance and leverage it. We think that by getting the right mix of simulation and live training we can do that. To give you some examples, today you can take a force at Fort Hood (Texas) and put them in the field and link them together with a force that's in the combined arms trainer, the CCTT, (and they can) fight side by side. You can link that with a brigade staff supporting those units and have virtual units on their right and left flanks, including an (opposing force) maneuvering against them. This kind of training really enhances not only the live, but uses the virtual portion of it to make it better, so that when they do actually go to the field they'll be able to use their training time much more effectively.

Embedded training. What we're finding as we deploy physically now to the Kosovo area, and before that into the Bosnia-Herzegovenia, we have to take our training with us. When you have a large training system for a weapon system, that's a significant logistics backlog nightmare. We need to be able to put (the training system) right inside the weapon system. My vision would be to find ways in which to reduce the area we need for processors. If you give me that spot I can put embedded training. We're working things like virtual targets within tanks — the ability to train soldiers (on) their night vision (equipment) — so that while they're sitting there in their tank they can actually see the different silhouettes of targets in the night vision environment and identify (them). In the future we can probably use that to acquire targets, so if they're sweeping their area, this same system would help them identify that there was a target. The second sweep would probably tell if it was an armor target. Third sweep, that it was a T-72, maybe with reactive armor. (That would) help them not only to train, but, I think in the future, to acquire and identify targets in that same environment, using the same technology we have today.

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"We'll never realize the full potential that digitization can bring to the battlefield if we don't leverage the technology to train our soldiers to <u>their</u> full potential -- we can't expect to fight digitally if we train analog."

We're building a digitized force and we must learn to use and leverage that same technology to enhance the training. To give you an example, some of the analysis we did shows that digitization, by leveraging use of the tactical internet for situational awareness, can make forces four … five … six times more capable. But we'll only be able to reach that potential if in fact we find ways to take that same information technology and leverage it so that we can enhance training.

How are we going to do that? We have to find ways to leverage the virtual and constructive systems to maximize the live systems. Live training is still by far the best, but right now we're running into resource constraints – both time and money – for training the digitized force. There is a cumulative effect learning those blocking and tackling skills you need to train normally in the analog environment, then adding … the digital requirements. We think in the future we'll be able to mesh those together to provide a digitized training environment.

Brigadier General William L. Bond served as Director, Army Digitization Office in the Office of the Chief of Staff of the Army, from July 21,1997, until he assumed command of the STRICOM in Orlando, Florida, on September 15, 1998.

The STRICOM will serve as the Service host for the Interservice and Industry Training, Simulation and Education Conference (I/ITSEC '99) in Orlando, Nov. 29-Dec. 3.

HLA Cadre flourishes, expands into new areas

By Marnie Salisbury
DMSO HLA Cadre

The Defense Modeling and Simulation Office (DMSO) is expanding the cadre concept to other technology transition activities within the office, starting with the Synthetic Environment Data Representation and Interchange Specification (SEDRIS). Throughout FY00 the cadre will work to bring the components of the SEDRIS technology to a range of DoD modeling and simulation (M&S) programs.

"Our experience with HLA has shown us that technology transition requires many support components. Solid technology, good documentation, educational programs, help desk support, and customer outreach," said Dr. Judith Dahmann. "The cadre is our customer outreach team."

The DMSO created the HLA liaison cadre in 1998 to enhance acceptance and understanding of the Department of Defense (DoD) High Level Architecture (HLA). Cadre members offer technical support to ongoing and emerging federations. Team members work as dedicated liaisons guiding programs through the Federation Development and Execution Process (FEDEP) and helping federation partners take advantage of the services and tools available from the DMSO.

"The cadre serves an important internal purpose as well," Dahmann noted. "This is our mechanism for bringing crucial field experiences back into the technology programs." Feedback may take the form of suggested improvements to the existing documentation, training course materials, freeware tools, or the HLA Web site. Cadre projects have also served as beta-testers for new supporting tools and recommended practices.

Current cadre assignments include the Pegasus analysis federation in use at U.S. Joint Forces Command (JFCOM) J9 and the Tasmanian Devil federation experiment with the Air Force Research Laboratory in Mesa, Ariz. and the Navy's Manned Flight Simulator at Patuxent River Naval Air Station, Md.

For more information contact:

Marnie Salisbury
DMSO HLA Cadre
(703) 883-7064
marnie@mitre.org

Bond

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We have to work interoperability. There are no more stand-alone systems. (We not only need a great individual trainer), but we need (to use it) in collective and combined arms environments. (It needs to be) part of the dismount. Say, an engagement skill trainer. To have that come out of the back of a Bradley along with the Stinger, crew-served weapons and (Squad Automatic Weapons) and use the engagement skill trainer so they can practice and train in a combined arms environment. In the future we can even link that into the CCTT.

We need to really work to maximize the reuse of what we're doing. There are ways I think we can do that. Basically, I think we need to incentivize our contractors to reuse not only the objects and standards that we've already approved, but even more philosophically we have to get away from the "not invented here" syndrome. I think we've found some ways in which we not only do source selection to incentivize (our) contractors to find ways to reuse, but also incentivize them within the contract to reward them when they reuse something that the Army has already developed.

We really need to work on enhancing training effectiveness. Some recent studies done in Great Britain show that only 15 percent of the capabilities that training can provide come from the course material. Fully 85 percent is the methodology you use to train. So, what I'm telling you is if you have a written document you want people to learn by reading, you're only going to be able to achieve maybe 15-20 percent. But, by making it interactive and engaging soldiers in the training environment you can fully realize … 85 percent, which would significantly enhance training.

My vision of the future: we'll not only use training technology for training's sake, but we'll use it in the real-world (for) course-of-action analysis, mission rehearsal and for decision making … I think in the future when processors get even faster we'll use the same capability (to) help commanders identify areas of opportunity, things that he might not normally have seen (when he first analyzed the battlefield). The computer has helped you do the courses of action, helped you do the mission rehearsal, it knows what your preferences are, your vision, your objective. It may tell you that the enemy is not reacting as fast as you'd thought he was going to, (that) here's an opportunity for one of your units to (exploit that opportunity). Again, this is all vision, my idea of the things we think (will happen).

One of the questions is how are we going to do all this. That of course is the challenge. I think we have to find ways to really leverage the entertainment industry, the computer gaming industry. We are doing that today and have opened up a (research project)... with the University of Southern California to be a kind of bridge between the Army and Hollywood. You've seen what they do. They tell the story. "Saving Private Ryan," those first 30 minutes have been rated by veterans as the most realistic, most emotional they've ever seen of war. How do we take that same thing ... to enhance training, to make it more realistic. So (the soldier) remembers and the coaches remember. We have to be able to do that. We have to create realism with sound, smell, touch. These things are all now available with computer technology. Things that increase the heart rate, make you perspire, sweat, the real feelings of combat. The goal is to immerse a soldier so he'll forget he's in a training situation and react the way he would in combat.

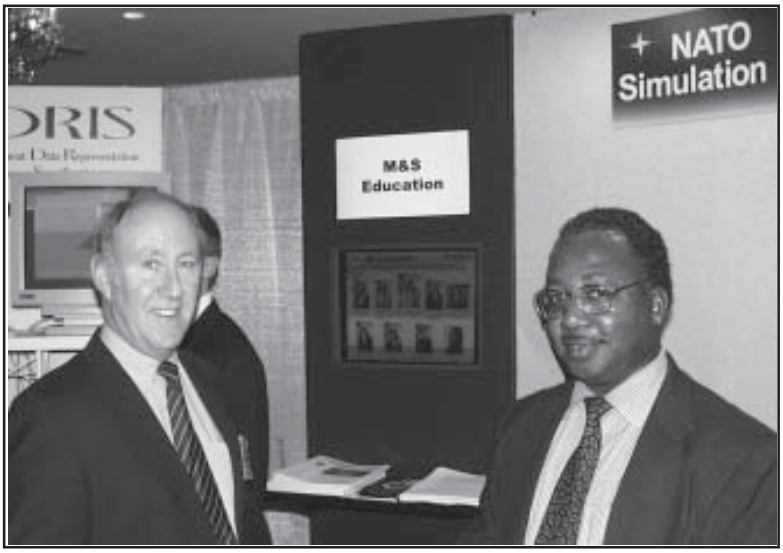
We'll never realize the full potential that digitization can bring to the battlefield if we don't leverage the technology to train our soldiers to their full potential -- we can't expect to fight digitally if we train analog.

DMSO developing NATO M&S orientation courses

Speakers at the NATO Modeling and Simulation Conference in Norfolk, Va., Oct. 28-29, pointed out the need for a workforce knowledgeable about NATO modeling and simulation (M&S) policies, processes and procedures.

The keynote speaker, Dr. Ernst van Hoek, Director of the NATO Research Technology Agency, said, "The second objective of the (NATO M&S) Master Plan is to provide common services in NATO M&S. This objective encompasses ... the provision of key education in the field of M&S ..."

Mr. Graham Burrows, Head of the NATO Modeling and Simulation Coordinating Office (MSCO), further noted, "A primary function of the (NATO M&S Group) and MSCO is to provide education on M&S activities ..."



Graham Burrows, Head, MSCO, discusses the new NATO M&S orientation course with Charles Snead, DMSO Education Team lead, at the NATO M&S Conference.

Other speakers alluded as well to Objective 2.2 of the NATO M&S Master Plan (MSMP), which identifies and documents the goal of "M&S Education Programs."

To address this requirement, the Defense Modeling and Simulation Office (DMSO) will support the development of NATO M&S orientation courses as a U.S. National contribution in support of the NATO MSMP implementation. This contribution will be an enabling element in the MSCO "tool kit" for implementing the MSMP. The NATO M&S courses will provide the MSCO with the ability to leverage the capabilities of a NATO-wide M&S educated cadre, consistent with NATO M&S vision, policies and implementing strategy as a means of achieving NATO MSMP goals.

The first M&S course being developed is the NATO M&S Orientation Course, or NMSOC. This course is designed to provide a broad understanding of NATO M&S terminology, concepts, organizations, programs, activities and key issues to newly assigned staff officers with little or no M&S experience. The NMSOC will provide a base of knowledge from which graduates can draw as they begin to function in staff positions dealing with M&S. Targeting NATO staff officers with minimal prior M&S experience, the NMSOC will help graduates to function more effectively and efficiently than others who have had to learn simply through on-the-job experience; to prepare staff actions that include M&S requirements; to apply current and emerging NATO M&S policies, regulations, and technologies; and to locate M&S resources.

Course development will be accomplished in phases, with the initial NMSOC serving as an introductory or "awareness" course focused on the NATO MSMP and current NATO initiatives. The final version will incorporate actual "hands-on" and practical exercises focused on implementing NATO M&S policies and programs. The course is being tailored after the current U.S. Department of Defense M&S Staff Officer Course (MSSOC), in terms of overall instructional goals and introductory nature. However, because of the different objectives in the NATO MSMP, the diversity of the target audience (cultural, national and mission) and the phased approach, the DMSO Education team is doing more than simply "re-coloring" the U.S. version.

The NMSOC development team began with an extensive review of the NATO MSMP, followed by searches of existing documents and the World Wide Web to establish a base of knowledge and references. From this and sponsor guidance, lesson objectives and an overall course instructional strategy were developed. At the same time, the team was contacting various agencies, to include the MSCO, to better focus the program on content and target audience. For instance, it made a big difference whether the target audience was staff personnel assigned to NATO billets or personnel from NATO countries working on national projects. This information was critical.

A major source of help was the newly formed International Steering Group of the Simulation Interoperability Standards Organizations (SISO), which meets in Orlando, Fla. twice a year. Although this group represents more than NATO, it does include several NATO representatives. The DMSO Education Team met with the group to solicit and reviewed draft objectives and lesson specifications. At this meeting, the team gathered valuable information and promises of future assistance.

Another major source of help was feedback provided by selected attendees at the Old Dominion University and Supreme Allied Commander, Atlantic (SACLANT)-sponsored "International M&S Week," Oct. 25-29, in Norfolk, which included the NATO M&S Conference. The team gathered comments and ideas from a large number of experienced NATO M&S personnel.

Currently, the team is analyzing the information collected from the various sources and developing a first draft of program materials. In addition, an extensive list of points of contact -- key personnel and agencies -- is being assembled as an important part of the "take-home" package the students will be provided.

An initial "alpha" test version of the NMSOC will be released in the early spring. Feedback in the form of student test results, comments and critique, as well as other reviews and comments from key NATO M&S personnel, will be evaluated and used to revise the course. This revised, or "beta," version will be delivered to the MSCO for implementation and continued development.

The NMSOC will be a valuable first step toward realizing the NATO MSMP objective of educating the NATO M&S workforce to more efficiently and effectively foster interoperability and re-usability of M&S applications within the Alliance.

For more information about NATO M&S course development effort, or to contribute comments or examples of national M&S activities, contact Charles Snead at (703) 933-3342 or *csnead@msiac.dmso.mil*.

MSRR adds joint analysis community models; medical, chem-bio models

By Gary Misch
MSRR Project Lead

The Defense Modeling and Simulation Office's (DMSO) Modeling and Simulation Resource Repository (MSRR) node recently added a significant number of models used in the joint analysis community. This revised J-8 Catalog, containing only models used by the joint analysis community, marks the end of the legacy "J-8 Catalog," which was a general inventory of models and simulations within the Department of Defense.

The legacy catalog was last updated in 1992, however, it is still available on the MSRR due to user demand. The service specific models formerly in the legacy catalog have been shifted to the individual service MSRRs where their information can best be kept up to date.

The DMSO MSRR now contains descriptions and points of contact for 127 models and simulations. In addition to the joint analysis models noted above, the MSRR has been updated with a current list of joint medical, and chemical and biological defense models.

The mission of the MSRR program is to realize cost savings by facilitating sharing of resources across the DoD modeling and simulation (M&S) community. To that end, sponsoring organizations within the program operate a Board of Directors, providing a single point of contact for all organizations desiring to share resources. Points of contact may be found at *http://www.msrr.dmso.mil/bod/POC.html*.

The Modeling and Simulation Information Analysis Center (MSIAC) operates the DMSO MSRR node. The MSRR registrar is an integral part of the MSIAC help desk, and can provide live, human-in-the-loop help, as well as assistance with online searches.

For more information on listing or locating M&S resources in the MSRR contact:

Mike Meehan
MSIAC Help Desk
(703) 933-3323/3324
msiac@msiac.dmso.mil

UOB

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managers with operational experience became familiar with the UOB toolset, they soon recognized the potential for the UOB toolset to assist operational planners with task organization needs. This synergy between M&S needs and warfighting needs pointed to the need for similar capability in other communities of interest.

The Warfighter's need to task organize demands a set of capabilities similar to those required by M&S practitioners. However, because there is a potential for loss of life during these operations, greater accuracy is needed implying the need for more highly classified data. The operational planner should use the best source. However, the best source may not be a single source. For example, personnel and equipment normally are described in different data sources. The operational community thus has a demand for capabilities like those in UOB to provide:

-- user-transparent data access,
-- easy selection of units and other components for inclusion in a task organization,
-- simple modification of unit composition and personnel/equipment quantities, and
-- use of comprehensible and robust data interchange formats.

A PME community has a slightly different set of requirements, even though many students are training to becoming operational planners. However, there are more similarities than differences in the needs of PME and M&S users. Because PME users are training in a schoolhouse environment, it is preferable to deal with unclassified data for classroom and homework use. Similarly, because of the short turnaround for each exercise, there is time to use only one source, or one source each for United States and opposing forces. But even though not all sources available to UOB are likely to be used, most other UOB capabilities will be employed. Instructors have been quick to point out the advantages of using a tool that de-emphasizes tedious task organizing, while allowing communication of the fundamental concepts. These advantages create a high degree of acceptance within the PME classroom. As reported in the last issue of DMSO News, pilot projects are being implemented at both U.S. Army and U.S. Marine Corps schools, Fort Leavenworth, Kan., and Quantico, Va., respectively.

For more information contact:

Mike Hopkins
UOB Project Manager
DMSO
(703) 824-3431
mhopkins@dmso.mil

Furman Haddix, Ph.D.
UOB Technical Lead
University of Texas Applied Research Laboratories
(512) 835-3500
furman@arlut.utexas.edu

FDP KAT

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the completed models in the Joint Conceptual Models of the Mission Space (JCMMS) library. The JCMMS library is an instance of the CMMS toolset currently under development by the DMSO. Models are registered in the library for release to users over the Internet.

The DMSO is in the process of defining a CMMS DIF for the interchange of models between applications within the CMMS toolset and other third party tools. XML has been chosen as the official format for the CMMS DIF in order to facilitate the adoption and implementation of the CMMS DIF. The FDP KAT is supporting the CMMS DIF in the form of export and import utilities for exchanging mission space models with the JCMMS Library and other applications that supports the CMMS DIF. The Microsoft XML (MSXML) parser was selected for KAT DIF support since it is free, its application program interface (API) can be accessed easily from *MS Access*, it supports the standard Document Object Model (DOM) specification, and it provides convenient extensions to the DOM API which simplifies XML processing. The Microsoft parser requires that the host machine have Microsoft *Internet Explorer 5.0* installed.

The DOM specification is an API for accessing XML documents. During execution the DOM exists as a tree structure consisting of multiple nested node objects. Node objects are the tagged pairs shown in Figure 2. The MSXML parser extends the DOM specification with the load, selectNodes, and

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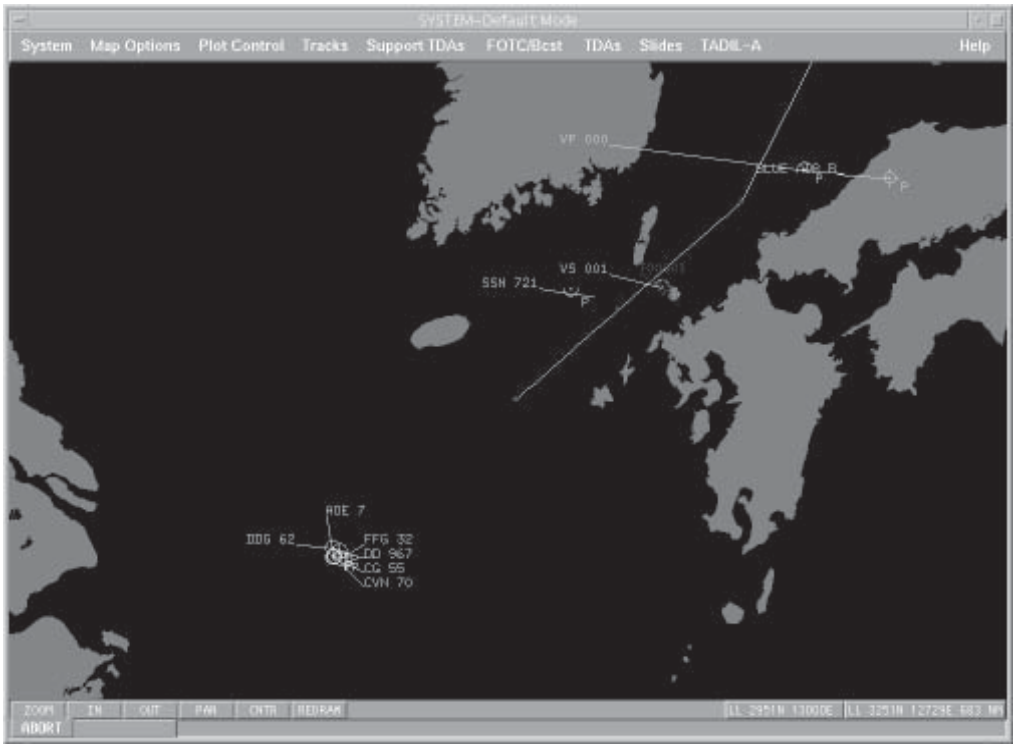
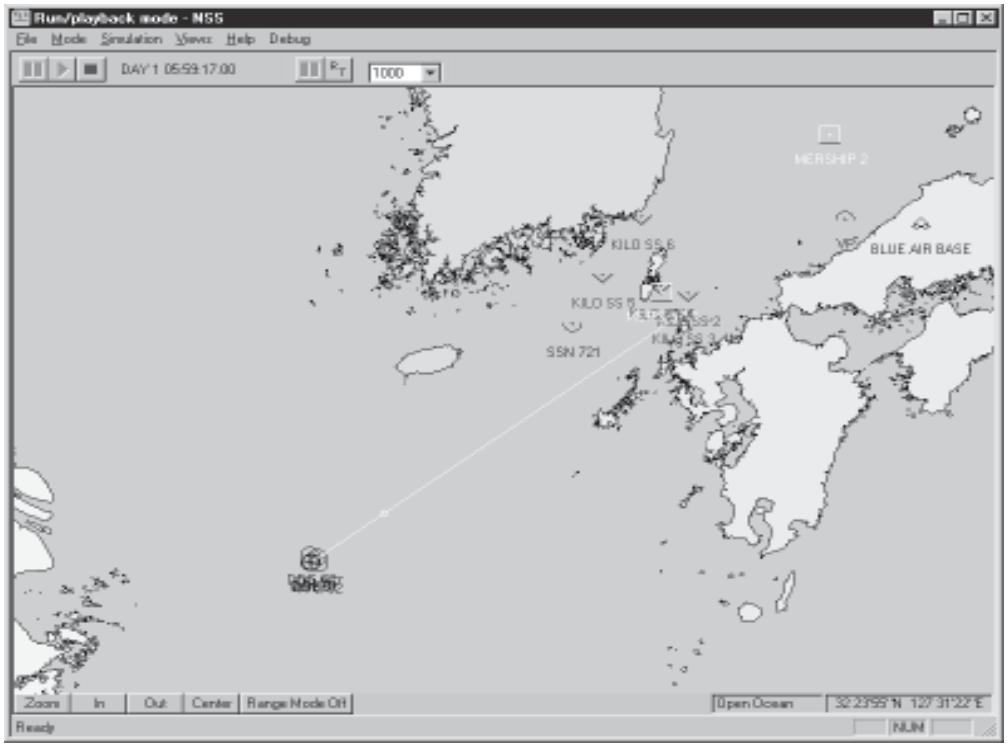
HLA

Simulation-C4I interoperability comes of age

By Zach Furness
DMSO HLA Cadre

See C4I-SIM, p. 9





The GCCS display (top) and NSS display (bottom) highlight the utility of the HLA for sharing C4I-simulation data.

C4I-SIM

Continued from p. 8

The long-time goal of the military Services to "train the way we fight," has come closer to reality in the past two years with the maturity of the DoD High Level Architecture (HLA) for simulation.

Recent experiments with federations composed of command, control, communications and intelligence (C4I) systems and simulations have helped to demonstrate the utility of the HLA to support the exchange of information between these systems.

The pursuit of rapid, reusable ways to integrate C4I systems and simulations is desirable for several reasons. All of the Services already rely heavily upon simulation as a primary tool for training -- both at the operational level (command staffs) and for unit-level training. The necessity of training using the same "go-to-war" systems that are used in the field makes linking these systems to the simulation architecture a high priority. Current C4I-simulation interfaces tend to either be labor intensive, as in the case of manned response cells that stimulate the training audience based on simulation events, or "stove-piped" linkages between single simulations and C4I systems that are not reusable. The advent of the HLA offers an opportunity to extend the interfaces that are being standardized for simulations to the C4I systems.

Current federations employing HLA C4I-Simulation applications span a wide range of functionality and users. The Joint Theater Level Simulation (JTLS), Global Command and Control System (GCCS), and NATO C2 Federation is using JTLS to provide air tracks, unit location data and ship status to GCCS and other NATO C2 systems. Other applications include a Navy federation including GCCS-Maritime and the Naval Simulation System (NSS), and an Army federation that includes the Eagle combat simulation and multiple Army Battle Command Systems (ABCS).

JTLS-GCCS-NATO C2 Federation Targeted for NATO Exercise

The JTLS-GCCS-NATO C2 Federation is being considered for use at an upcoming NATO exercise during the spring of 2000. Work in FY99 focused on expanding the data exchanges between the suite of tools used at NATO computer-aided exercises (CAXs). The federation performance and reliability is continually improving, to the point where it is ready to support an operational exercise. The Defense Modeling and Simulation Office (DMSO) is also working closely with the Joint Warfighting Center (JWFC) to look for opportunities to use the JTLS-GCCS portion of the federation in JWFC exercises during the coming year.

Federation developers from the NATO Consultation, Command and Control Agency (NC3A) and the United States have been working steadily over the past year to move the federation from the laboratory into the field. Recent efforts have focused on broadening the capability of the simulation-C4I interface to provide two-way data transactions between JTLS, the C4I systems and exercise support tools. A two-way interface will not only allow for the portrayal of simulation data on the GCCS and NATO C2 screens, but also allow selected orders generated by C4I systems to be interpreted by the simulation, without the need for model operators within the training response cells.

[Editor's Note: See a demonstration of the JTLS-GCCS-NATO C2 federation at the DMSO exhibit, booth 720, at the Interservice and Industry Training, Simulation and Education Conference (I/ITSEC), Nov. 29-Dec. 3]

NSS-GCCS Federation Highlights Reuse of C2-Simulation Interfaces

A Navy Simulation System (NSS)-GCCS-Maritime federation is an excellent example of integrating C4I systems with existing HLA interfaces into new federations. Building upon the GCCS HLA interface already built for use in the JTLS-GCCS federation, personnel from the Navy Research Lab (NRL) were able to integrate GCCS with SPAWAR-San Diego's NSS within a few months. Already, the Navy is looking for opportunities to apply this federation in its own training exercises.

[Editor's Note: See a demonstration of the NSS-GCCS federation at the DMSO exhibit, booth 720, at the Interservice and Industry Training, Simulation and Education Conference (I/ITSEC), Nov. 29-Dec. 3]

Eagle-ABCS HLA Federation Supports Army's Strike Force

An HLA Federation involving the Army's Eagle simulation and multiple Army Battle Command Systems (ABCS) was recently used to exercise students at the Army's Command and General Staff College (CGSC) as part of Army Experiment 6 (AE6). This annual Army experiment focuses on evaluating the impact of new technologies on Army command and control processes. As part of the experiment this year, the Digital Leader's Reaction Course (DLRC) training support environment, comprised of the HLA federation with ABCS systems, was used to provide the Opposing Force and White Cell stimulation to the students.

The federation used in the AE6 experiment was composed of the Army's Eagle combat simulation, linked via HLA, to the Army's Maneuver Control System (MCS), Advance Field Artillery Tactical Data System (AFATDS), and All Source Analysis System (ASAS). Controller staffs were played at the Division and Corp Level and subordinate and adjacent commands were played entirely within Eagle without any controller support. The application of HLA to link the C4I systems with simulation was crucial to immersing the students in an environment that could train them in new adaptive thinking processes using digitized C4I systems.

AOG Fosters Interoperability Between DII COE and HLA

The Architecture Oversight Group (AOG), which address issues of interoperability between C4I systems has been looking into incorporating aspects of the HLA into the Defense Information Infrastructure (DII) Common Operating Environment (COE). This investigation has been driven by the continuing push to integrate C4I systems with simulations across much of the DoD. The AOG recently chartered a technical working group to examine the issues and opportunities associated with integrating simulation capabilities more closely with the DII COE. The Runtime Infrastructure (RTI) 1.3 Next Generation (NG) has been segmented as an initial step to explore the feasibility of incorporating HLA services.

For more information conact:

Zach Furness
DMSO HLA Cadre
(703) 883-6614
zfurness@mitre.org

• HLA Help Desk •

Have a question about the HLA? Send your query to the HLA Help Desk at **hla@msis.dmso.mil**. We'll get you an answer.

EDISON

European aerospace, automotive industries using HLA in 30-month collaborative project

By Dr. Richard Weatherly
RTI Verification Project Leader

The *European Distributed Interactive Simulation Over Network*, or EDISON, a 30-month project begun in January 1998, is a collaborative engineering environment that brings together the European aerospace and automotive industries using the U.S. Department of Defense (DoD) High Level Architecture (HLA) for simulation.

The aim of the project is to specify, develop, experiment and exploit a generic and integrated architecture to support the interaction between geographically distributed simulations, to share and interactively use remote simulation facilities, and to support cooperative sessions for simulation modeling, processing and post-processing. Virtual reality improves the ability to analyze and evaluate results of the simulation sessions.

EDISON chose three pilot projects to spearhead the technology development: validation of complex space systems, collaborative work between distant engineering teams and remote training and mission rehearsal. The results from these pilot projects were presented to industry and academic conferences this past summer. EDISON showcased both pure numerical and real-time simulations with hardware and humans in the loop.

The EDISON infrastructure is a modular package that includes:

-- Simulation Framework which provides common simulation services (scheduling, real-time kernel, etc.) to the applications;

-- Middleware based on the HLA containing the vital services necessary for distributed simulations (time management, intelligent distribution mechanisms, extrapolation and prediction mechanisms to hide network latencies and jitters, etc.);

-- Virtual Reality Framework for real-time and interactive visualization of the simulation results;

-- Communication Framework based on asynchronous transfer mode (ATM) and internet protocol v6 (IPV6) and;

-- Supervisor and Groupware functions.

Using EDISON it is possible to qualify the European Space Agency's (ESA) Automated Transfer Vehicle (ATV), a spacecraft which docks automatically with the International Space Station to refuel and resupply the station, prior to the space flight. The ATV test facilities which are distributed throughout Europe and interconnected through EDISON allow real-time simulation sessions with ATV flight hardware and software.

In the automotive manufacturing sector, designers and acoustic engineers at various locations throughout Europe work together and study noise levels within a vehicle compartment with vibro-acoustic analysis. In this application, EDISON facilitates the sharing of distributed simulation data and results.

In the aerospace sector, astronauts and ground controllers train to tele-operate space systems, such as the ATV or the European Robotic Arm (ERA), by using remote simulations of these systems. The ATV and ERA are both ESA programs.

For more information visit the EDISON Web site at *http://cec.to.alespazio.it/edison.html.*

MISSION looking at how HLA can help manufacturing

By Dr. Frederick Kuhl
DMSO HLA Cadre

The Department of Defense High Level Architecture (HLA) for simulation continued to expand beyond its military roots as Col. Crash Konwin, Director of the Defense Modeling and Simulation Office (DMSO), presented the keynote address at an international meeting on simulation in manufacturing in Gaithersburg, Md., Oct. 19.

Modelling and Simulation Environments for Design, Planning and Operation of Globally Distributed Enterprises, or MISSION, is a consortium of industry, government and academic partners from the European Union, Japan and the United States that focuses on architecture and tools for distributed simulation in manufacturing. The yearly inter-regional meeting, Oct. 19-22, was hosted by the U.S. National Institute of Standards and Technology (NIST).

Konwin spoke about the origin of the HLA and the increasing importance of simulation in all phases of acquisition. He and Dr. Judith Dahmann, DMSO Chief Scientist, who also attended, met with the regional leaders of the consortium.

The driving force behind MISSION is the emergence of the "virtual enterprise" -- organizations that usually are competitors who join temporarily to develop and deliver a specific product. New information architectures and tools are needed to support planning and production in such geographically dispersed and rapidly created enterprises. Simulation, now perforce distributed simulation, is a necessary tool for planning the virtual enterprise.

The HLA is important for two reasons. One is that the application of the HLA to manufacturing expands its "economic base," increasing the number and variety of users, applications and tools. The wider base makes the HLA a better architecture for the DoD. The second reason is the application itself. Manufacturing, both product design and manufacturing process design, is a key part of Simulation-Based Acquisition, or SBA. The results of MISSION will promote SBA directly.

MISSION is a year into a three-year program of formulating requirements for distributed simulation in manufacturing; defining an architecture to prepare, conduct and exploit simulation; and building a demonstration of the main ideas. MISSION also intends to define a manufacturing systems engineering architecture that will combine various engineering tools, including simulation. The consortium has chosen the HLA as their architecture for executing distributed and component-based simulation.

The DMSO is a member of the MISSION consortium and will be working this year in applying the HLA to manufacturing simulation. Other U.S. partners include the NIST, several universities and a number of U.S. simulation tool vendors. The DMSO and NIST are members of the Object Management Group, the international consortium for distributed object computing. The OMG adopted the HLA last year as its standard for distributed simulation systems. As part of the DMSO's continuing involvement in the OMG, work coming from MISSION is coordinated with the OMG's manufacturing task force.

For more information see *http://www-plt.ipk.fhg.de/mission/* or contact:

Dr. Frederick Kuhl
DMSO HLA Cadre
(703) 883-7559
fkuhl@mitre.org

Range Commanders Council panel reviewing HLA as foundation standard for joint test, training range roadmap

By Phil Zimmerman
HLA Project Manager

In April, responding to a request by the Defense Test and Training Steering Group (DTTSG), the Range Commanders Council (RCC) tasked a Blue Ribbon Panel (BRP) to make recommendations on establishing and maintaining a roadmap for a common architecture for range instrumentation.

The DTTSG advises the Director, Test, Systems Engineering and Evaluation (DTSE&E) on corporate Defense Test and Training investment resources, oversees the requirements, development and integration of all training and test range instrumentation and facilitates the development of a consolidated acquisition policy for training and testing capabilities, including embedded test and training capabilities in weapon systems.

The roadmap for a common architecture for range instrumentation will be part of the Joint Test and Training Range Roadmap (JTTRR), which functionally organizes major instrumentation efforts into a coordinated DoD corporate strategy. The common architecture roadmap is not meant to include the technical details, but rather serve as the collective, recognized architectural dictum for instrumentation systems on all DoD ranges. It will provide investment managers and instrumentation developers a shared view of the necessary standards to which instrumentation must be developed, enabling inter-range interoperability and instrumentation reuse among ranges to be tremendously enhanced.

The BRP met for two days in early October to begin structuring the common architecture approach for test and training ranges. The panel, chaired by Dale Paquette of the Naval Undersea Warfare Center, is composed of 11 senior members of the Test and Training range communities.

Phil Zimmerman, HLA project manager for the Defense Modeling and Simulation Office (DMSO), briefed the advisory panel on the DoD High Level Architecture (HLA) for simulation. This gave the panel a view of the HLA from beginning to end, allowing members to understand the development and continued maintenance of the HLA; to learn about the Object Model Group (OMG) and Institute of Electrical and Electronic Engineers (IEEE) international standards efforts, as related to the three HLA specifications; as well as a chance to ask questions about its applicability to issues considered by the Blue Ribbon Panel to be essential elements of the roadmap.

George Rumford from the Office of the DTSE&E briefed the panel on the Test and Training Enabling Architecture (TENA) and its use of the HLA.

The two briefings alleviated concerns that there might be unwarranted duplication between the two architectures. Instead the panel found the two to be coordinated and complementary.

The BRP is currently drafting its recommendations to be presented at the next RCC meeting in February. Likely recommendations include having the RCC establish an "Architecture" subgroup with technical membership from the other instrumentation-specific subgroups. Possible charter elements for the "Architecture" group are:

* Maintain the Test and Training Range Architecture standard
* Determine major modernization decision points for updating the Test and Training Range Architecture standard.

For more information contact:

Phil Zimmerman
HLA Project Manager
(703) 998-0660
pzimmerm@msis.dmso.mil.

FDP DAT

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selectSingleNode methods. The load method parses a specified XML file and imports the contents into the DOM in a single function call. The selectNodes and selectSingleNode methods provide the means for querying the DOM and extracting data.

These two methods merit additional discussion for the convenience they add. The selectNodes and selectSingleNode methods return one or more nodes based on an extensible stylesheet language (XSL) pattern query. The syntax for the query is similar to Windows directory path syntax. For example, using the previous address book sample, the call to fetch a list of contacts appears as AddressBook.selectNodes("./Contact"). The "./" pattern is used to set the context of the query to the current node (AddressBook) and its descendents. The MSXML parser also supports recursive searches with the XSL patterns. In the example given in Figure 2, the query for all zip codes starting from the root node is AddressBook.selectNodes(".//Zip"). This query will return any node named Zip, regardless of how deeply nested the node is located. The MSXML parser also supports filtering. In the same example, the query to return the contact who's zip code is "32816" looks like: AddressBook.selectNodes("./Contact[Zip=32816]"). Filtering criteria is supplied in square brackets.

The FDP KAT takes advantage of the convenience provided by the load method when importing XML documents. Once a document is loaded into a DOM, the KAT calls the SelectNode() and SelectNodes() methods to locate and extract nodes. The XML properties and methods allow the KAT to process the XML document quickly and easily. The MSXML DOM does not offer a great advantage when writing export routines. Rather than use the DOM, the FDP KAT uses custom classes based on the VisualBasic Collection object. Each collection represents a node list, which may contain other nodes or node lists. The FDP KAT first populates all of the collections with information from its database, then calls the export method of the root collection, which in turn calls the export method of each of its child nodes and node lists. FDP KAT development experience shows that the use of a commercial-off-the-shelf (COTS) XML parser greatly reduces the amount of effort required to import a very complex XML document. In some sense, extracting information from an XML document is similar to writing structured query language (SQL) queries for a relational database. It is anticipated that the availability of COTS XML parsers will help proliferate the application of XML in future projects involving data interchange. When evaluating XML parsers, it is important to check for compliance with the XML DOM specification, and also for value-added extensions that may reduce development time.

For more information on the FDP KAT contact:

Mike Loesekann
DMSO CMMS Program Manager
(703) 998-0660
mloeseka@msis.dmso.mil

Cynthia Tuttle
FDP KAT Project Lead
(407) 380-1200
ctuttle@drc.com

KAT Compendium
http://ORL01.DRC.COM/KAT

CMMS Data Dictionary

Business rules for CMMS-DD data fill pay off

CMMS Data Dictionary Rules and Fill

By Bruce A. Harris
CMMS Data Dictionary Program Manager
and Ron Smits
CMMS Data Dictionary Project Engineer

The Defense Modeling and Simulation Office (DMSO) is developing the Conceptual Models of the Mission Space (CMMS) Data Dictionary (DD) in a continuing effort to provide the modeling and simulation (M&S) community with a comprehensive suite of tools. The three-dimensional data model for the CMMS-DD categorizes term-description combinations based on four required attributes: Focus, Domain, Participant, and Part-of-Speech. While the construct of the data model is important, of equal if not greater importance is a consistent and logical population of the underlying database.

Business Rules for the Data Fill

As a common resource for the M&S community, the CMMS-DD fill needs to be unambiguously categorized in the data model to reduce linguistic disparities present in the military jargon. Ideally, each term-description combination is uniquely captured in the database, so that a minimal set of pre-defined characteristics will "lock-in" the correct description for any given relevant term. To achieve that level of consistency is near impossible without the judicious adherence to a set of business rules that are defined before the data mining actually begins. Previous experience with verification and validation (V&V) of linguistic data has also shown that the use of automated tools (capture forms) is indispensable in providing a track record of the captured data.

The CMMS-DD developed a comprehensive set of business rules as part of the CMMS-DD data access tool that enable the analyst to categorize mined term-description combinations in a logically and doctrinally consistent manner. *Figure 1* provides a screenshot of the data form for the business rules. The rules establish binding guidelines for each of the CMMS-DD required attributes and their values, in addition to term selection criteria.

CMMS-DD Fill

As the initial data-mining phase of the CMMS-DD project is coming to a close, over 8,700 term-description combinations are categorized. These terms were drawn from the latest updates to the Chairman of the Joint Chiefs of Staff Joint Publication 1-02, as well as Navy, Marine Corps, Army and Air Force doctrinal and Service publications. The initial focus of the data mining has been on the direct support of M&S programs that involve military current operations, rather than support and administrative functional areas.

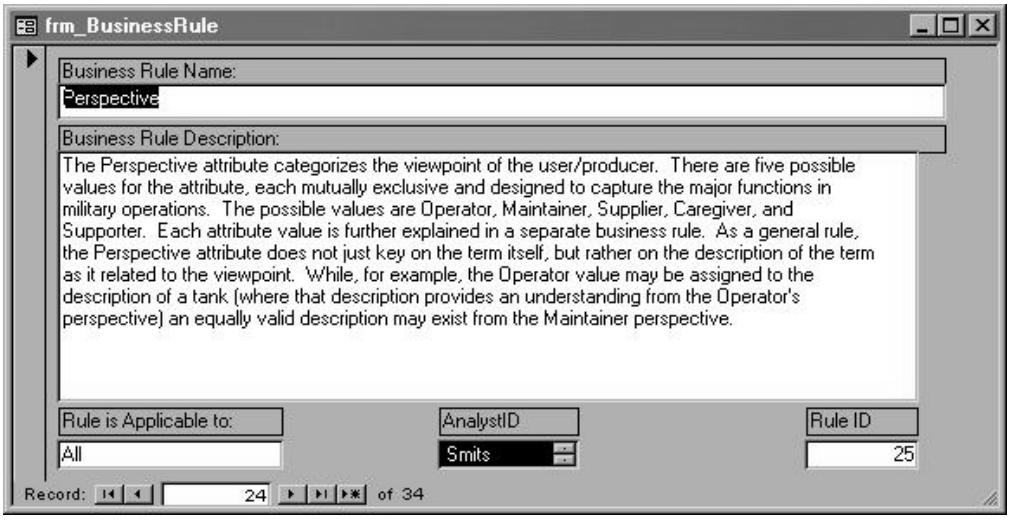

Fig. 1 Business Rules Capture Form

One of the key achievements of the current categorization schema is the unambiguous use of each term-description. There are several descriptions available for the term "Course of Action." Any given dictionary may actually list several descriptions for a term. In this case, JP 1-02 provides two such descriptions, as does Navy Warfare Publication (NWP) 1-02 and others for a total of eight captured descriptions. *Figure 2* provides the example of the "Course of Action" descriptions and categorizations. Each term-description is uniquely categorized using the four attributes, creating unambiguous use of the term in a given syntactical context. Additionally, each term description is captured using its own unique form, to facilitate V&V of the data fill at the user's convenience (*Figure 3*).

Access Tool use for V&V

The entire CMMS-DD database was developed as a Microsoft Access application with all forms, business

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rules, and attribute mappings included. The database can be distributed as a stand-alone application for individual use and provide the foundation for a comprehensive V&V effort. Much of the desired information regarding V&V issues is already included on the data capture forms. Each term-description is individually sourced and provides hyperlinks to the original data source from which it was mined, if available. Not all military dictionaries are available on the internet from their proponent's Web sites.

For this data-mining effort, only original proponent Web sites and documents were used. The World Wide Web continues to evolve and Web addresses change frequently. While there is no guarantee that any given hyperlink will be available -- the U.S. Air Force for instance has changed its electronic library three times within the last year -- the use of proponent sites and official up-to-date publications provides the best assurance that the mined data can be traced and verified by an independent auditor.

Term	Acronym	Description	Domain	Focus	Participant	POS
Course of Action						
		A possible plan open to an individual or commander which would accomplish or is related to the accomplishment of, his mission.	Maritime	Why	Supporter	Noun
	COA	A plan that would accomplish, or is related to, the accomplishment of a mission.	Joint	Why	Supporter	Noun
	COA	Any sequence of activities which an individual or unit may follow.	Ground	Why	Operator	Process
	COA	A step-by-step plan to accomplish a goal with the following elements: (1) strategy to achieve; (2) methods of measurement; (3) schedule and risk; (4) funding required; (5) expertise required; and (6) organizational support required.	Air and Space	Why	Supporter	Noun
		The scheme adopted to accomplish a job or mission.	Maritime	How	Operator	Process
	COA	The scheme adopted to accomplish a task or mission. It is a product of the Joint Operation Planning and Execution System concept development phase. The supported commander will include a recommended course of action in the commander's estimate. The rec	Joint	How	Supporter	Process
		establishes how to accomplish a Demonstration Mission Statement by: (1) seeking alternative solutions for achieving the objectives; (2) exploring the resources required for the various alternatives; (3) choosing the best strategy to meet the objectives; (	Air and Space	How	Supporter	Process
		A line of conduct in an engagement. (USMC) (See Joint Pub 1-02 for additional definition.)	Ground	What	Supporter	Noun

Fig. 2 Term-Description Example

On-going Efforts

As the initial data fill is completed, the resource enters the evaluation phase of the project. Web access for the resource facilitates user feedback while tracking the use and re-use of the database. These indicators can, in turn, provide meaningful metrics of the strengths of the resource and identify possible areas for improvement. Enabling basic queries against the underlying data and providing a term-description or source nomination process will serve to enhance the longevity and reliability of the CMMS-DD as another "tool of choice" in the DMSO toolset architecture.

For more information about the CMMS-DD project contact:

Michael Loesekann
DMSO CMMS Project Manager
(703) 824-3432
mloeseka@msis.dmso.mil

Bruce Harris
CMMS DD Project Manager
Dynamics Research Corporation
(978) 475-9090, ext 1878
bharris@drc.com

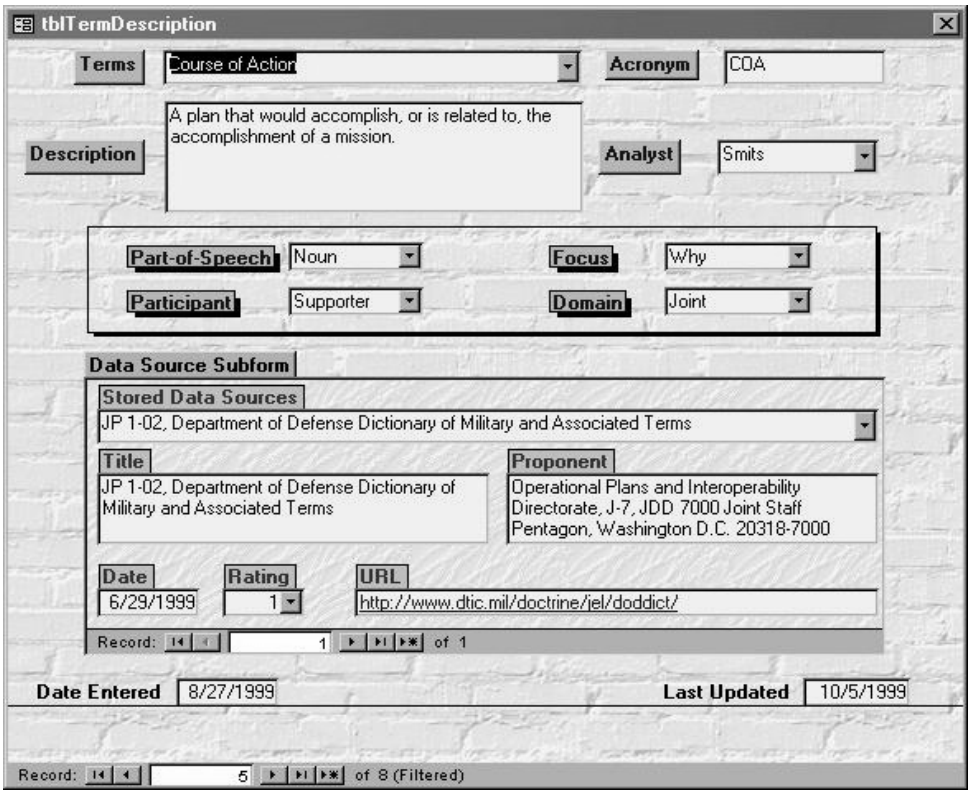

Fig. 3 Data Capture Form

ADS Library continues to expand in resource registrations, metadata content

By Mike Hopkins
DMSO ADS Project Manager

The Defense Modeling and Simulation Office's (DMSO) Authoritative Data Source (ADS) Project is providing the Department of Defense (DoD) modeling and simulation (M&S) community a valuable knowledge acquisition (KA) tool, today -- the ADS Library.

The ADS Library is a catalog of metadata for data/knowledge sources. The library, with its robust search capabilities, ease of access and user friendliness, expedites the KA process. It supports the entire spectrum of KA efforts required by either the development of new models or simulations, such as the Joint Simulation System (JSIMS), or the population of run-time databases used by existing M&S applications, such as the Joint Theater Level Simulation (JTLS).

Over the last several months the library has enhanced its metadata structures to allow for the capture of those elements of data quality information required to support identification of sources, determination of appropriateness for the need, and verification, validation, and accreditation (VV&A) by the user. To insure standardization, the ADS Working Group spent many hours cross-walking the terminology to be incorporated to support this expansion with existing standards. Although a total match with multiple standards was impossible the working group feels what has been incorporated is a good balance between major standards, such as International Standardization Organization (ISO), Federal Geospatial Data Committee (FGDC), Government Information Locator Service (GILS), and the Defense Data Directory System (DDDS). The fill of this additional information for sources currently in the library will occur over the normal update/maintenance cycle.

Also significant is the expansion of the ADS Taxonomy to explicitly support the cataloging of intelligence sources. To review this enhancement visit the ADS library Web site at http://ads.msrr.dmso.mil/ and enter either the "ADS Definitions and Terminology" or the "ADS Taxonomy Walk Through" sections.

Efforts are underway to transfer ADS metadata records for Service-owned sources to the respective Components' (Army, Air Force, and Navy) Modeling and Simulation Resource Repository (MSRR) ADS repositories. This will enhance the maintenance and update of those records. These sources will reside, for a short period, on both the Service and DMSO repositories until the transparent search capability between sites is fully implemented. This capability should be in place by the end of the year.

The DMSO will soon have the responsibility for hosting the ADS Library on the World Wide Web. This requires training of DMSO system and database personnel and upgrading of hardware to provide effective service. During what is expected to be a very short transition period visitors to the ADS Web site will see an "Under Construction" banner. Delays in responding to requests should be minimal during the transition, however, if a quick response is needed and the system is not providing it, users should call Mike Lach, (757) 825-4083, or Mike Hopkins, (703) 998-0660, for assistance.

The library is currently populated with metadata for 1,331 sources and additional candidates for inclusion are identified daily. Recent efforts have expanded the number of Human Behavior-related sources cataloged.

The library is available today, at the unclassified level, in the MSRR at http://ads.msrr.dmso.mil/ and at the classified level on the Secret Internet Protocol Router Network (SIPRNet) at http://broncos.msosa.dmso. contractor.smil.mil. Records include a wide selection of functional areas and come from DoD, government (non-DoD), foreign, and commercial sources.

KA requirements are expanding at increasing rates and the expense associated with doing business the old fashioned way are no longer acceptable. ADS is rapidly gaining recognition as the means by which to reduce the resource costs associated with knowledge acquisition.

For more information contact:

Mike Hopkins
DMSO ADS Project Manager
(703) 998-0660
mhopkins@msis.dmso.mil

UOB serves needs of multiple user communities

By Mike Hopkins
UOB Project Manager

The capabilities developed by the Unit Order of Battle (UOB) toolset project for the modeling and simulation (M&S) user community have clear applicability to two other Department of Defense (DoD) communities: military operations and training, and Professional Military Education (PME).

The primary objective of the UOB toolset is to serve the DoD M&S community by providing a one-stop, single-format source for authoritative data. In the past, the process of developing data suitable for simulation or federation execution was painful and tedious because:

-- multiple authoritative data sources had to be located,

-- accessibility had to be secured for each source,

-- each source had unique formats and methodology with which the user had to become familiar, and

-- no convenient way existed to mix and match data from different sources.

These problems can be minimized by using the three components of the UOB toolset: the UOB Authoritative Data Sources (ADS), the UOB Data Access Tool (DAT), and the UOB Data Interchange Format (DIF). These collectively allow the user to:

-- start with a useful set of classified and unclassified data sources (UOB ADS),

-- filter the data to a common set of data concerning units, command relationships between units, personnel, equipment and aircraft,

-- provide a common facility for establishing user authentication and authorization (UOB DAT),

-- give the user the ability to create Task Organizations by assembling extracts from the sources (UOB DAT),

-- give the user the ability to modify current or previously created Task Organizations (UOB DAT), and

-- provide the capability to Save/Export Task Organizations in a robust, common format (UOB DIF).

The success of this approach is amply demonstrated by a large number of users who have embraced the toolset. This user list includes the training community, e.g., the Joint Warfighting Center's Joint Integrated Database Preparation System (JIDPS) and Joint Exercise Management Package (JEMP), and the Joint Simulation System (JSIMS). As M&S

See UOB, p. 7

FDP KAT
Data Engineering projects stay on leading edge with extensible markup language

By Cynthia Tuttle
FDP KAT Project Lead

The Defense Modeling and Simulation Office (DMSO) is adopting one of the latest Internet technologies, extensible markup language (XML), into several of its Data Engineering (DE) projects. The DE projects are using XML to achieve the DE goals of data standardization and data reuse. DE projects that are implementing or have plans to implement XML include Conceptual Models of the Mission Space (CMMS) Library Toolset, Data Verification Interactive Editor (DAVIE), Unit Order of Battle Data Access Tool (UOB DAT), and the Formalized Data Product Knowledge Acquisition Tool (FDP KAT). This article provides a brief introduction to XML and a glimpse at how XML is being implemented in the FDP KAT.

XML Overview

XML is a cousin to Hypertext Markup Language (HTML). Both XML and HTML are universal standards for exchanging information over the Internet or an intranet. By now, most people are familiar with HTML, which describes how to format and display information in web browsers. XML, on the other hand, describes the content of the information. An XML document can serve as the data content for an HTML document. An example of information that can be represented as both HTML and XML is a point of contact entry in an address book. Suppose one has the following entries in an address book:

Defense Modeling and Simulation Office
1901 North Beauregard Street, Suite 500
Alexandria, VA 22311
Tel: (703) 998-0660
FAX: (703) 978-5001

University of Central Florida
4000 Central Florida Blvd.
Orlando, FL 32816
Tel: (407) 823-2000

This information can be marked-up with HTML tags to describe how it should be displayed in a browser. An example of the HTML representation for this contact is shown in Figure 1. HTML tags shown in the angle brackets, tell the browser where to insert line breaks and when to apply bold text. In the example below, ** ** indicates the beginning or a paragraph, **** indicates the start of bold text, **** indicates the end of bold text, **
** indicates a line break, and ** ** indicates the end of the paragraph. Note that these tags tell the web browser how to format the information, but not what the information means.

The same information marked up with XML tags appears in Figure 2. Unlike the HTML tags, the XML tags are used to clearly distinguish different components of information. The XML tags identify content rather than specifying the display format.

XML simplifies the extraction of data elements by removing ambiguity and adding structure. The content (tags) and the structure (syntax) in which tags must appear in an XML document may be defined in a Document Type Definition (DTD) or XML Schema. Since the DMSO Data Engineering program is in the business of promoting data standardization and reuse, its projects are in the process of defining their Data Interchange Formats (DIFs) as XML documents and are drafting DTDs to define the content and syntax of the DIFs. It is anticipated that the adoption of XML will make data more accessible to a wider audience.

Case Study: Application of XML in FDP KAT

The Formalized Data Product Knowledge Acquisition Tool (FDP KAT) is a desktop application based on *MS Access 97* that allows military subject matter experts to create mission space models for the purpose of describing military operations for simulations. The FDP KAT was created to assist the Joint Simulation System (JSIMS) Enterprise programs in creating models in their own FDP template format. Examples of mission space models include organization or unit models, mission or process models, and communication models. The targeted end users of these mission space models are the software developers, who analyze and abstract software classes, objects and methods from the models for the simulation. The JSIMS Enterprise programs register

See FDP KAT, p. 7

```
<html>
<head><title>Address Book</title></head>
<body>
<p>
<b>Defense Modeling and Simulation Office</b><br>
1901 North Beauregard Street, Suite 500<br>
Alexandria, VA 22311<br>
Tel: (703) 998-0660 FAX: (703) 978-5001<br>
</p>
<p>
<b>University of Central Florida</b><br>
4000 Central Florida Blvd.<br>
Orlando, FL 32816<br>
Tel: (407) 823-2000<br>
</p>
</body>
</html>
```

Figure 1. HTML Sample

```
<?xml version="1.0" encoding="UTF-8"?>
<AddressBook>
<Contact>
<Name>Defense Modeling and Simulation Office</Name>
<Street>1901 North Beauregard Street, Suite 500</Street>
<City>Alexandria</City>
<State>VA</State>
<Zip>22311</Zip>
<Voice>(703) 998-0660</Voice>
<FAX>(703) 978-5001</FAX>
</Contact>
<Contact>
<Name>University of Central Florida</Name>
<Street>4000 Central Florida Blvd.</Street>
<City>Orlando</City>
<State>FL</State>
<Zip>32816</Zip>
<Voice>(407) 823-2000</Voice>
</Contact>
</AddressBook>
```

Figure 2 . XML Sample

M&S Awards

Continued from p. 1

M&S functional areas – training, analysis and acquisition. The fourth category, a cross-functional area, considers those broader endeavors that impact all aspects of the overall DoD M&S effort.

Nominations in the functional areas will be reviewed by awards boards established by the corresponding functional area councils of the DoD's Executive Council for M&S (EXCIMS). A select subcommittee of the M&S Working Group (MSWG) will review nominations in the cross-functional area. To ensure an equitable representation in the non-government sector, selected members of the M&S Industry Steering Group (ISG) will participate in the selection process. Finally, the EXCIMS, chaired by, Dr. Delores M. Etter, Deputy Under Secretary of Defense for Science and Technology, will review the various groups' recommendations for approval of the awards.

For more information visit the DMSO Web site at *www.dmso.mil/awards/* or contact:

Larry Alexander
DMSO M&S Awards Project Lead
(703) 824-3404
lalex@msis.dmso.mil

ODDR&E / DMSO
Office of the Secretary of Defense
Washington, DC 20301-3040

STOW-A

Continued from p. 1

The 160th SOAR Training Facility at Fort Campbell was configured with simulators, networks, Semi-automated Forces (SAF) capabilities, displays for monitoring the battlefield, and utilities to facilitate exercise automated data collection and reduction capabilities.

Even radio communications were simulated during the exercise. Operational frequencies selected for monitoring were heard in the MROC through speakers or individual headsets. MROC bservers immersed in the action of the battle were exposed to the intensity, challenges and 'fog of war' as the scenario unfolded. But from a mission-rehearsal standpoint, they were able to see potential or actual problems and could make the necessary adjustments for follow-on planning.

"This year's exercise was historic because we proved the technology works," Jenkins said. "The Department of Defense mandated the (HLA) we (were) using, which means all DOD simulators (were) able to talk to each other in the same language," he explained. "Everything we (were) doing ... is leading-edge technology."

"The demonstration was a terrific example of how we can exploit technology to benefit mission training as well as mission rehearsal," said Col. Michael C. Damron, AFSOC director of training, who observed the exercise.

An 8th SOS crew flew the MC-130E Talon I weapons system trainer (WST) into hostile enemy territory during the exercise. Lt. Col. Lloyd Moon, 8th SOS operations officer, said he values the potential of this kind of training. "I'm very excited about the capability of 'the trainer' and our now-proven capability for distributed mission training (DMT) and rehearsal," he said. "The WST, linked to simulators from other special operations forces and Air Force units, provides a quantum leap as a learning and rehearsal tool."

"(The exercise)," Jenkins said, "(was) a monumental step in fulfilling the goal that every warrior who wears the uniform and is called on to enter harm's way will do so with the best tools, knowledge and training available; come home victorious; and tell their grandchildren about it."

Virtual components of the exercise included the OneSAF Testbed, MetaVR and SVS stealths, and Simulyzer for data recording, while Builder was used for exercise monitoring. It also involved two manned Combat Mission Simulators (CMS) and a live Blackhawk helicopter at Fort Campbell, a manned MC-130E simulator at Hurlburt Field and numerous role players communicating via an ASTi radio network, connected to live radios through SimPhonics.

The exercise had four live assets involved - including an Air Force MC130E Talon aircraft and an Army MH-60K Blackhawk - but for all other units, the role players controlled the OneSAF Testbed's computer-generated units. This included the non-live portions of the rotary wing assault force, all threat entities, all infantry units, and all fixed wing assets other than the live MC-130E. A SOF-specific baseline was created and maintained using Advanced Distributed Simulation Technology II (ADST-II).

The HLA Runtime Infrastructure (RTI) 1.3v6 and SOF Federation Object Model (F)OM 1.0 were used to connect the simulators over a dedicated high-speed (T-1) communications circuit. Each site provided an HLA interface to its simulators and simulation applications except for the radio simulation, which used Distributed Interactive Simulation (DIS) protocols. During the exercise all information transmitted via the T1 used the HLA protocol with the exception of the radio traffic. Each site used radio filters to insert radio packets into the HLA network for simulated radio communications.