Annual Report
academic year 2010 - 2011
MODELING
ANALYSIS
SIMULATION
VISUALIZATION
INNOVATION
# 2011 Annual Report

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WHAT DOES VMASC DO TO PROMOTE M&S IN HAMPTON ROADS?

We are often asked, “What does VMASC do to promote modeling & simulation.” Our answer is simple. VMASC is a university-wide multidisciplinary research center that emphasizes modeling, simulation, and visualization (MS&V) research, development and education. We are one of the world’s leading research centers for computer modeling, simulation, and visualization. Our mission is to conduct collaborative MS&V research and development, provide expertise to government agencies and industry, and to promote Old Dominion University, Hampton Roads and Virginia as a center of MS&V activities. Working with several industry, government, and academic members, VMASC furthers the development and applications of modeling, simulation and visualization as enterprise decision-making tools to promote economic, business, and academic development. We are an enterprise center of Old Dominion University and one of only four Virginia schools in the Carnegie Research Universities (high research activity) category.

Additionally, VMASC has had a significant impact in the economic development of Hampton Roads through its modeling and simulation academic program and research center. It is a major contributor to the sustainable economic development effort in Hampton Roads. Contributing factors include ODU’s fully accredited BS, MS and Ph.D. degree programs in modeling and simulation.

Since 2003, ODU has conferred thirteen Ph.D. degrees in the area of Modeling and Simulation. Of those conferred, eleven have stayed here in the Hampton Roads area in the M&S Industry. Two have started their own companies, which has contributed to economic growth in the M&S field. We’ve now provided a listing of those who have graduated and where they are today.
John A. Sokolowski, Ph.D.  
Conferred 2003  
Dissertation: “Modeling the Decision Process of a Joint Task Force Commander”  
Dr. Sokolowski is currently the Executive Director at VMASC. He was a submarine skipper before he took the top job in the modeling and simulation division of the Joint Forces Command (JFCOM). Before retiring from the Navy in 2001, he began a Ph.D. program in engineering management at ODU, and soon after retirement, he became a research scientist at VMASC. Dr. Sokolowski eventually shifted his Ph.D. focus at ODU to modeling and simulation engineering, and in 2003, became the first person in the world to be granted a Doctorate in that field. As VMASC’s Director of research until 2009, Dr. Sokolowski either led, or had significant involvement, in a dozen or so research projects at any one time. Under his leadership, the scope of research at VMASC has vastly expanded. Since earning his Ph.D., Dr. Sokolowski has conducted over $7.3M in sponsored research in Modeling & Simulation.

Eric Weisel, Ph.D.  
Conferred 2004  
Dissertation: “Models, Composability and Validity”  
Dr. Weisel started Werner Anderson, Inc. as a private company categorized under Modeling Agencies in 2002, with an annual revenue of $1 to $2.5 million and a staff of approximately 5 to 9. In 2010, Werner Anderson, Inc reorganized under the name Weisel Science & Technology Corporation. Weisel Science is a technology research company focusing on Human, Social, Cultural and Behavioral (HSCB) modeling and simulation. The company applies advance mathematics and M&S technologies to modeling and simulation of human systems and human-centric processes. Application domains include irregular warfare, intelligence, logistics, and manufacturing. Weisel Science is partnering with VMASC in the M&S Standards Study effort.

William E. Warner, Ph.D.  
Conferred 2006  
Dissertation: “A Framework for the Representation of Cohesion in Small Combat Units”  
Dr. Warner is currently working from SAIC as a Modeling and Simulation Engineer.

Rafael Diaz, Ph.D.  
Conferred 2007  
Dr. Rafael Diaz, research assistant professor at VMASC, leads the System Sciences applied research area. His research interests include operations research, operations management, and dependence modeling for stochastic simulation, simulation optimization methods, and production and logistics systems. He worked for five years as a process engineer and management consultant prior to his academic career. Since earning his Ph.D, he has conducted over $200K in sponsored research in Modeling & Simulation

Sachin Shetty, Ph.D.  
Conferred 2007  
Dissertation: “Distributed Knowledge Discovering Large-Scale Peer-to-peer Networks”  
Dr. Shetty is currently an Assistant Professor in Electrical and Computer Engineering at the University of Tennessee in Nashville, TN.

Bo Sun, Ph.D.  
Conferred 2008  
Dissertation: “Real-time Ultrasound Simulation for Medical Training and Standardized Patient Assessment”  
Dr. Sun has gone on to be an Assistant Professor in Computer Science at the University of the Sciences in Philadelphia, PA.

Mark Nesselrode, Ph.D.  
Conferred 2008  
Dissertation: “Developing a Repeatable and Reliable Methodology to Determine Return on Investment (ROI)”  
Dr. Nesselrode started Addx Corporation in Suffolk, VA as a private company categorized under Business Management Consultants. This corporation was an incubator company within the VMASC facility for three years. In 2009, the U.K.’s largest science and technology organization, QinetiQ established an agency presence in Virginia Beach, Virginia and Dr. Nesselrode was named VP for Special Projects.

Robert D. King, Ph.D.  
Conferred 2009  
Dissertation: “On the Role of Assertions for Conceptual Modeling as Enablers of Composable Simulation Solutions”  
Dr. King is currently working for Northrop Grumman.

Number of Modeling & Simulation Ph.D. students enrolled in ODU’s MSVE Department FY2011  
36
$90 million

Total amount of VMASC’s M&S revenue in Hampton Roads over 14 years

WHAT DOES VMASC DO TO PROMOTE M&S IN HAMPTON ROADS?

Randall B. Garrett, Ph.D.
Conferred 2009

Dr. Garrett is a Technical Director for Northrop Grumman.

Michael Robinson, Ph.D.
Conferred 2010
Dissertation: “Modeling Decision Making Related to Incident Delays During Hurricane Evacuation”

Dr. Mike Robinson, Research Assistant Professor, leads the Transportation applied research area at VMASC. His research seeks ways to increase individual and group mobility and safety through the use of modeling and simulation techniques. Research topics include several aspects of transportation, including traffic modeling, transportation network planning, behavioral influences and constraints, aviation safety, maritime operations, logistics and distribution, and training. VMASC researchers work closely with Old Dominion University’s Transportation Research Institute, Maritime Institute, and Ship Maintenance, Operations, and Repair Institute as well as other leading experts to maximize the strength of project teams. Since earning his Ph.D., he has conducted over $690K in sponsored research in Modeling & Simulation.

Saikou Y. Diallo, Ph.D.
Conferred 2010
Dissertation: “Towards a Theory of Interoperability”

Dr. Saikou Diallo, Research Assistant Professor, leads the Interoperability applied research area at VMASC. His research focuses on the development and application of theories and methodologies in order to solve interoperability problems that cut across M&S domains. The track works closely with professionals in industry, government and academia in order to apply theoretical findings into products that reach a wide user base. The ability to connect heterogeneous systems remains a great challenge whether we are dealing with legacy systems or integrating new solutions into existing capabilities. This is especially true in Modeling and Simulation (M&S) because every model is a purposeful simplification of reality that addresses a given problem and interoperating M&S solutions requires solving issues ranging from the technical connectivity of simulations to the conceptual composition of models. Since earning his Ph.D., he has conducted over $450K in sponsored research in Modeling & Simulation.

Elaine Blount, Ph.D.
Conferred 2011
Dissertation: “Incorporating Physical Fitness Through Rushing Can Significantly Affect Tactical Infantry Simulation Results”

Dr. Blount is currently employed with General Dynamics.

Johnny J. Garcia, Ph.D.
Conferred 2011

Dr. Garcia established SimIS in 2007 in Portsmouth, Virginia, as a veteran-owned 8(a) Information Technology services corporation. SimIS has experienced recent exponential growth by developing innovative approaches and solutions in three primary sectors: Modeling & Simulation, Information Security and Software Systems. Led and managed by industry professionals with career experience, determination, and balanced business acumen, SimIS has developed a customer-centric culture based on the entrepreneurial heart of its founder, employees and the communities they serve. Our government and commercial customers benefit from the SimIS commitment to strategic partnerships with key players in industry and academia.
VMASC has reached many milestones in its role as the recognized focal point of modeling and simulation (M&S) innovation and collaboration in Virginia. Several key initiatives designed to foster increased collaboration and participation between industry, academia and government (IGA) mark the way forward to greater cooperation and success:

**Senator Mark Warner’s M&S Task Force**
VMASC is the focal point of planning, coordination and information dissemination ensuring successful submission of multiple proposals.

**Virginia Summit on Modeling & Simulation**
VMASC acts as the key coordinator and sponsor for this event.

**Hampton Roads M&S Strategy 2020**
Initiated and developed collaboratively by VMASC and the Hampton Roads Partnership, the strategy incorporates a regional vision branding Hampton Roads as the international nexus for modeling, simulation and visualization.

**National Plan for M&S**
VMASC continues in its leadership role as committee participants in an NTSA-lead effort to develop a National Plan for M&S. Following Congressman Randy Forbes’ 2010 M&S Caucus Leadership Summit, members of its standing committee continued in a collaborative fashion to develop and publish a summary report from the 2010 Summit.

**VMASC Technology & Business Accelerator**
In promoting Hampton Roads as a leading M&S region, the VMASC Technology and Business Accelerator (VTBA) located within the Virginia Modeling, Analysis and Simulation Center, is a fully functional technology and business incubator that offers startup companies direct access to faculty and project researcher expertise and basic amenities including private offices, meeting and conference space with audio/video conferencing capabilities, telephone service, wireless and LAN connectivity, reception and break areas, copy and fax equipment, on-site parking, building security, and housekeeping services.

The VTBA has and continues to advance its mission to accelerate the formation, growth and success rates of modeling and simulation and related technology companies that will result in long-term economic impact to the region. To date, four fast growing startup companies have expanded and transitioned through the VTBA and on to market rate office space in Hampton Roads. The formation and growth of these companies have added significant investment and more than one hundred and fifty high paying, highly skilled jobs to the region.

**MODSIM World Conference & Expo**
VMASC is also a huge supporter and contributor to the annual ModsimWorld Conference, a unique multi-disciplinary international conference held in Hampton Roads. Since its inception in 2007 and for the following three years, VMASC managed the entire conference. The conference, now in its fifth cycle, attracts nearly 1000 attendees and exhibitors each year and supports the exchange of modeling and simulation knowledge, research and technology across industry, government and academia. VMASC continues its role of participation, promotion and sponsorship of ModsimWorld.

**Economic Development**
VMASC furthers its support of economic development through the transfer of intellectual property in the form of new processes, products and services.
SEPT • OCT 2010

The fourth annual MODSIM World Conference & Expo, held October 13-15th, 2010 at the Hampton Roads Convention Center in Hampton, Virginia, was the strongest conference yet. With VMASC as a primary sponsor, the 2010 theme, 21st Century Decision-Making: The Art of Modeling & Simulation, drew over 400 conference attendees, and over 700 students, parents and teachers took part in STEM Education events held on Wednesday, October 13th and Thursday, October 14th.

A grouping of papers submitted by Dr. Barry Ezell, Dr. John Sokolowski and Dr. Andrew Collins were selected as one of 2010’s “Contribution to Best Issue-Linked Paper Set” by the premier journal Risk Analysis. According to the journal’s editors, this award “recognizes a set of papers and/or commentaries that present different sides of issue debates in risk analysis.” Awards for these contributions were formally presented at the Society for Risk Analysis’ annual meeting in December 2010.

Two of VMASC’s most innovative project scientists, Mike Robinson and Saikou Diallo, were designated as Doctors of Philosophy by Old Dominion University upon the culmination of their studies in modeling and simulation. Dr. Mike Robinson, whose dissertation was entitled Modeling Decision Making Related to Incident Delays During Hurricane Evacuations, leads VMASC’s research in transportation and evacuation modeling. Dr. Robinson is currently leading a study of suggested transportation construction projects for the Hampton Roads region, forecasting the different alternative’s effectiveness at reducing the congestion issues currently experienced as well as those anticipated in the year 2034. He also leads a study of the proposed toll road connecting Hampton Roads with the Richmond-Petersburg area along the existing US 460 corridor, in which the particular focus is the proposed road’s impact on freight movement.

Dr. Saikou Diallo completed his Ph.D. in modeling and simulation with a dissertation entitled Towards a Formal Theory of Interoperability and also received ODU’s Faculty Award for Best Doctoral Student. Now a Research Assistant Professor at VMASC, Dr. Diallo has previously worked on the JC3IEDM and Web Services projects for the Joint Forces Command as a VMASC Senior Project Scientist. He also supervised and built a web-based visualizer for the NATO Modeling and Simulation Group (NMSG) and was integral to NASA’s Agent-based Modeling project. His most recent research areas of interest have involved critical infrastructure modeling (Water, Energy, Transportation, Communications) and the MS&V applications of model-based data engineering and web services.

VMASC held an innovative first-of-its-kind Adaptive Adversary Workshop on October 21, attracting leading researchers and national security experts from across the country. With VMASC’s Dr. Barry Ezell as the organizer and lead for the workshop, featured speakers at the workshop included many of the brightest minds in this cutting-edge field, including Jessica Stern of the Hoover Institution’s Task Force on National Security and Law, who also served on President Bill Clinton’s National Security Council; Ian Lustick, professor of political science at the University of Pennsylvania, who has written and edited more than 20 books on terrorism-related issues; John Lathrop of the group Strategic Insights, whose research focuses on counterterrorism risk management accounting for the adaptive adversary; and George Gabriel, manager for security, preparedness and emergency management for Whitney Bradley and Brown Inc., who recently authored the terrorism response plan for the city of Newport News. Co-sponsored by the Battelle National Biodefense Institute, the workshop attendees discussed various threats to the United States, including chemical, biological, radioactive, nuclear and high-explosive terrorism.
VMASC was awarded a $640,000 contract by the Department of Defense to develop M&S software development standards. The second year contract was also approved, totaling another $800,000. The funding was a congressional earmark from longtime M&S supporter Congressman Randy Forbes (R-4th District) and, under it, VMASC has been tasked with developing standards to allow a particular model to be used in multiple simulations.

This most recent study evaluated which single project would provide the most improvement to regional travel in coming years. The study found that the only project that would eliminate congestion at the HRBT is expanding the HRBT. With information provided by HRTPO, traffic volumes and trip paths used populations, origins, and destinations forecast for the year 2034. These simulations will aid Hampton Roads lawmakers in multiple legislative decisions for years to come. Study participants included Dr. Mike Robinson (VMASC Transportation Research Lead), Dr. Asad Khattak (Director of the ODU Transportation Research Institute), Dr. Mecit Cetin (Assistant Professor of Civil and Environmental Engineering at ODU), Peter Foytik (VMASC Senior Project Scientist), Craig Jordan (ODU Graduate Student), and Hongbing Zhang (ODU Graduate Student).

At the end of 2010, VMASC researchers completed and presented an assessment of the various major transportation network construction alternatives that have been proposed by the Hampton Roads Transportation Planning Organization (HRTPO). The study, an expansion on a previous study completed in 2008, was conducted at the request of Hampton Roads representatives to the Virginia General Assembly (primarily local Delegates Chris Jones, Glenn Oder, and John Cosgrove), and funded by Old Dominion University.

Researchers at Old Dominion University and VMASC teamed up for an innovative application of modeling and simulation - analyzing and solving the housing foreclosure crisis. Dr. Michael Seiler, professor of finance and Robert M. Stanton Chair of Real Estate and Economic Development and VMASC assistant professor Dr. Andy Collins developed a model of 2,500 homes to predict how defaulting on one’s mortgage effects one’s peers who have not defaulted. The model shows that a more-rapid foreclosure process is the best solution for short-term and long-term market improvement. The simulation is the first of its kind to address the housing crisis using agent-based models that allows for more true-to-life varying sets of rules to impact the final analysis.

In late November, VMASC, in collaboration with USJFCOM, participated in the 2010 I/ITSEC Conference hosted at the Orange County Convention Center in Orlando, Florida. With many industry members participating and exhibiting, VMASC was represented by faculty and staff members on hand to demonstrate & discuss M&S research in the following focus areas: Transportation, Medical & Health Care, Social Science, and Homeland Security & Military
Defense. Once again, it was VMASC’s honor to partner with the Hampton Roads Economic Development Alliance (HREDA) to co-host the 3rd annual I/ITSEC Hampton Roads Reception in Orlando, which drew M&S leaders from industry, government and academia. “Over 100 of our Hampton Roads allies and friends attended the event to show support for this burgeoning industry in our community. This was also a great networking opportunity for existing and potential companies interested in expanding to our region,” said HREDA’s Steve Cook.

These relationships are very important in efforts to bring more M&S companies to the Hampton Roads area. VMASC Director John Sokolowski stated, “This event truly shows the regional partnerships that exist among academia, industry, and government organizations. Our region is clearly recognized as a leader in modeling and simulation not only on a national level but also internationally.” Sokolowski concluded, “VMASC is dedicated to advancing this recognition and supporting economic development within Hampton Roads and the Commonwealth of Virginia. We see our role as bringing innovation to the field of modeling and simulation and helping to lead M&S initiatives for the benefit of all. We look forward to our continued partnerships with all of you in the coming year.”

JAN • FEB 2011
At the beginning of 2011, VMASC unveiled a new M&S applied research area for the study and application of interoperability issues. This new research area, lead by Dr. Saikou Diallo, focuses on the development and application of theories and methodologies in order to solve interoperability problems that cut across M&S domains. VMASC’s Interoperability researchers, scholars, and students work closely with professionals in industry, government and academia in order to apply theoretical findings into products that reach a wide user base. Dr. Diallo states, “The ability to connect heterogeneous systems remains a great challenge whether we are dealing with legacy systems or integrating new solutions into existing capabilities.” As a driving force for the area’s research, Diallo remains focused on the core issues, saying “Systems exist already. How can we better connect them? How can we get the best out of our existing solutions, so that we can solve new problems without having to rebuild everything from scratch?” The new area deals with theoretical frameworks, tool development, and applications to solve interoperability issues. As a new national center for this brand of interdisciplinary research, in the past two years alone, VMASC has attracted nearly $1 million in investments for interoperability research.

MAR • APR 2011
VMASC was honored to once again sponsor and host the fifth annual Modeling, Simulation & Visualization Student Capstone Conference on April 14, 2011. The Capstone Conference featured students in Modeling and Simulation undergraduate & graduate degree programs from many colleges or universities. Students presented their research to an audience of fellow students, faculty, judges, and other distinguished guests. For the students, these presentations afforded them the opportunity to impart their innovative research to members of the modeling and simulation community from academic, industry, and government backgrounds.

The MS&V Student Capstone Conference offered nine presentation tracks this year, each track assigned judges who selected the top three papers for each track. The tracks that their papers were divided into included the following: Gaming, M&S in Engineering, Training & Education, General Science, Immersion/Virtual Reality, Transportation, Homeland Security/Military, and Medical & Healthcare. The conference concluded with the evening awards banquet and a keynote speech by Dr. Steven Bennett of the U.S. Department of Homeland Security.
U.S. Sen. Mark Warner (D-Va.) made his first visit to VMASC as a member of Congress on April 20. Warner watched demonstrations of simulations and toured the facility, followed by a meeting with VMASC officials and Industry Board members to discuss the economic development that M&S has contributed to the region. Among the VMASC simulations being demonstrated were the blood management model developed by Dr. Catherine Banks, research associate professor; the Hampton Roads transportation alternative model by Dr. Mike Robinson, research assistant professor; and the foreclosure contagion simulation co-developed by Dr. Andy Collins, research assistant professor.

U.S. Representative Scott Rigell (VA-2) was welcomed at VMASC on April 27. VMASC Executive Director Dr. John Sokolowski provided Rigell with an overview of VMASC as well as a more detailed look at past and present M&S research. VMASC senior project scientist Menion Croll then gave Rep. Rigell a hands-on demonstration of the new VisPORT simulator; Rigell tried his hand at running the simulator also. After the demonstrations, Sokolowski gave Rigell a tour of the facilities and they later met with ODU and VMASC officials to discuss upcoming projects.

VMASC was pleased to welcome research associate professor Dr. Andrea Parodi. Dr. Parodi was formerly head of nursing research at Naval Medical Center Portsmouth and a program manager for Navy/Marine Corps Field Medical Technologies. After 26 years of service in the U.S. Navy Nurses Corps, she earned a Doctor of Science degree in nursing from the University of Alabama at Birmingham with a dissertation focusing on health policy analysis and education. With a master’s degree in critical care nursing from Vanderbilt University, Dr. Parodi’s clinical focus has been mainly in burns, trauma and cardio-thoracic surgery.

In 2001, Dr. Parodi began working with the Department of Modeling and Simulation at the Naval Health Research Center (NHRC) in San Diego, where she focused on casualty management, designed surgical systems for casualty care, and developed models for special surgical system designs. VMASC faculty and staff are recharged by the wealth of experience and knowledge that comes along with Dr. Andrea Parodi and look forward to her many innovative developments and leadership in the future.

MAY • JUNE 2011

Old Dominion University’s associate professor of engineering management and systems engineering in ODU’s Batten College of Engineering and Technology Dr. Andreas Tolk has co-edited a textbook about the theory and practice of interdisciplinary approaches to modeling and simulation. Tolk co-edited Intelligence-based Systems Engineering with Professor Lakhmi Jain from the University of South Australia, Adelaide, volume 10 in Springer’s Intelligent Systems Series of texts. Other ODU researchers are also included in book’s grouping of internationally recognized experts on intelligent systems, systems engineering, and modeling and simulation to show the potential of combining these technologies, including Dr. Chuck Keating, professor of engineering management and director of ODU’s National Centers for System of Systems Engineering; Dr. Andres Sousa-Poza, associate professor of engineering management; and Dr. Saikou Diallo, VMASC assistant professor. Dr. Tolk’s next co-authored book in the Springer Series, Ontology, Epistemology, and Teleology of Modeling and Simulation: Philosophical Foundations for Intelligent Modeling and Simulation Systems, has already been commissioned and should be finalized in the summer of 2012.
VMASC held a new workshop in its popular M&S Standards series from May 10 to May 12 in which key issues relating to governmental modeling and simulation standards were discussed. These issues included an open discussion on how organizational behavior related to standards development and what were the limits of M&S standardization.

This latest workshop, consisting of five half-day sessions lead and organized by VMASC’s Dr. Andrew Collins, had presentations provided by academic leaders in the M&S field including Dr. Osman Balci (Virginia Tech), Dr. Saikou Y. Diallo (VMASC), Dr. Catherine Morse (John Hopkins University), Dr. Mikel Petty (University of Alabama in Huntsville), Dr. Paul F. Reynolds (University of Virginia), and Dr. Bernard P. Zeigler (George Mason University).

The workshop focused on two aspects of M&S standards: Standards as Tools and Standards as Objects. These two aspects were discussed by the participants in an open non-attributable environment. One output of the workshop was that the underlying theory of M&S is still in its infancy; this can be a hindrance to the development of standards in certain areas. The modern wide-scale usage of M&S is less than 30 years old and it would be hard to expect any subject to have a well-formed foundation theory within that time-frame. This means that there are lots of interesting problems to be solved by academics and practitioners in the years to come. The final output was an anticipated increase in demand for M&S, due to the cost-saving nature of the industry applications. Yet with a decline in resources available to produce standards, this implies a need for the M&S community to become proactive with its future and its standards requirements.

The Virginia Modeling, Analysis and Simulation Center achieved success in its bid to become a prime contractor under the Seaport Enhanced (Seaport-e) Multiple Award Contract (MAC) vehicle program. Established by NAVSEA Warfare Centers, Seaport-e is a web-based, e-business procurement portal designed to make the Navy more efficient and effective in contracting for professional support services and enhancing small business participation. Thomas Reese, VMASC’s Director of Business Development and Technology Dr. Roland Mielke served as modeling and simulation experts on panels at the U.S. Department of Education’s Modeling and Simulation Stakeholders Meeting in Washington, D.C. Sokolowski participated in panel discussions focusing on modeling and simulation’s use in engineering design and manufacturing, in medicine, and in military and defense, while Mielke moderated a panel focusing on visualization and analysis teaching and training.

The event was also attended by U.S. Education Secretary Arne Duncan; Rep. Bobby Scott (D-Newport News); Assistant Education Secretary Eduardo Ochoa; Dr. Donald Combs, professor of health professions at Eastern Virginia Medical School; and Dr. Eric Sheppard, dean of the School of Engineering and Technology at Hampton University. Dr. Sokolowski noted that a major purpose of this Stakeholder’s meeting was to inform policymakers in the postsecondary education field “of the important role that modeling and simulation education now plays and will play in the future of our national security and global industrial competitiveness.”

On July 27, 2011, VMASC Executive Director John Sokolowski and ODU University Professor and Chair of the Department of Modeling, Simulation and Visualization Engineering in the Batten College of Engineering and Technology Dr. Roland Mielke served as modeling and simulation experts on panels at the U.S. Department of Education’s Modeling and Simulation Stakeholders Meeting in Washington, D.C. Sokolowski participated in panel discussions focusing on modeling and simulation’s use in engineering design and manufacturing, in medicine, and in military and defense, while Mielke moderated a panel focusing on visualization and analysis teaching and training.

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Through the Seaport-e Portal, Navy and Marine Corps organizations can solicit support services in 22 functional areas. Of the 22 functional areas, VMASC provides support

The Seaport award also positions VMASC to provide its support capabilities to Navy and Marine Corps organizations and limited support to other DoD, non-DoD, or Joint agencies for work that is integrally related to product areas and mission. Geographical areas VMASC is contracted to provide support services include Washington D.C., Maryland, Delaware, Virginia, West Virginia, and North and South Carolina. VMASC welcomes industry and other academic institutions with complementary capabilities and interest to become partners in delivering unmatched modeling and simulation support to our customers.
Those of us in the modeling and simulation sector walk a fine line between acknowledging the significance of the closing of U.S. Joint Forces Command and positioning ourselves for what’s next. We want to protect what we have had, while at the same time moving ahead to embrace new opportunities. Recent news reports about the closing of JFCOM have set forth the challenge - issued by U.S. Sen. Mark Warner and others - for high-tech business leaders in Hampton Roads to come up with a “Plan B.” Our region does stand to lose between 1,000 and 2,000 high-paying jobs because of JFCOM’s closing, and at first blush this may seem a devastating blow to the modeling and simulation sector, which has worked closely with JFCOM.

But a closer look shows that modeling and simulation remains a strong economic driver in the region and could be the answer to the job-development challenges that follow the loss of JFCOM. In reality, the vast majority of the workers losing jobs are not modeling and simulation professionals. They are military subject-matter experts who use simulations developed by others for training and experimentation purposes. So to characterize the loss of these jobs as a brain-drain of modeling and simulation experts does not accurately portray what is happening. For one thing, the downsized organization that JFCOM will evolve into will continue to have modeling and simulation as a cornerstone of its training and exercise portfolio. New simulations and better ways to join existing simulations are required to meet the future needs of the joint military community. This development will originate from the new JFCOM organization in Hampton Roads.

These simulations and the technology behind them are accomplished by a much smaller but vibrant set of academic and industry partners supporting the growing field of modeling and simulation. JFCOM also has not been the only user of this type of technology. The Army’s Training and Doctrine Command, Langley Air Force Base, the Naval Warfare Development Command and NASA Langley all have significant modeling and simulation requirements that need skilled professionals to support them. Hampton Roads is one of only three areas in the United States that produces these individuals, and Old Dominion University is the only place where one can obtain an undergraduate engineering degree in modeling and simulation. The demand for these individuals is significant. There are at least 110 advertised simulation engineering jobs currently in the region and 1,824 throughout the commonwealth. ODU produced the world’s
first doctoral graduate in modeling and simulation in 2003, and since then has added 11 more Ph.D.s in the field. Ten of those doctoral grads work in Hampton Roads. Two have started their own modeling and simulation companies, contributing jobs to the community.

At present, ODU and its Virginia Modeling, Analysis and Simulation Center are educating more than 100 graduate and undergraduate students in modeling and simulation, preparing a work force for tomorrow. The private sector in Hampton Roads also has begun to realize the importance of modeling and simulation to support more efficient government and better business and training practices. City governments are exploring modeling and simulation as a way to optimize services to their citizens. Businesses are using the technology to become more efficient, resulting in improved return to their shareholders and owners. Sectors of the economy that never before relied on modeling and simulation are seeing it as an important tool to help us understand and solve problems of ever-increasing complexity.

An example is the collaboration between Eastern Virginia Medical School and ODU’s VMASC to develop simulation tools to promote health care and the training of medical professionals. Medical modeling and simulation represents a way for Hampton Roads to diversify its work in the field, reducing dependence upon military contracts. Long before the announcement of the JFCOM closure, ODU President John Broderick and EVMS President Harry Lester were promoting joint research by their institutions on a virtual operating room and other medical systems and devices that can be licensed for use by private industry. And the foundation for all of this is produced in our region. So, in addition to placing the affected military subject-matter experts in other DoD and non-DoD jobs, we should be showcasing the true talent being developed in this region. This talent is being born right here, and these modeling and simulation professionals will become the innovators and job creators of tomorrow.
A catastrophic hurricane has just roared through Hampton Roads. The 16 communities in the region are about to start the difficult process of assessing the damage and planning the recovery.

There's wind and flood damage to property and infrastructure. Power is still out in much of the region. There have been reports of casualties and looting. Now people are返回ing to their homes, and will soon be demanding help from government agencies, in an effort to normalize their lives again. Where do you begin to figure all this out?

Thanks to a grant from Virginia’s Office of Commonwealth Preparedness (OCP), Old Dominion University’s Virginia Modeling, Analysis and Simulation Center (VMASC) is where community leaders will start.

ODU VMASC has received a $400,000 grant from OCP for its role in the Hampton Roads Full Scale Exercise May 16-19, which will test local government officials’ response to various scenarios - from a shooter at a local school to a maritime incident. The exercise will take place at Fort Eustis. The first day of the exercise, May 16, VMASC will host 140 emergency preparedness officials, including chief administrative officers from all 16 local cities and counties, conducting an exercise to simulate the days and weeks after a hurricane hits Hampton Roads.

Barry Ezell, associate professor of research at VMASC and the principal investigator for the grant, said ODU’s modeling and simulation expertise will be put to the test in conducting this event. “I like to say that this entire full-scale exercise is stretching the rivets and the hinges of VMASC,” Ezell said.

The May 16 event is what’s known as a “tabletop” exercise. A multidisciplinary simulation of Hampton Roads in the days after a hurricane is currently being created by VMASC researchers. On the day of the exercise, municipal officials from all 16 Hampton Roads communities will meet at VMASC and sit around tables in
two rooms - one room for Peninsula officials, one for officials from Southside cities and counties. In a third room between the two, subject-matter experts will provide information to both groups and facilitate information sharing. The simulation is designed to mimic the days immediately following a hurricane, and the effects in multiple areas. “It’s a very challenging scenario because it touches on all the big issues in response and recovery that they’ll face,” Ezell said.

“VMASC’s role is to provide modeling and simulation support, to inject technology into the tabletop. What we can’t do with simulation, we will do with good old-fashioned research and analysis. So it encompasses all the letters of VMASC, actually.”

Ezell said the exercise can be of real value because of its timing, and because veterans in any field often do real learning when faced with challenges they haven’t seen before. “Real learning takes place when things challenge conventional wisdom. And the more senior you get in your career, you react differently to challenges. We like to think we have it all figured out. Usually, we learn when something occurs that we haven’t thought of before,” he said. “This is a very friendly environment in which to learn, to experiment, before you have to deal with the challenge. And this event is occurring right before hurricane season.”

The tabletop exercise, however, takes up only day one of the Hampton Roads Full Scale Exercise. On May 17, VMASC will serve as the staging area for emergency personnel as a simulated “live shooter” exercise is held at the former Tidewater Community College campus in Portsmouth. The day after that, VMASC will again be the command hub for a “mass casualty” exercise being held at Harbor Park. The next day, May 19, will see the maritime scenario hosted at Fort Eustis. VMASC will again provide logistics.

The total cost of the exercise is $2.7 million. Besides OCP and the 16 communities’ emergency preparedness offices, the Virginia Department of Emergency Management and the Hampton Roads Regional Planning District Commission will take part. In addition to

During the simulation experiment in August, side-by-side tabletop exercises will be run, with VMASC researchers injecting technology into one of the exercises. Then the results, such as how effectively members communicate and how quickly learning occurs, will be measured in an effort to demonstrate, scientifically, the value of the technology. “Measuring the effectiveness of an exercise program is no trivial thing,” said Ezell, noting that Homeland Security Secretary Janet Napolitano has directed progressive advances be incorporated in the United States’ emergency preparedness planning. “We believe the appropriate use of technology will improve the learning experience. So we set out to prove it through experimentation,” Ezell said.
This year, VMASC broadened the spectrum over June, July, and August to include three sessions of our wildly popular Game Development Summer Camp for middle-to-high school-aged students.

With the support of Old Dominion University faculty and VMASC research staff, participants learned how to effectively make computer games using Game Maker and Microsoft Kodu Game Lab. They also learned basic 3D modeling tools and techniques using Google SketchUp and Maya.

Although no prior programming experience was required, many of the campers were regular “fluent” computer users, knowledgable not only in common computer operations but also in gaming interfaces and software development. Skills used by professional game developers and commercial game consoles such as Xbox 360 and smartphones were also introduced.

Led by ODU MSVE Department’s Yuzhong Shen and Hector Garcia, the camps consisted of lively interactive lectures and hands-on exercises as well as the ever-popular game play sessions at the end of each day, where the campers “tested out” the latest education and simulation games on Xbox 360, Wii, and PlayStation 3.

The Introductory Game Development Camp focused largely on 2D game development using Game Maker to build a visual interface. Campers continued on from 2D game development to perform some minor programming of their own. Important concepts such as level design, events, actions, collision
detection, and sound effects were also covered. By the end of the camp session, students had created several games, some as complex as shooting games and puzzle games.

With many campers moving on to the Intermediate Game Development Camp, game development using Microsoft Kodu was covered. Kodu is a visual programming language for creating games for personal computers and Xbox 360 game consoles. Necessary gaming topics such as terrain editor, game logic, collision detection, and path building were covered during this session, building upon the campers’ previous body of gaming knowledge and theory. Luckily, as the topics became more intense, the campers had more flexibility to design their own games for game consoles and gaming apps for smartphones.

At the Digital Content Design level of the Game Development Camp, the focus was advanced, concentrating on the design and creation of digital assets for games - 3D models and images. Campers worked through many tutorial sessions that covered Google SketchUp and Autodesk Maya advanced modeling. Google SketchUp is a powerful yet easy-to-use 3D modeling package, while Autodesk Maya is the industry standard for creating 3D models, animations, and special effects used in movies and games.

At the end of each week of camp, the young game designers and programmers gave in-depth presentation on what they have learned and demonstrated their creations for their parents, faculty, and staff.
This past year has certainly been a challenging one for those of us involved with modeling and simulation (M&S) in the Hampton Roads area. The community was hit with quite a surprise when in August Secretary Gates announced the disestablishment of U. S. Joint Forces Command (USJFCOM). This announcement raised significant concern about the economic impact of the decision on the region with the potential loss of 2000 to 3000 jobs. It also cast doubt on the future of the Hampton Roads M&S community. While this job loss was significant the majority of these positions were military subject matter experts who were users of M&S and not the M&S developers with the resident technical knowledge to carry on this capability for the region. We see this capability continuing to move ahead and not move elsewhere. The four companies that had their roots in VMASC are continuing on here in the region and at least in one case growing significantly. This resilience is a result of a diversification of the industry to multiple funding sources both within and outside the Department of Defense.

The same is true for VMASC. During our first five years of existence we relied almost exclusively on JFCOM funding. But we realized that there were many areas where M&S could be utilized as a training tool, a research methodology, a decision support tool, and as a means to analyze problems. It was not just a tool for the military. We started to research uses of M&S in the medical/health care area and in the area of homeland security, a natural extension of the military M&S. Shortly thereafter we added transportation as one of our applied M&S research areas. Most
recently we have developed M&S research capability to support business process and financial modeling. With this diversity came a wider variety of funded research opportunities, which has helped mitigate the impact of the JFCOM loss.

**Underlying the work in these applied research areas** is the wide variety of expertise possessed by our faculty researchers and those that support them. It takes faculty with backgrounds in many areas to support such a diverse set of research. In addition to the core areas of M&S our researchers have backgrounds in artificial intelligence, unmanned vehicles, national and international politics, operations research, medical protocols, and many others. They are able to bring their individual expertise to bear on a wide variety of problems in all of the areas I mentioned above.

**We see the biggest potential and the biggest growth** in the medical/healthcare fields. The American College of Surgeons has mandated the use of M&S in graduate medical education. Medical schools and hospital systems are beginning to use M&S to train their students and staff. We only see this utilization of M&S increasing especially because of the limited number of hours that are available to conduct this training. Simulation can provide 24/7 access to a training capability that is critical to patient safety and hospital operations.

In closing, while we are certainly experiencing challenging time we see unlimited opportunities ahead for M&S. We will exploit those opportunities through a balanced research and development approach and a strong M&S academic program.

John A. Sokolowski, Ph.D.
VMASC Executive Director

![Image with '$8.2 million' text](Image)
Academic Year 2011 was a foundation-building year for the Modeling and Simulation academic programs at Old Dominion University. The Department of Modeling, Simulation and Visualization Engineering (MSVE) conducted a national search that resulted in the hiring of two new faculty members.

Dr. ManWo Ng – Dr. Ng earned a B.Sc. in Mechanical Engineering and an M.Sc. in Applied Mathematics from Delft University. He then earned an M.S. in Statistics and his Ph.D. in Civil Engineering (Transportation) from the University of Texas at Austin. Dr. Ng is interested in the use of M&S to analyze large-scale transportation networks.

Dr. Michel Audette – Dr. Audette earned a B.E. in Electrical Engineering from McGill University, an M.E. in Electrical Engineering from Ecole Polytechnique, and his Ph.D. in Biomedical Engineering from McGill University. He is interested in medical/surgical simulation and image-guided & robotic surgery. The MSVE Department now has nine faculty and we are conducting a national search to add a tenth faculty position for next year.

The MSVE Department continued to build and expand its academic program offerings. The following programs and program components have been added this year:

- New courses being taught for the first time for Junior year of the undergraduate Modeling and Simulation Engineering program include: MSIM 320-Continuous Simulation; MSIM 310-Systems Modeling; MSIM 331-Simulation Software Design; MSIM 351-Analysis for M&S; MSIM 382-Continuous Simulation Lab; and MSIM 383-Simulation Software Design Lab.

- Two new undergraduate M&S minors have been established: (1) the simulation applications minor designed for engineering and science majors who plan to use M&S within their major disciplines; and (2) the simulation development minor designed for computer engineering and computer science majors who plan to develop new simulation tools and simulation applications in software.
• MSVE assisted our local community colleges, Tidewater Community College and Thomas Nelson Community College, to develop Associate of Science pre-engineering degree programs in M&S. Initiated this fall, both programs will graduate students who can transfer seamlessly to ODU's Bachelor of Science degree program in M&SE.

• MSVE officially initiated a web-based, asynchronous Master of Engineering degree program in M&S. The program now is accessible to students located across the United States and even in other countries.

Before the year comes to an end, the MSVE Department has aspirations to accomplish three additional goals:

• Establish a student chapter of the Society for Computer Simulation (SCS), International. The chapter will be the professional organization for undergraduate and graduate students interested in M&S.

• Establish the MSVE Industrial Advisory Board (IAB). In addition to advising the department on curriculum content, the IAB will be charged with generating public awareness for the new undergraduate M&SE program, sponsoring internship opportunities and scholarship funds to attract highly qualified students to the M&SE program, and sponsoring real-world design challenges for the M&SE capstone design courses.

• Work in partnership with VMASC to expand and enhance the Student Capstone Conference that is held each spring. This year we hope to expand the number of student participants and enhance the participation of M&S industry.

M&S academics continues to expand its reach across campus. All six academic colleges now offer M&S graduate certificate programs or graduate emphasis areas. The M&S Steering Committee gained new leadership as Dr. Kurt Gaubatz was appointed committee chair. A faculty recommending body, the Committee is charged with developing and enhancing interdisciplinary and multidisciplinary M&S academic opportunities. The Committee awarded 24 graduate assistantships to students working towards graduate M&S degrees and certificates; they also help to coordinate the university’s many academic program offerings that now serve over 150 ODU students who are either studying M&S or applying M&S in their own discipline.

The partnership between VMASC and the M&S academic programs continues to strengthen. Almost all VMASC research faculty are associated with one or more academic programs. They assist those programs through teaching and student mentoring. The research conducted at VMASC increasingly provides the thesis and dissertation topics for M&S students. In return, the academic faculty and students help to provide the expertise needed to conduct the VMASC research agenda. Together we have accomplished much, but there is the opportunity to accomplish so much more. These are exciting times for the ODU M&S enterprise.

Roland R. Mielke, Ph.D.
University Professor
Chair, Department of Modeling, Simulation and Visualization Engineering (MSVE)
THINGS HAPPEN!

Just as market demand for a particular product or service can increase to almost insatiable levels, market demand can also move in a direction that may cause a slowdown for the same market opportunity. Beginning in mid 2010, the latter of this phenomenon was becoming a reality for the modeling and simulation (M&S) community in Hampton Roads. It was at that point the community received notice U.S. Joint Forces Command (USJFCOM), the main source of M&S opportunity for many defense contractors in the region, would be disestablished. Now, nearly 18 months later, the shock of the news and ensuing actions have made clear its potential impact to local businesses and the region as a whole. Consequently, concerned business and community leaders have all embraced a heightened interest in diversifying the region’s economic and industrial base.

Similarly, the impact to VMASC is felt directly as a share of our research and development (R&D) and engineering technical services (ETS) efforts support programs at JFCOM. Fortunately, actions were taken years earlier to diversify VMASC’s M&S research capabilities to a broader base of defense and commercial opportunities. Current research projects in medical and healthcare, defense and homeland security, interoperability, social science and transportation, to name a few, collectively offer VMASC significant M&S opportunities and potential for sustainable growth.

Despite the current economic situation, business development and technology transfer initiatives at VMASC continue as key goals. In satisfying these goals we have in part, set our focus on stakeholders in local and state government, philanthropic and non-profit organizations, Defense and private industry in the Hampton Roads community. We believe that our capabilities and close proximity to these stakeholders and the organizations they represent are a tremendous opportunity for VMASC as well as a great resource and asset to the local community. Throughout the year ahead, we seek to engage and provide quality research support to this larger network of benefactors in the region and beyond.
GROWTH, INNOVATION and APPLICATION

Our strategy for growth and innovation is multifaceted as it incorporates a variety of research interest and opportunities in multiple domains. In a single scenario, several VMASC researchers are jointly developing innovative frameworks that have the potential to help local and state leaders effectively address some of the most complex social, environmental and economic problems in the region. These developments are lead by diverse and deep thinkers working independently and collaboratively to provide new knowledge and practical solutions to persistent and growing problems in the community. Most recently and to a greater extent than in previous times, VMASC researchers are placing greater emphasis on generating intellectual property (IP) in conjunction with their ongoing research. This trend is exciting and promises to bear much fruit in the future.

Moreover, we believe growth opportunities for VMASC lie in our breadth of capabilities and approach to addressing challenges that require comprehensive solutions. Difficult challenges extend beyond economic, social and environmental situations in developing nations, but are present right here in the homeland and region. Therefore, our approach is more focused than ever and ranks M&S innovation to address close to home challenges as high a priority as our push for continued M&S industry diversification.

Our research interests and business development objectives are straightforward. Through stakeholder outreach efforts, we seek to build relationships and associations with individuals and organizations for the purpose of engaging in future collaboration and innovation. Our first objective is to discover points of intersection where VMASC and government, private and institutional agencies may become aligned on needs and solutions, respectively. From there we seek to develop mutually beneficial research, development and technical support exchanges with government and private entities requiring insight or solutions to broad based, complex issues. Our success in expanding M&S technology applications by way of increased stakeholder collaboration can lead to high economic growth opportunities for the business community and the Hampton Roads region.

FINALLY, WHAT’S IN A NAME

We would all agree that an organization’s name and reputation is something to protect. On protecting and increasing the VMASC brand, we seek to build upon our successes, publish and provide unmatched research, and bring to bear capabilities and applications that set us apart from providers that primarily offer M&S tools. By focusing on and pursuing opportunities based on our R&D mission, core competencies, and intellectual and physical assets, we build strength and depth in key areas. We do not seek to be all things to all people however, as we sharpen our focus in strategic M&S areas, we expect others will immediately acknowledge that if you want verifiable solutions to complex problems, VMASC is the go to organization. Our goal is to be that modeling and simulation, research & development organization recognized as the one stakeholders say, “The more complex the problem, the more you need VMASC.” That’s the name recognition and reputation we want to protect.

Thomas Reese, MBA
VMASC Director of Business Development and Technology Transfer

Number of Spin-Off M&S companies that have grown out of VMASC
The Virginia Modeling, Analysis and Simulation Center (VMASC) entered into its Academic Year 2011 amidst the announcement that USJFCOM was closing at the end of August 2011. With the pending closing of USJFCOM, VMASC took drastic and immediate measures to secure its continued success. Within a month, VMASC began to restructure its research focus areas, reconnect with past customers and foster new collaborative relationships within industry, academia and other government agencies. Additionally, VMASC began an elaborate campaign to eliminate excessive and unnecessary spending. Getting out in front of this potential train wreck enabled VMASC to be more proactive and deliberate in its marketing and communication initiatives while continuing to support commitments outside VMASC, such as: ModSim World Conference and Expo 2011, I/ITSEC 2011 and other M&S affiliated conferences. Furthermore, the outcome of such measures brought a new sense of teamwork and collaboration among the faculty and staff members, and as a result, VMASC became stronger and better than before.

VMASC continued to grow in 2011 expanding its customer outreach while continuing to provide its existing customers with exceptional service and support. Just as in 2010, the economy was still tenuous and the unemployment rates nationwide reached their highest. Sadly, VMASC lost several key engineering and technical support (ETS) personnel due to the closing of USJFCOM, but we were delighted the majority were able to secure other employment within the Hampton Roads area within the M&S Industry and were able to transfer four key members of our ETS team within VMASC to other contracts. The loss was significant and an end to a very successful partnership with USJFCOM over the past 13 years.
On another note, with the support of Old Dominion University’s President John Broderick and VP Mohammad Karim, we were able to grow our faculty research workforce and develop new research focus areas. During the summer 2011, we actively began recruitment for several key research positions: Research Faculty for Human Behavior Modeling and Virtual Environments and Gaming, Senior Project Scientists for Software Development, 3D Modeling, and Medical Clinician. Hopefully, by spring 2012 all these positions will be filled and actively pursuing their own research initiatives.

Through this academic year, the Administrative Office was instrumental in supporting the submission of 45 proposals, valued at more than $15.4M. Of those 45 submissions, 53% were accepted for award, with total revenue exceeding $8.1M. The revenue for academic year 2011 fell by approximately eighteen percent; however, the total number of awards increased by three percent. This reduction was expected with the loss of revenues from our USJFCOM customer, but not so much as to hinder our efforts and grow our market base. In addition to project support, the administrative staff continued to provide exceptional support to all research, technical and professional staff by processing all travel arrangements and reconciliations, equipment and furniture purchases, tracking project expenses and awards, maintaining facilities operations, handling all human resource processing for both the State and Research Foundation and monitoring all revenues, expenses and establishing cost cutting initiatives.

Additionally, the administrative office continued to provide exceptional services for our internal and external conferences. This past year was a big undertaking of the administrative staff as we supported the Hampton Roads Full Scale Exercise under the direction of Dr. Barry Ezell. This event ran intermittently for six months with a final exercise off-site for three consecutive days. The final outcome was a huge success for VMASC and Hampton Roads.

Sheila Flanagan
VMASC Director of Administration & Support

VMASC continued to grow in 2011 expanding its customer outreach while continuing to provide its existing customers with exceptional service and support.
Events over the past year have provided us some glimmers of hope in the face of severe short-term challenges faced by our local M&S industry. Economic problems faced by our country plus radical changes to JFCOM have forced our M&S community to take a hard look at the future. However, with problems come opportunity.

Modeling and simulation are both pervasive in our daily lives from the manufacturing of ships and aircraft, to weather forecasting and socio-economic modeling. The M&S technologies DoD has developed over the past twenty years are in most cases directly transferable to other domains. The most promising of these domains and one that is poised for immediate growth is Medical M&S. VMASC and its member companies, working in conjunction with the local medical community and the National Center for Collaboration in Medical Modeling and Simulation, are laying the groundwork to take a leadership position in national commercial medical simulation technologies.

In an effort to develop closer ties between our region’s consumers and producers of M&S technologies, we have started a membership specific series of intimate speaker events. During these events, top government and industry leaders from a variety of M&S domains provide insight into their organization’s efforts and challenges for which they need solutions.

In a like manner, we are actively setting the conditions to take advantage of research being performed by VMASC staff researchers. We have begun to forge closer interactive ties between the VMASC research staff and industry members with the goal of commercializing the IP and products born of exceptional ideas.

With the VMASC facility increasingly being used by all manner of local, state, and federal agencies, it has been exciting to see VMASC develop a showcase area, provided free of charge to member companies. In this space, industry members can show their corporate wares and capabilities to a wide range of potential clients.

Finally, industry membership support has made it possible for a number of ODU undergrad M&S students to attend the 2011 ModSim World Conference and events at no cost. Additionally, our sponsorship of the annual M&S Capstone event will reap benefits not only for the students but also for member companies who will have the opportunity to see, interact with, and potentially hire some of our future leaders in M&S.

So, as we look ahead to the next twelve months, we have our challenges. But, we also have a firm foundation to build upon as we develop new opportunities in emerging M&S domains.

Jack McGinn
Chairman
VMASC Industry Board of Advisors
Jack McGinn, Chairman - TREC, Inc.
Tom Cole, Vice Chairman - DDL Omni
Craig Langman - General Dynamics IT
Dr. Eric Weisel - Weisel Science & Technology Corp.
Josh Jackson - SAIC
Pete Schrider - Alelo

John Kelly - Whitney, Bradley & Brown Inc.
Dewey Mauldin - The Boeing Company
Bob Armstrong - Booz Allen Hamilton

EMERITUS MEMBERS
Dr. Tom Mastaglio - MYMIC
John Dannon - Lockheed Martin

Total number of active VMSAC Partners from industry, government, and academia from 2010-2011
Alelo
Alion Science and Technology
The Boeing Company
Booz Allen Hamilton
CAE
Command Post Technologies, Inc.
DDL Omni Engineering
FGM, Inc.
General Dynamics - IT
Immersive Solutions
ITA International
Lockheed Martin Center for Innovation
Loyola Enterprises, Inc.
MAK Technologies
MYMIC
Northrop Grumman Mission Systems
SAIC
SimiS
TerraSim, Inc.
TREC
Visense
VMD Systems Integrators, Inc.
Whitney, Bradley, and Brown, Inc
Weisel Science and Technology Corp.
Air Force Agency for Modeling & Simulation
Air Force Operational Plans and Joint Matters
Air Force Research Lab
Army Capabilities Integration Center
Army Research Lab
Commander Operational Test and Evaluation Force (COMOPTEVFOR)
Combat Direction Systems Activity (CDSA), Dam Neck
Defense Modeling and Simulation
Emergency Management Training, Analysis & Simulation Center (EMTASC)
NASA Langley Research Center
NATO Allied Command Transformation
Office of the Secretary of Defense (OSD)
Naval Surface Warfare Center (NSWC), Dahlgren Division

Navy Warfare Development Command (NWDC)
Surface Deployment and Distribution Command
Transportation Engineering Agency (SDDCTEA)
U.S. Army Training and Doctrine Command (TRADOC)
U.S. Joint Coalition Warfighting (USJCW)

LOCAL GOVERNMENT
City of Suffolk
Crater Planning District Commission
Hampton Roads Economic Development Alliance (HREDA)
Hampton Roads Partnership (HRP)
Hampton Roads Research Partnership (HRRP)
Opportunity, Inc.
Virginia’s Center for Innovative Technology
VMASC is honored to have well-rounded faculty members working in varied fields of expertise to advance the multi-disciplinary aspects of modeling and simulation research and development.

The preceding and following information provides an accomplished overview of the modeling and simulation research carried out over the last year at VMASC, highlighting the contributions that each researcher has made to the field of modeling and simulation in Old Dominion University’s Virginia Modeling, Analysis and Simulation Center is the international research leader in modeling and simulation, visualization, and M&S-supported analysis.
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EDITORS OF BOOKS AND JOURNAL SPECIAL ISSUES


BOOK CHAPTERS WRITTEN


Padilla, J. (TBD). “Understanding and Complex Situations”. In S. Kovacic and A. Sousa-Poza (Eds.) *Complex Situations: Perspectives of Wicked Problems*. Springer-Verlag

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Andrew, Emily, Turnitsa, Charles and Tolk, Andreas. “Software Reuse for Modeling and Simulation.” Spring Simulation Interoperability Workshop, Boston, MA, April 2011.


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Tolk, Andreas, Saikou Diallo, Jose Padilla, and Charles Turnitsa. “How is M&S Interoperability Different from Other Interoperability Domains?”, SIWzie Award, SISO, Boston, MA, 2011.
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