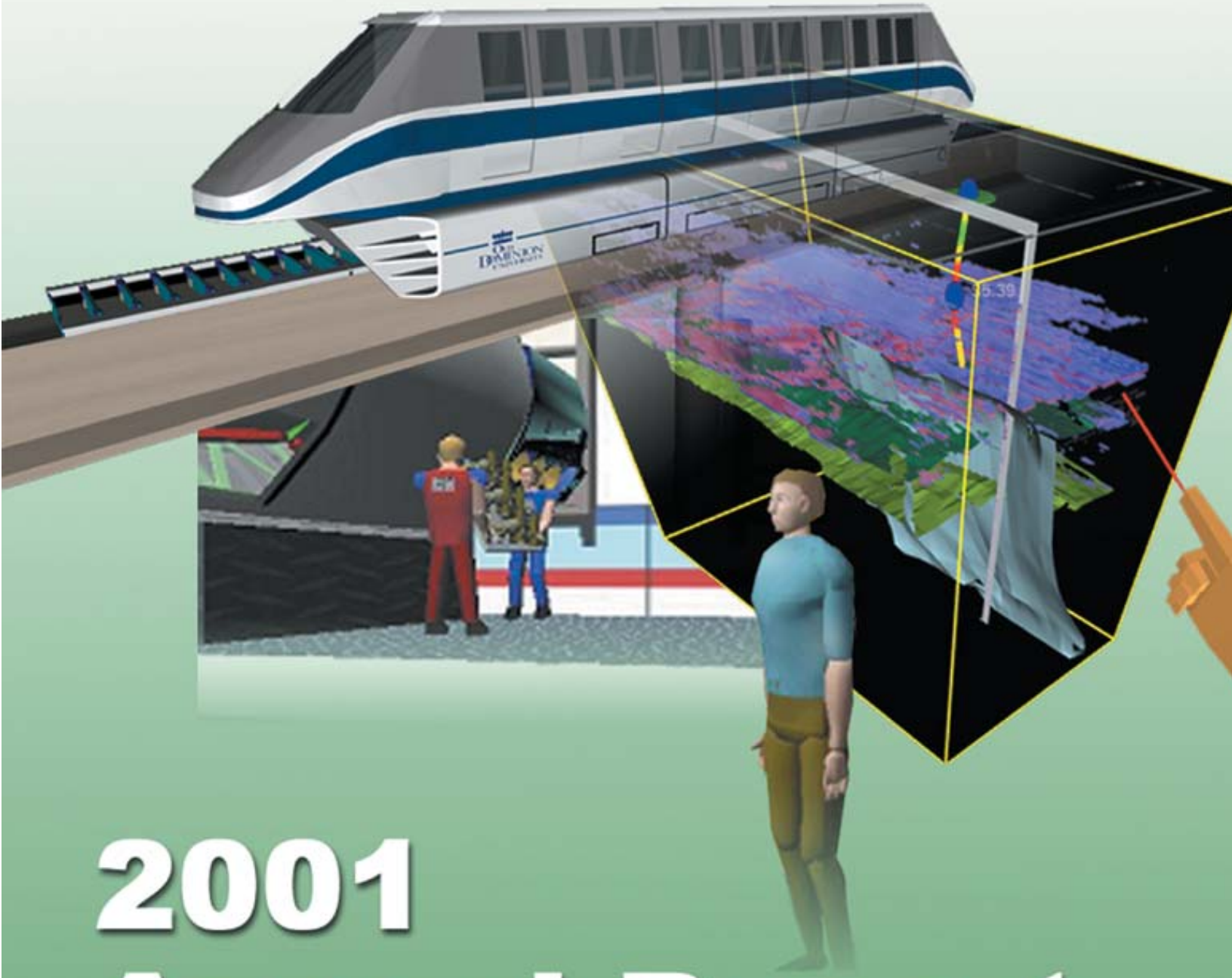

2001 Annual Report

VMASC

Virginia Modeling Analysis and Simulation Center

VMASC

I am pleased to present the Virginia Modeling, Analysis and Simulation Center (VMASC) Annual Report for calendar year 2001. This report highlights VMASC's many accomplishments, over the past year, and fulfills the terms of the Cooperative Research and Development Agreement between Old Dominion University and the United States Joint Forces Command.

The VMASC story remains exciting and compelling. It is exciting in terms of the new challenges offered to our staff, students and faculty; the emerging opportunities for collaboration with our academic, industry and government partners; and the significant economic benefit being realized within the regional economy. The story is compelling as we continuously expand the horizons of modeling, simulation and visualization through our role as an international leader in these areas of research and education.

CY2001 represented a watershed year for VMASC, in terms of revenue, project activity, and the future direction we have charted for the Center.
Our project-generated revenue remained strong at more than $3.5M and we remained the largest research producer within Old Dominion University.

Concurrently, with the strong sponsorship of the United States Joint Forces Command and Old Dominion University, we made a commitment to move rapidly and decisively towards the development of the first ever modeling and simulation-focused battle laboratory located at an academic institution. This laboratory will provide unique collaboration opportunities for our industry, government and academic partners; while offering our staff, faculty, and modeling and simulation graduate students a real-world laboratory in which to conduct meaningful research.

Our modeling and simulation graduate programs continued to grow impressively in 2001. 48 students are currently enrolled in the Masters degree program and 9 students have graduated from the program since its' inception. Fifteen students are currently enrolled in the PhD program, with the first graduate expected to matriculate in May 2003. The rapid growth of these programs has resulted in unique challenges for the students, our faculty and our staff.

Last fall, a small VMASC project staff consisting of one Associate Professor, one Staff Researcher, and two PhD students provided the integration leadership for the development of the Joint Battlespace Environment (JBE) at the Joint Warfighting Center (JWFC). The JBE was successfully demonstrated at the I/ITSEC 2001 Conference, in Orlando Florida, where more than 15 different simulations were integrated into one Common Operational Picture. We are continuing to work with the JWFC to potentially site the JBE, at VMASC, as an ongoing initiative within our new battle laboratory.

As this report goes to publication, we are hard at work on our goals and objectives for CY2002. Our priorities for 2002 include further development and installation of the battle laboratory, expanding the scope of our research activities, particularly in the area of medical modeling and simulation, and the infinite search for new opportunities to engage and support our industry, government, and academic partners.

These accomplishments are but a few of the many achieved by the
VMASC team of skilled researchers, dedicated university faculty and committed students. We will continue extending the frontiers of modeling, simulation and visualization science and engineering by our research and by educating tomorrow's civilian and military workforce in what will be one of the dominant enterprises of the twenty-first century. We invite you to join us in this exciting endeavor.

Sincerely,

R. Bowen Loftin, Ph.D.
Director of Simulation Programs

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Modeling
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VIRGINIA MODELING, ANALYSIS AND SIMULATION CENTER

ORGANIZATION SYNOPSIS

About VMASC

The Virginia Modeling, Analysis and Simulation Center is a not-for-profit collaborative enterprise center of Old Dominion University's College of Engineering and Technology. We are partnered with academia, industry and government and our focus is:

- Modeling, simulation, and visualization research, development and education
- Leveraging, promoting, and cultivating simualtion technology expertise through industry, government and academia.

VMASC Facility

- Location: 7000 College Drive, Suffolk, VA 23435
- Five Development Laboratories
  - Commercial Applications & Tools
  - Reusable Military Technology
  - 3D Synthetic Environments
  - Workstation Lab
  - Virtual Environments Lab (located in Kaufman Hall on the ODU campus)
- Over $3M in simulation hardware, software and tools
- Offices, Tech Library, and Meeting Facilities
- Facility LAN and High Capacity External Network Connection (DS3)

Mission/Vision

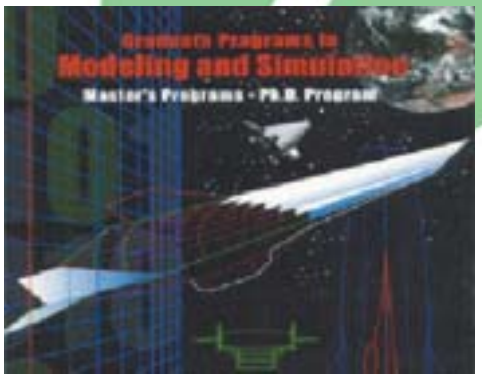
MISSION

- **Engage** in collaborative research and development in modeling and simulation and visualization (M&S/V)
- **Provide** government, industry, and academia with M&S/V scientific/ engineering applications, development and technical services
- **Promote** education in M&S/V through graduate degree programs, shortcourses and certification programs
- **Stimulate** economic development through increased industry and government use of M&S/V.

VISION

VMASC will be a global leader in modeling and simulation (M&S) reearch and development and an integrator of M&S with visualization technologies. VMASC will be a portal for the nation's premier M&S educational programs.

MODELING AND SIMULATION GRADUATE PROGRAMS



2001 Statistics

- 42 students enrolled in the M&S Master's Program
- 2 M&S Master's Program graduates in 2002
  - Karl Hamlyn
  - David Mohr
- 12 Students enrolled in teh M&S Ph.D. Program
- 1 Army War College Fellow
  - George Smith
- 1 Fullbright Scholar
  - Hungria Berbesi

VIRGINIA MODELING, ANALYSIS AND SIMULATION CENTER

PROJECT ACTIVITIES

ENGINEERING

INTELLIGENT SYNTHESIS ENVIRONMENT

Project Leads: Dr. R. Bowen Loftin, Dr. David Dryer, Dr. Debra Major
Sponsor: NASA/Langley Research Center
Description: Engineering today is an inherently collaborative activity. This project has extracted the key tasks from and examined the interactions within an engineering team developing designs for next-generation vehicles at NASA. Current research is targeted at identifying technologies that will enhance the collaboration within the teams.

INFORMATION SYSTEMS

INFORMATION SYSTEMS AND DIGITAL LIBRARY DEVELOPMENT SUPPORT

Project Leads: Dr. Steven Zahorian, Mr. Kevin McCleskey
Sponsor: Joint Warfighting Center, JW900
Description: Continued ongoing effort to provide a wide range of support to the divisions within the JW900 Department at JWFC.
Specific projects included:

- Assisting with the installation, configuration and trouble shooting of various computers and systems, within the JWFC computer network.
- Assisting in the manufacture and installation of fiber optic connectors and multi mode ST fiber connectors, and testing, using the Seicor testing unit.
- Providing software and hardware assistance for LIMS migration, web upgrades, and JWFC video conferencing.
- Developing and implementing software utilities to enhance network performance.
- Providing technical and engineering support in the area of distance learning technologies and initiatives.
- Providing guidance on current information systems technologies.
- Providing support in the area of graphics and visualization. Supporting the continued development and implementation of XML-based indexing architecture for the Joint Digital Library and the development of a speech-to-text translation capability for the JDL.
- Providing support for the loading, testing and trouble-shooting of Command, Control, Communications, Computers and Intelligence software loads on NT and UNIX platforms, the Global Command and Control System, the Contingency Theater Automated Planning System, the Theater Battle Management Core Systems and the Joint Intelligence Deployable Support System.

ENGINEERING AND TECHNICAL SOFTWARE SUPPORT

Project Lead: Mr. Kevin McCleskey
Sponsor: Navy Shipboard Electronic Systems Evaluation Facility (SESEF)
Description: Continued ongoing effort to assist in the development, implementation, enhancement and maintenance of the SESEF Automated Control System (ACS) and the Automated Test Equipment (ATE) proprietary software, through the integration of SESEF applications with off-the-shelf MS Windows based products including C++ and spreadsheet applications.

INFORMATION SYSTEMS TECHNOLOGY SUPPORT

Project Lead: Dr. Mohammed Zubair
Sponsor: Joint Battle Center (JBC)
Description: Continued ongoing effort to provide technical support in a various information technology areas with a focus on database administration and development, conducting research, and providing support for the development of web-based management applications.

MANAGEMENT INFORMATION SYSTEM DEVELOPMENT

Project Lead: Mr. William Wolters, Dr. Mukesh Rohatgi
Sponsor: U.S. Navy, Commander, Operational Test and Evaluation Force (COMOPTEVFOR)
Description: Continue ongoing effort to provide technical and analytical support to develop and implement the Force Management Information System (MIS) using web-based technology and COTS software. The resultant MIS, when fully fielded, will include all the elements of test management oversight, finance and manning modules, and other administrative support modules, to facilitate accurate information and report generation.

KNOWLEDGE MANAGEMENT SYSTEM REQUIREMENT DEFINITION STUDY

Project Lead: Mr. C.C. Hill, Dr. Mukesh Rohatgi
Sponsor: U.S. Joint Forces Command, Joint Warfighting Experimentation Battle Laboratory (JWEBL)
Description: Provide the Joint Experimentation Directorate (J9) with an integrated program of knowledge management research and evaluation experimentation support that assesses concept based hypothesis for near, mid and far term concepts, reviews technology capabilities, identifies the latest and best knowledge management practices, and assesses commercial and industry advanced knowledge management programs, to identify and recommend the best-value solutions supporting changes to doctrine, organizations, training, material and leadership to achieve significant advances in joint operational capabilities.

INFORMATION DISSEMINATION MANAGEMENT SUPPORT

Project Lead: Mr. Tom Lang
Sponsor: U.S. Joint Forces Command, Command, Control & Communications Directorate (J6)
Description: Provide continuing research and technical support to examine interoperability issues affecting the Combatant CINCs. Support is focused on interoperability problems encountered by CONUS-based forces deploying overseas. Identified issues and problems are set in perspective relative to their overall impact on joint forces operations by relating the deficiencies to their appropriate operational requirement, assessing their impact on the conduct of joint forces operations; then prioritizing them with cost estimates and recommendations for resolution within ongoing or new C4 programs or technology development initiatives.

ONESAF SOFTWARE ARCHITECTURE

Project Lead: Dr. Mikel D. Petty
Sponsor: GRC, International
Description: Provide consultation regarding computer generated forces and software architecture for prototype of OneSAF system architecture.

M&S TECHNOLOGY

SOFTWARE ARCHITECTURE DESCRIPTION LANGUAGES

Project Lead: Dr. Mikel D. Petty
Dr. Frederic D. McKenzie
Sponsor: U.S. Army, Simulation, Training, and Instrumentation Command

Description: Evaluate software architecture description languages, which are formal notations for specifying the high-level design architecture of large software systems, for their applicability to large simulation systems.Experimentally determine how well existing languages work for simulations.

JSAF CONFIGURATION MANAGEMENT PLAN

Project Lead: Dr. Mikel D. Petty
Sponsor: U.S. Joint Forces Command, Joint Experimentation

Description: Develop a configuration management plan for the Joint Semi-Automated Forces (JSAF) simulation software to insure the successful integration of the various software revisions, timely availability of updated releases and an organized archival and retrieval of previous releases.

VISUALIZATION FACILITY FOR GRIFFITHS UNIVERSITY (AUSTRALIA)

Project Lead: Dr. R. Bowen Loftin
Sponsor: Griffiths University, Gold Coast Campus

Description: Provide an analysis of needs and recommendations for the construction and equipping of a visualization facility for the Griffiths University Gold Coast Campus. VMASC personnel interviewed researchers at the campus and identified their requirements as a means of developing recommendations for the physical facility and equipment (computers, displays and interaction devices) necessary to cost effectively address those requirements. An evolutionary strategy was presented that would support researchers during the first phase of the facility development and a roadmap was produced to guide the facility's enhancement over the next three years.

TRAINING & EDUCATION

MULTI-NATIONAL EXPERIMENTATION PRE-SYMPOSIUM SUPPORT IN OSLO, NORWAY

Project Lead: Mr. Kevin McCleskey
Sponsor: U.S. Joint Forces Command, Joint Warfighting Experimentation Battle Lab

Description: Provide academic workshop support services focused on the development and management of the Call-for-Papers, the pre-symposium workshop program, and the final pre-symposium package of papers and presentations.

ADVANCED DISTANCE LEARNING (ADL) OPERATIONAL REQUIREMENT DEVELOPMENT

Project Lead: Mr. Tom Lang
Sponsor: U.S.Joint Forces Command, JTASC Advanced Concept and Initiatives Division

Description: Continue the ongoing effort to support the development of an ADL Network and its resultant curriculum content. Support the submission of two ACTD proposals to the Office of the Secretary of Defense (OSD) for the development of both an ADL Network and ADL content development for shareable courseware. Support the development of a JWFC ADL Campaign Plan and ensure it is aligned with the Joint Experimentation and Mission Rehearsal in the long-term. Support the requirement for leveraging the Joint Digital Library, Joint Simulation System, Joint Distributed Learning System, interagency and coalition training programs and other new technologies. Investigate leveraging the Partners for peace (PfP) five year Strategic Plan, the Swedish Memorandum of Understanding, the Memorandum of Understanding between U.S. DoD and the Swiss Federal Department of Defense, Civil Protection, and Sports with the development of the ADL Campaign Plan.

JOINT RANGE AND ADVANCED DISTRIBUTED LEARNING INTEGRATION

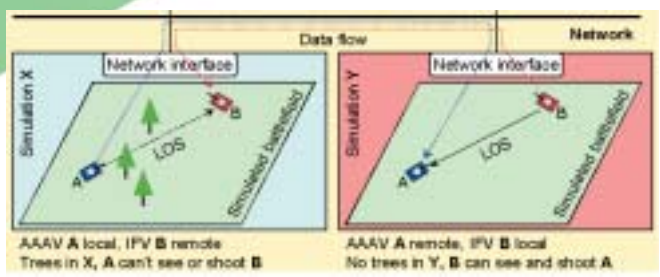
Project Lead: Mr. Tom Lang
Sponsor: U.S. Joint Forces Command, U.S. Joint Warfighting Center (J7)

Description: Identify Joint Range integration and interoperability shortfalls. Target opportunities for integrated training, experimentation and technology insertion. Focus on near and far term Joint Range integration to facilitate integration of Joint and Service testing, training and experimentation at RDT&E and training ranges and facilities, with emphasis on Navy and Marine Components and the Gulf Coast. Explore linkages with Distributed Training Environments that include network services providing for rapid, "just in time" training and rehearsal.

COMOPTEVFOR M&S INSTRUCTION

Project Lead: Dr. Mikel D. Petty
Sponsor: U.S. Navy, Commander, Operational Test and Evaluation Force (COMOPTEVFOR)

Description: Develop and deliver customized instruction and instructional materials on two M&S topics: "Modeling and Simulation for Operational Test Directors" (4 hours of instruction) and "Introduction to Modeling and Simulation for Test and Evaluation" (8 hours of instruction).



DEVELOPING VIRTUAL ENVIRONMENTS FOR TRAINING

Project Leads: Dr. R. Bowen Loftin, Dr. Frederic D. McKenzie, Dr. Mark W. Scerbo
Sponsor: Office of Naval Research
Partners: University of Pennsylvania, LinCom Corporation, University of Houston

Description: VMASC has been performing research in the area of training using virtual environments. Of interest is an understanding of the additional constraints encountered due to emotional responses in judgment-based military scenarios. Specifically, the goal is to address both culturally independent and dependent cues of nonverbal communication and recreate them in training scenarios. The focus will be on cues that are precursors to aggression and/or hostile activities such as those cues that suggest deception.

A digital terrain database of the Quantico MOUT site called Combat Town(Figure 1) is being used for the training environment.

The basic training objective is to monitor all ingress into a fictional town. The participant's role is to act in the role of a guard and stop each vehicle as it approaches the checkpoint, check and verify the identities of all persons seeking access to a town, and clear and/or deny access to all vehicles that appear suspicious. Figure 2 shows a configuration of the scenario with an intelligent agent in the role of the driver approaching the checkpoint.

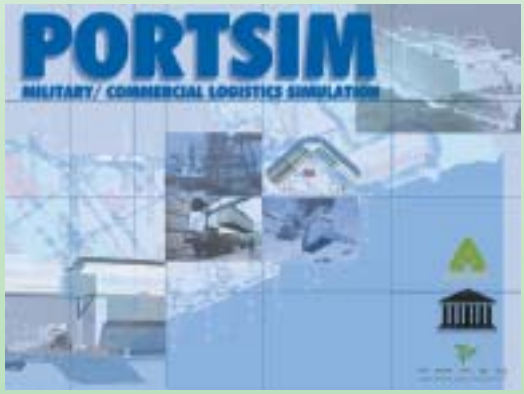
The training transfer study is scheduled to commence in March 2002. For this phase of the research, subjects will be selected from the ODU student population.

TRANSPORTATION

PORT SIMULATION (PORTSIM) DEVELOPMENT AND ENHANCEMENT

Project Lead: Dr. James Leathrum
Sponsor: Military Traffic Management Command Transportation Engineering Agency (MTMCTEA)

Description: Continued ongoing effort to improve and enhance the PORTSIM model, a discrete event simulation that facilitates the analysis and movement of military equipment through worldwide seaports and allows for detailed infrastructure analysis. Specific tasks included, developing and implementing a break-bulk process, continued development and enhancement of the statistical capability of the model, implement user desired enhancements, develop new modules and integrate and restructure existing modules, implement barge offloading routines and continue to assist in developing and executing Verification, Validation and Accreditation (VV&A) activities.



MAGLEV VISUALIZATION

Project Lead: Mr. Hector Garcia
Sponsor: American Maglev

Description: The MagLev (magnetic levitation) demonstration project at ODU is the first of its kind in the U.S. VMASC developed a model of the MagLev car and integrated the model with real images of the ODU campus and existing MagLev track to provide a virtual look at the system once it is complete.

WARGAMING & MILITARY APPLICATIONS

NAVIGATION SYSTEM SIMULATOR

Project Lead: Dr. Dave Dryer
Application Partner: WR Systems
Sponsor: US Navy-SPAWAR

Description: The focus of this project is to develop a prototype 2D/3D visual display using GPS location data and DNC depth data to aid in ship navigation. The display includes surrounding terrain, horizon, and navigation aids.

JOINT BATTLESPACE-ENVIRONMENT DEMONSTRATION

Project lead: Mr. Mark Phillips
Sponsor: U.S. Joint Warfighting Center, U.S. Joint Forces Command J7

Description: Integrate a range of simulation systems (constructive, virtual (including man in the loop) with real time C4ISR systems (GCCS-M) to build a prototype demonstration of the Joint Battlespace environment for the 2001 Interserice/ Industry Training, Simulation, and Education Conference in Orlando Florida

C4ISR ENGINEERING AND TECHNICAL

Project Lead: Mr. John Dorris
Sponsor: U.S. Joint Forces Command, Command, Control & Communications Directorate (J6)

Description: Continue the ongoing effort to evaluate the contributions of new C4ISR technology to Warfighting processes. Facilitate process improvements by accelerating the implementation of selected C4ISR technology. Ensure new C4ISR processes are interoperable and conform to joint standards and provide warfighter feedback early in the process. Compare alternative C4ISR processes, identify shortfalls in the current process and make technical recommendations to correct the shortfalls.

ADVANCED CONCEPT TEST DEMONSTRATIONS (ACTD) ENGINEERING AND TECHNICAL SUPPORT

Project Lead: Mr. Al Wunsch
Sponsor: U.S. Joint Forces Command, Joint Warfighting Experimentation Battle Laboratory (JWEBL)

Description: Continue ongoing effort to review and make recommendations on issues associated with on-going Advanced Concept Test Demonstrations (ACTDs). Develop test and evaluation criteria for Joint exercises and tests. Review and comment on all ACAT I/IA and JROC special interest documents that are validated and approved by the JROC. Develop and staff technical white papers, Mission Need Statements (MNS), Capstone Requirements documents and Operational Requirements Documents (ORD). Conduct performance analysis and assessment of special projects to support requirements development.

MODELING AND SIMULATION ENGINEERING AND TECHNICAL SUPPORT

Project Lead: Mr. Robert Kean
Sponsor: Joint Warfighting Center (JW500)

Description: Continue ongoing effort to provide modeling and simulation technical and engineering support including researching various legacy training models and simulations and their interactions using tools associated with the Joint Training Confederate (JTC) and providing recommendations for acquisition of modeling and simulation tools to be used by the JTC to meet exercise unique training objectives. In addition, provide subject matter information support concerning potential future training and analytical simulation systems and other emerging technologies.

ENGINEERING AND TECHNICAL SUPPORT RELATED TO C4ISR AND THEATER AIR MISSILE DEFENSE (TAMD)

Project Lead: Mr. Dave O'Neill
Sponsor: U.S. Joint Forces Command, Command, Control & Communications Directorate (J6)

Description: Continue the ongoing effort to support CINC coordination duties for the Joint Theater Missile Defense Office (JTAMDO). Evaluate the contributions of new C4ISR technology to approved Warfighting requirements. Ensure new C4ISR processes are interoperable and conform to joint standards. Support interoperability identification and resolution development. Perform tactical C4 reviews, studies and assessments. Review and assess TAMD Operational Requirements Documents (ORD) and Mission Needs Statements (MNS).

C4ISR PROGRAM MANAGEMENT SUPPORT

Project Lead: Mr. Chris Behre
Sponsor: Joint C4ISR Battle Center

Description: Continue the ongoing effort to provide the Combatant Commands, at the JTF level, with a joint assessment and experimental capability that has strong connectivity to programmatic implementations through the JS/J-8 and which provides a forcing function for joint capability and interoperability.

C4ISR ENGINEERING AND TECHNICAL

Project Lead: Mr. Tom Lang
Sponsor: U.S. Joint Forces Command, Command, Control & Communications Directorate (J6)

Description: Provide Millennium Challenge and follow-on experiment engineering analysis and evaluation in support of J61. Develop joint requirements, C4I networks, assumptions, principles and division of labor across service and agency boundaries.

MODELING AND ANALYSIS OF SHIP ROLL STIMULATION SYSTEM

Project Lead: Dr. Jen Huang, Dr. Roland Mielke
Sponsor: US Navy

Description: The project consists of the analysis and modeling of ship roll stimulation system. The objective is to design a control algorithm for the stimulation system and extend the analysis to determine if a ship stabilizer, made with existing hardware, is feasible.

JOINT EXPERIMENTATION FUTURES

Project Lead: Dr. Mikel D. Petty
Sponsor: U.S. Joint Forces Command, Joint Experimentation

Description: Perform science and technology assessments of emerging technologies with potential future effect on warfighting. Prepare analyses that provide tutorial explanations, research literature surveys, and future impact estimations for the emerging technologies. Participate as science and technology experts in Futures seminars focused and developing community insight on technological impact and research priorities.

VIRGINIA MODELING, ANALYSIS AND SIMULATION CENTER

RESEARCH CAPABILITIES

The true measure of an organization's research capability is the cumulative expertise of its research staff. VMASC research and technical projects are performed by modeling and simulation-focused faculty from both VMASC itself and the academic departments of Old Dominion University. This collegial teamwork gives VMASC an effective research staff that is deep in talent and broad in coverage. The following table lists the faculty most involved in VMASC research and their primary areas of expertise. As it shows, VMASC and ODU faculty researchers have education and experience that covers a wide range of simulation methodologies, from discrete event to real time, and simulation applications, from military to food service.

Graduate and undergraduate students of Old Dominion University ably support the faculty researchers on VMASC research projects. The students provide capable labor and creative energy that is essential to the projects' success.

Our expertise is backed up by a wealth of simulation software resources and laboratory facilities. Many of members of the VMASC consortium have made their simulation software products available for VMASC projects and VMASC researchers have put those products to good use. VMASC's physical facilities include laboratory space, computer equipment, specialized peripherals, and network infrastructure sufficient to support serious simulation projects.

Research Expertise Area	James P. Bliss	Lee A. Belfore	David A. Dryer	Hector M. Garcia	James F. Leathrum	R. Bowen Loftin	Alan Lusso	Frederic D. McKenzie	Roland R. Mielke	Mikel D. Petty	Mark A. Phillips	Ralph V. Rogers	Mark W. Scerbo	Jen Seevinck	John Sokolowski	William W. Swart	Andreas Tolk
Artificial intelligence		•				•		•							•		•
Computer generated forces							•	•		•					•		•
Distributed simulation				•	•	•		•		•	•						
High Level Architecture					•			•		•							•
Interoperability			•					•		•	•						•
Human Factors	•												•				
Adaptive Automation	•												•				
Cognitive engineering	•												•		•		
Control/display evaluation	•												•				
Environmental effects on performance	•												•				
Ergonomic evaluation	•												•				
Human performance measurement	•												•				
Human resource management	•												•				
Task analytic techniques	•												•		•		
Usability testing	•												•				
Mathematical modeling			•		•	•	•		•						•	•	
Simulation applications		•			•		•										
Air traffic control systems												•					
Business systems												•				•	
C4ISR Applications															•		•
Collaborative environments			•	•		•											
Decision Support Systems									•						•		•
Emergency management										•	•						
Food service																•	
Military simulation		•	•	•	•	•		•		•	•				•		•
Port traffic					•												
Simulation development				•	•	•	•	•	•	•	•	•			•		•
Simulation methodologies					•							•					
Discrete event simulation					•	•		•				•			•	•	•
Enterprise simulation			•						•		•					•	
Knowledge-based simulation												•			•		
Multi-resolution simulation			•		•					•							•
Object-oriented simulation					•	•		•		•		•			•		•
Training and education				•		•					•			•			
Adult education						•								•			
Curriculum design					•	•								•		•	
Distance learning			•								•			•		•	
Educational technology					•	•					•			•			
Intelligent tutoring						•	•					•					
Simulation education						•	•					•			•	•	
Training workshops														•			
Verification and validation		•			•					•					•	•	•
Visualization and virtual reality			•	•		•	•				•			•			
Battlefield Visualization			•	•		•					•						
Human-computer interaction	•		•	•		•	•						•	•			
Virtual reality		•	•	•		•	•							•			
Web-based visualization		•		•		•	•							•			
Other related topics		•				•	•		•	•		•		•			•

VIRGINIA MODELING, ANALYSIS AND SIMULATION CENTER

SIGNIFICANT ACCOMPLISHMENTS FOR 2001

- VMASC staff and associated faculty conducted 28 projects generating approximately $ 3.5 million in research revenues. This is the highest research income of any Old Dominion University budget unit.

- VMASC/ODU Battle Lab Inception. During 2001, VMASC pursued the development of a research infrastructure aimed at long-term research activities in support of the Hampton roads government, commercial and military sectors. To achieve this goal, it was necessary to build a technical infrastructure capable of serving any desired modeling and simulation application area by dynamic reconfiguration; hence the birth of the VMASC Battle Lab/ Commercial Decision Support Center. VMASC applied for and was awarded a Commonwealth Technology and Research Fund (CTRF) grant that, with matching funds from Old Dominion University, totaled $904,000.

  The Battle Lab has generated a great deal of interest from agencies and companies in Wash ington DC, Orlando, and the Hampton Roads Modeling & Simulation community. Operations are expected to commence in earnest by September 2002. Initial Battle Lab projects are being planned.

  Areas of interest for the Battle Lab are human factors (in particular human performance, hu man computer interaction and behavioral repre sentation in synthetic environments), grid based large scale distributed synthetic environments, large scale visualization, haptic/kinesthetic research (particularly in medical training) applications and low cost scalable computing architectures for Modeling and Simulation.

  Battle Lab successes will be measured by increased employment opportunities, research and development, economic growth for Virginia, attraction of top quality graduate students to Old Dominion University, and expansion of the commercial application of Modeling and Simulation in both the Hampton Roads area and the Department of Defense in general.

- VMASC membership grew to 136 members with the addition of fifteen new members. This membership was comprised of 91 Industry members (67%), 23 govern ment members (17%), 13 affiliate members (10%) and 9 academic members (7%).

- The overall total value of membership was more than $3.3 million, with fee-paying members value over $450K and in-kind members over $2.9 million. Of the industry members 15% were dues paying members. Consortium membership continued to grow with most active participa tion coming from the Department of Defense, focused M&S software vendors, and engineering service providers.

- VMASC participated in numerous modeling and simulation conferences and exhibits, highlighted by participation in the one week Interservice/Industry Training, Simulation and Education Conference (I/ITSEC) in Orlando Florida where VMASC led the integration of the first Joint Battle-Space Environment supporting the US Joint Forces Command.

- Dr. Mikel D. Petty, VMASC Chief Scientist, served on a National Research Council Modeling & Simulation Committee.

- Dr. Roland R. Mielke and Dr. Mikel D. Petty of VMASC, together with Dr. Thomas W. Mastaglio of MYMIC, deliv ered a tutorial on "Modeling and Simulation of Commercial Enterprises" at the 2001 Interservice/Industry Training, Simulation, and Education Conference (I/ITSEC).

- VMASC continued implementing the Member Value Proposition (MVP) management process for enhanced col laboration with consortium members focusing on VMASC strategic initiatives. The management approach details partnering activities with each member so the benefits of membership can be tracked each year for mutual value.

- VMASC is hosting Army War College Fellow LTC George Smith. The program will continue in 2002.

- 12 students are currently enrolled in the College of Engineering and Technology's Modeling and Simulation (M&S) doctoral program. This is the first M&S Ph.D. program at a public university in the United States.

- The Master's Program in Modeling and Simulation contin ued to grow. There are presently 42 students in the program, and 9 graduates from the program.

- VMASC conducted three Simulation Camps at middle schools and high schools throughout Hampton Roads.

- VMASC partnered with EVMS in new National Center for Collaboration in Medical M&S.

VIRGINIA MODELING, ANALYSIS AND SIMULATION CENTER

2001 PUBLICATIONS and PRESENTATIONS

Belfore II, L. A., "An Architecture for Constructing Large VRML Worlds," Transactions of the Society for Modeling and Simulation" vol. 18, no. 1, pp. 24-40, March 2001.

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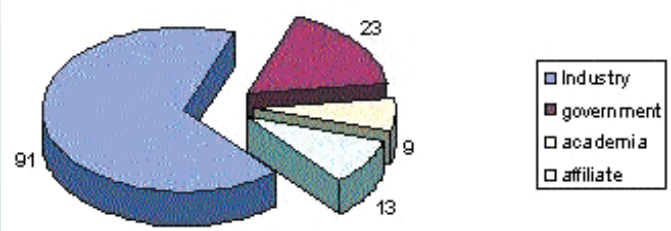
2001 MEMBERSHIP SYNOPSIS

VMASC MEMBERSHIP SUPPORT

During the calendar year of 2001, VMASC membership grew to 136 members with the addition of fifteen new members. This membership was comprised of 91 Industry members (67%), 23 government members (17%), 13 affiliate members (10%) and 9 academic members (7%).



MEMBERSHIP VALUE SINCE FORMATION

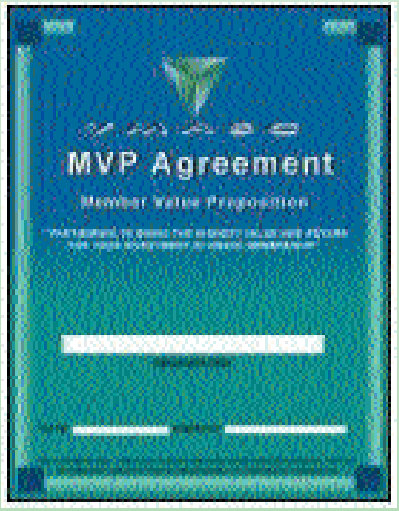
The overall total value of membership was over $3.5 million with fee-paying members value over $450K and in-kind members over $3 million. Of the industry members 15% were dues paying members. Membership status showed that the consortium continued to grow with most active participation coming from DoD focused M&S software venders and engineering service providers.

STRATEGIC FOCUS CHANGES

During 2001 marketing emphasis changes significantly to:

- Increased emphasis on research and collaboration
- Increased attention to military focused research
- Expansion of M&S graduate program support
- Decreased manpower devoted to pursuing commercial projects
- Implementation of MEMBERSHIP VALUE PROPOSITION (MVP) with emphasis on strategic fit

The new VMASC MVP agreement outlines specific program benefits with each member focused on VMASC strategic initiatives. The MVP initiative has become a compelling membership vehicle and provides a tangible plan to bring value for VMASC membership. The area of most interest is for M&S educational programs for staff development with access to M&S short courses and certification programs. Several new educational programs are being developed.



MARKETING ACTIVITIES

The highlight of 2001 came during I/ITSEC'01 show in Orlando, VMASC led the integration of the first Joint Battle-Space Environment (JBE) supporting the US Joint Forces Command. The integration effort consisted of 16 simulations and real time command and control systems (approximately 72 computers) from Navy, USAF and the Marines, with a total staff of over 40 engineers from military bases across the US. It was showcased and run successfully during I/ITSEC'01 a total of 8 times (four times as the JBE and four times as the USAF Joint Synthetic Battle-Space). The success of the demonstration will most likely lead to an annual demonstration at the I/ITSEC conference, the world's largest modeling and simulation exposition.

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*Now Northrop-Grumman


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