

Fiscal Year (FY) 2005 Budget Estimates RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							Date February 2004
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number: Joint Wargaming Simulation Management Office PE 0603832D8Z			
COST <i>(In Millions)</i>	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total Program Element (PE) Cost	45,835	41.735	46.017	46.489	47.083	48.853	49.928
JSM/P476	45,835	41.735	46.017	46.489	47.083	48.853	49.928

(U) A. Mission Description and Budget Item Justification:

Modeling & Simulation (M&S) has been a critical component in the development, deployment and sustainment of military capability for many years. By the last decade of the twentieth century, it became evident to Congress and the Department that a focused effort was needed to harness the promise M&S for national defense. To provide strategic direction, the Executive Council for Modeling and Simulation (EXCIMS) developed a vision statement for DoD M&S which they reconfirmed in 1999. "Defense modeling and simulation will provide readily available, operationally valid environments for use by the DoD Components: (1) To train jointly, develop doctrine and tactics, formulate operational plans, and assess warfighting situations; and (2) To support technology assessment, system upgrade, prototype and full-scale development, and force structuring. Furthermore, common use of these environments will promote a closer interaction between the operations and acquisition communities in carrying out their respective responsibilities." (DoD5000.59-P)

In responding to the Congressional initiative to "... establish an Office of the Secretary of Defense level joint program office for simulation to coordinate simulation policy, to establish interoperability standards and protocols, to promote simulation within the

military departments and to establish guidelines and objectives for [the] coordination [of] simulation, wargaming and training..." (SAC, SR101-521), the DMSO was created under DDR&E with an S&T budget designed to " ... promote the enhancements of DoD M&S technologies in support of operational needs and the acquisition process; develop common tools, methodologies, and databases; and establish standards and protocols promoting the internetting, data exchange, open system architecture, and software reusability of M&S applications." (DoD Directive 5000.59).

DMSO continues to direct a technical program that supports the effective use of simulation across the Department of Defense, provides the foundation for interoperability, enhances cost-effective use of simulation and serves as the laboratory for the development of standards or policy. The need for effective M&S capability continues to grow. Transformation Planning Guidance provides a clear statement that transformation must span the way we fight, the way we do business and the way we work with others. The way we fight must be in Joint and Coalition contexts with the equipment, training and planning to enable that type of operation. The business end of Defense, the acquisition of equipment and capabilities, needs to be adaptive to new missions and the introduction of new technology at a far more rapid pace. Finally, Defense must engage other sectors of the US government and our international partners in more effective ways. All of these tasks rely on the ability to use M&S capability that is agile, responsive and interoperable.

M&S requires the appropriate mix of long and short-term investment. The architectural basis that enabled Millennium Challenge 02 and supports on-going experimentation was the result of long-term (7 years) investment at a significant level. The speed and agility of tomorrow's military operations as illustrated in Operation Iraqi Freedom signals the need to link operational systems to simulations that can provide added insight into complex, dynamic situations. USD (AT&L) must rely on effective M&S tools and techniques to assess the military utility of emerging technology and speed its introduction into military products.

Further non-technical requirements in DoDD 5000.59 are to develop a DoD M&S Master Plan; policies and procedures for the validation, verification and accreditation (VV&A) of DoD M&S; designate DoD M&S Executive Agents; establish a Defense Modeling and Simulation

Office (DMSO) and establish a M&S Information Repository. DMSO is responsible for developing the DoD modeling and simulation infrastructure (standards, tools, methodologies, etc.) that meet the Department's requirements for Joint Warfighting usage across the domains of analysis, acquisition, training, experimentation, and operations. To accomplish this DMSO stimulates activities for Service cooperation, coordination, and consolidation of effort; establishes interoperability policy, standards and protocols; develops VV&A policy that leverages the expansion of science and technology; and promotes the appropriate use of M&S within the Department. This Program element specifically facilitates cost-effective M&S utilization across the Department through: a common technical framework for M&S which enables interoperability with other systems; timely delivery of the natural environment and common authoritative representations; oversight of authoritative representations of systems and human performance; M&S policy and guidance to meet M&S end-user needs; and a means to share the benefits of M&S.

B. Program Change Summary: (Show total funding, schedule, and technical changes for the program element that have occurred since the previous President's Budget Submission)

	FY 2003	FY 2004	FY 2005
Previous President's Budget	46.337	44.887	46.075
Current FY 2005 President's Budget	45.835	41.735	46.017
Total Adjustments	.502	3.152	.058
Congressional program reductions			
Congressional rescissions		3.152	
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			
Undistributed Reductions			
Other	.502		.058

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification						Date February 2004	
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number: Joint Wargaming Simulation Management Office PE 0603832D8Z			
	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Cost (\$ in millions)	45,835	41.735	46.017	46.489	47.083	48.853	49.928
RDT&E Articles Quantity *							
JSM/P476 (Projects A thru F)	45,835	41.735	46.017	46.489	47.083	48.853	49.928
(U) A. Mission Description and Budget Item Justification:							
<p>M&S has been a critical component in the development, deployment and sustainment of military capability for many years.</p> <p>In responding to the Congressional initiative to "... establish an Office of the Secretary of Defense level joint program office for simulation to coordinate simulation policy, to establish interoperability standards and protocols, to promote simulation within the military departments and to establish guidelines and objectives for [the] coordination [of] simulation, wargaming and training..."</p> <p>DMSO continues to direct a technical program that supports the effective use of simulation across the Department of Defense, provides the foundation for interoperability, enhances cost-effective use of simulation and serves as the laboratory for the development of standards and policy.</p> <p>M&S requires the appropriate mix of long- and short-term investment. The architectural basis that enabled Millennium Challenge and supports on-going experimentation was the result of long-term (7 years) investment at a significant level.</p>							

Further non-technical requirements in DoDD 5000.59 are to develop a DoD M&S Master Plan; policies and procedures for the validation, verification and accreditation (VV&A) of DoD M&S; designate DoD M&S Executive Agents; establish a Defense Modeling and Simulation Office (DMSO) and establish a M&S Information Repository.

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification							Date February 2004	
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number: Joint Programs Project A				
	FY 2003	FY 2004	FY 2005					
Project Name /No./Subtotal Cost	4.310	2.845	3.364					
<p>(U) A. Mission Description and Budget Item Justification: The Joint community and Services require infrastructure tools to allow their separate models, simulations and command and control systems to effectively operate in a common environment. The Joint Programs Project ensures DMSO standards, policies and products support the full spectrum of users while promoting interoperability through all technical areas. It also enriches the support tools of the DoD analysis, acquisition, training, experimentation, and operations communities. This project transitions M&S capabilities into major Joint Programs of Record, and drives the continued update of the High Level Architecture (HLA) to account for emerging technology and evolving user requirements.</p> <p>(U) B. FY 2003 Accomplishments: Joint Program investments created standards-based prototypes for use in several different communities.</p> <p>(U) The CINC/Service program fielded the JTLS-JCATS interface. The product was used successfully by the Joint Forces Command and the Korean Battle Simulation Center to link a theater-level simulation to a more detailed simulation of small unit operations. This meets one of the top needs voiced by the Combatant Commanders for multi-level simulation capability.</p> <p>(U) Runtime Infrastructure (RTI) development was transitioned to the commercial sector. At present there are four companies producing runtime infrastructures that have been verified by the Government. A greatly improved product with more agile support is the result of allowing the Department to realign its resources to more effectively manage and update the standard.</p>								

(U) HLA RTI Certification and Federation Compliance Test Suites have been completed and documented and are being readied for export to our NATO allies through the Research and Technology Board. By so doing, the US will enhance training for coalition operations without having to provide certification for all non-US simulation components.

(U) The distributed learning standard, Shareable Common Object Reference Model (SCORM), was linked to the HLA to produce a distributed course capability that allows a simulation to be called as part of a learning module. The product is now being enhanced by JFCOM to expedite training users of JTLS.

(U) Planned Program FY 2004 - 2005:

(U) Initiate and complete the update of the IEEE 1516 standard to promote continued development of standards-based Joint and coalition operations.

(U) Leverage the development of individual links between simulations and command and control systems to provide a web-based capability for accessing critical tactical databases to initialize and update simulations for operational use.

(U) Complete transition of RTI verification from a research grade to commercial grade provider.

(U) Create readily available framework for subject matter experts to use in developing objective validation procedures for simulations.

(U) Develop a "fitness for use" accreditation methodology for simulation that mirrors the levels of maturity in the Software Engineering Institute's Capability Maturity Model.

(U) Lead the simulation community in evaluating and adopting commercial standards for use in simulation.

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification				Date February 2004			
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number: Transformation Project B			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005				
Project Name /No./Subtotal Cost	5.144	0.000	3.500				
<p>(U) A. Mission Description and Budget Item Justification: Transformation Initiatives focus on providing the Department of Defense with the next generation of M&S tools and representation of the content of military operations needed to achieve the goals set out by JV2020, Quadrennial Defense Review (QDR), and other Transformation objectives. DMSO investments in transformation are directed at developing consistent architectures and interoperable components to create composable mission space environments consistent with the Services as they, evolve their specific personnel and equipment transformation initiatives. Service and Joint programs involved in DMSO's efforts to enable transformation include: collaboration with Joint Synthetic Battlespace (JSB, USAF), Joint Virtual Battlespace (JVB, USA), Fleet Battle Experiments (FBE, USN), Marine Air to Ground Task Force (MAGTF) Expeditionary Family of Fighting Vehicles (MEFFV, USMC) and Joint Experimentation (DCEE, JFCOM/JWFC).</p> <p>(U) B. FY 2003 Accomplishments:</p> <ul style="list-style-type: none"> (U) Completed the common Federation Object Model (FOM) shared between the JVB and JSB to enable consistent operation of sensor and command and control simulation entities. (U) Delivered a collaborative environment for program and product development to the MEFFV program. This will enhance the ability of the MEFFV program to exploit the benefits of simulation-based acquisition. (U) As the Transformation Program relies on the output of Project D (Technology Development) to provide essential components to transition, the work in this area will be suspended for a year (FY04) to mature technologies currently under development and to provide support for a new effort, Project F. <p>(U) Planned Program FY 2004 - 2005:</p>							

(U) In the FY 2004 - FY 2005 time frame, the project looks to leverage web technologies by providing simulation capabilities as web services. These efforts will translate into enhanced capability to link simulations and operational systems as well as provide easier access to scenario development with the attendant databases.

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification				Date February 2004			
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3			Project Name and Number Asymmetric Warfare and Homeland Security Project C				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005				
Project Name /No./Subtotal Cost	7.461	4.135	5.000				
<p>(U) A. Mission Description and Budget Item Justification: Modeling and Simulation affords decision makers the use of Course of Action (COA) analysis tools to wargame the best response before committing to action. Modeling and Simulation aids in understanding unconventional threats by expanding the scope of decision support tools with predictive human behavior models and advanced system behavior models. The key is to identify the threat before the threat becomes a reality. Improved information operations through computational models and social science theory allow commanders to shape engagement without force. The program leverages existing simulations, databases and interfaces to provide capability for training, mission planning and analysis.</p> <p>(U) B. FY 2003 Accomplishments: The work done under this project in the FY03 and FY04 time frame produced mission planning tools and analysis capabilities that became part of the Department's successful execution of Operation Iraqi Freedom (OIF).</p> <p>(U) 3D visualization tools were integrated with the JCATS simulation as part of the Flexible Asymmetric Simulation Toolkit (FAST). The product was deployed as a mission rehearsal and operational toolkit during OIF.</p> <p>(U) Several analysis tools were incorporated into a subsequent version of FAST and deployed to Iraq during the post-conflict phase of OIF. This demonstrated the tool's analytic capabilities in an active asymmetric environment and provided the direction for finalizing FAST and its transition to the Joint Urban Operations Office at JFCOM and the Center for Army Analysis (CAA).</p> <p>(U) The Joint Operations in Urban Synthetic Terrain (JOUST) program demonstrated the ability to provide a common environment for live and synthetic land, sea and air forces in a combined urban conflict. The program provided insights into</p>							

communication and shared perception issues important to the Joint National Training Capability. The cultural feature server provided a means of distributing the complex features of an urban setting to multiple simulations without the need for the significant time and resources normally used in recompiling databases. The products from JOUST were delivered to the Joint Urban Operations Office (JUOO) at JFCOM and to the Training and Experimentation components of JFCOM.

(U) Planned Program FY 2004 - 2005:

- (U) The program will exploit developments in communications and web technology to enhance the capability to interface mobile command and control assets with simulations running on readily portable computational system (laptops, Personal Data Assistants (PDAs) and the next generation wearable computers).
- (U) The program will exploit augmented reality capabilities to provide enhanced views of the battlespace on mobile devices.
- (U) As results from the technology programs in human, organizational and cultural behavior provide enhanced predictive capability, these enhancements will be integrated with simulation and planning tools that can be used in an operational environment. Such predictive capability is expected to have a profound influence on effects-based and information operations.

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification				Date February 2004			
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number: Technology Development Project D			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005				
Project Name /No./Subtotal Cost	20.664	13.650	20.211				
<p>(U) A. Mission Description and Budget Item Justification: DMSO supports multi-year technology development programs that enable the creation of agile, cost-effective M&S in support of consistent, interoperable mission spaces that can be used in trade-space analyses, analyses of alternatives and evaluation of emerging technologies, doctrine and tactics for the full spectrum of military transformational initiatives. Investment areas include the development of robust criteria for composable simulation systems, the ability to define and represent the appropriate level of human performance and decision making. This project evolves technologies critical to the effective use of simulation including: composability; the representation and delivery of dynamic, natural environment data; the representation of human performance both in simulations themselves and as intelligent systems to function in the place of simulation controllers; and the linking of simulations to command and control systems for operational use in planning and mission rehearsal. Further, DMSO supports such technical development as is needed to create meaningful verification, validation and accreditation processes and to support implementation of the strategic vision for M&S across the Department. A significant portion of technology development is directed to the identification and/or effective evolution of standards and their efficient use in modeling and simulation.</p> <p>(U) B. FY 2003 Accomplishments:</p> <ul style="list-style-type: none"> (U) <u>Composable Mission Space Environments.</u> <ul style="list-style-type: none"> (U) Completed two foundational studies on the technical framework for composability in the context of realistic federations of simulations. (U) Completed the development of Base Object Models (BOMs) as critical foundation elements for building composable components. 							

(U) Initiated the evaluation of web standards to support simulation. Completed the initial conversion of an HLA runtime infrastructure (RTI) to web-based technology.

(U) Synthetic Natural Environment Representation:

(U) All nine of the components of the Synthetic Environment Data Representation and Interchange Specification (SEDRIS) achieved final committee draft status in the International Standards Organization (ISO) standardization process. As with the HLA, this will enable the Government to transition future development of SEDRIS products to industry.

(U) Military environment representation:

(U) The Unit Order of Battle (UOB) tool was updated and used by the simulation community.

(U) The Mission and Means Framework was used to frame the Milestone B decision for the Future Combat System.

(U) Integration of Simulations and C4I Systems:

(U) An interface was developed between the track databases in the Global Command and Control System and the JWARS simulation. This interface was used to update the simulation and correct force deployment data. It will become a critical factor in the ability to use JWARS as an analysis tool for Combatant Commands.

(U) DMSO extended the work accomplished by Army in the SIMCI program by web-enabling the transfer of planning data to simulations for initialization. The web interface eliminated the need for a human to use file transfers to download the data.

(U) Representation of Human Performance:

(U) Performance Moderator Function (PMF) technology was used to demonstrate the ability to modify the behavior of a synthetic human in response to fatigue. The demonstration was done in the context of the Unreal Tournament game engine.

(U) The project demonstrated the use of a human behavior server. The server can use different models of human performance and provide modified behavior to the entities in a simulation. The initial tests were done for JWARS and JCATS.

(U) Composable Frameworks for M&S:

(U) Demonstrated the ability to use a web-based portal for viewing simulations during execution.

(U) Initiated transition of an environmental data server (OASES) by demonstrating that it could be run without the presence of an expert.

(U) Provided an environmental effects server for acoustic sensors.

(U) Planned Program FY 2004 - 2005:

(U) Synthetic Natural Environment Representation: In many simulations, valid representation of sensors and systems require appropriate representation of the physical environment. DMSO continues to lead the M&S community in establishing standards for environmental representation and the establishing processes to define, produce and deliver environmental data to simulations. This program will continue to emphasize providing valid, appropriately registered static and dynamic data including undersea, ocean, littoral, land, atmosphere and space. Representation of operations in urban terrain place increasing emphasis on providing ports, buildings, civil infrastructures (water, electrical, etc.) and population with the ability to dynamically change all of these features in response to civil and military activity. DMSO will extend current standards development and methodologies to address all of these critically important areas in support of transformation goals.

(U) Knowledge Integration (KI): The ability to assemble scenarios rapidly for execution requires the complete description of the military environment as well as the natural environment. Program emphasis will be placed on developing automated links between the missions portrayed in simulation scenarios and the data that describes the force structures needed to populate the scenario. DMSO will capitalize on the increasing linkage between simulations and operational systems to allow warfighters to develop scenarios on operational planning tools and then transfer them to simulations in a automated fashion. Such capabilities will provide more responsive, less resource-intensive use of simulation.

(U) Integration of Simulations and C4I Systems: Use of simulations in training and in operations requires that simulated entities be represented in the common operational picture in the C4I systems. This is done routinely, but using a variety of

different and, sometimes, incompatible methods. The Department needs a common lexicon and/or data model to establish consistent, bi-directional data and information transfer among simulations and C4I systems,. DMSO is working with the international C4I community to adopt and adapt the NATO LC2IEDM as the foundation for this common terminology. As the operational communication systems move to web-based services, DMSO is exploiting web technology to make the data translation and access capabilities into web services, thus providing greater consistency between operation and simulation systems.

- (U) Human Performance Representation (HPR): The ability to represent the human being and their decision making in simulation has been identified as a critical gap by simulation users. The HPR project will capitalize on the performance moderator research, advances in software agent behaviors and architectures, component modularization in distributed learning technology and the coincident establishment of test laboratories for human performance modeling research to provide next generation of human performance representation. The ability to represent threat behaviors will be coordinated with DARPA and key intelligence agencies through the Modeling and Simulation Executive Agent for Threat Representation. To increase the ability to represent effects-based operation, information operations and the effects of non-lethal weapons, emphasis will be placed on understanding and representing the militarily relevant factors in cultural and organizational behavior. At the same time, the program will exploit agent technology to provide intelligent controllers that can replace human controllers in simulation-aided exercises.
- (U) Composable Frameworks: Current capability to rapidly compose models with known, measurable accuracy is neither easy nor cost-effective unless simulations are specifically constructed to work together. The first step in establishing robust capability is building the formal foundation and specifying limitations. A key to setting capabilities and limitations is to first understand and then codify the ways the Department uses simulation. Current programs will form the empirical environment in which to evaluate concepts and frameworks. Beyond the use of current tools, the program will focus on the structure of composable modules through use of such technology as base object models and the development of metadata standards for describing the essentials of the modules as the initial step in

automated model selection and integration. New research in component technology for manufacture and test of standard software components and application of systems engineering to the design of componentized systems are expected to provide the basis for validation and certification of the resulting composition.

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification							Date February 2004	
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number Policy and Guidance Project E				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005					
Project Name /No./Subtotal Cost	8.256	12.605	9.942					
<p>(U) A. Mission Description and Budget Item Justification: By DoD policy, the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&L)) has responsibility for modeling and simulation (M&S) management, oversight, and policy development. DMSO, as the USD(AT&L)'s action agent, develops DoD modeling and simulation (M&S) policies, plans and programs that support effective and efficient management of the Department's M&S resources. DMSO also oversees DoD M&S activities to identify opportunities for cooperation, coordination, collaboration and consolidation of effort; establishes Departmental interoperability standards and protocols; promotes the effective and efficient use of M&S within the Department; and supports the DoD M&S management system established by DoD Directive 5000.59. These responsibilities stemming from the DoD Directive 5000.59 and the Congressional language that preceded it can be characterized into four broad categories:</p> <ol style="list-style-type: none"> (1) Oversight of Departmental M&S plans and programs; (2) Establishment of DoD M&S standards and best practices; (3) Interagency and International M&S cooperation; and (4) Establishment of M&S education and training programs. <p>(U) B. FY 2003 Accomplishments:</p> <ul style="list-style-type: none"> (U) Oversight of Departmental M&S Plans and Programs. <ul style="list-style-type: none"> (U) Ensured alignment of the Department's M&S efforts with the key Administration and Departmental policies and guidance (e.g., President's Management Agenda, the Joint Vision 2020, the Government Performance Results Act, the Training Transformation Strategic Plan, Quadrennial Defense Review, etc.). (U) Initiated development of a DoD M&S Strategic Plan, identifying goals and 								

objectives for the next ten years. An Implementation Plan that establishes DoD M&S milestones and funding will follow this effort.

(U) Supported the Department's M&S management structure, the Executive Council for Modeling and Simulation, and its committee structure.

(U) DoD M&S Standards and Best Practices.

(U) Published DoD Instruction 5000.61, "DoD [M&S] Verification, Validation and Accreditation (VV&A)" which updates and enhances Departmental policies increasing user confidence in M&S results. .

(U) Initiated the process of becoming the Lead Standards Agency for M&S under the Defense Standardization Program

(U) Interagency and International M&S Cooperation.

(U) Maintained information exchanges with other US governmental organizations.

(U) Participated in the DoC, National Institute for Standards and Technology's standards meeting on simulation standards and in their conference on Counterterrorism.

(U) Engaged with NASA on issues involving use and defense of air space.

(U) Hosted an international meeting on Operations Other Than War and produced a workshop proceedings

(U) Hosted an initial meeting of the heads of the modeling and simulation offices from Canada, Australia and the United Kingdom directed toward increasing collaboration.

(U) Served as sponsor and key participant in a number of national, international and interagency meetings including regular Modeling and Simulation Working Groups, Simulation Interoperability Workshops and others.

(U) Led NATO activities to provide HLA compliance testing to NATO allies.

(U) M&S education and training programs.

(U) Supported the professional military education of future DoD leaders through support of visiting professors at the military academies and the National Defense University.

(U) Through a DoD M&S Education Consortium, consisting of government and academia, provided guidance and formal direction of M&S education.

(U) Sponsored WARLORDS, a highly successful, simulation-based contest involving all the military academies competing against each other using warfighting and Information Warfare simulations.

(U) Planned Program FY 2004 - 2005:

(U) Oversight of Departmental M&S Plans and Programs.

(U) Complete development of an M&S Strategic Plan (MSSP) to tie M&S goals to the priorities of the President's Management Agenda as well as to the existing Government Performance and Results Act.

(U) Serve as the DoD focal point for M&S and as the USD(AT&L)'s action agent for the administration and support of the DoD M&S management structure.

(U) Define the authorities, functions, responsibilities and relationships of DoD Modeling and Simulation Executive Agents (MSEAs). (U) Develop new DoD Issuance on "Transfer and Release of DoD Models and Simulations and Related Technologies" to provide a single source of policy and procedural guidance for the DoD M&S community. This information currently resides in more than 30 different DoD Issuances.

(U) Conduct a five-year review and update DoD 5000.59-M, "DoD Modeling and Simulation (M&S) Glossary."

(U) Conduct a five-year review and update of DoD Directive 5000.59, "DoD Modeling and Simulation (M&S) Management."

(U) Work with the DoD Components to establish an Executive Steering Committee for the Modeling and Simulation Information Analysis Center (MSIAC) to provide broad-based DoD oversight and guidance to enable the MSIAC to better support the larger DoD M&S community.

(U) DoD M&S Standards and Best Practices.

(U) Work as the Standardization Management Activity (SMA)/Lead Standardization Activity (LSA) for DoD Modeling And Simulation. The goal is to develop and maintain M&S standards that improve military operational readiness within the Department of Defense and with our allies and coalition partners, reduce the cost of M&S ownership, and allow for ready insertion of new and transformational M&S capabilities and technologies.

(U) Interagency and International M&S Cooperation.

(U) Establish a forum for interagency coordination, cooperation, and standardization.

(U) Act as the US representative to the NATO Modeling and Simulation Group (NMSG) to ensure support for M&S coordination, cooperation and standardization.

(U) Engage with its foreign military M&S policy counterpart organizations to promote M&S coordination and cooperation.

(U) M&S education and training programs

(U) Sponsor Visiting Professors at the three Military Academies and the National Defense University. Through this effort the DoD M&S initiatives and success stories are incorporated into the school curricula and used to educate the future M&S users (warfighters and support personnel).

(U) Provides awareness education to DoD personnel through presentations at numerous conferences, seminars and meetings.

(U) Publish research papers and articles to increase the knowledge base of DoD decision makers.

Exhibit R-2a, RDT&E Project Justification				April 2004				
DEFENSE-WIDE, RDT&E (400) BUDGET ACTIVITY 3				Joint Wargaming Simulation Management Office PE 0603832D8Z M&S for Improved Acquisition of Defense Systems				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005					
M&S for Improved Acquisition of Defense Systems	0.000	9.000	4.000					
<p>(U) A. Mission Description and Budget Item Justification</p> <p>US military force capabilities are today highly dependent upon interoperability within complex systems-of-systems. The shift toward increasing reliance on network centric operations, and systems of increasing complexity linked together in more complex systems-of-systems, will increase the dependency on seamless interoperability across military service and national boundaries, and effective performance by each individual system. The defense acquisition systems engineering process - to design, develop, and test the systems - must exploit the demonstrated value of M&S more effectively to field improved capabilities soonest, with sufficient confidence the fielded capabilities will perform effectively in the systems-of-systems joint mission environment. It is simply not practical to create actual systems-of-systems environments within the acquisition systems engineering processes, but M&S can provide the capability to represent that environment to properly design, develop, and test the individual systems. An increasing body of evidence, including reports by the National Research Council, industry associations, and various DoD organizations all point to the need to transform the acquisition culture, processes, and technology to leverage and exploit to a greater extent the power of M&S for defense systems engineering and test.</p> <p>Accordingly, this project initiates a series of activities to enhance defense systems engineering and test culture, processes, and technology to begin to better leverage M&S technology and collaborative processes. OSD leadership of these activities is essential</p>								

to provide the focus and interest to assure participation and cooperation of the military departments. All the components must be included in this effort to provide effective joint acquisition environments just as military operations are joint. From the start, this effort will assess progress and problems, develop and implement a strategy, and then continue and sustain the initiative by building upon lessons learned and successes.

(U) B. **Accomplishments.** FY 2004 accomplishments include coordinating user requirements; completing background technical research; and drafting program plans, resource requirements, schedules, and milestones.

(U) C. **Planned Program FY 2004 - 2005:**

(U) FY 2004 Plans: In FY 2004, this project will initiate various technical efforts targeted on 2 goals:

1. Establish a centralized, focused effort in OUSD(AT&L) to improve the application of M&S technology across acquisition programs.
2. Plan and initiate a series of technical analysis activities with a goal of developing and instituting a capability to analyze joint integrated architectures to assure they are viable representations of the architecture intended for specific mission areas, and that the generated force capability represented by the architecture is realistic.

Goal 1 Plans: Establish a small community of interest across the DoD acquisition community intended to define a specific vision and roadmap for improving application of M&S in acquisition. FY 2004 is intended to be primarily a planning effort.

Goal 2 Plans: Initiate technical efforts to establish the capability to assess joint integrated architectures. These activities are coordinated with the various Functional Capability Boards of the Joint Staff. Specific objectives include:

- Define a methodology to conduct first order analyses of joint integrated architectures.
- Conduct proof-of-principle implementation of the first order analysis, and determine whether the technology of architecture representation and architecture based analysis is adequate to address user needs.
- Based on findings from the proof-of-principle implementation, define requirements for M&S technology development and application.
- Support development of behavior models and analysis tools to explore solutions to

military needs in the precision engagement mission area.

- Support development of a software development roadmap focused on evolution of Service systems to an integrated joint fires network.
- Pursue incorporation of advanced information technologies to resolve interoperability problems.
- Expand M&S tool sets to include trade-space analysis for simulation mission space environments. Support integration of results into Service efforts.
- Initiate activity to develop standards and protocols, including common data models and commercial standards, in order to move toward a consistent, interoperable mission space for trade-off analysis.
- Explore use of software technology to assemble mission scenarios rapidly for execution.
- Integrate data bases associated with establishing a capability for simulation of course of action analysis.
- Investigate underlying technologies and standards to support the ability to rapidly compose mission space models with known, measurable accuracy.
- Assemble a suite of reusable system data to support system level architecture development and analysis.
- Establish baseline portfolios (roadmaps) for current systems in each Functional Capabilities Board.

(U) FY 2005 Plans: Initiate a series of RDT&E activities to exploit the capabilities of M&S to improve effectiveness of Systems Engineering (SE) and test of defense systems, and systems-of-systems, to support achievement of joint mission capabilities.

- Define SE M&S policy and guidance necessary to transform culture in defense systems acquisition programs, to facilitate improving effective use of M&S.
 - Establish a small OSD-led steering committee with the military components.
 - Assess and define how M&S is to be integrated into DoD SE and program processes, including use of the Simulation Support Plans. Start by developing a baseline of current use, then develop a strategy to achieve the “how to” end state.
 - Develop DoD policy and guidance, including policy for M&S and information sharing, M&S and data ownership, contracting, and other areas such as consideration of M&S

- progress in acquisition decision reviews.
- Establish a training capability expanding on policy, guidance and best practices; "push" education and training to defense acquisition programs.
 - Initiate and lead focused interchange (SE M&S Community of Interest) between DoD, industry, and academia to maintain and inform the community on best practices.
 - Assess and recommend improvements to M&S infrastructure to facilitate interoperability and consistent exchange of defense systems M&S and data across DoD and industry.
 - Examine the various data standards and define a strategy for use of standards in the system engineering process in a consistent manner across defense acquisition to facilitate M&S data and content interchange. Build upon lessons learned from JDEP reference Federated Object Model.
 - Initiate activity to mature the Joint Distributed Engineering Plant (JDEP) as a key DoD component-level means for systems-of-systems engineering integration and test.
 - Define appropriate directory services for SE M&S information sharing, and develop a plan to provide services.
 - Provide incentives for defense system Program Managers to develop M&S tools which support DoD-wide systems-of-system engineering, and adopt best practices.
 - Establish a council of PM and industry representatives to contribute to prioritization of investments in JDEP infrastructure to support continued maturation of JDEP capability to support all warfare mission areas.
 - Develop a plan and initiate pilot efforts to demonstrate value of systems-of-systems engineering M&S approaches. Pilot projects will include both investment in M&S tools that contribute, and adoption of best practices across the life cycle of a program.