

UNCLASSIFIED

FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2

DATE: Feb 2006

BUDGET ACTIVITY: 07
PROGRAM ELEMENT: 0308601N
PROGRAM ELEMENT TITLE: MODELING AND SIMULATION SUPPORT

COST: (Dollars in Thousands)

Project Number & Title	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
Total PE	21,966	7,710	7,503	7,794	7,964	8,157	8,350
2222 MODELING AND SIMULATION	9,719	6,710	7,503	7,794	7,964	8,157	8,350
9999 CONGRESSIONAL PLUS-UPS	12,247	1,000	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element addresses projects under the Navy Modeling and Simulation (M&S) Office. It supports technical and management initiatives directed by Congress, Department of Defense (DoD), Secretary of the Navy (SECNAV), and Chief of Naval Operations (CNO) with the aim of bringing organization and focus to the development and use of M&S throughout the Navy and DoD. It provides a central agency for the formulation and implementation of policy and guidance in M&S, and represents Navy interests in Joint and other agency initiatives. It funds efforts to define and coordinate the corporate Navy M&S policy and guidance to evolve an interoperable and reusable core M&S capability consistent with the M&S technical framework prescribed by DoD. Efforts are organized around four product areas: (1) Engineering Studies and Analysis: identifies and measures the relevance of existing and emerging standards, technologies and services necessary to guide Navy M&S use; (2) Products and Services: promotes the policy, standards and technologies necessary to guide more efficient development and use of M&S across the Navy, including development and management of the Navy Modeling and Simulation Information Service (NMSIS); (3) M&S Quality Assurance Program: establishes and manages a disciplined process of model Verification, Validation and Accreditation (VV&A); and (4) Simulation Experiments: supports M&S use in Navy exercises and experiments across a wide variety of warfighting and supporting communities. Specifically, Simulation Experiments integrate appropriate models and simulations into Fleet exercises to test, validate and evaluate for possible transition the M&S tools to enable seamless access and use of operationally relevant M&S products in support of Navy operations, training, acquisition, analysis and assessment.

UNCLASSIFIED

UNCLASSIFIED

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B. PROGRAM CHANGE SUMMARY:

	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
FY 2006 President's Budget Submission	19,755	6,812	7,832
Congressional Action	0	1,000	0
Congressional Undistributed Reductions/Rescissions	-16	-102	0
Execution Adjustments	2,600	0	0
FY 2005 SBIR	-378	0	0
Program Adjustments	5	0	-328
Rate Adjustments	0	0	-1
FY 2007 President's Budget Submission	21,966	7,710	7,503

PROGRAM CHANGE SUMMARY EXPLANATION:

Technical: Not applicable.

Schedule: Not applicable.

C. OTHER PROGRAM FUNDING SUMMARY:

Not applicable.

D. ACQUISITION STRATEGY:

Not applicable.

E. PERFORMANCE METRICS:

This program supports ongoing efforts to define, develop and utilize modeling and simulation (M&S) technologies, standards and techniques in DoN and Joint programs across a wide range of disciplines and technical arenas. As such, performance metrics are specific to individual projects initiated under this program element. Representative examples of performance criteria for M&S support include the following: Validation, Verification and Accreditation (VV&A) of deployed M&S systems to support Fleet and Force missions and assessments; degree of composability and adaptability of system architectures employed in M&S systems; ability of M&S systems to replicate and permit recreation of force or system interactions that otherwise would

R1 Line Item 208

Page 2 of 11

UNCLASSIFIED

UNCLASSIFIED

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Exhibit R-2

DATE: Feb 2006

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be performed by more labor-intensive or expensive personnel, forces or elements; degree to which M&S frameworks would permit rapid integration and employment of analytic capabilities for the analysis and documentation of warfighter missions, weapons systems or Tactics, Techniques and Procedures (TT&P); and ability of a specific M&S technology or technique to meet the requirements specified in an individual project supported by this program.

UNCLASSIFIED

UNCLASSIFIED

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PROJECT NUMBER: 2222 PROJECT TITLE: MODELING AND SIMULATION

COST: (Dollars in Thousands)

Project Number & Title	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
2222 MODELING AND SIMULATION	9,719	6,710	7,503	7,794	7,964	8,157	8,350

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project addresses critical coordination of Navy Modeling and Simulation (M&S) efforts, integrates individual programs into a coherent whole, promotes reuse of resources, and aligns Navy efforts with Joint programs. It develops and maintains a comprehensive repository of models, simulations and authoritative data to support broad-based Navy requirements. It promotes reusability through the Quality Assurance process for models, simulations and data, and enhances interoperability by coordinating and reviewing Navy's transition to DoD-mandated standards for distributed simulations. The project participates in Fleet exercise experiments, distributed simulations and demonstrations such as Limited Objective Experiments (LOE), Virtual at Sea Training (VAST), and Virtual Missile Range (VMR).

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2005	FY 2006	FY 2007
ENGINEERING STUDIES AND ANALYSIS	5,537	3,156	3,633

This activity conducts engineering studies and analyses aimed at determining the feasibility and applicability of proposed standards or technical approaches to Navy Modeling and Simulation (M&S), and at investigating Service-unique requirements for standards or guidance. Individual efforts focus on developing or evaluating approaches to optimize training, assessments and acquisition functional/mission objectives through more efficient development and use of M&S. This activity develops methodologies and standards that will result in model and data reusability and interoperability through the formulation of a technical framework. These standards will support the full range of architecture and engineering design and analysis requirements across the Navy. This activity also provides an M&S degree program through the Naval Postgraduate School, Modeling Virtual Environments and Simulation (MOVES) curriculum.

UNCLASSIFIED

UNCLASSIFIED

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For FY06 submission, the Navy Modeling and Simulation Office (OPNAV N70M1) reallocated 2222 funds between the four functional areas (Engineering Studies and Analyses; Products and Services; M&S Quality Assurance; and Simulation Experiments) to more closely reflect current priorities for modeling and simulation support to the Fleet/Force. Overall funding totals for FY05, FY06 and FY07 remain unchanged.

FY 2005 Accomplishments:

- Continued to segment the Embedded Simulation Infrastructure and two Mission Applications and continued to prepare and demonstrate documentation for test and release in Global Command and Control System (GCCS) and Global Command and Control System/Maritime (GCCS/M).
- Continued to develop a set of models, architectures, and standards for communications M&S.
- Continued to work with the MOVES Institute and the MOVES degree program to provide military relevant thesis topics for research.
- Continued M&S support to Fleet Forces Command (FFC) for the CNO-directed Task Force Sim.
- Continued M&S utilization in Campaign/Mission assessments to support OPNAV N70 analysis of warfighting requirements.

FY 2006 Plans:

- Continue all efforts of FY05.

FY 2007 Plans:

- Continue all efforts of FY06.

	FY 2005	FY 2006	FY 2007
PRODUCTS AND SERVICES	1,411	1,346	1,500

This activity supports development of common services, tools, databases and standards to ensure the integration and connectivity of modeling and simulation (M&S) products employed in Naval assessments, in training and acquisition, and among operational communities. It manages and maintains the Navy Modeling and Simulations Information System (NMSIS), as a central M&S information resource to support informed M&S investment decision making across Navy. It provides essential planning and coordination of M&S efforts with other Services, the Office of Secretary of Defense (OSD), the Joint Staff, and other agencies to develop

R1 Line Item 208

Page 5 of 11

UNCLASSIFIED

UNCLASSIFIED

FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2a

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policies and procedures necessary for M&S standardization within the Navy. It provides annual updates to the Naval M&S Catalog, Master Plan, and Investment Strategy.

For FY06 submission, the Navy Modeling and Simulation Office (OPNAV NN70M1) reallocated 2222 funds between the four functional areas (Engineering Studies and Analyses; Products and Services; M&S Quality Assurance; and Simulation Experiments) to more closely reflect current priorities for modeling and simulation support to the Fleet/Force. Overall funding totals for FY05, FY06 and FY07 remain unchanged.

FY 2005 Accomplishments:

- Continued to promote and enhance state-of-practice and technology within the Navy M&S community.
- Continued the development, servicing and use of NMSIS as directed under applicable DoD DIR, SECNAVINST, and OPNAVINST.
- Continued to organize and facilitate quarterly Navy M&S Technical Interchange Meetings to bring together the Navy M&S community for a direct interchange of M&S requirements, technology, standards and experience.
- Continued to foster and develop the Navy M&S Standards Process that draws M&S experts from the acquisition, training and operational communities, and from industry.
- Completed update of the Navy M&S Master Plan.
- Initiated development of a Navy Enterprise M&S Support Plan.

FY 2006 Plans:

- Continue all efforts of FY05 less those noted as completed above.

FY 2007 Plans:

- Continue all efforts of FY06.

	FY 2005	FY 2006	FY 2007
M&S QUALITY ASSURANCE PROGRAM	389	500	520

This activity implements and manages the Modeling and Simulation (M&S) Quality Assurance development of the Verification, Validation and Accreditation (VV&A) process and guidelines for modeling, simulation, and data.

R1 Line Item 208
Page 6 of 11

UNCLASSIFIED

UNCLASSIFIED

FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2a

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It reviews both new and legacy M&S VV&A plans and reports, and develops and maintains the Naval M&S VV&A repository. It establishes and implements a VV&A training curriculum for developers and accreditors, and provides an annual VV&A assessment to CNO.

For FY06 submission, the Navy Modeling and Simulation Office (OPNAV NN70M1) reallocated 2222 funds between the four functional areas (Engineering Studies and Analyses; Products and Services; M&S Quality Assurance; and Simulation Experiments) to more closely reflect current priorities for modeling and simulation support to the Fleet/Force. Overall funding totals for FY05, FY06 and FY07 remain unchanged.

FY 2005 Accomplishments:

- Continued to develop and update case studies within the VV&A Handbook.
- Continued to incorporate information developed for training/education into the VV&A Handbook.
- Continued to coordinate with the NMSIS effort to update and Beta test new VV&A data entry fields as required.
- Completed coordination with DoD and Services to identify new data entry fields for VV&A common to all M&S Resource Repositories.
- Completed the research and development of methodologies for evaluating commercial off the shelf (COTS) tools used to develop valid M&S.

FY 2006 Plans:

- Continue all efforts of FY05 less those noted as completed above.

FY 2007 Plans:

- Continue all efforts of FY06.

	FY 2005	FY 2006	FY 2007
SIMULATION EXPERIMENTS	2,382	1,708	1,850

This activity supports Fleet exercises and experiments through the application of distributed simulations across a wide variety of warfighting and supporting communities. Specifically, it develops and integrates appropriate models and simulations into Fleet Synthetic Training (FST), and develops simulation efforts to

R1 Line Item 208
Page 7 of 11

UNCLASSIFIED

UNCLASSIFIED

FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2a

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PROGRAM ELEMENT: 0308601N PROGRAM ELEMENT TITLE: MODELING AND SIMULATION SUPPORT
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test and evolve the standards for models, interfaces, and data. It supports development of tools necessary to enable the seamless access and use of operationally relevant M&S products to support Navy training, warfare assessments and acquisition requirements.

For FY06 submission, the Navy Modeling and Simulation Office (OPNAV NN70M1) reallocated 2222 funds between the four functional areas (Engineering Studies and Analyses; Products and Services; M&S Quality Assurance; and Simulation Experiments) to more closely reflect current priorities for modeling and simulation support to the Fleet/Force. Overall funding totals for FY05, FY06 and FY07 remain unchanged.

FY 2005 Accomplishments:

- Continued to define Fleet training initiatives and M&S enhancements.
- Continued to support the Olympic Challenge series of Joint experimentations using a synergetic M&S approach.
- Continued development of the Virtual at Sea Training (VAST) concept to provide the capability to conduct training in a virtual environment that would otherwise require a land-based training range or be cost or schedule prohibitive.
- Continued to document elements of the maritime virtual environment and models that can be used effectively to enable reuse in naval simulations and to establish best practices where standards are not yet feasible.
- Continued the upgrade of Virtual Missile Range (VMR) virtual threat capabilities.
- Completed direct support to Navy component Joint Training Confederation (JTC) at Joint Forces Command (JFCOM) and Korea Battle Center (Ulchi Focus Lens).

FY 2006 Plans:

- Continue all efforts of FY05 less those noted as completed above.

FY 2007 Plans:

- Continue all efforts of FY06.

R1 Line Item 208
Page 8 of 11

UNCLASSIFIED

UNCLASSIFIED

FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2a

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C. OTHER PROGRAM FUNDING SUMMARY:

NAVY RELATED RDT&E:
PE 0603235N (Pilot Flash)

NON-NAVY RELATED RDT&E:
Not applicable.

D. ACQUISITION STRATEGY:

Not applicable.

UNCLASSIFIED

UNCLASSIFIED

FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2a

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PROGRAM ELEMENT: 0308601N PROGRAM ELEMENT TITLE: MODELING AND SIMULATION SUPPORT
PROJECT NUMBER: R9999 PROJECT TITLE: Congressional Plus-Ups

CONGRESSIONAL PLUS-UPS:

	FY 2005	FY 2006
GLOBAL ENGINEERING METHODOLOGY INITIATIVE FOR NAVAL INTEGRATION AND INTEROPERABILITY	2,698	0

This effort integrated Navy Tool for Interoperability Risk Assessment (NTIRA) data with system attribute data from other authoritative sources. Systems and attributes were assigned to a mission thread by reading authoritative sources, i.e., Global Engineering Methodology Initiative for Integration and Interoperability (GEMINII)/ForceNet Implementation Base Line (FIBL). End-to-end "interaction requirements" and dependencies were defined between the systems supporting the mission activities and C2 processes. This model measured composability and adaptability of the end-to-end system architecture in support of the mission thread and C2 process, and optimized between legacy and FORCENet Distributed Services. An interface to M&S systems for additional modeling (performance or warfighting effects) of these threads was provided.

	FY 2005	FY 2006
JOINT ANALYTICAL MODELING IMPROVEMENT PROGRAM (JAMIP) JWARS	3,762	0

This effort addressed the significant limitations of existing theater-level simulations that provide analytic support to senior officials. JAMIP involves a four-pronged approach to upgrade the capability of joint modeling to accurately assess the capabilities of Navy forces and programs to execute U.S. strategy within the constraints of resources. Current JAMIP goals are to continue development of the top-priority joint warfare model and to provide data support for the integration and enhancement of existing models as directed by the Deputy Secretary of Defense and endorsed by the Vice Chairman of the Joint Chiefs of Staff. One of the primary components of JAMIP is the development of the Joint Warfare System (JWARS), which will be a state-of-the-art, closed-form, constructive simulation of multi-sided, joint warfare for analysis. JWARS is also used in the Global Engineering Methods Initiative for Integration and Interoperability (GEMINII) War Room Assessment Toolset. Assessments are formal processes that demonstrate the implications of proposed solutions with the insight of modeling applications. The GEMINII Process was developed to facilitate performance of capability-based assessments that define composable mission services. The toolset is currently used for Program Objective Memorandum (POM)-type assessments and JWARS provides insights to the effects on the warfighter.

R1 Line Item 208
Page 10 of 11

UNCLASSIFIED

UNCLASSIFIED

FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2a

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	FY 2005	FY 2006
MODELING AND SIMULATION TO SUPPORT C4ISR DEVELOPMENT	5,787	0

This effort provided for development of emerging technologies in support of Navy and DoD transformation. These technologies were enhanced by the use of various modeling and simulation techniques that afforded a more efficient and effective use of resources in an evolving environment. The premise surrounding this effort is that the better the Navy can model and simulate actions/techniques to create greater interoperability among joint forces, the greater the success rate will be once the effort is integrated into the operational environment.

	FY 2005	FY 2006
US NAVY SPACE AND NAVAL WARFARE COMMAND NET CENTRIC OPERATIONS PROGRAM	0	1,000

This effort supports US Navy Space and Naval Warfare Command net centric operations program research.

UNCLASSIFIED