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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>							<b>DATE</b> February 2000		
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense Wide/BA 3							<b>R-1 ITEM NOMENCLATURE</b> Joint Wargaming Simulation Management Office <b>PE 0603832D8Z</b>		
<i>COST(In Millions)</i>	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total Program Element (PE) Cost	56.861	66.967	56.971	59.286	62.027	63.353	64.541	Continuing	Continuing
JSM/P476	56.861	66.967	56.971	59.286	62.027	63.353	64.541	Continuing	Continuing

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

(U) **BRIEF DESCRIPTION OF ELEMENT**

The Defense Modeling and Simulation Office has corporate-level responsibility for the cooperation and synergism of modeling and simulation (M&S) activities within the Department of Defense. M&S has demonstrated the capability to revolutionize the way in which the Department makes decisions and conducts its operations. Working as a system of systems, M&S can support a full range of applications (e.g. joint training, doctrine development, formulation and assessment of operational plans, mission rehearsal, force structuring and the acquisition of new systems). To ensure effective and efficient use of M&S, the Department has developed a strategy fostering interoperability and re-use, embodied in the Department of Defense Modeling and Simulation Master Plan, which serves as the basis for execution of this program. The major element of the strategy is development of a common technical framework (CTF) for M&S consisting of three components: the High Level Architecture (the most important); Conceptual Models of the Mission Space (CMMS); and Data Standardization. Supporting these is a broad range of shared common services which include environmental representation; human and organizational behavioral representation; verification, validation and accreditation of simulations; a modeling and simulation resource repository; a modeling and simulation operational support activity; and outreach and education initiatives to ensure standardized and timely implementation of the plan. As a result of this effort, the Department will be able to improve readiness, enhance mission rehearsal, optimize investment decisions, and achieve cost-effective acquisitions.

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(U) **Project Number and Title: P476 JSM**

(U) **PROGRAM ACCOMPLISHMENTS AND PLANS**

(U) **FY1999 Accomplishments:**

(U) Continued development of HLA technology, prototypes of enhanced capabilities and applications of advanced technology; expanded support, including high performance infrastructure for users of modeling and simulation, to enable them to exploit fully the increased capabilities that will be fielded under the HLA initiative, to include JSIMS and JWARS; designed and developed the prototype for M&S technologies required to implement technology needed to federate simulations operating at different levels of security to support applications for training, analysis and acquisition.  
(\$ 24.289 Million)

(U) Developed and delivered the third operational build of the CMMS Toolset to support integration and exchange of simulation implementation-independent functional descriptions of military operations and tasks; focused on the knowledge engineering activities conducted by simulation development subject matter experts who employ conceptual models to design and implement HLA Federations and M&S applications; CMMS Toolset support for simulation developer knowledge engineering activities were demonstrated by direct collaboration with JSIMS Enterprise simulation developers and with HLA transition efforts; CMMS Toolset extended to support engineering and engagement level of detail required in acquisition and operational test and evaluation applications; experiments conducted which established the scope, priority, and compatibility of requirements to support a multitude of equipment and systems characteristics and performance specifications.  
(\$ 3.200 Million)

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(U) Continued development of HLA related data standards and associated OMDD efforts; developed and delivered the first and second operational builds of the OB data access Toolset; provided OB data access Toolset support for M&S community via direct collaboration with the OSD PA&E Joint Data System, the JSIMS Enterprise, and selected HLA transition efforts; extended the registration template to support additional repository requirements and security and release policies and procedures; developed and coordinated producer Data Quality Assurance guidelines; distributed/installed Data Quality tools at additional DoD locations; began CSS, associated DIFs, and data standards development for targets/facilities information; continued to nominate and obtain final standards approval for other M&S data elements for inclusion in the DoD Data Dictionary System (DDDS); provided Functional Data Administration for M&S in accordance with DoDD 8320.1.  
(\$ 2.500 Million)

(U) Completed interchange mechanism full definition by release of two software packages and expanded technology insertion efforts to further develop test capabilities; expanded software tools for SEDRIS transmittal generation and verification; initiated SEDRIS standardization through established ISO processes; evaluated sources and documented procedures for the use of alternate sources for database generation, to include commercial options; provided additional tools, reference datasets, policies and procedures for the generation of integrated databases expanding existing terrain and ocean capabilities and integrating atmospheric data and effects; initially exploited atmospheric scintillation effects in simulations using AF developed technology; expanded representational resource experiments in high-resolution Simulation Based Acquisition (SBA)-related areas in cooperation with the Joint Strike Fighter JPO; expanded development of the weather scenario generation capability, to include oceanographic data; procedures for data acquisition through littoral classification and climatological data manipulation were tested through integrated experimentation; initiated operational capability for MEL with both Internet and SIPRNet capability; completed metadata specification for access and resource site software; and generally expanded resource availability across the MEL system.  
(\$ 9.527 Million)

(U) Continued extension of conceptual model of mission space technical framework to human and organizational behavior; examined limits of current Computer Generated Forces technologies; established Special Interest Area on the World Wide Web.  
(\$ 1.500 Million)

(U) Updated DoDI 5000.61 and completed the initial build of an application based VV&A Recommended Practices Guide; developed V&V methodology as it applies to HLA federations, legacy simulations and new development efforts; developed prototype VV&A history templates for data and M&S; created an action plan for VV&A in support of SBA based on the SBA Roadmap; assessed V&V tool capabilities.  
(\$ 3.000 Million)

(U) Modified and enhanced MSRR common, physical and software infrastructure based on network and database state-of-art and user requirements, including federation with other repositories, to form a collaborative, distributed repository system; continued documentation of MSRR; continued population of the MSRR system providing: (a) directories /catalogs; (b) data standardization resources (e.g., process and data models, data dictionary); (c) reusable data, algorithms, models and simulations; and (d) tools for browsing and accessing, linking across resources, configuration management, etc.; initiated requirements necessary for transition to the Information Analysis Center; modified software based on user requirements.

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(\$ 3.945 Million)

(U) Continued MSOSA operations providing one-on-one assistance/education to the M&S community and transitioned to the new Modeling and Simulation Information Analysis Center (MSIAC) organization.

(\$ 4.000 Million)

(U) Continued emphasis on outreach activities to include expanded M&S conference support and web-based public affairs activities.

(\$ 1.400 Million)

(U) Instituted development of fully interactive user, staff officer, manager and executive level courses that address training, acquisition and analysis domains; conducted technical seminars, workshops and symposia; developed, fielded and populated web-based electronic libraries to make all M&S course of instruction immediately available to the M&S community; widely disseminated M&S formal instruction through production and distribution of videos and CD-ROMS; inserted M&S technology into major joint warfighter exercises; refined and enhanced the capability of the models and simulations developed to support DoD's acquisition process.

(\$ 3.500 Million)

**(U) FY2000 Plans:**

(U) Apply increased advanced integrated automation to federation development and operation, demonstrating additional (20%) reduced costs to create a new federation; use advanced experimentation to support domestic and international standards organizations; establish partnerships with operational organizations; continue to support joint initiatives; use enterprise-level initiatives focused on common community concerns.

(\$ 33.411 Million)

(U) Transition the CMMS Toolset to operational status; update and maintain the CSS, DIFs, and KAT Tools, CMMS Library, and supporting conversion, quality assurance, integration, and analysis tools; update and maintain the CMMS Recommended Practices Guide; support operational use of the CMMS Toolset by the M&S community; adapt components of the CMMS Toolset to support equipment and systems characteristics and performance specifications; conduct experiments to establish the scope, priority and compatibility with human behavior representations.

(\$ 2.856 Million)

(U) Transition OMDDS to operational status; update and maintain HLA related data standards and required M&S ADS data; develop and deliver the third and fourth operational builds of the OB data access Toolset; review and update Data Quality Assurance guidelines; review and update DAVIE tool; distribute/install DAVIE tool at additional DoD locations; review and update DE-RPG to ensure appropriateness; maintain existing DIFs; continue to develop CSS, associated DIFs, and data standards for additional environmental representations, units/systems, and operations /human behavior; continue to nominate and obtain final standards approval for other M&S data elements for inclusion in the DDDS; assess Data Security requirements for on-going M&S efforts; provide Functional Data Administration for M&S in accordance with DoDD 8320.1.

(\$ 1.900 Million)

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(U) Continue SEDRIS path toward national and international standardization; complete user defined interchange experiments; initiate establishment of a consortium to manage SEDRIS products and definition in consort with target standardization organizations; develop integrated ocean database generation procedures that support transition from deep to shallow water operations and provide correlated environmental effects for SBA, training and analysis; high-resolution atmospheric effects and target scene depiction will also be studied in multi-resolution scenarios; initial work in space data use in simulation will emphasize growing interest in solar maximum events; continue to expand resource listings to include model and algorithm coverage for all environmental domains; compliance with evolving international metadata standards will be addressed; additional MEL services will be assessed from an established users and implementers consortium comprised of Military, Government, Industry and Academic members from both domestic and international organizations.

(\$ 11.200 Million)

(U) Initiate recommended practices guide for enhancing simulations with human and organizational behavior representations; continue special interest area in human behavior; examine reuse and interoperability among human behavior federates; examine and manipulate models of command decision-making.

(\$ 6.900 Million)

(U) Expand scope of VV&A guidance to address system and human behavior representations, live player interoperability, and fidelity issues; prototype VV&A tool concepts.

(\$ 2.100 Million)

(U) Maintain resource repositories to enable/encourage the reuse of models, simulations and related assets; federate with additional repositories within DoD; develop specialized structures, as necessary, to support innovative DoD programs which will increasingly depend on reuse; increase emphasis on offering incentives to M&S community to populate the repositories.

(\$ 1.400 Million)

(U) Utilize the MSIAC for core-level M&S services.

(\$ 3.000 Million)

(U) Continue emphasis on outreach activities to include expanded M&S conference support and web-based public affairs activities.

(\$ 2.000 Million)

(U) Execute transition of existing formal M&S courses of instruction to other agencies. DMSO will concentrate on effort to greatly expand the development and distribution of new courses to support the entire M&S community through electronic technologies.

(\$ 2.200 Million)

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**(U)      FY2001 Plans:**

(U) Demonstrate runtime infrastructure advances using next-generation software and hardware to increase (20%) performance for the same cost, using commercial software to replace 50% of customer software; continue to use advanced experimentation for enhanced standards, policies and procedures; continue partnerships with operational users; continue support of joint initiatives; continue to use enterprise-level initiatives focused on common community concerns.

(\$ 28.561 Million)

(U) Continue to support operational usage of the CMMS Toolset; continue adaptation of CMMS Toolset to support equipment and systems characteristics and performance specifications; adapt components of the CMMS Toolset to support human behavior representation as appropriate; update and maintain the CMMS RPG; continue the development of CSS and associated DIFs for CMMS subject matter descriptions; update and maintain knowledge acquisition tools and utilities to support CMMS activities.

(\$ 2.290 Million)

(U) Transition Order of Battle data access Toolset to operational status; support operational usage of OMDDS; update and maintain HLA related data standards and required M&S ADS data; develop and deliver the first and second operational builds of the Targets and Facilities data access Toolset; review and update Data Quality Assurance guidelines; review and update DAVIE tool; distribute/install DAVIE tool at additional DoD locations; review and update DE-RPG to ensure appropriateness; maintain existing DIFs; continue to develop CSS, associated DIFs, and data standards for additional environmental representations, units/systems, and operations/human behavior; continue to nominate and obtain final standards approval for other M&S data elements for inclusion in the DDS; assess Data Security requirements for on-going M&S efforts; provide Functional Data Administration for M&S in accordance with DoDD 8320.1.

(\$ 1.600 Million)

(U) Complete national and international SEDRIS standardization to include formal establishment of a management consortium; initiate investigation in the use and expansion of the SEDRIS data representation model in supporting dynamic changes in the physical environment; investigate very high resolution database designs that incorporate computer-added design files, and micro-climate environmental information for use in dynamic fly-throughs in urban terrain; continue to reduce integrated database generation timelines to meet evolving operational mission planning and mission rehearsal timeline requirements; demonstrate production and operational use of measures of database consistency to assess interoperability potential and tailor database design, generation and/or modification activities in establishing simulation federations and conducting exercise scenarios; complete initial pass at model and algorithm discovery and access in all environmental domains; fully link the MEL system with the National Spatial Data Infrastructure and appropriate international systems to ensure a robust capability to support U.S. DoD needs thus establishing a `one stop shop` capability for all environmental information needs.

(\$ 9.360 Million)

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(U) Initiate the development of technologies and tools to support incorporation of authoritative representations of human and organizational behavior into DoD simulations.

(\$ 5.740 Million)

(U) Expand scope of VV&A guidance to address complex cognitive processes and dynamic environment including terrain and atmosphere; populate VV&A tool sets.

(\$ 1.730 Million)

(U) Maintain resource repositories to enable/encourage the reuse of models, simulations and related assets; increase emphasis on offering incentives to M&S community to populate the repositories.

(\$ 1.150 Million)

(U) Utilize the MSIAC for core-level M&S services.

(\$ 3.000 Million)

(U) Continue emphasis on outreach activities to include expanded M&S conference support and web-based public affairs activities.

(\$ 1.720 Million)

(U) Complete transition of existing formal M&S courses of instruction to other agencies; expand the development and distribution of new courses to support the entire M&S community through electronic technologies.

(\$ 1.820 Million)

(U) <b>B. Program Change Summary</b>	<b><u>FY1999</u></b>	<b><u>FY2000</u></b>	<b><u>FY2001</u></b>	<b><u>Total Cost</u></b>
Previous President's Budget	60.518	68.456	68.250	Continuing
Appropriated Value	0.000	69.206	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(3.657)	(.522)	(.449)	
c. Other	0.000	(1.717)	(10.830)	
Current President's Budget	56.861	66.967	56.971	Continuing

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**Change Summary Explanation:**

- (U)    **Funding:**       Funding changes are the result of rescission, inflation and programmatic adjustments.
  
- (U)    **Schedule:**     N/A
  
- (U)    **Technical:**    N/A
  
- (U)    **C.    OTHER PROGRAM FUNDING SUMMARY COST:**       N/A
  
- (U)    **D.    ACQUISITION STRATEGY:** N/A
  
- (U)    **E.    SCHEDULE PROFILE:**     N/A

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