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June 15, 2005

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# Acquisition

## Audit of the Extended Range Guided Munition Program (D-2005-078)

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Department of Defense  
Office of the Inspector General

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### **Acronyms**

BTERM II	Ballistic Trajectory Extended Range Munition II
DCMA	Defense Contract Management Agency
ERGM	Extended Range Guided Munition
NSFS	Naval Surface Fire Support
RDT&E	Research, Development, Test and Evaluation
TEMP	Test and Evaluation Master Plan



INSPECTOR GENERAL  
DEPARTMENT OF DEFENSE  
400 ARMY NAVY DRIVE  
ARLINGTON, VIRGINIA 22202-4704

June 15, 2005

MEMORANDUM FOR NAVAL INSPECTOR GENERAL

SUBJECT: Report on Audit of the Extended Range Guided Munition Program  
(Report No. D-2005-078)

We are providing this report for review and comment. We considered management comments on a draft of this report in preparing the final report.

DoD Directive 7650.3 requires that all recommendations be resolved promptly. In response to the final report, we request that the Deputy Assistant Secretary of the Navy (Littoral and Mine Warfare), Office of the Assistant Secretary of the Navy for Research, Development and Acquisition provide additional comments on Recommendation A.1. by July 15, 2005.

If possible, please send management comments in electronic format (Adobe Acrobat file only) to [Audam@dodig.osd.mil](mailto:Audam@dodig.osd.mil). Copies of the management comments must contain the actual signature of the authorizing official. We cannot accept the / Signed / symbol in place of the actual signature. If you arrange to send classified comments electronically, they must be sent over the SECRET Internet Protocol Router Network (SIPRNET).

We appreciate the courtesies extended to the staff. Questions should be directed to Mr. Rodney D. Britt at (703) 604-9096 (DSN 664-9096) or Mr. John E. Meling at (703) 604-9091 (DSN 664-9091). See Appendix G for the report distribution. The team members are listed inside the back cover.

By direction of the Deputy Inspector General for Auditing:

A handwritten signature in cursive script, reading "Mary L. Ugone".

Mary L. Ugone  
Assistant Inspector General  
for Acquisition and Technology Management

## Department of Defense Office of Inspector General

Report No. D-2005-078

June 15, 2005

(Project No. D2004-D000AE-0163.000)

### Audit of the Extended Range Guided Munition Program

#### Executive Summary

**Who Should Read This Report and Why?** DoD and military managers involved in the management, support, and acquisition of the Extended Range Guided Munition (the Munition) Program (the Program) should read this report because it discusses requirements, affordability, and reliability issues that must be addressed before the Program progresses further through the acquisition process.

**Background.** The Navy uses naval surface fire support from Naval ships to conduct amphibious operations, to demonstrate combatant power, and to perform withdrawal operations from over-the-horizon and at close range. In assessing alternatives, the Navy concluded that a modification to the current shipboard 5-inch, 54 Caliber, Mark 45 gun mount, in conjunction with the development of an extended range guided munition, would provide the best alternative for fulfilling the gun- and guided-munition portion of the naval surface fire support mission need. In July 1996, the Navy Acquisition Executive approved the start of the Program for entry into the engineering and manufacturing development (now system development and demonstration) phase of the acquisition process. A Munition round is a 5-inch projectile with a rocket motor, an internal global positioning system receiver, and an inertial navigation system. The Navy intends to deploy the Munition on the Arleigh Burke class destroyers in 2011. In June 2004, the Project Manager for naval surface fire support notified the Navy Acquisition Executive that the Program's projected research, development, test, and evaluation (RDT&E) funding totaled \$363 million. Over the program life cycle, the Navy plans to procure an inventory of between 8,500 and 20,780 rounds to equip two full Munition magazines on the destroyers and to replace Munition rounds used for training. The Navy Comptroller has budgeted \$191.8 million in the Future Years Defense Program to begin Munition production in FY 2010.

**Results.** The Navy did not justify the Munition quantity requirements reported in the approved acquisition program baseline agreement and did not have a viable acquisition strategy to immediately procure the Munition. As a result, the Navy has obligated \$354 million and plans to obligate an additional \$146.1 million in RDT&E funds to continue development of the extended range munitions technology before determining whether it can afford the total cost for procuring and fielding the Munition. When the Director for Expeditionary Warfare, who by section 5038, title 10, United States Code is responsible for determining warfare requirements, validates the procurement objective, the Navy Acquisition Executive can better determine the affordability of the Program. Also, the Navy Acquisition Executive can inform the Marine Corps whether the acquisition strategy is viable and whether sufficient quantities will be available for operational use. If the validated procurement objective is unaffordable, the Navy should put the \$146.1 million in RDT&E funds (\$29.9 million in RDT&E funds that remain on the Ballistic Trajectory Extended Range Munition II contract and the \$116.2 million for developing the potential successor program) and the \$191.8 million in budgeted Munition procurement funds to better use (finding A).

The Project Manager for the Naval Surface Fire Support Program did not have a current and comprehensive Munition test and evaluation master plan or sufficient funding to conduct the developmental, guided flight tests needed to demonstrate whether the Munition will perform reliably. As a result, the Project Manager is executing the Program without adequate developmental test information on the reliability of the Munition while proceeding towards operational testing. In addition, the Project Manager cannot assure the Navy Acquisition Executive that sufficient test data will exist to assess the reliability of the Munition before his decision on whether to commence full-rate production on the Munition. Preparing an updated test and evaluation master plan and obtaining additional test funding will enable the Project Manager to assure the Navy Acquisition Executive that sufficient test data will exist to assess the reliability key performance parameter for the Munition before the full-rate production decision point (finding B).

See the Findings section of the report for detailed recommendations.

In November 2002, the Program was realigned from the Program Executive Office, Surface Strike to the Program Executive Office, Integrated Warfare Systems. The Program Executive Office, Integrated Warfare Systems realigned the Program under the missiles and launchers assessable unit, rather than as a separate assessable unit. As a result, a separate management control program review of the Program has not been performed since FY 2001.

**Management Comments.** The Deputy Assistant Secretary of the Navy (Littoral and Mine Warfare) responded for Assistant Secretary of the Navy (Research, Development, and Acquisition); the Director, Naval Surface Warfare Division; the Director for Expeditionary Warfare; and the Project Manager, Naval Surface Fire Support. Although the Deputy Assistant Secretary did not agree that the Director for Expeditionary Warfare was responsible for performing the requirements analysis, he stated that the Marine Corps Combat Development Command was developing the initial and development capabilities documents which would provide validated and approved procurement numbers for the ERGM by December 2005. The Deputy Assistant Secretary stated that it would be premature to stop the current Program or the Ballistic Trajectory Extended Range Munitions Project until after the Navy Acquisition Executive holds an Acquisition Strategy Program Review in late May 2005. He stated that the Navy Acquisition Executive would consider discontinuing further funding of the Program as an option at the Program Review. The Deputy Assistant Secretary stated that any acquisition strategy approved by the Navy Acquisition Executive would require a fully funded program. The Deputy Assistant Secretary additionally stated that the test and evaluation master plan would be revised to provide a description of the management structure, a description of the test events, a capabilities matrix, and resource requirements. He further stated that the Navy and the Director, Operational Test and Evaluation would establish the appropriate number of developmental guided flights required to demonstrate that the program reliability requirements were met.

**Audit Response.** Contrary to the Deputy Assistant Secretary of the Navy (Littoral and Mine Warfare) comments, we believe that the Director for Expeditionary Warfare is responsible for supervising warfare requirements pursuant to section 5038, title 10, United States Code. We request that the Director for Expeditionary Warfare provide comments in response to the final report on when he will meet his statutory obligation by approving the completion of a requirements analysis to determine the quantity of Extended Range Guided Munitions by July 15, 2005.

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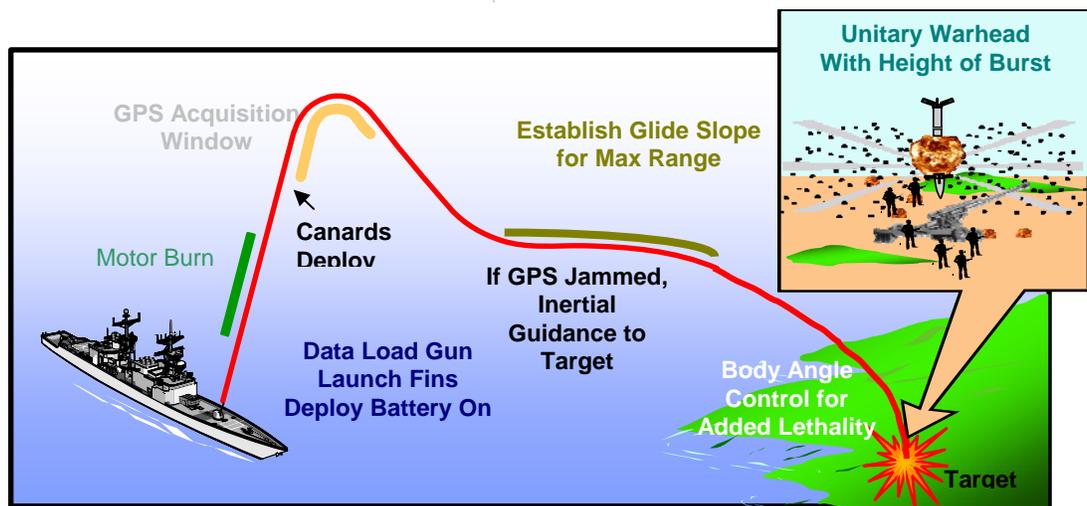
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## Background

The Navy uses naval surface fire support (NSFS) from Naval ships to conduct amphibious operations, to demonstrate combatant power, and to perform withdrawal operations from over-the-horizon and at close range. In May 1992, to meet the wide range of requirements in support of the Marine Corps expeditionary operations and the joint land battle, the Navy validated the need to satisfy NSFS requirements through a combination of guided munitions, rockets, and missiles that increased range, accuracy, and lethality. In assessing alternatives, the Navy concluded that a modification to the current shipboard Mark 45 5-inch, 54-caliber (Mk 45) gun mount, in conjunction with the development of an extended range guided munition, would provide the best alternative for fulfilling the gun- and guided-munition portion of the NSFS mission need. Appendix B provides definitions of technical terms used in this report.

**Extended Range Guided Munitions Program.** In July 1996, the Navy Acquisition Executive approved the Extended Range Guided Munition (ERGM) Program to enter the engineering and manufacturing development (now system development and demonstration) phase of the acquisition process as an acquisition category II program. The ERGM round is a 5-inch projectile with a rocket motor, an internal global positioning system receiver, and an inertial navigation system. The global positioning and inertial navigation systems, working together, provide the ERGM with autonomous guidance and control to target positions assigned before firing, and the rocket motor provides the ERGM with a far greater range capability than current ballistic projectiles. The ERGM round has a unitary warhead that is lethal against soft-to-medium hardened targets. The figure illustrates the concept of operation for the ERGM round.



### Concept of Operation for the ERGM

See Appendix C for a description of the ERGM round components and further details on the concept of operation. The Navy plans to deploy the ERGM on 27 Arleigh Burke Class destroyers beginning in 2011. Each destroyer has one 5-inch

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gun mount that is capable of firing the ERGM. Over the program life cycle, the Navy plans to procure an inventory between 8,500 and 20,780 rounds to equip two full ERGM magazines<sup>1</sup> on the destroyers and to replace ERGM rounds used for training. The Navy Comptroller budgeted \$191.8 million in the Future Years Defense Program to begin ERGM production in FY 2010.

**ERGM Acquisition History.** In September 1996, the Navy awarded Texas Instruments, Lewisville, Texas, a cost-plus-award-fee development contract for \$43.9 million to design and develop the ERGM. The Navy Acquisition Plan stated that development costs for the ERGM Program would be \$113.2 million and that technical development risk was low to medium. The Project Manager, Naval Surface Fire Support (the Project Manager) based the report's cost projections on the assumption that the technology from the former semi-active Laser Guided Projectiles developed in the 1980s could be leveraged without significant redesign. In January 1997, Raytheon Missile System (Raytheon), Tucson, Arizona, acquired Texas Instruments and relocated work on the ERGM development contract to Tucson. Since the relocation, the Navy has twice restructured the contract, with contract development costs increasing from \$43.9 million to \$178.6 million and estimated ERGM total life-cycle costs increasing from \$523.7 million to \$1.37 billion. In June 2004, the Project Manager notified the Navy Acquisition Executive that the ERGM Program was close to the threshold for classification as an acquisition category I program because the projected research, development, test, and evaluation (RDT&E) funding totaled \$363 million.

**ERGM Performance During Tests.** From June 2003 to February 2004, the ERGM experienced a series of failures during flight tests. After the last failure in February 2004, the contracting officer issued a partial stop work order and directed Raytheon to investigate the root cause of the failures. In May 2004, after Raytheon stated to the project manager that the root cause of the failures had been identified, the contracting officer canceled the stop work order.

In October 2003, because of the ERGM contract cost increases and performance concerns identified during tests, the Assistant Secretary of the Navy (Research, Development, and Acquisition) decided to pursue an alternative design to satisfy the NSFS guided munition requirement. On October 31, 2003, the contracting officer issued a broad agency announcement for the Ballistic Trajectory Extended Range Munition (BTERM II) as a possible low-cost alternative to the ERGM.

**Alternative Missile System.** On May 10, 2004, the Navy awarded Alliant Techsystems, Inc., Rocket Center, West Virginia, a cost-plus-incentive-fee contract for approximately \$30 million to develop and demonstrate the capabilities of the BTERM II. Because the BTERM II technology was promising, the Navy Acquisition Executive directed the Project Manager to prepare a revised acquisition strategy to plan for another full-and-open competition contract for the development of the extended range munition capability. The Project Manager's draft acquisition strategy specifies that the Navy Acquisition Executive will select from the ERGM, the BTERM II, and other qualified contractors in FY 2006, based on test results yet to be demonstrated. If the BTERM II or another technology is selected, the Project Manager plans to establish a new acquisition category II program in the system

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<sup>1</sup> A magazine is a storage compartment onboard a warship that is specifically used for storing weapons.

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development and demonstration acquisition phase of the acquisition process. To accomplish the new project, the Project Manager requested programming of \$146.1 million in RDT&E funds (\$29.9 million in RDT&E funds for the BTERM II contract and the \$116.2 million for continued development of the potential successor program) in the Future Years Defense Program.

**Program Management.** Within the Naval Sea Systems Command, the Program Executive Officer, Integrated Warfare Systems assigned a Major Program Manager to be responsible for all Navy surface ship weapons within the purview of the Program Executive Officer, Integrated Warfare Systems, and assigned the Project Manager for the NSFS with direct oversight responsibility for the ERGM Program. The Project Manager tasked the Naval Surface Warfare Center, Dahlgren Division, Dahlgren, Virginia, with direct oversight responsibility, as the technical direction agent, for the technical development of the ERGM. In addition, the Director, Naval Surface Warfare Division and the Director for Expeditionary Warfare, Office of the Chief of Naval Operations are responsible for overseeing the establishment of requirements and resources for the ERGM Program. Further, section 5038, title 10, United States Code, specifies that the Director for Expeditionary Warfare is responsible for determining expeditionary warfare requirements. The Navy Acquisition Executive is the milestone decision authority for the ERGM.

## Objective

The audit objective was to evaluate the overall acquisition management of the ERGM Program. Specifically, we evaluated whether management was cost-effectively readying the program for the production phase of the acquisition process. We also evaluated the management control program as it related to the audit objective. See Appendix A for a discussion of the scope and methodology of the review, the review of the management control program, and prior coverage related to the audit objective. See Appendix D for a discussion of another matter of interest concerning Defense Contract Management Agency (DCMA) oversight of subcontractors.

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## A. Quantity Requirements and Procurement Strategy for the Extended Range Guided Munition

The Navy did not justify the ERGM quantity requirements reported in the acquisition program baseline agreement because the Secretary of the Navy did not require the Director, Naval Surface Warfare Division to perform the required analysis to determine the planned ERGM procurement objective as required in DoD Instruction 3000.4, “DoD Munitions Requirements Process (DoD MRP),” October 23, 2003. Furthermore, the Navy did not have a viable acquisition strategy to immediately procure the ERGM in FY 2008 when the system development and demonstration phase of the acquisition process is to be completed. These conditions occurred because the Director, Naval Surface Warfare Division decided not to timely execute the procurement strategy and to assess alternative missile systems to satisfy ERGM requirements. As a result, the Navy has obligated \$354 million and plans to obligate an additional \$146.1 million in RDT&E funds to continue development of the extended range munitions technology before determining whether the total cost for procuring and fielding the ERGM is affordable.

### Full Funding and Requirements Generation Policy for DoD Munitions

DoD Instruction 5000.2, “Operation of the Defense Acquisition System,” May 12, 2003, sets forth policy for translating mission needs and requirements into stable, affordable, and well-managed acquisition programs. DoD Instruction 3000.4 describes the process that the Services are to use when developing munitions requirements. Secretary of the Navy Instruction 5000.2C, “Implementation and Operation of the Defense Acquisition System and the Joint Capabilities Integration and Development System,” November 19, 2004, establishes Navy policy for generating requirements for acquisition programs. Marine Corps Order 3900.15A, “Marine Corps Expeditionary Force Development System,” November 26, 2002, prescribes the development of future Marine Corps and Naval capabilities using a systematic and concept-based approach.

**DoD Instruction 5000.2.** DoD Instruction 5000.2 requires DoD Components to establish and execute an acquisition strategy that fully funds acquisition programs in the Future Years Defense Program after a system concept design is selected, a program manager is assigned, requirements are approved, and system-level development is ready to begin. The Instruction states that an affordability determination results from addressing system costs during the requirements generation process. The Instruction also states that, in no case, shall full funding to fully execute the planned acquisition strategy be done later than Milestone B, System Development and Demonstration Phase, unless a program first enters the acquisition process at Milestone C, Production and Development Phase.

**DoD Instruction 3000.4.** DoD Instruction 3000.4 requires the Secretaries of the Military Departments to establish munitions requirements to arm weapon systems and forces to perform under their assigned military mission, based on the current Defense

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Planning Guidance. To accomplish this requirement, each warfighting combatant commander is required to generate a near-year “Phased Threat Distribution,”<sup>2</sup> which allocates targets to each Service and allied forces. The near-year Phased Threat Distribution focuses on an operational and contingency plan that a combatant commander selects. The development of a near-year Phased Threat Distribution is based on theater-specific assumptions, which allows each warfighting combatant commander to assess Service target allocations, target overlap, and risk. DoD Instruction 3000.4 also requires the Chairman of the Joint Chiefs of Staff to collaborate with the combatant commanders and the Services on the near-year Phased Threat Distribution and mid-term defense planning scenarios and to develop the associated out-year Phased Threat Distribution that Services can use to generate the DoD munitions requirements to support the Defense Strategy. DoD Instruction 3000.4 further states that the total munitions requirement is composed of war reserve munitions<sup>3</sup> and training and testing requirements.

**Secretary of the Navy Instruction 5000.2C.** Secretary of the Navy Instruction 5000.2C requires that the Chief of Naval Operations and the Commandant of the Marine Corps, as user representatives, identify, define, validate, and prioritize mission requirements. Instruction 5000.2C further requires that the two flag officers continuously interact with the Assistant Secretary of the Navy (Research, Development, and Acquisition) throughout the acquisition process.

**Marine Corps Order 3900.15A.** Marine Corps Order 3900.15A requires that the expeditionary force development system use a four-phased approach to identify and develop warfighting capability. The first phase, “Force Capability Development,” requires that the Marine Corps assess Marine Corps Strategy 21, “Expeditionary Maneuver Warfare,” and related concepts to develop and identify needed capabilities. The second phase, “Requirement Development,” necessitates that the Marine Corps develop and select a course of action using “doctrine, organization, training, materiel, leadership and education, and personnel and facilities.” The third phase, “Prioritization and Resourcing,” requires that the Marine Corps be responsible for appropriate coordination and participation with Navy staff counterparts in prioritizing program requirements. The fourth phase, “Capability Fielding and Transition,” requires that the Marine Corps prioritize, fund, and field capabilities.

## ERGM Quantity Requirements

The Navy did not justify the ERGM quantity requirements reported in the acquisition program baseline agreement because the Secretary of the Navy did not require the Director, Naval Surface Warfare Division to perform the analysis to determine the ERGM procurement objective, as required in DoD Instruction 3000.4. In the September 1995 acquisition strategy report and the April 1997 acquisition program baseline agreement that the Navy Acquisition Executive approved, the Project Manager identified that 500 low-rate initial production rounds and 8,000 full-rate production

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<sup>2</sup> A phased threat distribution is the allocation of threat responsibility to an operational commander for planning and meeting the threat scenarios identified in the defense planning guidance.

<sup>3</sup> The sum of combat requirements, strategic readiness requirements, and current operation and forward presence requirements.

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ERGM rounds were needed to satisfy NSFS requirements. In the acquisition program baseline, however, the Project Manager stated that a true inventory objective needed to be established. The Project Manager revised the acquisition program baseline agreement in October 2002 but did not revise the original procurement objective; however, the Project Manager did identify an alternative procurement objective of 20,780 rounds. The Project Manager stated that the alternative procurement objective represented the number of rounds needed to stock two magazines on ERGM-capable platforms in FY 2011, the planned initial operating capability<sup>4</sup> date for the ERGM. The Project Manager also indicated that the alternative procurement objective included inventory depletion quantities based on the Marine Corps' round usage in planned training.

**Coordinating ERGM Requirements.** Section 5038, title 10, United States Code, "Director for Expeditionary Warfare," specifies that the Director for Expeditionary Warfare is responsible for determining warfare requirements; however, the Director for Expeditionary Warfare did not directly coordinate ERGM quantity requirements for the ERGM procurement objective with the Director, Surface Warfare Division. Although section 5038, title 10, United States Code specifies that the Director for Expeditionary Warfare is responsible for determining warfare requirements, which encompasses total quantity requirements for the ERGM procurement objective, the Navy does not recognize that position as the authority for determining procurement requirements for NSFS acquisition programs. The Navy's position is contrary to the title 10 requirement. Further, the authority of the Director for Expeditionary Warfare was further diminished by the formation of the Sea Power 21 Chief of Naval Operations Strategic Actions Group in a November 2002 realignment within the Office of the Chief of Naval Operations. Under the realignment, a representative for the Office of the Chief of Naval Operations stated that the Director for Expeditionary Warfare was placed into a joint warfare component which required him to share his decision making role with other Directors within the Office.

**Complying with DoD Policy on Munitions Quantities.** The Commanding General, Marine Corps Combat Development Command did provide the Navy with an analysis of the total number of rounds that would be required in the fleet inventory, based on the Defense Planning Guidance and the Quadrennial Defense Review. The Commanding General used four studies to prepare the analysis: two performed by the Naval Surface Warfare Center, Dahlgren Division, Dahlgren, Virginia; one performed by Johns Hopkins University, Applied Physics Laboratory, Columbia, Maryland; and one performed by the Marine Corps Combat Development Command, Quantico, Virginia. In determining the quantities of ERGM rounds needed for NSFS, the results from the four studies may have been useful, but the results did not provide a definitive number of ERGMs needed to support the ERGM inventory objective.

During the review, the Director, Surface Warfare Division located two of the four studies, which specifically addressed the munition requirements that the Commanding General, Marine Corps Combat Development Command used to prepare the analysis; however, the two studies were not performed to specifically determine the ERGM inventory objective. The Mission Area Analysis of Operational Maneuver from the Sea 2015, performed by the Marine Corps Combat Development Command, identified critical Marine Corps' deficiencies and provided an analytical basis for Marine Corps'

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<sup>4</sup> The date that the Navy plans to begin introducing the ERGM into the fleet for full operations.

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participation in Global 99. The Volume of Fire Study, performed by the Naval Surface Warfare Center, Dahlgren Division, examined the use of firepower in maneuver warfare, assessed the emerging role of precision-guided munitions, and analyzed how precision-guided munitions could satisfy the requirements for volume of fire that have historically been provided by large quantities of unguided projectiles. Because the two studies were not performed in accordance with DoD Instruction 3000.4, the munition requirements in the studies did not consider the logistics capabilities or determine munition requirements for war reserves.<sup>5</sup>

The Commanding General used his extrapolation of the results of the four studies to report to the Director, Surface Warfare Division an ERGM procurement inventory objective that ranged from 51,650 to 409,160 rounds. The NSFS Project Manager did not report the estimated quantities in the October 2002 ERGM acquisition program baseline agreement because the Navy did not have the funds needed to procure the significantly higher ERGM inventory objectives projected in the four studies.

The offices of the Director, Surface Warfare Division and the Director for Expeditionary Warfare agreed that the requirements analysis was not performed to justify the ERGM procurement objective reported in the revised acquisition program baseline agreement, October 2002. Had the true procurement objective been identified, the Navy Acquisition Executive would have had the information needed to determine the affordability of the ERGM Program and whether to continue the ERGM Program. See Appendix E for further details on responsibilities for developing ERGM quantity requirements and the four studies performed to identify NSFS munition requirements.

## **Program Acquisition Strategy**

The Navy did not have a viable program acquisition strategy to immediately acquire the ERGM rounds in FY 2008 when the system development and demonstration phase of the acquisition process will be completed because the Director, Surface Warfare Division decided not to timely execute the procurement strategy and to assess alternative missile systems to satisfy ERGM requirements.

In the acquisition program baseline agreement, October 2002, the Program Executive Officer for Surface Strike (now Integrated Warfare Systems) approved the required cost, schedule, and performance parameters needed to transition the ERGM to the production phase of the acquisition process. At that time, the Project Manager stated that the September 1995 acquisition strategy would be updated to include requirements in the revised acquisition program baseline agreement. As stated in the revised program acquisition baseline agreement, the Navy included \$236 million in Procurement of Ammunition, Navy and Marine Corps funding in the President's Budget for FY 2005 to begin procurement of 8,500 ERGM rounds in October 2005.

In March 2004, the Director, Surface Warfare Division decided to realign and remove the ERGM procurement funding account because of the performance problems with

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<sup>5</sup> The sum of combat requirements, strategic readiness requirements, and current operation and forward presence requirements.

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developmental testing and the delay of ERGM planned production until FY 2010. To implement this decision, the Navy Comptroller realigned in the Program Budget FY 2006 Working Table (P-40 Exhibit) \$358.7 million of Procurement, of Ammunition, Navy and Marine Corps funding--\$33 million in FY 2007; \$44 million in FY 2008; \$155 million in FY 2009; \$89 million in FY 2010; and \$38 million in FY 2011--to the ERGM and other Navy acquisition programs. To enable extended range munition production to begin in FY 2010, the P-40 Exhibit realigned \$191.8 million of the \$358.7 million in Procurement, of Ammunition, Navy and Marine Corps funding to the ERGM Program in FYs 2010 and 2011--\$69 million in FY 2010 and \$123.0 million in FY 2011.

In the President's Budget for FY 2005, the Navy Comptroller requested \$11.8 million in RDT&E funds to continue the ERGM developmental test program. However, in July 2004, the Congress reduced the ERGM Program's RDT&E budget to \$5 million, which affected the Project Manager's modification of the planned development contract needed to timely complete the land-based flight test program. Despite these actions, in January 2005, the Project Manager directed the contracting officer to incorporate an unfunded modification for \$9.3 million in the contract to enable Raytheon to conduct eight developmental, guided flight tests through July 2005, when the modification was funded.

**ERGM Program Affordability.** DoD Directive 5000.1 requires that acquisition managers prepare a revised affordability assessment to report to the milestone decision authority when a funding decision results in a program acquisition strategy not being viable. In the affordability assessment included in the ERGM Integrated Program Summary for FY 1995, the Project Manager concluded that the ERGM Program was affordable if the quantity requirement was limited to 8,750-rounds. However, the Project Manager did not update the affordability assessment as required to address the effect of the Navy's decision to delay production of the ERGM until FY 2010. In addition, an updated affordability assessment has not addressed the Navy's ability to satisfy the projected ERGM inventory objective requirements, as discussed earlier, which were projected in the four studies to range from 51,650 to 409,160 ERGM rounds needed to meet the Marine Corps' NSFS requirements.

## **Effect of Meeting Naval Surface Fire Support Requirements**

Although the Navy spent \$354 million and plans to spend an additional \$146.1 million in RDT&E funds to continue developing the technology for extended range munitions, it will not, as planned, begin to meet the Marine Corps' near-term ERGM need for NSFS until FY 2010. If the Navy Acquisition Executive awards the contract to Alliant Techsystems, Inc., to satisfy the ERGM requirement in FY 2006, fulfillment of the Marine Corps' NSFS requirement will be further delayed. To develop the alternative BTERM II technology, Alliant Techsystems, Inc., will need to accomplish the development efforts that Raytheon already completed.

In the Program Objective Memorandum-06 Supplemental Information Sheet, the Project Manager stated that budgeted procurement funding did not support the acquisition of the 8,500 ERGM rounds specified in the approved April 1997 acquisition program baseline agreement or the recommended 20,780 ERGM rounds specified in the October 2002

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acquisition program baseline agreement; it supported the acquisition of only 2,500 rounds, and that, if the budgeted amount was not increased, the unit production cost would greatly exceed the program unit procurement cost goal.

## Conclusion

The Navy Acquisition Executive should not continue to develop the ERGM Program, or any successor program, until a viable acquisition strategy is established and the Navy commits to satisfying the Marine Corps' NSFS requirement by fully funding a validated ERGM procurement objective. The \$354 million in RDT&E funding that the Navy has already invested and the \$146.1 million in RDT&E funds planned for future extended range munitions development may be wasted if the Navy remains less than fully committed to providing procurement funding for the ERGM Program. If Raytheon completes system development and demonstration as currently planned and is awarded the contract by the Navy Acquisition Executive, the Navy needs to have procurement funding available in FY 2008 to begin ERGM low-rate initial production.

Further, until the Navy validates the ERGM procurement objective through the use of a verified, validated, and accredited requirements model, the Navy Acquisition Executive will not have information needed to determine the affordability of the ERGM Program and whether to continue the ERGM Program. If the validated procurement objective is unaffordable, the Navy should put the \$146.1 million in RDT&E funds--\$29.9 million in RDT&E funds that remain on the Ballistic Trajectory Extended Range Munition II contract and \$116.2 million for development of the potential successor program development contract--and the \$191.8 million in budgeted ERGM procurement funds to better use.

## Management Comments on the Finding and Audit Response

**Navy Comments.** The Deputy Assistant Secretary of the Navy (Littoral and Mine Warfare), Office of the Assistant Secretary of the Navy for Research, Development and Acquisition, commented that the National Defense Authorization Act for Fiscal Year 1993 states that the Director for Expeditionary Warfare will supervise the performance of all staff responsibilities of the Chief of Naval Operations for expeditionary warfare, including responsibilities for amphibious lift, mine warfare, naval fire support, and other missions essential for expeditionary warfare. The Deputy Assistant Secretary stated that the Director, Warfare Integration and Assessment Division was responsible for the ERGM non-nuclear ordnance requirements process and participated with the Director, Expeditionary Warfare in determining the validated procurement objective for the ERGM.

**Audit Response.** The quotation from the National Defense Authorization Act for Fiscal Year 1993 is accurate. In his supervisory capacity, the Director for Expeditionary Warfare is responsible for supervising all staff responsibilities of the Chief of Naval Operations for expeditionary warfare, including the approval of the determination of the appropriate quantities for meeting the Marine Corps' NSFS requirements.

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## Recommendations, Management Comments, and Audit Response

**A.1. We recommend that the Director for Expeditionary Warfare, Office of the Chief of Naval Operations perform a requirements analysis to determine the quantity of Extended Range Guided Munitions needed to support the Marine Corps' naval surface fire support requirements as required in DoD Instruction 3000.4, "DoD Munitions Requirements Process (DoD MRP)," October 23, 2003. The Director should use a verified, validated, and accredited requirements model to perform the analysis as required in Marine Corps Order 3900.15A, "Marine Corps Expeditionary Force Development System," November 26, 2002.**

**Navy Comments.** The Deputy Assistant Secretary of the Navy (Littoral and Mine Warfare), Office of the Assistant Secretary of the Navy for Research, Development and Acquisition, responding for the Director for Expeditionary Warfare, Office of the Chief of Naval Operations, nonconcurred with the recommendation as written, stating that the appropriate office within the Office of the Deputy Chief of Naval Operations for Warfare Requirements and Programs to conduct the requirements analysis was the Director, Warfare Integration and Assessment Division. He stated that the Director uses the classified, DoD-compliant, non-nuclear ordnance requirements process to determine munitions requirements. The Deputy Assistant Secretary further stated that the Director, Naval Surface Warfare, in consultation with the Director for Expeditionary Warfare and the Director, Warfare Integration and Assessment Division, provided the Naval Gunnery Program Office with the unclassified, estimated, unit procurement objective that was contained in the original acquisition program baseline agreement. The Deputy Assistant Secretary also stated that the Navy will continue using the classified non-nuclear ordnance process to analyze ERGM procurement requirements. The ERGM requirements for the FY 2007 program budget submission were approved on March 31, 2005. He stated that the ongoing Initial Capabilities Document being developed by the Marine Corps and the subsequent Capabilities Development Document for the Extended Range Munition will provide validated procurement numbers for the ERGM Program. The Deputy Assistant Secretary stated that the Capabilities Development Document is expected to be approved by December 2005.

**Audit Response.** The Deputy Assistant Secretary's comments were not responsive to the recommendation. As discussed in the finding, the Office of the Deputy Chief of Naval Operations for Warfare Requirements and Programs did not have a requirements analysis to support the quantity of ERGMs to support the Marine Corps' NSFS requirements identified in the acquisition program baseline agreement. Completion of the classified non-nuclear ordnance requirements process could ensure that validated munitions quantities are established and included in the initial and development capabilities document for the ERGM Program. However, the use of that process and the resulting quantity determination require approval by the Director for Expeditionary Warfare in accordance with section 5038, title 10, United States Code. We request that the Director for Expeditionary Warfare provide comments on the final report and state when he will meet his statutory obligation by approving the completion of a requirements analysis to determine the quantity of Extended Range Guided Munitions needed to support the Marine Corps' naval surface fire support requirements as required in DoD Instruction 3000.4.

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**A.2. We recommend that the Director, Naval Surface Warfare Division, Office of the Chief of Naval Operations and the Project Manager, Naval Surface Fire Support coordinate with the Director for Expeditionary Warfare, Office of the Chief of Naval Operations to obtain validated procurement quantities for the Extended Range Guided Munitions as required in Secretary of the Navy Instruction 5000.2C, “Implementation and Operation of the Defense Acquisition System and the Joint Capabilities Integration and Development System.”**

**Navy Comments.** The Deputy Assistant Secretary of the Navy (Littoral and Mine Warfare), Office of the Assistant Secretary of the Navy for Research, Development and Acquisition concurred, stating that the ERGM Program is being restructured to reflect the Navy’s plan to conduct a full and open competition in FY 2005 or FY 2006 to provide a 5-inch guided projectile capability. He stated that the restructured program, known as the Extended Range Munition, will proceed to a system development and demonstration decision in March 2006. The Deputy Assistant Secretary stated that an acquisition program baseline will be developed as part of the milestone review process. He stated that the Chief of Naval Operations will approve and validate the inventory objective.

**A.3. We recommend that the Assistant Secretary of the Navy (Research, Development, and Acquisition) direct the Project Manager, Naval Surface Fire Support to discontinue further funding of extended range munitions technology until the Project Manager determines that validated procurement quantities of the Extended Range Guided Munitions, the Ballistic Trajectory Extended Range Munition II, or any other successor system needed to satisfy Marine Corps’ naval surface fire support requirements are affordable, and that the Navy can commit to timely and fully funding the production phase of the acquisition process, as required in DoD Directive 5000.2, “Operation of the Defense Acquisition System,” May 12, 2003.**

**Navy Comments.** The Deputy Assistant Secretary of the Navy (Littoral and Mine Warfare), Office of the Assistant Secretary of the Navy for Research, Development and Acquisition, nonconcurrent, stating that it would be premature to stop the current Extended Range Guided Munitions Program or the Ballistic Trajectory Extended Range Munitions Project until after the Navy Acquisition Executive holds an Acquisition Strategy Program Review in late May 2005. He stated that the Navy Acquisition Executive would consider discontinuing further funding of the Program as an option at the Program Review. The Deputy Assistant Secretary stated that both efforts were vital to ensuring that a healthy competitive environment exists for any further competitions and that the Navy and Marine Corps were working diligently to update the procurement quantities. He also stated that any acquisition strategy approved by the Navy Acquisition Executive would require a fully funded program.

**Audit Response.** Although the Deputy Assistant Secretary nonconcurrent, his comments were responsive to the intent of the recommendation.

For the complete text of the Navy’s comments, see the Management Comments section of the report.

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## B. Test and Evaluation Planning for the Extended Range Guided Munition

The Project Manager for the NSFS did not have a current and comprehensive test and evaluation master plan (TEMP) and sufficient funding to conduct guided flight tests before operational testing. These conditions occurred because the Project Manager did not update the December 1995 TEMP for the approval of the Director, Operational Test and Evaluation, as recommended in the Defense Acquisition Guidance, when the ERGM contract was significantly restructured in 2000 and 2002. Further, the Project Manager did not include funding requirements in the TEMP for developmental, guided flight tests needed to demonstrate the satisfaction of ERGM reliability requirements. As a result, the Project Manager is executing the development program without knowing whether adequate developmental test information will be available to support a decision to begin operational testing. In addition, the Project Manager cannot assure the Navy Acquisition Executive that sufficient test data will exist to assess the ERGM reliability key performance parameter before the full-rate production decision point.

### Test and Evaluation Policy

DoD Instruction 5000.2, the Defense Acquisition Guidebook, and Secretary of the Navy Instruction 5000.2C provide policy on test planning requirements.

**DoD Instruction 5000.2.** DoD Instruction 5000.2 states that program managers for acquisition programs on the Test and Evaluation Oversight List shall prepare and submit a TEMP for the approval of the Under Secretary of Defense for Acquisition, Technology and Logistics and the Director, Operational Test and Evaluation to support milestones B and C and full-rate production decisions. The Instruction further requires the TEMP to describe the planned developmental, operational, and live-fire testing, including measures to evaluate the system performance, the integrated test schedule, and the funding requirements to accomplish the planned testing.

**Defense Acquisition Guidebook.** The Defense Acquisition Guidebook states that program managers should update the TEMP between program milestone decision points when a program is significantly changed or restructured. The Guidebook also states that the TEMP is a contract between an acquisition program manager, the milestone decision authority, and the independent test agency and must be consistent with the acquisition strategy. The Guidebook further states that the program manager must follow the approved TEMP to properly budget for test and evaluation resources and schedules.

**Secretary of the Navy Instruction 5000.2C.** The Instruction implements DoD test policy and requires that the TEMP describe how each key performance parameter will be addressed during test and evaluation.

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## Current and Comprehensive Test and Evaluation Master Plan

The Project Manager did not update the TEMP for the approval of the Director, Operational Test and Evaluation after the ERGM contract was significantly restructured in 2000 and 2002.

**Updating the Test and Evaluation Master Plan.** The Navy Acquisition Executive approved the TEMP for the ERGM in December 1995 when the system development and demonstration decision, formerly the engineering and manufacturing development milestone decision, was made. Since the approval of the TEMP, the ERGM Program experienced developmental delays and flight test failures that caused significant restructures of the ERGM contract, as discussed in the Background section of the report. In addition, test plans and requirements for preparing the TEMP significantly changed during the 8 years that the program has been in the system development and demonstration phase of the acquisition process. In particular, the December 1995 TEMP did not include requirements for:

- A description of the management structure of the test and evaluation working integrated process for reliability, including the sub-level working groups.
- A detailed schedule to identify the specific test and evaluation events that take place during system development and demonstration. The detailed schedule should show specific types of flight test, reliability test periods, and natural environmental tests.
- A description of the test and evaluation events for development and operational testing, including the use of ground test assets, prototypes, and production test and evaluation.
- A capabilities crosswalk<sup>6</sup> matrix depicting the flow-down of desired capabilities from the initial capabilities document to the capability development document, formerly the operational requirements document, and the test criteria, including measures of effectiveness, suitability, survivability, and critical technical parameters.
- A reliability growth plan that measures progress of the system towards meeting reliability requirements of the system throughout its development.
- Resource requirements, including the test and evaluation budget and required funding, test assets, modeling and simulation support, facilities, test participants, instrumentation, data reduction capability, expendables, and any known shortfalls. The funding requirements and budget requirements are critical to the overall success of the program and must be as complete and as accurate as possible.

**Continuing the ERGM Program Without a Current and Comprehensive TEMP.** Because the Project Manager did not document and update the TEMP as required, the

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<sup>6</sup> A matrix that links the information listed in two separate documents.

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milestone decision authority did not have assurance that test plans supported the ERGM acquisition strategy. Specifically, the development test program described in the approved TEMP for the ERGM Program was different from the test program that the Project Manager was executing. Accordingly, the milestone decision authority had not formally approved the Project Manager's revised test strategy, including funds required, to demonstrate the readiness of the ERGM for operational testing and the planned full-rate production decision point.

In December 2000, recognizing the need for a revised test strategy, the milestone decision authority directed the Project Manager to complete the ERGM development test program in a series of five gates to measure progress toward completing the system development and demonstration phase and readiness for the low-rate initial production decision. The Project Manager established the five gates through a contract modification in December 2000. The five gates included:

- Gate 1, the successful completion of the 7-Card Guidance Electronic Unit launch and flight demonstration by March 30, 2001. Successfully completed as scheduled.
- Gate 2, the successful completion of the 5-Card Guidance Electronic Unit launch and flight demonstration by December 14, 2001. Successfully completed on January 31, 2002.
- Gate 3, the successful guided flight at nominal gun launch pressure by June 28, 2002. Successfully completed on August 28, 2002.
- Gate 4, the successful completion of land-based flight tests 1 and 2 by April 18, 2003. Raytheon failed land-based flight test 1 in October 2003. According to an NSFS program office representative, engineering flight tests 1 and 2 planned for February 2005, if successful, will complete the requirement for Gate 4.
- Gate 5, successful completion of the land-based flight tests and the ERGM qualification program. Completion dates have not been established.

The Project Manager acknowledged that an updated TEMP was required to support developmental and operational testing. He indicated that he would update the TEMP before conducting operational testing. At a minimum, the Project Manager should have updated the TEMP when the program breaches that resulted in a significant restructure of the program and the contract occurred in 2000 and 2002. As of February 2005, the Project Manager had not updated the December 1995 TEMP for the review and approval of the Director, Operational Test and Evaluation.

## **Operational Flight Tests Necessary to Demonstrate ERGM Reliability Requirements**

The Project Manager did not budget sufficient funds to conduct developmental, guided flight tests to demonstrate the reliability growth of the ERGM munition before operational testing.

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**Need for Guided Flight Tests.** Testers for standard munition rounds, such as the ERGM, usually conduct multiple munitions shots to assess munition reliability requirements. A reliability representative at Raytheon stated that because the ERGM round was launched through the Mk 45 gun mount, models and simulations could not be used to assess ERGM reliability. The representative stated that sufficient guided flight tests of the ERGM were necessary to test the survivability of the ERGM when launched from the Mk 45 gun mount and the performance of the ERGM rocket motor and guidance technology after launch.

**Number of Guided Flight Tests.** Before the ERGM Project Manager conducts dedicated technical evaluation and operational test phases, the reliability representative at Raytheon stated that, to adequately demonstrate ERGM reliability growth against the predictions made during the design phase, the ERGM Project Manager would need to conduct at least 20 developmental, guided flight tests after the ERGM configuration stabilized. However, the Raytheon representative also stated that if the ERGM successfully passes gate test number 4, the Project Manager would need to conduct only six additional developmental, guided flight tests in different configurations of the ERGM before requesting approval to begin the dedicated technical evaluation and operational test phases.

**Project Manager Test Plans.** After he completes the developmental, guided flight tests, the Project Manager intends to conduct 75 guided flight tests, 15 for the technical evaluation phase and 60 for the operational test phase. However, the 15 developmental, guided flight tests will not be sufficient to demonstrate that the ERGM is reliable because the rounds tested during the developmental, guided flight tests will not all have the same configuration.

**TEMP Reliability Testing Provisions.** In the December 1995 TEMP, the Project Manager did not identify the budget required to conduct the 20 ERGM guided flight tests and whether alternative methods could be used to demonstrate the ERGM reliability requirement before the low-rate initial production decision. By not identifying the budget needed to demonstrate ERGM reliability requirements before technical and operational testing, the Project Manager did not provide the resource sponsor with information needed to budget for the 20 guided flight tests.

## Conclusion

The Project Manager is executing a developmental test program without knowing whether adequate ERGM reliability information will be available to support a decision to begin operational testing. In addition, the Project Manager cannot assure the Navy Acquisition Executive that sufficient test data will exist to assess the reliability key performance parameter for the ERGM before the full-rate production decision point.

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## Recommendation, Management Comments, and Audit Response

**B. We recommend that the Project Manager, Naval Surface Fire Support prepare and submit an updated test and evaluation master plan for the Extended Range Guided Munition that provides a description of the management structure of the test and evaluation working integrated process team, a detailed schedule and description of the test and evaluation events, a capabilities crosswalk matrix, a reliability growth plan that includes an additional 20 developmental, guided flight tests, and test resource requirements for the approval of the Director, Operational Test and Evaluation.**

**Navy Comments.** The Deputy Assistant Secretary of the Navy (Littoral and Mine Warfare), Office of the Assistant Secretary of the Navy for Research, Development and Acquisition, responding for the Project Manager, Naval Surface Fire Support concurred, stating that the revised test and evaluation master plan will be developed to provide a description of the management structure of the test and evaluation integrated process team, a detailed schedule and description of the test and evaluation events, a capabilities crosswalk matrix, and required test resource requirements. He further stated that the Navy did not necessarily agree that an additional 20 developmental guided flight tests would be required to demonstrate that the program reliability requirements were met. As part of the test and evaluation master plan development, the Deputy Assistant Secretary stated that the Navy and the Director, Operational Test and Evaluation would establish the appropriate number of guided flights required to demonstrate that the program reliability requirements were met.

For the complete text of the Navy's comments, see the Management Comments section of the report.

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## Appendix A. Scope and Methodology

We evaluated whether the Project Manager was cost-effectively and efficiently readying the ERGM Program for the production phase of the acquisition process. Consequently, we focused the review on the areas of timely meeting the NSFS requirement; the justification for ERGM procurement quantities and test planning; and Defense Contract Management Agency, Raytheon oversight of the contractor quality assurance process. We performed this audit from May 2004 through March 2005 in accordance with generally accepted government auditing standards.

We reviewed documentation dated from May 1992 through October 2004, which we obtained from the Program Executive Office, Integrated Warfare Systems, Arlington, Virginia; the Naval Sea Systems Command, Arlington, Virginia; the Naval Surface Warfare Center, Dahlgren Division, Dahlgren, Virginia; Raytheon Missile System, Tucson, Arizona; and Alliant Techsystems, Inc., Rocket Center, West Virginia.

To accomplish the audit objectives, we:

- Determined the justification for ERGM procurement quantities based on requirements set forth in section 5038, title 10, United States Code, DoD Instruction 5000.2, DoD Instruction 3000.4, Secretary of the Navy Instruction 5000.2C, Marine Corps Order 3900.15A, memorandums from the Commanding General, Marine Corps Combat Development Command, and requirements studies performed by the Naval Surface Warfare Center, Dahlgren Division, Dahlgren, Virginia; Johns Hopkins University, Applied Physics Laboratory, Columbia, Maryland; and the Marine Corps Combat Development Command, Quantico, Virginia.
- Determined whether the NSFS procurement objective was affordable and fully funded in the Future Years Defense Program. To accomplish the audit objective, we also reviewed ERGM Program documentation including the mission need statement, operational requirements documents for the ERGM and the extended range munition, memorandums from the Commanding General, Marine Corps Combat Development Command, the acquisition strategy report, and the draft Extended Range Munition Acquisition Strategy.
- Determined whether the ERGM Program had a current and comprehensive TEMP and whether the Navy budgeted sufficient funds to conduct developmental and operational flight tests to demonstrate the satisfaction of the key performance parameter for reliability. To accomplish this audit objective, we reviewed the TEMP, reported test results, and assessed test and evaluation requirements in DoD Instruction 5000.2, the Defense Acquisition Guidebook, and Secretary of the Navy Instruction 5000.2C.

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- Determined whether Defense Contract Management Agency, Raytheon was delegated responsibility for performing quality assurance of ERGM subcontractors. To accomplish this audit objective, we reviewed the Federal Acquisition Regulation, the Defense Contract Management Agency *One Book*, memorandums of agreement between the NSFS Program Office and Defense Contract Management Agency, Raytheon, and conducted interviews with officials at the program office and Defense Contract Management Agency, Raytheon.

**Use of Computer Processed Data.** We did not use computer-processed data to perform this audit.

**Use of Technical Assistance.** We did not use technical assistance to perform this audit.

**General Accounting Office High-Risk Area.** The Government Accountability Office has identified several high-risk areas in DoD. This report provides coverage of the DoD Weapons System Acquisition high-risk area.

## Management Control Program Review

DoD Directive 5010.38, “Management Control (MC) Program,” August 26, 1996, and DoD Instruction 5010.40, “Management Control (MC) Program Procedures,” August 28, 1996, require DoD organizations to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

### Scope of the Review of the Management Control Program

In accordance with DoD policy, acquisition managers are to use program cost, schedule, and performance parameters as control objectives to implement the requirements of DoD Directive 5010.38. Accordingly, we focused our review on management controls for determining the ERGM procurement objective, for funding procurement quantities, for test planning, and for performing quality assurance oversight of ERGM subcontractors.

### Adequacy of Management Controls

We identified material management control weaknesses concerning determining ERGM procurement quantities, complying with statutory requirements, full-funding of procurement quantities, updating the TEMP, and identifying test funding requirements, as defined by DoD Directive 5010.38 and DoD Instruction 5010.40. Recommendations A.1., A.2., and A.3., if implemented, will improve the controls for developing ERGM capabilities-based munitions requirements and for timely determining whether the ERGM Program is affordable. Recommendation B., if implemented, will improve the controls for timely updating the TEMP and obtaining funding for guided flight tests for the ERGM Program. We will provide a copy of this report to the senior official responsible for management controls.

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**Adequacy of Management’s Self-Evaluation.** The Program Executive Officer for Integrated Warfare Systems performed annual reviews of the system of internal administrative and accounting controls in effect to satisfy the management control requirements. He used management reviews, audits, inspections, investigations, and other management information, such as knowledge from daily operations of programs and functions, to evaluate the assessable units. The Program Executive Officer for Integrated Warfare Systems based his annual statements of assurance on the results noted during the reviews of the assessable units. However, in the self-evaluations, he did not identify the specific management control weaknesses because the self-evaluations did not review those specific areas as part of the assessable units. Therefore, the Program Executive Officer for Integrated Warfare Systems did not identify or report the material management control weaknesses found by the audit. In addition, he did not identify the ERGM Program as a separate assessable unit.

The ERGM Program was originally assigned to the Program Executive Officer, Surface Strike. In November 2002, the ERGM Program was realigned from the Program Executive Officer, Surface Strike to the Program Executive Office for Integrated Warfare Systems. Before this realignment, the Program Executive Officer, Surface Strike performed a management control program review for FY 2001 and identified the ERGM Program as an assessable unit. A management control program review was not performed for the ERGM Program in FY 2002. In FY 2003, the Program Executive Office for Integrated Warfare Systems revised the management control program for NSFS into 26 assessable units that were reorganized from programs and products to technical and business categories. Even though the ERGM Program was close to reclassification as an acquisition category I program, the Program Executive Office for Integrated Warfare Systems realigned the ERGM Program under the missiles and launchers assessable unit. The Program Executive Office for Integrated Warfare Systems prepared a Statement of Assurance in July 2003 and again in June 2004 without specifically reporting on the ERGM Program. A representative for the Program Executive Office for Integrated Warfare Systems stated that the ERGM Program would again be assessed in January 2005 as part of the missiles and launchers assessable unit. The Program Executive Officer for Integrated Warfare Systems could improve the adequacy of his management control program if he identifies the ERGM Program or its successor program as a separate assessable unit.

## **Prior Coverage**

During the last 5 years, the Government Accountability Office (GAO), the Department of Defense Office of the Inspector General (DoD OIG), and the Naval Audit Service have issued four reports discussing the ERGM. Unrestricted GAO reports can be accessed over the Internet at <http://www.gao.gov>. Unrestricted IG DoD reports can be accessed at <http://www.dodig.mil/audit/reports>.

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## **GAO**

GAO Report No. GAO-04-248, "Defense Acquisitions: Assessments of Major Weapon Programs," March 2004

GAO Report No. GAO/NSIAD-99-91, "Defense Acquisitions: Naval Surface Fire Support Program Plans and Costs," June 1999

## **DoD IG**

DoD IG Report No. D-2001-032, "Use of Exit Criteria for Major Defense Systems," January 10, 2001

## **Naval Audit Service**

Naval Audit Service Report No. N2004-0057, "Earned Value Management for the Extended Range Guided Munition Program," June 16, 2004

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## Appendix B. Glossary

**Acquisition Category I.** An acquisition category I program is a major Defense acquisition program. A major Defense acquisition program is defined as a program estimated by the Under Secretary of Defense for Acquisition, Technology, and Logistics to require an eventual expenditure for RDT&E funds of more than \$365 million (FY 2000 constant dollars) or procurement funds of more than \$2.19 billion (FY 2000 constant dollars), or is designated by the Under Secretary of Defense for Acquisition, Technology, and Logistics to be an acquisition category I program.

**Acquisition Category II.** An acquisition category II program is defined as an acquisition program that does not meet the criteria for an acquisition category I program, but does meet the criteria for a major system. A major system is defined as a program estimated by the DoD Component Head to require an eventual expenditure for RDT&E funds of more than \$140 million in FY 2000 constant dollars, or for procurement funds of more than \$660 million in FY 2000 constant dollars or those designated by the DoD Component Head to be an acquisition category II program.

**Acquisition Life Cycle.** An acquisition life cycle consists of acquisition phases, each preceded by a milestone or other decision point, during which a system goes through RDT&E and production. Currently, the five phases are: concept refinement; technology development; system development and demonstration; production and deployment; and operations and support.

**Acquisition Program Baseline Agreement.** An acquisition program baseline agreement prescribes the key cost, schedule, and cost constraints in the phase succeeding the milestone for which it was developed. The milestone decision authority approves the agreement, which is signed by the acquisition program manager.

**Acquisition Strategy.** An acquisition strategy is a business and technical management approach designed to achieve program objectives within the resource constraints imposed. It is the framework for planning, directing, contracting for, and managing a program. It provides a master schedule for research, development, test, production, fielding, modification, post-production management, and other activities essential for program success. The acquisition strategy is the basis for formulating functional plans and strategies.

**Arleigh Burke Class Destroyers.** The Arleigh Burke class is a guided missile destroyer equipped with the Aegis Weapon System. The USS Arleigh Burke (DDG-51) was the first U.S. Navy ship designed to incorporate shaping techniques to reduce the radar cross-section, and therefore, reduce the likelihood of the ship being targeted by enemy weapons and sensors.

**Defense Planning Guidance.** The Defense Planning Guidance documents DoD planning efforts of the Joint Staff, the Office of the Secretary of Defense, and the Services. The Secretary of Defense issues the Defense Planning Guidance annually to the DoD Components to provide the strategic framework for developing the Services' program objectives memorandums.

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**Full and Open Competition.** Full and open competition, when used with respect to a contract action, means that all responsible sources are permitted to compete.

**Future Years Defense Program.** A future years defense program is the DoD database and internal accounting system that summarizes forces and resources associated with programs approved by the Secretary of Defense.

**Global Positioning System.** Within the ERGM, the Global Positioning System, a part of the inertial navigation system, guides the ERGM round to its target.

**Inertial Measurement Unit.** The Inertial Measurement Unit coordinates digitally with the mission computer for vehicle dynamic data, the Inertial Sensor Assembly, and the Inertial Measurement Unit Circuit Card Assembly to confirm the ERGM location during flight.

**Joint Chiefs of Staff.** The Joint Chiefs of Staff provide advice and assessment on military capability needs. The Chairman of the Joint Chiefs of Staff presents this advice and assessment through validated and approved capabilities documents.

**Key Performance Parameters.** Key performance parameters are those minimum attributes or characteristics considered most essential for an effective military capability. Key performance parameters cited in the Capability Development Document and the Capability Production Document are included verbatim in the acquisition program baseline agreement.

**Life-Cycle Cost.** Life-cycle costs are the total acquisition and ownership costs to the Government for systems over their useful life. They include the cost of development, acquisition, operations, and support (to include manpower), and where applicable, disposal. For defense systems, life-cycle costs are also called total ownership cost.

**Memorandum of Agreement.** A memorandum of agreement is an agreement between a program manager and a Contract Administration Office that establishes the scope of the surveillance responsibility that the Contract Administration will perform for the program manager.

**Milestone Decision Authority.** The milestone decision authority is the designated individual that has the overall responsibility for a program. The milestone decision authority has the authority to approve entry of an acquisition program into the next phase of the acquisition process and is accountable for cost, schedule, and performance reporting to higher authority.

**Mission Need Statement.** A mission need statement is a formatted non-system-specific statement on the operational capability needed to meet a specific threat.

**Naval Surface Fire Support.** NSFS provides responsive, lethal, and non-lethal fires, integrated and synchronized, to achieve the supported commander's intent.

**Near-Year Phased Threat Distribution.** Near-year phased threat distribution is the assignment of a portion of the enemy's total combat capability (forces, installations, and organizations) to DoD component commands. The distribution of types of targets is used by the Services to determine their munitions requirements.

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**Operational Requirements Document.** An operational requirements document is a formatted statement containing performance and related operational performance parameters for the proposed concept or system.

**Procurement Objective.** A procurement objective is the quantities of munitions that the Services acquire and derive by considering the total munitions requirement, projected inventory, monetary constraints, industrial capacity, acceptance testing, and production losses.

**Program Objectives Memorandum.** A program objectives memorandum is an annual memorandum in a prescribed format submitted to the Secretary of Defense by the DoD Component heads, which recommends the total resource requirements and programs within the parameters of the Secretary of Defense's fiscal guidance.

**Research, Development, Test and Evaluation Funds.** RDT&E funds are funds appropriated for basic research, applied research, advanced technology development, system development and demonstration, RDT&E management support, and operational systems development.

**Risk.** Risk is the measure of the inability to achieve program objectives within defined cost, schedule, and technical constraints associated with all aspects of the program.

**Statement of Assurance.** The statement of assurance indicates whether or not the management control systems meet the program standards, goals, and objectives of sound and effectively implemented management controls.

**System Development and Demonstration.** The system development and demonstration phase is the third phase of the DoD systems acquisition process. This phase consists of two efforts, system integration and system demonstration, and begins after Milestone B. It also contains a design readiness review at the conclusion of the system integration effort. A successful Milestone B decision can place the program in either system integration or system development phase of the acquisition process.

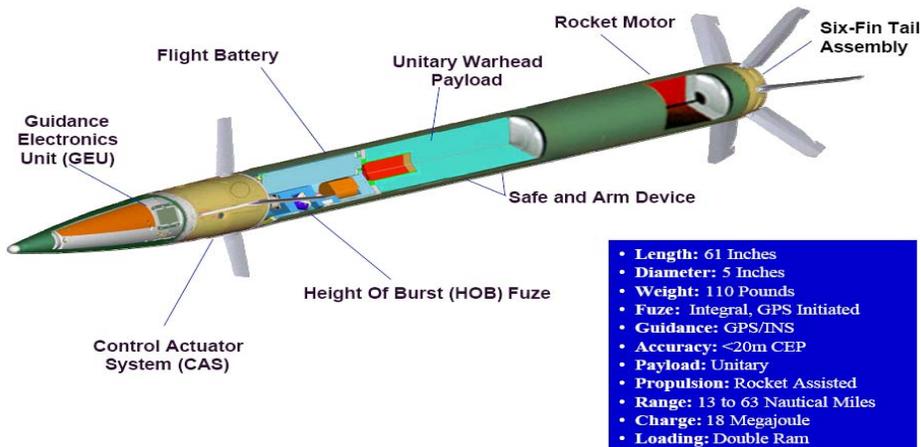
**Technology Development.** The technology development phase is the second phase of the DoD systems acquisition process. The purpose of this phase is to reduce technology risk and to determine the appropriate set of technologies to be integrated into the full system. This effort is normally funded only for advanced development work and does not mean that a new acquisition program has been initiated.

**Total Munitions Requirement.** The total munitions requirement is composed of war reserve munitions (the sum of combat requirements, strategic readiness requirements, and current operation and forward presence requirements) and training and testing requirements.

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# Appendix C. Description of the Extended Range Guided Munition Components and the Concept of Operation

## Description of the Extended Range Munition



CEP Circular Error Probable  
GPS Global Positioning System  
INS Inertial Navigation System

### ERGM Components

The ERGM consists of three major subassemblies: the guidance section, the payload section, and the in-flight propulsion section. The ERGM is delivered with a ramming sheath and shipping container.

The guidance section consists of two major subassemblies: the guidance electronics unit and the control subassembly. The guidance electronics unit and control assembly condition and regulate all power; accept and retain mission data; acquire global positioning system signals; cancel global positioning system jamming; deploy the canard and stabilize airframe roll; solve navigation; and generate autopilot and canard commands for guided flight.

The payload section consists of two major subassemblies: the forward payload electronics assembly and the warhead assembly. The payload section provides the structural coordination between the guidance section and the propulsion section. It also contains the warhead, safe and arm device, and flight battery.

The propulsion section consists of two major subassemblies: the rocket motor and tailfin assembly.

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## **Concept of Operation for the Extended Range Guided Munition Round**

The Navy plans to store the ERGM rounds in containers in the ship's magazine. During operations, the gun crew will remove the ERGM rounds from the container and load them through a mechanical assist device into the lower hoist of the Mk 45 gun system, which automatically transfers the rounds into the 10-round loader drum. Once the gun system receives a target location, the ERGM round interfaces with the global positioning system. Before firing the ERGM round, the Navy gunmen ram the ERGM round followed by the propellant charge into the Mk 45 gun mount. The guidance process continues with the gun shock activation of the flight battery that enables the system to fully operate after the ERGM round exits the gun barrel. Five seconds into flight, the onboard rocket motor ignites and burns for 8 seconds. The rocket motor burn allows the ERGM round to reach an altitude where it can deploy its canards to stabilize the roll. Once the ERGM is stabilized, the inertial measurement unit interfaces with the global positioning system satellite to guide the ERGM round towards the target. Upon reaching the target position, the safe-and-arm device activates and the burst sensor detonates the warhead at a predetermined altitude above the target. The ERGM round's lethality is accomplished through the fragmentation effects of the warhead.

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## Appendix D. Another Matter of Interest

During the audit, we noted that the Defense Contract Management Agency (DCMA), Raytheon Contract Administration Office, Tucson, Arizona, was not delegating quality assurance surveillance functions for components developed for the ERGM Program.

### Defense Contract Management Agency Subcontractor Oversight

DCMA, Raytheon did not delegate quality assurance responsibility for components developed at Raytheon subcontractors and suppliers for the ERGM Program. During the developmental flight testing, the ERGM experienced problems with the rocket motor igniter that was developed by Pacific Scientific Incorporated (Pacific Scientific), Phoenix, Arizona. As a result, Pacific Scientific had to redesign the rocket motor igniter. Pacific Scientific representatives at the DCMA Contract Administration Office, Phoenix, Arizona, stated that they did not receive a letter of delegation from DCMA, Raytheon to perform quality assurance reviews for the ERGM rocket motor igniter. Problems with the design of the rocket motor igniter may have been avoided if Raytheon had delegated the quality assurance surveillance function at Pacific Scientific to DCMA Contract Administration Office, Phoenix, Arizona.

Federal Acquisition Regulation subpart 46.405, "Subcontracts," requires that the Government perform quality assurance at the subcontractor level when the conditions for quality assurance at the source are applicable. The DCMA *One Book* states that quality assurance reviews during development of a weapon system must include delegations for surveillance at subcontractors and suppliers.

The August 2002 and August 2003 Memorandums of Agreement between the NSFS Program Office and the DCMA, Raytheon Contract Administration Office for the ERGM Program did not comply with the requirements in the Federal Acquisition Regulation Part 46 and the DCMA *One Book*. DCMA, Raytheon stated that it relied on the Project Manager to delegate necessary quality assurance surveillance functions for the ERGM Program during the system development phase. However, in the August 2003 Memorandum of Agreement with DCMA, the Project Manager, Raytheon Contract Administration Office did not assign DCMA with responsibility for performing quality assurance surveillance functions at Raytheon subcontractors and suppliers.

In the revised Memorandum of Agreement, September 2004, the Project Manager did include a requirement for the DCMA, Raytheon to delegate the quality assurance surveillance function to the Contract Administration Offices for ERGM subcontractors and suppliers. DCMA quality assurance surveillance of ERGM subcontractors and suppliers should benefit future development efforts for the ERGM Program.

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## Appendix E. Determining Quantity Requirements for the Extended Range Guided Munition

In December 1996 and again in June 1999, the Commanding General, Marine Corps Combat Development Command requested that the Chief of Naval Operations identify NSFS requirements for operational maneuvers while at sea. The Commanding General further stated that the affordability of future NSFS weapon systems and ordnance were a critical factor for ensuring that Naval forces had sufficient munitions to meet their operational needs. At those times, however, the Commanding General did not provide the Navy with an estimate of the ERGM rounds needed to support the Marine Corps' NSFS requirement.

**Responsibility for Developing ERGM Quantity Requirements.** Section 5038, title 10, United States Code, "Director for Expeditionary Warfare," specifies that the Director for Expeditionary Warfare is responsible for determining warfare requirements, which includes determining the ERGM procurement objective. The Director for Expeditionary Warfare, however, was not recognized within the Navy as the authority for determining procurement requirements for NSFS acquisition programs. The Commanding General, Marine Corps Combat Development Command, did communicate ERGM procurement objective requirements identified in various analyses to the Director, Surface Warfare Division. However, the Director, Surface Warfare Division did not obtain clarification or consult with the Commanding General concerning the completeness of the ERGM quantity requirement before providing the Project Manager with procurement objectives of 8,500 and 20,780 ERGM rounds in April 1997 and October 2003, respectively, for inclusion in the acquisition program baseline agreements. Under the November 2002 reorganization within the Office of the Chief of Naval Operations, the Director for Expeditionary Warfare's authority over NSFS requirements was further diminished when the Chief of Naval Operations approved, through Sea Power 21 Strategic Action Plan, the realignment of the Marine Corps role for Expeditionary Warfare into a joint warfare component. In that role, the Director for Expeditionary Warfare did not directly coordinate with the Director, Surface Warfare Division to ensure that the appropriate procurement objective was included in the ERGM acquisition program baseline agreement.

**Requirements Analyses Performed.** In March 2002, the Commanding General, Marine Corps Combat Development Command provided the Navy with an analysis of the total number of rounds that would be required to accomplish the Naval Surface Fire Support mission based on the Defense Planning Guidance and the Quadrennial Defense Review. The analysis was based on two studies from the Naval Surface Warfare Center, Dahlgren Division, Dahlgren, Virginia; one study from Johns Hopkins University, Applied Physics Laboratory, Columbia, Maryland; and one study from the Marine Corps Combat Development Command, Quantico, Virginia. Based on the results of the studies, the Commanding General reported that the Marine Corps may need from 51,650 to 409,160 rounds to satisfy NSFS requirements. The studies computed ERGM estimated quantities based on the Defense Planning Guidance scenario of a single mid-to high-intensity Major Theater War and a near simultaneous Small Scale Contingency occurring in southwest or northeast Asia. The ERGM

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estimated quantities computed in the studies were not included in the February 2003 ERGM acquisition program baseline agreement because the Navy did not have procurement funds necessary to fund the significantly higher ERGM procurement objectives. The following figure summarizes the study results.

	<u>OMFTS 2015 MAA</u>	<u>Volume of Fire Study</u>	<u>NSFS Requirements and Capabilities Study</u>	<u>21<sup>st</sup> Century SCFLS – Assessing the Impact of Evolving Missions on the Surface Combatant Force</u>
Source	Marine Corps Combat Development Command	Naval Surface Warfare Center, Dahlgren	Johns Hopkins University Applied Physics Lab	Naval Surface Warfare Center, Dahlgren
Scenario	Southwest Asia	Northeast Asia	Northeast Asia	Northeast Asia
Basis	6,814 rounds/6 days	5,394 rounds/19 hours	18,000 rounds/17 hours	314,300 rounds/65 days
Daily assault rate	1,136	2,697	9,000	n/a
Daily sustained rate	251	596	1,988	n/a
30-day assault	34,080	80,910	270,000	n/a
60-day sustained	15,060	35,760	119,280	n/a
10-day small scale contingency (sustained rate)	2,510	5,960	19,880	n/a
<b>Total</b>	<b>51,650</b>	<b>122,630</b>	<b>409,160</b>	<b>314,300</b>
MAA	Mission Area Analysis			
OMFTS	Operational Maneuvers From the Sea			
SCFLS	Surface Combatant Force Level Study			
Source:	Memorandum from Commanding General, Marine Corps Combat Development Command, “Naval Surface Fire Support Requirements for Expeditionary Maneuver Warfare,” March 19, 2002			
<b>Studies Performed to Identify NSFS Requirements</b>				

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## Appendix F. Audit Response to Management Comments on the Report

### Under Secretary of Defense for Acquisition, Technology, and Logistics

**Management Comments.** In unsolicited comments, the Under Secretary of Defense for Acquisition, Technology, and Logistics concurred with the draft report findings and recommendations.

### Deputy Assistant Secretary of the Navy (Littoral and Mine Warfare) Comments

The Deputy Assistant Secretary of the Navy (Littoral and Mine Warfare), Office of the Assistant Secretary of the Navy for Research, Development and Acquisition, provided additional comments on statements in the draft report. The complete text of the management comments on statements in the draft report is in the Management Comments section of the report.

**Navy Comments.** The Deputy Assistant Secretary recommended revising the draft report to state that the ERGM has a unitary warhead that is optimized for attacking soft targets such as troops in the open because the munition was not designed to efficiently attack hardened targets.

**Audit Response.** The operational requirements document for the ERGM states that the munition was being developed to engage air defense systems, mobile surface-to-surface missile batteries, bunkers and fortifications, artillery, troops and light armored vehicles. Accordingly, we revised the report to state that the ERGM will engage soft-to-medium hardened targets.

**Navy Comments.** The Deputy Assistant Secretary recommended revising the draft report to state that the Navy intends to deploy the ERGM on only the 32 Arleigh Burke Class Destroyers because the Navy no longer intends to make the Ticonderoga Class cruisers capable of firing extended range munitions.

**Audit Response.** We removed reference to the Ticonderoga Class cruisers from the report.

**Navy Comments.** The Deputy Assistant Secretary recommended deleting the sentence concerning the Major Program Manager from the report because the Program Executive Officer, Integrated Warfare Systems was not responsible for some surface weapons such as the Tomahawk missile.

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**Audit Response.** We revised the sentence to state that the Major Program Manager is responsible for all surface weapons within the purview of the Program Executive Officer, Integrated Warfare Systems.

**Navy Comments.** The Deputy Assistant Secretary recommended revising the draft report statement that the Navy did not justify the ERGM quantity requirements reported in the approved acquisition program baseline agreement because the Navy Acquisition Executive does not have authority to require the Director, Surface Warfare Division to perform the required analysis.

**Audit Response.** We revised the statement in the report to say that the Secretary of the Navy rather than the Navy Acquisition Executive has the responsibility to direct the Director, Surface Warfare Division to perform the required analysis in accordance with guidance in DoD Instruction 3000.4.

**Navy Comments.** The Deputy Assistant Secretary recommended revising the draft report statement that the Commanding General, Marine Corps Combat Development Command did not provide the Navy with an analysis of the total number of ERGM rounds that would be required in the fleet inventory based on the Defense Planning Guidance and Quadrennial Defense Review because those studies addressed naval surface fire support and not total ERGM round requirements. He stated that the results of the four studies may be useful in determining quantities of munitions that will be required to support a single mid-to-high-density Major Theater War and a near simultaneous, small scale contingency.

**Audit Response.** We revised the report to state that the results from the four studies may have been useful in determining quantities of ERGM rounds needed for NSFS. However, the four studies by themselves did not provide a definitive number of ERGMs needed to support the ERGM inventory objective.

**Navy Comments.** The Deputy Assistant Secretary recommended deleting the sentence stating that the Director for Expeditionary Warfare's authority was further diminished after the November 2002 reorganization within the Office of the Chief of Naval Operations because it is inaccurate.

**Audit Response.** According to representatives within the Office of the Chief of Naval Operations, the role of the Director for Expeditionary Warfare was diminished as a result of the Sea Power 21 Chief of Naval Operations Strategic Actions Group reorganization. Further, Section 5038, title 10, United States Code, specifies that the Director for Expeditionary Warfare is responsible for determining warfare requirements, including determining the ERGM procurement objective. Accordingly, we did not delete this sentence.

**Navy Comments.** The Deputy Assistant Secretary recommended revising the draft report statement that the Navy did not have a viable acquisition program strategy to immediately acquire the ERGM rounds in FY 2008 when the system development and demonstration phase of the acquisition process is to be completed. He stated that the statement was inaccurate because the Navy has continually fully funded ERGM

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procurement quantities identified in the 1996 ERGM Acquisition Program Baseline agreement and that these procurement quantities have been validated by the non-nuclear ordnance requirements process.

**Audit Response.** The ERGM Program was not always fully funded. In March 2004, as stated in the report, the Director, Surface Warfare Division decided to realign and remove the ERGM procurement funding because of performance problems in developmental testing and the decision to delay the start of production until FY 2010. The Navy did not complete the non-nuclear ordnance requirements process until March 31, 2005, after we completed the audit. As required, the Navy should have developed an accurate and validated inventory for the ERGM Program and determined its affordability before the ERGM Program entered the engineering and manufacturing development phase of the acquisition process in July 1996. Accordingly, we did not revise those statements.

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## **Appendix G. Report Distribution**

### **Office of the Secretary of Defense**

Under Secretary of Defense for Acquisition, Technology, and Logistics  
Under Secretary of Defense (Comptroller)/Chief Financial Officer  
    Deputy Chief Financial Officer  
    Deputy Comptroller (Program/Budget)  
Director, Program Analysis and Evaluation

### **Joint Staff**

Director, Joint Staff

### **Department of the Army**

Auditor General, Department of the Army

### **Department of the Navy**

Chief of Naval Operations  
    Director, Naval Surface Warfare Division  
    Director for Expeditionary Warfare  
Commandant of the Marine Corps  
Assistant Secretary of the Navy (Manpower and Reserve Affairs)  
Assistant Secretary of the Navy (Research, Development, and Acquisition)  
    Commander, Naval Sea Systems Command  
        Program Executive Officer Integrated Warfare Systems  
        Project Manager, Naval Surface Fire Support  
Naval Inspector General  
Auditor General, Department of the Navy

### **Department of the Air Force**

Assistant Secretary of the Air Force (Financial Management and Comptroller)  
Auditor General, Department of the Air Force

### **Other Defense Organization**

Director, Defense Contract Management Agency

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## **Non-Defense Federal Organization**

Office of Management and Budget

## **Congressional Committees and Subcommittees, Chairman and Ranking Minority Member**

Senate Committee on Appropriations

Senate Subcommittee on Defense, Committee on Appropriations

Senate Committee on Armed Services

Senate Committee on Governmental Affairs

House Committee on Appropriations

House Subcommittee on Defense, Committee on Appropriations

House Committee on Armed Services

House Committee on Government Reform

House Subcommittee on Government Efficiency and Financial Management, Committee on Government Reform

House Subcommittee on National Security, Emerging Threats, and International Relations, Committee on Government Reform

House Subcommittee on Technology, Information Policy, Intergovernmental Relations, and the Census, Committee on Government Reform

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# Department of the Navy Comments



DEPARTMENT OF THE NAVY  
OFFICE OF THE ASSISTANT SECRETARY  
RESEARCH, DEVELOPMENT AND ACQUISITION  
1000 NAVY PENTAGON  
WASHINGTON, DC 20350-1000

**MAY 18 2005**

MEMORANDUM FOR THE ASSISTANT INSPECTOR GENERAL FOR AUDITING,  
DEPARTMENT OF DEFENSE

SUBJECT: Draft DODIG Audit Report On Extended Range Guided Munition Program  
(Project No. D2004AE-0163)

The Department of the Navy response to the subject report is attached.

A handwritten signature in black ink, appearing to read "Roger M. Smith".

Roger M. Smith  
Deputy Assistant Secretary of the Navy  
(Littoral and Mine Warfare)

Attachment:

1. Department of the Navy Response to DoDIG Report on Extended Range Guided Munition Program

**DEPARTMENT OF THE NAVY RESPONSE  
TO  
DODIG DRAFT REPORT ON THE  
EXTENDED RANGE GUIDED MUNITION PROGRAM  
(Project No. D2004AF-0163, Dated 31 March 2005)**

**Recommendation A1:** "We recommend that the Director for Expeditionary Warfare, Office of the Chief of Naval Operations, perform a requirements analysis to determine the quantity of Extended Range Guided Munitions needed to support Marine Corps Naval Surface Fire Support requirements as required in DoD Instruction 3000.4, *DoD Munitions Requirements Process (DoD MRP)*, October 23, 2003 using a verified, validated, and accredited requirements model as required in Marine Corps Order 3900.15A, *Marine Corps Expeditionary Force Development System*, November 26, 2002."

**DON Response:** We do not concur with Recommendation A1. The appropriate directorate within the office of the Deputy Chief of Naval Operations for Warfare Requirements and Programs (N7) who should conduct the requirements analysis is the Director, Warfare Integration and Assessment Division (N70). The classified (SECRET) DOD compliant Navy process for determining munitions requirements is the Non-Nuclear Ordnance Requirement (NNOR) process. The program sponsor for ERGM is the Director of Surface Warfare (N76) who, in consultation with the Director of Expeditionary Warfare (N75) and N70, has provided the Naval Gunnery Program Office (NGPO) with an unclassified estimated unit procurement number which is contained in the original Acquisition Program Baseline Agreement (APBA). The Extended Range Guided Mmunition (ERGM) offers the Navy a capability to accurately address targets at nearly 5 times the range of current conventional ammunition. However, this increased capability will come with an increased cost. Due to ERGM's GPS/INS accuracy, significantly less ERGM rounds are required to address a typical target set when compared to conventional ammunition. This precision versus volume fire tradeoff has not been accurately portrayed by studies using models that are limited in their ability to give "credit" for ERGM's accuracy as opposed to the ballistic dispersion of conventional ammunition. The Navy will continue to analyze precision versus volume tradeoffs, but will continue to use the DoD mandated NNOR process analysis. The PR07 NNOR ERM requirement, approved on 31 March 2005, was established through the use of NNOR model inputs and computations in accordance with DOD Instruction 3000.4.

The ongoing *"Joint Fires in support of Expeditionary Operations*

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*in the Littoral*" Initial Capabilities Document being developed by the Marine Corps Combat Development Command and the subsequent Extended Range Munition (ERM) Capabilities Development Document (CDD) will provide validated procurement numbers for ERGM. The CDD is expected to be approved by December 2005.

**Recommendation A2:** "We recommend that the Director, Naval Surface Warfare Division, Office of the Chief of Naval Operations and the Project Manager, Naval Surface Fire Support (NSFS) coordinate with the Director of Expeditionary Warfare, Office of the Chief of Naval Operations to obtain validated procurement quantities for the Extended Range Guided Munition as required in Secretary of the Navy Instruction 5000.2C, *Implementation of Mandatory Procedures for Major and Non-Major Defense Acquisition Programs and Major and Non-Major Information Technology Acquisition Programs.*"

**DON Response:** Concur. The ERGM program is being restructured to reflect the Navy's plan to conduct a full and open competition in FY05/06 to provide a 5" guided projectile capability. The restructured program, known as the Extended Range Munition (ERM), will proceed to a Milestone "B" decision in March 2006. As part of the Milestone review process, an Acquisition Program Baseline (APB) will be developed. The APB will provide an inventory objective that has been approved and validated by the CNO. Target completion date is March 06.

The Navy and Marine Corps consider NSFS to be a fundamental component of the triad of fire support vital for successful joint forcible entry operations in the littorals, particularly early in those operations when organic Marine Corps artillery is transitioning ashore. Detailed NSFS requirements for range, responsiveness, accuracy, lethality, and volume are developed in concert with the Marine Corps and are planned to evolve over time as new capabilities such as the Marine Corps Expeditionary Fighting Vehicle and V-22 enter the fleet. These specific requirements are being further analyzed and formalized in a Marine Corps-sponsored Initial Capabilities Document for *Joint Fires in Support of Expeditionary Operations in the Littorals*. This ICD will incorporate the requirements and consider all the contributing fire support capabilities available in the Joint force. In concert with our Sea Strike analysis, this ICD will also serve to identify our overall fire support capability gaps, the associated risk, and the most effective means to close those gaps both in the near-term and far-term. Expected approval date for the ICD is October 2005.

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**Recommendation A3:** "The ASN (RDA) direct the PM, NGPO to discontinue further funding of extended range munitions technology until the PM determines that validated procurement quantities of ERGM, BTERM, or any successor system needed to satisfy Marine Corps naval surface fire support requirements are affordable, and that the Navy can commit to timely and fully funding the production phase."

**DoN Response:** We do not concur with Recommendation A3. An Acquisition Strategy Program Review is scheduled with ASN (RDA) in late May 2005, and discontinuing further funding of this effort is an option that will be evaluated by the Milestone Decision Authority. It would be premature to stop the current ERGM program or the BTERM project, until after ASN (RDA) makes an informed decision. Both efforts are vital to ensuring a healthy competitive environment exists for any further competitions. The Navy and USMC are diligently working through the slow and deliberative requirements development process to determine and update procurement quantities. Any acquisition strategy approved by the MDA will require a fully funded program towards this requirement.

**Recommendation B:** Recommend that the Project Manager, Naval Surface Fire Support prepare and submit an updated Test and Evaluation Master Plan (TEMP) for the Extended Range Guided Munition that provides a description of the management structure of the test and evaluation working integrated process team, a detailed schedule and description of the test and evaluation events, a capabilities crosswalk matrix, a reliability growth plan that includes an additional 20 developmental guided flight tests, and test resource requirements for the approval of the Director, Operational Test and Evaluation.

**DON Response:** Concur in principle. As part of the Milestone B approval process for the Extended Range Munition (ERM) program, a TEMP will be developed expanding upon the Extended Range Guided Munition TEMP approved in 1996. As recommended by the DODIG, the new TEMP will provide a description of the management structure of the test and evaluation integrated process team, a detailed schedule and description of the test and evaluation events, a capabilities crosswalk matrix, and required test resource requirements.

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The Navy does not necessarily concur with the recommendation that an additional 20 guided flight tests are required. As part of the TEMP development process, the Navy and DOT&E will establish the appropriate number of guided flights required to demonstrate that all Key Performance Parameters (KPP's) are met, appropriate ERM safety and environmental requirements are adhered to, and that reliability requirements are met. Until analyses are completed in these areas, it is premature to determine that 20 additional guided flights is the appropriate number.

Target completion date is 31 March 2006.

**Additional clarifying comment:**

- **Page 6, "Coordinating ERGM Requirements" is as follows:**

**National Defense Authorization Act for Fiscal Year 1993 correctly states the following in regard to N75 role in supervising NSFS staff responsibilities.**

***"The Director for Expeditionary Warfare shall supervise the performance of all staff responsibilities of the Chief of Naval Operations regarding expeditionary warfare, including responsibilities regarding amphibious lift, mine warfare, **naval fire support**, and other missions essential to supporting expeditionary warfare."***

As we state in our response to Recommendation A1, the Director, Warfare Integration and Assessment Division (N70) is responsible for the Non-Nuclear Ordnance Requirements Process. N75 and N76 both participate in this process, which is used to determine the validated procurement objective for ERGM.

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Pages 4  
and 5

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Specific Recommended Changes

Num	Page	Old Text	New Text	Discussion
1	1	The ERGM round has a unitary warhead that is lethal against hardened targets.	The ERGM has a unitary warhead that is optimized for attacking soft targets such as troops in the open.	ERGM was not designed to efficiently attack hardened targets
2	2	The Navy plans to initially deploy the ERGM round on 32 Arleigh Burke Class destroyers beginning in 2011 and later deploy them on 22 Ticonderoga Class cruisers.	The Navy plans to deploy ERGM on 32 Arleigh Burke Class destroyers beginning in 2011.	The Navy no longer intends to make Ticonderoga cruisers capable of firing ERM.
3	4	The Major Program Manager is responsible for all Navy Surface ship weapons.	Delete entire sentence	Some weapons, such as Tomahawk are not within the purview of PEO IWS
4	5	The Navy did not justify the ERGM quantity requirements report in the approved acquisition program baseline agreement because the Navy Acquisition Executive (NAE) did not require the Director, Surface Warfare Division to perform the required analysis to determine the planned ERGM procurement objective as required in DoD Instruction 3000.4	The Navy's PR07 Non-Nuclear Ordnance Requirement was approved on 31 March 2005. The NAE does not "direct" CNO to perform any analysis to establish procurement objectives. In the case of ERGM, OPNAVINST 8011.9A and 8010.12 are used by CNO to determine munitions procurement objectives.	Comment is inaccurate.
5	7	The Commanding General, Marine Corps Combat Development Command did not provide the Navy with an analysis of the total number of ERGM rounds that would be required in the fleet inventory based on the DPG and the QDR.	The Commanding General, Marine Corps Combat Development Command provided the Navy with extrapolated results from 4 studies that may be useful in determining quantities of munitions that will be required to support a single mid to high intensity Major Theater War and a near simultaneous small scale Contingency. The quantities provided are not ERGM specific, but apply to all	Comment is inaccurate

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			types of surface fired munitions.	
6	7	The Director for Expeditionary Warfare's authority was further diminished after the November 2002 reorganization within the Office of the Chief of Naval Operations.	Recommend delete this sentence.	Comment is inaccurate.
7	8	The Navy did not have a viable acquisition program strategy to immediately acquire the ERGM rounds in FY 2008 when the system development and demonstration phase of the acquisition process is to be completed. This condition occurred because the Director, Surface Warfare Division did not have the ability to obtain full funding in the FYDP for the ERGM procurement objective needed to satisfy NSFS requirements.	The Navy has continually fully funded ERGM procurement quantities identified in the 1996 ERGM Acquisition Program Baseline. These procurement numbers have been validated by the NNOR process and have also taken into account ship fill (magazine size), affordability and procurement of other Naval gun fired munitions.	Comment is inaccurate

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## **Team Members**

The Department of Defense Office of the Deputy Inspector General for Auditing, Acquisition and Technology Management, prepared this report. Personnel of the Department of Defense Office of Inspector General who contributed to the report are listed below.

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