Audit Report

MARINE CORPS QUANTITATIVE MUNITIONS
REQUIREMENTS PROCESS

Report No. 99-051 December 10, 1998

Office of the Inspector General
Department of Defense

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Acronyms

CBMR	Capabilities-Based Munitions Requirements
CINCs	Commanders in Chief

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

December 10, 1998

MEMORANDUM FOR COMMANDING GENERAL, MARINE CORPS COMBAT DEVELOPMENT COMMAND

SUBJECT: Audit Report on Marine Corps Quantitative Munitions Requirements Process (Report No. 99-051)

We are providing this report for information and use. This is the fourth in a series of reports on DoD management and implementation of the capabilities-based munitions requirements process. We considered management comments on a draft of this report in preparing the final report.

Management comments conformed to the requirements of DoD Directive 7650.3. The Marine Corps concurred with the recommendations and stated that it will incorporate the recommendations in its FY 99 ammunition study and ensure that the model is verified, validated, and accredited as required.

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Ms. Jacqueline L. Wicecarver at (703) 604-9044 (DSN 664-9044), Ms. Kathryn M. Truex at (703) 604-9045 (DSN 664-9045), or Ms. Mary Lu Ugone at (703) 604-9049 (DSN 664-9049). See Appendix C for the report distribution. The audit team members are listed inside the back cover.

David K. Steensma

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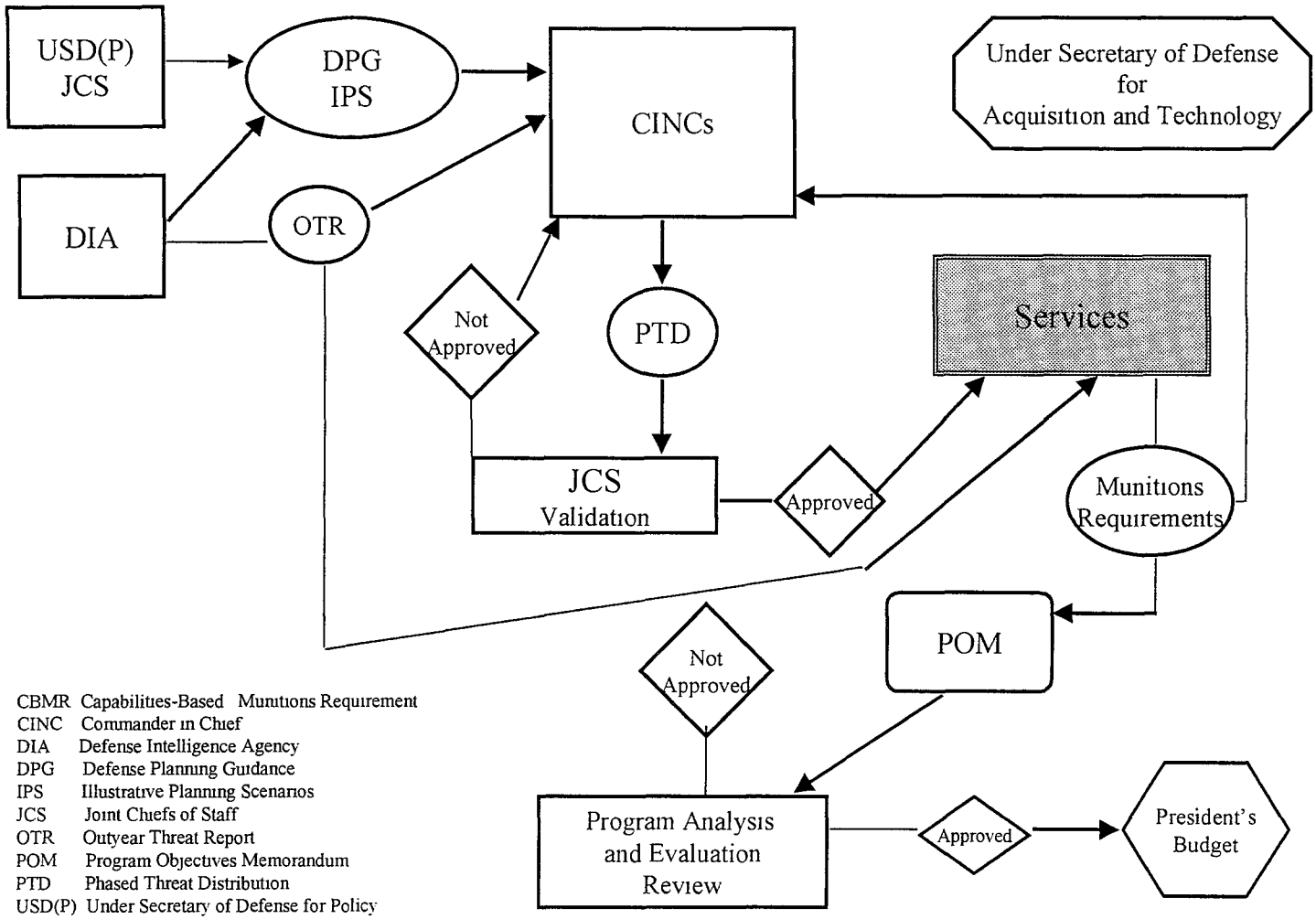

CBMR Capabilities-Based Munitions Requirement
CINC Commander in Chief
DIA Defense Intelligence Agency
DPG Defense Planning Guidance
IPS Illustrative Planning Scenarios
JCS Joint Chiefs of Staff
OTR Outyear Threat Report
POM Program Objectives Memorandum
PTD Phased Threat Distribution
USD(P) Under Secretary of Defense for Policy

Capabilities-Based Munitions Requirements Process

Office of the Inspector General, DoD

Report No. 99-051 **December 10, 1998**
(Project No. 7AL-0025.03)

Marine Corps Quantitative Munitions Requirements Process

Executive Summary

Introduction. This is the fourth in a series of reports on DoD management and implementation of the capabilities-based munitions requirements process. The prior reports are listed in Appendix B. The capabilities-based munitions requirements process identifies required procedures that the Military Departments and the U.S. Special Operations Command must follow to establish munitions requirements in support of the DoD Planning, Programming, and Budgeting System. The capabilities-based munitions requirements process requires that the Commanders in Chief of the Combatant Commands distribute outyear threats to the Services based on their warfighting concept of operations. Based on the threat distributions, the Services establish munitions requirements projected to the last year of the Future Years Defense Program to support planning for future procurements. The flow chart on the preceding page illustrates the capabilities-based munitions requirements process.

Objectives. The overall audit objective was to evaluate DoD models in generating quantitative munitions requirements. Specifically, we are continuing to evaluate DoD theater models in generating Service threat distributions, and we are evaluating Service models and assumptions in generating quantitative requirements. This report addresses the models and assumptions that the Marine Corps used to generate munitions requirements in support of the capabilities-based munitions requirements process. Previous reports addressed the capabilities-based munitions requirements theater models and associated analytical procedures used to generate threat distributions; the management of the capabilities-based munitions requirements process; and the Army and Navy process, models, and assumptions in generating quantitative requirements. Follow-on reports will address the Air Force and U.S. Special Operations Command models and assumptions in generating quantitative requirements. We also reviewed the adequacy of the management control program as it applied to the other stated audit objective.

Results. The Marine Corps used two different methods to determine its munitions quantities. Additionally, the Marine Corps did not reconcile the differences in quantities determined by the methods; use the Commanders in Chief phased threat distributions; submit requirements data in the required format; and did not independently verify, validate, and accredit the requirements generations models. As a result, the Marine Corps

potentially misestimated its munitions requirements, and did not meet the Commanders in Chief operational objectives. See Part I for a discussion of the audit results. See Appendix A for details on the review of the management control program.

Recommendations in this report, if implemented, will improve the Marine Corps process for generating quantitative munitions requirements in support of the capabilities-based munitions requirements process.

Summary of Recommendations. We recommend that the Commanding General, Marine Corps Combat Development Command, reconcile the differences in the quantities determined from the various methods; use the Commanders in Chief threat allocations; submit capabilities-based munitions requirements in the format required in DoD Instruction 3000.4; and verify, validate, and accredit models as required by DoD Instruction 5000.61.

Management Comments. The Marine Corps concurred with the recommendations, and stated that it will incorporate the report recommendations in its FY 1999 ammunition study. Additionally, the Marine Corps will ensure that the models are verified, validated, and accredited as required.

Audit Response. The Marine Corps comments were responsive to the intent of the report recommendations. No further comments are required.

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Background

The Capabilities-Based Munitions Requirement (CBMR) process identifies required procedures that the Military Departments and the U.S. Special Operations Command must follow to establish munitions requirements in support of the DoD Planning, Programming, and Budgeting System.[1] The CBMR process provides inputs to evaluate munitions procurements for adequacy, consistency, and appropriateness. DoD Instruction 3000.4, "Capabilities-Based Munitions Requirements (CBMR) Process," June 16, 1997, established procedures for military planners to base munitions requirements on the estimated quantity of munitions required to defeat specified threats within a given force structure.

Combat Requirements. Combat requirements are based on the Commanders in Chief (CINCs) phased threat distributions, using the Defense Intelligence Agency Outyear Threat Report as the authoritative threat estimate to evaluate wartime consumption. The Services determine the war reserve munitions requirements[2] by scenario as specified in the most current Defense Planning Guidance, considering wartime consumption and the policy to arm committed forces to their designed military capability.[3] The combat requirements address the operational objectives of the Commanders in Chief against potential threats, consider logistics capabilities, and ensure that the Services have an appropriate quantity of munitions. The residual readiness requirement is the quantity of munitions needed to provide a post-major theater of war combat capability for forces that are committed to Defense Planning Guidance scenarios. The strategic readiness requirement is the quantity of munitions needed to arm forces that are not committed to support combat operations in the assigned major theaters of war. The strategic readiness requirement also includes additional munitions requirements that are needed to meet treaty or statutory obligations to allies. The combat requirements are based on the CINCs phased threat distributions. Finally, the Services develop training, testing, and current operational requirements for each of the munitions. When the Services complete their munitions requirements process, the data are provided to the Under Secretary of Defense for Acquisition and Technology, and the Director, Program Analysis and Evaluation, in accordance with the formats in Enclosure 3 to DoD Instruction 3000.4.

Marine Corps Models. The Marine Corps uses a series of models and analytical procedures to calculate quantitative requirements in support of the CBMR process. Service-level models are used to generate quantitative requirements by identifying the quantities and types of munitions needed to defeat apportioned threats. DoD Instruction 5000.61, "DoD Modeling and Simulation (M&S) Verification, Validation, and Accreditation (VV&A)," April 29, 1996, requires that DoD Components establish validation, verification, and accreditation policies

[1]The DoD Planning, Programming, and Budgeting System is cyclic process that provides a formal, systematic structure for making decisions on policy, strategy, and developing forces and capabilities to accomplish anticipated missions.

[2]War reserve munitions requirement is the sum of combat, residual, and strategic readiness requirements.

[3]Designed military capability does not mean that every system must be filled to design capacity unless warranted by the threat or the nature of the operational requirement.

and procedures for the modeling and simulation used. The Services also use analytical procedures in conjunction with their models when they calculate quantitative requirements. The analytical procedures have a direct and significant impact on the final calculation of requirements.

The Marine Corps Combat Development Command, Studies and Analysis Division, led a review of 11 alternative and complementary methodologies to determine the best way to develop Marine Corps Class V(W) requirements. The review was a cooperative effort between the Marine Corps Ammunition Working Group Study Advisory Committee and the Analytical Systems Engineering Corporation. After the initial review, the Study Advisory Committee selected four computer modeling applications for further review: the original Marine Corps Ammunition Requirements Management System, the modified Marine Corps Ammunition Requirements Management System, the original Non-Nuclear Ordnance Requirement, and the modified Non-Nuclear Ordnance Requirement. The Marine Corps used these computer applications and subject-matter-expert estimates to determine its ground munitions requirements for the Program Objectives Memorandum for FY 1998 through FY 2003. The Marine Corps submitted the same information for the FY 2000 through FY 2005 Program Objectives Memorandum.

Objectives

The overall audit objective was to evaluate DoD models in generating quantitative munitions requirements. Specifically, we evaluated DoD theater models in generating Service threat distributions, and we are continuing to evaluate Service models and assumptions in generating quantitative requirements. This report addresses the processes, models, and assumptions that the Marine Corps used to generate ground munitions requirements in support of the CBMR process. We also reviewed the adequacy of the management control program as it applies to the audit objectives. See Appendix A for a discussion of the audit scope and methodology, the organizations visited and contacted during the audit, and the material management control weakness identified during the audit. See Appendix B for prior audit coverage related to the audit.

Marine Corps Quantitative Munitions Requirements Process

The Marine Corps used two different methods to determine its munitions requirements. However, the Marine Corps did not reconcile and document the significant differences that resulted from the different methods. Additionally, the Marine Corps did not use the CINCs phased threat distribution; did not submit requirements data in a compliant format; and did not independently verify, validate, and accredit its requirements generation models. The reported munitions requirements of the Marine Corps are questionable because it selects the larger result of the two different methods without reconciling the reason for the variances. As a result, the Marine Corps potentially misestimated its munitions requirements and did not meet the CINCs operational objectives.

Estimated Munitions Requirements

The Marine Corps has recognized over past years that it had not realistically estimated its ammunition requirements and, in 1995, it initiated efforts to correct the process. Before 1995, the Marine Corps estimated its ammunition requirements using various undocumented methods and discussions. In 1995, the Marine Corps initiated the Ground Ammunition War Materiel Requirement Determination Study (1995-1996) (the Study) to review its process for determining quantitative munitions requirements. The Study was to research, develop, and document the basic assumptions, strategic guidance implementation, operational planning, scenarios, weapon and ammunition data, and other variables for war materiel requirement methodologies to determine munitions and combat planning factors. The combat planning factors would aid in developing information for the Program Objectives Memorandum for FY 1998 through FY 2003 and would help the Fleet Marine Force Commanders to determine the requirements to support contingency operation plans. The Study focused on Marine Corps participation in two near-simultaneous Major Regional Contingencies[4] stated in the Defense Planning Guidance, based upon the Illustrative Planning Scenarios and the Naval Planning Scenarios. As the Combat Development Command completed the Study, the Defense Planning Guidance and the Illustrative Planning Scenarios was updated, which caused a corresponding change in the Marine Corps participation in the major theaters of war. Accordingly, the Marine Corps extended the Study to evaluate the differences in force allocation of Marine Corps units, extend timelines to each major theater of war, and evaluate attrition effects from aviation ordnance. Additionally, the Marine Corps updated the models to reflect more current weapons and identification code information.

The Study was established to help determine the requirements in the Program Objectives Memorandum for FY 1998 through FY 2003. However, the Marine Corps has a questionable process for determining its reported requirements. Additionally, the Marine Corps did not comply with DoD guidance to use the

[4] Major regional contingencies are now called major theaters of war.

CINCs phrased threat distributions and to report its munitions expenditures by target category in the Outyear Threat Report. Finally, the Marine Corps did not comply with DoD guidance because it used models that were not verified, validated, and accredited for the intended purpose.

Methods Used to Determine Munitions Requirements

The Marine Corps Combat Development Command Study Advisory Committee (the Committee) used two methods to develop combat munitions requirements for FY 1998 through FY 2003 and, again, for FY 2000 through FY 2005.

Modeled Method. The modeled method used 4 of the 11 models reviewed by the Committee. The Committee reviewed the models' data requirements using source documents, manuals, allocations and lists for scenarios, weapons systems, ammunitions, opposing forces, and naval gunfire and aviation with subject-matter-expert changes, as needed, to accommodate the uniqueness of the Marine Corps. The Committee's subject-matter and functional experts based their data on combined assumptions, military experiences, and estimates for shooter and target allocations, ammunition usage, tactics and schemes of maneuvers, weapon system employment, and weapon power ratings.

Additionally, the Committee used data on the forces that were employed in the Naval Planning Scenarios. The Committee analyzed the results to determine the objectivity and validity of the model output. The weapons were grouped according to the model methodology and output was compared from all the models. The Study concluded that:

- the models had considerable input data that was highly subjective and undocumented,
- the processes and methods used to determine ground munitions expenditures were based primarily on the traditional models of attrition warfare, and
- the effects of aviation and naval gunfire support were not adequately modeled.

The Marine Corps is to be commended for its objective identification of the process and model shortcomings. The Marine Corps used the results of the modified Marine Corps Ammunition Requirements Management System and the Non-Nuclear Ordnance Requirements-Q models munitions requirements to develop munitions requirements.

Combat Load Method. Once the Marine Corps determined its final requirements using the models, the Committee recommended that separately developed munitions quantities be determined by the combat load[5] method. The Committee recommended that specific threat-oriented, anti-armor weapons, such as the Javelin and Predator, be allocated at least 2.25 combat loads and threat anti-

[5]Combat load is the standard quantity and type of munitions carried by a weapons platform or its dedicated support vehicle.

air weapons, like the HAWK and Stinger, be allocated 1 combat load plus enough for operational and logistical losses.[6] The Committee assigned all other weapons 1.5 combat loads. The Committee did not explain or document the process it used to determine the combat loads for each weapon type system.

Comparison of Quantities from the Two Methods. The Committee made a quantitative comparison between the model-generated combat expenditures and the combat load quantities and found that reported munitions requirements of the Marine Corps were the larger quantity from either method. The Marine Corps Program Objectives Memorandums for FY 1998 through FY 2003 and FY 2000 through FY 2005 reflect the higher quantity of munitions. However, the Study did not reconcile and document the significant differences between the modeled and combat-load munitions quantities even though the Marine Corps compared requirements from each of the methods.

The table below shows the difference between the quantities for the modeled and combat load methods. Marine Corps reported requirements match the higher quantity regardless of the method used.

Comparison of Quantities

Quantity	Modeled Quantity	Combat Load Quantity	Difference	Reported Requirement
Mortar Rounds	682,405	54,433	627,972	682,405
Javelin	1,264	2,214	950	2,214
Predator	4,428	1,139	3,289	4,428
TOW Missile	1,695	792	903	1,695
M1A1	6,503	26,100	19,597	26,100

Residual and Strategic Readiness Requirements

The Marine Corps also uses the combat load process to determine its residual and strategic readiness requirements. The general assumption is that the weapons platform or its dedicated support vehicles are fully loaded before entering the conflict or operation plus an additional supply for a predetermined number of days.

Residual Readiness Requirements. The Marine Corps determined that its residual readiness requirements were two Maritime Prepositioning Ships Squadrons fully loaded with 30-day supply, three Air Contingency Force sets with 5-day supply, and the Landing Force Operational Readiness Material with 15-day supply. The Combat Development Command representative could not provide documentation that supported the purpose, logic, or amount of munitions allocated for the residual readiness requirements.

Strategic Readiness Requirement. The subject-matter experts allocated the combat loads for the following Marine Corps strategic readiness requirements: the Norway Airlanded Marine Air Ground Task Force; Ground Defense Force,

[6]Sufficient quantities for operational and logistical losses were not defined in the Marine Corps Study.

Guantanamo Naval Station; War Reserve for Support of Allies; and Peacetime Operating Stocks. Because the subject-matter experts did not document their recommendations, we could not determine whether they fully supported the Defense Planning Guidance, Illustrative Planning Scenarios, and DoD Instruction 3000.4.

CINCs Phased Threat Distribution

DoD Instruction 3000.4 requires the Services to base munitions requirements on threats that are developed by the CINCs. The Services must ensure that the munitions requirements meet the operational objectives of the CINCs, and that the correct quantity is procured to defeat specified threats.

Phased Threat Distributions. DoD Instruction 3000.4 requires the Services and the U.S. Special Operations Command to base calculations of combat requirements on the CINCs phased threat distributions. The CINCs phased threat distributions assign a share of the threat target base to each supporting Component, allowing for a reasonable overlap among Services to ensure operational flexibility. The Marine Corps, however, used threat data generated by the Marine Corps Intelligence Agency instead of the CINCs phased threat distributions to determine its combat requirements and specifically did not address the CINCs allocations in three categories of threat distribution. The Combat Development Command representative stated that the Marine Corps determined munitions requirement based on capabilities and tactics and computed the Marine Corps threat. In response to a discussion draft of this report, a Marine Corps representative stated the Marine Corps compared the CINCs threat allocation to the Marine Corps Intelligence Agency force structures when determining munitions requirements. However, the Marine Corps was not able to provide documentation to support this comparison. We do not question the Marine Corps Intelligence Agency use of authorized intelligence information, but rather the use of the CINCs phased threat distribution as the basis for determining munitions requirements as required by DoD Instruction 3000.4.

Data Formats

Data formats of the Marine Corps do not comply with DoD Instruction 3000.4, which requires the Services and the U.S. Special Operations Command to identify the total number of targets killed, by type of munitions employed, for each major theater of war using the Defense Intelligence Agency target type II categories. Enclosure 3, Figure 3-1, of DoD Instruction 3000.4 provides an example of the specific data and format the Services and the U.S. Special Operations Command should submit for review and analysis. A representative from the Office of the Under Secretary of Defense for Acquisition and Technology stated that the information provided by the Marine Corps for the 1997 CBMR, based on the Program Objectives Memorandum FY 1998 through FY 2003, was unacceptable. The Marine Corps agreed to provide the Program Objectives Memorandum FY 2000 through FY 2005 information in the required format. However, the Combat Development Command did not change the FY 2000 through FY 2005 information or format and did not comply with DoD Instruction 3000.4 reporting

requirements. Because the CBMR information was not compiled and submitted in the correct format, it was difficult for the Office of the Under Secretary of Defense for Acquisition and Technology to determine whether the Marine Corps met the operational capabilities of the CINCs.

Guidance for Model Use

The Marine Corps did not comply with DoD Instruction 5000.61 because the Marine Corps Ammunition Requirement Management System and Non-Nuclear Ordnance Requirement-Q models were not verified, validated, and accredited for their intended purpose. In addition, the Combat Development Command has not implemented plans to verify, validate, and accredit the models used to determine capabilities-based munitions requirements. The Marine Corps has not planned and provided the resources to ensure that the models are verified, validated, and accredited to comply with DoD Instruction 5000.61.

Estimated Requirements

The Marine Corps potentially misestimated its capabilities-based munitions requirements because the Combat Development Command Study Advisory Committee selected the munitions quantities based on an unreconciled and undocumented process. Additionally, the Marine Corps used internally generated threats instead of those developed and allocated in the CINCs phased threat distributions. The Marine Corps did this because its threat data more closely follows the Marine Corps' operations and military doctrine. Finally, the Marine Corps did not ensure that the models used were verified, validated, or accredited because its intent was to use the Study as an aid to develop the Program Objectives Memorandum for FY 1998.

Requirements Process Results

As a result, the process that the Marine Corps used to determine its CBMR may potentially misestimate its FY 1998 through FY 2005 procurements. Additionally, the Marine Corps threat allocations allowed vulnerabilities in the CINCs operational capability. Finally, the Marine Corps did not comply with DoD Instructions 3000.4 and 5000.61 to better ensure that the munitions quantities developed and the models used are reliable. The Marine Corps CBMR process can be improved by implementing the recommendations in this report.

Management Comments on the Finding and Audit Response

Management Comments. The Marine Corps stated that it met the CINCs phased threat allocation requirements for each campaign and scenario. The Marine Corps

also commented that it was not required to comply with DoD Instruction 5000.61 because the Instruction was signed after the 1995-96 Phase I and Defense Planning Guidance Assessment reports were completed.

Audit Response. We do not agree with all the details of the Marine Corps response to the report finding. For example, it is not clear how the Marine Corps confirmed that the final combat requirements met the CINCs phased threat distribution when documentation showed that three threat categories were not covered. Additionally, the Marine Corps commented that the 1995-96 Phase I and the Defense Planning Guidance Assessment reports were completed before DoD Instruction 5000.61 was signed. The final reports, for Program Objectives Memorandum 1998, were dated February 10, 1997, 9 months after DoD Instruction 5000.61 was signed. In June 1993, the Marine Corps issued a message that recognized the importance placed by Congress and DoD on modeling and simulation efforts. To support that effort the Marine Corps issued guidance on modeling and simulation management, the Secretary of the Navy Instruction 5200.38, "Department of the Navy Modeling and Simulation Program," October 18, 1994. Navy Instruction 5200.38 applies to all analyses supporting the development of the Department of the Navy Program Objectives Memorandum. Other earlier guidance included DoD Directive 5000.59, "DoD Modeling and Simulation Management," January 4, 1994, which established policy, assigned responsibilities, and prescribed procedures for the management of modeling and simulation. In addition, the Marine Corps Modeling and Simulation Master Plan, July 26, 1994, articulates the vision, objectives, and management framework for the Marine Corps.

Recommendations and Management Comments

We recommend that the Commanding General, Marine Corps Combat Development Command:

1. Implement the requirements of the DoD Instruction 3000.4, "Capabilities-Based Munitions Requirements (CBMR) Process" for the 1999 capabilities-based munitions requirements cycle. Compliance should specifically include:

    a. Using the Commanders in Chief phased threat distributions.

    b. Submitting munitions data in the required format.

    c. Reconciling and documenting the significant differences determined by the modeled and combat-load methods.

2. Comply with the requirements of the DoD Instruction 5000.61 to verify, validate, and accredit models used to determine capabilities-based munitions requirements for the 1999 cycle.

Management Comments. The Marine Corps concurred and stated the FY 1999 ammunition study will incorporate the audit recommendations. Further, the Marine Corps will ensure the resulting model is accredited, verified, and validated.

Appendix A. Audit Process

Scope

We evaluated the methodology that the Marine Corps used to generate munitions requirements to determine whether it was reasonable and in compliance with DoD Instruction 3000.4. Specifically, we evaluated the Marine Corps' process, models, assumptions, and associated analytical procedures in generating quantitative requirements, and we assessed their impact on the CBMR process. Our review included the procedures that the Marine Corps used to develop the data presented in the Marine Corps Ground Ammunition War Materiel Requirement Determination Study (1995-1996). We assessed the Marine Corps' generation of threat distributions to include warfighting analysis; inputs, operations, and outputs of the original and modified Marine Corps Ammunitions Requirements Management System; and the original and modified Non-Nuclear Ordnance Requirements. Our evaluation of the Marine Corps procedures for generating quantitative requirements included evaluating the six final reports for the Ground Ammunition War Materiel Requirements Determination Study (1995-1996); the final report of the Defense Planning Guidance Assessment; briefing charts; the 1997 CBMR munitions requirements; and correspondence and interviews with the Combat Development Command. We evaluated records and interviewed personnel from August 1997 through July 1998.

DoD-wide Corporate Level Government Performance and Results Act. In response to the Government Performance and Results Act, the Department of Defense has established 6 DoD-wide corporate level performance objectives and 14 goals for meeting these objectives. This report pertains to achievement of the following objective and goal.

- **Objective:** Fundamentally reengineer DoD and achieve a 21st century infrastructure.
- **Goal:** To reduce costs while maintaining required military capabilities across all DoD mission areas. (DoD-6)

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

Methodology

Computer-Processed Data. We relied on final reports from the Marine Corps and its 1998 CBMR munitions requirements data sheets. We did not verify the accuracy of the data. However, data validity would not affect our audit conclusions because we focused on the process and not on the data.

Sampling Procedures. We used nonstatistical sampling procedures to evaluate the Marine Corps' process for generating requirements for munitions. We

reviewed all Marine Corps procurement budget data items in the Office of the Secretary of Defense President Budget 1998 Conventional Munitions Master Plan. Additionally, we judgmentally selected five items from Marine Corps documentation to illustrate the methods used by the Marine Corps to determine munitions quantities.

Technical Assistance. We obtained technical assistance from operations research analysts, Office of the Inspector General, DoD, to evaluate the models used to generate threat distributions and munitions requirements.

Audit Type, Dates, and Standards. We performed this economy and efficiency audit from March 1998 through August 1998. The audit was conducted in accordance with auditing standards issued by the Comptroller of the United States, as implemented by the Inspector General, DoD.

Contacts During the Audit. We visited or contacted individuals and organizations within DoD. Further details are available on request.

Management Control Program Review

DoD Directive 5010.38, "Management Control (MC) Program," August 26, 1996, requires 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. We reviewed the adequacy of management controls as they relate to the determination capabilities-based munitions requirements. We included tests of management controls considered necessary to satisfy audit objectives. Specifically, we reviewed those management controls over the planning, developing, and documenting the requirements generation processes.

Adequacy of Management Controls. We identified a material management control weakness in the procedures to generate quantitative requirements for munitions as defined by DoD Directive 5010.38. Specifically, the management controls implemented by the Combat Development Command could not ensure that the Marine Corps effectively generated quantitative requirements for its munitions. Specifically, the Marine Corps did not reconcile significant differences in estimating methodologies. In addition, the Marine Corps did not implement existing controls, which required using the CINCs phased threat distributions, submitting information in the required format, and verifying, validating, and accrediting models. We could not quantify Marine Corps munitions quantity misstatements. The recommendations in this report, if implemented, will improve the controls for developing capabilities-based munitions requirements. A copy of this report will be provided to the senior officials responsible for management controls for the Marine Corps.

Adequacy of Management's Self-Evaluation. The Marine Corps did not perform a self-evaluation that identified the designated office responsible for

generating its munitions requirements. As a result, the Marine Corps did not identify or report the material management control weakness that the audit identified.

Appendix B. Summary of Prior Coverage

During the last 5 years, the General Accounting Office issued two reports and the Office of the Inspector General, DoD, issued six reports that are related to the generation of DoD quantitative requirements for munitions.

General Accounting Office

General Accounting Office Report No. GAO/NSIAD-97-93 (OSD Case No. 1312), "Army Acquisition: Longbow Hellfire Missile Procurement Quantities Significantly Overstated," May 1997.

General Accounting Office Report No. GAO/NSIAD-96-72 (OSD Case No. 1075), "U.S. Combat Air Power: Reassessing Plans to Modernize Interdiction Capabilities Could Save Billions," May 1996.

Inspector General, DoD

Inspector General, DoD, Report No. 99-043, "Navy quantitative Requirements for Munitions," December 3, 1998.

Inspector General, DoD, Report No. 98-167, "Army Quantitative Requirements for Munitions," June 26, 1998.

Inspector General, DoD, Report No. 98-160, "Management Oversight of the Capabilities-Based Munitions Requirements Process," June 22, 1998.

Inspector General, DoD, Report No. 98-092, "Threat Distributions For Requirements Planning At U.S. Central Command and U.S. Forces Korea," March 20, 1998.

Inspector General, DoD, Report No. 96-176, "Army's and Marine Corps' Quantitative Requirements for Blocks I and II Stinger Missiles," June 25, 1996.

Inspector General, DoD, Report No. 95-265, "Summary Report on the Audits of Anti-Armor Weapon Systems and Associated Munitions," June 29, 1995.

Inspector General, DoD, Report No. 95-157, "Army's Processes for Determining Quantitative Requirements for Anti-Armor Systems and Munitions," March 29, 1995.

Appendix C. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology
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Under Secretary of Defense (Comptroller)
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Commander, Marine Corps Combat Development Command
Auditor General, Department of the Navy

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House Committee on Appropriations
House Subcommittee on National Security, Committee on Appropriations
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House Subcommittee on National Security, International Affairs, and Criminal Justice, Committee on Government Reform and Oversight
House Permanent Select Committee on Intelligence

Marine Corps Comments

DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
2 NAVY ANNEX
WASHINGTON, DC 20380-1775

IN REPLY REFER TO:
7500/7AL-0025.03
RFR-10/rfk
12 November 1998

MEMORANDUM FOR THE INSPECTOR GENERAL, DEPARTMENT OF DEFENSE
ACQUISITION MANAGEMENT DIRECTORATE

Subj: AUDIT REPORT ON MARINE CORPS QUANTITATIVE MUNITIONS REQUIREMENTS PROCESS (PROJECT NO. 7AL-0025.03)

Ref: (a) DODIG memo dtd 9Sep98
(b) Marine Corps Ground Ammunition War Materiel Requirements (WMR) Determination Study (1995-96)

1. Reference (a) transmitted the draft of the subject audit report for review, and requested Marine Corps comments.

2. The following comments are provided:

FINDING: "The Marine Corps used two different methods to determine its munitions requirements. However, the Marine Corps did not reconcile and document the significant differences that resulted from the different methods. Additionally, the Marine Corps did not use the CINCs phased threat distribution; did not submit requirements data in a compliant format; and did not independently verify, validate, and accredit its requirements generation models. The reported munitions requirements of the Marine Corps are questionable because it selects the larger result of the two different methods without reconciling the reason for the variances. As a result, the Marine corps potentially misestimated its munitions requirements and did not meet the CINCs operational objectives."

MARINE CORPS RESPONSE:

- *"The Marine Corps did not reconcile differences in quantities determined by the models."* Nonconcur. The Marine Corps did reconcile the differences in quantities determined by the two models. We did not, however, adequately document our rationale in Reference (b) to the satisfaction of the DODIG. Evidence of this rationale exists in the form of spreadsheets and appropriate communication (E-mails) from the Study Advisory Committee (SAC). The SAC examined comparisons of ammunition requirements based upon modeled output requirements versus combat load requirements. The methodology to arrive at the combat load requirement was a subjective endeavor that underwent extreme scrutiny at all levels of the Marine Corps. Each individual ammunition DODIC was then examined. The greater of the modeled output or combat load was then chosen as the Marine Corps requirements for that specific DODIC.

- "*The Marine Corps did not use the CinC's Phased Threat distributions.*" Nonconcur. Page 19 of Reference (b) states, "Further analysis by the Study Team confirmed that the final combat requirements generated by the WMR Study met the CinC's time phased threat allocation requirements for each campaign/scenario as specified by the CBMR process

- "*The Marine Corps did not submit requirements in the required format.*" Concur. When Reference (b) was submitted, DODINST 4100.41 was in effect and it specified no required formats for data submission. Prior to the next required submission, the DODINST 4100.41 was replaced by DODINST 3000.4 and specific reporting formats were required. Because the Marine Corps models were developed while the DODINST 4100.41 was in effect, the reference did not comply with the new DODINST 3000.4. The Marine Corps did not pursue a POM 00 ammunition study since there had been no significant changes to weapons, to force structure, or to the DPG IPS. Thus, the models were not modified in accordance with the newly required formats. The Marine Corps is undertaking an FY99 ammunition requirements determination study and an objective of this effort is to modify models to comply with the new DODINST.

- "*The Marine Corps did not independently verify, validate, and accredit its requirements generation models.*" Nonconcur. DODINST 5000.61 of 29 April 1996, applies to "all DoD Modeling and Simulation used after the effective date of this instruction." The 1995-96 Phase I report and the DPG assessment report were completed prior to this date and were therefore not required to comply with the DODINST 5000.61. Additionally, Studies and Analysis Division, MCCDC, is the accrediting agent for models used by and for the Marine Corps. This Division provided representatives for the SAC, where they reviewed the modeling efforts during all phases of this study.

RECOMMENDATIONS: "We recommend that the Commanding General, Marine Corps Combat Development Command:

"1. Implement the requirements of the DoD Instruction 3000.4, 'Capabilities-Based Munitions Requirements (CBMR) Process' for the 1999 capabilities-based munitions requirements cycle. Compliance should specifically include:

"a. Using the Commanders in Chief phased threat distributions.

"b. Submitting munitions data in the required format.

"c. Reconciling and documenting the significant differences determined by the modeled and combat-load methods.

"2. Comply with the requirements of the DoD Instruction 5000.61 to verify, validate, and accredit models used to determine capabilities-based munitions requirements for the 1999 cycle."

MARINE CORPS RESPONSE: Concur. The FY99 ammunition study will incorporate the recommendations of the DODIG. The Marine Corps will ensure that the resulting model is accredited, verified, and validated as required by the DODINST 5000.61.

Robert F. Kassel
By direction of the
Commandant of the Marine Corps

Audit Team Members

The Acquisition Management Audit Directorate, Office of the Assistant Inspector General for Auditing, DoD, produced this report.

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