

GAO

Report to the Honorable
Nancy Landon Kassebaum, U.S. Senate

August 1992

OPERATION DESERT STORM

War Offers Important Insights Into Army and Marine Corps Training Needs



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The Honorable Nancy Landon Kassebaum
United States Senate

Dear Senator Kassebaum:

This report describes the focus of training for United States ground combat forces in preparing for Operation Desert Storm. It identifies key areas that need to be emphasized in peacetime training and the importance of continuous emphasis on training to minimize skill decay and maintain proficiency and readiness—and ensure the ability to fight and win. It underscores the importance of innovative training in a resource constrained environment.

As you requested, we plan no further distribution of this report until 10 days after its issue date. At that time, we will send copies to the Chairmen of the House and Senate Committees on Appropriations; the Chairmen of the House and Senate Committees on Armed Services; the Director, Office of Management and Budget; and the Secretaries of Defense, the Army, and the Navy. Copies will also be made available to other interested parties upon request.

This report was prepared under the direction of Paul L. Jones, Director, Defense Force Management Issues, who may be reached on (202) 275-3990, if you or your staff have any questions concerning this report. Other major contributors to this report are listed in appendix II.

Sincerely yours,

Frank C. Conahan
Assistant Comptroller General

Executive Summary

Purpose

In August 1990, when Iraq invaded Kuwait, many military officials considered the yet-to-be deployed U.S. military ground forces to be better prepared than ever to fight and win. However, these forces were also known to have several areas where increased training emphasis was needed because they had exhibited some recurring performance weaknesses during unit training exercises. Although Operation Desert Storm ground operations would prove to be of limited duration, this outcome was not known as the forces prepared for war. The months of preparation leading up to battle provided an environment for gaining important insights into future training needs and priorities.

A growing interest in the military's training needs, particularly ground forces, led Senator Nancy Kassebaum to request that GAO determine (1) what was the focus of preparatory training for Operation Desert Storm ground operations, (2) what factors accounted for the great success in the area of command and control of maneuver forces, and (3) what implications might be drawn for future peacetime training.

Background

U.S. training manuals recognize that soldiers and marines must train continually to develop and maintain combat skills. In addition, senior military leaders recognize that rigorous, repetitive training is essential if the military is to be prepared to fight and win the first battle and minimize casualties. Winning the first battle has proven difficult and costly in past wars. History has shown that when military forces are sufficiently trained to win the initial battles, their chances of success and for minimizing losses in later battles increases significantly.

Much peacetime training takes place at the individual and unit levels at home stations and through periodic rotations to special combat training centers. These centers magnify the intensity of training and provide as much realism as is possible in a peacetime environment. Many military leaders see rigorous peacetime training as a key to the heightened proficiency of today's military. Despite the recognized quality of today's combat forces, various areas requiring increased emphasis have been recognized repeatedly in recent years in after-action reviews of training events, including the need for greater attention to individual and small unit skills, rehearsals, and staff planning.

From August 1990 until the onset of the ground war in February 1991, U.S. military forces trained with perhaps even greater motivation and intensity than ever before amid strong prospects for ground combat but uncertainty over when it would begin.

Results in Brief

From GAO's discussions with military leaders, the type of training U.S. forces underwent just prior to deployment and after arriving in country focused on (1) individual and small unit and (2) battle staff training, that is, planning and controlling combat operations. These areas have been recognized as increasingly important in recent years, but have not always received adequate attention, and thus have been identified as the source of some common recurring training weaknesses.

The emphasis on battle staff training has been given credit for much of the success in the command and control of maneuver forces. Several approaches to training received heightened use and recognition, increasing their potential for use in peacetime training. These included the importance of rehearsals and repetition in training, the use of noncommissioned officers as trainers, and the growing importance of computer simulations.

Although actual Desert Storm ground operations were of short duration, they accentuated the need to strengthen peacetime emphasis on joint training, training for deployment, and training involving logistical and other support functions. The lessons learned also suggest the continuing need for a strong emphasis on training and readiness during peacetime as a precaution against skill deterioration. In many respects those lessons were not new lessons but old ones revalidated.

Principal Findings

Emphasis on Individual and Small Unit Training Was Essential to Success

Individuals deployed to the Persian Gulf varied both in how long they had been with their units and the time they had spent together training—some units were at peak proficiency in terms of recent training, while others were just beginning periods of concentrated training with many personnel relatively new to their units. Irrespective of these differences, ground commanders gave individual and small unit training the greatest priority in preparing for combat.

Commanders gave priority emphasis to weapons firing, battle drills, and rehearsals. They built on individual and small unit training to build soldiers' and marines' confidence in themselves, their weapons, and their leaders, and progressed to larger unit size training. Commanders made extensive use of noncommissioned and junior officers to train individual soldiers, marines, and small units—an area of emphasis Army and Marine Corps

officials had recognized as needing increased emphasis in peacetime. They used some innovative training approaches, such as substituting wheeled vehicles for tanks in some maneuver training, that while not a replacement for more traditional training, offered important advantages in a resource-constrained environment.

Battle Staff Training Accounted for Much Success in Command and Control

Army and Marine Corps officers cite the emphasis given to battle staff training as critical to the success they enjoyed in commanding and controlling large-scale maneuver forces in the desert. The importance of battle staff training, including the use of computer simulations, has received increasing recognition in recent years, particularly within the Army, and by many accounts, should receive even greater emphasis in the future. Such training is especially important for officers who command and control large-scale combat operations.

Battle staffs consist of the commander and officers from various parts of their own and other support organizations put together to help plan, synchronize, and control combat operations. Battle staff training gives them the opportunity to develop their own skills, strengthen staff interactions, and increase the team's proficiency in managing and coordinating the systems that directly and indirectly support combat operations. The training can range from exercises where each member of the staff, using a map and symbols representing a proposed operation, explains their understanding of the mission, to complex simulations in which a computer executes the staff's plans and displays the results of the operation. Various types of staff training were used in preparing for Desert Storm ground operations. Comments from many officials emphasized that the war validated and reinforced the importance of this training. The Army is devoting much attention to developing its capabilities in this area using computer simulation technology. Marine Corps officials have also cited the need and desire to make greater use of computer simulations.

Implications for Future Training

While Desert Storm ground operations were of limited duration, they highlighted weaknesses in several training areas. The need for increased emphasis on joint training, large-scale deployments, and logistical support was widely recognized in the aftermath of the war. Although existing training gave some attention to these areas, various officials indicated that the war demonstrated the need for greater emphasis on deployment training to develop proficiency in executing processes and procedures associated with deployments of large-scale forces—force levels not

normally reached in peacetime training exercises. Weaknesses were also recognized in the command and control of support organizations in a combat environment due to limited training with combat forces in peacetime. Various officials and lessons learned reports indicate that the war demonstrated the importance of joint training exercises and the need for even greater emphasis on enhancing coordination and common understanding of procedures, processes, and terminology. Some officials indicate that the need for joint training is not limited to large-scale exercises. DOD and service officials told GAO that these needs are being addressed in post-war training.

A continuous emphasis on training is important to minimize skill decay and maintain proficiency and readiness—and the ability to fight and win the first battle of the next war. Preparations for Desert Storm ground combat underscored the importance of basic soldier and marine skills, and gave increased recognition to the importance of staff level training as well as the need for increased training in some other areas. All of this accentuates what many military trainers already consider a “full training plate.”

Various peacetime constraints, ranging from time, resources, personnel turbulence and other factors, require that commanders make trade-offs in formulating training programs and that, as in war, innovative substitutes to traditional approaches may be required to maximize training opportunities in a resource-constrained environment. The war showed that such innovative substitute approaches are not necessarily less effective and, in some instances, may offer important advantages. In some instances GAO noted increased emphasis in these training areas after units and their commanders returned from the war.

Recommendations

GAO is not making recommendations in this report.

Agency Comments

The Department of Defense fully concurred with the report's findings and conclusions. (See app. I.)

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Abbreviations

BCTP	Battle Command Training Program
CALL	Center For Army Lessons Learned
GAO	General Accounting Office
MCLLS	Marine Corps Lessons Learned System
MCAGCC	Marine Corps Air/Ground Combat Center
MEF	Marine Expeditionary Force
NCO	noncommissioned officer
NTC	National Training Center
SOP	standard operating procedure

Introduction

Well-trained soldiers and marines are the foundation for well-trained units and the key to the success of larger units in military operations. Likewise, well-trained leaders and battle staffs are important to battle planning, command and control and synchronization of maneuver units, and the execution of battle plans. Important training takes place at home stations, where units are permanently stationed, as well as at specialized combat training centers designed for realistic large-scale combat exercises. However, various resource constraints, including time, funding, and personnel turnover can inhibit units' abilities to develop and maintain high levels of training proficiency. Assessments of training exercises at combat training centers in recent years have suggested that large-scale exercises by themselves are only a part of balanced training programs. They must be undergirded by strong individual and small unit training programs as well as strong training of commanders and their battle staffs.

Important advances have been made in recent years in the use of computer simulations to enhance training at all echelons. These simulations permit more concentrated and repetitive training through use of such means as tactical training simulators for gunnery and maneuver and computer simulation exercises focusing on command and control and staff training. However, differences of opinion have existed within the military over how far the services would or should go in embracing this new technology and to what extent it should offset or replace traditional field training; answers to questions about the "right mix" of these types of training are not clear-cut.

Building Block Approach to Training Ground Forces

The training of ground combat forces begins with the development of individual soldier and marine skills and continues through small unit drills to higher echelon, large-scale combined arms live-fire and maneuver exercises.¹ The basic building block is training that concentrates on teaching individual soldiers and marines to perform specific duties and tasks associated with their military occupational skills. Individual skills include marksmanship with individual and crew-served weapons, tactical skills such as movement at night, reaction to direct and indirect fire, selection of firing positions, construction of defensive positions,

¹The term "echelon" refers to a separate level of command. Squads, platoons, companies, battalions, brigades or regiments, and divisions are succeeding higher echelons of command in the Army and Marine Corps. Squads and platoons are normally the central focus of what is referred to as small unit training.

surveillance, and security. **Collective training is the training of one or more military units above the soldier level.**

Modern military doctrine requires combined arms² and associated support services teamwork. When committed to battle, units must be prepared to execute combined arms and services operations without additional training or lengthy adjustment periods. Collective training teaches soldiers and marines to work as a unit, and part of a combined arms team, to complete key, essential tasks. To be successful the soldiers and marines participating in a collective training exercise should possess the individual skills needed to complete the tasks being trained.

Time, funding constraints, and personnel turbulence make it difficult for units to progress sequentially from individual training to large-scale exercises. Therefore, some degree of concurrent or simultaneous training of multiple forces and events is often necessary.

Once individuals and units have reached a desired level of proficiency, Army and Marine Corps training guidance calls for leaders to follow their collective and individual training plans to repeat critical task training as a way to sustain proficiency and to prevent skill decay. Sustainment training often must be done while training personnel new to the unit.

Home Station Training

Most training occurs at the individual and unit level, at home stations, where units are permanently located, or at other off-post locations. At home stations, unit commanders develop and execute a regular schedule of training events designed to train individual and collective skills. Home station training includes field training exercises permitting individuals and units to use their equipment over actual terrain and gives commanders and their staffs the opportunity to exercise command and control and synchronize the use of their forces.

Home station training for ground forces ranges from small, limited-scale exercises involving a few soldiers and marines, to large-scale exercises involving battalion or brigade-size units for Army forces and company-size units for marines. Some training employs small situational training exercises designed to train soldiers in a closely related group of tasks or

²The term "combined arms" refers to two or more types of organizations such as armor, infantry, cavalry, aviation, field artillery, air defense artillery, and engineering, that support one another in combat operations.

drills. Other training events may use command field exercises in which a unit's leadership conduct tactical operations without using the entire unit's personnel. Larger scale field training exercises may involve battalion or brigade task force tactical missions. In the case of the Army, these exercises may include live-fire exercises or pit one force against another using a special laser training device to simulate weapons fire.³

The Marine Corps generally conducts live-fire field exercises rather than force-on-force exercises. Corps officials recognize the benefit of force-on-force maneuvers but said they were constrained by resource limitations.

Both Army and Marine Corps field training employ a variety of training aids, equipment simulators, and other battle simulations (manual and computer-assisted) to depict wartime conditions while making efficient and effective use of their resources.

The size of home station training areas available to units varies greatly, particularly between units stationed overseas and those in the United States. For example, local training areas for units stationed in Germany have historically varied in size from 3 to 8,000 acres, with divisional units not always housed at the same location. In the United States, individual installations vary, but far more land is available and typical installations may vary in size from just under 100,000 acres up to more than 1,000,000 acres. Regardless of the location, often there have been limitations in the frequency and types of training because of constraints ranging from safety, costs, time available, environmental considerations, and competing demands for space.

Combat Training Centers

The history of battle, the experience of commanders, and the judgment of military leaders all confirm the direct link between training and victory in war. An important lesson learned from the war in Vietnam was that well-trained forces are more likely to survive their first missions and that their chances for survival increase with each successful mission. Military leaders have often considered larger scale training exercises, building on established proficiency of individuals and small units, to be the best method, short of war, to test their ability to effectively deploy and execute missions. However, due to resource constraints and other factors,

³This device is known as the "Multiple Integrated Laser Engagement System."

large-scale exercises have often been difficult to accomplish at home stations, particularly for units stationed in Germany. In the United States, maneuver training can typically be done for up to a battalion-size force at home stations, whereas in Germany, training at home stations and other local training areas is typically no more than at platoon level.⁴

To provide realistic training and adequate assessment of their combat units' capabilities, the Army, and to a lesser extent, the Marine Corps, have come to rely on specialized combat training centers. The Army has three tactical training centers and one simulation training center in its family of combat training centers. The Marine Corps has one combat training center. These large training centers add degrees of realism and rigor to training not otherwise available in peacetime.

The Army's tactical training centers include the National Training Center (NTC) at Fort Irwin, California, and its smaller counterpart, known as the Combat Maneuver Training Center,⁵ at Hohenfels, Germany. Mechanized infantry and armored battalions complete a "rotation" to these training centers every 12 to 18 months to participate in maneuver training exercises against an opposing force. Live-fire gunnery training is also conducted at the NTC as well as at a separate dedicated site in Germany. A third tactical training center, the Joint Readiness Training center at Fort Chaffee, Arkansas, is used primarily by light infantry forces, including on occasion marine units. A fourth center or program, the Battlefield Command Training Program (BCTP) focuses on computer-simulated command and control training for division and corps staff. It operates by telecommunications links between Fort Leavenworth, Kansas, and the participating units stationed elsewhere in the United States or overseas; a permanent opposing force is stationed at Fort Leavenworth.

The NTC, with its electronic sensors, cameras, and observers and controllers, provides capabilities unmatched anywhere else in the Army

⁴USAREUR training guidance issued in July 1991 notes that the training environment in USAREUR has changed. It notes that maneuver training can no longer be conducted in traditional training areas due to environmental and political reasons. It calls for maneuver training with leaders substituting wheeled vehicles for tanks to accomplish some maneuver training objectives.

⁵The Combat Maneuver Training Center, in Germany, covers 44,000 acres compared with the NTC, which has over 200,000 acres available for maneuver training. Whereas at the NTC two battalions can maneuver on the ground concurrently, the Combat Maneuver Training Center maneuvers only one battalion on the ground at a time and employs computer simulation technology to train another battalion, all under the control of the brigade headquarters staff. The NTC is in the process of adding computer simulation technology to enable it to simulate additional forces in the battles at that center.

and is recognized as the Army's premier combat training center. There, two battalions, along with associated combat support units, can engage in simulated battles against opposing forces employing a full range of combat capabilities in the closest approximation of a combat environment available in peacetime. The NTC documents and analyzes training deficiencies of armored and mechanized infantry forces and provides information on units' strengths and weaknesses documented during mock battles. Military trainers recognize that by the time units complete their rotations to these combat training centers, they will have significantly enhanced their performance. Military leaders view the degree of improvement as proportional to how well-trained units are at the point of beginning their NTC rotations; that is, the better trained units are as they begin their rotations, the more they will get from the exercise.

The Marine Corps Air-Ground Combat Center (MCAGCC) in Twentynine Palms, California, provides marines intensive training analogous to the Army's combat training centers. Covering approximately 600,000 acres, it is used to provide maneuver and gunnery training to marine battalions that travel there for periodic training exercises. There a unit's training begins with platoon exercises and progresses to a battalion-level combined arms live-fire training exercise. The battalion battle staff receives training in command and control, with specific focus on coordination of firepower provided by air and artillery units. Unlike the Army, the Marine Corps does not use laser training devices and opposing forces for key exercises at MCAGCC. Instead, battalion-level training culminates in a live-fire maneuver exercise in which marines move into target areas after firing at fixed targets. While an NTC rotation may represent the culmination of an Army unit's training cycle after which many personnel may rotate to new units, a Marine Corps unit's MCAGCC rotation represents an interim step in preparation for a unit deployment overseas lasting several months.

Various Factors Constrain Training

The services recognize that units fluctuate in training proficiency because of many factors, including training frequency, key personnel turnover, and time and resource constraints. Army officials have previously acknowledged that personnel turnover and shortages in critical positions, competing time requirements, and funding priorities that sometimes

reduced training funds made it difficult to sustain a high level of unit proficiency.⁶ Many Army and Marine Corps personnel have cited personnel turbulence as one of the most significant problems affecting a unit's ability to train. To some extent, this turbulence has been exacerbated by the need to rotate personnel from one assignment to another, and particularly for the Army, between the United States and overseas locations. However, personnel turbulence is apt to remain a training challenge in the future even with fewer troops stationed overseas. Indications of this turbulence were provided in a March 25, 1992, testimony before a Senate Armed Services Subcommittee by the Army's Deputy Chief of Staff for Personnel, who stated that approximately 46 percent of Army enlisted personnel have 4 years or less service. Such levels of relatively inexperienced soldiers accentuate the importance of a building block approach to training and help to explain the need for repetitive training cycles.

Our prior work dealing with Army training showed that available training funds limited the amount of maneuver training conducted at home stations and this often meant that priorities for funding and other resources went to units that were preparing to rotate to the NTC. This previous work indicated that, within normal training cycles, because of personnel turbulence, competing priorities for time and training funds, units at a given installation could vary significantly in the currency of their training.

Prior to Operations Desert Shield and Storm, both the Army and the Marine Corps units had personnel shortages. Units were often short of servicemen with specific critical military occupational specialties and there was a general shortage of experienced noncommissioned and staff officers. In addition, there was high personnel turnover after Army units completed their rotation at a combat training center or Marine Corps units returned from scheduled overseas tours of duty. Thus, while one unit, preparing for a combat training center or overseas deployment, probably would be at its highest state of unit proficiency, another unit, not yet preparing to go, would be at a much lower proficiency level.

Another constraint to training, prior to Operation Desert Storm, was that commanders and training officers did not have enough time available in their schedules to develop, conduct, and review the training exercises for the soldiers and marines in their units, as well as participate in their own

⁶Army Training: Various Factors Create Uncertainty About Need for More Land (GAO/NSIAD-91-103, Apr. 22, 1991).

battle staff training exercises. Although Army and Marine Corps training policy called for noncommissioned officers (NCO) to conduct individual and small unit training, the services did not routinely carry out this policy. As a result, commanders in many units were the primary trainers of individuals and small units. Some commanders we talked with, in units not employing NCOs as primary trainers of individuals, said that only recently were there enough well-trained NCOs to permit a delegation of responsibility. Other commanders had reservations about the ability of NCOs to adequately conduct required training.

Common Recurring Training Problems

The Center for Army Lessons Learned (CALL) is tasked with documenting the training strengths and weaknesses of units participating in major training events. Marine Corps units use the Marine Corps Lessons Learned System (MCCLS) to report after-action reports. Specific lessons learned from training exercises at Army and Marine Corps combat training centers included the importance of training at every organizational echelon, training to a standard, using rehearsals and repetitions in training, and developing and training tactical standard operating procedures.

The after-action reports from the Army's training centers have revealed continuing problems in the areas of friendly-fire accidents, command and control, battle staff planning and coordinations, understanding commanders' intent, time management, coordination of fire support, use of reconnaissance and surveillance, and lack of, or ineffective use of, rehearsals. These recurring problems occurred at every level and revealed weaknesses in the home station training conducted by ground force units. NTC training officials have previously noted an all-to-common problem of poor performance by crews and small units. These officials have noted that battles can only be won at lower echelons, such as at the platoon level, but that they can be lost at higher echelons. In other words, well-trained battalion staffs with poorly trained platoons will have difficulty winning battles. Prior to the onset of Operations Desert Shield and Storm, NTC officials had expressed the view that not enough repetition in training was being done at the platoon level and that lower level training needed more command attention on an ongoing basis.

According to the Marine Corps' Director for Training at MCAGCC, units participating in training there displayed weaknesses in staff planning, command and control, coordination of fire support, and chemical and biological weapons protection. However, according to the Director, these units, which primarily train at the company level and below at their home

stations, showed strengths in their individual marine and small unit training. At the same time, many training officials were quick to point out that individual skills deteriorate rapidly and repetitive training is needed to sustain a high level of training proficiency.

Revision of Training Guidelines

Recognizing the need to correct recurring training problems, the services initiated actions in recent years to evaluate and refine their training guidance to address training in a resource-constrained environment. Because of that evaluation, the services developed training guidelines on how to plan, execute, and assess training at all levels. The Marine Corps published its Fleet Marine Force Manual 0-1, Unit Training Management Guide, in April 1991 and Fleet Marine Force Manual 0-1A, How to Conduct Training, in December 1990. The Army developed Field Manual 25-100, Training the Force, and Field Manual 25-101, Battle Focused Training, published in November 1988 and September 1990, respectively. These publications document the services' training philosophy and provide guidance in employing it.

The focus of the revised training guidelines is the development of individual and leader skills while advancing to unit training using multi-echelon training events and simulations. They emphasize individual and small unit training, giving leader training to noncommissioned and junior officers so they can train their subordinates, battle staff training for senior officers, and the building of higher echelon training events upon lower echelon exercises.

Transitions Underway Involving Computer Simulations

The military has traditionally made use of hundreds of training aids and devices to simulate weapon systems and terrain or to otherwise support training requirements. They range from the simple to the complex. They include such things as concrete blocks to simulate mines, plywood terrain boards replicating in miniature fashion the terrain of a given battle area, and laser gunnery systems to simulate the effects of direct-fire weapons, from rifles to tanks and helicopter gunnery systems. Further, spurred somewhat by resource constraints and technology advancements, important evolutionary approaches to training are now underway, particularly within the Army, employing computer simulation technology, that should allow the military to train ground forces more smartly and economically. This technology provides an important complement to existing training at all echelons. It has been used to develop a range of capabilities from simulators to facilitate gunnery and maneuver training, to

computer-assisted simulation exercises to train commanders and staffs in the coordination and control of combat operations at various echelons of command. Ongoing efforts to link and network diverse simulations offer much increased potential to facilitate joint training between the services.

Simulations Are Especially Important to Staff Training

Computer-controlled simulations aid in training platoon through corps-level units. Computer simulations have become especially important in training commanders and staff at higher echelons. At higher echelons, this technology makes training available to senior commanders and staffs that was difficult to accomplish in the past due to resource constraints. Both the Army and Marine Corps have incorporated computer-assisted simulations in commander and battle staff training exercises. Commanders of battalions and larger units have staffs to help them plan and oversee the execution of combat operations. Battle staffs normally consist of the unit commander, personnel and administration officer, intelligence officer, operations and plans officer, and supply officer, each of whom may be supported by additional staff. The battle staff may also include representatives of the combat support⁷ and combat service support elements,⁸ and is responsible for supporting the commander in developing battle plans and the command and control of combat operations.

In recent years, the Army has come to increasingly rely on computer-driven simulation exercises for training battalion and higher level commanders and staffs. They are an important aspect of the pre-command training given to field-grade officers just prior to assuming command of battalions and brigades. The Army uses the simulations to train these newly designated commanders in command and control and synchronization skills. Participants develop and execute battle plans and assess the results generated by the computer simulation.

The Army uses its BCTP to train division- and corps-level battle staff. BCTP's computer-assisted simulations replicate the execution of battle plans and orders against an opposing force following the doctrine and tactics of the simulated enemy, and then displays the results of the operation. Trained observer controllers review the battle staff's processes and give their

⁷Combat support units are, or may become, part of a force formed for combat operations and include artillery, air defense, aviation (other than attack helicopters), engineers, signal, and electronic warfare.

⁸Combat service support units provide assistance to sustain forces, including administrative, chaplain, civil affairs, food, finance, legal, maintenance, medical service, supply, transportation, and other logistical services.

observations and advice in post-exercise review sessions. The Army plans to send all of its new division and corps commanders and their battle staffs through this program.

The Marine Corps employs manual and computer-assisted war games to train tactical commanders and their staffs in planning and conducting combat operations. However, due to resource constraints, Marine Corps officials told us that their use of computer simulations has been less extensive to date than the Army's. The Marine Corps also uses non-computer-aided war games to train battalion staff in all phases of combat, including combat service support.

Computer simulation has become an important component of "large-scale" exercises in Germany involving U.S. and allied forces in recent years. In 1990, with the growing environmental and political concerns that were increasingly constraining large-scale maneuver exercises across the German countryside, the U.S. European Command and the U.S. Army in Europe recognized the need for and designed a new training strategy for REFORGER⁹ 1990 that relied heavily on computer simulations to train commanders and their staffs. Our analysis of REFORGER 1990 showed that the exercise realized the following benefits: it (1) emphasized battle planning, staff procedures, and command and control; (2) made more efficient use of training time; (3) provided a focus on higher echelons that might otherwise be too costly; and (4) lessened adverse environmental and political impacts.¹⁰ Military leaders are increasingly recognizing that computer simulations permit practicing war fighting skills far more regularly, particularly at higher echelons, than more traditional large-scale field exercises that are limited by money, time, and space. Plans for REFORGER 1992 call for even greater use of computer simulation and will involve the Army, Air Force, and the Navy in a simulated exercise.

Both the Army and the Marine Corps have indicated they plan to increase their use of computer-aided simulations; however, Marine Corps officials told us that resource limitations prevent them from progressing at the pace taken by the Army. The Army's long-range training plans call for an evolution from "device assisted" to "device based" training. However, despite movements toward greater use of computer simulations to facilitate training, there are differences of opinion in the services over how

⁹REFORGER, or Return of Forces to Germany, is an annual training exercise.

¹⁰Army Training: Computer Simulations Can Improve Command Training in Large-Scale Exercises (GAO/NSIAD-91-67, Jan. 30, 1991).

far they should go and to what extent they would be used in conjunction with and/or offset more traditional forms of training.¹¹

Objectives, Scope, and Methodology

The objectives of this review were to determine if the ground forces' training and preparation for Operation Desert Storm, both at home stations and in-theater, provided lessons that can be applied to peacetime training. Specifically we sought to determine (1) what was the focus of preparatory training, (2) what factors accounted for the great success in the area of command and control of maneuver forces, and (3) what implications might be drawn from preparations for this war for future peacetime training.

We obtained information for this review from officials at the Departments of Defense, Army, and the Navy, Washington, D.C.; U.S. Army, Europe, Heidelberg, Germany; the Combined Arms Command, Fort Leavenworth, Kansas; and the U.S. Marine Corps Combat Development Center, Quantico, Virginia.

We interviewed commanders and training officials of major Army and Marine Corps ground units that deployed to the Persian Gulf. These units included

- the 1st Mechanized Infantry Division, Fort Riley, Kansas;
- the 3rd Armored Cavalry Regiment and the 11th Air Defense Artillery Brigade, Fort Bliss, Texas;
- the XVIII Corps Headquarters, 82nd Airborne Division, and the 1st Corps Support Command, Fort Bragg, North Carolina;
- the 101st Airborne Division (Air Assault), Fort Campbell, Kentucky;
- the 1st Cavalry Division and the Tiger Brigade of the 2nd Armored Division, Fort Hood, Texas;
- the 24th Mechanized Infantry Division, Fort Stewart, Georgia;
- the VII Corps Headquarters, Stuttgart, Germany;
- the 1st Armored Division, Ansbach, Germany;
- the 3rd Armored Division, Frankfurt, Germany;
- the 2nd Armored Cavalry Regiment, Nuernberg, Germany;
- the II Marine Expeditionary Force and the 2nd Marine Division, Camp Lejeune, North Carolina; and

¹¹The issue of "right-mix" and other simulation issues are being further addressed in our separate review examining the Army's planned acquisition of an advanced simulation system known as the Close Combat Tactical Training System, and overall Department of Defense efforts to foster simulation networking capabilities.

- the I Marine Expeditionary Force and the 1st Marine Division, Camp Pendleton, California.

To obtain additional information on training lessons from Operation Desert Storm, we interviewed officials at the Army's Center for Army Lessons Learned, and the BCTP, Fort Leavenworth, Kansas; the NTC, Fort Irwin California; and the 7th Army Training Command, Stuttgart, Germany. We also interviewed members of the Marine Corps' Battle Assessment Team at Quantico and its Air-Ground Combat Center, Twentynine Palms, California. We also talked with officers of the 5th Mechanized Infantry Division, Fort Polk, Louisiana, about their preparations as a potential deploying unit.

In addition to collecting basic information from locations we visited, we also revisited a number of key locations and senior officers at installations in the United States to brief them on the tentative results of our work and to determine whether these officers concurred with our results. In all instances, we found concurrence with the basic thrust of our findings.

We conducted our work between April 1991 and March 1992 in accordance with generally accepted government auditing standards.

Individual and Small Unit Training Were Heavily Emphasized in Preparing for Operation Desert Storm

Prior to the onset of Operations Desert Shield and Storm, military leaders considered U.S. forces to be better trained than ever. However, there were significant differences between units in terms of recent training experience and unit cohesiveness as they began preparing to deploy to Southwest Asia. The intervening months between the time that Iraqi military forces invaded Kuwait and U.S. and allied forces launched the ground war provided time for additional training of U.S. forces either at home stations prior to deployment or in-theater after arriving in Southwest Asia. Training focused heavily on individual and small unit skills and progressed upwards in a building block approach. Training preparations under the threat of imminent combat, even as in peacetime, were affected by constraints that determined how and what training took place. Some approaches were used that, while not new, provided increased recognition of their importance to peacetime training.

Training Quality and Proficiency of Deploying Units Varied

Ground units sent to Saudi Arabia were at varying levels of training proficiency when notified to prepare for deployment. A unit's location, resources, and previously assigned mission affected the quality of its training and its ability to accomplish training at its home station before deploying. According to commanders and other key unit officials, some units had reached heightened levels of proficiency after months of continuous training while others were just beginning a new cycle of training with many new personnel. For example:

- Personnel in one Marine Corps division varied widely in proficiency; some had completed extensive desert training while others needed basic skills training.
- One Marine Corps battalion was at peak training proficiency when it received notification to deploy to Southwest Asia. The battalion had just completed several months of intensive training in amphibious assaults, urban combat techniques, and jungle combat training when Kuwait was invaded.
- Most of the staff and soldiers in a company in the 1st Infantry Division (Mechanized) that deployed as part of the offensive buildup were assigned to their unit within a month of deploying to Southwest Asia in December.
- Two squadrons of an Army Armored Cavalry Regiment had just completed several months of intensive training readying themselves to attend the NTC; this contrasted with two brigades in another division that were just beginning a new training cycle with many new personnel.

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The above were typical of the diverse training proficiencies we noted among deploying units. To some extent the diversity in currency of training and proficiency were related to types of forces involved, where they were stationed, their previously assigned wartime missions, and whether they were slated to be deploying early or to be follow-on forces.

**Training Proficiency of
Contingency and Other Early
Deploying Forces Varied**

Army and Marine Corps divisions and supporting units began arriving in-theater in early August 1990 and continued to arrive through January 1991. The contingency forces supporting XVIII Corps arrived in-theater on August 8, 1990, followed closely by elements of the 1st Marine Division. Other major combat units arrived between August and October 1990. Table 2.1 shows the major Army and Marine Corps ground combat forces we talked with that were deployed to participate in the initial deterrence and defensive buildup in Southwest Asia.

**Table 2.1: U.S. Ground Forces Deployed
Between August and October 1990**

Corps or division	Home station
XVIII Airborne Corps	Fort Bragg, North Carolina
1st Cavalry Division	Fort Hood, Texas
1st Marine Division	Camp Pendleton, California
2nd Armored Division	Fort Hood, Texas
3rd Armored Cavalry Regiment	Fort Bliss, Texas
24th Infantry Division	Fort Stewart, Georgia
82nd Airborne Division	Fort Bragg, North Carolina
101st Airborne Division	Fort Campbell, Kentucky

Early deploying contingency units, such as the 82nd Airborne Division and 101st Airborne Division (Air Assault), were trained to deploy anywhere in the world, with their own equipment, within 18 hours of notification. Because of their contingency missions, these Army divisions were fully staffed and received priority for training resources. Marine Corps units also trained to deploy within days; however, instead of transporting a brigade's equipment, the Marine Corps maintained a fleet of ships prepositioned throughout the world, with enough equipment and supplies to support a brigade for 30 days.

The training necessary to maintain a high level of proficiency is resource and time intensive, and over a prolonged period of time can create hardships on soldiers, marines, and their families. In addition, units must take turns completing noncombat garrison duties such as guard duty,

funeral details, parades, and other duties. Accordingly, not all of the units in divisions with contingency missions were equally prepared for immediate deployment. Instead, the responsibility to deploy within hours of notification rotated between the divisions' battalions, and units slated for more immediate deployment were at the forefront for resourcing and training intensity. Thus, only designated "deployment ready" battalions deployed to Saudi Arabia within hours of being notified to deploy. The other battalions used the time available before deploying to "train up." They deployed within a few weeks.

The training proficiency of the Army's heavier forces (armor and mechanized infantry) supporting XVIII Corps varied widely. Under the previously existing Soviet threat scenario, they were part of the follow-on forces that would, in the event of imminent combat, deploy to Europe and pick up equipment stored there. However, they were called upon to deploy to Southwest Asia with their own equipment as a heavy contingency force.

The training proficiency of the heavier divisions has often been based on the timing of their next training at the NTC. They did not always have all of the personnel needed to fully staff their units and, further, were subject to personnel turbulence of up to 12 percent a month normally, or much higher immediately following an NTC rotation. To ensure they had a full complement of soldiers when they went to the NTC, commanders placed restrictions on personnel rotations and sought temporary personnel placements from other units. Consequently, personnel turbulence in a heavy infantry or armor unit would be especially high soon after completing an NTC rotation. As a result, many well-trained soldiers rotated out of the unit and were often replaced by soldiers with less experience, and the unit's level of training proficiency declined.

Because of their training schedules, the 1st Cavalry Division's two brigades were not at peak levels of training proficiency. One had recently returned from the NTC and therefore had replaced much of its battle staff and members of many of its crews. The other brigade was just beginning several months' preparation for an upcoming exercise at the NTC. In contrast, the 3rd Armored Cavalry Regiment was nearing the end of its preparations for the NTC and its squadrons, having completed months of intensive training, were well trained and prepared to deploy to the desert.

One battalion of the 1st Marine Division was short of personnel with critical radio and mortar skills. It received many new people before deploying and had to integrate them into its companies. To increase the

proficiency of those marines and their companies, the battalion conducted 7 days of training that focused on basic individual and weapons skills.

Training Proficiency of Follow-on Forces Varied

On November 8, 1990, the President ordered increased deployments to provide an "offensive capability." As a result, the VII Corps and supporting units from Germany, augmented by the 1st Infantry Division (Mechanized) and the 2nd Marine Division, were notified to deploy, and the ground forces began arriving in Saudi Arabia by mid-December and continued into January 1991. Table 2.2 lists the Army and Marine Corps divisions that deployed to Southwest Asia as part of the offensive buildup.

**Table 2.2: Ground Forces Deployed
Between November 1990 and January
1991**

Corps or division	Home station
VII Corps	Stuttgart, Germany
1st Armored Division	Ansbach, Germany
1st Infantry Division (Mechanized)	Fort Riley, Kansas
2nd Armored Cavalry Regiment	Nuernberg, Germany
2nd Marine Division	Camp Lejeune, North Carolina
3rd Armored Division	Frankfurt, Germany

Historically, Army forces in Germany, because of their proximity to expected combat, had maintained a higher level of training emphasis and proficiency than units in the United States. Units stationed there traditionally had been more fully staffed and had lower personnel turnover rates than their counterparts in the United States.¹ However, at most locations in Germany, land area and environmental constraints restricted most training with tracked vehicles to platoon level and higher echelon gunnery and maneuver training limited primarily to two training locations. As a result, ground forces in Germany trained at lower echelons more frequently and spent more time conducting training in the field. For example, in 1990, before being notified to deploy to Saudi Arabia, much of the 3rd Armored Division spent 150 days in training. In contrast, according

¹Before deploying to the Persian Gulf some Army and Marine Corps units were not fully staffed. Some in the United States had as little as 87 percent of their authorized personnel. Personnel shortages were also reported in Army units stationed in Germany due to post cold-war force reductions that were underway. This shortage of personnel was especially critical among NCOs and in certain military occupational specialties. To ensure units were fully manned, the services employed a technique called cross-leveling—moving servicemen from schools and non-deploying units to deploying units. Because of cross-leveling, many commanders conducted training that focused at the individual level to ensure that all servicemen were adequately trained and integrated into their units.

to the division's training plans, contingency units stationed in the United States may spend less than 100 days in the field each year.

Training Guidance Focused on Individual and Small Unit Skills

Senior Army and Marine Corps commanders made it clear from the outset that training in fundamental skills would take priority in preparing for Operations Desert Shield and Storm. For instance, generals in the Army and Marine Corps required all servicemen to receive training in such individual skills as the use of chemical protection equipment before deploying to the Persian Gulf. The generals, in messages to their units, said that individual skills should be mastered before unit training began. Commanders of some deploying units said that even without their generals' requirement to do so, they still would have focused their training efforts on fundamental or individual skills.

A message from the Army's Forces Command listed special briefing and training requirements for all deploying Army units. Specifically, the message recommended that soldier briefs and training focus on (1) their conduct and responsibilities while in Southwest Asia; (2) the difference in the rules of engagement for peacetime and wartime; (3) customs and courtesies in Southwest Asian countries; and (4) protection from terrorists. The message also required the soldiers prove their proficiency in chemical and biological warfare protection skills.

The Commanding General of the II Marine Expeditionary Force provided guidance on training its marines before they deployed for Southwest Asia. In his message, he said that "as a minimum every marine and sailor deploying to Southwest Asia will complete individual skills training" and that unit commanders were to conduct unit training only after the completion of individual training. The message also said that individual skills training would include firing and adjusting the sights of their weapons; chemical and biological weapons protection; orientation with the situation, threat, and culture in Southwest Asia; field sanitation; and desert and land navigation.

Predeployment Training Gave Priority to Individual and Small Unit Skills

All units, no matter how recent their training, conducted predeployment training that focused on individual and small unit skills. Contingency and other early deploying units used the time available to train individual soldier and marine skills. The same was true for the heavy forces that deployed in September and October 1990 and units stationed in Germany

that deployed in December 1990 and January 1991. Some examples of the predeployment training include:

- One Marine Corps battalion had completed months of intensive training. When notified to prepare for deployment, it went to the Corps' combat training center prior to deployment for additional training. There, the battalion fired all of its weapons, conducted individual and small unit training exercises, and became acclimated to the desert.
- A regiment in the 1st Marine Division, which deployed early, held 7 days of home station training that provided weapons familiarization, platoon live-fire exercises, training in chemical and biological weapons protection, and identification of Iraqi armor.
- The 3rd Armored Cavalry Regiment conducted around-the-clock training using simulators. Tank commanders and gunners trained in a simulated M1A1 Abrams tank. Artillery personnel trained fire support skills using a tactical simulation. Air defense personnel used an air defense simulator to train in the use of Stinger missiles.
- The 1st Armored Division developed a plan focused at the platoon level and below, incorporating simulators in training and requiring that soldiers show proficiency on the simulators before firing the weapons on their Abrams tanks and Bradley fighting vehicles.

In-Theater Training Continued Focus on the Basics as a Building Block

Once in Southwest Asia and fully equipped, units also focused on individual and crew skills. They repeated training on chemical and biological warfare, first aid, buddy care, and other individual skills. Servicemen received training on Iraqi combat doctrine and weapon system identification and capabilities. Also, commanders ensured all servicemen and crews had an opportunity to practice firing their weapons. As commanders could arrange access to the land, the Army and Marine Corps division staffs developed gunnery ranges and live-fire assault facilities. The ranges were large enough to allow the units to practice firing most of their weapon systems. Thus, with some limitations, servicemen fired every weapon they could expect to use in combat.

The fact that much of the training emphasis was on developing and enhancing individual and small unit skills does not mean that this training was viewed as sufficient by all personnel. For example, a Marine Corps lessons learned assessment made note of limitations in live-fire training that was available in-theater during Operation Desert Shield, with many personnel firing 50 rounds or less on some weapons, whereas many would liked to have done more to build confidence and proficiency. It noted the

lack of training integrating live-fire gunnery with maneuver training prior to the opening of the ground conflict. It stated that, in the area of maneuver training, only units with a 2- to 4-month training advantage in Southwest Asia prior to Operation Desert Storm were satisfied with the amount of training they received. It noted that there was extensive training and rehearsals for obstacle breaching operations "and in point of fact, this was considered by many to be the primary training emphasis for Operation Desert Storm."

Training Progressed to Large-Scale Multi-echelon Exercises

Training for Operation Desert Storm progressed in what the Marine Corps calls "stair steps" and the Army refers to as "building blocks." In both Army and Marine Corps ground force units this meant that training began by developing individual soldier and marine skills, continued through squad, platoon, and company drills, and progressed to battalion and brigade size combined-arms, live-fire exercises.

As individuals and crews displayed gunnery proficiency, training officers added maneuver training to their gunnery exercises. Sometimes Abrams tanks or Bradley fighting vehicles maneuvered through ranges set up to replicate Iraqi fortifications. This training was progressive, starting with individual skills and advancing through small unit training events to large-scale exercises.

After individuals were trained, squads and platoons conducted maneuvers. Then, when the squads and platoons displayed their proficiency in their assigned skill areas, the training progressed to company-sized exercises and then included battalions and brigades. However, the progression to larger unit training was not always sequential. To reduce the resources required, some training of individual soldiers and marines was done concurrently with unit training in what is referred to as a multi-echelon approach. In a multi-echelon training exercise, units such as platoons and companies train together. Some units may have new leaders and soldiers working together for the first time, while others are working to sustain unit skills already achieved.

Training in Breaching Skills Used Building Block Approach

The services went to great lengths to train their personnel to breach or pass through the Iraqi obstacle belts. Army and Marine Corps divisions built various scale models of the Iraqi defenses and some full-sized reproductions of portions of obstacles. Units used maps with obstacles drawn in to conduct map exercises where leaders talked about the planned

maneuver and steps that would be taken to execute operations. They conducted “talk-throughs” using sand tables,² and “walk-throughs,” with and without troops, of the obstacles. They also conducted training exercises with key leaders and their equipment to rehearse the breach. Some of the exercises included live-fire. This proved especially beneficial to soldiers and marines that were using new equipment, such as the M1A1 Abrams tank, M2A2 Bradley fighting vehicles, mine-clearing explosives fired from modified armored bridge launchers, mine rakes, mine plows, and other breaching equipment. As each unit’s proficiency increased, the complexity of the training also increased.

Resource Constraints Affected Training Even in Preparing for War

As in peacetime, units faced constraints while training in preparation for Operation Desert Storm and had to “work around” training constraints. These work-arounds ranged from tactical exercises employing limited numbers of key personnel and equipment to use of surrogate vehicles to simulate movement of massive-sized forces.

Prior to deploying and after arriving in Southwest Asia, units conducted some training without their equipment because it was being shipped to the Gulf. This highlighted the importance of innovative training. For example, one company commander from the 1st Infantry Division, who was in command of a unit with mostly new personnel, conducted training in maneuvering in formations using broom sticks to represent the main guns of his unit’s tanks. That company led its division’s breach of Iraqi obstacles at the onset of the ground war.

Some initial delays were encountered in obtaining gunnery ranges. Even after they were obtained, some commanders faced limitations in, or wanted to preserve, supplies of ammunition, fuel, and repair parts. These limitations sometimes restricted the frequency and scope of training. For instance, some commanders said they were required to balance the need to ensure all servicemen had the opportunity to fire their weapons with limited amounts of training ammunition. Some commanders restricted the ammunition for weapons firings during training to three rounds per weapon. Firing all the weapons often required the units to use ammunition from the “basic load”—ammunition reserved for use in actual combat.

²These are scale models of terrain that may use cardboard cutouts, bits of wood or stone to represent units, soldiers, and equipment to depict planned operations.

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Commanders were also concerned that the use of Abrams tanks, Bradley fighting vehicles, and other equipment for training would increase the “wear and tear” on the equipment and thus place additional strain on the maintenance crews and increase the need for spare parts already in heavy demand, and thus, limited their use in maneuver training. The training officer for one armor battalion told us that his subordinate units conducted platoon-level battle drills 2 or 3 days a week, and company-level drills once or twice every 2 weeks. While they would liked to have done larger scale exercises, they did not because of constraints on fuel and replacement parts.

In training to breach the Iraqi obstacle belt and to maneuver the great distance required to engage the Iraqi forces, both Army and Marine Corps divisions started with simple training exercises that included only leaders or drivers—called a tactical exercise without troops. For example, a Marine Corps division conducted its first maneuver of all of its equipment using only its leaders and drivers. The rest of the division’s marines were free for other training.

In another example, the 3rd Armored Division conducted two large-scale training events in which the drivers used four-wheel drive vehicles instead of their Abrams tanks and Bradley fighting vehicles to practice the maneuver. A post-war review of VII Corps participation in Operation Desert Storm, prepared by VII Corps, summarized how the division came to use this approach.

As the air war dragged on and the prospect of a ground war neared, Maj. Gen. Paul E. Funk, commander of the Third Armored Division, began looking for the right tool to train his troops for the initial push north. He found it in two exercises; HUMMEX I and II. HUMMEX I, which took its name from the HMMWV (the vehicle that replaced the jeep), helped adapt the division’s extensive European training to the desert environment. The first exercise stressed mass movement and maneuver, and it gave commanders a chance to see where their troops would be in battle in relation to other units on the ground. . . . It primarily used the HMMWV, thus sparing the heavier armored weapon systems, the M1A1 and the Bradley fighting vehicle, undue wear and tear. The second exercise, HUMMEX II, built on the first, but included some armored vehicles.

Surrogate vehicles have previously been used in peacetime to compensate for limits on available training land or funding, both in the United States and in Germany, and sometimes viewed by some commanders as a less-than-desirable approach. Military observers said that the use of surrogate vehicles while training for Operation Desert Storm reduced the wear and tear on those weapon systems and provided better visibility for the participants in a smaller maneuver area that could be controlled by the

event's leaders. These exercises stressed mass movement and maneuver and gave the commanders a chance to see their troops in relation to the other maneuver units.

Training Conducted While Executing Some Operations

When possible, commanders used the planned execution of operations to provide an opportunity to conduct training. For instance, days before the start of the ground war, the VII Corps was ordered to move 160 kilometers (approximately 100 miles) west of its forward assembly area. Normally, commanders prefer to use heavy equipment transports to haul combat equipment in such moves and thereby reduce wear on the Abrams tanks and Bradley fighting vehicles. However, for this move the corps' battle staff opted to drive the actual combat equipment and thus provide battle formation training to drivers and commanders and to rehearse the maneuvers they expected to use during the actual attack. This decision was made in part because there was a shortage of heavy equipment transports needed to move the combat vehicles. However, it was also made because it gave the forces from Germany, where maneuver training is restricted by environmental constraints and the size of training areas, an opportunity to conduct a large-scale maneuver training exercise.

Training Exercises Included Extensive Rehearsals and Repetitions

Numerous military commanders attributed much of their success in Operation Desert Storm, particularly the breaching operations, to the use of rehearsals—an area of emphasis sometimes receiving limited attention during peacetime training. Most training officers acknowledge the need for rehearsals and state it was not a lesson learned but a lesson validated or reinforced. While many units were aware of the need for rehearsals, some commanders indicated they needed to be more proficient in the use of rehearsal techniques.

Several commanders and training officers said that one problem with using rehearsals is that some leaders are not well trained in how to use them. The Army's CALL has recognized the importance of using rehearsals and the need to develop leaders skilled in their use. Its publication, No. 91-1, entitled Rehearsals, dated April 1991, states that based on observations at the combat training centers, the need to conduct adequate rehearsals was applicable to both light and heavy forces. It specifically commented that most units waited until they were at a combat training center to practice rehearsals. However, there the pace of the exercises can limit the time available for rehearsals.

CALL has further noted that the use of rehearsals paid off in Operation Desert Storm. It states that rehearsals can vary in complexity, from a back-brief or restatement of the commander's orders and intent, to reduced force rehearsals like map exercises, sand table exercises, walk-throughs, to large-scale rehearsals such as a full-dress rehearsal with all the unit's personnel and equipment.

Increased Use of Noncommissioned and Junior Officers as Trainers

Army and Marine Corps preparations for Operation Desert Storm, made significant use of NCOs as the primary trainers of individuals and small units. Previously, officers normally had primary responsibility for training both individuals and units. While the services' training philosophies had been that the authority and responsibility for detailed planning, organization, conduct, evaluation, and supervision of training should be delegated to the lowest command element with the ability to conduct effective training, that often had not extended down to NCOs. Before the war, some divisions had begun setting aside time for the NCOs to train individuals. Other divisions, however, did not. Additionally, units often reported they did not have enough NCOs qualified to be trainers.

Because of cross-leveling,³ units received a full complement of NCO and junior officers as they readied for Operations Desert Shield and Storm. Therefore, commanders could give their NCOs, along with junior officers, primary responsibility to train individuals and crews. Because they delegated the training responsibility, commanders were able to increase the amount and frequency of training conducted in the units. It also gave senior officers the time to participate in battle staff training.

³Cross-leveling is taking personnel from one unit to fill vacancies in another unit. One Army official has estimated that during Operations Desert Shield and Storm as many as 50,000 Army active and reserve personnel were cross-leveled to meet personnel needs.

Battle Staff Training Was Key to Successful Command and Control of Maneuver Forces

Many Army and Marine Corps senior commanders attribute the successful command and control of Operation Desert Storm's maneuver forces to their emphasis on battle staff training. Techniques used ranged from repetitive training exercises involving battle drills and tactical standard operating procedures (SOP) to developing and refining potential operating plans. Wargaming and the use of computer simulations were important to the U.S. Central Command both before and after the Iraqi invasion of Kuwait.

A Key Battle Staff Exercise Conducted Before Hostilities Began

In July 1990, before Operation Desert Storm, Central Command conducted a joint-service command post exercise called "Internal Look 90." This was a simulation exercise using computer-generated terrain replicating areas in the Persian Gulf. Several after-action reviews of Operation Desert Storm cite this exercise as instrumental in developing concepts and plans employed by the Commander in Chief, Central Command, and component commanders. The training officer for the 24th Infantry Division, which participated in this exercise, said this training was the primary exercise that helped the commander, his staff, and brigade staff prepare for Operation Desert Storm.

Battle Staff Training for Deploying and Deployed Forces

Key aspects of battle staff training for deploying and deployed forces involved the repetitive training of battle drills and operating procedures at various echelons and numerous wargaming activities. The importance of computer simulation technology for battle staff training received increased recognition as a result of its use in preparing for Desert Storm's ground operations.

Battle Drills and Standard Operating Procedures

Both the Army and the Marine Corps devoted extensive efforts in developing, reviewing, and refining battle drills and tactical SOPs while training ground forces preparing to deploy and those already in theater. Battle drill is a term normally used in connection with smaller units such as platoons; it means practicing rapid reactions to orders and possible enemy actions. Similar trained responses were practiced at higher echelons, except that at higher echelons they are normally referred to as tactical SOPs.

In preparation for Operation Desert Storm several divisions, brigades, and battalions developed or modified tactical SOPs—procedures regularly practiced and understood by most members of a unit. The tactical SOPs also

specified formations, communications, and battle staff organizations. According to many commanders, units rehearsed the breaching operations and conducted the ground war using tactical SOPs.

The 2nd Marine Division not only rehearsed the planned breaching of the Iraqi obstacle belt, but also developed "breaching drills" that permitted teams of up to battalion-sized units to train for and execute breaching actions. Marine Corps officials acknowledge that peacetime training in breaching operations had been inadequate.

The 1st Cavalry Division, an early deploying heavy infantry unit, conducted communications exercises, "skull sessions," map exercises, and developed what they referred to as brigade-level battle drills before deploying. According to the division's commanding general, the development, practice, and refinement of battle drills or tactical SOPs at every level in the division was a lesson learned from training conducted at the NTC. Commanders at varying organizational levels reported using battle drills during training exercises to validate the drills and to train the soldiers in their use. The training also allowed the leaders to test the concepts employed in the drills. The division's staff told us that the battle drills were very helpful to them because of their division's varied missions during the war. At one point it had a defensive mission; at another point, it conducted deception operations; and, finally, it joined VII Corps in the westward envelopment and attacking operation. However, while the division's orders changed, the battle drills, once developed, tested, and trained, remained constant.

Similarly, the 1st Armor Division, which deployed to Southwest Asia from Germany just before initiation of offensive actions, developed and wargamed standard battle drills before it deployed. As a result, the division commander issued operational orders that were based on tactical SOPs that had been used in training, with certain exceptions. Training officials stated that the units were able to execute the orders quickly because they had rehearsed the battle drills.

Battle Staff Training and Wargaming Exercises

Wargaming exercises ranged from informal give and take among senior leaders and staffs regarding proposed operating plans to sophisticated use of computer simulation technology to plan, test, and revise potential courses of action. Army and Marine Corps units conducted battle staff training exercises incorporating manual and computer-aided simulations throughout Operation Desert Storm, both for defensive and offensive

operations. Units conducted battle staff training exercises before they left their home stations, in defensive positions in Saudi Arabia, and in preparation for the offensive operation. Many techniques were employed, some as simple as discussing the operation as presented on a map, while others were supported by skilled trainers and computer-aided simulations. The services noted the importance of this training in their after-action reviews of the war.

During Operation Desert Storm, commanding generals at corps and division levels conducted various types of wargaming sessions. For instance, the Commanding General of VII Corps conducted map exercises with his division commanders.¹ All participants back-briefed the corps commander on their understanding of their roles in the operation—what he wanted them to do and why.

The Commander of the Marine Expeditionary Force (MEF)² in the desert personally led weekly map and wargaming exercises using maps and sand tables. These exercises started out as a luncheon session and expanded to day long and weekly sessions. According to participants, the wargames made the commander's intent clear to everyone. The Marine Corps' after-action report for Operation Desert Storm states that

the generals who commented on these wargames said they made General Boomer's intent clear to all participants. Several generals said that because of the wargames, they were able to figure out what they needed to do as they listened to the war unfold on the radio nets.

The report also describes these wargaming activities as "probably the most important command and control procedure."

Members of Fort Leavenworth's BCTP simulation team went to Fort Hood, Texas, in late August 1990 to provide training to the battle staff of the 1st Cavalry Division and a brigade of the 2nd Armor Division prior to their deploying to the Persian Gulf. The exercise was run at the brigade level with subordinate commanders down to company level. The division training officer said the exercise gave the division commander the opportunity to communicate his priorities and manner of fighting to his

¹Portraying military situations on maps and overlays, such exercises help the commander train staff and leaders in planning, coordinating, and executing tasks using map boards, chalkboards, training mock-ups, and sand tables.

²A MEF is the largest of the Marine Air-Ground Task Forces. Normally they are built around a division/wing team, but can include several divisions and aviation wings, together with an appropriate combat service organization.

staff. It also allowed the division battle staff to practice its battle drills. According to one brigade commander, the exercises gave everyone an opportunity to become familiar with the commander's process of issuing orders and to understand how he intended his operations to be executed.

The 1st Infantry Division, expecting to receive notification to deploy to Southwest Asia, responded to an opportunity to participate in a BCTP exercise held by III Corps at Fort Hood, Texas. The new division commander wanted to give his staff the opportunity to work together. The staff noted that this was their first chance to work with the commander and gain an understanding of his command style. They said that this training also proved beneficial once they were ordered to Saudi Arabia because it built proficiency in battle staff processes and gave the staff more time to spend working on the division's battle plans.

The BCTP simulation staff traveled to Southwest Asia to help train the battle staff of the XVIII Corps. According to corps staff officers, BCTP staff helped units validate their orders development process. The BCTP staff used a computer simulation to replicate the planned battles, following the orders generated by the battle staff and executing the opposing forces' responses, based on known Iraqi doctrine.

The BCTP staff did not specifically review the orders that battle staffs developed. Instead, in some instances, they reviewed the processes the staffs followed in developing plans and orders. According to XVIII Corps officers, the BCTP staff's reviews, including discussions about the orders process, were extremely helpful and allowed the battle staff to receive the training needed to refine their orders development process. For instance, the VII Corps held a wargaming exercise for corps and division battle staffs to develop the time lines for the massive westward envelopment known as the "left hook." One military observer compared the BCTP staff favorably with the renowned opposing force at the NTC. This official said that just as the NTC's opposing force is well qualified because it has fought more battles than anyone else, the BCTP staff had seen more corps battle plans than anyone else.³

The Marine Corps Air-Ground Task Force Instruction Team, much like the BCTP but without computer-aided simulations, also traveled to Saudi Arabia to help the 1st Marine Division and I MEF battle staff get established.

³Some BCTP staff subsequently became part of the battle staff of the units they had been training.

**Training Exercises Used to
Troubleshoot Battle Plans**

Commanders often used training events to validate and, if necessary, correct their battle plans. The complexity of synchronizing combat actions makes troubleshooting and testing of those plans with rehearsals, talk-throughs, and walk-throughs very important. By troubleshooting their battle plans during the training exercises, the staff identified possible problems in the plans and made the necessary adjustments. For example, an early version of the plan to breach the Iraqi obstacle belt called for the 1st Marine Division to conduct the breach and the 2nd Marine Division to follow through. During wargaming sessions commanders refined their approach to conducting the breach. One sand model exercise showed that the plan to move both divisions through the breach lanes and turn them at an oil field would not work because there wasn't enough room.

In another example, the computer simulations run during the BCTP exercises for XVIII Corps staff showed the need to place artillery units toward the front of a formation. The simulations of the battle plan suggested that if the artillery units moved with the formation, they would not have sufficient time to set up and provide cover, and if the units stayed behind, the rest of the formation would soon be beyond the range of coverage the artillery unit could provide. Based on the results of the computer simulations, the division commanders modified planned maneuver formations, placing the artillery units toward the front of the formations to give the artillery enough time to set up and provide cover.

Implications for Future Training

While Desert Storm ground operations were of limited duration, they showed the need for increased attention to peacetime training emphasis in the areas of joint training, large-scale deployments, and logistical support. This additional training is complementary to the more basic building blocks of peacetime requirements evident in preparing for Operation Desert Storm—emphasizing individual and small unit training, and training of battle staffs—as indicated in chapters 2 and 3. Collectively, these factors offer some important insights into training requirements and the need for trade-offs in an increasingly resource-constrained environment.

Training Areas Requiring Greater Attention

Various officials indicated that the war demonstrated the need for greater emphasis on deployment training to develop proficiency in executing processes and procedures associated with deployments of large-scale forces—force levels not normally reached in peacetime training exercises. Weaknesses were also recognized in the command and control of support organizations in a combat environment due to limited training with combat forces in peacetime. Various officials and lessons learned reports indicate that the war demonstrated the importance of joint training exercises and the need for even greater emphasis in the future to enhance coordination, common understanding of procedures, processes, and terminology. Some officials indicate that the need for joint training is not limited to large-scale exercises.

Large-Scale Contingencies Need Increased Attention

While there is uncertainty over the nature and extent of future threats facing the United States, there is recognition that planning for U.S. defense requirements is no longer dominated by a Soviet threat where the United States had a largely defensive mission on a relatively small, well-defined front. Experiences in recent years have shown just how diverse U.S. military contingencies can be—ranging from the relatively small actions in Grenada and Panama to the large-scale deployment to the Persian Gulf. The Gulf war demonstrated the need to place greater emphasis on training for large-scale deployments and the importance of joint training.

To some extent the need for greater emphasis on large-scale deployments was recognized by key U.S. commanders in Germany who saw the potential for a different type of contingency than the one they had traditionally trained for; they had taken action to reorient some of their training prior to the onset of Operations Desert Shield and Storm. U.S. Army, Europe, training guidance had been changed in the year prior to the Iraqi invasion of Kuwait to emphasize the need for units to be able to move

200 kilometers (approximately 120 miles) to contact and engage an enemy force and had placed greater emphasis on deploying division-level logistical units. Various innovative approaches to training were taken to meet these training objectives in the relatively small training areas available.

The Marine Corps' formal assessment of lessons learned in Operations Desert Shield and Storm stated that "training for large scale operations should take on a new emphasis." It noted that at the highest organizational level of deployed Marines—the I MEF—key staff personnel had inadequate knowledge and operating experience at that level, including how the MEF command operations center worked and operated in a joint environment. There was insufficient personnel and equipment to support multiple command posts and liaison teams, and the MEF had difficulty in performing both the command and control functions of a fighting headquarters along with the functions of a planning/coordinating headquarters with the Commander in Chief. In a resource-constrained environment, such training may be accomplished by a variety of means, including command post exercises and computer-simulated wargames. After the war, the commander of Marine forces in Operation Desert Storm emphasized strongly the need to improve staff training and increase the use of computer simulations.

**Deployment Training Needs
Additional Emphasis**

In the aftermath of Operations Desert Shield and Storm, various commanders and their staffs cited the need for increased training on deploying higher echelon forces. Some Army officials said that brigades and battalions receive adequate deployment training through their rotations to the combat training centers and overseas tours. However, they said that Operation Desert Storm showed that division- and corps-level deployment procedures were often lacking or inadequate.

Numerous officials told us that they do not believe a full-scale division deployment is necessary to provide this training. They suggested that the division staff could prepare the paperwork and test the processes needed to deploy the division as part of a regular unit rotation to a combat training center. Several training officers told us that much of this training, the development of orders and processing of essential paperwork, could be handled somewhat by computer simulation exercises. They noted that, once the unit arrived at the combat training center, observer-controllers could check the division's paperwork to verify its accuracy. They believed

this would be an inexpensive method of training division staff in deployment.

Combat Service Support Training Needs Increased Emphasis

In previous reports on Desert Storm logistics,¹ we pointed out what has become a widespread concern among many military leaders—namely, that sustainability could have become a major problem for the Army's air and ground systems had the ground war continued for a protracted period. Army officials identified shortages of spare and repair parts as a major impediment to sustained operations. A shortage of transportation and material handling equipment made it difficult to support the combat units. Many commanders noted that some of these logistics problems could have been identified, and thus reduced, if they had been adequately stressed during peacetime training exercises. The limited amount of field training time for combat support units was further reflected in observations by combat unit commanders and combat service support unit commanders who stated that there was a need to provide more training in basic combat skills to the servicemen in combat service support units.

To stress their logistics systems and ensure they receive proper training, combat commanders said that they would like to take all of their combat service support units to a rotation at a combat training center. However, some commanders noted that such training is difficult because personnel in combat service support units devote much of their peacetime efforts to performing their support functions such as motor pool maintenance. Further, others indicated that resource limitations, including the cost of fuel, as well as the time that personnel would have to be away from the maintenance pool, make it difficult for commanders to increase the frequency and duration of training of support with combat units.

Several commanders also noted that higher echelon battle staffs often lacked sufficient proficiency in commanding and controlling combat service support units. Various Army officials noted that, in the past, training in the synchronization of support assets was often overlooked during battle staff training exercises.

One alternative for increased focus on training combat service support forces with combat forces is through increased use of simulation

¹Operation Desert Storm: The Services' Efforts to Provide Logistics Support for Selected Weapon Systems (GAO/NSIAD-91-321, Sept. 26, 1991) and Operation Desert Storm: Transportation and Distribution of Equipment and Supplies in Southwest Asia (GAO/NSIAD-92-20, Dec. 26, 1991).

technology. The Army's National Simulation Center at Fort Leavenworth, Kansas, recently upgraded its Brigade-Battalion Simulation to include combat service support requirements. Although this upgrade was a natural progression for the system and not a result of lessons learned from Operation Desert Storm, it does fill a need. Recognizing a weakness in the command and control of combat service support, many commanders and training officers are looking for ways to train their battle staff inexpensively. Brigade-Battalion Simulation is a system many battle staff already use or soon will. Thus, the inclusion of combat service support is generally a welcome addition.

Joint Training Needs Increased Emphasis

Many military officials cited the need for an increase in joint service training events based on their experiences in Operations Desert Shield and Storm. According to these officials, units need more training and practice to aid ground forces in coordinating mass fires, close air support, and ground combat maneuvers with Army and Marine Corps units. These officials noted problems involving a lack of standard terminology and procedures between the services that manifest themselves in the desert as they came together for Operation Desert Storm. There were reports of insufficient numbers of liaison officers from one service assigned to units of another service and incompatible communications equipment between the services, both adversely affecting cross-service coordination and communications.

Various officials have indicated that in the past peacetime training exercises have placed insufficient emphasis on joint planning and interoperability and the use of liaison teams to facilitate coordination and joint action. Recognizing the range of operations undertaken by the United States in recent years, some observers have cited the need for joint training activities across a spectrum of joint operations from small to large. A greater emphasis on joint training has been evidenced in the aftermath of the Gulf War.

Continued Emphasis Needed in Employing Basic Building Blocks to Training

Preparations for Operation Desert Storm ground operations reinforced the importance of some key areas of training of ground forces that will continue to be important in peacetime training. These preparations emphasized the importance of basic soldier and marine skills, and also gave heightened recognition to the importance of commander and staff training.

Individual and Small Unit Training Strategies

Much of the training in preparation for Desert Storm was possible because NCO and junior officers were used as the primary trainers of individuals and small units. Service training policies call for NCOs to conduct individual and small unit training, and Operation Desert Storm proved its value; however, the services had not implemented this philosophy uniformly before the onset of the Gulf war. Some officers we interviewed in units not employing NCO officers as primary individual trainers said that only recently had the services had enough well-trained NCOs to allow a delegation of responsibility. They also expressed concern regarding the effort required to ensure the NCOs were conducting required and adequate training. Officers in units with a tradition of using NCOs as primary trainers of individuals and small units, told us that the NCOs had the best opportunity to observe the servicemen and decide what training they needed.

Several Army divisions and Marine Corps regiments now allocate NCOs a block of time to conduct individual and crew training. The structure and management of that time varies by organization, but the philosophy is to provide 4 to 5 consecutive hours of uninterrupted time for individual and crew training. Usually, the NCO responsible for individual training identifies areas needing improvement and uses this time to provide that training. Sometimes superiors review the NCO's training plans to ensure the training covers only mission essential tasks and uses appropriate standards. The use of NCOs as primary trainers is apt to be expanded to the extent units follow guidance contained in revised training guidance issued by the services prior to the onset of the Gulf war.

Operation Desert Storm showed the importance of rehearsals and repetitions in employing battle drills and tactical SOPs in training personnel in fundamental skills that permit quick preparation for unanticipated events. This was not a new lesson learned as much as it was a lesson revalidated even though military officials report that insufficient emphasis had been placed in this area previously.

Importance of Commander and Battle Staff Training, Including Growing Importance of Computer Simulations

Computer-simulated training has proven to add an important dimension to training at all levels or echelons, but particularly for commanders and staffs. Preparations for Desert Storm ground operations gave heightened recognition to the importance of commander and battle staff training, especially in the skills needed to command and control military operations. It is through repetitive practice that officers are able to develop and sustain the skills to perform their functions as commanders or members of battle staffs. Additional time for some officers to participate in battle staff

training exercises might be available through increasing use of noncommissioned and junior officers as trainers of individuals and small units.

Senior leaders in both the Army and Marine Corps have indicated that they wanted to make even greater use of computer simulation technology for battle staff training in the future. Such training is seen as a complement to, not a replacement for, large-scale field exercises such as those conducted at the services' combat training centers.

**Importance of Combat
Training Centers Continues**

The combat training centers are widely recognized by military leaders as providing the most realistic, stressful combat environment available during peacetime. They have been recognized as a key to enhancing the quality of today's soldiers and marines and having provided an important training edge before the onset of preparations for Operations Desert Shield and Storm; the importance of these centers continues.

**Increasing Need for
Trade-Offs in Training**

Commanders and trainers often comment that their training "plate" is already full, making it difficult to accomplish all desired training. At the same time, trade-offs in training activities are often required due to time, personnel, and other resource constraints. There is little to suggest that additional trade-offs will not be required in the future. This increases the importance of closely examining training needs and priorities and assuring that resources are balanced between the classroom, simulations, training at various echelons, and field exercises, including those at the combat training centers.

In an increasingly resource-constrained environment, innovative approaches to training will likely be needed to maximize training opportunities. Preparations for Operation Desert Storm demonstrated that innovative substitute approaches are not necessarily less effective, but may offer important advantages in some instances. Techniques, such as the use of surrogate vehicles for some aspects of maneuver training used in peacetime to overcome resource constraints, proved to be applicable to preparations for combat and we believe are apt to have continued applicability in peacetime—not as a replacement for more traditional approaches, but as a supplemental approach that, depending on the training objectives, can offer important advantages while conserving resources.

Conclusions

A continuous emphasis on training is important to minimize skill decay and maintain proficiency and readiness—and the ability to fight and win the first battle of the next war. Preparations for ground combat underscored the importance of basic soldier and marine skills, and gave increased recognition to the importance of staff level training as well as the need for increased training in some other areas. Computer simulations offer much potential to augment existing training as well as to facilitate training in areas not having received adequate attention in the past. However, all of this accentuates what many military trainers already consider a full training “plate.”

Various peacetime constraints, ranging from time, resources, personnel turbulence and other factors, require that commanders make trade-offs in formulating training programs and that, as in war, innovative substitutes to traditional approaches may be required to maximize training opportunities in a resource-constrained environment. The war showed that such innovative substitute approaches are not necessarily less effective and, in some instances, may offer important advantages.

In many respects the lessons learned in Operations Desert Shield and Desert Storm were not new lessons but old lessons revalidated. To some extent they are reflected in revised Army and Marine Corps training policies issued within a year before the onset of the Gulf war. In some instances, we have noted increased emphasis in these training areas as units and their commanders returned from the war and began planning for future peacetime training.

Agency Comments

DOD fully concurred with the report's findings and conclusions. DOD's comments are reproduced in their entirety in appendix I.

Comments From the Department of Defense



FORCE MANAGEMENT
AND PERSONNEL

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301-4000

JUL 29 1992

Mr. Frank C. Conahan
Assistant Comptroller General
National Security and
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United States General Accounting Office
Washington, DC 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report entitled, --- "OPERATION DESERT STORM: War Offers Important Insights into Army and Marine Corps Training Needs," dated June 17, 1992 (GAO Code 391158, OSD Case 9111). The Department concurs with the draft report.

Sincerely,


Christopher Jehn

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