

GAO

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

April 1991

ARMY TRAINING

Various Factors Create Uncertainty About Need for More Land



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**National Security and
International Affairs Division**

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The Honorable Nancy Landon Kassebaum
United States Senate

Dear Senator Kassebaum:

This report shows that a number of factors can affect training requirements, limitations, and land use. These factors create uncertainty about the extent to which additional home-station training areas in the United States are needed; would be used if acquired; would enhance training proficiency and readiness; and would correct common, recurring training deficiencies. They indicate that a comprehensive training strategy is needed to provide the basis for deciding land needs. The report recommends that the Secretary of the Army develop such a strategy and use it as a basis for requesting additional training land.

As you requested, we plan no further distribution of this report until 30 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 and the Army. Copies will also be made available to other interested parties upon request.

Please contact me at (202) 275-4141 if you or your staff have any questions concerning this report. GAO staff members who made major contributions to this report are listed in appendix IV.

Sincerely yours,

A handwritten signature in cursive script that reads 'Richard Davis'.

Richard Davis
Director, Army Issues

Executive Summary

Purpose

Army officials have indicated that more training land is needed at several installations throughout the United States. Public concern about a proposed expansion of Fort Riley, Kansas, prompted Senator Nancy Kassebaum to ask that GAO undertake a two-part effort to examine the Army's training land acquisition plans and procedures.

GAO's first report, Army Training: Need to Improve Assessments of Land Requirements and Priorities (GAO/NSIAD 90-44BR, Dec. 1, 1989), focused on procedures for establishing land needs, examining alternatives, and setting acquisition priorities. This report addresses broader questions: (1) What deficiencies exist in maneuver training, and to what extent are they caused by land shortfalls? (2) How have land shortages affected training and readiness? (3) What effect will the Army's future training plans, including the increased use of computer simulations, have on land needs? (4) Can the Army develop a standard for training land requirements? (5) Can combat training centers compensate for limited home-station land?

Background

To minimize losses and to win on the modern battlefield, Army soldiers must have realistic peacetime training. Greater mobility and enhanced capabilities of modern weapon systems, such as tanks and other tracked vehicles used by armored and mechanized infantry forces, have heightened concerns within the Army about the adequacy of its training space.

Training takes place at the individual and collective (or unit) levels, involving up to battalion- or brigade-sized units at home stations, where units are permanently located. Another important factor in achieving training proficiency is off-post training, such as periodic rotations to the Army's combat training centers, such as the National Training Center, located at Fort Irwin, California, which has over 200,000 acres usable for maneuver training.

Results in Brief

A number of factors create uncertainty about the need for more training land. These factors include (1) training deficiencies for which the lack of land does not appear to be the principal cause; (2) the need for a greater focus on small-unit training that is less land-intensive; (3) constraints on resources other than land that often limit the amount and scope of training at existing installations; (4) commanders' assessments indicating that most maneuver units are highly trained and ready to perform their missions; (5) the Army's stated plan to place greater reliance on computer simulations; and (6) the impending force reductions. Needs

for home-station training land are influenced by many factors and are more subjective than prescriptive; consequently, a uniform standard for specifying needs for training land does not appear practical. The Army's combat training centers provide an important complement to home-station training and help offset limitations in home-station training.

Principal Findings

Land Is Not the Key Factor in Recurring Training Problems

Combat training center information shows recurring training problems for Army units both in the United States and Germany, but the lack of land does not appear to be the principal cause. Instead, these problems frequently are related to battlefield planning, the development and use of intelligence data, reconnaissance, communications, and rehearsals. In addition, some key training officials at installations with relatively smaller home-station training areas in the states told GAO that the problems the National Training Center identified in their units were not land related. A number of senior Army leaders told GAO that the Army was increasingly recognizing that many proficiency problems arose from an insufficient focus on individual and small-unit skills and from insufficient repetition in training. These problems and potential solutions do not suggest that higher echelon training, which could help justify the need for more land, is not needed, but raises questions about the relative priority major training land acquisitions should be given.

Factors Other Than Land Availability Have Affected Readiness Ratings

Army commanders told GAO, and indicated in their required monthly reports on the training status and readiness of their units, that the lack of training areas seldom was a significant impediment to training, particularly in the United States. They reported that priorities accorded training funds, personnel shortages and high turnover rates in key training and leadership positions, and competing time requirements were having the most effect on their ability to train soldiers and maintain their skill proficiency.

Greater Use of Computer Simulations Is Anticipated

The Army is currently using a number of sophisticated training devices, including computer-controlled simulations, to augment its field training. Army long-range training guidance calls for the greater use of advanced training devices and computer simulations as a way to train smarter and more effectively in anticipation of future constraints on resources. What

the appropriate mix of field exercises and computer-simulated training should be is not well defined at present. Therefore, land needs are uncertain as well.

Force Restructuring Could Affect Land Needs

The Army plans to reduce and restructure its forces. Training requirements could be affected by the changing threat and greater emphasis on low- to mid-intensity conflicts, the numbers and types of divisions that are retained, how and where they are stationed, and the levels of readiness that the Army seeks to maintain. These variables, which are not yet well defined, add to the uncertainty over future requirements for training land.

Standard Land Requirements May Not Be Realistic

The Army's training circular 25-1, published in 1978, specifies a standard training land requirement of about 83,000 contiguous acres for battalion-level ground maneuver exercises. The Army is now revising and updating that circular. As of April 1991, the revised circular had not been completed. A draft version, however, identifies a much reduced land requirement—61,000 acres—down over 25 percent from the earlier circular. However, the draft revision suggests the use of the acreage as a beginning point for individual installations' further assessing land needs, recognizing that the amount actually needed could be larger or smaller, depending on training factors unique to individual installations. This policy seems to recognize that standardizing land requirements would be impractical.

Combat Training Centers Complement Home Station Training

In addition to home-station training areas, combat training centers are also important to developing and assessing training proficiency. Because of constraints on home-station land in Germany, the training center there is relied on as the principal source of battalion-level maneuver training. On the other hand, the National Training Center serves more to complement home-station training rather than to compensate for significant limitations in home-station training lands. Combat training centers provide an important means of assessing units' proficiency and identifying areas requiring attention in home-station training.

Army Lacks a Comprehensive Training Strategy

One reason the Army's training land requirements are not well defined is that the Army lacks a comprehensive strategy that integrates all of the key factors affecting training requirements, limitations, and land use. GAO recognizes the difficulty that developing such a strategy

entails, particularly in view of the uncertainty that still exists over force restructuring and determining the appropriate mix of field and computer-simulated training. However, without a comprehensive strategy in place, the Army lacks a sound basis for making land acquisition decisions. Many senior Army leaders, although agreeing with GAO's analysis of the interrelated factors that affect training and the use of land, still believe that additional land is needed. These officials voiced concern that buying land in the future will be more difficult, as environmental and political constraints will only increase over time. This view only reinforces the need for a comprehensive training strategy to guide land acquisition decisions.

Recommendations

GAO recommends that the Secretary of the Army (1) develop a comprehensive, integrated training strategy that addresses the key factors affecting training and land use and (2) base requests for additional training land on the completed strategy.

Agency Comments

The Department of Defense concurred with the intent of both of GAO's recommendations and stated that the Army was developing a Combined Arms Training Strategy that would integrate all of the resources required for training. Publication of a coordinating draft is expected in September 1991. The Department also stated that following the completion of this effort and efforts associated with base closures and realignments, the Army would develop a comprehensive strategy for land acquisition. GAO believes that future land acquisition proposals should clearly reflect a consideration of issues identified in this report.

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Abbreviations

CALL	Center for Army Lessons Learned
CMTC	Combat Maneuver Training Center
CTC	Combat Training Center
DOD	Department of Defense
GAO	General Accounting Office
METT-T	Mission, Enemy, Terrain, Troop, and Time available
NTC	National Training Center
PRIME	Precision Range Integrated Miles Enhancement
SIMNET	Simulation Networking
TC	Training Circular

Introduction

To minimize losses and to win on the modern battlefield, the Army recognizes it must practice in peacetime for the first battle of the next war. This recognition has reinforced the Army's desire for larger training areas at selected installations so that armored and mechanized infantry forces, employing tanks and other tracked vehicles, may train more realistically—positioning, moving, and stressing their maneuver and support forces as they would expect to do in a wartime environment. The greater mobility and the enhanced capabilities of modern weapon systems have heightened concerns within the Army about the adequacy of its existing training space.

Army Training Philosophy

The Army Chief of Staff has stated that

...our nation's ability to deter attack or act decisively to contain and de-escalate a crisis demands an essentially instantaneous transition from peace to war preparedness. This requires that all leaders in the Army understand, attain, sustain, and enforce high standards of combat readiness through tough, realistic multi-echelon combined arms training designed to challenge and develop individuals, leaders, and units."¹

Training should be conducted in as realistic an environment as possible. The Army believes that, in addition to training in individual and small-unit skills, soldiers need periodic large-scale training to effectively coordinate and synchronize the various combined arms elements that are commanded at the battalion or brigade levels. This training involves what the Army terms a "multi-echelon approach" to training, emphasizing the simultaneous training of individuals, leaders, and units at each echelon in the organization during large-scale training events. The Army views multi-echelon training as the way to use its available time and resources most effectively.

The Army's training strategy stipulates that once individuals and units have trained to a required level of proficiency, leaders should structure individual and collective training plans to repeat critical task training at the level of frequency necessary to sustain proficiency. This sustainment training enables units to stay within a range often referred to as a "band of excellence." This philosophy is embodied in Army Field Manual 25-100, entitled Training the Force and dated November 15,

¹The term "echelon" refers to a separate level of command. Platoons, companies, battalions, brigades, and divisions are succeeding higher echelons of command. The 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 would expect to mutually support one another in combat operations.

1988. Field Manual 25-100 emphasizes that "Army units must be prepared to accomplish their wartime missions by frequent sustainment training on critical tasks; they cannot rely on infrequent 'peaking' to the appropriate level of wartime proficiency."

The Army recognizes that it does not have enough time and other resources to achieve and sustain soldiers' proficiency on every training task. Therefore, commanders are responsible for focusing training on tasks most essential to accomplishing the organization's wartime mission (these tasks are listed on the unit's "mission-essential task list"). Even in similar organizations, mission-essential tasks may vary significantly because of differences in wartime missions.

Field Training

The Army expects its heavy forces (its armored and mechanized infantry) to conduct offensive, defensive, or other missions. This training requires a focus on gunnery and maneuver training. Gunnery training enables individuals, crews, and units to develop the skills necessary to employ their weapons and destroy the enemy. Army regulations provide specific, objective criteria by which individuals and crews must be evaluated periodically on their gunnery proficiency. Gunnery training with live ammunition generally takes place on ranges set aside specifically for that purpose.

Maneuver training is training that enables units to move, supported by fire, to a position of advantage relative to the enemy. Given the nature of maneuver training, criteria for assessing its effectiveness are more subjective than they are for gunnery training. Training for maneuver units may involve small, limited-scale situational training exercises designed to train soldiers in a closely related group of tasks or drills. In command field exercises, the unit's leadership and its subordinate units go to the field to conduct tactical operations without full troop strength. In larger-scale exercises known as "field training exercises," an entire unit, such as a battalion or a brigade task force, goes to the field and conducts tactical missions involving the various battlefield operating systems.² In field training exercises, force-on-force maneuver exercises are not conducted using live ammunition, but rather involve simulated firing using a special laser training device.³

²"Battlefield operating systems" are the major functions that must be performed by the force to successfully execute operations on the battlefield. The systems are maneuver, fire support, command and control, intelligence, mobility/survivability, combat-service support, and air defense.

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

Training occurs at the individual, as well as at the collective (or unit) level, at home stations, where units are permanently located, and at off-post locations. Until recently, the Army's goal has been to be able to conduct battalion-level field training at home stations, recognizing that higher levels of training are desirable but not always possible, given constraints on land and other resources.⁴ Field training exercises not only allow individual soldiers to train using their equipment over actual terrain but also provide command staff up to the battalion and brigade levels with needed leader training, involving the command and control and the synchronization of subordinate forces and battlefield operating systems. At the same time, the Army recognizes that field exercises conducted at succeeding higher echelons, particularly above brigade level, become more expensive and less efficient.

Different echelons of Army units participate differently in battle operations. Squads, platoons, and companies are more directly involved in the close-in battle, while higher echelons (beginning with battalions) become more heavily involved in the command and control of operations. It is the synchronization of assets, or the placement of the proper forces at the right places at the right times, that ultimately wins battles. Because squads, platoons, and companies are directly involved in the battle and must be able to move and shoot effectively, it is important that these units have opportunities to train in their actual combat vehicles to gain familiarity and confidence in their weapons systems and themselves. While training is intended to be multi-echelon, it is difficult to train the lower echelons efficiently as part of a larger training event because the additional numbers of people, equipment, and layers of command make it more time-consuming to reposition units between missions, resulting in much down time and reduced training benefits for lower echelon forces. The fact that training benefits for lower echelons are limited in large-scale exercises has been recognized as an undesirable but nevertheless real consequence during previous large-scale field exercises in Europe.⁵ Trade-offs have to be made between meeting training needs and objectives at all levels and balancing time and resource constraints.

Determining the amount or frequency of field training required for units, particularly those at lower echelons, is a very subjective decision

⁴This goal was recently changed to conducting brigade-level training at home stations, according to Department of Defense (DOD) and Army officials, with battalion level training now considered a minimum essential requirement.

⁵See GAO report, Army Training: Computer Simulations Can Improve Command Training in Large-Scale Military Exercises (GAO/NSIAD 91-67, Jan. 30, 1991).

on the part of individual commanders. As command and control functions become the predominant mission of higher echelons, it becomes less clear how often field training is needed for the entire unit, since computer simulations offer much potential for training soldiers in command and control and staff processes important at those echelons. There are varying viewpoints among Army commanders and trainers concerning the appropriate echelon where training can be significantly accomplished through the use of computer simulations, although many officials we talked with suggested it was somewhere around or above the brigade level. Computer simulations are also recognized as an appropriate complement to, though not a replacement for, field training at lower echelons.

Combat Training Centers

In recent years, the Army has also come to rely increasingly on its combat training centers (CTC) to further train and assess the capabilities of its combat units. These centers include the National Training Center (NTC) at Fort Irwin, California, and its smaller counterpart, known as the Combat Maneuver Training Center (CMTC),⁶ at Hohenfels, Germany, where mechanized infantry and armored battalions can engage in free-play maneuvers against an opposing force. A third training center is the Joint Readiness Training Center at Fort Chaffee, Arkansas, which is used primarily by light forces. A fourth center, or program, the Battlefield Command Training Program, focuses on computer-simulated command and control training for division and corps staff. It operates by telecommunication 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, which began operations in 1981, with its electronic sensors, cameras, and observer/controllers, provides capabilities unmatched anywhere else in the Army and is recognized as the Army's premier CTC. 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

⁶The CMTC, which covers 44,000 acres, is much smaller than the NTC, where over 200,000 acres are used for maneuver training. The CMTC is still evolving, and the Army plans to develop capabilities there that are similar to those of the NTC, such as having a permanent opposing force and instrumented battlefield to assess battle outcomes. Whereas the NTC can maneuver two battalions on the ground concurrently, the CMTC maneuvers only one battalion on the ground at a time and employs computer simulation to train another battalion, all under the control of the brigade headquarters staff.

environment available in peacetime.⁷ The NTC documents and analyzes training deficiencies of armored and mechanized infantry forces and provides information on units' strengths and weaknesses as they plan and execute various offensive and defensive missions. Summary performance information outlining training strengths and weaknesses is routinely provided to units prior to their departure. Such information is also aggregated by the Army's Center for Army Lessons Learned (CALL) and used to develop trend-line data on training issues. The Army's goal, recognizing the importance of the NTC, is to have all of its battalion commanders take their units through training exercises there during their command tours; units we visited rotated through the NTC about every 14 months.

Units at installations in the United States spend several months "training-up," or preparing for their periodic rotations to the NTC. They normally train up to the battalion or brigade level at their home stations, depending on the availability of land, in preparation for these rotations. By way of comparison, in Germany, where less training land is available, units rely on the CMTC at Hohenfels as the primary maneuver training ground for units at the company and battalion levels. Home-station training in Germany is normally confined to the platoon level and below.

Weapon System Modernization Makes Army Officials Question the Sufficiency of Existing Training Land

In recent years, the Army has fielded a number of new weapon systems with greater speed and more sophisticated gunnery that can shoot further and be employed even while moving. As modern weapon speed and firepower have increased, the space available to do maneuver training has figuratively shrunk because these systems traverse available ground more quickly and because gunnery ranges have expanded to meet gunnery training requirements.

Weapon systems such as the Multiple Launch Rocket System and the Hellfire missile require range areas so large that very few Army posts have sufficient range space to employ them to their maximum range. The M-1 tank can move at speeds almost double those of its predecessor and can fire more accurately at distances approaching 2,500 meters than could World War II vintage tanks at 1,300 meters. Thus, the M-1 can engage other weapon systems at longer ranges, thereby expanding

⁷The Army's goal is to eventually train three battalions with their brigade headquarters simultaneously at the NTC, with two maneuvering against an opposing force and one battalion conducting live-fire exercises.

its range of effectiveness. The weapon systems on the M-2 Bradley Fighting Vehicle have taken on characteristics of those mounted on a tank in comparison with the M-2's predecessor, the M-113 armored personnel carrier. Whereas the M-113 employed a .50-caliber machine gun, the M-2 is equipped with a 25-millimeter automatic stabilized cannon, a 7.62-millimeter coaxial machine gun, and tube-launched, optically tracked, wire guided missiles. The M-2 requires a larger gunnery range for training than the M-113.

In recent years, the Army has installed multipurpose range complexes at many of its maneuver installations in the United States that permit weapons associated with combined arms operations, such as tanks, infantry fighting vehicles, and attack helicopters, to fire in concert. When not in use for live firing, some of the ranges and all of the buffer zones are open for maneuver. These facilities include designated lanes for tracked vehicles to traverse with underground sensors and automated pop-up targets representing individuals and enemy weapon systems. At several installations, such as Forts Polk and Riley, the construction of multipurpose range complexes has required the use of land previously available for free-play maneuver training. Moreover, when these ranges are in use, additional land is required for safety buffer zones around them, further reducing the availability of training land. For example, Fort Riley's multipurpose range complex consumes nearly 13,000 acres of land; when actually in use, an additional 30,000 acres is set aside to provide a safety buffer zone. At Fort Polk, range modernization efforts have taken up over 90 percent of the largest on-post maneuver areas. Thus, Fort Polk units no longer use its on-post area for battalion-level maneuver training. Instead, its units perform lower echelon training at the home station and travel 12 miles to an adjacent training area to do battalion-level maneuver training.

Prior GAO Reports

Our December 1989 report pointed out that the Army had inadequate procedures for establishing training land needs, examining alternatives, and setting acquisition priorities.⁸ More specifically it reported the following:

- The Army was revising its priorities without having established adequate procedures for deciding relative needs.

⁸See *Army Training: Need to Improve Assessments of Land Requirements and Priorities* (GAO/NSIAD 90-44BR, Dec. 1, 1989).

- The Army's guidance, which was used as a basis for establishing collective training requirements, was 11 years old; recognizing that the guidance was out of date, the Army had begun to update it.
- The Army required an alternative analysis before it made a final decision to acquire land. However, this analysis could be biased because it was not done until after the initial decision had been made that additional land was required.

Our August 15, 1990, letter to the Secretary of the Army concluded that in view of force restructuring and other issues, the Army's plan to spend funds in pursuit of the expansion of Fort Riley, Kansas, would not be prudent (see app. I).

Objectives, Scope, and Methodology

The objectives of this review were to determine whether land constraints were causing training deficiencies and whether additional training land would likely remedy those deficiencies. More specifically, we addressed the following questions: (1) What deficiencies exist in maneuver training, and to what extent are they caused by land shortfalls? (2) How have land shortages affected training and readiness? (3) What effect will the Army's future training plans, including the increased use of computer simulations, have on land needs? (4) Can the Army develop a standard for training land requirements? (5) Can combat training centers compensate for limited home-station land?

We obtained information for this review from officials at the Department of Defense and the Department of the Army, Washington, D.C.; U.S. Army, Europe, Heidelberg, Germany; the U.S. Army Forces Command, Fort McPherson, Georgia; the U.S. Army Training and Doctrine Command, Fort Monroe, Virginia; the Combined Arms Command, Fort Leavenworth, Kansas; various field offices of the Army Research Institute; and the Office of the Program Manager for Training Devices, Orlando, Florida; the Army's Armor School at Fort Knox, Kentucky; the Infantry School at Fort Benning, Georgia; the Aviation School at Fort Rucker, Alabama; and the Command and General Staff College at Fort Leavenworth, Kansas.

We also interviewed commanders and training officials of selected maneuver units stationed in the United States and Germany. These units included the 1st Mechanized Infantry Division, Fort Riley, Kansas; the 5th Mechanized Infantry Division, Fort Polk, Louisiana; the 1st Cavalry Division and 2nd Armored Division, Fort Hood, Texas; the 4th Infantry Division, Fort Carson, Colorado; the 9th Motorized Division, Fort Lewis,

Washington; the 3rd Armored Cavalry Regiment, Fort Bliss, Texas; and the Forward Brigade of the 1st Infantry Division in Germany. Forts Polk, Riley, and Lewis are installations where the Army has identified the need for additional training land.

We selected maneuver units because these types of units typically operate with tracked vehicles and require the largest amounts of maneuver training land. By including units having varying amounts of home-station training land, we sought to determine what differences, if any, existed in how training occurred, how land was used, and what training problems had been identified.

To determine whether training deficiencies we identified might be related to having insufficient training land at home stations, we interviewed commanders and training officials of the NTC and the CMTC, reviewed pertinent documents that identify training strengths and weaknesses of units, and discussed lessons learned with officials from CALL, including field sites at the NTC and the CMTC. We also reviewed unit status reports for selected maneuver and support battalions stationed in the continental United States and Germany to get a further indication of readiness status and factors adversely affecting units' abilities to train.

Near the completion of our fieldwork, we sought additional insights and perspective regarding our tentative findings by formally briefing selected Army leaders at the general officer level. We briefed the Commander, U.S. Army, Europe; the Commander, III Corps, Fort Hood, Texas; division commanders under III Corps; the Commander, Combined Arms Command; the Assistant Chief of Staff for Training, U.S. Army Training and Doctrine Command; and the Chief of Staff, Forces Command. These officials generally agreed with our analysis and the interrelated problems we identified that affect training and the use of land. Information obtained during the course of those briefings has been incorporated into this report.

We conducted our work between January and November 1990 in accordance with generally accepted government auditing standards.

Lack of Land May Not Be the Primary Cause of the Army's Training Problems

Common training problems exist for Army units in the United States and Germany, where sharp differences exist in the size of training areas. There are indications that training land areas are neither the principal cause of nor the solution to these problems. Units stationed in the United States have varying amounts of home-station training land, but even the smallest maneuver installations we visited in the United States were far larger than those available in Germany. Many Army leaders believe that the key to solving many training problems is increased emphasis on individual and small-unit training.

Common Training Problems

Army trainers and others whose responsibility it is to observe the performance of Army units training at the CTCs in Europe and the United States indicate that maneuver units face common, recurring training problems. Many problems are related to inadequate battlefield planning, development and use of intelligence data, conduct of reconnaissance and counter reconnaissance, maintenance of communications, and conduct of rehearsals. According to Army officials, limitations on training land are not the principal cause of these problems.

Inadequate Planning

Army trendline data from battlefield maneuver exercises from 1987 to 1990 indicates that (1) commanders have difficulty in effectively issuing planning guidance to their staffs and (2) the guidance is either piecemeal or vague. Planning is often inefficient and unorganized, and staffs sometimes have inadequate knowledge of military doctrine and manage their time poorly.

Insufficient Use of Intelligence Data

Another common problem is commanders' insufficient use of intelligence data in developing plans of operation, referred to as "intelligence preparations of the battlefield." Intelligence staff are required to prepare studies of the battlefield and predict how and when the enemy is likely to move and its most probable approach. CALL officials told us that, while maneuver plans developed by commanders should be based on this assessment, commanders do not make sufficient use of the intelligence data or sufficiently emphasize its use by subordinate commanders in preparing their plans. According to some Army training officials, this problem can be addressed by conducting varying levels of field training exercises, including home-station drills and tactical exercises, without extensive use of troops in the field.

Poor Reconnaissance

Poor performance of reconnaissance and counter-reconnaissance missions is another recurring problem seen in training exercises at the CTCs. Units are not effectively scouting the enemy to gather intelligence on their operations or taking adequate measures to preclude the opposing force from doing the same. A commander with the highly trained opposing force at the NTC told us that its units regularly exploited the poor reconnaissance skills of rotating units. The problems, according to some training officials, can be addressed through repetitive field training exercises at home stations. A CALL official told us that the majority of battles that go badly do so because of reconnaissance problems and that reconnaissance was also an area that had not been given sufficient attention in the classroom.

Inadequate Communications

A recurring problem is that units do not maintain adequate communications with other units and with higher headquarters. According to CALL officials, the lack of "spot reports" is attributed to inexperience on the part of staff and troops in delivering reports under stress and to commanders' and staffs' failure to enforce compliance with Army reporting standards. This problem has been recognized at platoon, company, and battalion levels. Army training officials indicate that communications can be practiced without entire units going to the field, but spot reporting must be done in a realistic, stressful environment. Computer-controlled simulation systems exist to help provide such training.

Insufficient Rehearsals

Insufficient emphasis on rehearsing battle plans, either at the NTC or at home stations, is another common problem. A senior Army commander told us that the concept of rehearsals is not well-defined. According to a CALL official, the Army has not developed sufficient doctrine in this area but is now working to put out a manual addressing it. Rehearsals can include the use of "sand tables" to illustrate the battle plan or can involve senior leaders' "walking through," or together reviewing, the battle plan to identify and address potential problems.

Each unit completing a rotation at the NTC is provided with what is called a "take-home package," which outlines the unit's strengths and weaknesses as evidenced by its performance at the CTC. The packages identify areas requiring additional training at home stations. For example, a "take-home package" for one unit included in our review cited the need to sustain key members' planning skills through command-post exercises. In addressing problems identified in the

maneuver battlefield operating system, the reviewers recommended conducting command-post exercises, situational training exercises, tactical exercises without troops, or computer simulations and war-gaming. The only recommendation that might require using significant amounts of land involved platoon-level live-fire sustainment training. Our review of other take-home packages and CALL data reflected similar problems.

Army Leaders Recognize the Need for Increased Focus on Lower Echelon Training

We asked Army officials in Germany and the United States about the extent to which land shortages might have contributed to the training problems identified at the CTCs. Training officials at some installations, including Forts Riley and Polk, told us that land shortages were not the cause of these training problems. Other Army officials do, however, believe some training problems are related to land shortages. While some Army officials in Europe were more vocal about the need for more land to train more effectively, training officials both in the United States and in Germany provided examples of how many problems could be addressed without using large amounts of land.

Numerous senior Army leaders in Germany and the United States have pointed to the need for increasing the emphasis on individual and small-unit training. Fiscal year 1990 training guidance from the 3rd Brigade of the First Infantry Division, located in Germany, stated that:

[B]asic soldier skills. . . are the cornerstone of combat readiness. However, they frequently get overlooked by unit senior leadership in the constant press of trying to keep major collective training events on track. A common syndrome is one of officers and senior NCOs who are over stressed, while soldiers and junior NCOs are bored.

The fact that in Germany training areas are small and there is more emphasis on small-unit skills points out the significance of the problem. Similar comments have been made by training officials at installations in the United States, where more land is available for training and greater emphasis is placed on multi-echelon training.

In April 1990, the commander of the 3rd Armored Cavalry Regiment, located at Fort Bliss, briefed his higher headquarters at III Corps on the need to "re-establish small unit skills." His view was based on an assessment of the regiment's recent rotation through the NTC and on what he perceived to be the "fixes" needed to address training deficiencies. The commander indicated that there had been an over reliance on larger echelon collective training within the Army without a recognition that such

training should represent the culmination of small-unit training proficiency. He indicated that the emphasis on training was just the reverse of what it should be and that it had resulted in the inability of commanders to synchronize larger units.

A senior training official at the NTC told us that an all-too-common problem was the poor performance by crews and small units. NTC and other Army 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 the battle. NTC officials expressed the view that not enough repetition in training was done at the platoon level and that lower level training needed more command attention. They advanced the view that if units came to the NTC with weak platoons, it was difficult to fix their problems in the limited amount of time available there. The officials also stated that if lower echelons were strong, it was easier to fix higher echelon command and control training problems at the NTC.

A training official at Fort Carson, Colorado, told us that training at that installation in fiscal year 1991 would focus more on small units in response to training deficiencies identified through NTC rotations as well as in response to budget constraints.

Land Constraints Are Greater in Germany Than in the United States

Training land constraints are more of a problem in Germany than in the United States. Local training areas for Army units based in Germany vary in size from 3 acres to 8,000 acres, with divisional units not always housed at the same location. Other training areas are available but often have significant constraints that limit their use for maneuver training. These differences reinforce the question of whether training land is a primary cause of training deficiencies in the United States, given the commonality of recurring training problems for which land does not appear to be the principal cause.

Land area and environmental constraints restrict maneuver training with tracked vehicles at most locations in Germany up to the platoon level and require that higher echelon training take place through periodic rotations to the CMTC. Commanders in Germany told us that their greatest need was for more land for company-level maneuver training.

Divisional installations in the United States included in our review varied in size from about 100,000 to over 1,000,000 acres, although not

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all of the land was available for maneuver training involving tanks and other tracked vehicles. Table 2.1 compares installation acreage with amounts of land available for maneuver training at installations we visited.

Table 2.1: Installation Size and Areas Available for Maneuver Training at Selected U.S. Installations

Acres in thousands		
Installation	Total acreage	Maneuver training areas
Fort Bliss, Texas	1,100	331
Fort Carson, Colorado (main post)	138	23
Pinon Canyon, Colorado (sub-post)	245	210
Fort Hood, Texas	217	132
Fort Lewis, Washington (main post)	86	44
Yakima Center, Washington (sub-post)	261	230
Fort Polk, Louisiana (main post)	165	56
Peason Ridge, Louisiana (sub-post)	33	27
Fort Riley, Kansas	97	50

Maneuver training areas are not necessarily fully contiguous and are usually broken down into a number of different training areas at each installation. Forts Polk and Riley have the most limited amounts of training land suitable for conducting tracked vehicle maneuvers of the installations we visited in the United States. Training officials at both these installations told us that, while battalion-level training did take place, it was not considered optimal, and more land was desired. While these two installations have been seeking to obtain approximately 83,000 acres of contiguous land for battalion-level maneuvers based on the original Training Circular (TC) 25-1 guidance, it should be noted that the largest single area of maneuver land at Fort Hood, widely regarded as one of the Army's best maneuver training posts, is approximately 70,000 acres. Several training officials stated that, although there were other, smaller areas available that were used for platoon- and company-level maneuvers, with two divisions housed at Fort Hood, access to training areas was sometimes a problem. This problem may be reduced by an Army decision made during the course of our review to deactivate one division stationed at Fort Hood.

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Officials at Fort Lewis, Washington, who would like to expand the Yakima Firing Center for use as a regional active and reserve training facility, cite the need for an additional 63,000 acres to facilitate brigade-level training exercises. This emphasis on brigade-level training at home stations may be partly a result of the long-term goal of the Army to expand the NTC to accommodate full brigade-level training; this goal has produced a corresponding desire among some training officials to train at that level before training at the NTC.¹

Maneuver installations in the United States, even the smallest ones we visited, had much larger home-station training areas than were available to units stationed in Germany. The fact that common training deficiencies are reflected in the results of unit training at CTCs in Germany and the United States, compounded by the recognized need for greater emphasis on small-unit training, underscores the difficulty in knowing the extent to which additional training land in the United States would alleviate many training problems.

¹The NTC currently has about 600,000 acres of land; however, only about 200,000 is available for maneuver training. The NTC is seeking to expand, adding an additional 200,000 acres.

Competing Demands for Resources Other Than Land Limit Training in the United States

Land is not the most significant resource shortage affecting the ability of Army units to train in the United States. The greater problems in the United States, according to Army officials, involve funding priorities, personnel turnover, and shortages in critical positions. Competing time requirements also affect units' ability to train. While these problems may make it difficult for the Army to sustain a high level of unit proficiency, the significance of these problems is unclear since most Army commanders regard their units as well trained and prepared to undertake most of their wartime tasks. If the lack of land is a serious impediment to Army training, this problem is not well documented in Army readiness reports.

Training Funds, Personnel Problems, and Competing Time Requirements Are Key Factors

Numerous commanders in the United States told us, and also cited in required monthly reports on the training status and readiness of their units, that their ability to train and maintain their units at desired levels of proficiency was most significantly affected by the priorities accorded training funds, high personnel turnover rates of leaders and troops, shortages in key training positions, and competing time requirements.

Funding Priorities

Army commanders and training officials at Forts Carson, Hood, Lewis, Polk, and Riley told us that available training funds were limiting their amounts and levels of maneuver training. Officials at most of these installations noted that their training funds had declined in recent years and were expected to continue to decline. Part of these reductions, according to an Army headquarters official, is due to the different priorities installations have placed on the Army's allocation of training funds. Army officials noted that, even when funds were not reduced, training sometimes suffered because of the effect of inflation or the rerouting of money to continue base operations.

Because of funding difficulties, officials at some installations—including some that would like to acquire additional training land—indicated that they were not making as great a use of their existing training land as they would have liked. Funding difficulties resulted in emphasizing lower echelons of training, the trucking of tanks and other tracked vehicles to ranges to save fuel, and the use of more fuel-efficient wheeled vehicles as surrogates for tracked vehicles. In guidance issued by the Commander of Fort Riley on November 29, 1989, he stated that, because of funding limitations, approval would not be granted for training at the

company level except when a unit was preparing to go to the NTC for a training exercise. One Fort Riley battalion commander, in his monthly assessment of training, noted that training was at a standstill because of a lack of funds and because there was an insufficient number of non-commissioned officers qualified to be trainers. Forts Hood and Polk had funding limitations that caused them to move tanks and other tracked vehicles by truck when they moved more than a minimum number of miles to training areas. Fort Carson, which had acquired the 245,000-acre Pinon Canyon training site in the early 1980s, had to cancel one of three planned training exercises at that facility in 1990 and expected further cutbacks in training in 1991—a situation that had presented itself before the onset of Operation Desert Shield/Storm.

Personnel Constraints

Numerous senior leaders we talked with described personnel turbulence as one of the most significant problems affecting the Army's ability to train. Personnel turnover is exacerbated, if not caused, by the Army's system of rotating personnel from one assignment to another, between the United States and overseas locations.

Monthly reports prepared by commanders indicating the status of their unit training provide important insights into the significance of the personnel problems. For example, one commander noted that shortfalls in qualified leaders, along with funding limitations, had a major impact on his unit's ability to train. Numerous other commanders made similar comments in their reports.

While some Army officials told us that they needed more land to maneuver at their home stations to help address training deficiencies identified at the NTC, we found that personnel turnover often had precluded this training from happening. Units we visited in the United States reported that it was not unusual to have personnel turnover rates of 10 to 12 percent per month; some units report random occurrences of even higher turbulence. Turnover of leaders can also be greater at times than it is for troops overall. One commander noted that his battalion was made up of ineffective crews. Personnel turnover equated to replacing 20 out of 24 crews every 90 days.

Personnel turbulence, along with shortages of key leaders, could mean that units would have to train at the NTC¹ with less than the full complement of soldiers that they would expect to have in a wartime environment. To limit this possibility, commanders place restrictions on personnel rotations before units go to the NTC, particularly among key leaders. Commanders also seek temporary fillers from other units to round out their units. Consequently, commanders report that soon after NTC rotations are over, personnel turbulence is increased, particularly among key leaders. This condition limits efforts to correct unit deficiencies identified at the NTC. One training official noted that, while his unit had recently completed an NTC rotation, it was unable to sustain lessons learned due to a lack of key noncommissioned officers.

Army officials are hopeful that personnel turbulence may be reduced in the future with troop reductions in Europe but indicate it has been an intractable problem without an easy solution.

Competing Time Demands Inhibit Training

Army officials indicate that, in addition to funding and personnel problems, competing demands limit the time available to devote to training. These demands may range from handling normal collateral duties on an installation to fighting forest fires to serving as support for other units that are preparing for an NTC rotation or as trainers for reserve or Reserve Officer Training Corps units.

At Fort Riley, Kansas, for example, training officials told us that 75 days each summer were devoted to working with Reserve Officer Training Corps cadets. According to these officials, more than a brigade of troops is required to support this training. Thus, the 1st Infantry Division must divert about 3 months of training time and over 3,000 personnel away from training its own personnel.

The division commander's training guidance for fiscal year 1990 at Fort Polk noted that the post would have to contend with significantly reduced funding, along with competing requirements for time, which he called their most constrained resource.

The Commander of an armored cavalry regiment at Fort Bliss, Texas, told us that the regiment's biggest impediment to collective training was the fact that so much time was required to train soldiers in individual skills. He said this problem was compounded by a high annual turnover

¹The Army is striving to have battalions complete NTC rotations about once every 18 months.

rate and the limited training that soldiers received in their initial military occupational skills upon entering the Army. According to the Commander, his regiment receives over one-half of its new personnel directly from Army schools. He said that the schools teach the individual soldiers only about 60 percent of the skills they needed. The Commander concluded that the need to complete occupational skills training, coupled with high personnel turbulence and the priorities accorded units' preparation to train at the NTC, makes home-station sustainment training a "myth." Officials at other installations also mentioned that the inability to perform sustainment training was a problem.

Uneven Training Emphasis in the United States

A strong desire of commanders for their units to perform as well as they can at the NTC produces an uneven distribution of training resources among units at given U.S. installations—an approach commanders in Europe indicate they seek to avoid in developing their training plans.

A training official at a U.S. installation stated that giving resource priorities to units "training up" to go to the NTC creates a "feast or famine" situation in that units not in the train-up mode go for extended periods of time with limited training. One battalion commander commented that his unit had not had any platoon- through battalion-level maneuver training for 8 months because he had had to spend time supporting other installation activities. Training officials at other installations cited similar examples.

Commanders Assess Overall Training Quality and Readiness as High, Despite Resource Constraints

Despite resource constraints and the training problems we have identified, senior Army leaders consider today's Army to be better trained than ever. This positive assessment is reflected in unit status reports² as well as in numerous other statements by senior Army leaders. Unit status reports do not portray the lack of training land as a significant impediment to training.

Battalion-level commanders report monthly on their training status as part of an overall assessment of their units' ability to accomplish their assigned wartime missions.³ This system uses "C-ratings" from 1 to 5 to

²Monthly unit status reports completed by commanders permit them to evaluate an overall level of readiness and to indicate the extent to which various factors have a minor, major, or prohibitive impact on their ability to meet their training objectives.

³In completing these reports, commanders assess personnel, equipment status, and training status.

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identify levels of readiness. Table 3.1 lists criteria used in assessing training status.

**Table 3.1: Unit Status Report Rating
Criteria for Training**

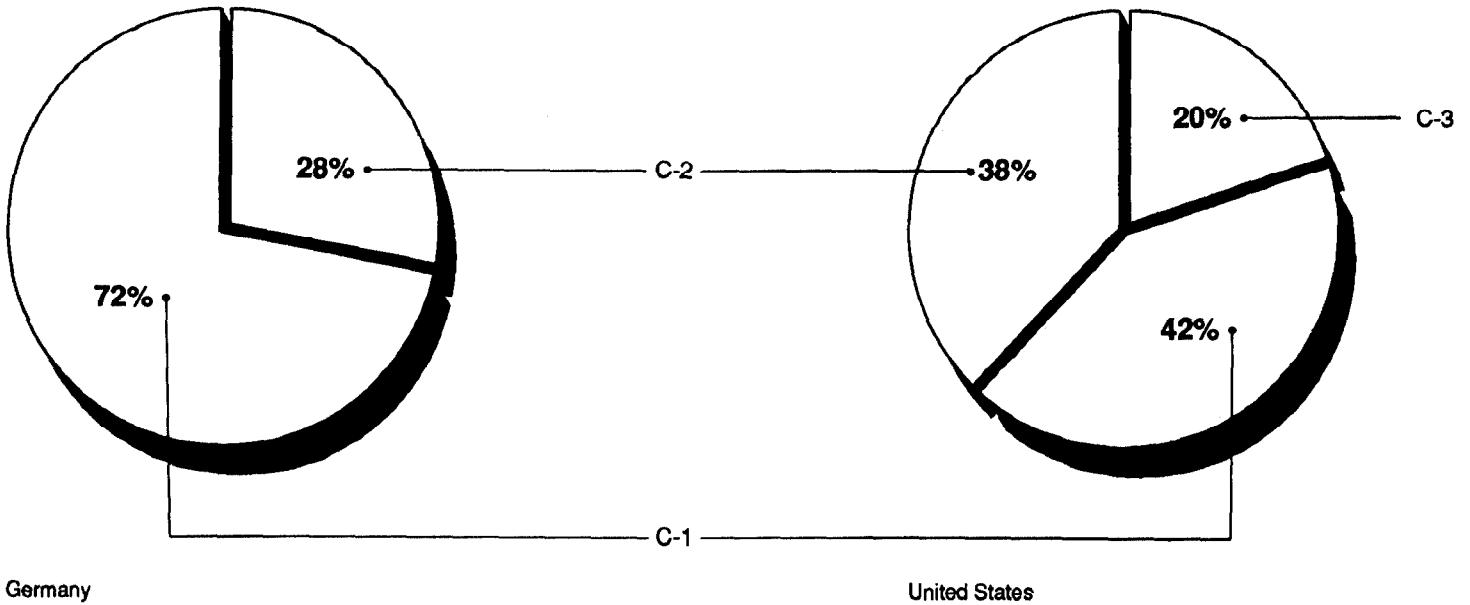
Rating	Criteria
C-1	The unit can undertake its full wartime mission.
C-2	The unit can undertake the bulk of its wartime mission.
C-3	The unit can undertake a major portion of its wartime mission.
C-4	The unit requires additional resources or training to undertake its wartime mission.
C-5	The unit is undergoing a service-directed resource change or is authorized personnel and/or equipment at a level that does not allow it to achieve a C-3 or higher rating.

Source: Army Regulation 220-1.

We reviewed November 1989 and February 1990 monthly unit status reports for 60 maneuver and maneuver support battalions stationed in the United States and for 46 stationed in Germany to evaluate the units' training status and factors identified as affecting their ability to train. We selected these battalions from installations that had units equipped with tracked vehicles and relatively larger and smaller training areas.

The data consistently portrayed a high state of training readiness for units in the United States and in Germany during that time; the highest rates overall were assigned to units stationed in Germany. Figure 3.1 shows the level of training readiness of selected ground maneuver battalions in the United States and Germany for February 1990.

Figure 3.1: Level of Training Readiness of Selected Ground Maneuver Battalions

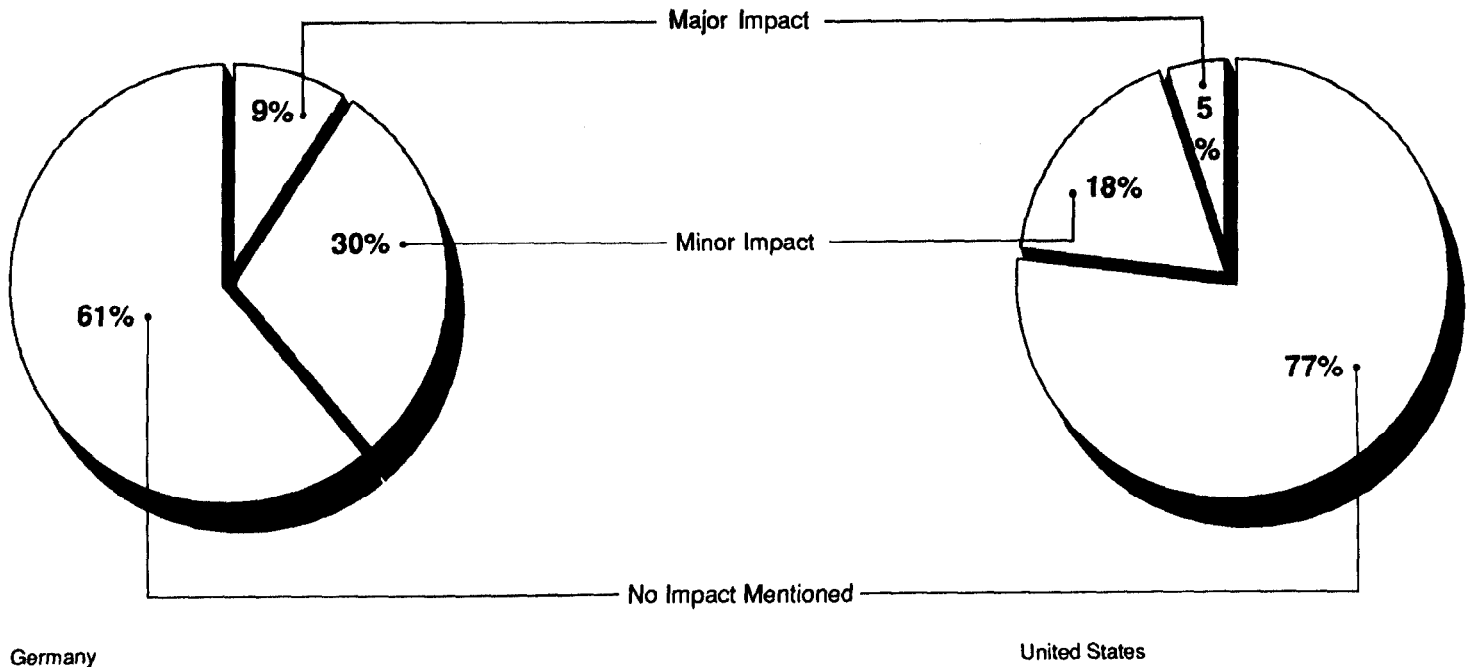


Source: Based on unit status reports.

In completing their unit status reports and assessing training, commanders assess the extent to which various resources have affected their ability to train. Our review of these status reports, as indicated in figure 3.2, showed that in most cases, both in the United States and in Germany, the availability of training areas was reported as having no impact. In only a very few instances was it reported as having a major impact.⁴

⁴Although the readiness data shows the relatively limited impact of training area availability on training readiness in Germany, training officials there frequently told us their greatest need was for bigger training areas to allow them to do company-level maneuver training.

Figure 3.2: Relative Impact of Training Area Availability on Units' Abilities to Train



Source: Based on unit status reports.

Even when the availability of training areas was reported as having a major impact on training, unit commanders were still reporting their units as well trained and prepared to undertake the bulk of their war-time tasks—that is, they rated their units C-1 or C-2. No commanders reported that the lack of training areas had a prohibitive impact on training, regardless of the C-ratings they had assigned their units.

Some Army officials suggested that commanders were underreporting the extent to which training land was a problem since they believed that the amount of training land was something that they were not likely to influence. We recognize that this could be true to some extent; however, when commanders did indicate that the lack of training land was a problem, they were more apt to cite it as having only a minor impact. Also, commanders were not reluctant to cite other resource constraints, such as shortages of leaders, over which they also seemed to have little influence.

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Despite some efforts to play down the significance of C-ratings, most senior Army leaders expressed great confidence in the quality of today's soldiers. Even when they knew their responses could reflect negatively on the Army's efforts to acquire additional training land, they expressed strongly held views that today's Army was better trained than it has been at any time in recent history. However, they also recognize the need to maintain and enhance the quality of that training, so they will be prepared to fight and win the first battle of the next war and be more confident of doing so with fewer casualties. Senior Army leaders credit the NTC with giving them a better appreciation of their units' training strengths and weaknesses than they have had before.

Simulations Are an Essential Component of Training

Current Army maneuver and field training uses simulations¹ in various ways to depict wartime conditions. Simulations are needed to make the most efficient and effective use of limited resources. Computer-controlled simulations aid in training platoon- through corps-level units, although Army commanders and trainers note limitations in their usefulness. Further, the Army's long-range training plans—including its evolving Combined Arms Training Strategy—suggest that computer-assisted simulations will be even more important in future training. Army plans recognize that increased weapons' capabilities; greater environmental, political, and safety constraints; and shrinking resources will cause training to evolve from being "device assisted" to "device based." Army leaders view computer simulations, however, as a means of augmenting rather than replacing field training at lower echelons. They have yet to determine the appropriate mix of field and computer-simulated training.

Simulations Are an Important Component of Realistic Army Training, Even in the Field

Department of the Army Pamphlet 350-9, "Index and Description of Training Devices," describes hundreds of training aids that the Army uses to simulate weapon systems and terrain or to otherwise support training requirements. These devices range from the simple to the very sophisticated. For example, they include plywood boards containing miniaturized versions of the terrain of given battle areas. The components of the miniature set may consist of vehicles, equipment, personnel, structures, trees, and shrubbery. They may be arranged to simulate and illustrate many types of military problems.

The more sophisticated devices include components of the Multiple Integrated Laser Engagement System, a family of training systems that simulate the effects of direct-fire weapons, from rifles to tank and helicopter gunnery systems. This laser system is capable of simulating two-sided, real-time tactical engagements at unit sizes up to battalions and provides for realistic casualty assessments. Firing the weapon simulators is much like firing the actual weapons. However, instead of firing live ammunition, these simulators transmit harmless laser beams. To allow the simulation to be as real as possible, the rifles and machine guns use blank ammunition, and the missiles and main guns use weapons effect simulators to simulate the noise, blast, and smoke of the actual weapons. This laser system has become an important component of field training.

¹We use the term "simulations" here to mean a variety of training aids, equipment simulators, and battle simulations, whether manual or computer-assisted.

Computer-Controlled Simulations Provide Added Benefits to Training but Have Drawbacks

The Army currently uses a variety of computer-controlled training devices to simulate battle scenarios and facilitate the training of individuals and units (see app. II). However, Army commanders and trainers note limitations in their use.

Computer simulations were used to augment field training at installations we visited. Usage varied, depending on the interest of individual commanders. Computer simulations were most often viewed as a means of augmenting rather than replacing field training at lower echelons. Commanders and trainers stressed to us that computer simulations were limited in their abilities to replicate battlefield conditions, to realistically stress units over space and time, and to otherwise replicate a realistic battlefield environment—elements important to the conditioning and training of troops. Many Army officers see computer simulations as an effective way to prepare troops for field exercises and to reinforce lessons learned in field exercises but not as a replacement for them. DOD stated that simulations did not fully replicate actual maneuver training; however, they were a viable means of repeatedly training some tasks.

Use of Simulations Is Expected to Increase

Army guidance on training for the future indicates that the Army will increasingly use computer simulation technology to “train smarter” and to respond to resource constraints that limit the amount of field training that can be completed—particularly at home stations. Future Army plans envision CTCs as the location of most large-scale training exercises.

An Army long-range planning document that provides guidance for future training states that the Army “require[s] dramatic increases in the use of simulations and video and computer assisted training to give our soldiers the competitive edge. These systems will have high initial costs.”²

Another Army publication states that

. . . new weapon systems with increased lethality, range and accuracy will influence decisions as to where and how training will be done. Growing environmental concerns will further restrict use of range and maneuver areas making it more difficult for units to train in the field. Training manpower resources will also decline. To offset these training constraints, the Army will transition from device-supported to device-based training. . . . The Army plans to expand the use of simulators and simulations within institutional and unit training programs. In turn, this will minimize

²Training and Doctrine Command Long-Range Plan for FY 1991 to 2020, volume I. This document was signed by the Commander of the Army's Training and Doctrine Command in March 1989.

the impact of training constraints such as time, funding, land, safety and environmental concerns.³

Army Training 2007, draft guidance for all Army Training and Doctrine Command centers and schools, envisions future training strategies as relying on “. . . a mix of field training and simulators for individual training and simulations for unit training through the battalion-level. The reliance on simulation increases proportionately from brigade through echelons above corps.”

We found such projections of future training environments and strategies reflected in several Army documents and planning papers. Moreover, the Army’s evolving Combined Arms Training Strategy—its strategy for training in the future—envisions using devices and simulations almost exclusively to build proficiency before training is conducted in the field. This strategy recognizes that shrinking resources will likely restrict field training below current levels. Future plans also suggest that CTCs will become more important in unit training, as large-scale maneuver training is accomplished almost exclusively at locations with more expansive land areas such as CTCs or regional training centers. The strategy anticipates that individual, crew, squad, and small-unit training will be accomplished at the home stations.

Need to Determine the Appropriate Mix of Field and Computer- Simulated Training

Although the Army is evolving toward the greater use of computer simulations, it has yet to determine the appropriate mix of field and computer-simulated training, particularly at lower echelons. Some senior Army leaders we briefed on the results of our review expressed doubts that the Army would place as great a reliance on the use of computer simulations as indicated in some of the guidance we had seen. They said that the growing use of simulation would be tempered until the effectiveness of computer simulations had been proven. Army officials who are developing the future training strategy state that one of the biggest challenges facing the Army is in determining the right quantity of simulators to develop and acquire over time.

An Army Research Institute official, in summarizing the benefits and drawbacks of computer simulations, told us that little convincing research existed on the question of whether computer simulation training could achieve the same standards of training as training in the field on actual equipment or the extent to which simulations provided

³Deputy Chief of Staff for Training, *Army Training 21*, U.S. Army Training and Doctrine Command.

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negative training or taught bad habits. Drawbacks to conducting such tests are their high cost and the difficulty of designing and executing such assessments. Other Army officials also recognize that sufficient testing has not been done to determine the most appropriate mix of field training and computer simulation. Further, some Army officials are skeptical that such tests will ever give a definitive answer to the question of appropriate mix.

Defining Uniform Requirements for Maneuver Training Land May Not Be Realistic

The Army has justified its training land acquisition plans based on guidance contained in a 1978 circular. The circular was used to prescribe the amount of land required to conduct training for units of various echelons. That circular is now being revised; a draft revision indicates less of a prescriptive approach to determining training land requirements. It recognizes a view now prevalent among a number of Army officials: that, although it may be desirable to prescribe specific training land requirements for installations, many factors argue against establishing a uniform standard. These factors include varying missions and terrain features, environmental considerations, and other factors unique to individual battlefield operations.

Training Circular 25-1, Used to Justify Land Requirements, Is Now Being Revised

The amount of land most often cited by the Army as needed for battalion-level home-station maneuver training is approximately 83,000 contiguous acres. That figure was derived from the Army's Training Circular 25-1, published in 1978. The circular states that 83,000 acres of contiguous land are needed for conducting the largest, battalion-level, ground maneuver exercise. Other parts of the circular outline a building-block approach to identifying land needs based on the prescribed frequency and number of iterations of exercises by echelon each year.

In July 1989, Army officials, believing that TC 25-1 was outdated primarily because of equipment modernization, initiated efforts to revise the circular. While that effort was not finalized at the time we completed our field work,¹ the draft revision reduces the land requirement for battalion-level training to about 61,000 acres in a rectangular maneuver area of 8 kilometers by 31 kilometers for a "movement to contact,"² the largest battalion-level maneuver operation focused on in the draft revision.³ However, the draft revision recognizes that specific terrain may be so restrictive as to argue in favor of having a smaller training area or so wide open as to require greater acreage.

Officials at the Combined Arms Command involved in the update process told us that they had had difficulty determining how specified land requirements were developed for the original TC 25-1. In working to

¹Although completion of the revised TC 25-1 has been delayed several times, Army officials estimated that the revised circular would be completed by April 1991.

²"Movement to contact" is an offensive operation designed to gain initial ground contact with the enemy or to regain lost contact.

³The land requirement for brigade-level training was not specifically identified in the draft revision to TC 25-1 but would use the battalion baseline as a building block.

revise it, these officials sought input from the Army's armor and infantry schools. The two schools varied greatly in their determinations of how much land was needed for various operations. For example, in examining the amount of land needed by a battalion to conduct a hasty attack operation, an attack with limited preparation time, proposals ranged from about 12,000 to 41,500 acres. Combined Arms Command officials decided on about 17,000. Likewise, views varied widely among commanders we interviewed as to the amount of land needed to do battalion-level training; their views on how much was desirable for battalion-level maneuver training ranged from about 14,000 to 173,000 acres. The figures used in the draft revision, while considering weapons capabilities and enemy doctrine, reflect a tempering of land areas provided by the schools based on the collective, subjective judgment of the participants involved in the process at the Combined Arms Command. Army officials described the draft revision as an effort to provide a generic baseline, or guide, that individual installations could build on in assessing their land needs, rather than a prescriptive approach applicable to all installations.

That a revised TC 25-1 should only be used as a guide in identifying training land needs is reinforced by the Army's efforts to compare the draft 8 kilometer by 31 kilometer template with existing training land at Fort Riley, Kansas. The template, when overlaid on a map of Fort Riley, was somewhat larger than Fort Riley's training areas. During ensuing discussions, however, Fort Riley and Combined Arms Command officials concluded that the land, after adjustments in operations, permitted the training of most tasks to Army standards. The limited land was described by Army officials as restricting the training of the division's aviation assets, command and control, and combat service-support operations. Yet the "bottom line" was that, although the situation was less than optimal, Fort Riley officials indicated they were "making it work" with the land currently available. According to these officials, the situation at Fort Riley requires innovative scenarios and imaginative trainers.

Numerous Factors Argue Against Establishing Uniform Requirements for Maneuver Training Land

Armor and infantry school officials responsible for developing the Army's doctrine and other Army officials told us that training manuals in recent years have been less prescriptive concerning training land requirements. These officials, and training guidance issued by these schools, indicate that a group of factors that affect the amount of land used must be considered during the planning or execution of a tactical operation. They are embodied in the acronym "METT-T," which stands for "Mission, Enemy, Terrain, Troops, and Time available." Various training officials at installations we visited indicated that METT-T affects how they train as well as the amount of land they use. For example, at the time of our fieldwork the division stationed at Fort Riley had a war-time mission for its battalions to defend sectors of operations ranging from 4 to 8 kilometers wide and 8 to 13 kilometers deep—an area between 7,400 and 24,000 acres—considerably less than what is stated in the Army's draft revision. However, missions do change over time and could cover much larger areas.

Units do not always train against an opposing force. When they do, they may reduce the amount of land assigned to the opposing force to provide more land to the principal units being trained. Terrain features, such as hills or forested land, may limit the amount of land that is maneuverable by tracked vehicles; conversely, in flat, open terrain more land may be required to provide more sufficient space to engage an opposing force without being seen prematurely. A negative feature of most home-station training land, regardless of its size, is that it does not take long before troops are sufficiently familiar with the terrain; some of the training benefits are therefore lost because soldiers rely on familiar landmarks rather than on traditional navigational aids. According to a division commander at Fort Hood, Texas, one of the Army's largest maneuver installations, units at his installation have similar navigational problems.

Environmental Factors Affect Land Requirements and Use

In response to environmental laws and regulations and increasing public concern over environmental issues and in accordance with good management practices, the Army has been making an effort to better manage its land. For example, environmental concerns have led the Army at some installations to periodically set aside areas of land from maneuver operations so that the land may recover from the wear and tear caused by intensive maneuver traffic. At some installations, extensive efforts have been made to protect endangered plant and wildlife species. In other areas, such as Fort Hood, Texas, Fort Lewis, Washington, or Pinon

Canyon, Colorado, efforts involve making areas containing Indian archaeological sites off limits.

The Army's acquisition in the early 1980s of the Pinon Canyon training site about 155 miles away from Fort Carson, Colorado, illustrates how environmental issues can increase land acquisition requirements as well as restrict the use that is made of that land. The Army purchased the Pinon Canyon site to provide adequate battalion-level maneuver training space for Fort Carson. Over 240,000 acres of land were acquired, with about 210,000 acres suitable for maneuver training. However, because of the fragile nature of the soil and agreements reached as a result of environmental impact assessments associated with the acquisition process, significant limitations have been placed on the use of that land. For maneuver training purposes, the land is divided into five parcels of varying size; total acreage used for maneuver training at any one time varies from 95,000 acres to 115,000 acres, with the remainder required to lie at rest for as long as 3 years. Fort Carson conducts brigade-level field training exercises at Pinon Canyon; however, due to environmental restrictions, it is currently limited to an average of about four mechanized brigade rotations to Pinon Canyon of 3 weeks each year. This situation clearly indicates that it is not feasible to prescribe training land requirements that would be applicable to all installations.

The Impact of Force Restructuring Is Not Yet Clear and Could Affect Training and Land Requirements

Changing views on threat in recent years, accompanied by reductions in East-West tensions, have set the stage for large reductions in U.S. military forces over the next several years, a move that could have significant implications not only for the size of Army forces but also for how they are organized, structured, and trained. Although this evolving situation adds to the uncertainty about the need for more training land at home stations, some Army officials continue to argue for specific land acquisitions to provide a hedge against potential future needs.

Changing Force Structure

As political reforms have taken place in Eastern Europe, the United States has responded by developing plans for reducing and restructuring its forces. When agreement is reached on the troop portion of the Conventional Forces in Europe Treaty, current expectations are that troop levels in Europe will be reduced by about 80,000 personnel; indications are that even further reductions could be forthcoming. The active Army could be reduced from a high of about 780,000 in the mid-1980s to just over 500,000 by 1995. Decisions will be required concerning the numbers and types of divisions that should be placed in the active and reserve forces, the threat to be planned for, the amounts of funding to be devoted to training to achieve desired levels of proficiency, and the stationing of units to facilitate quick deployment in time of need.

Before the Persian Gulf crisis, there were indications that senior Army leaders were leaning toward greater reliance on lighter, more mobile active-duty forces. These forces would respond to what has increasingly been viewed as the greater probability of low- to mid-intensity conflicts¹ occurring in third world countries, rather than the potential for high-intensity conflict in Europe, on which force structure planning has been based for many years. This change suggested that lighter forces in the active force should be given priority over heavier, armored forces that in theory would be needed less quickly. The situation in the Persian Gulf suggested that this issue may not be decided for some time.

At the same time, Members of Congress have suggested that the concept of "flexible readiness" should be considered. "Flexible readiness" would entail varying the readiness levels of units, depending on how quickly they would be needed to respond to a threat. This concept clearly has

¹"Low-intensity conflict" generally refers to a conflict that is confined to a geographic region and is often characterized by constraints on weapons, tactics, and levels of violence. A "mid-intensity conflict," according to the Army, involves the use of military power, excluding nuclear weapons, with constraints on weapons, tactics, and levels of violence. "High-intensity conflict" is characterized by a lack of constraints on weapons, tactics, and levels of violence.

implications for the frequency and levels of training that units would require and raises additional questions about the extent to which additional home-station training land would be used if acquired.

Army Sees Land Acquisition as a Hedge Against Future Needs and Constraints

Numerous senior Army leaders, after being briefed on the results of this review, agreed with our analysis and the interrelated problems we identified that affected training and the use of land. They expressed concern, however, that the Congress and the public would conclude that the Army did not need additional training land. They believe it still does. Several senior leaders voiced concern that environmental and political constraints would only increase over time, making it difficult to acquire land in the future. They believe the Army should avail itself of "targets of opportunity" to acquire land now as a hedge against future weapon systems modernization that could add to the range and lethality of weaponry and increased training requirements. Some Army officials view as targets of opportunity the proposed expansions of the NTC in California and the Yakima Firing Center in Washington State. Both involve largely public lands and would not cause significant displacements of residents.

The Army's case for acquiring land in remote areas is bolstered by the findings of the Defense Secretary's Commission on Base Realignment and Closure. The Commission's December 1988 report noted that the increasing emphasis on joint and combined-arms operations had expanded the requirement for large training areas such as the NTC. The report recommended that consideration be given to using funds derived from the closing of military installations to expand large, existing training facilities in the western United States.

A Moratorium on Land Acquisition

DOD declared a moratorium on land acquisition in September 1990. Its rationale was the need to ensure that DOD and individual military services acquired land only where there was a clearly demonstrated need. The Deputy Secretary of Defense's September 13, 1990, letter announcing the moratorium placed the reassessment of land needs in the context of force restructuring and base closures and realignments. It stated that the services could request exceptions to the moratorium when military requirements were urgent or when the moratorium would have an adverse effect on DOD's ability to perform its mission.

DOD followed its September 1990 moratorium with guidance to the military services on how to assess their land needs and request the Secretary of Defense's approval for acquisition. In that guidance, the Assistant Secretary of Defense for Production and Logistics requested that the military services provide justifications for their major land acquisition proposals. He also asked that the impact of force and base structure changes envisioned in the fiscal year 1992 through 1997 Six-Year Defense Plan be considered. The services were expected to address alternatives, particularly the potential for using land available from a sister service before new acquisitions were initiated. Other issues to be addressed included (1) the impact of force/base structure plans for fiscal years 1991 through 1997, (2) public sensitivities, (3) anticipated environmental issues, and (4) the impact on training if further land acquisition is not approved. DOD expected to receive the services' submissions by April 1991.

DOD's moratorium is consistent with the report of the Committee on Armed Services, House of Representatives, on the authorization of defense expenditures for fiscal year 1991.² In that report, the Committee noted that the Department of Defense had been handicapped by inadequate training facilities due to weapon system modernization. It said that a number of expansion proposals would have been justifiable in an expanding defense environment but could not be justified when the defense establishment was contracting. The report further stated that until the military adjusted to its reduced size, the Committee would not be receptive to requests for the acquisition of land for additional training ranges.

The Army requested a waiver for the Yakima Firing Center's expansion, a sub-installation of Fort Lewis, Washington, and the waiver was granted by DOD on October 30, 1990. Principal justifications cited in requesting the waiver included the following: (1) lessons learned from CTC experiences demonstrated a greater need for large-scale maneuver training; (2) larger areas were needed to accommodate faster and more lethal weapon systems; (3) active and reserve units needed enhanced abilities to train at brigade and battalion levels; (4) other installations such as the NTC and the Joint Readiness Training Center were saturated; and (5) acquisition funding had already been budgeted.

²Report of the Committee on Armed Services, House of Representatives, on H.R. 4739, 101st Congress, Aug. 3, 1990.

Conclusions, Recommendations, and Agency Comments

Conclusions

The extent to which additional home-station training land in the United States may be needed is unclear. It is also unclear to what extent such added land would (1) be used if acquired; (2) enhance training proficiency and readiness; or (3) correct common, recurring training deficiencies. One reason the Army's training land requirements are not well defined is that the Army lacks a comprehensive training strategy that integrates all of the interrelated factors affecting requirements and land use. There are a number of indications that the lack of land does not now significantly degrade Army training, and it is not clear how much training land is needed or would be used if more land were obtained.

Maneuver units in the Army have experienced many recurring training problems at CTCs, but these problems are not well related to the size of training land. Considerable evidence suggests that the solutions to many of these problems lie in training exercises that are not land-intensive or in the use of computer simulations. Further, the Army is increasingly recognizing the need for greater emphasis on individual and small-unit training that is also less land-intensive. This change in emphasis does not diminish the importance of battalion-level training in the field, but it suggests that efforts should be focused on attaining a balanced level of training at all echelons before additional home-station training land is acquired and the amount of higher echelon training is increased.

Combat training centers have become and will remain an important part of the Army's overall training program. The CTC in Germany is one that clearly is used to compensate for limitations in home-station training areas. In the United States, the NTC serves more to complement home-station training than it serves to compensate for this training's limitations. In both instances, the centers serve as battle laboratories, extensively evaluating training proficiency.

Because constraints on resources other than land are the primary inhibitors to maneuver training in the United States, some doubt exists as to the extent to which additional land might be used if acquired, particularly in a period of declining defense budgets. That uncertainty is compounded by (1) commanders' assessments that their units are better prepared today than ever before and ready to undertake most of their wartime tasks, (2) the unanswered question of the appropriate mix of field and computer-simulated training, and (3) uncertainties associated with expected large-scale force reductions and the restructuring now beginning to affect all military services.

By looking at one issue in isolation, such as the impact of weapon system modernization, one could point to the need for expanded training areas at many installations in the United States. Also, if one just looked at the number of units vying for land at a large installation such as Fort Hood, Texas, one might also conclude that more land was needed there. However, when other factors are integrated into the equation—such as types of training problems, personnel turnover, time constraints, and plans for the increased use of training devices and computer simulations—the issues of whether and how much additional home-station training lands are needed are less clear.

DOD has taken an important and needed first step in calling for a reexamination of land acquisition in light of force restructuring. However, there are many interrelated factors affecting the Army's future training land requirements, and the Army's acquisition decisions are not being guided by a comprehensive training strategy that considers all of these factors. Until such a strategy is in place, the Army lacks a sound basis for making land acquisition decisions.

Recommendations

We recommend that the Secretary of the Army take the following actions:

- Develop a comprehensive, integrated training strategy that addresses the key factors affecting training and land use. Such a strategy should (1) outline the Army's approach to addressing the recurring training problems identified at the combat training centers and recognize the need for greater emphasis on small-unit training; (2) outline the Army's plans for addressing various other constraints, including funding priorities and personnel turnover, that are apt to restrict training and the use of land; and (3) define the relationship of training land to long-range plans for greater reliance on training devices, including computer simulations.
- Base requests for additional training land on the completed training strategy.

Agency Comments and Our Evaluation

DOD concurred with the intent of both of our recommendations and stated that the Army was developing a Combined Arms Training Strategy that would integrate all of the resources required for training and prioritize those training resources for application to training events. Publication of a coordinating draft is expected in September 1991. DOD also stated that following the completion of the Combined Arms

Training Strategy and efforts associated with base closures and realignments, the Army would develop a comprehensive strategy for land acquisition. DOD said that in the meantime, requests for added training lands would be based on existing guidance, including TC 25-1. DOD stated that training land requirements in the new strategy were expected to be identical to those in the current draft version of TC 25-1.

We believe that the Army's efforts to develop a Combined Arms Training Strategy is a step in the right direction. However, briefings provided us to date on development of the strategy do not make clear the extent to which it will address and fully integrate the issues identified in this report. Further, since DOD states that future requests for additional training land will be based on criteria specified in the Combined Arms Training Strategy and are expected to be identical to those in the current draft of TC 25-1, we remain concerned that the Army may continue to pursue land acquisition based on prescriptive, uniform land requirements without fully considering (1) factors that could offset land needs or affect its use if acquired and (2) the extent to which additional land would enhance training and readiness. We believe that land acquisition proposals, whether based on TC 25-1 or the new Combined Arms Training Strategy, should clearly reflect a consideration of issues identified in this report.

The full text of DOD's comments is reproduced in appendix III, along with additional, annotated evaluations of the specific statements.

GAO's Letter to the Secretary of the Army Regarding the Proposed Expansion of Fort Riley, Kansas

GAO

United States
General Accounting Office

National Security and
International Affairs Division

August 15, 1990

The Honorable Michael P. W. Stone
The Secretary of the Army

Attention: The Inspector General
SAIG-PA

Dear Mr. Secretary:

Last December 1, 1989, we reported to Senator Nancy Kassebaum on the Army's plans to acquire additional training land at Fort Riley, Kansas. We are now completing a more comprehensive follow-on review focusing on Army training land requirements and alternatives to acquiring land. We will be reporting to Senator Kassebaum in the near future on this work.

We believe that the results of our work have important implications concerning the planned expenditure of public funds ranging from \$200,000 to \$1 million for a study of alternatives available to Fort Riley to meet the training and maneuver area shortfall identified by their Land Use Requirements Study. Therefore, we want to share with you our preliminary findings and conclusions before we finalize our report and provide it to you for formal comment. We believe that the question of whether the Army needs additional training land is one that transcends the question of whether an individual installation such as Fort Riley needs land. It involves some fundamental issues that need to be addressed at the highest levels of the Army and the Department of Defense. We do not believe that the expenditure of public funds for an alternatives analysis focused on Fort Riley is in the public interest at this time.

Our work to date indicates that various resource constraints currently place significant limitations on training and the use of existing training land. Our work also indicates that common training problems face maneuver units both in Europe and in the United States, regardless of the amount of available home station training space. In essence, more land, by itself, likely will not solve these problems. The Army acknowledges that fewer resources will be available for training in the future; it is developing a device-based training strategy which will place greater reliance on simulators

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Riley, Kansas**

and simulations. The Army also recognizes that the purpose of field training in the future will change, focusing more on refining and testing skills developed through the new strategy. These and other factors result in the Army's inability to fully define its requirements for additional home station training land at the present time.

Current Training Constraints

Senior Army leaders and various reports indicate that the Army is faced with numerous resource constraints besides its limited training land. These problems are more pronounced in the continental United States, but they affect European-based units to some extent as well. They include such things as a reduction in training funds, personnel turbulence and shortages, and equipment shortages.

Limitations in training funds have constrained the amount of maneuver training being conducted at several of the U.S. installations we visited, including Forts Carson, Polk, and Riley. Because of these constraints, the installations are not making full use of existing training land. Despite funding and land constraints, installations have been able to make funding and land available to battalion-level units preparing to go to the National Training Center--even at Fort Riley. These situations raise questions concerning how much additional training land is needed and how much and how often it might be used if acquired.

Through interviews with senior commanders and training officials and on the basis of data we obtained from the Center for Army Lessons Learned, we have become aware of a number of recurring training problems that have been identified by the Army for maneuver units completing rotations through the Army's combat training centers. There is a commonality to many of these problems both for units in Europe and in the United States, regardless of the amount of land available at home station training areas. There is much to suggest that land shortages are not necessarily the principal cause of these problems and that providing more land will not be the principal solution.

Evolving Approach To Training

Many senior Army officials have told us that there is increasing recognition in the Army that a large portion of the Army's training problems are due to an inadequate emphasis on individual and small unit training, the type

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of training that is not necessarily land intensive. Even though European-based units focus more on individual and small unit training, given their land constraints, they experience the same types of training problems as do units in the United States, where much larger training areas are available. For example, European and stateside units alike have demonstrated problems in the areas of doctrine and battlefield planning. Therefore, it is reasonable to question whether the Army is now experiencing more fundamental training problems than those associated with land shortages.

We recognize that the Army's need for and use of U.S. training lands is affected by the greater speed and range of modernized weapon systems. At the same time, home station training areas are much more limited in Europe than they are in the U.S. While commanders in Europe frequently express the need for more land to accomplish company/team maneuver training, they, as well as commanders in the United States, nearly always cite the unavailability of training areas as a minor, rather than a major, impediment to training. More importantly, an overwhelming majority of Army commanders in the U.S. and Europe rate their units as possessing the resources and as having accomplished the training necessary to undertake all or nearly all their wartime missions. An important factor in accomplishing this training is not just home station training, however limited it may be, but also periodic rotations to the Army's combat training centers.

Army training plans indicate that training is transitioning "from a device-supported, high OPTEMPO/live fire program to a device based program that uses significantly lower levels of OPTEMPO/live fire." This strategy calls for a mix of field training and simulators for individual and unit training through the battalion level. This initiative is underway because the Army recognized that future training funds will be even more constrained than they are now, that land limitations will continue to exist, and that a device-based strategy represents an approach to smarter training. While the Army is moving in this direction, the extent of training transfer is not well known nor is it yet clear what the best mix of field and device-based simulated training will be. This adds to the uncertainty over training land requirements.

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GAO's Letter to the Secretary of the Army
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Riley, Kansas**

Force Restructuring

The Army is beginning what is expected to be a large downsizing and restructuring effort over the next several years. Training requirements could well be affected by the changing threat and greater emphasis on low- to mid-intensity conflicts, the numbers and types of divisions that remain in the active structure and how and where they are stationed, level(s) of readiness that the Army seeks to maintain, and emphasis on training combinations of heavy and light forces. These variables, which as yet are not well defined, add to the uncertainty over training land requirements.

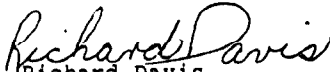
Conclusions

We believe that the Army's training land requirements are not well defined for now and need to be reassessed as the impact of force restructuring becomes better known. Accordingly, we believe that an analysis of alternatives study for Fort Riley in conjunction with its proposed expansion is not a prudent course of action at this time. Our conclusions arise from an extensive body of work at a number of military installations in the continental United States as well as in Europe. We obtained a broad perspective on training land requirements, training land availability and use, training problems Army leaders have identified, and the extent to which these problems are related to land. Our conclusions are also the result of synthesizing a great deal of information provided by many senior military commanders and training officials.

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We recently briefed III Corps and its divisional commanders concerning our findings and conclusions. We are arranging similar briefings at Forces Command and the Training and Doctrine Command. These briefings will give senior leaders the opportunity to provide us additional perspective on the issues as we complete our written report. We would welcome the opportunity to provide the same briefing to you and your staff should you desire further information in advance of the draft report.

Sincerely yours,


Richard Davis
Director Army Issues

Types of Computer Simulations

The Army has a number of computer-controlled simulations currently in use and is working toward developing others to provide even greater unit training capabilities.

One type of computer-controlled simulation technology currently in use involves a device known as the "Unit Conduct of Fire Trainer." This device provides training in basic and advanced gunnery skills for armored and infantry tracked vehicles such as the M-1 tank and the M-2 Bradley Fighting Vehicle. Another type of computer simulation is the Army Training Battle Simulation System, which allows maneuver battalion commanders and their staffs to make command, control, and communication decisions in a simulated battlefield. A number of other computer simulations are also particularly beneficial in training personnel in command and control, battle planning, and staff processes. Such training can be particularly important at higher echelons (the brigade level and above), where the focus is increasingly on command and control. One such simulation, called "JANUS," has been incorporated into the curriculum of the pre-command courses conducted at Fort Leavenworth Kansas, for newly designated battalion and brigade commanders. Its focus is on training commanders in command and control and synchronization skills; participants develop and execute battle plans and assess results. The courses were developed out of a recognition of shortcomings in training in this area and of the difficulty of teaching it on the ground.

Army guidance referred to as "Mission Training Plans," developed by the Army's armor and infantry doctrine schools, supports the use of simulations for training. For example, Army Training and Evaluation Program 71-2, for the tank and mechanized infantry battalion task force, cites computer-controlled simulations that allow battalion commanders and staffs to (1) practice emerging tactical war doctrine; (2) experience operations covering large areas for extended periods of time; (3) task, organize, and maneuver combined arms formations; (4) integrate all fire-support assets; (5) supply and sustain assigned forces; (6) seek and use intelligence; (7) use terrain properly; and (8) practice realistic warfare in a command post exercise environment. The variety of this training does not suggest that simulations can by themselves provide all the training that is needed at the battalion level or replace field training; however, in light of current constraints on time, funding, and land, computer-controlled simulation exercises offer an additional option for training in some key areas.

Computer simulations were an important ingredient of a large-scale, higher echelon, focused training exercise that the Army conducted in early 1990 as part of the Joint Chiefs of Staff-sponsored Return of Forces to Germany exercise. The Army realized important benefits in using computer simulations in this exercise, particularly in light of growing constraints on large-scale field exercises in Germany.¹ Computer simulations also offer important command and control training benefits at lower echelons; however, there is less agreement among Army officials on the overall benefit of such simulations at lower echelons compared to field training exercises, where space and other resources are more readily available.

In recent years, the Army, in conjunction with the Defense Advanced Research Projects Agency, has developed and put into use at several Army installations in the United States and Germany 236 prototype simulation systems known as "SIMNET" (which means "simulation networking").² SIMNET is used to replicate key functions in a mock-up of a tank or armored personnel carrier. Through networking capabilities, SIMNET can link multiple vehicles into platoon-, company-, and even battalion-level exercises. SIMNET has been criticized by various Army commanders and trainers for not fully replicating the battlefield. For instance, it cannot simulate tanks digging into the ground or permit commanders to view the battlefield as they could in a real tank by opening the hatch on top of the tank. Despite these and other limitations, training guidance for U.S. Army forces stationed in Germany states that commanders should use SIMNET as a "training gate," or a prerequisite for a variety of training exercises; it also enumerates many tasks and sub-tasks that should be taught using the system.³

The Army is working toward developing an advanced version of a SIMNET-type trainer. The new system, known as the "Close Combat Tactical Trainer," would build on the technology and capabilities of SIMNET while seeking to reduce its limitations. The Army's Fiscal Year 1991 Posture Statement indicates that "the Close Combat Tactical Trainer will permit force-on-force training in networked simulators, reducing the fuel, maintenance, and other expenses of training all collective tasks in the field." A requirements document pertaining to the trainer provides

¹See Army Training: Computer Simulations Offer Important Benefits in Large-Scale Military Exercises (GAO/NSIAD 91-67, Jan. 30, 1991).

²SIMNET simulators were not located at most U.S. installations where we examined land use and training, including Forts Riley and Polk, two of the smaller installations.

³U.S. Army, Europe, Regulation 350-1, April 7, 1989.

additional insights into the benefits of this and other computer simulations contrasted with field training. It states that

Under ideal conditions, one iteration of a tactical training event using actual equipment would probably train 'better' than one iteration of the same event using the CCHTT [close combat tactical trainer] regardless of how we define 'better.' Unfortunately we very rarely enjoy the ideal conditions—weather interferes, the required number of people necessary to support the training scenario are not available, equipment breaks down when it shouldn't, there isn't enough money available, there isn't a training area available, or there isn't time available. . . . One of the biggest benefits of the CCHTT [close combat tactical trainer] will be the more efficient utilization of training time.

We also learned of another computer simulation that, according to some initial assessments by the Army Research Institute, seems to have much potential for facilitating gunnery and maneuver training and diagnosing training weaknesses, particularly in areas where training land is limited. The system, known as "Precision Range Integrated Miles Enhancement" (PRIME), has been used for platoon-level gunnery and maneuver training. It provides for free-play maneuver exercises against various scenarios and targets that shoot back at the maneuvering unit. It has been characterized as having the capabilities of a mini-NTC due to its ability to record and assess the performance of platoons engaged in free-play maneuvers. A May 1989 Army Research Institute assessment of the PRIME system, then in use at Fort Hood, Texas, noted that, while system improvements were needed, there were also significant training benefits. On the basis of the Institute's analysis and interviews with company commanders using the system, the Institute stated that it appeared that eight of nine tactical operations associated with attack-and-defend missions could be taught solely by or in conjunction with PRIME. Commanders reported that in using PRIME their platoon leaders were not issuing proper platoon fire commands, not providing spot reports when engaged or complete situation reports following an engagement, not commanding or controlling their tanks during maneuver from one battle position to another, not assigning sectors of fire during the battle run, and generally not controlling radio communications. They found that their tank platoons were not ready for advanced qualification tests. The problems identified using PRIME rather dramatically fit the pattern of recurring problems identified by the Army for higher echelon forces undergoing training at the NTC.

It is therefore easy to see how a system such as PRIME could be invaluable in diagnosing and addressing problems early on at home stations and in more efficiently and effectively using resources. Just recently,

the former commander of III Corps and Fort Hood, now the Commander of U.S. Army forces in Germany, arranged to have PRIME moved to Germany for use there. The Commander told us that, while improvements could be made to this system to make it more effective, he could not wait for the perfect system before using it.

While most of the current simulation systems are separate from the actual weapon systems whose functions they are designed to simulate, the next generation of weapon systems is projected to include embedded simulations that could allow simulated training to take place using the actual weapon systems and without requiring the system to even leave the motor pool for that type of training.

Comments From the Department of Defense

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



FORCE MANAGEMENT
AND PERSONNEL

ASSISTANT SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301-4000

FEB 11 1991

Mr. Frank C. Conahan
Assistant Comptroller General
National Security and
International Affairs Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Conahan:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "ARMY TRAINING: A Comprehensive Strategy Would Provide Basis for Deciding Land Needs," dated December 21, 1990 (GAO Code 393378, OSD Case 8447-A). The DoD concurs, or partially concurs, with most of the findings in the draft report. The DoD also concurs with the intent of both of the recommendations. However, the DoD disagrees with some of the rationale used to arrive at the recommendations, as well as some of the actions required to put the recommendations into effect.

The Army now has a basic training strategy, as enunciated in Field Manual 25-100, Training the Force, and Field Manual 25-101, Battle Focused Training, and is taking appropriate action to develop a more comprehensive training strategy. That strategy will include procedures for establishing requirements for training land and for identifying justified land acquisition proposals. Procedures established pursuant to the current DoD moratorium on land acquisition provide an additional means of assuring that acquisition requests are fully justified.

The Army is developing a strategy for the acquisition of training land. This strategy will be derived from the training strategy discussed above. Since the lack of a completed land acquisition strategy, rather than the lack of a training strategy, appears to be the main thrust of the draft report, a more appropriate title for the report might be "ARMY TRAINING: An Acquisition Strategy for Land Needs is Required."

Several misunderstandings in the draft report lead to erroneous conclusions about the Army requirements for land for training:

- The Army goal is to have sufficient maneuver space at home stations for brigade-level exercises; where this is not feasible, space for battalion-level exercises is the minimum essential requirement.

See comment 1.

See comment 2.

See comment 3.

**Appendix III
Comments From the Department of Defense**

See comment 4.

See comment 5.

- Concentration on small-unit training does not reduce training land requirements; the aggregate maneuver space for separate training by the line companies of a battalion may exceed the space required for a battalion-level exercise.

- Factors such as decreased funding for training, personnel turnover, or the introduction of simulations do not reduce the requirement for training land at home stations. These factors may reduce the frequency and duration of field training, but the requirement for field training at home station up through the brigade or battalion level will continue.

Detailed comments on each finding and recommendation in the GAO draft report are contained in the enclosure. The DoD appreciates the opportunity to comment on the draft report.

Sincerely,



Christopher Jehn

Enclosure:
As Stated

GAO DRAFT REPORT - DATED DECEMBER 21, 1990
(GAO CODE 393378, OSD CASE 8447-A)

"ARMY TRAINING: A COMPREHENSIVE STRATEGY WOULD
PROVIDE BASIS FOR DECIDING LAND NEEDS"

DEPARTMENT OF DEFENSE COMMENTS

* * * * *

FINDINGS

- o **FINDING A: Comprehensive Training Strategy.** The GAO reported that one reason the Army training land requirements are not well defined is because the Army lacks a comprehensive training strategy--one that integrates all of the key factors affecting requirements and land use. The GAO recognized the difficulty in developing such a strategy, particularly in view of the uncertainty that still exists over such factors as force restructuring and the "right mix" of field and computer simulated training. The GAO nevertheless concluded that, until the Army has a comprehensive strategy in place, it lacks a sound basis for making land acquisition decisions. The GAO observed that many senior Army leaders, although agreeing with the GAO analysis of the interrelated factors that affect training and the use of land, still take the position that additional land is needed. According to the GAO, those Army officials voiced concern that buying land in the future will be more difficult inasmuch as environmental and political constraints will only increase over time. The GAO further concluded, however, that this view simply reinforces the need for a comprehensive training strategy to guide land acquisition decisions. (pp. 2-3, pp. 7-8, pp. 63-65/GAO Draft Report)

- o **DoD Response:** Partially concur. The principal reason Army training land requirements are not well defined is that the Army doctrinal guidance is evolving and may not now be specific enough to ensure Army-wide application. (That point is recognized in the GAO draft report.) The revision of Training Circular 25-1, Training Land, was in progress when the GAO on-site audit work was being conducted. The revised Training Circular 25-1 is forecast for publication in February 1991. It will prescribe a method for calculating training land requirements using validated criteria, provide environmental planning guidance for land acquisition and use, and provide Army major commands required guidance for installation land development. The circular will also address the adequacy assessment of training land and justification for acquisition proposals. The GAO assertion that the Army lacks a comprehensive training strategy is not

Now on pp. 2-5 and 43-45.

See comment 6.

Enclosure

correct. The Army strategy is embodied in its doctrinal training publications, Field Manual 25-100, Training the Force; Field Manual 25-101, Battle Focused Training; and in the Combined Arms Training Strategy, the coordinating draft of which is to be published in September 1991. While the Army does have a comprehensive training strategy, it currently lacks a completed strategy to guide land acquisition decisions.

- o **FINDING B: Army Training Philosophy.** The GAO reported that, in addition to training individual and small-unit skills, it is the Army position that conducting periodic large-scale training is needed to coordinate and synchronize effectively the various combined arms elements that are commanded at the battalion or brigade levels. The GAO described that policy as involving a multi-echelon approach to training, emphasizing simultaneous training of individuals, leaders, and units at each echelon in the organization during large-scale training events. The GAO observed that the Army views multi-echelon training as a way to use its available time and resources most effectively.

The GAO explained that, once individuals and units have trained to a required level of proficiency, the Army training strategy stipulates that leaders must structure individual and collective training plans to repeat critical task training at a level of frequency to sustain proficiency--staying within a range or "band of excellence." The GAO noted that this philosophy is embodied in Army Field Manual 25-100, entitled Training the Force, dated November 15, 1988, which emphasizes that "Army units must be prepared to accomplish their wartime missions by frequent sub-stainment training on critical tasks; they cannot rely on infrequent "peaking" to the appropriate level of wartime proficiency." (pp. 12-18/GAO Draft Report)

DoD Response: Concur.

- o **FINDING C: Weapon System Modernization Makes Army Officials Question Sufficiency of Existing Training Lands.** The GAO explained that, in recent years, the Army fielded a number of new weapon systems having greater speed and more sophisticated gunnery systems. The GAO noted that, as modern weapon speed and firepower have increased, the space available to do maneuver training has shrunk figuratively because (1) the new systems traverse available ground more quickly and (2) gunnery ranges have expanded to meet gunnery training requirements.

The GAO pointed out that weapon systems, such as the Multiple Launch Rocket System and the HELLFIRE Missile, require range areas so large that very few Army posts have sufficient range

Now on pp. 10-14.

space to employ them without using special training ammunition. The GAO further explained, for example, that the M-1 tank can move at speeds almost double that of its predecessor and can fire more accurately at distances approaching 2,500 meters--as compared with World War II vintage tanks that could fire up to 1,600 meters--and can engage other weapon systems at longer ranges, thereby expanding its range of effectiveness.

The GAO reported that in recent years the Army has installed multipurpose range complexes at many of its maneuver installations in the United States, to accommodate firing from M-1 tanks, M-2 BRADLEY Fighting Vehicles, APACHE helicopters, and other weapon systems. The GAO found that, at several such installations (for example, Fort Polk and Fort Riley), construction of multipurpose range complexes required the use of land previously available for free-play maneuver training. According to the GAO, when the ranges are in use, additional land is required for safety buffer zones around them, which further reduces the availability of training land. (pp. 18-10/GAO Draft Report)

Now on pp. 14-15.

See comment 7.

DoD Response: Concur. For clarification, "multipurpose" ranges are not designed specifically for single combat systems such as the M1 tank. The ranges are designed to accommodate live-fire training in the combined arms manner described in Army doctrinal training publications. Accordingly, all weapons associated with combined arms operations, such as tanks, infantry fighting vehicles, attack helicopters, and indirect fire weapons, may be fired in concert on multipurpose ranges. When not in use for live firing, some of the ranges and all of the buffer zones are open for maneuver.

- o **FINDING D: Training Circular 25-1 Used to Justify Land Requirements Is Now Being Revised.** The GAO reported that the Army needs approximately 83,000 contiguous acres for home station maneuver training. According to the GAO, that figure was derived from Army Training Circular 25-1, published in 1978, which states that 83,000 acres of contiguous land is needed for conducting the largest, most likely required battalion-level ground maneuver exercise. The GAO noted that the Circular outlines a building-block approach to identifying land needs, based on prescribed frequency and iterations of exercises by echelon each year. The GAO reported that, in July 1989, Army officials initiated efforts to revise the Circular because it was considered to be outdated. The GAO noted that, while the revised circular had not been finalized as of November 1990, the draft revision does reduce the land requirement for battalion-level training to 61,000 acres in a rectangular maneuver area of 8 kilometers by 31 kilometers for a movement to contact, the largest battalion-level maneuver operation focused on in the

Now on pp. 36-37.

draft circular revision. The GAO further noted that the draft revision recognizes that, when specific terrain is considered, the nature of the terrain may be so restrictive as to argue in favor of having a smaller training area--or so wide open as to require greater acreage. The GAO concluded that the figures used in the draft revision reflect a collective, subjective judgment on the part of participants involved in the process at the Combined Arms Command and a tempering of land areas that some trainers might want for a battalion-level exercise. (pp. 24-26/GAO Draft Report)

DOD Response: Concur. However, the basis for training land requirements is more substantial than is recognized in the draft report. The doctrinal objective for home-station training land capability is stated in the draft revision of Training Circular 25-1: "Ideally, each installation would have sufficient land to conduct brigade-level operations... However, the extensive land area required for training, compared to the limited land available, necessarily limits the type of training at many installations; therefore, maneuver training at the battalion task force level becomes the minimum essential requirement." Pursuant to this doctrinal objective, the Army will attempt to configure home-station installations with the requisite acreage to support brigade-level training whenever feasible. When support of brigade-level maneuver is not possible at home station, Army units must travel to maneuver areas such as the combat training centers, Pinon Canyon, Yakima and Grafenwoehr to do maneuver and gunnery training. The Army must also develop and use strategies which incorporate computer simulations to assist in training. That concept is being developed by Training and Doctrine Command and the warfighting commanders-in-chief under the Combined Arms Training Strategy for Army active and reserve component training.

See comment 8.

The GAO language implies that the "collective, subjective judgment on the part of participants involved in the process at the Combined Arms Command" is an improper basis for making determinations on training land requirements. In fact, such expert judgments, in concert with a staffing process, are the primary basis for establishing all Army doctrine.

- o **FINDING E: Numerous Factors Argue Against Taking A Standard Approach to Specifying Maneuver Training Land Requirements.** The GAO found that, in recent years, training manuals have been less prescriptive concerning training land requirements. The GAO observed training guidance issued by the Army doctrine schools indicate that there is a group of factors that must be considered during the planning or execution of a tactical operation that affect the amount of land used, as follows:

Appendix III
Comments From the Department of Defense

- **Mission**--the who, what, when, where, and why of what is to be accomplished;
- **Enemy**--current information concerning the enemy-- strength, location, disposition, activity, equipment, capability--and a determination as to the probable course of enemy action;
- **Terrain**--information about vegetation, soil type, hydrology, climatic conditions, and light data to determine the impact that the environment can have on current and future operations for both enemy and friendly forces;
- **Troops**--the quantity, level of training, and psychological state of friendly forces, to include the availability of weapons systems and critical equipment; and
- **Time available**--the time available to plan, prepare, and execute operations for both enemy and friendly forces.

The GAO also discussed how the various factors affect how the training is conducted, as well as the amount of land used. For example, the GAO noted that, at the time of its field work, the division stationed at Fort Riley has a wartime mission to defend a sector of operations ranging from 4-8 kilometers wide to 8-13 kilometers deep--an area between 7,400 acres and 24,000 acres. The GAO further reported that, in training, units do not always train against an opposing force--or in cases where they do, they may reduce the amount of land assigned to the opposing force as a way of providing more land to the principal units being trained. The GAO also observed that terrain features, such as hills or forested land, may limit the amount of land that is maneuverable by tracked vehicles; conversely, flat, open terrain may require more land to provide sufficient space and distances to engage an opposing force without being seen prematurely. The GAO acknowledged that a negative aspect of most home station training land, irrespective of its size, is that it does not take long before troops are sufficiently familiar with the terrain, thus negating some of the training benefit by relying on familiar landmarks rather than using traditional navigational aids. (pp. 26-28/GAO Draft Report)

DoD Response: Partially concur. The DoD does not agree with the GAO assessment that multiple factors "argue against" a standard approach to specifying training land requirements. Multiple factors may complicate a standard approach, but do not negate the value of a standard approach. A "prescriptive" method of determining land requirements has not been used by the Army in the past; the facts gathered by the GAO of the varying opinions of Army leaders indicate a

Now on p. 38.

See comment 9.

substantial lack of any prescribed method for specifying maneuver training land requirements. The revision of Training Circular 25-1 will correct that situation by providing a prescribed method.

See comment 10.

The GAO statement that "the division stationed at Fort Riley has a wartime mission to defend a sector of operations ranging from 4-8 kilometers wide to 8-13 kilometers deep..." is in error. The area described in the GAO draft report is the area for a single battalion. The current area of operations for the First Infantry Division in support of Operation Desert Shield is considerably larger than that identified in European war plans. The DoD disagrees with the GAO implication that the size of a unit's wartime area of operations should in some way influence the size of its home-station maneuver area. The flexibility of Army units to operate in any area of the world and the impact of varying sizes of potential unit areas of operations are precisely the reasons that Army training philosophy embraces the use of doctrinal standards and norms for all Army training. Clearly, some standard for training land must be specified. A standard is alluded to in the GAO draft report "ARMY TRAINING: Evaluations of Units' Proficiency Are Overstated," dated November 19, 1990 (GAO Code 393363/OSD Case 8544):

See comment 11.

"...the home station training that GAO observed in many instances lacked realism... While many of these deficiencies can be overcome, there are impediments at home station, such as the lack of sufficient land for maneuver training, that present more difficult challenges."

The Army's approach to standardizing its land needs by type unit is evolving as part of the Combined Arms Training Strategy; additionally, the revision of Training Circular 25-1 outlines proper ways for evaluating land needs and requesting them.

- o **FINDING F: Environmental Factors Can Increase Land Requirements As Well As Restrict Use of Land.** The GAO reported that, to an ever-increasing degree, environmental factors are affecting how the Army uses its training land and have encouraged Army efforts to better manage its land. The GAO found that, at some installations, environmental concerns have led the Army periodically to set aside areas of land from maneuver operations so that the land can recover from the wear and tear caused by intensive maneuver traffic. The GAO also found that, at some installations, extensive efforts have been made to protect endangered plant and wildlife species, while other areas have been fenced where Indian archaeological sites are located.

The GAO cited the Pinon Canyon training site, some 155 miles away from Fort Carson, Colorado, acquired by the Army in the early 1980s, to indicate how environmental issues can increase land acquisition requirements, as well as restrict the use that is made of that land. The GAO observed that the Pinon Canyon site was purchased to provide adequate battalion-level maneuver training space for Fort Carson. The GAO reported that over 240,000 acres of land were acquired, with about 210,000 acres suitable for maneuver training; however, due to the land agreements reached as a result of environmental impact assessments associated with the acquisition process, significant limitations were placed on the use of that land. The GAO further reported that, as a result, for maneuver training purposes the land is divided into five parcels of varying size--with total acres used for maneuver training at any one time varying from 90,000 acres to 115,000 acres and with the remainder required to lay at rest for 3-year periods. The GAO noted that Fort Carson conducts brigade-level field training exercises at Pinon Canyon; however, due to environmental restrictions, it is currently limited to an average of four mechanized brigade rotations to Pinon Canyon of 3 weeks per year. The GAO concluded that the described situation clearly indicates that it is not feasible to prescribe training land requirements that would be applicable to all installations. (pp. 28-29/ GAO Draft Report)

Now on pp. 38-39.

DoD Response: Concur. Land acquisitions are subject to environmental mitigation--that is, methods to preserve the environment of the acquired land--as identified in Environmental Impact Studies. The DoD stewardship of natural resources is critical to the continued use of lands for training. The GAO correctly concludes that some environmental considerations will cause the Army to acquire more land than the doctrinal dimensions described in Training Circular 25-1. Because land use considerations vary by installation, they may be addressed in Land Use Requirements Studies, which may place further restrictions on the training use of the acquired land. However, exact mitigation procedures and the exact acreage available for maneuver training in a training land acquisition will not be known to Army officials until the conclusion of Final Environmental Impact Studies.

- o **FINDING G: Common Training Problems.** The GAO found that many training problems are related to inadequate battlefield planning, developing and using intelligence data, conducting reconnaissance, maintaining communications, and conducting rehearsals. The GAO noted that, according to Army officials, training land limitations are not the principal causes of those problems. The GAO cited examples of how many of these problems can be addressed by means other than large-scale exercises requiring extensive land areas.

Now on pp. 2-3, 18-20,
and 43-44.

The GAO also explained that each unit completing a rotation at the National Training Center is provided a "take-home package" which outlines the unit strengths and weaknesses as evidenced by the unit performance at the Combat Training Center. The GAO further explained that the packages identify areas requiring additional training emphasis at home stations. For example, a "take-home package" for one unit included in the GAO review cited the need to sustain key members' planning skills through command post exercises as a way to strengthen their performance in reconnaissance and surveillance. According to the GAO, in addressing problems identified in the maneuver battlefield operating system, the reviewers recommended conducting (1) command post exercises, (2) situational training exercises, (3) tactical exercises without troops, or (4) computer simulations and wargaming. The GAO noted, however, that the only recommendation that might require using significant amounts of land involved platoon-level live-fire sustainment training. (p. 4, pp. 30-32, pp. 63-65/GAO Draft Report)

DoD Response: Partially concur. Although there are several maneuver training problems that are not directly associated with land, the problems cited by the GAO "...related to battlefield planning, developing and using intelligence data, conducting reconnaissance, maintaining communications and conducting rehearsals" have training land implications. The availability of the requisite land to array friendly and opposing forces has a direct impact on the ability of Army units to train on those problems.

See comment 12.

There is a considerable amount of training that can be done without large portions of land, such as small-unit training for crews and squads. However, larger units must also train to doctrinal standards. For example, all battalions training at the National Training Center perform the following missions: defense, deliberate attack, and movement to contact. The doctrinal areas for those maneuvers are 34,100, 16,802, and 61,280 acres respectively, yet the areas available at the National Training Center are 59,304, 49,420, and 74,130 acres. The exact dimensions of the areas are tailored to unit-specific scenarios. Brigade and division maneuvers are also required, but they are costly and in many cases maneuver area is not available. Therefore, those units must design an innovative mix of field training, command field exercises, and command post exercises to solve the training problem. Just as football teams must rehearse on the playing field, the Army needs to maneuver over terrain of various types and sizes on which it may have to fight a war. Simulations may permit some solutions, and all training does not require large areas; but, without adequate land, the Army cannot fully train.

The DoD also disagrees with the implication in the draft report that those items specified in the referenced "take-home package" for one unit are sufficient to sustain maneuver training proficiency for all Army units. The take-home package is tailored to the specific needs of a single unit at the time it departs the Combat Training Center. Army-wide requirements cannot be aggregated in the sum of take-home package recommendations.

- o **FINDING H: Army Leaders Recognize The Need for Increased Focus on Lower-Echelon Training.** The GAO asked Army officials in Germany, as well as in the United States, about the extent to which land shortages may have contributed to the training problems identified at the Combat Training Centers. The GAO found that, at some installations (including Fort Riley and Fort Polk), land shortages were not the cause of the identified training problems. The GAO reported, however, that Army officials in Europe were more vocal about the need for greater land to train more effectively. Training officials both in the United States and Germany provided the GAO with examples of how many problems could be addressed without using large amounts of land by increasing the emphasis on individual and small-unit training. (p. 4, pp. 33-34, pp. 63-65/GAO Draft Report)

DoD Response: Partially concur. Although many training problems can be addressed without using large amounts of land, a number of training problems must be addressed by the addition of training land. As the previously referenced GAO draft report, "ARMY TRAINING: Evaluations of Units' Proficiency Are Overstated," states (OSD Case 8544):

"In a large part, unit level training takes the form of field exercises at platoon through battalion levels, command post exercises for staff, and live-fire exercises. Some divisions also conduct combined arms exercises involving two maneuver battalions, though the land constraints at home station limit such exercise to a few divisions."

Some installations lack the maneuver space for brigade- and division-level training; however, units at those installations must seek innovative methods of mixing differing types of field training in order to meet training needs. The DoD disagrees with the GAO implication that the focus of training at levels lower than brigade or battalion will decrease the requirement for maneuver training land. In fact, the requirement for training land increases when smaller units conduct independent and simultaneous training. For example, as is stated in the draft revision of Training Circular 25-1, the dimensions required for a mechanized battalion offense are 4 x 17 kilometers (68 square kilometers

Now on pp. 3, 20-21,
and 43-44.

See comment 11.

See comment 4.

or 16,802 acres). If the maneuver companies from the battalion were to conduct separate offensive training, the dimensions of the four areas required would be 5 x 10 kilometers for each company, or a total of 200 square kilometers (49,420 acres). Those doctrinal dimensions are stated in the draft revision of Training Circular 25-1.

- o **FINDING I: Land Constraints Are Greater in Germany Than in the United States.** The GAO reported that training land constraints are more of a problem in Germany than in the United States. The GAO explained that local training areas for Army units based in Germany vary in size from 3 acres to 8,000 acres, with divisional units not always housed at the same location. The GAO further reported that, while other training areas are available, there often are significant constraints that limit their use for maneuver training. The GAO concluded that the described training land differences between the United States and Germany reinforce the question of whether training land is a primary cause of training deficiencies in the United States.

The GAO reported that land area and environmental constraints restrict maneuver training with tracked vehicles at most locations in Germany to the platoon level and require that higher echelon training take place through periodic rotations to the Combat Maneuver Training Center. The GAO reported that, on the other hand, maneuver installations in the United States had much larger home-station training areas than were available to units stationed in Germany. The GAO concluded that the fact that common training deficiencies are reflected in the results of unit training at Combat Training Centers in Germany and the United States, compounded by the recognized need for greater emphasis on small-unit training, reinforces the question of to what extent additional training land in the United States would alleviate many training problems. (pp. 35-37, pp. 63-65/GAO Draft Report)

DoD Response: Partially concur. The DoD agrees that maneuver training land constraints in Germany are more severe than in the United States. The DoD disagrees, however, with the GAO implication that the lack of maneuver training land is not a cause of training deficiencies. The Army need for land is based on doctrinal sized areas needed to accomplish battalion, brigade, and division missions. The GAO draft report results are based primarily on analysis of battalion and smaller units, because those data are most readily available. Less land is available to train at brigade, division, and corps level, but there is still a need to maneuver on the ground and in simulation to train on lessons learned.

Now on pp. 21-23
and 43-44.

See comment 13.

Now on p. 43.
See comment 5.

The support of doctrinal conditions and standards is the only manner in which the Army can respond to training requirements. The GAO draft report supports the need for battalion-level field training in its conclusions (p. 63) and suggests a "balanced level of training" (implied at a lower level). The example provided in the DoD response to Finding H demonstrates how lower-echelon training may require more land. The draft report conclusion also suggests that higher-echelon training should be conducted at the appropriate time. Land to support higher-echelon training must be available when needed. This further supports the position that doctrinal standards and conditions must be supported, allowing units to "graduate" to higher-level training at the appropriate time or providing the opportunity for the integration of multi-echelon training.

- o **FINDING J: Training Funds, Personnel Problems, and Time Are Key Factors.** The GAO reported that numerous commanders in the United States indicated that their ability to train and maintain desired levels of proficiency, particularly at the unit level, is affected to a significant extent by the priorities accorded training funds, high personnel turnover rates affecting leaders and troops, shortages in key training positions, and competing time requirements.
 - **Funding Priorities.** The GAO reported Army commanders and training officials at Fort Carson, Fort Hood, Fort Lewis, Fort Polk, and Fort Riley advised that available training funds were constraining the amount and levels of maneuver training that was being done. According to the GAO, officials at most of the cited installations noted that training funds (which had declined over the past 4 years) were expected to continue declining in the future because of the different priorities installations have in the Army allocation of training funds. The GAO explained that, even when fund reductions did not occur, Army officials noted that, in some cases, training suffered because of the effect of inflation or the rerouting of money to continue base operations. The GAO further reported that, because of funding difficulties, officials at some installations--including those which would like to acquire additional training land--indicated that they were not making as great a use of their existing training land as they would like to do.
 - **Personnel Constraints.** The GAO reported that numerous senior leaders described personnel turbulence as one of the most significant problems affecting the ability of the Army to train. The GAO concluded that the personnel situation is exacerbated, if not caused, by the Army system of main-training higher unit staffing levels overseas than in the United States. The GAO

explained that, while some Army officials indicated that more land was needed at home station to help train at higher echelons and address training deficiencies identified at the National Training Center the GAO concluded that personnel turnover generally precluded that training from happening.

- **Competing Time Requirements Also Inhibit Training.** The GAO reported that competing requirements limit the time available to devote to training. According to the GAO, those demands may range from handling normal collateral duties on an installation to fighting forest fires to serving as support for other units in the process of preparing for a National Training Center rotation or as trainers for Reserve or Reserve Officer Training Corps units. (pp. 4,5, pp. 38-42, pp. 63-65/GAO Draft Report)

Now on pp. 3, 24-27,
and 43-44.

DoD Response: Partially concur. The DoD agrees that funding limitations, personnel turbulence, and competing requirements for time impact on the ability of commanders to train and maintain desired levels of proficiency. However, those factors do not influence the need of Army units for maneuver training land. The level of training funding restricts the duration and frequency of field training, but it has no effect on the size of the maneuver area to support brigade or battalion training or the requirement to train at those levels.

See comment 5.

The DoD also disagrees with the draft report statement that, "While some Army officials told us that they needed more land at home station to help them train at higher echelons and address training deficiencies identified at the National Training Center, we found that personnel turnover generally precludes this training from happening." While installation support missions may delay its resumption, training does not cease because of personnel turnover; it typically resumes at the individual and small-unit level to correct deficiencies identified at the National Training Center, as well as to integrate new personnel--and builds back up to battalion and brigade level. The objective of the training is to reach a higher level of proficiency and to realize the training benefits of the combat training center experience.

See comment 14.

- o **FINDING K: Uneven Training Emphasis in the United States.** The GAO reported that competing demands on resources, principally funding, coupled with a strong desire by commanders for their units to perform as well as they can at the National Training Center, resulted in giving priority for resources to units preparing to go to the Center. The GAO found that this priority produced an uneven distribution of training among units at given U.S. installations--an approach

brigade and division can influence. The availability of training land is generally considered a fixed resource that cannot be influenced. Some commanders may rate available land as a constraint until after a Combat Training Center rotation.

- o **FINDING M: Simulations Are an Important Component of Realistic Army Training, Even in the Field.** The GAO reported that the Department of the Army uses hundreds of training aids to simulate weapon systems and terrain or to otherwise support training requirements, which range from the simple to the very sophisticated. The GAO observed that the more sophisticated devices include components of the Multiple Integrated Laser Engagement System, a family of training systems that simulate the effects of direct-fire weapons from rifles to tank and helicopter gunnery systems. The GAO explained that the laser system is capable of simulating two-sided, real-time, tactical engagements at unit sizes up to battalion level, and provides for realistic casualty assessments. The GAO explained that, in order to allow the simulation to be as real as possible, the rifles and machine guns use blank ammunition, and the missiles and main guns use weapons effect simulators to simulate the noise, blast, and smoke of the actual weapons. The GAO concluded that the laser system is an essential component of field training at home stations, as well as at Combat Training Centers (pp. 5, 48-49, 63-65/GAO Draft)

DoD Response: Concur.

- o **FINDING N: Computer Controlled Simulations Provide Added Benefits To Training But Have Drawbacks.** The GAO found that the Army currently also uses a variety of computer-controlled training devices to simulate battle scenarios and facilitate training of individuals and units. The GAO concluded, however, that there are limitations in their use.

The GAO observed that computer simulations were used to augment field training at the installations it visited but that the usage varied, depending on the interest of individual commanders. The GAO found that computer simulations were most often viewed as a means of augmenting, rather than replacing, field training at lower echelons, and described several types of computer simulations currently in use. The GAO reported that commanders and trainers stressed that computer simulations are limited in their abilities (1) to replicate battlefield conditions, (2) to stress units realistically over space and time, and (3) otherwise to replicate a realistic battlefield environment. The GAO further observed that, while many Army officers see computer simulations as an effective way to prepare troops for field exercises and to reinforce lessons learned in field exercises, they do not see them as a replacement for field

Now on pp. 3 and 32.

Now on p. 28.

The GAO explained that battalion-level commanders report monthly on their training status as part of an overall assessment of their units' ability to accomplish their assigned wartime missions. The GAO further explained that the system uses "C-ratings" from 1 to 5 to identify levels of readiness. (Draft report table 4.1 lists the criteria used in assessing training status.)

To evaluate the units' training status and factors identified as affecting their ability to train, the GAO reviewed November 1989 and February 1990 monthly unit status reports for 60 maneuver and maneuver support battalions stationed in the United States and for 46 stationed in Germany. The GAO found that, for that period, the data consistently portrayed a high state of overall readiness for units in the United States and Germany, with the highest ratings assigned to units stationed in Germany. The GAO reported that, in most cases both in the United States and in Germany, the availability of training areas was reported as having no impact on unit training readiness, and in only a very few instances was it reported as having a major impact. The GAO pointed out that, even where availability of training areas was reported as having a major impact, unit commanders were still reporting their units as well trained and prepared to undertake the bulk of their wartime tasks. The GAO found that none of the units it reviewed cited the lack of training areas as having a prohibitive impact on training, regardless of readiness ratings. The GAO also reported that, in the United States, other resource problems (such as qualified leaders, funding shortfalls, and time constraints) were more frequently cited--irrespective of readiness ratings.

The GAO noted that some Army officials suggested that commanders are under-reporting the extent to which training land is a problem because they believe that land is an area that they are not likely to influence. The GAO recognized that this could be true; however, where commanders did indicate training areas as being a problem, they more often were apt to cite them as having only a minor impact. (pp. 4-5, pp. 43-47, pp. 63-65/GAO Draft Report)

Now on pp. 2, 27-31,
and 43.

DoD Response: Partially concur. The DoD disagrees that the lack of training land is not an impediment to training because it is not reflected in battalion readiness reports. Battalion maneuver training requirements are generally met by the existing training land and range complexes Army-wide. The Army training land needs are based on more than the training of single battalions. The Army must have the resources necessary to train up to corps level missions, though not solely in maneuver field exercises. Additionally, there is a propensity for battalion commanders to cite only resource constraints that their immediate commanders at

See comment 16.

training, particularly at lower echelons, has yet to be determined. The GAO reported that some senior Army leaders doubt that the Army would place as great a reliance on the use of computer simulations as indicated by some of the existing guidance--and that growing use would be tempered until the effectiveness of computer simulations had been proven. The GAO commented that Army officials who are developing the future training strategy stated that one of the biggest challenges facing the Army is in knowing what is the right quantity of simulators to develop and acquire over time.

The GAO concluded that little convincing research exists on the question of whether computer simulation training can achieve the same standards of training as training in the field on actual equipment or to what extent simulations provide negative training or teach bad habits. The GAO further concluded that drawbacks to conducting such tests are their high cost and the difficulty of designing and executing such assessments. (p. 5, pp. 56-57, pp. 63-65/GAO Draft Report)

Now on pp. 3-4 and 34-35.

DoD Response: Concur. An appropriate mix of field training and use of simulators and simulations must be developed. However, the determination of the mix must be based on the comparison of objective--as opposed to developmental--simulators and simulations with the training benefit of field training. The Army is just entering an era of device-based training and, in many cases, has yet to field objective systems. The decision by the Army to pursue device-based training will be based on affordability and the documented quality of the training transfer. Simulations may reduce the frequency and duration of field training, but they will not be used as a substitute. Army units can be compared to a professional football team. The team may use devices and simulations to practice individually and collectively, but must be able to go to a real football field to synchronize in time and space those things done in simulation.

See comment 19.

- o **FINDING P: Changing Force Structure Environment.** The GAO observed that, as political reforms have taken place in Eastern Europe, the United States has responded by developing plans for reducing and restructuring its forces. The GAO speculated that, when agreement is reached on the troop portion of the Conventional Forces in Europe treaty, troop levels in Europe will likely be reduced from over 300,000 down to 195,000--with indications that even further reductions could be forthcoming. The GAO noted that the active Army overall could be reduced from a high of about 780,000 in the mid-1980s to just over 500,000 by 1995. The GAO reported that, accordingly, decisions will be required concerning the numbers and types of divisions that should be placed in the active and reserve forces, what threat(s)

exercises. The GAO reported that, while most of the current simulation systems are separate from the actual weapon systems whose functions they are designed to simulate, the next generation of weapon systems are projected to include embedded simulations that could allow simulated training to take place using the actual weapon systems and without requiring the system to leave the motor pool for that type of training.

The GAO reported that guidance on training for the future indicates that the Army will make increased use of computer simulation technology to "train smarter" and to respond to resource constraints that limit the amount of field training that can be completed, particularly at the home station. According to the GAO, the future Army plans envision Combat Training Centers as the location of most large-scale training exercises; however, the Army has yet to determine the optimum mix of field and computer-simulated training.

The GAO explained that the evolving Combined Arms Training Strategy--the Army strategy for training in the future--envisions using devices and simulations almost exclusively to build proficiency before training is conducted in the field. The GAO further explained that this strategy recognizes that shrinking resources will likely restrict field training below current levels. The GAO noted that future plans also suggest that Combat Training Centers will become more important in executing unit training as large-scale maneuver training is accomplished almost exclusively at locations, such as Combat Training Centers or regional training centers, with more expansive land areas. The GAO concluded that the strategy anticipates that individual, crew, squad, and small-unit training will be accomplished at the home station. (p. 5, pp. 49-56, pp. 63-65/GAO Draft Report)

Now on pp. 3-4 and 33-34.

See comment 17.

See comment 18.

DoD Response: Concur. For clarification, simulations do not fully replicate actual maneuver training; however, they are a viable means of repeatedly training those tasks within their capability. It should also be understood that the Army intends to maintain the capability to provide maneuver training at home-station locations. The GAO understanding that the Army intends to isolate "most large-scale training exercises" at the Combat Training Centers or regional training centers is incorrect. To the contrary, the majority of active Army brigade- and battalion-level training exercises will occur at unit home stations with the exception of Army units based in Europe.

FINDING O: Need to Determine Mix of Field and Computer-Simulated Training. The GAO found that, although the Army is evolving toward greater use of computer simulations, the right mix of field and computer-simulated

in an emergency. Since training resources, even for high-priority units, are not much above minimum levels for crew and unit proficiency, lower-priority units would not be able to sustain effective training programs. Experience has shown it is very difficult to take a unit that is not well trained and bring it up to standard through a forced-draft training program. The DoD is convinced that its approach to flexible readiness is the correct one and that the congressional approach would inflict serious long-term damage on the active force.

See comment 20.

With regard to the GAO conclusion about the relationship of flexible readiness and training land, each Army installation housing maneuver units will continue to require the same amount of training land--i.e., enough land for brigade exercises or, as a minimum, battalion exercises--even if funding levels were curtailed. Those exercises, and smaller-unit training, would be less frequent, but the land requirement would not change.

- o **FINDING Q: Land Acquisition as a Hedge Against Future Needs and Constraints.** The GAO explained that senior Army leaders maintain that the Army should avail itself of "targets of opportunity" to acquire land now, as a hedge against future weapon systems modernization, which could add to the range and lethality of weaponry and increased training requirements. The GAO reported that the Army views as targets of opportunity the proposed expansions of the National Training Center in California and the Yakima Firing Center in Washington State, both of which involve largely public lands and would not cause significant displacement of residents.

Now on pp. 5 and 41.

The GAO found that the Army case for acquiring land in remote areas is bolstered by the findings of the Secretary of Defense Commission on Base Realignment and Closure, to the effect that the combined-arms operations expand the requirement for large training areas, such as the National Training Center. The GAO noted the cited report recommended that consideration be given to using funds derived from closing of military installations to expand large, existing training facilities in the western United States. (pp. 6,7,59,60, pp. 63-65/GAO Draft Report)

See comment 21.

DoD Response: Concur. However, acquiring land as a "target of opportunity" is not an Army or DoD policy or procedure. Both the expansion of the National Training Center and Yakima Firing Center would have the purpose of allowing brigade-level maneuver in accordance with the draft revision of Training Circular 25-1. There are currently no Army land acquisition proposals that are based on the rationale described by the GAO as "targets of opportunity."

should be planned for, what amounts of funding will be devoted to training to achieve desired levels of proficiency, and where units will be stationed to facilitate quick deployment in time of need.

The GAO noted that, before the Persian Gulf crisis, there were indications that senior Army leaders were leaning toward greater reliance on lighter, more mobile active duty forces; these forces would respond to what has increasingly been viewed as the greater probability of low- to mid-intensity conflicts occurring in third world countries rather than to the potential for high-intensity conflict in Europe on which force structure planning has been based for many years. The GAO observed that such a change suggested the potential for greater priority to lighter forces in the active force, in comparison with heavier, armor forces that, in theory, would be less likely to be needed as quickly. The GAO pointed out that the current situation in the Persian Gulf suggests that this question may not be decided for some time.

The GAO noted, however, that, at the same time, some in the Congress have suggested that the concept of flexible readiness needs to be considered. According to the GAO, this concept would vary the readiness levels of units, depending on how quickly they would be needed to respond to a threat. The GAO concluded that this concept clearly (1) has implications for the frequency and levels of training that units would require and (2) raises additional questions about the extent of which additional home-station training land would be used if acquired. (pp. 5,6,58,59, pp. 63-65/GAO Draft Report)

Now on pp. 4 and 40-41.

DoD Response: Concur. For accuracy, the DoD position on the concept of flexible readiness should be understood and reflected in the GAO report. The DoD currently practices a form of flexible readiness in allocating training resources. The major division is between the active force and the Reserve components, with the latter receiving lower levels of training opportunity and resources, in keeping with their part-time status and limited time for training. While there is some gradation in training resources among active units, depending on their missions and deployment schedules, active units should receive enough resources to enable them to train up to their readiness standards. Beyond the requirement to be prepared for short-notice deployment, as has been demonstrated in Desert Shield, a vigorous training program is required to sustain morale and retention. Good people will not continue to serve in second-class units.

The congressional approach to flexible readiness would make deep cuts in training resources for late-deploying units on the assumption that they could rapidly train up to standard

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- outlines its approach to addressing the recurring training problems identified at the combat training centers, and recognizes the need for greater emphasis on small-unit training;
- outlines its plans for addressing various other constraints, including funding priorities and personnel turn-over that are apt to restrict training and use of land; and
- defines the relationship of training land to long-range plans for greater reliance on training devices including computer simulations. (p. 65/GAO Draft Report)

Now on p. 44.

DoD Response: Concur. The Army is taking appropriate actions to comply with the intent of this recommendation. The Army has developed a training strategy as outlined in Field Manual 25-100, Training the Force, and Field Manual 25-101, Battle Focused Training. Doctrinal tasks, conditions, and standards are the foundations for Army training. That same training philosophy allows field commanders the latitude to address the transitory and unit-specific training problems identified in the GAO draft report. As previously discussed, the factors of funding, personnel turnover, and integration of simulations do not alter the Army requirement for training land, though certainly those factors influence the frequency and duration of maneuver training.

The Army is developing a Combined Arms Training Strategy that integrates all of the resources required for training and prioritizes those training resources for application to training events. Publication of the coordination draft is expected in September 1991. When implemented, the Combined Arms Training Strategy will provide a recommended set of training events, with an associated set of supporting resources (to include training land) to attain and sustain training excellence Army-wide. Training land requirements for this strategy are expected to be identical to those in the current draft version of Training Circular 25-1.

Upon completion of the Combined Arms Training Strategy and actions associated with base closures and realignments, the Army will develop a comprehensive strategy for land acquisition. The strategy will be based on the doctrinal requirements for training land contained in Training Circular 25-1 and will consider such factors as land availability, affordability, and capability of simulations.

RECOMMENDATION 2: The GAO recommended that the Secretary of the Army base requests for additional training land on the completed training strategy. (p. 65/GAO Draft Report)

Now on p. 44.

See comment 22.

- o **FINDING R: A Moratorium On Land Acquisition.** The GAO reported that, on September 13, 1990, the DoD declared a moratorium on land acquisition to ensure that the Department and the individual Military Services acquire land only where there is a clearly demonstrated need. The GAO noted that, as of October 26, 1990, the Army had requested a waiver for the Yakima Firing Center, a sub-installation of Fort Lewis, Washington. The GAO observed that the DoD has issued guidance to the Military Services on assessing their land needs and requesting approval for acquisitions by the Secretary of Defense. The GAO noted that, in the guidance, the Assistant Secretary of Defense (Production and Logistics) requested that each of the Military Services provide justification for their major land acquisition proposals, as well as the impact of force and base structure changes envisioned in the FY 1992-FY 1997 Six-Year Defense Plan being considered. The GAO reported that the Services are expected principally to address alternatives, particularly the potential for using land that may be available from a sister Service, before new acquisitions are initiated. The GAO reported that other issues to be addressed include the following:

- the impact of immediate and FY 1992 to FY 1997 force/base structure plans;
- public sensitivities;
- anticipated environmental issues; and
- the impact on training, if further land acquisition is not approved.

The GAO reported that the DoD moratorium is consistent with the report of the Committee on Armed Services, House of Representatives, on authorization of defense expenditures for FY 1991. (pp. 60,61, pp. 63-65/GAO Draft Report)

DoD Response: Concur. The Army request for a waiver for the expansion of the Yakima Firing Center was approved on October 30, 1990.

* * * * *

RECOMMENDATIONS

RECOMMENDATION 1: The GAO recommended that the Secretary of the Army develop a comprehensive, integrated training strategy that:

Now on pp. 41-42.

The following are GAO's comments on the Department of Defense's letter dated February 11, 1991.

GAO Comments

1. It does not appear that factors identified in this report that can affect land requirements and use were considered in DOD's granting of a waiver to its moratorium for the Yakima expansion.

2. The issue is more than simply a land acquisition strategy. We believe that the Army's training strategy must reconcile its land acquisition goals with long-range training plans that indicate a greater reliance on simulations. It must also integrate a consideration of various resource constraints, common recurring training problems, and the recognized need for greater emphasis on individual and small-unit training.

3. We encountered varying views among commanders as to the appropriate echelon to focus on for maneuver training at home stations and the amount of land required. However, officials from the Army's Combined Arms Command—which plays a pivotal role in developing and consolidating doctrinal requirements—told us that the clear consensus of Army officials was that battalion-level training should be the highest level of focus at home stations. Moreover, field and computer-simulated training can be combined to achieve a brigade-level focus, as the Army does at its CTC in Hohenfels, Germany, where limited land is available.

4. There are a number of problems with this line of reasoning. First, not all companies train simultaneously. Second, installations normally have training areas subdivided into areas of varying size that are not all contiguous. Companies training independently would not necessarily need to use contiguous land areas. Third, a Combined Arms Command official told us that company-level data cited by DOD had not been tempered by the same process that the Command employed to bridge variances in assumptions and requirements associated with input from the Army's infantry and armor schools for battalion training land needs. Thus, infantry battalion requirements were reduced—company-level requirements were not. Because of this inconsistent application of methodology, the sum of company-level requirements appeared substantially greater than the amount required for battalion training.

5. The constraints on resources other than land do not negate the need for training at various echelons and the need for training land. However, these constraints certainly affect the duration and frequency of training, and we believe it is only logical to expect that they could also

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DoD Response: Partially concur. In the future, requests for additional training land will be based on the criteria specified in the Combined Arms Training Strategy that is being developed by the Army. In the meantime, requests will be based on guidance in Field Manual 25-100, Field Manual 25-101, and Training Circular 25-1.

This recommendation, as written, can be interpreted to mean that proposals for training land acquisitions should be suspended until publication of the referenced strategy. The procedures, described in the GAO draft report, for implementing the DoD moratorium on land acquisition, including the provision for waivers in exceptional cases, provide adequate safeguards without precluding fully justified land acquisitions.

recommends that the Secretary of the Army change the training readiness reporting system for active Army units from one that is based largely on commanders' assessments of training conducted at home stations to one that uses as a baseline the independent assessment of proficiency that is demonstrated at CTCs.

12. DOD appears to be arguing for more training land, yet at the same time it recognizes that there are alternate approaches to minimize land requirements. More land might be desirable, but it is difficult to determine the optimum amount from a cost-benefit standpoint. We have recognized the need for battalion-level field training and have pointed out throughout our report that various approaches are used to compensate for land constraints to train at higher echelons.

We have not suggested that higher echelon training is not needed or desirable. However, given the nature of common, recurring training problems to be solved—many of which do not necessarily require more land—and the Army's recognition that greater emphasis should be placed on lower echelon training, we believe all of these factors should be considered in evaluating the need for additional training land.

In our draft report we made reference to one take-home package as an example to illustrate the general points we had already made: that many training problems were common to all units and that land was not necessarily the requisite "fix" for those problems. Our review of other take-home packages and CALL data, all of which is based on the results of CTC exercises, showed similar problems.

13. Our report does not state that a lack of land for maneuver training is not a cause of training deficiencies or that more land would not be desirable in Germany. However, we point out in chapter 3 that Army commanders infrequently reported the lack of training areas as an impediment to training readiness, and when they did, they did not report it as a significant impediment.

14. Army data shows high personnel turnover rates for troops and key leaders, particularly after units return from NTC rotations. Given these turnover rates, an essentially new unit may be in place without the old unit's having had an opportunity to collectively address its training deficiencies. This essentially new unit must then focus on lower level skills.

15. Not all installations we visited operated on the red-amber-green training cycles. Nevertheless, Army training officers cited various

affect the Army's use of additional training land. Large-scale exercises are costly, and it is not unusual for them to be curtailed to save money. Moreover, the Army has recognized the need for increased focus on developing and sustaining individual and small-unit skills. This need is compounded by the need to address other common, recurring training problems that are not necessarily related to the availability of land. Together, these factors raise a question about the criticality of the Army's need for more land for higher echelon training.

6. Although the Army's doctrinal and training publications provide unit training strategies, these strategies do not provide the broader, integrated strategy called for in our recommendation. The Army's recognition of the need for a more comprehensive strategy is evidenced by its ongoing efforts to develop a Combined Arms Training Strategy.

7. We revised the report to amplify the characteristics of multipurpose ranges.

8. In commenting on the use of subjective judgment in revising TC 25-1, we were pointing out that the process was an imprecise one and that it reflected an effort to bridge widely varying figures provided by the Army's armor and infantry schools, with each approaching the project with different assumptions.

9. We agree that a sound, methodical approach is desirable; however, information provided by various Army officials does suggest that numerous factors argue against a prescribed or uniform definition of the amount of land needed at all installations. We have modified our report to better reflect this point.

10. We modified the report to reflect the fact that the wartime mission area of responsibility we cited for the First Infantry Division stationed at Fort Riley was in fact for its battalions. It is not our position that the size of a unit's wartime area of operation should in some way determine the size of its home-station maneuver area. However, that was the argument of a number of Army officials in their efforts to justify larger training areas.

11. The final report, entitled Army Training: Evaluations of Units' Proficiency Are Not Always Reliable (GAO/NSIAD 91-72, Feb. 15, 1991), recognizes that the most realistic simulated combat environment is at the Army's NTC—an environment that would be difficult to replicate at home stations even if larger training areas were available. The report

officials involved with the Yakima expansion were encouraging the inclusion of language concerning brigade-level training in the revised TC 25-1.

resource constraints that negatively affected planned training and affected their units' ability to maintain desired levels of proficiency.

16. Commanders often cited the impact of various factors on their ability to train, many of which had existed for a long time and over which they and their senior commanders had little control. They more often mentioned factors other than land as having greater impact. When commanders did report the availability of training areas as having an impact, they still gave their units high overall readiness ratings.

17. We revised the report to further amplify the benefits and drawbacks of simulations.

18. The information we presented about the Army's future plans for using simulations came from Army planning documents outlining the Army's vision of training in the future.

19. Not only is the Army currently examining the possibility of acquiring even more sophisticated simulation technology, it already is making considerable use of such technology at various echelons, even though the appropriate mix of simulated and field training has not been defined.

20. If, in fact, the Army plans to place a greater focus on brigade-level field training in the future, it could be faced with the choice of expanding a number of home-station installations, a task that could be very difficult and costly, or making greater use of large regional training centers such as the NTC.

21. The phrase "target of opportunity" is used by a number of Army officials and in Army documents to describe certain land acquisition efforts. For example, a February 21, 1989, Army information paper notes that the Army's Forces Command had identified proposed expansions at both NTC and Yakima as "targets of opportunity" because of the large tracts of contiguous Bureau of Land Management land.

22. Although the Army might want to acquire additional training land at a location—such as Yakima—involving largely public lands for use as a regional training facility, it is not clear that the acquisition at Yakima should be justified on the basis of a draft revision to TC 25-1, which apparently will cite the need for brigade-level home-station training areas. The Yakima acquisition effort began before the Army had initiated efforts to update TC 25-1; further, we noted during our review that

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