

July 1986

# ARMY TRAINING

## National Training Center's Potential Has Not Been Realized



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United States  
General Accounting Office  
Washington, D.C. 20548

National Security and  
International Affairs Division

B-222994

July 23, 1986

The Honorable John O Marsh, Jr  
The Secretary of the Army

Dear Mr Secretary

A primary objective of the Army's National Training Center is to assess the effectiveness and efficiency of Army units and weapons systems based on training exercises conducted at the Center. This report describes activities at the Center and discusses a number of steps to be taken by the Army if it is to achieve this objective.

The report contains recommendations to you in chapter 2. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a federal agency to submit a written statement on actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report. A written statement must also be submitted to the House and Senate Committees on Appropriations with an agency's first request for appropriations made more than 60 days after the date of the report.

We are sending copies of this report to the Chairmen of the above Committees, the Secretary of Defense; the Director, Office of Management and Budget, and the Chairmen, House and Senate Committees on Armed Services.

Sincerely yours,

<sup>for</sup>  
Frank C. Conahan  
Director

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# Executive Summary

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The Army has spent more than \$385 million developing the National Training Center and from 1983 to 1985 incurred annual operating costs ranging from about \$62 million to \$90 million. In addition, each unit which trains there incurs costs ranging from \$4 million to \$6 million. Through fiscal year 1985, the Army has spent more than \$42 million maintaining and operating the Center's instrumentation system. This system collects battlefield data to support the training exercises. The Army told the Congress this data would be used to assess the effectiveness and efficiency of organizations, weapon systems, tactics, and doctrine.

GAO conducted this review to find out whether the Army was using the information collected from Center exercises to analyze deficiencies in unit performance, determine their causes, and initiate solutions. GAO also wanted to determine whether the Army was developing Army-wide lessons learned from exercise results.

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## Background

The National Training Center was established at Fort Irwin, California in 1981. The Center provides individual soldiers and units a training environment which closely parallels that of actual warfare. In addition to providing live fire exercises, the Center provides individual units experience in force-on-force engagements against a simulated Soviet force consisting of about 1,500 men permanently assigned to Fort Irwin.

The objectives of the Center are to

- provide a place where Army units can undertake realistic training that cannot be accomplished at home stations, and
- enable the Army to objectively measure the effectiveness and efficiency of organizations and weapon systems.

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## Results in Brief

The Army has clearly achieved one of its two primary objectives for the National Training Center— providing training under realistic conditions.

However, the full potential envisioned by the Army for the Center when it was established has not been realized. This is because the Army has been unable to (1) use the objective data collected for overall assessments of its organizations and weapon systems or (2) identify causes of Army-wide problems demonstrated during Center exercises and initiate solutions. Consequently, in 1985, units continued demonstrating problems in many of the same areas as they did in 1981.

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## Principal Findings

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### Analysis of Objective Data

There are two major reasons why the Army has not developed a means to objectively assess the effectiveness and efficiency of its organizations and weapon systems. First, the Army has not identified the types of data needed to assess unit performance over the long term. As early as 1979, the Army recognized the need to identify data requirements and establish standards so that exercise results could be qualitatively and quantitatively measured. However, the Army still has not accomplished either of these actions.

Secondly, objective data collected through the Center's instrumentation system is too unreliable and incomplete for overall analysis. These data problems are caused primarily by the instrumentation system's inability to monitor and record battlefield vehicle activities during movement along valleys and trenches. Consequently, the Army is reluctant to use the data to draw conclusions regarding Army-wide lessons learned.

Although data deficiencies preclude trend analysis which was to be used for measuring unit and weapon system effectiveness, the Army uses some of the data collected as a training aid to provide immediate feedback on unit performance. Army officials told GAO that this data was vital to the Center and the units which trained there since it allowed observers and participants to determine the results of battlefield decisions and actions.

The Army, in an effort to solve its data analysis problems, awarded a contract in February 1985 which includes the following tasks listed in the order they are to be accomplished:

- designing methods for identifying and eliminating incorrect or incomplete information,
- developing performance measures, task lists, and analysis methodologies,
- integrating home station training with Center training; and
- identifying user needs, including data collection and analysis requirements, desired formats, and information available which could meet user needs.

While this effort should identify the data requirements necessary for measuring unit and weapon system effectiveness, the loss of battlefield

data occurring because of the instrumentation system's inability to record vehicle activities while traveling along valleys and trenches is a continuing problem

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### Subjective Assessments

Since the National Training Center began operations in 1981, various Army organizations have documented their subjective assessments of exercise results. These assessments have identified recurring problems, but the Army has not developed a system to identify their causes and initiate solutions.

The Army is developing a new system to better capitalize on subjective assessments. It plans to develop a systematic means of developing lessons learned from a number of sources, including major command exercises and actual combat, as well as the National Training Center. This system, the Center for Army Lessons Learned, will cost an estimated \$3.4 million through fiscal year 1991.

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### Recommendations

GAO recommends that the Secretary of the Army take the following actions:

- Once the contractor has determined the data requirements necessary for measuring unit and weapon system effectiveness at the National Training Center, determine the technological and economic feasibility of collecting such data
- If objective data can be economically collected, establish a target date for implementing a system for data collection and analysis
- If objective data collection is not technologically or economically feasible, determine whether the current data collection system is the most cost effective system for obtaining the information currently used or needed for units' after-action reviews.

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### Agency Comments

The Department of Defense agreed with GAO's findings and recommendations and stated the Army has made some notable progress towards developing viable data collection, analysis, and lessons learned systems. (See app. I.) Agency comments are discussed in detail in chapters 2 and 3.



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**Abbreviations**

ARI	Army Research Institute
CAC	U.S. Army Combined Arms Center
CALL	Center for Army Lessons Learned
FORSCOM	U.S. Army Forces Command
GAO	General Accounting Office
NTC	National Training Center
SME	subject matter expert
TRADOC	U.S. Army Training and Doctrine Command

# Introduction

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The Army's National Training Center (NTC) was established at Fort Irwin, California, in 1981 to (1) provide a place where Army units can undertake essential training that cannot be accomplished at home stations and (2) enable the Army to objectively measure the effectiveness and efficiency of organizations and weapon systems

The NTC enables soldiers and units to train in an environment which closely parallels that of actual warfare, an opportunity not now available at home stations. Training at the NTC consists of both force-on-force engagements against an opposing force and live-fire exercises. The opposing force, consisting of about 1,500 personnel, is designed to replicate a Soviet motorized rifle regiment. Soviet tactics and U.S. vehicles modified to look like Soviet vehicles are used during force-on-force simulated engagements to make the combat training as realistic as possible.

The NTC requires units to conduct training in about eight different battle scenarios, which include offensive and defensive operations during both day and night. The battle scenarios require units to perform critical tasks related to their wartime missions. The scenarios are changed for each training exercise so that the NTC experience presents different challenges to soldiers who have been to NTC before.

Force-on-force exercises are conducted using the Multiple Integrated Laser Engagement system. This system, carried on both equipment and troops, lets both soldiers and units know immediately if a kill or near-kill is scored. Use of this system helps add realism to the exercises and provides a real-time assessment of casualties. It allows commanders to see immediately the results of their orders and doctrine applied on a realistic battlefield.

Since NTC training includes 14 intense days of exercises, units are required to demonstrate sustainment capabilities. In order to sustain, they have to provide full logistical support under realistic combat conditions. This logistical support includes performing maintenance in the field, evacuating casualties, and living in a bivouac area.

Objective exercise data from the NTC's instrumented battlefield are gathered from several sources. Audio data are acquired by monitoring radio transmissions to help determine what happened during the exercises. Video data are obtained from a stationary camera atop a mountain at the NTC and eight mobile cameras. Digital data are provided by the NTC computer system which is tied into the laser-based engagement system.

and the live-fire targets. In addition, subjective assessments of unit performance are provided by 126 observers who watch and record events during the exercises.

Data from all these sources are used to give the units immediate feedback after each exercise in the form of after-action reviews. The data are then summarized to provide the units with take-home packages, which include

- videotaped summaries of the debriefings covering the units' performance,
- map overlays of the movement and maneuvering of the units on the battlefield during the various exercises, and
- diagnostic results to be used as a basis for evaluating the units' past training programs and to address their home station training needs.

The Army spent more than \$385 million to develop the NTC, including about \$76 million for the instrumentation system. The cost of maintaining and operating the instrumentation system totaled over \$42 million through the end of fiscal year 1985. Annual costs to operate the entire NTC have ranged from \$61.8 million in fiscal year 1983 to \$90.3 million in fiscal year 1985.

The NTC is the joint responsibility of two Army commands: the U.S. Army Forces Command (FORSCOM) has operational control, and the U.S. Army Training and Doctrine Command (TRADOC) is responsible for operating the instrumented battlefield, designing the training exercises, and evaluating the training results. At the end of fiscal year 1985, all the Army's heavy infantry and armor brigades based in the continental United States had trained at the NTC. Most of these brigades have trained there at least twice, and some have trained three times. In addition, some light infantry organizations have trained at the NTC. Army officials estimate that it costs between \$4 million and \$6 million each time a unit trains at the NTC, primarily for transportation of soldiers and equipment.

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## Objective, Scope, and Methodology

Our objective was to evaluate the Army's system for using NTC exercise results in analyzing unit performance deficiencies, determining their causes, and initiating solutions. In doing so, we primarily focused on assessing the adequacy of the Army's management information system for compiling lessons learned at the NTC.

In performing our work, we visited

1. The two headquarters commands responsible for the NTC to discuss their roles—TRADOC, at Fort Monroe, Virginia, and FORSCOM, at Fort McPherson, Georgia.
2. The NTC to (1) gain a thorough understanding of its activities, and determine what information is collected during the exercises, (2) discuss data reliability, and (3) obtain officials' opinions on the types of recurring problems demonstrated by units which have trained there
3. Several TRADOC organizations to determine how the Army assesses and documents NTC exercise results and how the Army uses the information developed. The organizations selected are responsible for the school training and doctrine development for the types of units which train at the NTC. The TRADOC organizations included (1) the Combined Arms Center (CAC) at Fort Leavenworth, Kansas, (2) the Infantry School at Fort Benning, Georgia, (3) the Armor School at Fort Knox, Kentucky, (4) the Artillery School at Fort Sill, Oklahoma, and (5) the Quartermaster School at Fort Lee, Virginia.
4. The U.S. Army Research Institute (ARI) at the Presidio of Monterey, California, to understand the Army's effort to use the NTC instrumented data and NTC data reliability.
5. Several FORSCOM units to discuss the usefulness of NTC exercise feedback in identifying training problems and correcting deficiencies, including
  - 24th Infantry Division, Fort Stewart, Georgia (2nd Brigade, 3rd Battalion/19th Infantry and 2nd Brigade, 5th Battalion/32nd Armor)
  - 197th Infantry brigade, Fort Benning, Georgia (3rd Battalion/7th Infantry and 2nd Battalion/69th Armor)
  - 194th Armor Brigade, Fort Knox, Kentucky
  - 75th Field Artillery Brigade, Fort Sill, Oklahoma.

Finally, we reviewed plans, agency correspondence, congressional hearings, and studies relating to the evaluation of NTC exercise results and lessons learned. We conducted our work between February and October

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**Chapter 1**  
**Introduction**

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1985 in accordance with generally accepted government auditing standards

# The Army Has Been Unable to Analyze Objective Data From NTC Exercises

As part of the Army's justification to the Congress<sup>1</sup> for establishing the NTC, the Army stated it would collect objective data for measuring the effectiveness and efficiency of units, organizations, equipment, tactics, and doctrine. The NTC's use of some of the objective data collected during the exercises has clearly enhanced units' training experience. The data allows NTC officials to provide a more detailed explanation of battlefield events to individual units and explain the consequences of specific actions.

However, after more than 3 years of data collection at a cost of more than \$42 million, the Army has been unable to use the objective data for overall effectiveness assessments of its organizations and weapon systems or to identify Army-wide lessons learned. According to CAC—the Army organization responsible for developing lessons learned—the instrumented data collected is too incomplete and unreliable for trend analysis. Further, the Army has yet to determine the specific types of objective data that are needed to accomplish these tasks. As a result, the Army has been unable to accomplish one of its NTC objectives and has not fully capitalized on the NTC's potential.

Even though the Army has not been successful in collecting reliable objective data for overall analysis, it has developed a facility where realistic training is conducted. Soldiers and commanders view NTC training as very beneficial. As a result, commanders are more aware of what will be required during any future conflict and are making changes in the way soldiers train at home stations.

## Lack of Reliable Objective Data Precludes Army-Wide Assessments

TRADOC's NTC Development Plan, published in April 1979, recognized—among other things—the value of gathering objective data on battlefield performance under realistic conditions. The plan stated that such data would be invaluable for assessing and designing training doctrine, programs, management, and program support. Subsequently, the Army spent more than \$76 million for a range instrumentation system to collect the data, including information on vehicle and personnel losses, hits and kills by weapon type, number of rounds fired per kill by weapon type, number and duration of radio transmissions, and engagement ranges by weapon type.

<sup>1</sup>Hearings, Subcommittee on Military Construction Appropriations, Committee on Appropriations, House of Representatives. March 19, 1981, p. 219.

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**Chapter 2**  
**The Army Has Been Unable to Analyze**  
**Objective Data From NTC Exercises**

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In 1981, TRADOC delegated to CAC the responsibility for developing and disseminating NTC lessons learned. Inherent in the CAC's lessons learned assignment is the requirement to analyze qualitatively and quantitatively, the audio, video, and digital data collected by the range instrumentation system. To realize the full potential of the NTC, TRADOC decided that it needed a computer system which would be dedicated to analyzing data collected by the instrumentation system. As a result, in November 1983, TRADOC proposed an NTC Feedback System. This system was expected to provide the Army the capability to extract, sort, and manipulate NTC data and make it available to support Army-wide initiatives dealing with institutional and unit training trends, doctrine, and force development. Also, the Feedback System was expected to enable entities such as CAC and Army schools to view, analyze, and assess the data on a real-time basis. The Army's budget request for fiscal year 1986 included \$2.9 million for initial development of the Feedback System.

In October 1984, however, CAC recommended that TRADOC suspend the purchase of the NTC Feedback System. This request followed a CAC evaluation of the NTC instrumentation data in which CAC officials concluded that the data was unreliable and incomplete. The CAC evaluation report stated that

"the digital data tapes are of negligible analytical value [because the] data is incomplete in its portrayal of what actually transpired on the battlefield. [T]hese inaccuracies will be inherent to any analytically generated summaries."

CAC further reported that manual extraction and analysis of the data collected was futile and not cost effective.

CAC's evaluation of NTC data quality revealed many shortcomings which, in the aggregate, preclude reliable analyses. These shortcomings included (1) the fact that some weapon firings, hits, and kills are not collected by the instrumentation system, (2) extensive loss of vehicle and weapon location information, which increases the likelihood of erroneous hit and kill information by weapon type, (3) erroneous statistics on the number of times weapons are fired, and (4) active vehicles and weapons displayed as destroyed. The primary cause of these shortcomings, according to CAC officials, is the instrumentation system's inability to monitor and record battlefield vehicle activity during movement along valleys and trenches. In view of the data quality problems, CAC officials stated they hesitated to use the data to draw conclusions.

regarding Army-wide lessons learned through trend analysis. CAC officials told us in February 1986, that the proposed Feedback System had been cancelled.

Despite the data deficiencies for overall analysis, the Army uses some of the data collected during NTC exercises for immediate unit feedback. Army officials have stressed that the NTC's primary goal is training and that some of the data is invaluable when observers critique unit performance. For example, the data facilitate training by allowing NTC officials to graphically display a battle-wide perspective of a unit's location on the battlefield and its position in relation to the opposition force. As the observers view monitors which display this action from a battlefield perspective, they make cause-and-effect judgments on critical battlefield actions. Observers identify those displays which identify critical actions which may represent turning points in the engagements. Later these displays can be used by the observers to assess and demonstrate leader and unit performance. Also, by viewing these displays, exercise participants can analyze the results of their decisions and actions.

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## **The Army Has Not Defined the Information and Analyses Needed**

Although the Army has been gathering objective data on units' battlefield performance since 1983, it has yet to determine the specific types of data that are needed for overall assessments of its organizations and weapons systems from which it can develop lessons learned. According to Army officials, emphasis to date has been directed primarily toward the training aspects of the NTC and developing the capability for providing units with immediate feedback.

Since 1979 the Army has repeatedly affirmed the need for lessons learned to isolate and resolve recurring problems that have Army-wide impact. In 1979, in its NTC Development Plan, the Army recognized that developing lessons learned was an important aspect of the NTC. The Development Plan also stressed the importance of evaluating unit performance against a set of standards and established June 1981 as a critical milestone for developing and validating quantitative and qualitative performance measures, mission tasks, and baseline standards. Yet, when the NTC became operational in July 1981, the Army had not developed the performance evaluation methodology outlined in the Development Plan.

Further, according to Army officials, the Army still has not determined either what analyses it requires or the data needed to develop these analyses and lessons learned. For example, CAC officials told us the



Army schools, which are responsible for training and doctrine development, had not been required to define the specific information needed to fully evaluate training and doctrine effectiveness. CAC officials agreed that first deciding what information and analyses are needed is critical to determining what data should be collected.

Although the Army has developed unit performance measures and standards as part of its Army Training and Evaluation Program, these measures and standards, according to Army officials, need to be more fully developed in order to evaluate changes in performance over time. In December 1983, CAC successfully tested a plan designed to measure unit performance in one of the eight NTC battle scenarios. According to CAC officials, a critical task list, conditions, and standards were developed to measure a unit's performance in each critical task. Officials stated that CAC had planned to develop similar measurement parameters for the remaining seven battle scenarios; however, this has not been done. CAC officials stated they did not know why their CAC predecessors abandoned the effort but speculated the results may have been too much like a measurement system of unit's success or failure at the NTC. The officials said the Army did not want to test or compare units because commanders might try to mask known deficiencies. NTC officials told us CAC's effort had been stopped because of inadequate resources and because ARI had been tasked by TRADOC to develop unit performance standards. ARI has awarded a contract for this purpose.

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### The Army Has Awarded a Contract to Accomplish Its 1979 Objective

In February 1985, ARI awarded a 3-year \$1.5 million contract to develop performance measures, evaluate the usefulness of NTC instrumented data for analyzing exercise results, and assist in developing an analysis methodology. Among other things, the contract includes the following work steps, which are listed in the order they are being accomplished:

- designing methods for identifying and eliminating incorrect, incomplete, misleading, or scientifically undesirable data,
- developing performance measures, task lists, and analysis methodologies;
- integrating home station training with NTC training; and
- identifying user needs, including data collection and analysis requirements, desired formats, and information available which could meet user needs.

In our opinion, the sequence of contract work steps does not appear to be the most efficient way to proceed. Initial efforts are focused on identifying and eliminating incorrect data and developing an analysis methodology. Since this will occur before determining what data and analyses are needed by users, considerable effort could be spent analyzing data for which there is little or no demand. As the task list shows, identifying user requirements is not scheduled to occur until the latter phase of the contract.

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## Positive Effects of the NTC

Despite problems using NTC data for developing Army lessons learned, the Army has met its objective of providing realistic training. In addition, the NTC is affecting how units train at home stations. Several unit commanders we interviewed stated that as a result of their NTC experiences, they were training their soldiers under more realistic and rigorous conditions at their home stations than they had in the past. Most unit commanders we interviewed applied their NTC experience to home station training in various ways. For example, one infantry battalion commander said that his soldiers' previous training for breaching barriers consisted of merely knowing, not practicing, how to accomplish the task. However, the NTC demonstrated the importance of soldiers being able to quickly breach barriers. Consequently, the commander modified home station training and now requires soldiers to practice breaching barriers. Other unit commanders cited activities in which their units showed weaknesses during NTC training and said that they now included those activities in home station training plans and field exercises. Another unit commander scheduled a seminar series with each seminar focused on one problem identified during the unit's NTC training.

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## Conclusions

The NTC is a facility where units and soldiers train in an environment closely paralleling that of actual warfare. To this extent, the Army has clearly achieved one of its two primary objectives—providing training under realistic conditions. However, the NTC's full potential has not been realized because the Army cannot assess the effectiveness and efficiency of its organizations and weapon systems using NTC data.

The Army did not adequately define its analysis needs and corresponding data requirements, nor did it develop criteria for performance measurement before purchasing the NTC data collection system. As a result, the Army has spent millions of dollars collecting information which it is reluctant to rely on for developing Army-wide lessons.

learned, although some of the information has been quite useful in enhancing individual units' training experience

While the ARI contract should identify the data requirements necessary for measuring unit and weapon system effectiveness, the loss of battlefield data occurring because of the NTC instrumentation system's inability to record vehicle activities during movement along valleys and trenches is a continuing problem. Because of the difficulty the Army has encountered in collecting complete and reliable data from the battlefield, there is a question whether state-of-the-art technology can obtain the data needed for analysis.

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## Recommendations

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

- Once the contractor has determined the data requirements necessary for measuring unit and weapon system effectiveness at the NTC, determine the technological and economic feasibility of collecting such data in order to ensure that the data needed for analyses is available before resources are committed to data collection
- If objective data can be economically collected, establish a target date for implementing a system for data collection and analysis.
- If objective data collection is not technologically or economically feasible, determine whether the current data collection system is the most cost effective system for obtaining the information currently used or needed for units' after-action reviews.

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## Agency Comments

The Department of Defense agreed with each of our findings and recommendations. It said a decision on the technological and economic feasibility of collecting the data needed for measuring unit and weapon system effectiveness at the NTC is expected by July 1987. At that time, depending on the outcome of the feasibility of collecting required data, the Army will either establish a target date for implementing a data collection and analysis system, or determine the most cost-effective system to obtain data for units' after-action reviews

The Department of Defense also cited actions which have been taken to (1) clarify that training is the primary mission at the NTC, (2) improve the utility of objective data, and (3) establish lead and support responsibilities for lessons learned. Defense said the Army considers the primary

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**Chapter 2**  
**The Army Has Been Unable to Analyze**  
**Objective Data From NTC Exercises**

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mission of the NTC to be training, with data collection and analysis secondary. Accordingly, the Army is modifying an agreement between CAC and ARI, which outlines ARI responsibilities for developing NTC data collection and analysis requirements, to ensure this relationship is clear

Included among planned enhancements to the NTC instrumentation system, which are intended to improve the utility of objective data, are an expanded computer capacity and a coding system to identify exercise participants and provide more accurate matching of firing units and related targets. Finally, CAC and ARI have executed a formal agreement which establishes CAC's lead responsibility for lessons learned and outlines ARI's responsibilities for establishing data requirements and for data collection and analysis.

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# The Army Needs to Develop a System for Using Subjective Evaluations of NTC Results

Since early 1981 Army units have demonstrated many recurring problems during NTC exercises. However, the Army has not developed a system to identify their causes and initiate solutions. We alerted the Secretary of the Army in a March 1984 report<sup>1</sup> that potential systemic problems were being highlighted during NTC exercises.

Many subjective assessments of NTC exercises have been made since 1981; however, the Army has not consolidated them into a single list of NTC lessons learned or Army-wide recurring problems. Currently, the Army is developing a new system for consolidating subjective lessons learned from the NTC, as well as other major military exercises and combat experiences. When it is implemented, the Army will have, for the first time, a systematic way to obtain such information from NTC exercises.

## Past Assessments Have Lacked Structure

In addition to assessments of unit performance based on the objective data discussed in chapter 2, many subjective assessments of NTC exercises are made by Army officials based on individual observations and judgments. For example, since the NTC began operations in 1981, Army schools have sent subject matter experts (SMEs) to the NTC to observe exercises and evaluate the adequacy of training and doctrine. The SMEs, in some instances, have not been required to document their observations and, when they have, they have followed no structured format. CAC officials told us that SME reports had historically been too general and not always useful. However, CAC did not try to fully use this data source to help fulfill its NTC lessons-learned responsibilities until 1985. At that time, it established an SME trip report format and made SME trip reports mandatory. Therefore, while SMEs have observed NTC training since 1981, until recently their observations have been too unstructured to provide a basis for evaluation.

The five Army schools we visited emphasized the use of NTC information to evaluate the adequacy of training and doctrine to different degrees and in various ways. For example, the Armor School has initiated a project whereby it will review unit take-home packages to possibly identify recurring problems applicable to armor units. School officials hope that once the information is developed, it will provide a foundation for evaluating training that has not been provided from SME visits or from data CAC has collected in the past. In contrast, the Quartermaster School has

<sup>1</sup>Impact of the Army's National Training Center on Improving Individual Soldier and Unit Abilities (GAO/NSIAD-84-51 Mar. 2, 1984)

done little to obtain information on the effectiveness of training in its specialities. Most of the school's NTC feedback has come from only one NTC visit by school representatives.

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## Recurring Soldier and Unit Deficiencies Are Not Being Corrected

CAC receives subjective assessments of problems demonstrated during NTC exercises from participating units and NTC exercise observers. These assessments discuss unit strengths and weaknesses, how units overcame problems on the battlefield; and, sometimes, suggestions for improving doctrine and training. CAC has published articles on NTC lessons learned based on these subjective assessments and sent NTC exercise observer comments to the schools. However, CAC officials have stated they have not consolidated this information into one list of Army-wide recurring problems or developed a strategy for solving them.

The NTC, for example, has compiled three separate volumes of training observations that represent trends identified during training exercises. The first volume was compiled in March 1982 and covers training at the NTC from August 1981 to March 1982. A comparison of the 1982 NTC training trend assessment with current school and unit assessments shows that many of the problem areas identified in 1985 are the same as those identified in 1981 and 1982. Recurring weaknesses identified include:

- Command and Control
  - Inadequate planning time is allotted to subordinate commanders
  
- Maneuver Procedures
  - Units lack proficiency in conducting night operations
  - Unit commanders do not effectively use their scout elements
  
- Firepower
  - Commanders do not fully integrate artillery and mortar elements into mission plans.
  - Artillery support is not fully coordinated with maneuver plans
  
- Communications
  - Commanders and soldiers talk too frequently and too long on the radio

- Vital information is transmitted over the radio to the benefit of the enemy.

Nuclear/Biological/Chemical

- Chemical alarms are not effectively used
- Soldiers do not use prescribed decontamination procedures.

NTC officials pointed out, however, that in some cases there were differences in problem degree, with the more recent incidents being less severe. Data presented in the volumes were generally insufficient for us to determine the severity of the problems or to validate the statement that more recent occurrences are less severe

Several positive aspects in terms of lessons learned have been identified especially regarding units returning to the NTC. According to NTC officials, units which have trained at the NTC more than once have demonstrated improvements in several areas, including dealing with radio jamming, demonstrating knowledge of doctrine, and integrating key command personnel into mission planning and execution.

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## New System for Collecting and Consolidating Subjective Assessments

The CAC has recently initiated a new system for identifying subjective Army-wide lessons learned. This system—the Center for Army Lessons Learned (CALL)—will consolidate lessons learned from the NTC, major exercises, and actual engagements in one central location and analyze them to (1) identify trends, (2) identify training problems and their causes, (3) prioritize the problems, and (4) develop (or assign proponents to develop) solutions to them. According to Army officials, CAC plans to fully implement the CALL by fiscal year 1988.

As part of the CALL program, CAC is developing a systematic process for documenting lessons learned. According to CAC officials, SMEs will use a standardized data/observation collection format during NTC training observations. For the first time, the Army will have a systematic process for obtaining information on specific events since the observers' attention will be focused on issues selected by CAC. CAC tested this data collection approach in April 1985 and concluded it was an effective means of data collection. Further, CAC has used SME and NTC observer feedback to task several Army schools to study and resolve specific problems observed.



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## TRADOC Is Using the NTC Feedback System Funds for CALL

When CAC began developing CALL, TRADOC decided to fund it from the \$2.9 million programmed in fiscal year 1986 for the cancelled NTC Feedback System (See p. 13). CAC officials estimate that CALL will cost \$3.4 million through fiscal year 1991, with fiscal year 1986 costs estimated at \$600,000. Accordingly, funds programmed for the Feedback System exceed the amount required for CALL. Consequently, the Congress reduced the Army's fiscal year 1986 budget request for the Feedback System by \$2.3 million. This amount represents the difference between the total \$2.9 million requested for the system in fiscal year 1986 and the \$600,000 required for initial development of the CALL program.

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## Conclusions

The Army's subjective assessments of unit performance at the NTC indicate recurring problems. However, because the Army did not provide guidance to ensure that data collected would be comparable and complete, the assessments have not been as useful as they could have been in identifying specific causes of recurring problems.

The CALL system is designed to provide needed structure to the Army's subjective NTC assessment efforts, as well as a means to initiate problem solutions. We believe the systematic data collection aspects of CALL are critical to a sound lessons-learned program.

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## Agency Comments

The Department of Defense agreed with our findings and conclusions. It commented that the CALL, which includes an NTC Lessons Learned Division, has published two products: the NTC Commander's Memorandum, November 1985; and NTC Lessons Learned, January 1986.

# Comments From the Assistant Secretary of Defense, Force Management and Personnel

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

13 MAY 1986

Mr. Frank C. Conahan  
Director, National Security and  
International Affairs  
US General Accounting Office  
441 G Street, NW  
Washington, DC 20548

Dear Mr. Conahan:

This is the Department of Defense response to the GAO draft report, "Need for a Lessons-Learned System at the National Training Center," transmitted by your letter of April 2, 1986 (GAO Code 393089, OSD Case 6983). The Department's comments on each finding and recommendation in the draft report are at the enclosure.

The Department of Defense fully agrees with GAO's statements regarding the success of the National Training Center (NTC) in providing highly realistic, effective training for ground combat forces and supporting arms. The Department also agrees with GAO that the creation of systems for tactical data collection and analysis and the development and dissemination of lessons learned has lagged behind the original expectations. However, subsequent to the time that GAO completed its field work, the Army has made notable progress toward creating viable data collection, analysis and lessons-learned systems, as is explained in detail in the enclosure.

By and large, the Department of Defense considers the GAO report to be a very useful contribution to the realization of the NTC's full potential. The Department appreciates the opportunity to comment on the report.

Sincerely,

  
Chapman B. Cox

Enclosure

See comment 1

GAO DRAFT REPORT - DATED APRIL 2, 1986  
(GAO CODE 393089) - OSD CASE 6983

"NEED FOR A LESSONS-LEARNED SYSTEM AT THE  
NATIONAL TRAINING CENTER"

DEPARTMENT OF DEFENSE COMMENTS

\* \* \* \* \*

FINDINGS

- o **FINDING A: Positive Effects Of The National Training Center (NTC).** The GAO reported that the NTC was established at Fort Irwin, California in 1981 to (1) provide a place where Army units can undertake essential training that cannot be accomplished at home stations, and (2) enable the Army to objectively measure the effectiveness and efficiency of organizations and weapon systems. The GAO found that despite problems using NTC data for developing Army lessons learned, the Army has met its objective of providing realistic training. The GAO also found that the NTC is affecting how units train at home stations. For example, the GAO noted that several unit commanders interviewed stated their NTC experiences resulted in their training their soldiers under more realistic and rigorous conditions at their home stations than they had in the past. Further, other unit commanders cited activities in which their units showed weaknesses during NTC training and said that they now included those activities in home station training plans and field exercises. The GAO concluded that the NTC is a facility where units and soldiers train in an environment closely paralleling that of actual warfare and, to this extent, the Army has clearly achieved one of its two primary objectives--providing training under realistic conditions. (pp. 1-3, 14-15, GAO Draft Report)

Now on pp 8-9, 16

**DoD RESPONSE:** Concur.

- o **FINDING B: Lack Of Reliable Objective Data Precludes Army-Wide Assessments.** The GAO reported that as part of the Army's justification to the Congress for establishing the NTC, the Army stated it would collect objective data for measuring the effectiveness and efficiency of units, organizations, equipment, tactics and doctrine. The GAO noted that in 1981, the U.S. Army Training and Doctrine Command (TRADOC) delegated, to the U.S. Army Combined Arms Center (CAC), the responsibility for developing and disseminating NTC lessons learned. Further, the GAO noted

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that the TRADOC proposed an NTC Feedback System, which was expected to provide the Army the capability to extract, sort and manipulate NTC data, and make the data available to support Army-wide initiatives dealing with institutional and unit training trends, doctrine and force development. The GAO found, however, that in October 1984, the CAC recommended that TRADOC suspend the purchase of the NTC Feedback System and the proposed system was canceled. The CAC determined that the data was unreliable and incomplete, primarily because of the instrumentation system's inability to monitor and record battlefield vehicle activity during movement along valleys and trenches. The GAO found that despite the data deficiencies for overall analysis, the Army does use some of the data collected during NTC exercises for immediate unit feedback. The GAO concluded, however, that the NTC's full potential has not been realized--the Army cannot assess the effectiveness and efficiency of its organizations and weapon systems using NTC data. The GAO further concluded that after more than 3 years of data collection at a cost of more than \$42 million, the Army has been unable to use the objective data for overall effectiveness assessments of its organizations and weapon systems, or to identify Army-wide lessons learned. (pp. 7-11, 15-16, GAO Draft Report)

Now on pp 12-14, 16

**DoD RESPONSE:** Concur. For clarification, it should be noted that the Army, from the inception of the NTC proposal, has consistently considered the primary mission of the NTC to be training, with data collection and analysis secondary missions. Army Regulation 350-50, National Training Center, dated 15 March 1980, reads (in paragraph 5c), "The training environment will be paramount at the NTC. Data collection will be secondary to accomplishing training objectives." The delays and false starts described by GAO in the secondary data collection and analysis mission should not be allowed to overshadow the overall high performance of the NTC based on the success of its primary training mission. To assure that there is no question with respect to the primacy of training at the NTC, the Army is taking action to modify the September 1985 Letter of Agreement (LOA) between the Combined Arms Center (CAC) and the Army Research Institute (ARI) which outlines ARI responsibilities for developing NTC data collection and analysis requirements, to insure that the LOA reflects this priority.

With regard to the unreliability of the objective data, enhancements and upgrades to the NTC instrumentation systems are planned which should improve the utility of the data. These improvements include:

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- Expanded computer capacity and redesigned documented software.
- New software structure will allow for much more flexible data manipulation and for observer/controller input tied to Army Training and Evaluation Programs.
- Player identification coding to provide substantially more accurate pairing of each firing unit and its target.
- Substantially improved home station training capability.
- Integration of indirect fire, Army aviation/air defense, and nuclear-chemical play.

The majority of these improvements are funded in FY 1986; some are included in the FY 1987 budget. Target for full implementation of this package is March, 1988.

- o **FINDING C: The Army Has Not Defined The Information And Analysis Needed.** The GAO noted that according to Army officials, the emphasis to date has been directed primarily toward the training aspects of the NTC and developing the capability for providing units with immediate feedback. The GAO found that in December 1983, the CAC successfully tested a plan designed to measure unit performance in one of the eight NTC battle scenarios, and had planned to develop similar measurement parameters for the remaining battle scenarios, but this has not yet been done. According to the GAO, NTC officials have stated that the CAC's effort was stopped because of inadequate resources and because TRADOC tasked the Army Research Institute (ARI) to develop unit performance standards. The GAO concluded that a major reason the Army has not developed a means to objectively assess the effectiveness and efficiency of its organizations and weapon systems is the Army has yet to determine the specific types of data needed. The GAO further concluded that, as a result, the Army has been unable to accomplish one of its NTC objectives and has not fully capitalized on the NTC's potential. (pp. 7, 11-13, 15, GAO Draft Report)

Now on pp 12, 14-16

**DoD RESPONSE:** Concur. However, as noted in the DoD Response to Finding B, since the GAO visit a formal LOA has been signed between CAC and ARI. This LOA has established CAC's lead in the Lessons Learned arena and ARI's support of the mission. The LOA outlines ARI responsibilities and milestones for developing objective data requirements, a methodology for the use of NTC findings in doctrine, organization, equipment, and training development, and methods for continuing to improve the utility and quality of NTC data.

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- o **FINDING D: The Army Has Awarded A Contract To Accomplish Its 1979 Objectives.** The GAO noted the recognition in the 1979, NTC Development Plan that developing lessons learned was an important aspect of the NTC. The GAO found, however, that when the NTC became operational in July 1981, the Army had not developed the performance evaluation methodology outlined in the Development Plan. The GAO reported that in February 1985, the ARI awarded a 3-year, \$1.5 million contract to develop performance measures, evaluate the usefulness of NTC instrumented data for analyzing exercise results, and assist in developing an analysis methodology--the objectives of the 1979 Development Plan. The GAO further found that the contract includes the following tasks listed in the order they are to be accomplished: (1) designing methods for identifying and eliminating incorrect or incomplete information, (2) developing performance measures, task lists and analysis methodologies, (3) integrating home station training with NTC training, and (4) identifying user needs, including data collection and analysis requirements, desired formats, and information available to meet user needs. The GAO concluded that the sequence of contract work does not appear to be the most efficient way to proceed--data and analysis requirements should be determined first. The GAO also concluded that while the ARI contract should identify the data requirements necessary for measuring unit and weapon system effectiveness, the loss of battlefield data occurring because of the NTC instrumentation system's inability to record vehicle activities during movement along valleys and trenches is a continuing problem. The GAO further concluded that because of the difficulty the Army has encountered in collecting complete and reliable data from the battlefield, it is questionable whether even state-of-the-art technology can obtain the data needed for analysis. (pp. 11-12, 13-14, 16, GAO Draft Report)

Now on pp 14-16

**DoD RESPONSE:** Concur. As noted above, the LOA referred to in DoD Responses to Findings B and C lays out the master plan for bringing the data collection and analysis function fully on line, and changes the task prioritization as suggested by GAO to determine data and analysis requirements before further system design is effected. It should be noted that ARI worked to identify user needs as preparation for writing the contract Statement of Work and the LOA with CAC; further, the contract in fact required that research on user needs was to begin when the contract was let and this research did begin as planned.

- o **FINDING E: Subjective Assessments Have Lacked Structure And Unit Deficiencies Identified Are Not Being Corrected.** The GAO found that since the NTC began operations, various Army organizations have documented their subjective assessments

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of exercise results and shortcomings. The GAO further found that past assessments by subject matter experts (SME), participating units and exercise observers have lacked structure. The GAO did note a positive aspect of lessons learned--according to NTC officials, units that have trained at the NTC more than once have demonstrated improvements. The GAO found that the Army's subjective assessments of unit performance at the NTC indicate recurring problems. The GAO also found that the Army has not developed a system to identify the causes of the problems and initiate solutions. The GAO concluded that, because the Army did not provide guidance to ensure the data collected would be comparable and complete, the assessments have not been as useful as they could have been in identifying specific causes of recurring problems. (pp. 18-22, 24, GAO Draft Report)

Now on pp 20-22, 23

**DoD RESPONSE:** Concur. As noted in Finding F, the Center for Army Lessons Learned (CALL) has begun operations at Fort Leavenworth, Kansas. The CALL includes an NTC Lessons Learned Division which has published and distributed two products Army-wide: the NTC Commanders Memorandum, 20 November 1985, and NTC Lessons Learned, 31 January 1986. DoD anticipates that the CALL will correct the shortcomings identified in this finding.

- o **FINDING F: New System For Collecting And Consolidating Subjective Assessments.** The GAO found that the CAC has recently initiated a new system for identifying subjective Army-wide lessons learned--the Center for Army Lessons Learned (CALL) will consolidate lessons learned from the NTC, major exercises and actual engagements in one central location, and analyze them to identify trends, training problems, etc. Further, as part of the CALL program, the CAC is developing a systematic process for documenting lessons learned and SMEs will use a standardized data/observation collection format during NTC training observations with issues to be selected by the CAC. The GAO, therefore, concluded that for the first time, the Army will have a systematic process for obtaining information on specific events, which will provide needed structure to the Army's subjective NTC assessment efforts, as well as a means to initiate problem solution. The GAO further concluded that the systematic data collection aspects of CALL are critical to a sound lessons-learned program. (pp. 22-24, GAO Draft Report)

Now on pp 22-23

**DoD RESPONSE:** Concur.

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**RECOMMENDATIONS**

- o **RECOMMENDATION 1:** The GAO recommended that the Secretary of the Army, once the contractor has determined the data requirements necessary for measuring unit and weapon system effectiveness at the National Training Center, determine the technological and economic feasibility of collecting such data in order to ensure that the data needed for analysis is available before resources are committed to data collection. (pp. 16-17, GAO Draft Report)

**DoD RESPONSE:** Concur. It is anticipated that the Commander, Combined Arms Center, will make a recommendation on the technological and economic feasibility to the Commander, TRADOC, by 1 July 1987.

- o **RECOMMENDATION 2:** The GAO recommended that the Secretary of the Army, if objective data can be economically collected, establish a target data for implementing a system for data collection and analysis. (p. 17, GAO Draft Report)

**DoD RESPONSE:** Concur. A date will be set by Commander, TRADOC, if the decision in Recommendation 1 is to proceed.

- o **RECOMMENDATION 3:** The GAO recommended that the Secretary of the Army, if objective data collection is not technologically or economically feasible, determine whether the current data collection system is the most cost effective system for obtaining the information currently used or needed for units' after-action reviews. (p. 17, GAO Draft Report)

**DoD RESPONSE:** Concur. This action is already underway, as outlined by the CAC-ARI LOA, with an interim report due to CAC from ARI in July 1986.

Now on p 17

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The following are GAO comments on the letter from the Assistant Secretary of Defense dated May 13, 1986

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**GAO Comments**

1. The draft report title was changed to better portray the report's main message.



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