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The Identification and Prioritization of Light Infantry Research Issues

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had the greatest influence (i.e., squad, platoon, company, battalion, brigade, division, or corps).

From this analysis, 49 shortcomings were identified as critical to Light Infantry unit combat success. These shortcomings fell into five of the seven BOSSs. There was a general consensus on the importance of these shortcomings across the various data sources.

The shortcomings were prioritized, based in part on research feasibility and the expected benefits of the research in enhancing Light Infantry unit combat effectiveness.

14. SUBJECT TERMS (Continued)

Infantry issues and lessons learned (I²L²)
Army Lessons Learned Management Information System (ALLMIS)
Maneuver
Fire support
Mobility and survivability
Air defense
Combat service support
Command and control
Intelligence
Doctrine
Organization
Training
Material

THE IDENTIFICATION AND PRIORITIZATION OF LIGHT INFANTRY RESEARCH ISSUES

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THE IDENTIFICATION AND PRIORITIZATION OF LIGHT INFANTRY RESEARCH ISSUES

Introduction

The current contract between Litton Computer Services and the U.S. Army Research Institute, Fort Benning Field Unit (ARI) (MDA 903-88-C-0407) began in January, 1988. This report deals with the Light Infantry portion of that contract and summarizes significant doctrine and training findings (see Appendix A--briefing slides). The purpose of this report is to identify specific shortcomings and related issues in Light Infantry doctrine and training and establish a system for prioritizing these issues. This is a critical step in the development of meaningful research solutions for Light Infantry doctrine and training problems.

The adoption of the Light Infantry concept by the U.S. Army created unique demands ranging from training and doctrine requirements to integration of Light Infantry divisions into the AirLand Battle concept. Subsequent research will focus on improving Light Infantry force readiness through the development of enhanced training programs and procedures and more effective tactical doctrine.

An integral part of the present research has been to involve Infantry units in the identification of specific problems and issues. Information from Light Infantry units that have participated in this effort has influenced the identification of doctrine and training shortcomings and the prioritization of research issues established in this report.

Previous Efforts

Preliminary research identified a large pool of training and doctrine shortcomings. A content analysis (Weber, 1985) was performed to (a) reduce the list to those issues that had the most significant impact on Light Infantry units' capabilities to meet their missions, and (b) look for commonalities in the shortcomings that would allow them to be organized or grouped into categories that dealt with similar problems. In effect, these categories represented broad preliminary areas for possible research. Because these information sources have been dynamic, they will continue to stimulate future research activities. For this reason they will be discussed here. These sources include U.S. Army Light Infantry doctrine publications, unit-specific programs and information, U.S. Army Combined Arms Command (CAC) information, the Joint Readiness Training Center (JRTC) liaison officer (LNO) from the U.S. Army Infantry School, computerized data bases, and miscellaneous sources of information.

Sources Used to Identify Shortcomings

The primary source of Light Infantry doctrine was found in the U.S. Army's 7-70 series of field manuals (FM 7-70 Light Infantry Platoon/Squad, FM 7-71 Light Infantry Company, and FM 7-72 Light Infantry Battalion). Another source of Light Infantry doctrine has been the FM 7 series, (FM 7-8, The Infantry Platoon and Squad, FM 7-10, The Infantry Rifle Company, and FM 7-20, The Infantry Battalion), which are currently under revision by the Combined Arms and Tactics Department of the U.S. Army Infantry School. These field manuals will replace the FM 7-70 series of manuals that pertain only to Light Infantry units. The doctrinal content of this replacement series of manuals will be reviewed following distribution. This collection of documentation and the evolution of Light Infantry manuals reveals an on-going process. The findings and recommendations of this report will be influenced by further doctrinal changes.

Unit-specific training information is very important and the present research plan specified four visits annually to the 7th Infantry Division (Light), the 82nd Airborne Division, and the 29th Infantry Division (Light) National Guard. The purpose of these planned visits was to capture a unit's daily experiences from the environment in which they spend the preponderance of a training year. These visits were to provide the opportunity to identify training and doctrine shortcomings and to validate/verify information gained from other data sources. At each unit, information was to be examined concerning unit training, to include training schedules and results, Mission Essential Task Lists (METL), Army Training and Evaluation Programs (ARTEPS), Mission Training Plans (MTPs), tactical and nontactical training activities. Interviews of subject matter experts, primarily commanders down to the company level, were to confirm suspected training and doctrine shortcomings, eliminate others, and focus future efforts. The early termination of contract activities limited the scope of work and only one division was visited to provide user feedback to the proponent for doctrine and training literature.

The U.S. Army Combined Arms Command (CAC) was another important source of information. CAC is responsible for the Combat Training Centers (CTCs) which include the National Training Center (NTC) at Fort Irwin, California, JRTC at Fort Chaffee, Arkansas, the Battle Command Training Program (BCTP) at Fort Leavenworth, Kansas, and the Combat Maneuver Training Center (CMTC) at Hohenfels, Germany. Feedback to units from each CTC varies but critical information is contained in Take Home Packages (THPs), After Action Reviews (AARs), observer/controller written observations, Training and Evaluation Outlines (T&EOs), fire support summaries, and battle damage assessments. In addition, the Center for Army Lessons Learned (CALL), a subordinate element of CAC's Deputy Commanding General for

Training (CAC-TNG), plays a vital role in publishing lessons learned which are gleaned from unit experiences at each training center.

There are also computerized data bases that aid in the process of identifying training and doctrine shortcomings. Two of these data bases include the Infantry Issues and Lessons Learned (I2L2) analysis system (Directorate of Evaluation and Standardization [DOES], 1988) and the Army Lessons Learned Management Information System (ALLMIS) (ALLMIS, 1988). The I2L2 has been compiled and maintained by the Directorate of Evaluation and Standardization (DOES) of the U.S. Army Infantry School (USAIS). It is a data base which consists of a collection of current Infantry related observations and issues along with a directory program to assist the user in accessing information. The program provides access to an historical record of observations and issues including a variety of Army exercises and events which have been reviewed by CALL, Fort Leavenworth, and the USAIS, Fort Benning. The ALLMIS is a similar system that allows users to access historical records of observations made during Army exercises and events which are catalogued by exercise/event, functional area, mission, echelon, and other relevant key words. The I2L2 data base provided significant input for this report.

The I2L2 data base receives additions from various sources including the USAIS Infantry liaison team (ILT), which interacts with Infantry battalions worldwide to provide feedback to the USAIS. The ILT activities are orchestrated by a group of officers and enlisted personnel, permanently assigned to the Directorate of Evaluation and Standardization, USAIS. This group is augmented by subject matter experts from other directorates in the USAIS and from other sources in the U.S. Army as the total range of activities of battalions in the field are monitored. Particular attention has been given to the areas of organizational design, operational concept, adequacy of doctrinal and training products developed by the USAIS, and the full range of combat support and combat service support.

The directorates of the USAIS (DOES, Combined Arms and Tactics Department (CATD), Directorate of Combat Developments (DCD), and the Directorate of Training and Doctrine (DOTD) provide expertise to the ILT efforts. This work is also influenced by information from the units in the field by providing feedback to the USAIS which indicates how well materials are meeting the unit's training needs for maintaining combat readiness.

Observations made by observer/controller personnel at the NTC and the JRTC have been included in the I2L2. These observations were made during the most tactically realistic scenarios possible with soldiers training 24 hours a day. Units

rotating through the JRTC are battalion sized task forces complete with all typical attachments including combat support and combat service support elements. All JRTC missions are conducted against an opposing force (OPFOR) which is trained and equipped to fight Soviet and Soviet-satellite force doctrine and tactics. The bulk of observer/controllers are permanently assigned as cadre to the NTC and the JRTC and are well trained. For special-focus rotations at the NTC, additional experts from the branch schools are used to augment permanent O/C staff to collect information that is of interest to the school or specific proponent.

The CATD, USAIS, has provided a permanent liaison officer (LNO) who works exclusively with the JRTC. The JRTC LNO serves as the focal point to provide coordination and assistance between the USAIS and the JRTC and makes observations concerning the implementation of doctrine, training, organization, and equipment for the light forces training at the JRTC.

The JRTC LNO produced detailed accounts of his observations of each of the first five battalion task force rotations through JRTC (Wells, 1987a, 1987b, 1988a, 1988b, 1988c). These observations included interactions with JRTC O/Cs, summary notes from attendance at all levels of after action reviews (AARs), as well as actual observations of training. The JRTC LNO organized his observations into four categories: doctrine, training, organization, and material. These categories are useful in defining the nature of shortcomings and promote insights into how a particular problem may be addressed. This structure also helps to group particular types of problems together that are indicators of larger issues. The observation of the JRTC LNO served as crucial support for earlier research which was conducted that identified over 170 Light Infantry training and doctrine shortcomings. These shortcomings helped shape the research issues and directions which are refined in this report.

There were also miscellaneous sources of information that have included interviews with subject matter experts, trip reports of SMEs who have visited JRTC to observe training during focused rotations, and articles from training publications such as Army, Soldiers, Army Trainer, Infantry, and Military Review. These sources are often not formally cited because of limited specific relationship to the issue, but they frequently provide the first indication that a problem exists.

Accessing these sources of information to identify training and doctrine shortcomings has been an ongoing process. New information served to confirm/validate or revise current research issues, as well as identify new issues. By necessity, both short-term and long-term research issues have resulted from this process, depending upon the nature and scope of the identified training problem. Therefore, research issues have been

reevaluated regularly to ensure that maximum benefit can be delivered to the U.S. Army with efficient and appropriate investigations.

A large part of the effort to date has been spent identifying sources that allow access to emerging information outside the institutional or unit environments. For example, the Litton staff attended a workshop in May, 1988 that dealt with accessing and using the NTC database at the ARI Presidio of Monterey Field Unit. This workshop provided the necessary information to allow access to this database as well as the more recently established JRTC database. In addition, research staff members attended the Warfighter Exercise at Fort Lewis, Washington during September, 1988. This exercise was part of the BCTP, a division staff level simulation exercise exported from Fort Leavenworth, Kansas to regional training sites. Attendance allowed the observation of brigade and division staff activities. Finally, during April and May of 1989, researchers observed the Bold Thrust exercise conducted by the 7th Infantry Division (Light) at Fort Ord, California. The Bold Thrust exercise is a multi-echelon, force-on-force exercise that models the JRTC. Bold Thrust is a division managed external evaluation executed in accordance with the Battalion Training Management System (BTMS) using doctrinally accepted mission training plans (MTPs). Included in the exercise are several after action reviews designed to provide feedback to improve tactical and technical proficiency of soldiers within the exercising battalion. In effect, this exercise is the cornerstone of the 7th Infantry Division's training program. The examination of performance data from Bold Thrust is expected to provide illustrations for modeling training improvements and interventions for institutional and unit programs.

Method

Content Analysis

The initial review of Light Infantry data sources identified over 170 training and doctrinal shortcomings. A content analysis of the data resulted in the identification of 16 preliminary research issues. Judgments from contractor and institutional subject matter experts were used to select shortcomings based on the following criteria: (a) impact on the capability of the Light Infantry unit to train and accomplish its mission, (b) frequency of occurrence of the problem as indicated by several sources, (c) costs (i.e., time and resources) to remedy the problem and the benefits to be realized by the Army, (d) whether or not the training or doctrine shortcomings identified by a particular source had been corrected since publication of that source, and (e) appropriateness of the source as it applied to the identified shortcoming. These criteria were not equally applicable in all circumstances.

The most important criterion by far was the impact of the shortcoming on the capability of the Light Infantry unit to accomplish its mission. Each shortcoming was evaluated by this criterion. Not every potential shortcoming was compared to all of the other criteria listed; those shortcomings that had already been corrected (criterion d) did not appear in the report. The other criteria were used when they applied to the particular shortcoming under examination. Overall, the first criterion listed was the most important in influencing our decision to include the issue for further investigation

Once identified, shortcomings were then sorted into categories using a variation of the Q-Sort method (Nunnally, 1978 pp. 613-624). The list was examined and then sorted into categories on the basis of whether the shortcomings appeared to be more general or specific research issues. For example, several shortcomings dealt with very specific command and control problems, while others pertained to the common employment of crew served weapons.

This initial content analysis established categories based on any commonalities that might exist across issues on the list. The analysis produced the following sixteen categories:

1. Command and Control
2. Communications
3. Reconnaissance
4. Specific Light Infantry Doctrinal Publications
5. Joint Doctrinal Publications
6. Heavy/Light Force Integration
7. Ground and Air Mobility Assets
8. Engineer/Sapper Capabilities
9. Air Defense
10. Reduced Visibility Operations
11. Nuclear, Biological, and Chemical (NBC) Capability
12. Antiarmor Capability
13. Employment of Machineguns and SAWs
14. Employment of Mortars
15. Training Evaluation/Analysis
16. Soldier Load

Once these categories (of shortcomings) were established, it became evident that many of them were similar to the seven battlefield operating systems (BOSs) as outlined in the Training and Doctrine Command (TRADOC) Pamphlet 11-9. The BOSs have been adopted by the U.S. Army to structure unit training evaluation, doctrine development, and diagnostic evaluation of training developments. The seven BOSs are:

1. Maneuver
2. Fire Support
3. Air Defense

4. Command and Control
5. Intelligence
6. Mobility and Survivability
7. Combat Service Support

The BOSSs have been used in structuring the development of squad through brigade level MTPs and FM 25-100, Training the Force (1987), which is the capstone training document for corps and staffs down through the lowest echelon of command. Furthermore, feedback to units in the form of take-home packages from the JRTC and NTC are structured according to the seven BOSSs. Given these facts, the BOSSs were used to organize the list of shortcomings to define more clearly the research issues in terms comparable with feedback from the CTCs. Litton's research plan reflected this decision to incorporate the seven BOSSs to help identify Light Infantry training and doctrine shortcomings, develop them into research issues, and establish a priority for future research to provide solutions to the identified problems.

A second content analysis of the more than 170 shortcomings was completed. However, this sorting of the shortcomings into appropriate categories was guided by the structure of the battlefield functions and the hierarchical structuring of the tasks inherent to those functions. Most of the identified shortcomings were easily categorized using the BOSSs. Some shortcomings were dropped from the more recent list because some of them had been remedied. It became necessary to establish an additional category labeled training analysis. A final list of 154 shortcomings was identified.

The 154 shortcomings were then evaluated by 17 subject matter experts serving at division through battalion staff levels in the 7th Infantry Division (Light). The evaluation was made using the following criteria: (a) the overall importance of the shortcoming on the ability of the Light Infantry unit (squad through battalion) to successfully accomplish combat missions, (b) which BOS was influenced most by the shortcoming, (c) the nature or source of the shortcoming (i.e., doctrine, training, organization, or equipment problems), and (d) the level within the organization where a particular shortcoming had the greatest impact (i.e., squad, platoon, company, battalion, brigade, division, or corps).

After reviewing the evaluations made by the subject matter experts, the list was consolidated to 49 shortcomings that were considered to be "Critical" in terms of their effect on the ability of a Light Infantry unit to be successful in combat. The SMEs were able to categorize most of the identified shortcomings into five of the seven BOSSs.

These included maneuver, intelligence, mobility and survivability, combat service support, and command and control.

The additional category of training analysis was also included. The identification of shortcomings that are in the fire support and air defense BOSs can be anticipated as more understanding of the entire system is gained through CTC training. As indicated earlier, the data collection effort has been ongoing and there is little reason to believe there are no training and doctrine shortcomings in Light Infantry units that pertain to these two BOSs. The training scenarios at the CTCs are not as robust in the areas of air defense and fire support simulation as they need to be to exercise the full capabilities of the unit as it trains.

In the results section of this report, the list reflects the SME evaluations and is further organized into more specific research issues within each category. Many of the specific issues within each category clearly reflect the nature of the shortcoming (i.e., a problem with doctrine, training, organization, or equipment) and the subheading within the category reflects this. In other cases categories are not as clearly defined. For example, under the category heading combat service support there is a subheading entitled casualty evacuation because the shortcomings primarily deal with this particular aspect of combat service support and may not be uniquely either a defined doctrine or training issue. Additional investigations are required to determine what contributions doctrine and training each make to this shortcoming.

The discussion section provides a comprehensive examination of each research issue that resulted from these sequential analyses in terms of the nature of the problems, their criticality, and the approach to identifying and developing research solutions to these problems. The priority in which research solutions will be pursued is given certain resource restrictions. Because the BOSs provide the critical structural components, a description of each, including the training analysis category, is provided. The following definitions of the BOSs were drawn from TRADOC Pamphlet 11-9, Blueprint of the Battlefield (1988) and will be helpful in understanding the organization of the shortcomings list presented in the results section and in the subsequent discussion of the issues.

Battlefield Operating Systems (BOSs)

The BOSs are the major functions occurring on the battlefield, performed by the force, to successfully execute operations. BOSs should not be confused with Army branches or proponents. Despite the familiar branch-oriented terminology of the seven BOSs, each BOS includes functions performed by many segments of the force. Elements of the force are responsible for performing functions in several or all of the BOSs in the execution of assigned missions. The BOSs are areas of responsibility a force has with respect to accomplishing its

mission. For example, all echelons and units within a division must perform common functions in the Command and Control BOS.

For the most part, functional areas within a BOS are consistent with combat activities commonly associated with the titles of the BOSSs. However, a BOS may appear incomplete because some functions previously considered collectively are divided across two or more BOSSs. TRADOC Pamphlet 11-9 (1988) was used to guide our categorization and that document catalogues battlefield activities into logical functional relationships. Therefore, the gathering of all combat information is contained in the Intelligence BOS. The use of direct fires against ground targets through any means relates to the Maneuver BOS; command and control of operations is covered under the Command and Control BOS, and so on. The following descriptions of functions under each of the BOSSs show the core functions as well as the relationships that exist across BOSSs.

Maneuver BOS. Maneuver is the employment of forces on the battlefield through movement and direct fires in combination with fire support, or fire potential, to achieve a position of advantage in respect to enemy ground forces in order to accomplish the mission. The Maneuver BOS includes direct fire systems (e.g., small arms, tank main guns, and attack helicopter fires). It does not include indirect fires that are included under the Fire Support BOS.

The Maneuver BOS pertains to all forces. Support forces must move or maneuver on the battlefield in order to provide the support needed by the combat forces, Infantry, and Armor. Artillery forces must maneuver to be in the correct position to provide fire support. Signal, engineer, air defense, and combat service support units must be able to move with combat formations deep, close, or in the rear areas in order to support the battle.

The Maneuver BOS consists of three functions - move, engage the enemy, and control terrain. Movement includes the positioning and repositioning of forces (units and equipment) relative to the enemy, to secure or retain positional advantage, while making full use of terrain and formation. The positioning of forces may be on or below the surface. Other battlefield subfunctions of movement include terrain negotiation and navigation.

The function of Engaging the Enemy refers to entering into conflict or combat with the enemy using direct fire or close combat against ground targets. This is the lethal aspect of maneuver employing direct fire. Direct fires that are distinguished from close combat for analytical purposes include small arms, tanks, antitank guns and rockets, automatic weapons, directed energy weapons, and attack helicopter fires. Close

combat refers to those other lethal means for fighting in close quarters (e.g., bayonets and other hand weapons).

Controlling terrain is the third function of maneuver. Often combat forces are required to deny terrain to the enemy by physically occupying terrain and controlling its use through actual or potential direct fire.

Although an inherent part of maneuvering on the battlefield, indirect fires are included under the Fire Support BOS. Target acquisition is both an intelligence and fire support function and is included under the Intelligence and Fire Support BOSs. The movement of units, by whatever means, to include nonorganic transportation units, falls under the Maneuver BOS; but the movement of supplies, equipment, and individual personnel and material on a transportation conveyance by a service organization, is included in the Combat Service Support BOS.

Fire support BOS. The Fire Support BOS is the collective and coordinated use of target acquisition data, indirect fire weapons, armed aircraft (less attack helicopters), and other lethal and nonlethal means against ground targets in support of maneuver force operations. The fire support BOS includes artillery, mortar, naval gun fire, other nonlinear-of-sight fires, close air support, and electronic countermeasures.

The essential features of the Fire Support BOS are processing fire support ground targets and engaging ground targets. Processing ground targets consists of selecting the target and the appropriate engagement system and developing the fire order. The commander, in issuing planning guidance, decisions, concepts, and intentions under the Command and Control BOS, establishes the priority of supporting fires that control the prioritization of targets. Orders issued to execute fire missions are presented in the Command and Control BOS.

Air defense BOS. Air defense includes all measures designed to nullify or reduce the effectiveness of attack on the force by hostile aircraft or airborne missiles. This BOS includes all weapons systems with a potential to engage aerial targets.

The Air Defense BOS includes three major functions. The first function is processing of air targets (i.e., threat evaluation and engagement decisions at the fire unit level, based on pre-defined rules and procedures). The second function is attacking air targets by lethal or nonlethal means. The third function is denial of airspace. The lethal engagement of air targets can be with air defense artillery, other unit fires, or air-to-air systems. Nonlethal engagement of air targets primarily includes jamming of navigational aids and weapons guidance systems. As is the case with direct and indirect fires,

air defense target acquisition is included under the Intelligence BOS.

Command and control BOS. Command and Control is the exercise of authority and direction by a commander over assigned forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, facilities, and procedures employed by a commander in planning, directing, coordinating and controlling forces and operations in the accomplishment of the mission.

The U.S. Army's Command and Control operational concept is the basis for the Command and Control BOS. The concept states that the function of Command and Control is the process of generating and applying combat power decisively. The Command and Control BOS specifies those functions that military leaders must perform in making sound and timely decisions and in directing the activities of assigned and supporting units. Information is the medium of the Command and Control process, which results in two products, decisions and directives.

As in the Command and Control concept, the functions in the BOS are executed by every leader, at every echelon, in every functional area, using the Command and Control system available for the particular unit. The output of command and control at each echelon consists of orders which serve as input to the command and control process at lower echelons. The feedback from the lower echelon serves as part of the input to the command and control process at the next higher echelon.

The Command and Control BOS covers all command and control functions that are necessary to execute other BOS functions. In order to maneuver, a unit at any level needs command and control. To employ fire support, air defense, combat service support, and so on, Army organizations need command and control. Although the execution of the various Army functions and tasks is analyzed in the other BOSs, all command and control functions and tasks are analyzed under the Command and Control BOS.

Command and control is a process. It is the process of acquiring information, assessing whether any new actions are required, determining what these actions should be, and directing the appropriate action. Each command and control echelon continually acquires information about the mission, enemy, terrain, troops, and time (METT-T) through a variety of means. The information is sent and received while maintained in a form convenient to the decision-making process.

A distinction is made between the function of acquiring and communicating information and the intelligence function of collecting information. The command and control function of acquiring information is the exchange of METT-T data or

information with the command and control echelons under consideration. The intelligence function of collecting information refers to the process of collecting or generating enemy and terrain information from the battlefield environment.

Command and control is a continuous process. Courses of action are developed, analyzed, and a single course of action selected based on the information available. In subsequent command and control cycles, modification of the course of action and associated decisions based on newly acquired information is represented by the same functions in the Command and Control BOS. Also, because control is executed through the feedback of information and then assessment of that information, control of any mission is accomplished through the next iteration of the command and control cycle. However, a given command and control function need be analyzed only once to determine requirements and capabilities for that function regardless of the command and control cycle.

Intelligence BOS. The Intelligence BOS is the relationship of functions that generate knowledge of the enemy, weather, and geographical features required by a commander in planning and conducting combat operations. It is derived from an analysis of information on the enemy's capabilities, intentions, vulnerabilities, and the environment (FM 101-5-1).

The major functions within the Intelligence BOS are collecting information, processing that information, and preparing intelligence reports. Information is collected on the situation, to include the threat, physical/social/political, economic environments, and target acquisition.

In discussion of the Command and Control BOS, a distinction is made between the function of acquiring and communicating information and the intelligence function of collecting information. That same distinction is repeated here for clarity. The command and control function of acquiring information refers to the exchange of METT-T data or information. In contrast, the intelligence function of collecting information refers to the process of collecting or generating enemy, weather, and terrain information from the battlefield environment.

Other key features are noteworthy. Target damage assessment is a subfunction of "Collecting Target Information." Although the preparation of intelligence reports is a function of the Intelligence BOS, the preparation of intelligence reports is also a command and control function.

Mobility and survivability BOS. Mobility and survivability is the capability of the force that permits freedom of movement relative to the enemy while retaining the ability to accomplish its primary mission. The Mobility and Survivability BOS also

includes those measures that the force takes to remain effective and functional by protecting itself from the effects of enemy weapon systems and natural occurrences.

The mobility and survivability BOS includes all functions for enhancing friendly forces mobility (e.g., overcoming obstacles) and functions that enhance the effects of friendly weapon systems (e.g., channeling the enemy or stopping or slowing his movement). There is a very recognizable distinction between the Maneuver BOS and the Mobility and Survivability BOS. Specifically, the Maneuver BOS lists those functions pertaining to moving from positional advantage, whereas the Mobility and Survivability BOS lists those functions pertaining to enhancing friendly movement or degrading enemy movement which includes all measures for avoiding enemy detection and reducing the effects of enemy weapons (e.g., deception, OPSEC, and security).

Some of the functions associated with nuclear, biological, and chemical (NBC) activities are found in the Mobility and Survivability BOS. For example, actions taken to avoid NBC hazards, to protect individuals and systems during contact, and to remove these hazards after contact are covered under the function of Providing Battlefield Hazard Protection. Offensive NBC activities are covered for the most part in the Fire Support BOS under the function, Conduct a Nonlethal Attack.

Combat service support (CSS) BOS. The CSS BOS includes the support and assistance provided to sustain forces, primarily in the logistical, personnel services, and health services fields.

The CSS BOS contains functions and services required to man, arm, fuel, fix, and move the Army in combat operations. The CSS BOS also includes functions to build and maintain facilities and provide military police support. Manning includes the support operations that assure the uninterrupted flow of fighting men to the battle area and provides personnel services during operations. Manning includes field services, health services, administrative support, chaplaincy activities, morale support, and replacement operations. Arming is the provision of munitions to the weapon systems. Fueling is the provision of required fuels to weapon systems and other equipment. Fixing transcends maintenance in that it preserves the availability of weapon systems and equipment and includes the provision of repair parts. The distribution function pertains to providing all classes of supplies, equipment, and replacement personnel to the units when they are needed. The sustainment engineering function refers to the restoration, building, and maintaining of facilities that support combat operations. The maintenance of military law and order and the control of prisoners of war is provided by military police support.

The following category, training analysis, is not one of the BOSSs, but it has been found to be useful in organizing the list of shortcomings.

Training analysis. The goal of combat oriented training is to achieve combat readiness standards. Within the confines of reasonable safety and common sense, leaders must be willing to integrate smoke, noise, simulated NBC, battlefield debris, loss of key leaders, cold weather, and other realistic conditions into training. Leaders must demand this type of realism in training and seize every opportunity to move soldiers out of the classroom and into the field, to fire weapons, maneuver as a combined arms team, incorporate protective measures against enemy actions, and include joint and combined operations when possible. This training doctrine and philosophy was validated by the capstone training document FM 25-100, Training the Force, dated 15 November, 1988.

Light Infantry unit commanders and leaders train their units to meet Army Training and Evaluation Program (ARTEP) standards established for specific unit types. The ARTEP manuals contain assigned wartime missions and, as the title implies, direct that all training be evaluated and all evaluation is training. All training tasks in the ARTEP manuals have been finitely quantified with overt, measurable standards. Inherent to each of these tasks are a multitude of soldier, unit (collective), and leader tasks that, when performed to the specified standards, result in a unit's attaining the desired level of combat readiness. Mission training plans (MTPs) have recently given trainers a better focus on training to specific missions and provided much more "how to" information than have past training documents. The orchestration of this of this very complex training process provides a tremendous challenge to Light Infantry leadership.

Results

The list of 49 shortcomings that follows has been organized by BOS in the manner earlier described. They are basically listed in order of rated importance by topic and with an arbitrary cut off score of 3.50 (described below). There was considerable agreement among SMEs in the field concerning which BOS was most affected by a shortcoming and whether the shortcoming was primarily a problem in doctrine, organization, training, or material. There was less agreement concerning the level or echelon within the organization most affected by a shortcoming, but the majority of selections usually fell into one primary level with either the echelon above or below that level receiving the remaining responses.

To promote a more convenient understanding of the list, a set of letters and numbers at the end of each shortcoming is enclosed in brackets. The first entry in the set is the average

numerical rating of importance obtained from SMEs. The ratings of importance were scaled: 1 - Not at all Important, 2 - Slightly Important, 3 - Somewhat Important, 4 - Important, and 5 - Very Important.

The second entry in the set pertains to the BOS affected by the shortcoming and is coded in the following manner: MAN - Maneuver; FS - Fire Support; AD - Air Defense; C² - Command and Control; I - Intelligence; M/S - Mobility and Survivability; CSS - Combat Service Support;

The third entry in the set reflects the nature of the problem and is coded in the following manner: D - Doctrine; O - Organization; T - Training; M - Material.

The final entry indicates that level within the organization where a specific shortcoming has the greatest impact according to the majority of the SME evaluations. It is coded as: SQD - Squad; PLT - Platoon; CO - Company; BN - Battalion; BDE - Brigade; DIV - Division.

For example, if a shortcoming is followed by the notation [4.60 MAN T DIV], it indicates that the average numerical rating of importance for that shortcoming was 4.60 (important, and almost very important), that it affects the Maneuver BOS, it is primarily a training problem, and has the greatest impact at the division level. Please note, each shortcoming also includes citation of the original item source.

Maneuver/Training Analysis

The maneuver and training analysis categories are presented together since all training analysis shortcomings were judged to have their greatest impact on the maneuver BOS.

Antiarmor weapons. Antiarmor elements employed in the defense were not aware of a number of proven techniques for fire control that would enhance the use of thermal sights (Wells, 1987a) [4.70 MAN T CO].

Infantry has been unsuccessful to date in stopping enemy armor (Wells, 1987b) [4.50 MAN T BN].

Soldiers' loads continue to expend a soldier's strength prior to enemy contact. Many leaders are still tailoring soldiers' loads based on contingencies and not the mission. Much of this excess weight is due to poor load disciplines. The use of caches hampered a unit's flexibility and mobility, and poor vehicle load planning further complicated echelonment and the resupply of units (Wells, 1987b) [4.13 MAN T BN].

Direct fire. The employment of machineguns and squad automatic weapons is a lost art. Poor maintenance often causes malfunctions and there is a general failure to train machinegunners and employ them in a tactically correct manner (Wells, 1988a) [4.17 MAN T PLT].

The ability of the nine-man rifle squad to sustain casualties and remain an effective fighting force by providing both a base of fire and a maneuver element is limited (Wells, 1987a) [3.64 MAN O SQD].

Home station training (training analysis). Many units fail to train to the same high standards enforced at JRTC, which are the foundations of the Army Training and Evaluation Programs (ARTEPs) and the Mission Training Plans (MTPs) (Wells, 1987a) [4.23 MAN T BN].

All units rotating through JRTC have experienced training problems directly related to inadequate or unrealistic training at home station (Wells, 1987a) [3.69 MAN T BN].

Institutional training (training analysis). The Infantry Officer Advanced Course (IOAC) does not prepare officers sufficiently for Light Infantry operations (DOES, 1984) [4.20 MAN T CO].

The Infantry Officer Basic Course (IOBC) and the Armor Officer Basic Course (AOBC) students need to be better schooled in the employment of combined arms assets (DOES, 1986) [4.00 MAN T CO].

Command and Control

Leader training. The ability to get people motivated and get things done under stressful conditions continues to be a problem, especially at lower echelons. Soldiers who are physically tired and operating under adverse weather conditions require aggressive, positive, and determined leadership to remain effective (Wells, 1987b) [4.62 C² T PLT].

Leaders have demonstrated difficulty in grasping time-decision factors, the interface of troops and time available, and mission requirements (Wells, 1987a) [4.46 C² T BN].

During the rotations at JRTC, a number of leaders are killed and the chain of command is immediately reconstituted. Many subordinate leaders are found to be ill-prepared to accept such responsibilities (Wells, 1987a) [4.21 C² T CO].

Proficiency in the "tools of the tactician", such as the estimation/decision process, METT-T analysis and troop leading

procedures has been absent in all rotations at the JRTC (Wells, 1988a) [4.08 C² T BN].

Leaders and Infantry staff officers do not seem to grasp the doctrine of combat and combat support assets. There is a weakness across the board in the ability of dismounted units to operate as a combined arms team (Wells, 1987a) [3.82 C² T BN].

Communications equipment. Light Infantry units need a reliable, long-range radio for use in rugged terrain. The AN/PRC-77 radio is totally inadequate and should be replaced by the AN/PRC-70 or AN/PRC-104 radio (DOES, 1986) [4.40 C² M BN].

Light Infantry units operate in the most rugged terrain, frequently exceeding the capability of line-of-sight radios (Wells, 1987a) [4.31 C² M BN].

Light Infantry unit FM radios suffered range restrictions that have been attributed to dense jungle vegetation (DOES, 1986) [4.13 C² M BN].

Unit communications performance is being degraded on administrative, logistics, and brigade command nets. This deficiency is primarily the result of units not understanding the best location on the battlefield for a specific system to best operate and maximize capabilities. Additionally, radios that generally perform well are degraded in the terrain where light forces normally operate (Wells, 1988a) [4.08 C² M BN].

The Light Infantry battalion is authorized four miles of WD-1/TT communications wire. Tactical requirements for wire, to include manning of Observation/Listening Posts is approximately 12 to 15 miles of wire (Wells, 1987b) [4.00 C² M BN].

Staff involvement. All key personnel are not being involved in fire support planning and coordination; nor are all fire support assets being planned for and orchestrated (Wells, 1988a) [4.25 FS T BN].

The battalion signal officer is frequently left out of the staff planning sequence. Use of staff officers to assist the commander in maintaining contact with actions on the ground is generally weak; particularly with the S2 and S3 (Wells, 1988a) [3.64 C² T BN].

Commander's intent/orders. Commanders are having difficulty with the commander's intent in terms of giving subordinates freedom of action but retaining the control necessary to synchronize the overall effort (Wells, 1988a) [4.08 C² T BN].

Mission orders have been used to justify loose and incomplete staff work and poor or inadequate staff coordination in almost every rotation at every level. Commander's intent has either been inadequately expressed or has contributed little to mission accomplishment. This has been due to an inadequately expressed concept, insufficiently supported by graphics. Mission-type orders without a clear concept and proper coordination are particularly dangerous at lower levels where inexperience is the rule (Wells, 1988a) [3.80 C² T BN].

A number of training units are departing from utilizing the five paragraph field order format at company and battalion level. Some key information is being lost due to this practice (Wells, 1987a) [3.71 C² T CO].

Intelligence

Reconnaissance/scout platoons. Scout platoons were ineffective in the bulk of battalion operations. Severe problems exist in the doctrine, training, and equipment areas (Wells, 1987b) [4.60 I T BN].

Scouts are difficult to employ in traditional missions without transportation. This particularly impacts on scouts being employed in the right area quickly and the ability to carry enough support for extended operations (Wells, 1988a) [3.73 I T&M BN].

Reconnaissance elements are operating with too much printed operational and Signal Operating Instruction (SOI) information while in hostile terrain (Wells, 1987b) [3.73 I T CO].

Equipment problems. Infantry scouts lack the mobility and communications assets to accomplish assigned missions (Wells, 1987a) [4.20 I M BN].

A scout platoon is authorized one AN/PRC-77 radio. Scout squads have no radio by TO&E and the platoon's AN/PRC-77 has great difficulty communicating with the Tactical Operations Center when operating in rugged terrain (Wells, 1987b) [4.10 I M BN].

Organization. Reconnaissance units are being tasked with more missions than they have the capability to perform simultaneously (Wells, 1988a) [4.20 I O BN].

A Light Infantry battalion's scout platoon is too small (18 personnel) to effectively cover the battalion's area of operations (Wells, 1987a) [3.60 I O BN].

Mobility/Survivability

Training. Two of four battalion task forces have not used engineers effectively in the defense. Exact siting of obstacles, prioritization of engineer work, and formulation of obstacle plans have been poorly done because of lack of early coordination and face-to-face planning (Wells, 1988a) [4.27 M/S T BN].

When heavy forces (armor/mechanized) pass through light forces, more coordination is required because light forces lack the mine clearing equipment possessed by heavy forces (DOES, 1986) [3.82 M/S T BN].

Every unit to date has demonstrated a general lack of knowledge on the employment restrictions for a Family of Scatterable Mines (FASCAM) field. Unit commanders do not have a grasp on the length of time required to seize an objective, or accurately determine movement times (Wells, 1987a) [3.75 M/S T BN].

Nuclear, biological, and chemical (NBC) capability. Light Infantry has an inherent vulnerability when operating in a potential NBC environment due to limited carrying capacity and limited decontamination capability. Based on METT-T, the Light Infantry commander will have to make a risk assessment of his protective posture. MOPP IV is an additional burden for an overloaded soldier. The heavy task force can assist Light Infantry by carrying or providing replacement protective clothing as forces link up and provide decontamination support (DOES, 1986) [4.08 M/S D BDE/BN].

Light forces units have limited potential for survival in a chemical environment due to limited carrying capacity for MOPP-IV equipment and no decontamination capability (DOES, 1986) [3.92 M/S M BN].

Equipment. Light engineer squads have no mobility with which to transport barrier material and supplies from stock points to construction sites (Wells, 1987a) [4.00 M/S M BN].

The Light Infantry has only one means of breaching wire and mines rapidly; that being the M1A1 Bangalore Torpedo. This device is slow to employ, heavy, cumbersome, and must frequently be put together and emplaced under fire (Wells, 1988a) [3.92 M/S M BN/CO].

Doctrine. Current engineer manuals focus primarily on the mechanized force. There is very little light engineer doctrine (e.g., how to conduct a "covert" breach) (Wells, 1988a) [3.83 M/S D CO].

A best general purpose prepackaged barrier and survivability package needs to be developed for Infantry units by the Engineer School and Logistics Center. There is no standardization in current planning and content of these packages (Wells, 1987a) [3.71 M/S D BN].

There is no light company or battalion doctrine for breaching enemy obstacles (Wells, 1988a) [3.60 M/S D BN/CO].

Combat Service Support

Casualty evacuation. During decentralized operations, there is insufficient haul capability in the Light Infantry battalion to move casualties and push forward required logistical support (Wells, 1987b) [4.87 CSS M BN].

Light Infantry companies experience significant difficulties in evacuating casualties in a timely manner. This is due to a lack of TO&E vehicles (Wells, 1988a) [4.36 CSS M BN].

Training. In situations involving high numbers of casualties and limited transportation for evacuation, units training must include more combat lifesaver training (Wells, 1987a) [4.60 CSS T CO].

When units make contact and a hasty attack is launched, the handling of casualties has not been rehearsed, nor have actions been clearly established to recover personnel (Wells, 1987b) [4.23 CSS T CO].

Units have extreme difficulty in processing and evacuating prisoners of war and casualties. Although there are some equipment shortcomings, most fundamental to this problem is the failure to train and plan adequately (Wells, 1987b) [3.83 CSS T CO].

Communications. A Light Infantry battalion aid station cannot communicate by FM radio with the forward support medical company. The battalion aid stations require a capable radio from the medical battalion in order to coordinate the timely evacuation of casualties (DOES, 1986) [4.38 CSS M BN].

Support platoon vehicles do not have a communications capability. In decentralized operations it is difficult to consolidate assets or shift the logistics effort (Wells, 1987b) [4.13 CSS M BN].

The administrative/logistic net between the combat trains and the field trains is established using AN/PRC-77 radios. The 8 kilometer range of this radio is inadequate for the required task (Wells, 1987b) [4.08 CSS M BN].

This list of 49 shortcomings represents a consensus between the USAIS database, research staff subject matter experts' determinations, and Light Infantry Division command and staff personnel concerning the importance or criticality to Light Infantry operations. This list was developed specifically to identify areas of institutional and unit consensus. It does not necessarily reflect all the appropriate issues that could be considered for establishing research priorities, but rather those which are seen as having a high probability of payoff and user determined validity.

Discussion

All the 49 shortcomings noted fit into four areas: doctrine, training, organization, and material. Within this list, the priority for possible research is influenced by the following rationale. To a large extent, training has some degree of involvement with almost every issue. A leader trainer, or subject matter expert has noticed something wrong during observations at the CTC and this is usually recorded as a training deficiency. Therefore, logically, the first point of examination is the training itself. Is there something problematic in the way training is being conducted that would result in the shortcoming occurring as noted? If so, the most appropriate approach to alleviating the problem is to alter that training, wherever it is occurring (in the institution, home station, NTC, JRTC, etc.). While the first operational component is sound doctrine, training is in this situation (the CTC) the primary consideration. The first priority then is, "Is training being conducted properly and effectively?"

The next logical question to be asked, if appropriate, is: "Given that training is being done according to published doctrine (if indeed it is), is there something incorrect or missing in the doctrine?" The translation from doctrine to effective training development is a critical and complex task. The observations at the CTCs can provide feedback for doctrinal as well as training improvements. Doctrinal issues that have been identified will be referred to the proponent (USAIS) for investigation.

After addressing problems with doctrine and training, identified shortcomings in organization and material must be evaluated by the appropriate proponents. Relatively speaking, it may be much more difficult to make rapid changes in these two areas. Materiel acquisition and manpower requirement changes are lengthy processes. Problems with organizational structure are often difficult to identify and remedy. ARI does not make decisions to change organizational structure (e.g., the number of soldiers in a particular crew) and can only make recommendations for changes in structure based on findings from research. Organizational problems that have been identified will be

communicated to the Infantry proponent which can address the issues to determine what changes are needed.

Materiel problems pose a similar dilemma. The identification of problems can be communicated to the proponent where training solutions prove insufficient in addressing materiel based shortcomings. Materiel related issues are typically associated with training shortcomings that result from lack or misuse of equipment. These issues can be resolved by implementing training interventions designed to overcome equipment limitations whenever possible. These fixes have the potential to be straightforward and can remedy very serious operational problems. Proper identification of the underlying source of the problem is important. For example, a radio with limited range that is employed in terrain that restricts the operating range of communication systems can erroneously be labeled a serious training shortcoming. Broken communications might be misconstrued as a lack of training (i.e., the operator not knowing that a message should have been sent at a particular time or not knowing how to operate the radio) when indeed both equipment and employment training come into play.

Key research issues are described in the Summary section. Those issues requiring additional elaboration are addressed in the specific sections which follow.

Combat Service Support

Combat Service Support (CSS) shortcomings were considered very important by the Infantry subject matter experts. There were three primary CSS issues identified and agreed to have both institutional and unit sources. They include casualty evacuation, training and communications.

At the root of the casualty evacuation problem is the insufficient transport capability in the Light Infantry battalion's Table of Organization and Equipment (TO&E). This deficiency does not permit casualties to be moved in a timely manner and is exacerbated by the corresponding inability to move logistical support forward. Most subject matter experts believed this situation, which has the most deleterious effect at battalion level, was basically an equipment problem resulting from a lack of TO&E vehicles. It is equally appropriate to consider this an organizational problem because it is the absence of transport equipment which contributes to the problem. The core issue in this circumstance is materiel and is organizationally based.

There were three shortcomings that provided indications that there were some CSS training problems as well. In situations involving large numbers of casualties (in addition to a lack of vehicles for transporting casualties) units were not employing

enough combat lifesaver training skills. It was also noted that units had trouble processing casualties and captured enemy prisoners of war (EPWs). Situations involving enemy contact and subsequent hasty attacks were specifically identified as producing these types of collective personnel disposition problems. Subject matter experts agreed that these were problems resulting from not having rehearsed (trained) these types of activities enough to master them under time constrained and stressful conditions. Also, it was felt by most of the SMEs that these types of CSS training problems would most likely affect performance with the company.

The third consensus CSS issue, communications, has been identified as essentially being an equipment problem affecting operations within the battalion. It was noted that a Light Infantry battalion aid station could not communicate via FM radio with the forward support medical company because of the limited range of the AN/PRC-77 radio. Likewise, the eight kilometer range of this radio is not sufficient to support the administrative/logistic net requirements to communicate between the combat trains and the field trains. The support platoons in Light Infantry battalions have a different problem (i.e., an organizational problem) because they do not have a communications capability at all.

Even though there are some apparent equipment shortcomings, there seems to be a lack of ability for Light Infantry units to sustain casualties and continue to function in an efficient manner. It will be necessary to evaluate unit training records to determine whether emphasis is given to this training and to determine if the scenarios simulate the problems well enough to prepare units for the scenarios they encounter at JRTC.

Maneuver

Light Infantry battalions training at the NTC and JRTC have experienced several problems dealing with tasks that are maneuver BOS functions. These problems deal with antiarmor weapons, general training, land navigation, soldier load, and direct fire activities.

Shortcomings dealing with antiarmor weapons represent training, materiel, and organization problems. The Light Infantry antiarmor weapons, the TOW and DRAGON, have been found to be lacking when used in restricted terrain and during times of reduced visibility. This is ironic because these conditions typically enhance the general capabilities of light, dismounted forces. In relatively close compartmented terrain TOW and DRAGON weapons systems have reduced effectiveness because their wire-guided systems can be hindered by natural obstacles. Limited visibility can commonly effect the Multi-purpose Integrated Laser Engagement System (MILES) differently than it does the actual

weapon. Furthermore, some antiarmor elements employed in the defense were not aware of a number of proven techniques for fire control that would have enhanced the use of thermal sights. This is clearly an area where training improvements can be explored.

The TOW and DRAGON systems are also far too heavy to be easily managed by dismounted soldiers moving for great distances where stealth is paramount and no vehicle support is involved. In addition, the three-man TOW crew consisting of a leader, gunner, and loader are unable to provide security during sustained operations. If casualties were sustained, the crew could not continue the mission. This may require doctrinal, organizational, and materiel investigations.

Maneuver training problems were also identified. For example, the after action reviews of two light units training at the JRTC exhibited a serious level of inexperience in training for rapid deployment by air; unit commanders frequently did not properly estimate the amount of time needed to seize an objective with plans sometimes showing time requirement underestimations of 50 percent. Battalion and company commanders had difficulty in maneuvering units in the field to accomplish unity of effort through orchestration of assigned or attached assets.

Light Infantry units at the JRTC have routinely demonstrated problems with land navigation, especially at the junior leader level. In decentralizing unit control, particularly at the platoon and squad levels during the conduct of search, attack, and infiltration missions, lesser experienced soldiers were ill prepared for land navigation responsibilities. In numerous instances these leaders have neither been adequately trained in the basics of navigation at institutional courses nor have they been in a leadership position long enough to acquire, practice, and maintain these skills. Night operations in a decentralized mode have invariably resulted in confusion and fratricide. Insufficient reconnaissance and the misuse of night vision devices (NVDs) further degrade a unit's ability to accurately position itself on the terrain.

Many units have corrected the problem of tailoring a soldier's load so that physical capabilities can be maximized. However, the lack of organic transportation assets to the rifle company for carrying part of a soldier's load and poor vehicle load planning of externally supplied transportation continues to complicate the issue of unit resupply.

The effective employment of direct fire using machine guns and squad automatic weapons (SAWS) has been severely degraded in the Light Infantry rifle platoons. The machine gun section is composed of two M60 machine guns with a gunner and assistant gunner assigned to each gun. There is not a dedicated noncommissioned officer (squad leader) responsible for the

technical and tactical training and employment of the machine gun section.

The organizational structure of the light platoon limits the ability of the machine gun crews to carry the required ammunition and equipment, position and control the weapons, and deliver consistent and sustained supporting fires for the platoon. The automatic fire in the squad is provided by the SAW. The disciplined use of ammunition is a critical skill that gunners must learn because of limited carrying capacity within the squad to support the SAWs.

The continuous unsatisfactory state of maintenance of the machineguns is another serious issue that has been noted. Poor maintenance often results in malfunctions of the weapons and relates very strongly to the failure to have a dedicated leader and trainer (NCO) of the crews on a daily basis. When a chain of command responsibility is not emphasized, training and maintenance suffer. Weapons effectiveness is further reduced from a frequent failure to utilize NVDS properly. According to observations confirmed by units, NVDS have often not been carried, have not been zeroed during daylight, nor properly mounted on the weapons.

These issues pose some interesting questions:

- The equipment problems related to antiarmor weapons in Light Infantry units exist primarily because the weapons systems are too heavy and do not function well in environments best suited for Light Infantry units (close terrain). Are there alternatives available? Could the current shortcomings in the employment of these weapons be overcome by different training? Does the organization of the crew need to be changed? If so, what is the optimum crew size? Is it feasible to include more vehicles to support these weapons?

- Are land navigation skills not acquired at the institutional training level or is it more a matter that skills decay over time? What is the best program for Light Infantry units to use to ensure that land navigation skills are retained?

- What is at the heart of the problem of tailoring soldiers' loads? Does the commander give clear guidance concerning the load requirements based on the primary mission or specified contingencies? Is there a lack of confidence or experience concerning resupply capabilities that leads to overloading?

- Is the lack of training in the correct tactical employment of machine guns and SAWs simply attributable to the lack of a noncommissioned officer responsible for training?

- Is the size and organization of the nine-man rifle squad sufficient to accomplish the assigned missions?

- Are maintenance problems the result of insufficient or inappropriate training or a lack of funds available to maintain the equipment?

- What is the cause of leaders not being able to accurately assess the time needed to accomplish different tasks? Is it primarily a doctrinal or training problem, or both?

Command and Control

There were four primary Command and Control (C²) issues that were identified. They dealt with leader training, communications equipment, staff involvement, and commander's intent/orders. The most critical of these issues is leader training.

Problems in leader training continue to center around the ability of the unit leader to motivate soldiers and accomplish assigned tasks under stressful conditions, specifically at lower echelons. Factors identified as contributing to poor leader performance included: 1) difficulty in grasping time-decision factors, the interface of troops and time available; 2) lack of proficiency in such critical skills as estimation/decision processes, METT-T analysis, and troop leading procedures; 3) inability of leaders and staff officers to effectively employ the doctrine of combat and combat support assets; and 4) lack of understanding of the interrelationships among staff roles.

These problems indicate that further investigations need to be made to determine the degree to which doctrine and training have contributed to this situation. The leader preparation issue holds great potential for developing training enhancements to improve current doctrinal understanding and applications. In addition, there may be a need to develop specific training aids to teach these skills in a manner that would encourage better retention of skills under pressure. There also may be some utility in developing job aids for the skills that would serve as a quick reference document to stimulate memory for use in highly stressful situations or sustained operations where fatigue may be a major factor.

Intelligence

There were three noted types of shortcomings that limited the effectiveness of battlefield intelligence. They were related to reconnaissance/scout platoon activities, equipment, and organization. The most serious problem was that scout platoons have been somewhat ineffective in the majority of battalion

operations at the JRTC. This has been due in part to problems with doctrine, training, and equipment. Transportation limitations contribute to the reconnaissance problem because Light Infantry units do not have enough transportation assets to quickly employ their scouts. In addition, reconnaissance elements have been found to be operating with too much printed operational and SOI information in their possession while in hostile terrain. These issues raise several potential research questions: What has occurred or not occurred that has rendered scout platoons ineffective? Are the problems attributed primarily to doctrine, training, or equipment? Is the employment doctrine adequate? If so, are the observed problems due to lack of training at home station or other factors such as poor intelligence preparation of the battlefield?

Communications problems focus on the use of the AN/PRC-77 radio. A scout platoon is authorized only one AN/PRC-77 radio and scout squads have no radio by TO&E. The range limitation of the authorized radio affects the capability of the battalion's intelligence gathering assets in the scout platoon and degrades overall battalion capabilities. The availability of only one radio limits timely coordination and integration of intelligence assets.

The relatively small size of the Light Infantry battalion's scout platoon is viewed as the major reason for its inability to effectively cover the battalion's area of operations and accomplish simultaneous mission taskings. Even though some of these problems can be classified as organization problems, other training related questions remain:

- How can these reconnaissance units be better prepared to face heavy taskings?
- What are some alternatives to overcome the limitations of the current 18 man structure of the scout platoon?
- Are there adequate guidelines enunciated in doctrinal manuals concerning "how much information" is appropriate to be carried by the units when in hostile terrain?
- Can the battalion enhance its capacity to gather intelligence within the current transportation and communications constraints? How can its assets be optimized for better intelligence preparation of the battlefield?

Summary

As stated earlier, the focus of research activities is on training shortcomings. As the issues were examined, it became apparent that many of the problems are interrelated. For example, several problems are caused by the austere

organizational structure (i.e., limited number of vehicles and other equipment) of Light Infantry units. However, this is the limitation accepted in the tradeoff to have a light, responsive force (if provided with deployment transportation). This does not mean that equipment problems such as the limitations of the AN/PRC-77 radio and engineering needs should be neglected. The emphasis of this program is on training interventions that can reduce problems through applied research.

It is beneficial to reiterate those specific research issues which hold the most potential for being influenced by intervention efforts. The present goal is to define more clearly the areas of research that will produce products or provide information that will benefit Light Infantry soldiers. The following order of presentation represents the priority with which this goal can be pursued to produce effective research solutions.

In the combat service support area, casualty evacuation problems exist that are caused in part by the lack of transportation capability. However, there also has been a lack of combat lifesaving skills and an inability to handle EPWs adequately which are more indicative of corrective training problems. There is a need to investigate why these skills are not present or why, if they do exist, they are not being used when they are most needed.

It is difficult to be seen as an effective combat leader if realistic estimates of the time required to complete tasks can not be made. This problem warrants a thorough analysis of the relevant doctrine and training to determine where interventions are appropriate.

Another maneuver training problem is the inadequate land navigation skills noted during exercises. Are soldiers graduating from courses such as the Primary Leadership Development Course (PLDC), Basic Non-Commissioned Officer Course (BNCOC), Advanced Non-Commissioned Officer Course (ANCOC), Infantry Officer Basic Course (IOBC), and Officer Candidate School (OCS) with the skills they need? If so, is demonstrated poor navigation just a matter of skill decay? Furthermore, night operations apparently complicate these problems. It may be worthwhile to examine how land navigation is taught for night operations (and practiced) and how much emphasis is placed on the use of NVDs.

Soldier load is another problem that affects maneuver. Generally, overloading Light Infantry soldiers quickly degrades the maneuver capability of units. This is a training problem that possibly can be solved by teaching commanders to clearly identify battlefield contingencies in a realistic manner. This is indeed a skill more complicated than it appears which should

be developed as a command matures. A thorough analysis of doctrine and how it is currently translated through training is needed for this problem. A simple job aid may be required to remedy this problem if adequate doctrine and training already exist to develop these skills.

Command and control issues are clearly centered around the behaviors of leaders. Command and control is an extremely complicated process that collectively represents one of the biggest training challenges to the U.S. Army. When leaders have difficulty in grasping estimation/decision processes, conducting METT-T analyses, utilizing troop leading procedures, or clearly establishing the commander's intent through proper orders, it is an indication that training may not be as effective as it should be. It is somewhat easy to describe, via doctrine, the general process of command and control. It is, however, much more difficult to develop specific training programs and procedures which cultivate these skills. Close observation and evaluation of training which has been designed to promote the acquisition of these skills will reveal opportunities to develop training content and related job aids that will facilitate the learning process and promote skill retention. Once again, job aids for some of these skills might serve a useful purpose in highly stressful situations or during sustained operations where fatigue may degrade performance. Simple job aids could help integrate new and inexperienced staff members into functioning staff organizations.

One of the most intriguing areas for research concerns intelligence. Why have scout platoons been relatively ineffective at the JRTC? Is it simply a matter of too few vehicles and limited quantity and inadequate communications equipment? Is the scout platoon too small to perform battalion reconnaissance missions (i.e., 18 personnel)? How the activities related to gathering and utilizing intelligence are accomplished and then integrated into the command and control process needs to be thoroughly analyzed. This analysis would include such issues as scout platoon size and that factor's influence on the performance of intelligence gathering; home station exercises that emphasize practice and integration of the intelligence preparation of the battlefield (IPB) process; and other sources of data to confirm that problems with intelligence occur in places other than the JRTC.

Mobility and survivability issues were somewhat more varied than others. It is important to learn more about how engineers and their skills are incorporated into the planning process and how effectively these assets are actually used. In addition, Light Infantry units will most likely have to coordinate with heavy forces in the event of a mid-level conflict and the engineering coordination between them has to be well managed and competent. There seems to be room for improvement with both

these tasks. One of the most serious problems concerns NBC capability. There does not seem to be a straightforward answer to that problem. The only argument against this statement is that Light Infantry units typically might not be deployed in the types of conflicts that entail a high probability of the use of NBC weapons.

Virtually all of the issues related to training analysis need to be closely scrutinized at both home station and the institutional school level. Many of the issues noted serve to provide more specific clues as to what to look for when evaluating specific components of home station and institutional training.

Conclusion

This report identifies potential Light Infantry research issues and questions that, if answered, will contribute to enhancing combat readiness. The process of establishing issues is not complete and cannot be accomplished quickly. An extensive list of potential training and doctrinal shortcomings was identified and narrowed to those validated as most serious by the subject matter experts from institutional, unit, and combat training center settings. These have been classified into seven major areas according to the battlefield operating systems and organized into 21 more specific research issues within the areas. This identification and classification process remains dynamic as new information is routinely gained that both challenges and confirms aspects of what has been accomplished to date. The next step in this process is to take each research issue and systematically ask whether related research will provide practical, useful results that enhance Light Infantry readiness. The extent of the research activities undertaken will be determined by priorities and available resources.

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Appendix

THE IDENTIFICATION AND PRIORITIZATION OF LIGHT INFANTRY RESEARCH ISSUES

**DOCTRINE, TRAINING LITERATURE, UNIT OBSERVATIONS, LESSONS LEARNED (CALL), AND
SUBJECT MATTER EXPERT INTERVIEW SOURCES**

MORE THAN 170 SHORTCOMINGS WERE IDENTIFIED AND PRIORITIZED

ISSUES WERE INITIALLY CATEGORIZED AND PRIORITIZED BY:

- INITIAL CONTENT ANALYSIS - IMPACT ON CAPABILITY TO PERFORM MISSION**
- FREQUENCY OF OCCURRENCE/EXTENT OF DEFICIENCY**
- COSTS TO CORRECT THE PROBLEM**

SHORTCOMING PRIORITIZATION

AFTER REVIEW, 49 SHORTCOMINGS WERE CONSIDERED CRITICAL AND CATEGORIZED BY:

SME WEIGHTED ISSUE PRIORITY - MOST CRITICAL TO MISSION CAPABILITY

BATTLEFIELD OPERATING SYSTEM AFFECTED

ECHELON - UNIT LEVEL MOST LIKELY AFFECTED BY SHORTCOMING

SHORTCOMING SUMMARY

ALL 49 PRIORITY ISSUES FIT INTO 16 CATEGORIES:

	BN	CO	PLT	SQD
DOCTRINE	2*	2*		
TRAINING	17*	9	2	
ORGANIZATION	2			1
MATERIAL	17	1		
	38*	12*	2	1

*SOME ITEMS FIT MULTIPLE CATEGORIES

SHORTCOMINGS BY BATTLEFIELD OPERATING SYSTEM AND ECHELON

	BN	CO	PLT	SQD
MANEUVER	2	1	1	1
FIRE SUPPORT	1			
AIR DEFENSE				
COMMAND & CONTROL	11	2	1	
INTELLIGENCE	6	1		
MOBILITY/SURVIVABILITY	9*	3*		
COMBAT SERVICE SUPPORT	5	3		
TRAINING ANALYSIS	2	2		
	36	12	2	1

*SOME SHORTCOMINGS CROSSED ECHELONS (ALL TRAINING ANALYSIS ITEMS WERE IN THE MANEUVER BOS)

RECOMMEND RESEARCH PRIORITIES

REPORT RESULTS TO APPROPRIATE USAIS DIRECTORATES

ESTABLISH INFANTRY TRAINING RESEARCH PRIORITIES TO INCLUDE:

- **MANEUVER - TRAINING FOR RAPID DEPLOYMENT, TIME TO PLAN AND EXECUTE OPERATIONS, NAVIGATE, NIGHT OPERATIONS, SOLDIERS' LOAD, AND AUTOMATIC WEAPONS EMPLOYMENT**
- **COMMAND & CONTROL - LEADER TRAINING, STAFF FUNCTIONS, COMMUNICATIONS (MATERIAL), AND COMMANDER'S INTENT**
- **INTELLIGENCE - RECON/SCOUT ACTIONS AND CAPABILITIES**
- **MOBILITY/SURVIVABILITY - OBSTACLE BREACHING**
- **COMBAT SERVICE SUPPORT - CASUALTY EVACUATION & RESUPPLY**