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The Light Infantry Division in Mid-High Intensity Conflict:
Should it be fought as a pure force?

A Monograph
by
Major Patrick J. Beer
Infantry

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School of Advanced Military Studies
United States Army Command and General Staff College
Fort Leavenworth, Kansas

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Major Patrick J. Beer

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Approved by:

Dennis W. Tighe
COL Dennis W. Tighe, MS

Monograph Director

James R. McDonough
COL James R. McDonough, MS

Director, School of
Advanced Military
Studies

Philip J. Brookes
Philip J. Brookes, Ph.D.

Director, Graduate
Degree Programs

Accepted this 20th day of December 1991

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ABSTRACT

THE LIGHT INFANTRY DIVISION IN MID-HIGH INTENSITY CONFLICT:
SHOULD IT BE FOUGHT AS A PURE FORCE? by MAJ Patrick J. Beer,
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This monograph analyzes whether the heavy corps should fight the light infantry division (LID) as a pure force in a mid-high intensity conflict (M/HIC). The monograph examines current doctrine from FM 100-5 down to division-level manuals. While doctrine states that the level of task organization is dependent on METT-T and the commander's estimate process, light infantry field manuals and field circulars fail to adequately address heavy/light operations. Next, two historical examples of infantry fighting in a M/HIC demonstrate the viability of fighting a pure LID in a heavy corps. The first example studies the German invasion of Crete, where the 5th Mountain Infantry Division fought as a pure force under the 11th Airborne Corps against a heavy/light Allied force. The second example reviews Egypt's use of dismounted infantry in its initial assault across the Suez Canal during the 1973 Arab-Israeli War. Finally, the monograph analyzes the mobility, firepower, and survivability of heavy and light divisions within a heavy corps by comparing divisions fought as pure organizations with those task organized for heavy/light operations. The monograph's conclusion confirms the doctrinal guidance that task organization decisions are a function of the commander's estimate process. However, evidence does support fighting the LID pure in some situations. This conclusion implies a need to: fill the doctrinal void in the light division field manuals and field circulars; increase the LID's transportation capabilities; and improve its artillery, antitank, antiaircraft weapons.

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INTRODUCTION

Since the introduction of the light infantry division (LID) in 1985, commanders, scholars, and politicians have debated its proper employment. Although history provides examples of light infantry fighting in mid- to high-intensity conflict (M/HIC), improvements in mechanized forces and increased battlefield lethality have brought the combat worth of light infantry forces into question. Moreover, opinions vary on how to best employ the LID and how to integrate it with heavy forces.

Several options for employing the LID are available. Fighting the light infantry division as a "pure" force means not cross-attaching heavy and light forces below division level within the corps. The other employment option for the corps would be to cross-attach brigades or battalions between heavy divisions and the light division.

The purpose of this monograph is to determine whether the corps commander should fight the light infantry division as a pure force in a M/HIC. Although light infantry is defined as "infantry that has no organic carriers, including airborne and air assault infantry,"¹ I will not address the airborne or the air assault variants of light infantry in order to limit the scope of this paper.

My methodology for answering the research problem is to begin with an analysis of the available doctrine on the employment of light infantry in M/HIC scenarios. This analysis should indicate how well current doctrine addresses fighting a

"pure" LID in a M/HIC as part of a heavy corps operation. The importance of light infantry doctrine may increase in the future as the U.S. Army reduces the number of active heavy divisions in its force structure. In fact, the probability that light divisions—given their strategic mobility and low operating costs—will have to fight in a M/HIC with heavy forces will probably increase.

After analyzing doctrine, I will then use Richard E. Simpkin's combat worth model from his theoretical work *Race to the Swift* to develop my evaluation criteria of **mobility**, **firepower**, and **survivability**. These criteria should help me determine the difference in the combat worth of a corps that fights a LID as a pure force versus one that cross attaches heavy and light brigades between divisions.

My next step is to use these criteria to analyze two historical examples to determine if employing the LID as a pure infantry force in the past enhanced the combat worth of its corps or corps-equivalent headquarters. After examining the Germans' use of a light infantry mountain division in the invasion of Crete in World War II, I will look at Egypt's use of dismounted infantry in its assault across the Suez Canal during the 1973 Arab-Israeli War. These analyses should also determine any lessons learned that may be applicable to current and future battlefields.

Having taken a historical look at light infantry, I can then compare a corps fighting with three pure divisions to one with

mixed divisions. Using the same criteria, this analysis should identify the major advantages and disadvantages of each option. Finally, I plan to synthesize each of the above analyses to help form conclusions--conclusions which should answer my research question. Any implications drawn from those conclusions should determine what, if any, changes to doctrine, organization, and equipment may be necessary to enhance the combat worth of a light infantry division that is fighting as a pure force in a M/HIC.

CURRENT DOCTRINE

No theory exists for the employment of the LID in a M/HIC. The most recent source for the theoretical employment of light infantry in general is Richard E. Simpkin's *Race to the Swift*.² However, his analysis, which is based on the active defense, is outdated because AirLand Battle doctrine has superseded the active defense doctrine of 1976. In short, it appears that a specific theory does not exist for employing the LID in a M/HIC, where the battlefield conditions include significant depth, non-linearity, and highly lethal weapon systems.

Nevertheless, because doctrine is based on theory, a review of current doctrine may offer a solution for the best way to employ the LID in a heavy corps. Because of combat support (CS) and combat service support (CSS) considerations, I believe that the doctrine concerning employment of a light battalion in a heavy brigade or a light brigade in a heavy division does not necessarily extrapolate to a LID fighting within a heavy corps.

Therefore, my focus will be on doctrine for echelons above brigade level.

At the keystone level, FM 100-5, Operations, describes how to use light infantry in the functional area of maneuver. The manual outlines suitable missions for light infantry in operations where armored forces predominate. These missions include securing operational and tactical pivots of maneuver (such as key terrain) to facilitate the heavy forces' maneuver, controlling restrictive terrain, and rear area operations.³ The corps is the next tactical level at which heavy/light operations are addressed.

At the corps level, a dichotomy exists concerning the optimum employment option for the LID within a heavy corps. In the chapter on defense, FM 100-15, Corps Operations, states the command estimate process and the factors of METT-T determine the level at which forces are mixed. However, the chapter on offense states that "the optimum employment option is to employ the light division as a division under corps control."⁴

FM 100-15-1, Corps Operations: Tactics and Techniques, takes a different tack. This manual states that no prescribed method exists for the task organization of heavy and light forces.⁵ Instead, this manual agrees with the defensive chapter of FM 100-15 that the commander's estimate process is the sole determinant for the level at which heavy and light forces task organize.⁶

Below corps level there are two division-level manuals which should logically address the LID in a M/HIC. However,

FM 71-101, Infantry, Airborne, and Air Assault Division Operations, does not address heavy/light operations at all. This manual was published five years before the first LID was activated and it has not been updated since then. The only current LID field circular, FC 71-101, Light Infantry Division Operations, also fails to address heavy/light operations. Instead, the most thorough review of heavy/light operations is in FM 71-100, Division Operations.

FM 71-100 describes suitable complementary heavy and light tasks, command relationships, augmentation requirements, and CS/CSS issues in its Appendix A. Additionally, Appendix D describes planning considerations for all types of infantry divisions, to include the LID. Furthermore, this manual agrees with FM 100-15-1 that the commander's estimate process determines the level at which heavy and light forces should task organize.⁷

Although doctrine does not consistently support a specific level for task organizing heavy and light forces, it does provide general guidance for light forces working with heavy forces. First, light forces should deny the enemy his unhindered use of restrictive terrain. Next, light infantry protects itself by dispersing and by taking advantage of its mobility relative to the enemy in restrictive terrain. Finally, although light infantrymen dig in for survival, they should not be tied to their positions in restrictive terrain because that would negate their relative mobility advantage and their ability to disperse for

protection.²

In summary, then all theory for the employment of the LID in a M/HIC is inferential; explicit theory does not exist. However, while most light infantry doctrine states that the optimum level for the integration of heavy/light forces should be a function of the commander's estimate process, FM 100-5 does support the use of the LID as a pure force in a corps. Before I can analyze which employment option better enhances the corps' combat worth, I need to establish criteria for determining the advantages and disadvantages of each method of employment.

ANALYSIS CRITERIA

Richard Simpkin's theory of combat worth and Huba Wass de Czege's model of relative combat power share three similar components useful in analyzing any combat force. Simpkin's model portrays a dynamic, interactive triangle with **mobility**, **firepower**, and **survivability** at each corner. His model demonstrates that one cannot look at each criterion in isolation; as each changes, the other two may be affected. For example, a combat force that increases its **survivability** by preparing bunkers and fortifications would decrease its **mobility** and possibly limit its **firepower**.³

The three combat worth criteria are very similar to the components of Huba Wass de Czege's relative combat power model. His theory is that the outcome of battle is primarily dependent upon the qualitative differences in the effects of each side's **leadership**, **firepower**, **maneuver**, and **protection**.

The apparent differences, then, between the components of Simpkin's combat worth model and Wass de Czege's relative combat power model are, first, the effects of leadership, and second, the use of the term maneuver as opposed to **mobility**. Leadership would seem to be the most important criterion in analyzing any combat force. However, it is not useful in my analyses since I am assuming that the leadership effect will not vary among light infantry--regardless of whether the LID is fought as a pure force or as a mixed force. Moreover, I will use Simpkin's **mobility** criterion instead of Wass de Czege's **maneuver** component, since **mobility** is both a component of **maneuver**¹⁰ and more relevant to my analysis of light forces.

Mobility is a "quality or capability of military forces which permits them to move from place to place while retaining the ability to fulfill their primary mission."¹¹ FM 100-5, Operations emphasizes the importance of **mobility**, because "[a]t all levels, effective maneuver demands air and ground **mobility**."¹² FM 100-5 also contends that **mobility** equal to or greater than that of the enemy is a prerequisite for the mobile defense.¹³

At the tactical level, unit **mobility** is dependent upon physical fitness and health of individuals, unit teamwork and esprit, unit equipment capabilities, unit equipment maintenance, and unit **mobility** skills. . . . [Unit **mobility** skills] are of paramount importance on the modern battlefield and include road marching, occupying assembly areas, map reading, foot **mobility**, air **mobility**, and many other related skills.¹⁴

Additionally, **mobility** is a key component of the AirLand Battle tenet of agility. "Agility--the ability of friendly forces to act faster than the enemy--is the first prerequisite

for seizing and holding the initiative."¹⁵ Although strategic mobility is perhaps the LID's most important advantage,¹⁶ the following issues appear to be the most important on the battlefield:

*How much faster than the enemy can the unit move cross-country?

*Does the unit's organic transportation assets contribute to its mobility?

*How does the unit's mobility influence its corps or corps-equivalent headquarters' tempo of operations (optempo)?

Another criterion of combat worth is firepower. Simpkin defines firepower as the ability to "transfer energy to the enemy."¹⁷ JCS Publication 1-02, Department of Defense Dictionary of Military and Associated Terms, and Webster's Encyclopedic Unabridged Dictionary define firepower as the ability to fire and the amount of fire delivered by a unit or weapon.

Both Wass de Czege and FM 100-5 also identify what firepower should provide. Like the other two components of the combat worth model, firepower should not be considered in isolation from the enemy. Training is an important aspect of firepower because its effectiveness requires "highly trained crews, observers, and fire direction personnel."¹⁸

Firepower provides the enabling, violent, destructive force essential to realizing the effects of maneuver. It is the means of suppressing the enemy's fires, neutralizing his tactical forces, and destroying his ability to fight. . . . It is the effect [Wass de Czege's emphasis] of firepower which contributes to combat power

[and combat worth] and not its unapplied or misapplied potential. It is the accuracy and volume of fires, the lethality of munitions and the flexible employment of weapons systems which combine to create its effect.¹⁹

In summation, **firepower** is not only the volume of destructive force, but also its effect on the enemy force. This leads to the following questions:

*Given an organization, what major weapons systems provide the volume of destructive force?

*How effective is the organization's **firepower** in terms of lethality and accuracy?

The final criterion of combat worth is **survivability**. Simpkin defines **survivability** as the ability to avoid or absorb the transfer of energy from the enemy.²⁰ Although Wass de Czege's term was "protection," he did discuss **survivability** by identifying its three components as concealment, exposure limitation, and damage limitation.²¹ Concealment involves avoiding observation; for example, camouflage and stealth improve concealment.²² Exposure limitation is action that makes detected personnel and equipment harder to hit.²³ Finally, damage limitation mitigates the effects of enemy fire on targeted personnel and equipment.²⁴ FM 100-5's description of protection says that it includes "all actions that are taken to counter the enemy's **firepower** and maneuver by making soldiers, systems, and units difficult to locate, strike, and destroy."²⁵

For the purpose of this monograph, then, I consider **survivability** and protection to be synonymous, since they both include those actions which limit the effects of enemy fire upon

friendly forces. Those actions include limiting the enemy's acquisition of friendly forces and lessening the effects of the enemy's firepower after the friendly unit has been acquired. Therefore, the criterion of survivability will address the following issues:

*How well can the unit limit its exposure?

*What organic systems or actions does the unit have to mitigate the effects of enemy fire?

With these criteria in hand, I can now analyze two historical examples of light infantry forces--both of which illustrate the use of pure light infantry forces on a M/HIC battlefield. The analysis first looks at the German use of the *Gebirgjaeger*, a light infantry mountain division that fought as a pure force in the invasion of Crete in World War II. The second historical example examines Egypt's use in 1973 of a light infantry first echelon in 1) the initial assault across the Suez Canal and 2) the subsequent seizure and reduction of the formidable Israeli Bar Lev Line.

HISTORICAL ANALYSIS

CRETE In May 1941, Nazi Germany invaded Crete. Located four hundred miles from North Africa, but only sixty miles from Greece, Crete's strategic value was that whoever owned it could control access to the Aegean Sea and threaten sea lines of communications in the Eastern Mediterranean Sea. One hundred and seventy miles in length and about thirty miles in width, the mountainous island has four principal mountain ranges

rising to nearly two thousand, seven hundred meters high. The mountains are steep, barren, eroded, and impassable in many areas. The environmentally hostile southern shore has no large harbors; consequently the major towns and ports are on the northern side, and these are connected by one major east-west road. The island at that time also contained three small airstrips at Maleme, Canae, and Heraklion (Appendix A).²⁸

This restrictive terrain was ideally suited to light infantry forces. Although the terrain was impassable to vehicles, it would appear that the Allies forgot that light infantry can move across almost any ground. As Napoleon said, "An army could pass wherever a man could put his foot."²⁷

Usually, any analysis of the invasion of Crete examines General Student's 11th Airborne Corps' operations, since it conducted the first airborne invasion in history. However, I will concentrate on the German 5th *Gebirg* [Mountain] Division's operations, because that unit was a light infantry division.

Although they did not achieve the glory associated with the capture of the island, the *Gebirgjäger*--who airdropped in the second wave of assault forces--were instrumental in the German victory.²⁸ The Allied garrison managed to maintain a tough defense despite the fact that, during the ten weeks following 10 January 1941, the Allied forces on Crete had six different commanders.²⁹ The Allied garrison had 43,614 soldiers and the support of the local population. The Allies had also received sixteen light tanks and seven infantry tanks from the

Middle East Command. Against the Allied garrison the Germans allocated only 22,750 soldiers to seize Crete; however, 7,000 seaborne Germans never even reached the island.

Besides the Allies having a three-to-one numerical advantage over the attacking Germans, good Allied intelligence also tended to be a force multiplier.³⁰ Specifically, Allied preliminary intelligence about the time, place, and method of attack was correct. In fact, the Allies correctly predicted that the Germans would conduct a phased attack, consisting of an intensive air attack, followed by a paratroop assault on the airfields. After the airfields were secure, troops airlanded on the airfields and seaborne forces attacked Suda Bay to link up with the other forces--again, just as the Allies predicted.³¹ However, as I will show later, neither the intelligence nor the force ratio was as helpful as each might have been.

The initial airborne assaults tried to capture the three airfields at Maleme, Retimo, and Heraklion. Although the Germans failed to capture the Retimo and Heraklion airfields, they did capture the Maleme airfield; this victory allowed the airlanded *Gebirgjager* to reinforce the paratroopers. As soon as the light mountain division began its march through the mountains, the numerically inferior Germans gained--and never lost--the initiative.³²

The Allied garrison defended generally east to west, since they were anticipating a head-on German assault down the coast road. The Allied plan was based on the premise that the high

mountains were impassable. However, it was through these mountains that the *Gebirgjäger* passed, carrying all of their equipment and heavy weapons. While one or two *Gebirgjäger* battalions fixed the enemy to the front, other *Gebirgjäger* battalions decisively attacked the enemy from the flank and rear.³³

The advantage enjoyed by the German mountain division was also a result of German air superiority as well as the organic heavy weapons (machine guns and antitank). The result of the bitter fighting was that the Allies evacuated the island with a little over fifty percent of their original force--despite an original three-to-one advantage. An analysis of the *Gebirgjäger's* combat worth, when compared to that of the Allies, should explain the reasons for the German mountain division's success.

The first mobility issue looks at how much faster than the enemy the unit can move cross-country. Because they were so highly trained in mountain warfare, the capability of the *Gebirgjäger* to move through the rugged mountainous terrain exceeded that of the Allied garrison, which was a mixed force of light infantry and tanks. The Allied garrison's inability to have mobility equal to or greater than the enemy precluded their conducting an effective mobile defense.³⁴ Consequently, each of the Allies' attempts to conduct a rear guard action resulted in the *Gebirgjäger* bypassing the Allies in rough terrain and then attacking them from an unexpected direction.³⁵ Nevertheless, despite their cross-country mobility, the *Gebirgjäger*

conducted assaults against both strong-point defenses and towns; consequently, the Germans suffered relatively high casualties from combat that was often hand-to-hand.

The second **mobility** issue is the availability of organic transportation assets. The *Gebirgjäger* were completely dismounted; they had no organic vehicles.³⁸ Conversely, the Allies had a distinct advantage with their organic transportation. They had both armored cars and trucks. These vehicles probably allowed the Allies to displace faster than the Germans, but only along the few roads and trails on the island.

The final **mobility** issue focuses on how the *Gebirgjäger's* **mobility** contributed to the optempo of its higher headquarters. Since the 11th Airborne Corps--the controlling headquarters for the *Gebirgjäger*--was also restricted to foot movement, the *Gebirgjäger* enhanced the optempo of the overall German effort by attacking across restrictive terrain. If, however, the *Gebirgjäger* had been a mixed force, it would have had a portion of its force--the heavy force--tied to the same road network the Allies used; thus, it would have slowed the Corps' optempo.

In summation, relative **mobility** in restricted terrain is one of the major advantages of pure light infantry units that are opposed by heavy or mixed forces. This relative **mobility** proved to be decisive in Crete because the *Gebirgjäger's* training, experience, and off-road foot **mobility** enabled them to move faster than the Allies--even without organic transportation, and to contribute significantly to the optempo of the overall German

operation.

The second criterion of combat worth is firepower, which includes not only the volume of destruction but also its effect on the enemy. Initially, the *Gebirgjäger* were limited to such light infantry weapons as rifles and grenades. These weapons were of little use against the Allies' armored vehicles. However, German *Stukas*, which provided close air support, enhanced the mountain division's volume of destructive force. Even with air supremacy, the Germans did not gain the initiative until dismounted soldiers carried larger organic machine guns and antitank weapons into their attack positions in the mountains.³⁷ While the Allies' armored vehicles and machine guns were eventually countered somewhat by the *Gebirgjäger's* machine guns and antitank weapons, it was German airpower that gave the Germans their firepower advantage. Thus, while organic firepower may have been at a deficit, the effectiveness of the German firepower did eventually exceed that of the Allies—but only after air power was added to the equation.

The Germans' firepower was more effective than that of the Allies because once the Germans drew fire from the Allies, the *Gebirgjäger* were able to accurately mark the Allied positions for *Stuka* attacks.³⁸ Naturally, however, marking enemy positions could have been done equally well by either pure or mixed forces. On the ground, the Germans fixed the defender's attention forward while other German soldiers maneuvered to flank and rear positions. Once in these flank and

rear positions, the German ground fire was very effective.³⁸

These flank and rear attacks could not have been done by heavy forces since the mountains were impassable to vehicles. In addition, if the force had been mixed, there would have been fewer light soldiers to strike at the Allies from the mountains.

Although the Allies' volume of destruction at times matched that of the Germans, the Allies' firepower appears to have been less effective. Whenever the Allies initiated engagements, the *Gebirgjager* used the folds in the mountainous terrain for cover. The Germans would then rely on their air force and flanking forces to relieve them. As a result, despite its initial destructive capabilities, the Allies' firepower effect could not be maintained.

In summation, the volume and the effect of fire shifted in the Germans' favor only because of the Germans' air superiority. In fact, it is doubtful that the Germans would have defeated the Allies without airpower. This seems to suggest that a light infantry division attacking a heavy force, even in restrictive terrain, must rely on firepower provided from outside the organization.

The first issue for **survivability** concerns how well a unit limits its exposure. The Allies did this better than the Germans because they fought from prepared, well-camouflaged trenches. By remaining stationary, the Allies limited the German Air Force's observation. The foot-mobile Germans, on the other hand, were more easily observed when they were in the open. This fact made the Germans' use of seemingly impassable terrain

even more important, since the Allies did not expect the Germans to attack them from the rear. While limiting exposure is vital to **survivability**, mitigating the effects of enemy **firepower** after you have been detected is just as important.

The Germans used the terrain to protect them from direct fire. However, as proficient as the Germans were in mitigating Allied **firepower** effects, the Allies were even better. The Allies had prepared trenches with interlocking fires which softened the blow after their positions were detected. Additionally, the Allies used armored vehicles, houses, and other buildings to soften the effects of enemy direct fire and shrapnel.

Thus, the Allies were initially more **survivable** than the Germans since they were able to hold their positions until the Germans reinforced their light infantry with **airpower**, antitank weapons, and heavy machine guns. Moreover, the Allies had heavy equipment and shelters which were not available to the Germans.

In summary, the invasion of Crete illustrated some important points about a light infantry division fighting as a pure force against a heavy/light opponent. The Germans achieved a relative **mobility** advantage over the Allies by being able to attack across terrain thought impassable. Although **mobility** was a definite German strength, the organic **firepower** within the light division was insufficient. In fact, the Germans' **firepower** exceeded that of the Allies only because it was augmented by German air supremacy. Although the Germans appeared to be less **survivable**

than the Allies, the other two criteria surmounted this German disadvantage. Thus, the German experience may illustrate how a light unit may be able to rely on **mobility and firepower**—even if the latter comes from external sources—to overcome a **survivability** disadvantage.

The German light infantry that defeated a heavy/light mixed force opponent on Crete provides other three lessons that are probably transferable to the future. First, light infantry forces must be masters of restrictive terrain, transforming its difficulties into advantages. Crete was a suitable location for fighting the light infantry division as a pure force because there was enough restrictive terrain to deploy the whole division. Accordingly, the choice of whether to fight pure or mixed should be largely a function of the terrain⁴⁰—perhaps even more than the other factors of METT-T. The second lesson is that light infantry operations are particularly vulnerable to enemy **firepower**. Finally, planners must give some thought to providing additional **firepower** from non-organic forces in order to enhance both the light forces' **survivability** and its ability to kill the enemy.

Although the above lessons apply to light infantry as a pure force or in a heavy/light mix, their relevance becomes more significant as the size of the independent light unit increases. While these lessons from a war fought almost fifty years ago appear applicable even today, the 1973 Arab-Israeli War provides a more modern example of light infantry forces fighting on a

M/HIC battlefield.

SUEZ CANAL My next example discusses only the opening phase of the 1973 Yom Kippur War, since that portion of the war illustrates the Egyptian use of light infantry. After the 1967 Arab-Israeli War, the Israelis built the Bar Lev Line on the east side of the Suez Canal. It was a sand barrier, 50-70 feet high, on top of the existing wall of sand that had been left by the original canal excavation. The Israelis defended this line with thirty-one strongpoints and twenty rear posts, each of which was supposed to be reinforced by armored forces in case of an attack. The Bar Lev Line's fortifications were so formidable that the previous Soviet advisors to the Egyptians had believed that only nuclear weapons could attack it successfully.⁴¹ The Israelis thought they needed approximately four thousand men to adequately man this defensive position. However, on 6 October only an 800-man reserve battalion was securing these sites--and one-fourth of that unit was on holiday pass for Yom Kippur.⁴²

The Egyptians began their offensive by attacking airfields and command and control facilities with two hundred and fifty aircraft. Simultaneously, two thousand artillery tubes conducted a fifty-three minute preliminary bombardment of the Bar-Lev Line's strongpoints, tank concentration areas, and command and control facilities.⁴³

Under the cover of this intensive fire, the dismounted infantry from five infantry divisions crossed the Suez Canal in rubber assault boats and scaled the Bar-Lev rampart. Within

thirty minutes, the first echelon's approximately eight thousand infantrymen had crossed the obstacle in two waves. This dismounted first echelon had been formed by stripping out soldiers from five mechanized infantry divisions. Equipped with the latest Soviet antitank and antiaircraft weapons, the first wave of Egyptians carried these weapons on their backs and bypassed the Israeli defenders. The job of isolating and reducing these strongpoints belonged to the second wave. The first wave continued up to ten miles past the Israeli strongpoints to set up antitank ambushes and killing zones to prevent Israeli armor and aircraft from attacking the bridgehead across the Suez Canal.⁴⁴ The Egyptian infantrymen were reinforced with specially organized and highly trained dismounted infantry tank-killer teams who established a thick antitank zone immediately behind the crossing. This ambush zone was occupied by ninety infantry antitank weapons--again, all hand carried--for each mile of frontage.⁴⁵

The depth of the ambush zone was limited because the Egyptians knew that they did not have the capability to continue operations deep into the Sinai desert. Although they had good Soviet antitank and antiaircraft weapons, there were no replacements for losses since Egypt had already severed its ties with the Soviet Union. The other reason for not continuing deeper into the desert was that the strategic purpose of the attack had been met. The Egyptians had planned a limited objective attack to draw off Israeli forces from Syria--who was

making the main attack against Israel--and then sue for peace.⁴⁶

After the first wave cut off Israeli armor reinforcement, the second wave of Egyptian infantry reduced the isolated strongpoints. Within three hours of the initial infantry assault across the canal, the antitank and antiaircraft defenses were in place and fourteen strongpoints had been captured.⁴⁷

Immediately following the second wave of infantry assaults, engineers crossed the canal and used special water cannons to "melt" away sections of the wall of sand. Bulldozers then dug ten crossing sites in the Bar Lev Line. After this initial success by the dismounted first echelon, the second echelon armor and mechanized forces crossed the Suez Canal to link up with the first echelon in its defensive positions in order to reconstitute the five mechanized divisions.⁴⁸

Although the majority of Israeli tank losses (830 total) were from other tanks, antitank guided missiles accounted for one-fourth to one-third of the losses.⁴⁹ In fact, one Egyptian infantry squad destroyed eight Israeli tanks within ten minutes using the Sagger antitank weapon.⁵⁰

The principal weapon which held off the Israeli armoured [*sic*] counterattacks for the first 24 and, to an extent, the full 48 hours, was *Sagger*--and not simply because it surprised the Israeli tank crews, but because the missiles hit the tanks.⁵¹

Prior to using the combat worth criteria to analyze the opposing forces, it is important to understand how this war between two mechanized armies is applicable to a LID. Although a total of five mechanized infantry divisions conducted the

attack against Israel, the dismounted infantry forces that seized pivots of maneuver inside the Israeli defenses were in the first echelon of the attack. This mission of seizing pivots of maneuver agrees with FM 100-5's description of a suitable purpose for light infantry forces. However, because the Egyptian force structure did not have a separate LID, five mechanized infantry divisions had to give up some of their combat power to perform a mission that was more suitable for one LID.

The initial phase of the Egyptian attack was successful, but what was the combat worth of the infantry divisions as compared to the Israeli defenders and their obstacles? Cross-country mobility is the first issue for examination. After crossing the Suez Canal in rubber assault boats, the dismounted Egyptian infantrymen were exclusively foot-mobile. While the Egyptians had organic transportation assets available within their five mechanized divisions, both the need to use rubber assault boats to achieve surprise and the impassable nature of the fortifications prohibited their use. Although dismounted movement is normally limited to only three to four kilometers per hour, Egyptian movement was further slowed by the requirement to carry anti-aircraft and antitank weapons on foot. Despite their slow rate of movement, the Egyptians reached their objective before the Israelis—but only because the Egyptians had a "head start."

The Israelis were either in immobile strongpoint defensive positions or in tanks as a mobile reserve. Obviously, even dismounted speed would be faster than the strongpoint

defenders. However, the Egyptians were also "faster" than the armor reserves. Because strategic and operational surprise gave them a "head start," the dismounted Egyptian infantrymen reached their assigned objectives before the Israeli armor units could respond. Once in position, the Egyptian infantry established an ambush zone. This zone negated the inherent mobility advantage of Israeli armor by preventing them from relieving the beleaguered strongpoints on the Bar Lev Line.

This Egyptian mobility contributed to the overall optempo of the attack. As mentioned earlier, the Egyptians led with a dismounted infantry echelon because the Bar Lev Line was impenetrable by vehicles of any sort.⁵² Once the far bank was secured and the Egyptian ambush zone in place, second echelon mechanized forces were able to cross the Suez Canal on bridges and rafts. After crossing, the Egyptian divisions linked up with their dismounted elements in order to reinforce the ambush zone. It would seem that by bypassing the Israeli fortifications to secure pivots of maneuver, the Egyptian dismounted infantrymen enhanced the heavy units' optempo.

Thus, it appears that the mobility of the Egyptians exceeded that of the Israelis--but only because they achieved strategic and operational surprise. Although Israeli armor possessed a faster rate of movement, the Egyptian infantrymen were already in position before the Israelis could respond.⁵³ Additionally, the Egyptian dismounted first echelon enhanced the five heavy divisions' optempo by securing pivots of maneuver within and

beyond the Israeli defenses.

Shifting our focus to firepower, the first issue to analyze is the major weapon systems that provided the volume of destructive force. Initially, the infantry divisions relied on the artillery bombardment for their firepower. They then employed infantrymen carrying antitank and antiaircraft weapons in depth throughout their sector, since the Egyptians knew that the Israelis relied on their armor and air forces. As far as armor and air forces were concerned, the Israelis had a volume of destructive force that was comparable to that of the Egyptians.⁵⁴ However, the Israelis were initially deficient in infantry and artillery because of their over-reliance on armor.⁵⁵ Overall, the Israelis started out with a firepower disadvantage because they threw "unsupported armor against well-prepared defensive positions."⁵⁶

Even more important than the volume of destructive force is the effectiveness of the fires. Conducting a strategic offensive with a tactical defensive, the Egyptians rapidly secured the ambush zone and then waited for the Israeli armor forces to come to them. In the meantime, the Egyptians prepared positions oriented on the direction from which the Israelis would counter attack. As a result, Israeli aircraft were met by a thick zone of antiaircraft weapons around the ambush sites, and their tanks were effectively attacked by the well dug-in antitank weapons. Israeli fire was less effective because the Israelis did not know exactly where the dismounted Egyptian infantrymen were

located.⁵⁷ Thus, the **firepower** volume and effect favored the Egyptians in the initial stages of the war. However, how did the two sides compare from the aspect of **survivability**?

The Egyptians were able to deny observation by Israelis and mitigate the effects of enemy fire by digging defensive positions into the hillsides and by dispersing in the wadis—natural trenches formed by erosion.⁵⁸ The Egyptians were also able to easily target the Israelis, since the latter were either in permanent strongpoint defensive positions on the Bar Lev Line or they were counterattacking in tanks. Although the Israelis were more easily observed, the walls of the Israeli strongpoints and Israeli tank armor somewhat mitigated the effects of Egyptian fires. Israeli armor, like all armor protection, was effective against small arms, shrapnel, and debris. However, neither the strongpoints nor the tanks were sufficient protection against the Egyptian infantry antitank weapons.⁵⁹

In summation, the Egyptians achieved a relative **mobility** advantage over the Israelis. This **mobility** advantage can be attributed to the Egyptians' "head start," which they gained through both strategic and operational surprise. Additionally, the Egyptians' volume and effect of **firepower** was better than that of the Israelis because the Israelis attacked well-prepared defenses with tank-pure forces. The Israelis' **firepower** was further degraded because the Egyptian infantrymen dispersed and hid in the wadis and in fighting positions in the hills. Finally, these same wadis and fighting positions enhanced the

Egyptians' survivability.

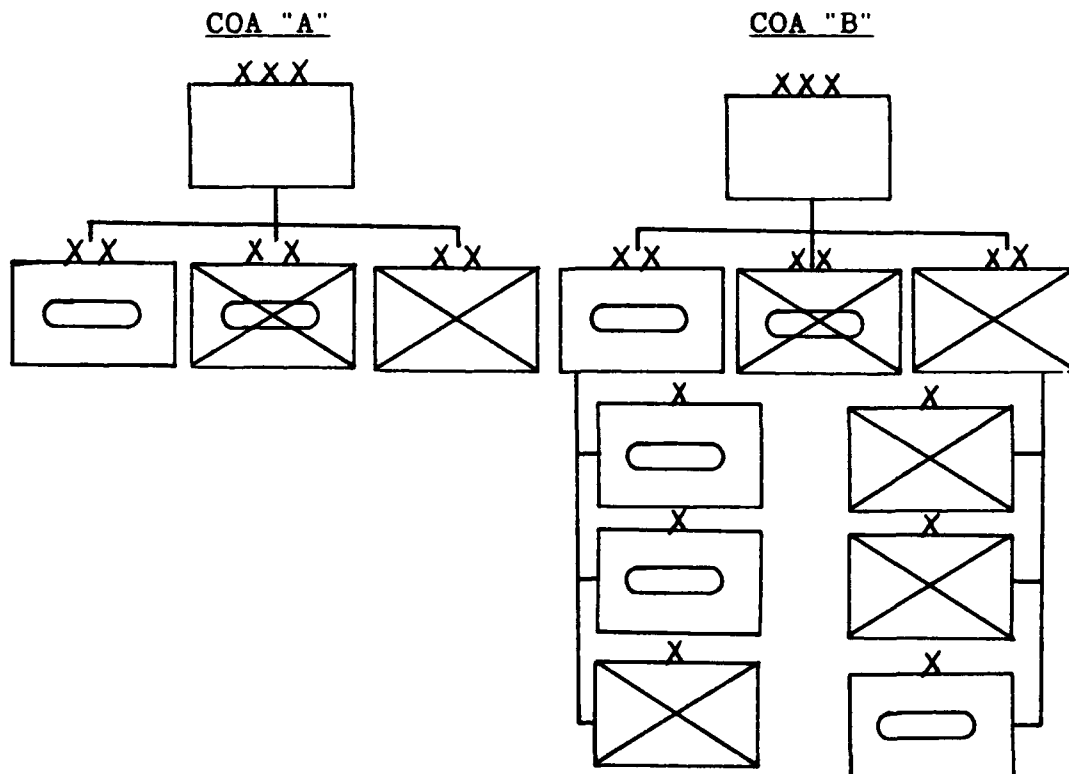
Each of the above analyses using the combat worth criteria provide lessons that may be applicable today and in the future. First, light infantrymen gain a relative mobility advantage when they are given a "head start" to their objective; that is, light infantrymen need time to get into position before heavy forces can interfere with them. This "head start" can compensate for their slower rate of movement. Secondly, unlike the dismounted mechanized Egyptian infantrymen, who man-handled their organic equipment with them, a LID today normally requires corps augmentation for a more potent antitank and antiaircraft defense.⁶⁰ Lastly, as we saw in Crete, effective use of terrain enhances survivability.

So far, the two historical examples have shown us that a LID can be fought pure. A significant benefit from fighting the LID as a pure force versus a mixed force seems to be in the former's contributions to the optempo of the corps or corps-equivalent headquarters. However, the LID does have shortcomings in firepower and survivability. The light force is unable to bring a large volume of fires from organic sources and must rely on external sources. Additionally, while the LID's survivability seems somewhat limited, it can be enhanced by prudently limiting observation by the enemy and by dispersing the forces.

COMPARISON OF PURE VERSUS MIXED

The following analysis is not a comparison of a LID versus

a heavy division; instead it compares two divisional employment options for the corps. The first option is to employ the LID and the heavy divisions as pure forces. The second option is to cross attach brigades between the LID and a heavy division to produce a mixed force. In this analysis, course of action "A" consists of a corps with one light and two heavy divisions employed as pure forces. In course of action "B," I have arbitrarily assumed that the corps is task organized with one pure mechanized infantry division, one heavy/light division with two armor brigades and one light infantry brigade (LIB), and one light/heavy division with two LIBs and one heavy brigade from an armor division.



Several assumptions form the basis for the following analysis. First, the expected enemy in a M/HIC will probably be a mechanized force similar to a Soviet surrogate. Such a heavy force provides a worst-case scenario for a LID fighting as a pure force; if the LID can fight this enemy, it should be able to fight any other. Next, I am assuming that the armor brigade the LID receives during the cross attachment process consists of two armor battalions and one mechanized infantry battalion plus a typical brigade "slice" of CS and CSS assets.⁶¹ The detachment of this heavy brigade leaves its parent heavy division with a flexible force of four armor battalions and three mechanized infantry battalions. Given these assumptions, how do the two employment options compare?

The LID's cross-country **mobility** is limited to dismounted movement. Therefore, in non-restrictive terrain, such as in a desert where speed is critical, the LID's cross-country **mobility** is a disadvantage. However, there are two methods that can overcome this tactical **mobility** disadvantage. The pure LID can either 1) move through very restrictive terrain or 2) it can receive a "head start," which means giving the LID an earlier line of departure (LD) time than the rest of the corps units. However, a danger exists that if the LID crosses the LD hours before the heavy forces, the plan will change enroute to the objective. Being foot mobile, the LID is not very flexible. Thus, the corps commander might have to choose between not making a necessary change to a plan or cancelling the LID's mission. If

the corps does not use these two mobility compensation techniques, the LID lacks the tactical mobility in unrestricted terrain to keep up with heavy forces.

Conversely, the mixed force has greater overall tactical mobility than the pure LID because, in addition to having forces (LIBs) who can walk through restrictive terrain, the corps can carry its LIBs "piggyback" on the organic assets of the heavy divisions. Moreover, because the light infantrymen have many more night vision devices than heavy forces, they can enhance the vision capabilities of the heavy force.⁶²

Because the mixed force can supplement the transportation assets of the LIB with the heavy unit's vehicles, it appears that the tactical mobility of the LID is far less capable than that of the mixed force. Doctrinally, corps assets are supposed to assist the LID with its transportation requirements; however, it seems that augmentation often fails to come through.⁶³ While inadequate corps support is a common failing at the National Training Center, REFORGER 88 and REFORGER 90 also showed that the problem of simultaneously supporting a heavy corps and a light division has not yet been fully worked out by COSCOMs.⁶⁴ On the other hand, in a heavy/light division, supporting the attached LIB significantly degrades the corps' CSS capabilities.⁶⁵ Thus, because this corps transportation augmentation is not dependable—at least for now—I will only analyze the organic transportation assets for the divisions.

The LID fighting as a pure force has minimal transportation

assets. There are seven five-ton trucks in each brigade, but these vehicles are for CSS operations. The divisional supply and transportation (S&T) battalion has sixty-five five-ton trucks; again, these are needed for CSS operations. However, the LIDs recognize that S&T trucks could be used in a "surge" effort to transport a brigade, if needed.⁶⁶

The other major transportation asset in a LID is two assault helicopter companies [AHC] with fifteen UH-60 Blackhawk helicopters each. The 7th ID(L) Capabilities Book states that its "two assault helicopter companies can move the combat assets of two infantry battalions in a single lift."⁶⁷ However, assuming a 100% operational fleet of fifteen UH-60s per company, and assuming exorbitant combat load conditions of twenty passengers per aircraft, the most that two companies can transport in a single lift is six hundred soldiers. Therefore, by my calculations, the aviation assets in a LID can move little more than one battalion in a single lift. Thus, even two helicopters companies do not significantly enhance the mobility of the light division. In any case, the only way the LID moves with organic assets is to walk, fly, or use the S&T trucks as a last resort.

In contrast, the mixed division has more organic transportation assets. The heavy battalions are 100% mobile with organic M1 tanks, M2/M3 fighting vehicles, and other trucks. While the primary movement means through restricted terrain for the LIB attached to a heavy division is dismounted movement, that LIB has the advantage of being able to hitch a ride with the

mechanized forces in unrestricted terrain.

As with the LID, helicopter assets are available in the mixed division. The heavy division has one assault helicopter company that can transport about half of an infantry battalion in a single lift. This option uses aviation assets better because it maximizes available airlift in the heavy division's AHC. Unless the AHC is supporting logistics efforts, it gets relatively minimal use in a fully mobile heavy division. Although the pure force has more lift assets available, it would appear that the heavy/light organization makes overall better use of its organic aviation lift assets.

The final mobility issue concerns the light unit's contribution to the corps' optempo. Because of its larger mass, it would seem that a LID fighting as a pure force can seize pivots of maneuver in restrictive terrain more easily than a LIB can. The LID is more capable of independent operations than a LIB because of its inherent command, control, and CSS support capabilities. Thus, it can free the more mobile pure heavy forces for more decisive action in unrestricted terrain.⁶⁹ In effect, since its heavy divisions do not have to dismount their mechanized infantry to fight for terrain, the corps can maintain a higher level of optempo.⁶⁹

A LIB attached to a heavy division could have the same objective of seizing pivots of maneuver; however, the mixed division has the following distinct disadvantage. After its LIB moves through restrictive terrain to secure pivots of maneuver

for a heavy division, the division is faced with a dilemma of either waiting for the LIB to reassemble or continuing its mobile operations--letting the LIB catch up later. If the heavy division waits for the LIB to reassemble, the resultant pause gives the enemy an opportunity to recover and seize the initiative. If the heavy division does not wait, the risk of fighting two separate battles increases; that is, there could be one fight with the heavy units and another with the left-behind light brigade.

It seems likely, however, that a mixed division would wait at some point for the LIB to catch up. Otherwise, command and control problems and the danger of two fights could increase. Thus, within the corps, the two divisions with heavy/light and light/heavy task organizations may need to pause. However, in a corps consisting of one light and two heavy divisions, neither heavy division would need to pause. A LID fought as a pure force in restrictive terrain could secure objectives across the corps' zone and free both of the heavy divisions for more mobile warfare. After the initial attack, the LID's organic firepower is so small that leaving the LID behind would not degrade the corps' overall firepower significantly. Therefore, the corps could afford to continue operations without pausing for the LID. The LID's control might then revert to an echelon above corps to preclude the corps having to fight two separate fights.

In summarizing the mobility criterion, it appears that the mixed force has better tactical mobility. The mixed division makes better use of organic assets such as the AHC and its

"piggyback operations" to move the LIBs cross-country. The mixed forces thus have more flexibility in the types of terrain they can operate in. While the corps' optempo would seem to be enhanced by fighting the LID as a pure force, the weight of the evidence points to the mixed force as being the more mobile force, regardless of the terrain.

Firepower considerations are just as important as those of mobility. The LID's division artillery is limited to fifty-four 105-mm howitzers and eight 155-mm howitzers. Fighting as a pure force, the LID has minimal antitank systems without augmentation. Specifically, the LID has twelve TOWs (heavy antitank missile) and fifty-four Dragons (medium antitank missile) per brigade. In addition, the LID's aviation brigade has one attack helicopter battalion (AHB) with twenty-nine AH-1 Cobra helicopters. However, the Cobra has only eight TOWs per aircraft and has no night-fighting capability.⁷⁰ Obviously, few major weapon systems contribute to the volume of firepower in a LID.

On the other hand, the heavy division has ten battalions compared to the LID's nine. An armor division has six armor and four mechanized infantry battalions. A mechanized division has five armor and five mechanized infantry battalions. Each armor battalion has fifty-eight M1 tanks and each mechanized infantry battalion has fifty-four M2 infantry fighting vehicles, twelve ITVs (Improved TOW Vehicles), and thirty-six Dragons. Each heavy battalion also has six M3 cavalry fighting

vehicles. The heavy division artillery consists of twenty-four 155-mm howitzers per brigade, twenty-four 8" cannons, and one Multiple Launch Rocket System (MLRS) battery with nine launchers. Additionally, there are two AHBs with twenty-one AH-64 Apache helicopters, each of which can carry eighteen Hellfire missiles. Another significant advantage that the Apache has over the Cobra is the Apache's night fighting capability.⁷¹

Given these significant differences, it seems obvious that when it fights mixed, the armor division gives up a great deal of firepower. Assuming that the armor division gives up a brigade of one mechanized infantry battalion and two armor battalions, it would lose the following major tank killing systems: 116 M1 tanks, 117 M2/M3 fighting vehicles, 24 TOW vehicles, 72 Dragons, and 24 155-mm howitzers. Thus, the heavy division gives up much more firepower than the LID could possibly replace with a LIB.⁷²

However, the issue here is not a firepower comparison between a light and a heavy division. The significant issue is at the corps level. Regardless of whether the LID is fought pure or mixed, the total number of major divisional firepower systems are the same within the corps. A question arises, though, about whether the LID's firepower should be enhanced at the expense of the more decisive armor division. Naturally, METT-T provides the deciding factors; however, it seems that distributing firepower assets in a mixed form detracts from the concept of weighting the main effort. Additionally, diluting the firepower assets

throughout the corps would be contrary to the AirLand Battle imperative of concentrating combat power.⁷³

Although counting major tank-killing systems is a simple measure of the volume of fires, determining firepower effectiveness is more difficult. Therefore, I have assumed that a unit's target acquisition capabilities are a good indicator of the effectiveness of its firepower. Discounting the corps' assets, the LID's target acquisition assets include the AN/ALQ-151 QUICKFIX airborne radar, AN/TPQ-36 mortar locating radars, and AN/PPS-5 Ground Surveillance Radars, and a long range surveillance detachment. Conversely, the heavy division has all of the above people and equipment, plus additional communications acquisition and intercept assets such as the AN/TRQ-32(V) TEAMMATE, AN/TRQ-32(V) radio receiving set, AN/TSQ-138 TRAILBLAZER, and AN/MSQ-103A TEAMPACK.⁷⁴ Therefore, the mixed formation provides the LID with a significantly better acquisition ability--if some of the above acquisition systems are cross attached. However, as with the firepower assets, enhancing the LID's target acquisition capability with heavy assets decentralizes the control of assets available to the mobile heavy divisions. Here again, it seems better not to task organize target acquisition systems in order to follow the AirLand Battle imperative of concentrating combat power.

In summary, the corps' total firepower does not change, regardless of whether the divisions are pure or mixed. However, the firepower of the LID is significantly improved when fighting

mixed since the mix increases the LID's volume of firepower and its target acquisition ability. A major shortcoming of a mixed division, however, is that it thins out the concentration of firepower assets available to the corps. If it fights pure, however, the LID's target acquisition shortfalls limit its ability to engage deep targets and execute counterfires.⁷⁵ In effect, the advantages and disadvantages balance each other out, so that the final arbiter becomes the results of a METT-T analysis.

The third combat worth criterion, **survivability**, is enhanced when the LID limits the enemy's observation of it by dispersing, by using camouflage, by moving through restrictive terrain, and by operating at night. It is more difficult to observe dismounted soldiers in rugged, broken terrain, such as mountains, than it is in such open areas as valley floors. Although the mixed force uses many of the same concealment techniques as the LID, the combination of vehicles and dismounted soldiers in a mixed force is more observable because vehicles provide a larger silhouette, are noisier, and occupy more space than light infantry. A disadvantage of the pure LID is that its capabilities dictate that it should be force oriented instead of terrain oriented.⁷⁶ Particularly in defending restrictive terrain, a force orientation allows the LID to use its relative **mobility** to maneuver against a mechanized force. On the other hand, a terrain orientation requires the LID to hold a particular piece of ground, which negates the LID's advantages of relative **mobility** and dispersal. Thus, the LID has less flexibility

than the mixed force. In addition, a terrain orientation in the defense could lead to high attrition in the LID because of improved weapon systems' lethality.

The LID's ability to mitigate firepower effects is minimal. The LID has one engineer battalion with six armored combat earthmovers (ACE) and eighteen small equipment excavators (SEE). The ACE is primarily used in a survivability role in the rear area by creating berms for fuel bladders and digging in other assets. The SEEs assist in construction tasks that include individual fighting positions, FA firing positions, cutting combat trails, and obstacle emplacement.⁷⁷ It appears, then, that a significant corps augmentation is needed to make a LID survivable in M/HIC.

When fighting mixed, the LIB takes the same survivability measures as the LID. However, a heavy division has an engineer brigade organic to its organization, as compared to only a battalion for the LID. Therefore, more ACEs, SEEs and other engineer vehicles are available for digging and creating obstacles. However, as with the firepower criterion, providing these engineer assets to the LIB would seem to reduce the effort available to the rest of the division. For example, the heavy division may have to decide to either weight the main effort or divert additional engineer assets to the light infantry to enhance the LIB's survivability. However, enhancing the LIBs' survivability by fighting mixed prohibits the concentration of divisional engineer combat power. Therefore, while it would seem

that a pure force can better weight the main effort than a mixed force can, the corps may have less flexibility on where it can use its engineer assets, since it must protect the LID. Again, the choice of mixed versus pure would seem to be dependent upon the situation.

CONCLUSIONS AND IMPLICATIONS

As General Edwin H. Burba Jr., the Commander-in-Chief of U.S. Forces Command, said, ". . . under most circumstances our contingency forces should comprise a mixture of heavy and light units."⁷⁸ Additionally, General John R. Galvin, the current Commander-in-Chief of U.S. European Command, once said that

[b]ecause of the differences in strategic mobility, planners and tactical commanders may have to get used to the idea of "phased tailoring"--beefing up the light force with selected elements (e.g. ATGMs, air defense systems, etc.) from the later-arriving heavies.⁷⁹

The issue has been to determine if heavy/light integration at the corps level--that is, by fighting the LID as a pure force--is better than heavy/light integration at the division level.

While I would like to be able to come to a clear cut conclusion, it appears that the preponderance of the evidence does not allow it. Neither position overwhelms the other. Essentially, it seems that I could have stopped my research after my analysis of doctrine. There, the conclusion was that the task organization was dependent upon METT-T. As my summary of historical and contemporary analyses show below, I would have to agree with doctrine; that is, it depends upon the situation.

Starting with the mobility issue, the mixed force is able to

move faster cross-country in less restrictive terrain by riding "piggy-back" on the heavy unit's vehicles. Additionally, the mixed force makes better use of the aviation lift assets within the heavy division. However, use of the pure light infantry force—as we saw in the two historical examples, enhances the corps' optempo better than the mixed force does.

As far as firepower is concerned, the *Gebirgjäger* lacked sufficient organic firepower. Additionally, although the Egyptian dismounted infantry had sufficient firepower for their initial mission, they also needed the additional assets provided by the second echelon heavy forces. A contemporary analysis reinforced the LID's firepower shortcomings. On the other hand, while cross-attaching brigades between heavy and light divisions augments the LID's firepower, it also attenuates the corps' combat power as a whole. Although this attenuation may be necessary for a specific mission, concentrating firepower by keeping the heavy divisions pure allows the corps to weight the main effort.

Finally, from a survivability standpoint at the division level, the pure forces are better able to limit observation by the enemy because the combination of vehicles and dismounted soldiers in the mixed force is more observable. The German *Gebirgjäger* demonstrated this advantage for pure forces in the mountains of Crete and the Egyptians further proved it in the desert of the Sinai. The second survivability consideration—mitigating enemy fires—showed that the LID is better off when

it fights mixed, but that the corps' **survivability** as a whole is enhanced when the forces are pure. Fighting the divisions pure enhances the corps' ability to concentrate its combat power.

In conclusion, distinct advantages and disadvantages exist for fighting the corps as pure or mixed forces. Ultimately, and in accordance with doctrine, METT-T and the commander's estimate process will determine the optimum level of heavy/light integration. Given the right situation, though, fighting the divisions as pure forces could enhance the corps' optempo and facilitate the concentration of combat power and subsequent weighting of the main effort. However, I cannot say that in all cases the optimal mix for a heavy corps in a M/HIC is to fight its attached LID pure.

Given the conclusion that fighting the LID as a pure force can enhance the combat worth of the heavy corps, the major implications would seem to apply to doctrine, organizational issues, and equipment needs. The doctrinal issue presents the shortfall which is most easily fixed. Doctrine is correct in stating that the commander's estimate process determines the level of heavy/light integration. However, no current light infantry division-level field manual or field circular completely or sufficiently addresses heavy/light issues. Although a M/HIC would be a "worst-case" situation, the light infantry division needs doctrine for fighting pure in those conditions. given the likelihood that future conflicts will involve a mix of heavy and light forces at some level.⁸⁰

The second implication applies to the LID's organization. The LID needs to increase its transportation capabilities and reduce its augmentation needs from external sources. The table of organization and equipment should be changed to replace the current transportation motor transport company with a light/medium truck company.⁸¹ Although this would decrease the number of trucks in the S&T Battalion from sixty to fifty, it would add ten tractors and twenty-five 22 1/2-ton semitrailers. This change would significantly increase both local and line haul capabilities, and thus add to the division's organic mobility capabilities.⁸²

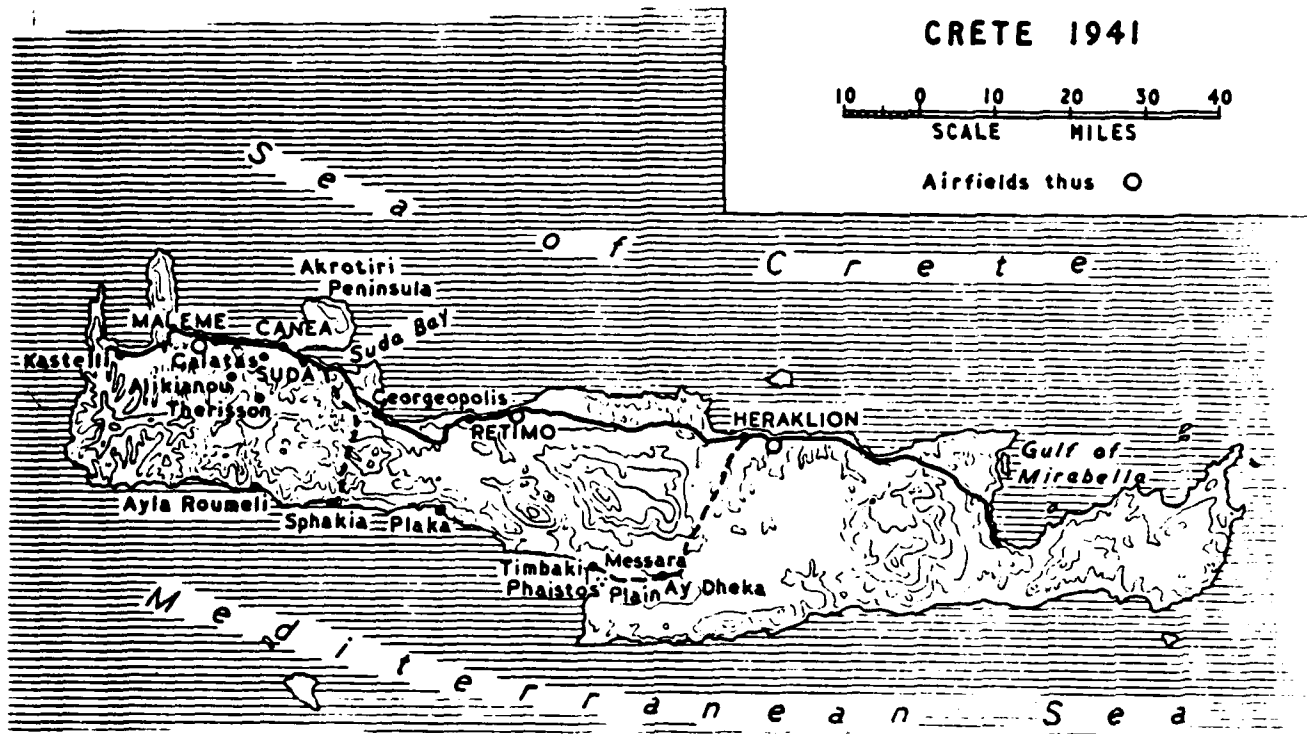
The third implication, and most noticeable, is in the area of equipment. Although we should resist the natural phenomenon of organizations to continue to add "just a few" more heavy weapons (since that could compromise strategic mobility), three weapons categories need immediate attention.⁸³ Lieutenant General Harrison, the first commander of the 7th ID (L) and later commander of I Corps, identified the equipment needed to make the LID capable of fighting across the spectrum of conflict.⁸⁴

We need a lightweight, more manoeverable [*sic*] 155-mm howitzer. We need a light anti-tank weapon--the Dragon is too big and bulky, and the TOW is the wrong weapon for the light infantryman to drag around the battlefield. And we need an improved anti-aircraft capability.⁸⁵

Although improvements in these three weapons are needed by all types of units, the need is even more acute in the LID because of its particular vulnerability to artillery, tanks,

and airpower. When these weapons are available, the LID will be even more capable of fighting as a pure force in a M/HIC. As LTG Taylor, Commander III Corps, said "I can assure you, in a smaller Army, we can only fight heavy/light or light/heavy. . . . The details of how to get the most out of force mixes have yet to be determined."⁸⁶

Appendix A: Map of Crete ⁸⁷



END NOTES

1. U.S. Army, FM 71-123, Tactics and Techniques for Combined Arms Heavy Forces: Armored Brigade, Battalion/Task Force, and Company/Team (Washington: Department of the Army, 1991), B-2.
2. Richard E. Simpkin, Race to the Swift: Thoughts on Twenty-First Century Warfare (London, Brassey's, 1986), 300-304.
3. U.S. Army, FM 100-5, Operations (Washington: Department of the Army, 1986), 41.
4. U.S. Army, FM 100-15, Corps Operations (Washington: Department of the Army, 1989), 5-18.
5. U.S. Army, FM 100-15-1, Corps Operations: Tactics and Techniques (Washington: Department of the Army, 1991), A-1.
6. Ibid.
7. U.S. Army, FM 71-100, Division Operations (Washington: Department of the Army, June 1990), A-2.
8. FM 71-100, A2-A6.
9. Simpkin, 81-82.
10. FM 100-5, Operations, 12.
11. Department of Defense, JCS Pub 1-02, Department of Defense Dictionary of Military and Associated Terms (Washington: Department of Defense, 1989), 237.
12. FM 100-5, Operations, 12.
13. Ibid., 135.
14. Huba Wass de Czege, "Understanding and Developing Combat Power," Advanced Military Studies Program Course 2 Readings, Book 1, 10 February 1984, 26-27.
15. FM 100-5, Operations, 16.
16. Hearing on Armed Services, United States Senate, "The Army's Light Division", 20 June 1985, 22.
17. Simpkin, 81.
18. FM 100-5, Operations, 13.
19. Wass de Czege, 13.

20. Simpkin, 81.
21. Wass de Czege, 30.
22. Webster's Encyclopedic Unabridged Dictionary of the English Language based on The Random House Dictionary of the English Language, the Unabridged Edition (New York: Portland House, 1983), 303.
23. Wass de Czege, 30-32.
24. Ibid., 30-32.
25. FM 100-5, Operations, 13.
26. James Lucas, Alpine Elite: German Mountain Troops of World War II (London: Jane's, 1980), 36.
27. Antoine H. Jomini, "The Art of War" in Roots of Strategy Book 2, ed. J.D. Hittle, (Harrisburg: Stackpole, 1987) 465.
28. David Garnett, The Campaign in Greece and Crete (London: His Majesty's Stationery Office, 1942), 63.
29. Buckley, 151.
30. Ibid., 157.
31. Ibid.
32. Lucas, 54.
33. Ibid., 56.
34. FM 100-5, Operations, 135.
35. Lucas, 73.
36. Ibid., 46-72.
37. Ibid., 61.
38. Ibid., 60-68.
39. Ibid., 52.
40. FM 100-5, Operations, 41.
41. Egyptian Colonel exchange officer, interviewed by author, Fort Knox, Kentucky, May 1982.

In 1981-2, I attended the Armor Officer Advanced Course

with an Egyptian Colonel who had been a battalion commander during the 1973 war. He stated that his Soviet advisor recommended reducing the Bar Lev Line with nuclear weapons. He also said that the Egyptian government did not follow that advice because the Suez Canal was in their homeland. The Egyptians then sought other alternatives.

42. Frank Aker, October 1973: The Arab-Israeli War (Hamden, CT: Archon, 1985), 21.

43. Hassan El Badri, Taha El Magdoub, and Mohammed Dia El Din Zohdy, The Ramadan War, 1973 (Cairo: United Press, 1974), 62.

44. Aker, 26.

45. David Eshel, Mid-East Wars: The Yom Kippur War (Hod Hasharon, Israel: Eshel-Dramit, 1978), 9.

46. LTC Ezzeldin A Mahmoud, CGSC Allied Officer from Egypt, interviewed by author, Fort Leavenworth, KS, 29 October 1991. This note applies to the entire paragraph.

47. Hassan El Badri, The Ramadan War, 1973, 62.

48. Eshel, 10-11, 14.

49. Elizabeth Monroe and A.H. Farrar-Hackley, The Arab-Israel War, October 1973: Background and Events (London: The International Institute for Strategic Studies, 1975), 31.

50. Aker, 27.

51. Monroe, 33.

52. Aker, 23, 28.

53. Ibid., 28-29.

54. Eshel, 48.

55. John A. English, On Infantry (New York: Praeger, 1981), 188.

56. Ibid., 188.

57. Ibid.

58. Aker, 26.

59. Monroe, 33.

60. FM 71-100, A-10.

61. A typical brigade "slice" of combat support and combat service support would likely include a field artillery battalion, forward support battalion, engineer battalion, signal platoon, air defense artillery platoon, military intelligence platoon (GSR), chemical platoon(s), and a military police platoon.

62. 7th Infantry Division (Light), Capabilities Book, 15 June 1987, 1-10.

63. J.M. Hutchinson "Of Tanks and Infantry: Lessons of Heavy-Light Integration Learned Forgotten and Relearned," (War College Thesis, US Army War College, Carlisle Barracks, PA. 5 April 1991), 67.

"In most NTC mixed-force rotations the necessary support for light forces is generated by similar ad hoc arrangements within the host heavy division. Corps plugs are seen as a panacea. The question as to what extent they really exist may not have been satisfactorily examined."

64. Independent Observation Report (IOR) on the 10th Mountain Division (Light Infantry) During REFORGER 90, US Army TRADOC, TRADOC Independent Evaluation Directorate (TIED), Fort Leavenworth, Kansas, undated.

Para 3.2.4.3 Organization.

a. "The corps failed to provide required augmentation to the light infantry division."

d. "The ability of a COSCOM to support a heavy corps and a light infantry division simultaneously has not been analyzed/verified. TRADOC should examine the capability of the COSCOM to provide augmentation to the light infantry division operating in a mid- to high-intensity environment."

65. LTG Ronald L. Watts, VII Corps After Action Report, Light Infantry Employment in the European Environment, REFORGER 88 (18 November 1988), 17.

"During Certain Challenge 88, the LIB (light infantry brigade) required a significant percentage of 2nd COSCOM's fleet of five ton cargo trucks as troop transportation during the deployment phase. In order to support the LIB, all five-ton cargo trucks assigned to the 4th Transportation Battalion (previously directed for turn in), as well as 20 organic mission vehicles from 2nd COSCOM were required. The diversion of a large amount of transportation assets reduced 2nd COSCOM's ability to move supplies and repair parts forward to VII Corps MSCs and its own units from which the organic five-tons had been obtained."

66. 7th ID(L) Capabilities Book, 15-1 to 15-11.

67. 7th ID (L) Capabilities Book, 5-1.

Although the Capabilities Book states that the two AHCs can move two infantry battalions in a single lift, I do not believe that this correct. Page 3-3 of the Capabilities Book states that an infantry battalion has 570 personnel. If both AHCs had all aircraft available, without seats, only 600 personnel can be moved in a single lift. Therefore, two AHCs with 100% operational aircraft can only move one battalion + in a single lift.

The 7th ID(L) Capabilities Book, 15-11 confirms that the maximum troop capacity, without seats, is twenty passengers. This information was further substantiated by MAJ Brad Mascn, a Blackhawk helicopter pilot who has flown the Blackhawk helicopter in combat.

68. U.S. Army, FM 71-3, Armored and Mechanized Brigade Operations, (Washington: Department of the Army, 1988), A-1.

69. Steven W. Senkovich, "Heavy-Light Offensive Desert Operations" (School of Advanced Military Studies Monograph, US Army Command and General Staff College, 1990), 39.

70. 7th ID(L) Capabilities Book, 3-3, 4-3, 5-2.

71. FM 101-10-1/1, 1-1 to 1-255.

72. 7th ID(L) Capabilities Book, 3-3.

The LIB could compensate the heavy division with the following major tank-killing systems:

| | |
|----|-----------------|
| 12 | TOW |
| 54 | DRAGON |
| 18 | 105-mm HOWITZER |

73. FM 100-5 Operations, 23.

74. US Army, FM 71-100-1, Armor and Mechanized Division Operations: Tactics and Techniques (Washington: Department of the Army, 1 May 1991), 1-38 to 1-40.

The AN/TRQ-32 (V) TEAMMATE is a communications intercept and direction-finding (DF) system designed to detect, record, and provide location information on threat communications emitters. The system provides HF, VHF, and UHF communications intercept, and VHF line of bearing (LOB) DF.

The AN/TRQ-30 (V) is a man-transportable, battery-powered LOB and intercept SIGINT system designed to search for and determine the bearing of radio signals in the 0.5- to 150-

megahertz range. It has an operating range of approximately a brigade area of interest.

The AN/TSQ-138 TRAILBLAZER is a ground-based VHF and UHF intercept and DF system. The heavy division CEWI battalion normally has one TRAILBLAZER system, consisting of five stations.

The AN/MSQ-103A TEAMPACK intercepts, processes, records, and provides LOB data on noncommunications emitters. The TEAMPACK system is a transportable, ground-based electronic intelligence system designed to detect and provide LOB information on threat countermortar, counterbattery, combat surveillance, and target-acquisition radars.

75. FM 71-100, A-13.

76. 7th ID(L) Capabilities Book, 1-10.

77. Ibid., 7-1.

78. Edwin H. Burba, Jr., "FORSCOM in a Changing Era: Gulf Crisis Demonstrates the Need for Contingency Force Versatility." Army Green Book (October 1990): 50.

79. John R. Galvin, "The Heavy-Light Concept." Infantry (July 1982): 74.

80. Carl Vuono, "Today's US Army: Trained and Ready in an Era of Change." Army Magazine (October 1989): 22.

81. IOR, 10th Mountain Division (Light Infantry) During REFORGER 90, 12.

82. U.S. Army, Student Text 101-6, G1/G4 Battle Book (US Army Command and General Staff College, Fort Leavenworth, KS, 1 June 1991), 4-24, 4-29.

83. William E. Dupuy, "The Light Infantry: Indispensable Element of a Balanced Force," Army Magazine (June 1985): Table of Contents Summation.

84. "Role of U.S. Light Infantry," Jane's Defense Weekly (29 October 1988): 1076.

85. Ibid., 1076-1077.

86. LTG Taylor, Commander III Corps, U.S. Army, in a presentation to the School of Advanced Military Studies, 29 October, 1991. (Quoted with LTG Taylor's permission).

87. Christopher Buckley, Greece and Crete 1941 (London: Her

Majesty's Stationery Office, 1952), 148.

BIBLIOGRAPHY:

1. Interviews

- Mahmoud, Ezzeldin A. Interview by Patrick J. Beer, 29 October 1991. Bell Hall, Command and General Staff College, Fort Leavenworth, KS.
- Mason, Brad. Telephone interview by Patrick J. Beer, 29 October 1991. Fort Leavenworth, KS.
- Torok, Ernie. Interview by Patrick J. Beer, 29 October 1991. Sheridan Hall, AirLand Battle Future Office, Fort Leavenworth, KS.
- Unidentified Egyptian Colonel. Interview by Patrick J. Beer, o/a 15 February 1982. Boudinot Hall, Armor Officer Advanced Course, Fort Knox, KY.

2. Articles

- Burba, Edwin H. Jr. "FORSCOM in a Changing Era: Gulf Crisis Demonstrates the Need for Contingency Force Versatility," Army Green Book (October 1990): 50-51.
- Crowell, Howard G. and Jared L. Bates. "Heavy-Light Connection: Division." Infantry (July-August 1984): 18.
- Downing, Wayne A. "Light Infantry Integration in Central Europe," Military Review (September 1986): 18-29.
- Dupuy, William E. "The Light Infantry: Indispensable Element of a Balanced Force," Army (June 1985): 29.
- Editor. "Role of U.S. Light Infantry." Jane's Defense Weekly (29 October 1988): 1076-1077.
- English, J.A. "Thinking About Light Infantry." Infantry (November-December 1984): 22.
- Eshel, David. "The US Army Light Division, Right of Wrong?," National Defense (May-June 1987): 58.
- Galvin, John R. "Heavy-Light Forces and the NATO Mission." Infantry (July-August 1984): 11.
- Galvin, John R. "The Heavy-Light Concept." Armed Forces Journal International (July 1982): 66-74.
- House, Jonathan M. "Designing the Light Division," Military Review (May 1984): 47.

- Huddleston, Louis D. "Light Infantry Division: Azimuth Check," Military Review (September 1985): 16.
- McMichael, Scott R. "Proverbs of the Light Infantry," Military Review (September 1985): 24-27.
- Motley, James B. "Heavy-Light Forces: Assessing the Challenges," Infantry (January-February 1985): 13.
- Newell, Clayton. "Heavy-Light Forces Divisions or Brigades?," Infantry (January-February 1985): 12-13.
- Vuono, Carl. "Today's US Army: Trained and Ready in an Era of Change." Army (October 1989): 22.
- Wass de Czege. "Three Kinds of Infantry," Infantry (January-February 1985): 11.
- Wood, Jack B. "Heavy-Light Connection: Brigade." Infantry (July-August 1984): 22.

2. Books

- Adan, Auraham. On the Banks of the Suez: An Israeli General's Personal Account of the Yom Kippur War. New York: Presidio, 1980.
- Aker, Frank. October 1973: The Arab-Israeli War. Hamden, CT: Archon, 1985.
- Allen, Peter. The Yom Kippur War. New York: Scribner's, 1982.
- Badri, Hassan El and Taha El Magdoub and Mohammed Dia El Din Zohdy. The Ramadan War, 1973. Cairo: United Press, 1974.
- Buckley, Christopher. Greece and Crete 1941. London: Her Majesty's Stationery Office, 1942.
- Cooper, Matthew. The German Army: 1933-1945. Chelsea: Scarborough House, 1978.
- English, John A. On Infantry. New York: Praeger Special Studies, 1981.
- Eshel, David. Mid-East Wars: The Yom Kippur War. Hod Hasharon, Israel: Eshel-Dramit, 1978.
- Gabriel, Richard A. Operation Peace for Galilee: The Israeli-PLO War in Lebanon. New York: Hill and Wang, 1984.

- Garnett, David. The Campaign in Greece and Crete. London: His Majesty's Stationery Office, 1942.
- Heilbrunn, Otto. Warfare in the Enemy's Rear. New York: Praeger, 1963.
- Herzog, Chaim. The Arab-Israeli Wars: War and Peace in the Middle East. New York: Random House, 1982.
- Insight Team of the London *Sunday Times*. The Yom Kippur War. New York: Doubleday, 1974.
- Jomini, Antoine H. "The Art of War." In Roots of Strategy Book 2. Harrisburg: Stackpole, 1987.
- Lucas, James. Alpine Elite: German Mountain Troops of World War II. London: Jane's, 1980.
- Marshall, S.L.A. Men Against Fire: The Problem of Battle Command in Future War. Gloucester, Mass: Peter Smith, 1978.
- Monroe, Elizabeth and A.H. Farrar-Hackley. The Arab-Israel War, October 1973: Background and Events. London: The International Institute for Strategic Studies, 1975.
- Mrazek, James E. The Fall of Eben Emael: Prelude to Dunkerque. Luce: Privately Published, 1970.
- Natkiel, Richard. Atlas of World War II. New York: The Military Press, 1985.
- Simpkin, Richard E. Race to the Swift: Thoughts on Twenty-First Century Warfare. London: Brassey's, 1986.
- Sobel, Lester A. Editor. Israel and the Arabs: The October 1973 War. New York: Facts on File, 1974.
- Stokesbury, James L. A Short History of World War II. New York: William Morrow and Company, 1980.
- Thomas, David A. Nazi Victory: Crete 1941. New York: Stein and Day, 1972.
- Von Manstein, Erich. Lost Victories. Novato, CA: Presidio Press, 1982.
- Webster's Encyclopedic Unabridged Dictionary of the English Language. Based on The Random House Dictionary of the English Language, the Unabridged

Edition. New York: Portland House, 1983.

3. Government Documents and Studies

Army Chief of Staff General E.C. Meyer. White Paper, 1980: A Framework for Molding the Army of the 1980s Into a Disciplined, Well-Trained Fighting Force. Washington DC: Department of the Army, 25 February 1980.

Department of Defense. JCS Pub 1-02, Department of Defense Dictionary of Military and Associated Terms. Washington DC: Department of Defense, 1989.

US Army. Capabilities of the Light Infantry Platoon-Motorized (CLIP-M). US Army Combat Developments Experimentation Center, Fort Ord, California, August 1984.

US Army. Independent Evaluation Report (IER) for Certification of the Light Infantry Division. Volume 1, Main Report. Combined Arms Center, Fort Leavenworth, Kansas, March 1987.

US Army. FM 7-30, Infantry, Airborne, and Air Assault Brigade Operations. Washington DC: Department of the Army, 24 April 1981.

US Army. FM 71-3, Armored and Mechanized Brigade Operations. Washington DC: Department of the Army, 1988.

US Army. FM 71-100, Division Operations. Washington DC: Department of the Army, June 1990.

US Army. FM 71-100-1, Armor and Mechanized Division Operations: Tactics and Techniques. Washington DC: Department of the Army, 1 May 1991.

US Army. FM 71-101, Infantry, Airborne, and Air Assault Division Operations. Washington DC: Department of the Army, March 1980.

US Army. FM 71-123, Tactics and Techniques for Combined Arms Heavy Forces: Armored Brigade, Battalion/Task Force, and Company/Team. Washington DC: Department of the Army, June 1991.

US Army. FM 100-5, Operations. Washington DC: Department of the Army, May 1986.

- US Army. FM 100-7, The Army in Theater Operations
(Draft). Fort Monroe, VA, 31 July 1990.
- US Army. FM 100-15, Corps Operations. Washington DC:
Department of the Army, September 1989.
- US Army. FM 100-15-1, Corps Operations: Tactics and
Techniques. Washington DC: Department of the Army,
1991.
- US Army. FM 101-5, Staff Organization and Operations.
Washington DC: Department of the Army, 25 May 1984.
- US Army. FM 101-10-1/1, Staff Officers' Field Manual
Organizational, Technical, and Logistical Data
(Volume 1). Washington DC: Department of the Army,
October 1987.
- US Army. Heavy/Light Corps Middle East Evaluation.
Volume I, Executive Summary, June 1974.
- US Army. Independent Observation Report (IOR). 10th
Mountain Division (Light Infantry) During REFORGER
90. TRADOC Independent Evaluation Directorate
(TIED). Fort Leavenworth, Kansas, Undated.
- US Army Infantry School. Light Infantry Briefing Slides.
1989.
- US Army. ST 101-6, G1/G4 Battle Book. Fort Leavenworth,
KS: US Army Command and General Staff College,
1 June 1991.
- US Army. ST 100-9, Techniques and Procedures for
Tactical Decisionmaking. Fort Leavenworth, KS: US
Army Command and General Staff College, July 1991.
- US Army. "The Army's Long Range Plan for Fielding Light
Divisions." Report to Congress. Appendix 1 to Annex
A, April 1985.
- US Army. The Stone Forest: A Heavy/Light Combat
Narrative. Center for Army Lessons Learned, Fort
Leavenworth, Kansas, May 1990.
- US Army. VII Corps After Action Report, Light Infantry
Employment in the European Environment, REFORGER 88.
18 November 1988.
- US Army. 7th Infantry Division (Light) Capabilities
Book. Fort Ord, CA, 15 June 1987.

US Congress. Senate Armed Services Committee. Hearing on the Army's Light Division. Washington DC: Government Printing Office, 20 June 1985.

4. Unpublished Theses and Papers

Huggins, C.R. "The Light Infantry in High-Intensity Combat Environment." Air War College, Maxwell AFB, Alabama, May 1987.

Hutchinson, J.M. "Of Tanks and Infantry: Lessons of Heavy-Light Integration Learned Forgotten and Relearned." War College Thesis, US Army War College, Carlisle Barracks, Pennsylvania, 1991.

Kirkland, Donald E. "Offensive Operations in Urban Europe: The Need for a 'Heavy' Light Infantry Force." School of Advanced Military Studies, US Army Command and General Staff College, 1985.

McMichael, Scott R. "A Historical Perspective on Light Infantry." Combat Studies Institute Research Survey #6. Fort Leavenworth, Kansas, 1987.

Poston, David L. "Light Infantry Augmentation to Heavy Divisional Forces in Europe." Master of Military Arts and Science Thesis, US Army Command and General Staff College, 1989.

Senkovich, Steven W. "Heavy-Light Offensive Desert Operations." School of Advanced Military Studies, US Army Command and General Staff College, 1990.

Thurman, Edward E. "The Light Infantry Division, An Operational Force." School of Advanced Military Studies, US Army Command and General Staff College, 1985.

Wass de Czege, Huba. "Understanding and Developing Combat Power." Advanced Military Studies Program Course 2 Readings, Book 1, Fort Leavenworth, Kansas, 1984.