

AD-A191 405

DTIC
SELECTED
APR 05 1988
S D

A LOOK AT DEEP OPERATIONS: THE OPTION
OF DEEP MANEUVER

by

Major David C. Mock
Armor

School of Advanced Military Studies
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas

31 December 1987

Approved for public release, distribution is unlimited.

88-2173

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION Unclassified		1b. RESTRICTIVE MARKINGS	
2a. SECURITY CLASSIFICATION AUTHORITY		3. DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution unlimited.	
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE			
4. PERFORMING ORGANIZATION REPORT NUMBER(S)		5. MONITORING ORGANIZATION REPORT NUMBER(S)	
6a. NAME OF PERFORMING ORGANIZATION School of Advanced Military Studies, USAC&GSC	6b. OFFICE SYMBOL (if applicable) ATZL-SWV	7a. NAME OF MONITORING ORGANIZATION	
6c. ADDRESS (City, State, and ZIP Code) Fort Leavenworth, Kansas 66027-6900		7b. ADDRESS (City, State, and ZIP Code)	
8a. NAME OF FUNDING / SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (if applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c. ADDRESS (City, State, and ZIP Code)		10. SOURCE OF FUNDING NUMBERS	
		PROGRAM ELEMENT NO.	PROJECT NO.
		TASK NO.	WORK UNIT ACCESSION NO.
11. TITLE (Include Security Classification) A Look at Deep Operations: The Option of Deep Maneuver			
12. PERSONAL AUTHOR(S) Major David C. Mock, USA			
13a. TYPE OF REPORT Monograph	13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Year, Month, Day) 87/12/31	15. PAGE COUNT 45
16. SUPPLEMENTARY NOTATION			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	
		Deep operations, Deep attack, Deep battle, Deep maneuver, Interdiction ←	
19. ABSTRACT (Continue on reverse if necessary and identify by block number) The idea of interdicting lines of communications, restricting the employment of reserve forces, destroying supply bases, or cutting off routes of withdrawal has been the object of deep operations throughout the history of modern warfare. This paper seeks to address the implications of deep operations doctrine in regard to maneuver capability. It begins by exploring the concepts of deep operations through the analysis of military theorist like Carl von Clausewitz, J.F.C. Fuller, B.H. Liddell Hart, Donn Starry and Richard Simpkin. Next, it validates the deep operations concept by examining the theory's implementation by the Germans in Russia, 1941, the U.S. 4th Armored Division in Western Europe, 1944 and more recently by the Israelis in the Sinai, 1967. Finally the study reviews the evolution of contemporary deep operations doctrine. It explores the dynamic balance between firepower and maneuver and how the nature of battle continues to change as each takes the dominant role. It concludes with some considerations for the conduct of deep operations in contemporary battle. <i>(Keywords)</i>			
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL Major David C. Mock		22b. TELEPHONE (Include Area Code) (913) 684-2963	22c. OFFICE SYMBOL ATZL-SWV

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

A LOOK AT DEEP OPERATIONS: THE OPTION
OF DEEP MANEUVER



by

Major David C. Mock
Armor

School of Advanced Military Studies
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas

31 December 1987

Approved for public release, distribution is unlimited.

88-2173

School of Advanced Military Studies
Monograph Approval

Name of Student: David C. Mock

Title of Monograph: A Look at Deep Operations: The Option of
Deep Maneuver

Approved by:

James R. McDonough Monograph Director
Lieutenant Colonel James R. McDonough, M.S.

L.D. Holder Director, School of
Colonel L.D. Holder, M.A. Advanced Military Studies

Philip J. Brookes Director, Graduate Degree
Philip J. Brookes, Ph.D. Program

Accepted this 4th day of March 1988

ABSTRACT

A LOOK AT DEEP OPERATIONS: THE OPTION OF DEEP MANEUVER by
MAJ David C. Mock, USA, 40 pages.

The idea of interdicting lines of communication, restricting the employment of reserve forces, destroying supply bases, or cutting off routes of withdrawal has been the object of deep operations throughout the history of modern warfare.

This paper seeks to address the implications of deep operations doctrine in regard to maneuver capability. It begins by exploring the concept of deep operations through the analysis of military theorists like Carl von Clausewitz, J.F.C. Fuller, B.H. Liddell Hart, Donn Starry and Richard Simpkin. Next, it validates the deep operations concept by examining the theory's implementation by the Germans in Russia, 1941, the U.S. 4th Armored Division in Western Europe, 1944 and more recently by the Israelis in the Sinai, 1967.

Finally, this study reviews the evolution of contemporary deep operations doctrine. It explores the dynamic balance between firepower and maneuver and how the nature of battle continues to change as each takes the dominant role. The concept of deep operations is still valid in contemporary warfare. However, at present we are relying on technology to provide a firepower solution to deep operations at the expense of maneuver. This firepower solution provides the enemy with a one dimensional, relatively simple problem to solve. The paper concludes that success on the modern battlefield will come only from a balanced approach of fires and maneuver in the deep battle.

Table of Contents

	Page
1. Introduction.....	1
2. Theory and History of Deep Operations	
Deep Operations Theory	3
Historical Examples of Deep Operations.....	12
3. Contemporary Deep Operations Concepts.....	25
4. Contemporary Application of the Deep Operations Concept.....	29
5. Doctrinal Implications.....	35
6. Conclusion.....	39
Endnotes	
Bibliography.....	43

INTRODUCTION

In 1982 the US Army adopted Airland Battle as its warfighting doctrine. The new doctrine was a major departure from the 1976 version in that it defined the modern battlefield not just as a single battle fought by troops at the FLOT (front line of troops) but one that would be fought in depth, both ours and the enemy's, thus restoring concepts that have long been part of our military heritage. The battlefield envisioned by the Airland Battle concept consists of three interrelated battles: close, (the battle at the FLOT), rear, (operations behind the FLOT), and deep, (operations in the enemy rear). As the title states the scope of this paper is deep operations at the tactical level. To use a common frame of reference FM 100-5 defines deep operations and their purpose as:

activities directed against enemy forces not in contact designed to influence the conditions in which future close operations will be conducted....At the tactical level deep operations are designed to shape the battlefield to assure advantage in subsequent engagements.¹

This concept of deep battle is not a revolutionary one. Nor is it new to the American way of war. The results of interdicting lines of communication, delaying or prohibiting the employment of additional forces into the battle, destroying bases of supply, severing routes of withdrawal and capturing or destroying command and control facilities have ensured the success of numerous military operations.

Historically operations in the enemy's rear have multiplied the effects of defeat, causing the collapse of the entire enemy force. In short, leverage gained by attacking the enemy in his rear versus applying that same force against his front can yield a greater result. Or as Carl von Clausewitz said, "... the effect of an action on the rear or flanks will not in itself multiply our forces. Rather it will raise their potential to a higher power..."²

The means to conduct deep operations today are much more sophisticated than with armies of the past but the purpose is still the same. The current U.S. Army doctrine sums up the concept as:

The object of all operations is to impose our will upon the enemy-to achieve our purposes. To do this we must throw the enemy off balance with a powerful blow from an unexpected direction...The best results are obtained when powerful blows are struck against critical units or areas whose loss will degrade the coherence of enemy operations in depth, and thus most rapidly and economically accomplish the mission.³

As currently stated in FC 100-15-1, Corps Deep Operations, the means to execute deep operations are one of the elements of the "Operational Triad"⁴: Fires, C²CM (command and control counter measures), and Maneuver. FM 100-5 explains the use of these elements in deep operations as:

The primary assets for deep attack are aerial, artillery, and missile weapons. However, conventional and unconventional ground and air maneuver units can also

interdict enemy movement and neutralize key facilities in depth."

The doctrine makes the statement that fires delivered by air (Battlefield Air Interdiction at the tactical level) and artillery are the preferred method of fighting the deep battle while the use of ground or air (attack helicopters) maneuver forces are the less preferred. If this is the case, why is it so? Are the effects of fires today such that a maneuver force is no longer a practical solution to deep operations? Has the design of maneuver forces made them unwieldy if they are of sufficient size to be a credible threat? Or is it that the necessary coordination for deep maneuver by either ground or air units make that option too difficult when compared to deep fires? Perhaps it could be that the American way of war has habitually sought a firepower oriented doctrine?

This paper seeks to address the implications of deep operations doctrine in regard to maneuver capability. To answer the question the paper looks into the classic and contemporary theory of deep operations through an examination of some important figures in the development of American doctrine. It then validates the theory through an examination of the historical use of deep operations. Finally, the paper concludes with an analysis of some doctrinal voids and possible considerations for deep operations for maneuver forces.

Theory and History of Deep Operations

Deep Operations Theory

An army's fundamental doctrine is the condensed expression of its approach to fighting campaigns, major operations, battles and engagements. Tactics, techniques, procedures, organizations, support structure, equipment and training must all derive from it. It must be rooted in time tested theories and principles, yet forward-looking and adaptable to changing technologies, threats, and missions.*

FM 100-5, Operations, is the U.S. Army's warfighting doctrine. It is rooted in the theories of classical and contemporary writers whose concepts have been tested in warfare over the years. At the same time it applies current and future technologies to the conduct of war.

Understanding the contemporary doctrine as it addresses deep operations requires the examination of its particular foundation in classical and contemporary theory. To do this requires a review of some classical theorists, such as Carl von Clausewitz, J.E.C. Fuller, B.H. Liddell Hart, and a few contemporary ones, like Generals Donn Starry and Richard Simpkin.

Through his study and experience in war, Clausewitz understood that the battlefield was not linear. He knew the effect, in both the moral and physical dimension, that deep operations played in the conduct of successful operations. He addresses the effect with the statement:

The risk of having to fight on two fronts, and even the greater risk of finding one's retreat cut off, tend to paralyze movement and the ability to

resist and so affect the balance between victory and defeat. In the case of defeat, they increase the losses and can raise them to their very limit-to annihilation. A threat to the rear can, therefore, make a defeat more probable, as well as more decisive.⁷

In his time the cavalry arm had the greatest mobility differential; therefore, they were normally the reserve. They could be committed to the fight just as a reserve would be today by either applying them directly to the nose of the enemy or to his flanks or rear. The cavalry's objective would be to cut the lines of communication, destroy the bases of supply, block the withdrawal of enemy forces or interdict uncommitted forces enroute to influence the main battle. Of the two possible applications. Clausewitz is quite clear on the most effective:

So far we have treated rapid reinforcement of the losing side as a simple addition of strength, with support coming up from the rear, which is normally what happens. But an entirely different situation arises when the reinforcements attack the enemy's flank or rear...in most cases reinforcements are much more effective when approaching the enemy from the flank or rear, just as a long handle gives greater leverage. In that way it is possible to restore an engagement with a force that would have been insufficient if used against the front.*

Lines of communication have two functions according to Clausewitz. They are a source of supply and a route of withdrawal.* If the aim of the deep operation is to cut the lines of communication then there may be two objectives for the operation as well:

It may aim at disrupting, or cutting communications, causing the enemy to wither and die, and thus be forced to retreat; or it may aim at cutting off the retreat itself.¹⁰

He adds that in regard to the first objective, the manner in which modern armies are supplied, it may take time for the effect to be significant, and in regards to the second objective, a breakthrough is virtually certain with disciplined troops.

The mission of the reserve may not always require the destruction of the enemy force, the disruption of his lines of communication or the interdiction of his reserves to have an effect on the action at the main battle. The threat of the reserve force being used against an enemy's vulnerability is sufficient at times to draw forces away from the main battle to protect that vulnerability. Since in war a clear picture of the enemy's intention or the size of his force is a rarity, the use of forces to draw the enemy away from his main focus can be used quite effectively. Clausewitz calls this a diversion.

Clausewitz states that the effect of a force applied against the enemy's rear has a greater potential than one applied to his front, but he also understood that the risk is potentially higher as well. He cautions that:

...One should particularly bear in mind the principle stated at the start, namely, that troops used in the enemy's rear cannot be used against his front; that is to say, that the effect of an action on the rear or flanks will not in itself multiply our forces. Rather it will raise potential to a higher power-

higher to possible success, but also
higher to possible danger.¹¹

Accurate and timely intelligence is essential for the success of deep operations. Aggressive reconnaissance providing a clear picture of the enemy's rear area is a must for the survivability of the deep operation's force. Modern technology is working to provide that capability for without it the risk to the force in the enemy rear is high. Clausewitz, always wary of intelligence, advises us to the risk of deep operations without accurate intelligence:

Remember that both sides fumble in the dark at all times. One will quickly realize that a party sent past the enemy's wing to raid his rear is like a man in a dark room with a gang of enemies. They will get him in the end. The same fate awaits the raiders.¹²

Clausewitz perceived the purpose and objectives of deep operations. He knew the potential benefits of a deep operation versus a frontal operation and he appreciated the risks associated with sending a force into the enemy rear. Recognizing which objectives are worth the risks and when to take those risks is a difficult condition to establish.

A more recent theorist, J.F.C. Fuller, also addresses deep operations as a fundamental element of warfare. He realized that with the advent of the gas engine there would be greater mobility and capability to conduct operations in the enemy's rear. Fuller states that mechanization will make it "...easier to turn the flanks of a hostile force and attack it in the rear".¹³ He logically continues that if the gas engine is the key to mobility, fuel must be a critical

element. An additional aim of deep operations will be the destruction or capture of the enemy's bases of supply.

Fuller's experiences and observations in the First World War demonstrated to him the value of the tank and the airplane. Looking to the future he prophesied that:

It is the overwhelming blow which above all others paralyzes an enemy's will, and in the future the object will undoubtedly be simultaneously to strike such a blow on the ground and the air.¹⁴

Although Fuller was not specifically addressing deep operations with this statement, the implications for deep operations are quite evident. He does make it quite clear, however, that the main effort of warfare takes shape in rear operations where the payoff is greatest:

The frontal threat and the frontal holding attack are quite different operations. The object of the first is to compel the enemy to assume the defensive, and of the second to force him to maintain it; in other words, to pin him to a locality. Once this is accomplished the true attack takes the form of a flank or rear maneuver.¹⁵

A contemporary of Fuller was B.H. Liddell Hart. A proponent of maneuver, he saw that mechanization would again even the balance between firepower and maneuver which had been so radically upset in WW I. Liddell Hart believed that mechanization of armies would change the nature of battle in that the reliance on lines of communication for supplies, fuel, repair parts and ammunition would make the enemy rear area the "Achilles' heel" of his operation. The destruction of the enemy's supply lines would influence the outcome of

battle with at least the same effect as the destruction of his combat units. Supply lines being a more vulnerable target would exact a lesser cost than the destruction of forces at the front. Liddell Hart gives us some advice on deciding the depth and thus the object of our deep attack:

In the planning of any stroke at the enemy's communications, either by maneuver round his flank or by rapid penetration of a breach in his front, the question will arise as to the most effective point of aim-whether it should be directed against the immediate rear of the opposing force, or further back....In general, the nearer to the force that the cut is made, the more immediate the effect, the nearer to the base the greater the effect. In either case, the effect becomes much greater and more quickly felt if made against a force that is in motion, and in course of carrying out an operation, than against a force that is stationary.¹⁶

Liddell Hart also makes the case that the effect is not just physical. Although the destruction of forces or supplies in the rear has a physical effect it has a psychological effect as well. Like Clausewitz, Liddell Hart believes that it will affect the moral fiber of the troops and the commander. The depth of the attack is what makes the difference on where the effect has the most influence.

A further consideration is that while a stroke close in rear of the enemy force may have an effect more on the minds of enemy troops, a stroke far back tends to have more effect on the mind of the enemy commander.¹⁷

The essence of tactics for Liddell Hart was to attack the enemy in two directions simultaneously, so while fighting in one direction the enemy was vulnerable in the

other. The created dilemma would make the enemy strong in one place while vulnerable in another, thus being weaker all around. In either case the enemy's strength could not be concentrated or focused on just one fight at a time.

...while one limb of the force fixes the enemy, pinning him to the ground and absorbing his attention and reserves, the other limb strikes at a vulnerable and exposed point-usually the flank or line of retreat and communications in war...^{1*}

Technology has changed the nature of warfare since the time of Clausewitz, Fuller and Liddell Hart. That change is most apparent in the ever dynamic balance between firepower and maneuver. Although the notion and purpose of deep operations have remained the same, the means to strike deep into the enemy's rear have changed through technological innovation. This same innovation tilts the scale first toward firepower then to maneuver and back. Contemporary theorists like Generals Richard Simpkin and Donn Starry take the concepts of deep operations and apply them to the modern and future battlefields with an eye to this constantly changing balance.

Unlike their predecessors whose concepts were of a general nature, the contemporary theorists, specifically Starry and Simpkin, address a particular theater and enemy. This makes great sense because today our most serious threat is from the Soviet Union, and logically our doctrine should focus on him.

General Starry's concepts were instrumental in reorienting the U.S. Army from the focus on airmobile warfare in Viet Nam to the contemporary threat and battle in Europe. He addresses deep operations as a requirement for victory, but does it with a slight modification from the classical approach. He specifically states that the need for deep attack emerges from the nature of our potential enemies.

What is important is that superiority in numbers permits him to keep a significant portion of his force out of the fight with freedom to commit it either to overwhelm or to bypass the friendly force. The existence of these follow-on echelons gives the enemy a strong grip on the initiative which we must wrest from him and then retain in order to win.¹⁹

General Starry's concept of deep operations is designed to control the tempo of the close battle by controlling the rate the enemy can introduce his forces into the fight. Interdicting the enemy's uncommitted echelons before they arrive to influence the main battle will create opportunities to seize the initiative from him. General Starry's vision for the structure of the U.S. Army is based on the essential need for deep operations.

Like General Starry, General Richard Simpkin sees the aim (in the present) of deep operations as the disruption of the enemy's uncommitted forces to throw him off of his plan, thus, creating conditions for friendly forces to seize the initiative. He extends the notion of deep operations into the future with an eye on technology that increases the

effects of future munitions to do more than delay and disrupt but destroy as well. His concept of "interchangeability" says that in the future, the effects of fires and ground forces may be so similar that deep operations can be conducted by either fire or maneuver. His concept of deep operations is not focused on a specific technology or a single system. Instead, Simpkin proposes alternatives for the future deep operation.

Historical Examples of Deep Operations

The preceding military theorist developed the concepts of deep operations from analysis of historical examples. While there are numerous examples of deep operations, ancient and modern, this paper uses three recent historical experiences for illumination. The first example of a tactical deep operation occurred in 1942 with the German Army in Russia.

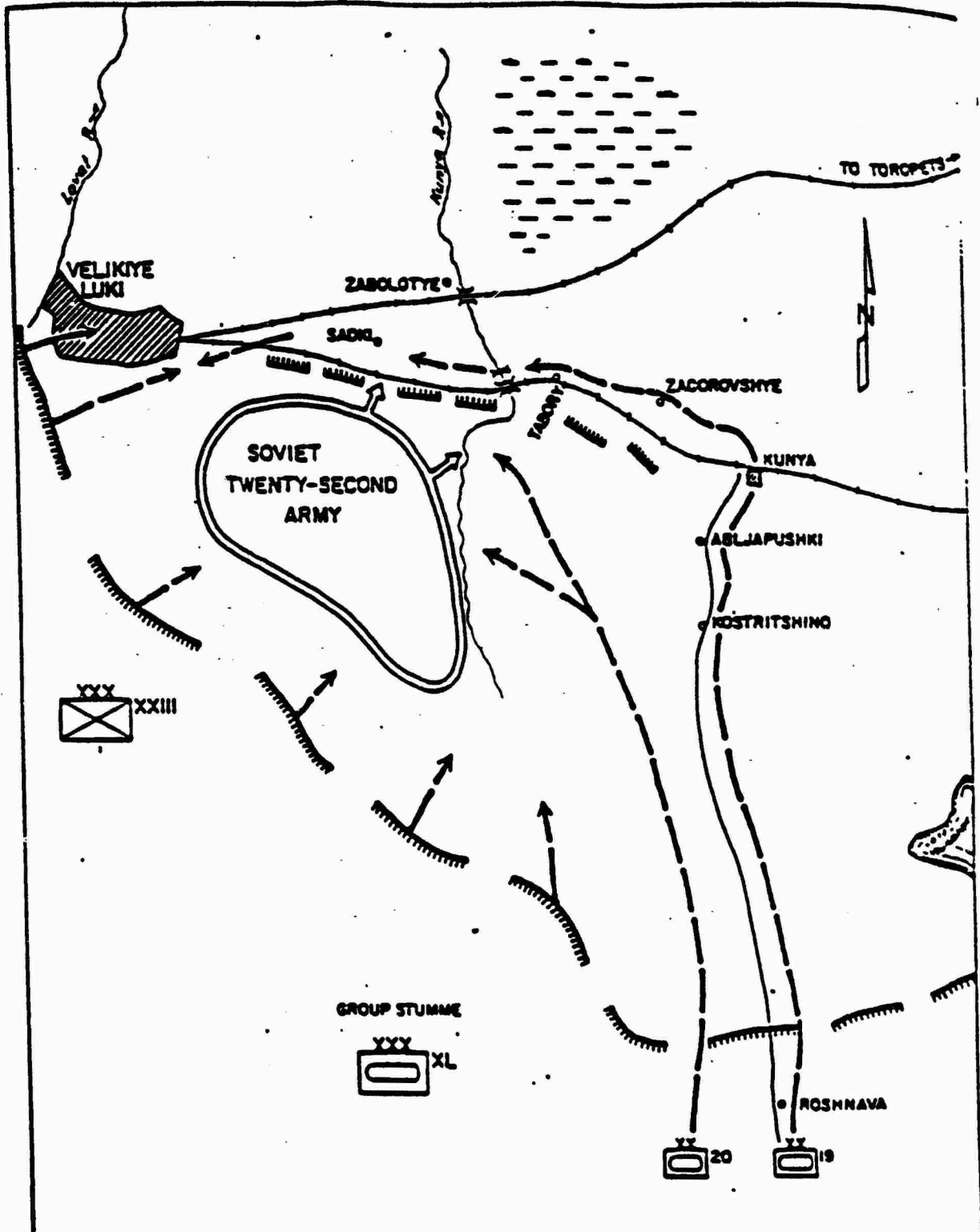
By August 1941, the German offensive had reached a temporary pause with a rather large salient protruding into the German lines on the left of the German Ninth Army.²⁰ The salient extended west as far as Velikiye Luki which was held by the Russians. Aerial reconnaissance verified a large Soviet buildup with the expected intention of cutting into the rear of the Ninth Army.

Realizing the Soviet intention, the Germans decided to strike first. Their mission was to reduce the forces in the salient. The operation began on 22 August with an attack by

three infantry divisions on the southern shoulder of the salient to force a penetration. Upon breakthrough two Panzer divisions, the 20th Panzer Division on the left and the 19th Panzer Division of the right, moved rapidly through the penetration.

The 19th Panzer was the main effort and had a good road network to support its move, while the 20th guarded its left flank. The objective for the 19th was to cut the Soviet lines of communication and link up with XXIII Corps about 40 miles away.²¹ Because of poor terrain, the 20th would not be able to keep pace with the 19th. In essence the 19th Panzer would be alone for the operation.

It was obvious to the division commander that security could only be maintained by speed and constant movement. He organized the division with an advanced guard consisting of a panzer regiment, an armored artillery unit, and a collection of engineer and antitank detachments. The main body was organized into two task forces. The first consisted of an armored infantry regiment, two armored artillery battalions, an engineer battalion and various support units. The second was composed of an armored infantry regiment, an artillery battalion, a rocket launcher battalion and various support units. The reconnaissance battalion was task organized with the attachment of the antitank company to provide reconnaissance and security.²²



CHAPTER 5, MAP 1
A PANZER DIVISION SPEARHEADS AN ENCIRCLING MOVEMENT
 SITUATION 22-25 AUGUST 1941
 [Hatched Area] GERMAN POSITIONS
 [Dashed Arrow] GERMAN THRUSTS
 [Solid Arrow] RUSSIAN THRUSTS

0 5 10

The reconnaissance task force was positioned forward with the breakthrough divisions. When the penetration was sufficient (about 1200 hours) the 19th Panzer Division launched into the Soviet rear. As it did so, it was joined by Luftwaffe aircraft that provided early warning and close air support.

By 1700 hours 19th Panzer had reached Kunya, thus cutting the rail line to Velikiye Luki. One task force from the main body was ordered to cover the left flank (southwest) of the division as it moved northward from Kunya to Tabory while the reconnaissance battalion guarded the right flank. Moving very quickly the lead elements of the division entered Tabory by 1800 hours and captured intact a railroad bridge and a road bridge over the Kunya River. However, these were not sufficient to support the movement of large vehicles. The bridgehead was expanded west of the river and the division engineers were ordered to build a bridge for the division's heavy vehicles. This situation forced the halt of the advance for the day and the division went into a hasty defense in anticipation of Soviet counterattacks that night.

The division commander planned to continue the attack as soon as the bridge was constructed and to link up with XXIII Corps at Velikiye Luki that day, thus completing the encirclement of the Soviet force. The division was not able to cross until around 1500 hours making the link up that day impossible. After crossing the bridge, however, they

encountered some resistance. They routed one formation, captured another and destroyed elements of a third, to include some tank and antitank forces.

During the day, aerial reconnaissance had spotted a large formation of Soviet troops moving toward the northwest. At about 0100 hours the Soviets launched a large scale attack against the 19th Panzer. The fighting was fierce and costly to both sides, but in the end the Soviets were repulsed.

The Germans again moved toward Velikiye Luki the following day. The Soviets continued their effort to break out, thus delaying the link up between 19th Panzer and XXIII Corps. Finally, early on the 25th of August after three and a half days of fighting, the link up was made. Following two more days of fighting the salient was reduced. The Germans had destroyed or captured eight divisions ending the threat to Ninth Army.

In this example the German forces were able to seize the initiative from the enemy through the use of a deep operation. The force was organized and commanded for a rapid advance against the Soviet rear. Reconnaissance from the air and ground were key to the success. A close cooperation existed between the air and ground units.

The presence of the Panzer division in the enemy rear had a physical and psychological effect and resulted in the reduction of a superior force. The application of a numerically inferior force against the enemy's rear was a

risky operation, but had a much greater payoff than if it had been applied to the nose of the penetration.

A classic American example of deep operations is that of the 4th Armored Division at Nancy, France, September, 1944. The division, part of the XII Corps, had participated in the race across France and by September had taken to heart and proven the doctrine of FM 17-100 ²³:

The armored division is organized primarily to perform missions that require great mobility and firepower. It is given decisive missions. It is capable of engaging in most forms of combat but its primary role is in offensive operations against hostile rear areas²⁴.

'As a group, the division believed that the 4th's proper place was deep in the enemy rear.'²⁵

During its fight across Europe the 4th Armored Division had perfected the organization and procedures that would ensure the success of its engagements. Through experience a close cooperation had developed with the XIX Army Air Force that would provide the 4th Armored Division with responsive reconnaissance surveillance and target acquisition as well as effective close air support and battlefield air interdiction. That close air-ground teamwork was instrumental in guiding the division around enemy strong points and into key areas in the enemy rear.

By 31 August the division had crossed the Meuse River so quickly that the defenders were not able to destroy the bridges. A gasoline shortage soon slowed and finally stopped its drive. However, within the week XII Corps had stockpiled

enough fuel to order an attack by three divisions (the 80th Infantry, the 35th Infantry and the 4th Armored) to cross the Moselle and continue the pursuit. The final XII Corps plan ordered the 35th and 4th AD(-) to cross the Moselle south of Nancy while the 80th and Combat Command A (CCA) of the 4th were to cross north of the city.

Poor roads and enemy resistance slowed the effort in the south. In order to maintain the initiative Division Commander Major General 'P' Wood shifted the main effort of the 4th Division to CCA north of Nancy.

CCA, consisting of a reconnaissance troop, a tank battalion, an armored infantry battalion, an infantry battalion (borrowed from the 80th Div.) three artillery battalions and a reinforced engineer battalion,²⁶ crossed the river before daylight on 13 September over a bridgehead secured by the 80th Div. 'Clarke's (Col. Bruce C. Clarke, Commander CCA, 4th AD) mission was to execute a deep attack, with an objective for the day...some twenty miles distant.'²⁷

The formation was organized with a tank-heavy task force leading, followed by an infantry-heavy task force. The rear included the engineers, infantry, and trains. CCA carried enough supplies for seven days of independent operations.

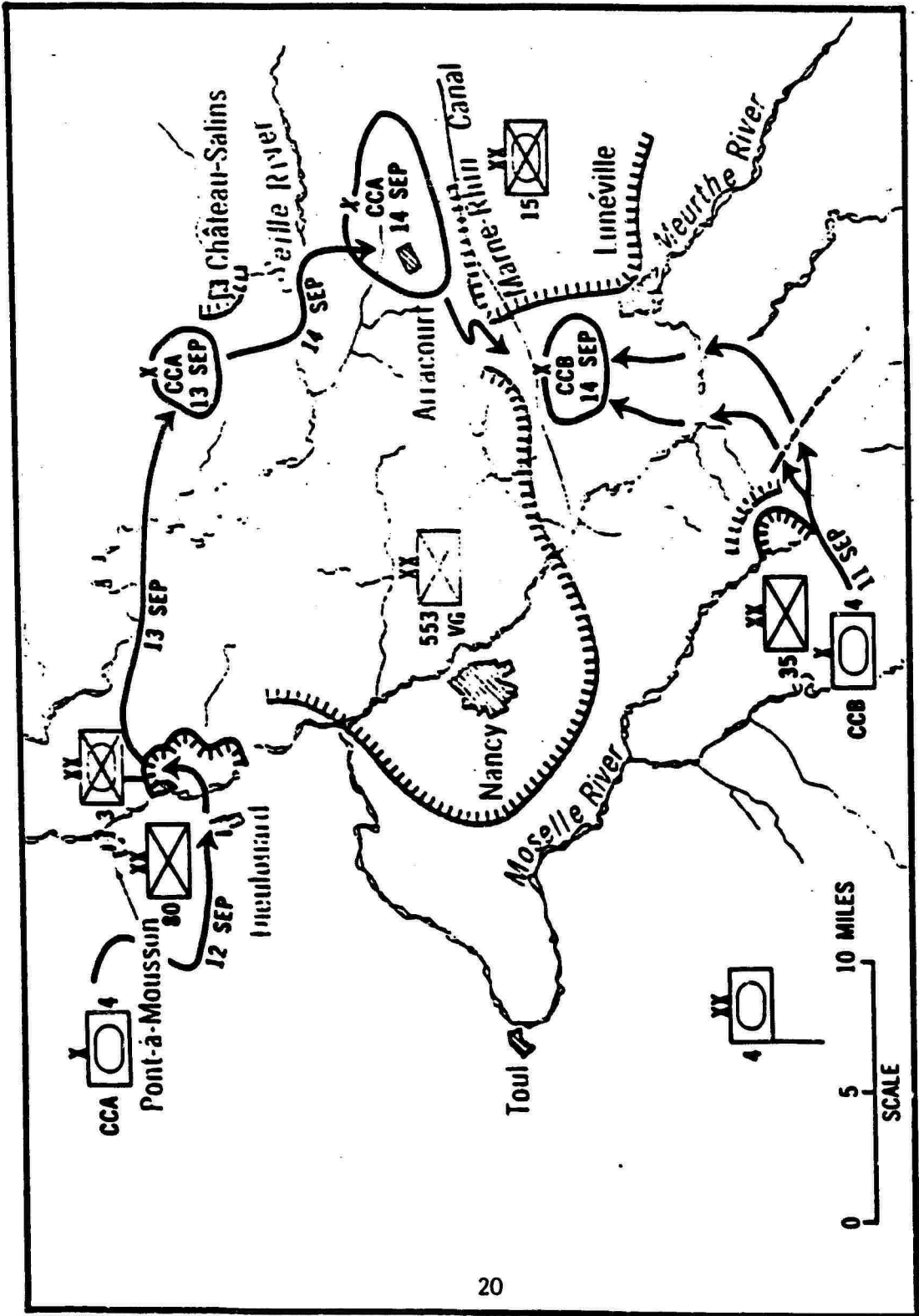
The first day of the operation met with little resistance as CCA was now in the enemy rear. By evening it had reached its objective, the high ground near Chateau-

Salins about twenty miles in the enemy rear. The cost to the enemy was 354 prisoners, 12 tanks, 85 vehicles and 5 guns. CCA had only 13 dead and 16 wounded.²⁸ CCA occupied a defensive position that night waiting for its rear to catch up and by morning was supplied and prepared to continue its attack. CCA was to bypass Chateau-Salins and continue to Arracourt cutting the German lines of communication to Nancy.

By the end of the second day of operations, CCA had cut the LOC's to Nancy by occupying a blocking position near Arracourt. In the process it had captured an additional 400 POW's. Twenty-six armored vehicles and 136 other vehicles were destroyed along with ten 88 mm guns. CCA had sustained a total of thirty-three casualties and lost two tanks.²⁹

From Arracourt, CCA conducted a bold series of raids and ambushes that captured and killed over one thousand enemy and destroyed almost three hundred vehicles. Its operation east of Nancy was so successful that the 553d Volksgranadier Division was forced to withdraw from Nancy leaving it open for occupation by the 35th Division.

The link up of CCA with CCB was made on 16 September, three and a half days after crossing the Moselle north of Nancy. Like the 19th Panzer Division, organization for combat gave it the flexibility needed for this type of operation. It relied heavily on air units to provide close air support and aerial reconnaissance. Bold leadership, solid operating procedures, and agility allowed the 4th AD



4th Armored Division's encirclement of Nancy, 11-14 September 1944

to rout a superior force and win a tactical victory.

The physical and psychological effect of the 4th AD in the enemy rear resulted in the enemy's collapse at Nancy. The risk in this case was also high, but by applying the 4th Armored Division to the rear of the enemy versus a frontal assault on the strongpoints around Nancy were again worth the risks.

The third example occurred during the 1967 Arab-Israeli war. The crossroads at Abu Agheila, about thirty miles inside the Egyptian border, controlled the central road across the Sinai. Although tracked vehicles could maneuver in some of the surrounding desert, the choke point at Abu Agheila regulated the flow of follow-on forces and support units. The Egyptian Army had fortified the crossroads and protected it by building a strongpoint six miles to the east at Um Katef. The strongpoint at Um Katef was actually a series of fortified positions tied together by mines, obstacles and wire. The southern flank was guarded by a battle position at Kusseima. Its purpose was to keep Um Katef from being bypassed from the south. The northern flank was "protected" by terrain that was thought to be impassable by tanks and mechanized infantry. Um Katef was manned by two infantry brigades of the Egyptian 2nd Infantry Division. The third infantry brigade occupied Abu Agheila and Kusseima, while the armored brigade, about 90 tanks, was in reserve near the Ruafa Dam east of Abu Agheila.

The attacking Israeli force was General Sharon's Division consisting of an armored brigade, an infantry brigade and a paratroop brigade. The division reconnaissance battalion and the armored brigade(-) passed north of the strongpoint at Um Katef and into the rear of the Egyptian position occupying a blocking position north of Abu Agheila to interdict the reserve.

As the armored brigade(-) passed north of Um Katef, the remainder of the brigade moved against the face of the strongpoint to fix the defender's attention. At the same time, the infantry brigade moved north of the strongpoint to attack it from the weak flank. As the infantry assault began, the fixing attack slipped south to complete the envelopment of the strongpoint.

The attack began at night to reduce the effectiveness of the Egyptian artillery. To add surprise, the attack was made from the north over what was considered impassable terrain. To complete the reduction of the strongpoint, Israeli paratroopers air assaulted into the artillery positions in the rear of the strongpoint at Um Katef. The effect was complete neutralization of the Egyptian artillery.

As the fight began, the armored brigade(-) moved from its blocking position to Abu Agheila and reduced it. Then it moved east to interdict the Egyptian's armored reserve. Meanwhile, the other tank battalion from the Israeli armored brigade, after flanking the Um Katef position from the

south, moved west to intercept the reserve. The two Israeli armored battalions surrounded the reserve as it moved toward Um Katef and by daybreak it was destroyed.

With the neutralization of the Egyptian artillery, the destruction of the reserve and the attacks against the weak flank, the Egyptians were forced to abandon the positions at Um Katef and Abu Agheila. The result of the operation was the destruction of a major part of the Egyptian 2nd Infantry Division and, more importantly, the opening of the road across the Sinai.³⁰

As in the preceding examples, the organization for combat gave the Israelis the needed flexibility to execute the mission. The force was able to envelop the enemy with armor and air assault troops quickly to reduce the strong point. The combined effects of the air assault and armor force destroying the artillery and reserve with the simultaneous surprise attack on the strong point forced the Egyptians out of the positions. This opened the road across the Sinai.

Contemporary Deep Operations Concepts

Current US Army doctrine, FM 100-5 Operations, is a synthesis of classical and contemporary military theory verified by analysis of wartime application. Although founded in military theory and history, it reflects the changes that technology has made in the nature of warfare. Airland Battle doctrine states:

Successful attack will require isolation of the battle area in great depth as well as the defeat of enemy forces in deeply echeloned defensive areas. Successful defense will require early detection of attacking forces, prompt massing of fires, interdiction of follow-on forces, and the containment of large formations by fire and maneuver.³¹

In short, the doctrine acknowledges the theory and history of deep operations. Success in offense and defense is achieved by not only defeating the enemy in the close battle but by simultaneous attack throughout the depth of his force.

As seen by the example of the 4th Armored Division, deep operations have been a part of our military heritage and history. This heritage was applied to fit the nature of the airmobile infantry war in Viet Nam. While we were doing that, however, we lost sight of the threat posed by the Soviet Union in Western Europe. With the withdrawal from South East Asia in the early '70's, attention was refocused on the conventional war against our greatest potential threat in the most dangerous theater, Western Europe. The

beginning of the reorientation started with the publishing of the 1976 version of FM 100-5.

By the early 1970's, the army had awakened to the fact that while we were focused on our war in Viet Nam, our major threat, the Soviet Union, had made some very significant changes in the quantity and quality of its military. These substantive changes in Soviet forces, as well as the knowledge that we could not match them in quantity, forced us into seeking a firepower based attrition doctrine in which our technological advantages could best be applied. A requirement to interdict uncommitted forces before they entered the battle was recognized, but it was not a maneuver option. Since we were so outnumbered, all maneuver forces were needed to thicken the fight on the FLOT. Despite its shortcomings, the 1976 FM 100-5 began the process that has evolved into the present concepts in our current doctrine.

By the late 1970's it was realized that 'active defense' doctrine was not sufficient to win a war. The army began to reform the doctrine. General Starry's notion of the 'extended battlefield' was the genesis of a new concept on how to fight the threat. He envisioned an interrelationship between the close, deep, and rear battles that was based on the echelonment of Soviet forces. Although terrain in Western Europe has an impact on the disposition of the Soviet Army, it is the precept of momentum as a doctrinal fundamental that mandates the echelonment of Soviet forces. Echelonment allows them to maintain the momentum of their

offense by the continuous introduction of fresh forces into the fight, thus eliminating the need for an operational pause. Further, it enables them to keep a large part of their force uncommitted, thereby maintaining a "strong grip on the initiative". Uninterdicted, the mass and momentum of the Soviet forces would eventually overwhelm the enemy.

To maintain the momentum of such a large force requires the use of precise time schedules and norms. This normative process could be exploited as a vulnerability. General Starry's concept provided for the interdiction of uncommitted forces, delaying and disrupting their employment and thus forcing the enemy commander off his plan.

The interdiction of enemy forces in their rear areas by tactical air strikes, ground maneuver, and long-range artillery fires was hardly a new idea. What was different in the interdiction challenge facing the Army doctrinal planners of the late 1970's was the situation of Soviet echelonment...³²

A concept was sought that would exploit the vulnerabilities inherent in the Soviet echelonment. This was the foundation of Airland Battle.

Thus, with the publication of the 1982 FM 100-5, deep attack became an integral part of our doctrine. As General Starry stated, "deep attack is not a luxury; it is an absolute necessity to winning".³³ The envisioned goal of deep operations was to create conditions conducive to seizing and maintaining the initiative.

In comparison to the 1976 FM 100-5, the 1982 and 1986

versions have a more balanced approach to the dynamic elements of firepower and maneuver. However, the quantitative edge enjoyed by the Soviets had not narrowed in the interim. The challenge facing the army was how to execute the concept of deep operations while being numerically inferior in conventional ground forces. Even though the doctrine acknowledges a maneuver option, the deep battle is perceived as being fought mainly by fires.

The primary assets for deep attack are aerial, artillery, and missile weapons. However, conventional and unconventional ground and air maneuver units can also interdict enemy movement and neutralize key facilities in depth.³⁴

Our concept of deep operations has been and is still based on the fact that we are numerically disadvantaged in forces and, for some very good reasons, cannot hope to even up the imbalance. Therefore, to make up for that deficit, we rely on technology to produce more lethal firepower. In reality, conventional wisdom sees deep operations as deep fires, either by air or long range artillery.

But must this be so? Initially, the concept was that deep operations would delay and disrupt the uncommitted forces and isolate the close battle thereby creating windows of opportunity to seize the initiative. Are we now taking a great leap forward through technology and saying the effects of deep fires can not only delay and disrupt but also destroy as well, and that a maneuver force is no longer a practical solution? Will the purpose of the close battle be only to fix the enemy, while the deep battle destroys him?

Is the mobility differential (including speed, agility and sustainment) necessary to execute a deep operation no longer achievable by ground forces if they are of sufficient size to be a credible threat? Or is it that the necessary coordination for deep maneuver by either ground or air units make that option too difficult when compared to deep fires? Or could it be that the American tradition is that firepower, not maneuver, is the solution?

Contemporary Application of the Deep Operations Concept

The purpose of this paper is not to highlight the capabilities of the various systems and munitions being procured by the army, but to show how technological advances provide a premise for the direction in which we are currently headed. These advances have given firepower the capability to not only delay and disrupt, but to destroy the enemy as well. The effects of fires are becoming so lethal and their ranges so deep that they can destroy large portions of the enemy force and key nodes in his command and control structure long before they are committed to battle. Some of the modern systems that offer such capabilities are the Multiple Launch Rocket System (MLRS) and Family of Scatterable Mines (FASCAM). The range of the MLRS covers the entire depth of a Soviet division in contact. Its munitions can delay, disrupt and destroy uncommitted regiments, command and control nodes, and support facilities.

The fundamental element of this assumed direction is that effects of fires will equal the effects of maneuver. In other words the "interchangeability" that Richard Simpkin speaks of is fast becoming a technological reality. This great leap in technology changes the historical difference between the effects of fires and maneuver. Up to this point the effects of fires have been limited in duration and lethality. Previously, the duration was limited because once the fires had ceased so had the effect. Fires could destroy or immobilize only if they were direct hits, and they were difficult to get. Conversely, the effects of a maneuver force can be greater as well as more lasting, as we saw in the examples of the 19th Panzer Division, the 4th Armored Division, and Sharon's Division. The force in being in the enemy's rear is a threat as long as it is there. It cannot be ignored. It will not go away.

Modern munitions are seeking to close the gap between the effects of fires and the effects of maneuver. The "extended neutralization" effect of modern and future munitions may in fact do that and render unacceptable the practicality of conducting a deep operation by maneuver. There are two major considerations inherent in maneuver that when compared to the option of fire make it the least preferred solution: the limited number of available maneuver forces, and the mobility differential that makes them difficult to maneuver in the enemy rear when sufficiently sized to become a credible threat.

One of the fundamentals of deep maneuver is that the battle at the FLOT must be stabilized before the deep maneuver is executed. Despite Clausewitz's comment that more leverage is gained by applying the reserve to the flanks or rear of the enemy versus thickening the battle at the FLOT, in the situation of being greatly outnumbered, it may take the reserve to stabilize the situation at the FLOT, leaving no option for deep maneuver. Even though the potential pay off for a successful deep maneuver may be high, the relative risk may be unacceptable.

However, if the decision is made to conduct a deep maneuver, that option would not be easy to execute because of the mobility considerations. Although sustainment is not the whole issue of mobility, it is a key element. An example of this logistical concern is the fuel consumption of a current U.S. division. Assuming a normal operating time of twenty hours per day, the fuel requirements for a heavy division would be about 470,000 gallons of diesel, 20,000 gallons of Mogas and about 72,000 gallons of JP-4.³⁵ This is about one and a half times the fuel hauling capacity of the division for only one day's operation.

If these factors could be resolved, an additional consideration would have to be addressed: the comparative difficulty of coordinating a deep maneuver (ground or air) with that of a deep operation by fire. Whereas a deep fire mission would use relatively simple control measures to regulate deep fires, a deep maneuver by either a ground or

air element requires extensive coordination to insert, control and recover it.

The challenges presented by a shortage of maneuver forces, the difficulty of coordinating a deep maneuver, the mobility of ground maneuver forces and the survivability of air maneuver forces are formidable. We apparently think technology has provided an alternative to these difficulties, and that the preferred method of conducting deep operation is by fires.

If technology brings us to this position, then indeed the pendulum will have taken taken a big swing toward firepower and logic would dictate a larger firepower force at the expense of a smaller maneuver force. The battle at the FLOT would no longer be the main effort but a supporting effort made by the maneuver force to fix the enemy, identify his main effort and cause him to mass. The main effort would be the deep battle conducted by fire to destroy the enemy.

As always, the balance between firepower and maneuver is a dynamic one. As the pendulum swings towards firepower, the role of maneuver becomes less important. But eventually the pendulum swings back as the technology that brought about a dominance of firepower inevitability provides a counteraction to that technology. The dominance of firepower in World War I, as exemplified by the machine gun and artillery, yielded to maneuver in the next World War with the ascendancy of the airplane and the tank. In short, the

pendulum never stops its motion. Centering on a single solution is not the best answer.

However, at present we may be doing just that. In comparison, the difficulties associated with deep maneuver and the relative ease with which modern firepower can destroy in depth, it is easy to see that why we have focused on a single approach to deep operations. The evidence is in the acquisition and development of modern systems coming into the force. Of these, sophisticated sensors and intelligence collectors and long range fire systems are preeminent. The current concept for the design of the army is based on a technological solution to the problem of being outnumbered in maneuver forces. As this applies to deep operations, the result is the reliance on an intricate system of collectors tied to a highly lethal system of deep fire weapons. The interaction of these two systems is designed to find and destroy key elements of the enemy before he is committed to influence the close battle.

The assumption, obviously, is that the vulnerabilities of the system must not be significant. But if technology can produce a system, it can eventually produce a counter to it. Without examining the weaknesses and limitations of firepower it would appear that firepower is a single, complete solution to deep operations.

The structure of the deep operations system requires an array of sophisticated sensors to be tied into an all source intelligence center. From the all source intelligence

center, intelligence is provided to a targeting cell which designates various targets for the firing units. It would be impossible to find and destroy all of the intelligence collectors in a timely manner. It would be difficult to neutralize the dispersed firing systems. It appears the most vulnerable part of the system is the linkage between the intelligence collectors and the firers: the all source intelligence center and the targeting cell. Destruction of this key connection renders the entire system impotent. Removal of the focal point for intelligence collection blinds the deep fires and makes the lethality of modern munitions powerless. If this is the case and we have relied solely on deep fires to win the deep battle and to create the opportunities for seizing the initiative, we have made a grave error.

The answer does not lie in building a single sophisticated system but rather in planning a sophisticated approach to deep operations that gives the enemy a multitude of problems simultaneously. The untried potential of modern firepower is one problem for the enemy. The probability for success is great if the system works as designed. But already we have experienced the concrete effects of synergistic deep operations. History validates this with the examples of the 19th Panzer, the 4th Armored, and Sharon's divisions. This tested and workable solution to deep operations should not be forgotten. The formula for success requires a balanced and synchronized application of

artillery and air delivered fires, electronic warfare, deception and air and ground maneuver.

Doctrinal Implications

The fundamental premise of Airland Battle doctrine lies in seizing and holding the initiative as a key to victory. This doctrine acknowledges three interrelated battles: close, deep, and rear. It affirms the need for a balanced approach in fighting the close and rear battle, but does not endorse it for the deep battle. As General Starry states, the need for deep attack is precipitated by the nature of our potential enemy. The structure and mass of Soviet forces demands the conduct of deep operations to wrest the initiative from him. The deep attack will create the opportunities to seize the initiative. Only by giving the enemy a multitude of diverse and dynamic tactical problems to solve simultaneously in his rear, can we insure the probability of success. A sophisticated and balanced approach to deep operations will be laborious to synchronize and tough to execute but is the only practical solution against an opponent structured like the Soviets.

Tactical considerations such as mission, task organization, synchronization of effort and tactical passage are not unique to deep operations, but their application to deep operations requires specific attention and needs to be addressed more clearly in the doctrine. The first of these tactical considerations is the mission. If the reserve is given a specific mission to conduct a deep operation, it

must be its only mission. It is inconsistent to task a maneuver force to execute a deep operation and then assign it other "be prepared" missions. It becomes a classical case of moving in two directions at the same time with little progress either way. The commander must focus on the one mission. The necessary detailed planning and preparation for the deep operation requires all of his attention.

The next consideration is the task organization of the deep maneuver force. Although the mission will have a significant impact on determining the task organization, there are numerous factors that must be considered. For the deep maneuver force to be a significant threat, it must be about a division in strength and the combat elements should be predominantly armor. The tank heavy force will have a greater degree of protection, higher volume of fire and a relatively large basic load of ammunition.

Artillery accompanying the force should be tailored according to the mission. A consideration brought about by MLRS is that the extended range of the system can provide indirect fire support up to a depth of about 20-25 kilometers without crossing the FLOT. This decrease in size would increase the overall mobility of the maneuver force by reducing the logistical burden for ammunition and other classes of supply. As technology gives the capability to range deeper with precision, all supporting fires may be shot from the friendly side of the FLOT thereby reducing the

need to have supporting artillery accompany the maneuver force.

As demonstrated by the examples of the 19th Panzer and 4th Armored divisions, success was in part ensured by the cooperation of air and ground forces both focused on the same objective. The air units provided close air support, reconnaissance and security that increased the freedom of action for the ground force. Today these same effects are achieved by integrating attack helicopters and air cavalry into the formation.

In task organizing for deep operations the combat support requirements are somewhat unique. Across the FLOT the maneuver force will be subjected to the enemy's close air support. This places the force in a vulnerable position and requires a much heavier proportion of air defense than is organic to the division. After the maneuver force crosses the FLOT, the divisional air defense battalion by itself is not sufficient to cover the entire maneuver force. To provide the necessary coverage would require at least two ADA battalions.

Intelligence/electronic warfare becomes an even more significant element to the deep maneuver force in that it is essential to the effectiveness and survivability of the force. The intelligence collectors and surveillance systems that determine deep fire targets must be used to guide the maneuver force to its objective or away from threats to its security. It is imperative that the linkage to the corps

intelligence center remains unbroken to take advantage of this asset.

Combat service support is a critical issue. There are two alternatives for supporting the maneuver force. If the maneuver force is structured to be self-contained, it will be limited in its endurance and range. The limiter would be class III first and then class V. Additional considerations must be given to medical evacuation and other key areas. The other alternative is to keep the lines of communication open to the maneuver force. Although this would increase the endurance and range of the force, the lines of communication may become a vulnerability if they cannot be secured. This vulnerability becomes a liability if the maneuver force has to provide that security.

Another major area for consideration is the tactical passage of the maneuver force. Although a very complicated operation that requires considerable coordination, two key elements must be addressed: positioning and timing. If infantry is used in a deep mission, it can get into the enemy rear by 'stay behind', infiltration or airmobile insertion. For a large armored force, however, a penetration must be made. The concern is where to position the deep maneuver force relative to the breakthrough force. It must be positioned so that it does not interfere with the penetration force or become a lucrative target while massing for the thrust. However, the position must be close enough to pass through the penetration at the proper time. These

points only scratch the surface of the complex issues for the tactical passage but are indicative of the doctrinal implications necessary to conduct a deep maneuver.

Synchronization of effort is the fundamental notion behind a balanced approach to deep operations. It implies that the missions and objectives for each of the deep operations systems are focused on producing a single result. The goal of the synchronized approach is to provide the enemy a multitude of diverse tactical problems to solve that will overwhelm his command and control system. While this is a difficult task, it is a practical solution that will accomplish the goal of the deep operation, create the opportunity to gain and maintain the initiative.

Conclusion

The notion of deep operations remains a key concept for attaining victory. Technology, as it changes the conduct of warfare, gives us a diverse array of solutions to the problem of how to execute the concept. Historically, maneuver has been the solution for tactical deep operations, but as technology gives us new capabilities the preferred method is moving toward firepower. It is the preferred method because the effects of fires are more lethal and destructive than ever and in theory the effects of fires are approaching the equivalency of the effects of a maneuver force. This key point means that the enemy can be delayed, disrupted and destroyed in depth without the difficulty,

risk, or expense inherent in deep maneuver. The concept is based on the assumption that the vulnerabilities of the targeting/firing system have no significant counter.

If this is the case the problem we have presented the enemy is one dimensional and simple to solve. This single solution is not the best answer. Only by giving the enemy commander a multitude of problems, simultaneously, will we be able to seize and maintain the initiative. While this requires balance and synchronization of artillery and air delivered fires, deception, and electronic warfare, above all it means maneuver, the ability to close with and destroy the enemy -- even in the deep battle.

Endnotes

1. FM 100-5, Operations (Washington: Headquarters, Department of the Army, May 1986), p. 19.
2. Carl von Clausewitz, On War, edited by Michael Howard and Peter Paret (Princeton, 1976), p. 465.
3. FM 100-5, p. 14.
4. (S) FC 100-15-1, Corps Deep Operations (U) (Washington: Headquarters, Department of the Army, June 1985), p. 2-15.
5. FM 100-5, p.38.
6. Ibid., p.5.
7. Clausewitz, p. 233.
8. Ibid., p. 242.
9. Ibid., p. 345.
10. Ibid., p. 346.
11. Ibid., p.465.
12. Ibid., p.462.
13. J.F.C. Fuller, Armoured Warfare (London, 1943), p. 33.
14. Ibid., p.37.
15. Ibid., p.96.
16. B.H. Liddell Hart, Strategy (London, 1954), p. 331.
17. Ibid., p.331.
18. B.H. Liddell Hart, The Remaking of Modern Armies (Boston, 1928), p. 45.
19. Donn A. Starry, "Extending the Battlefield," Military Review, (March, 1981), p.34.
20. Historical Division, Headquarters US Army Europe, Division Operations During the German Campaign in Russia, Reprint by Advanced Military Studies Department, Command and General Staff College, (Fort Leavenworth, 1984), p. 33.
21. Ibid., p. 35.
22. Ibid., p. 35.

23. The title of FM 17-100 was Armored Command Field Manual, The Armored Division.

24. FM 17-100, Armored Command Field Manual, The Armored Division, (Washington: U.S. War Department, 1944), p. 2.

25. Christopher R. Gabel, The 4th Armored Division in the Encirclement of Nancy, (Fort Leavenworth, 1986), p. 4.

26. Ibid., p.12

27. Ibid., p.14.

28. Ibid., p.15.

29. Ibid., p.16.

30. Trevor N. DePuy, Elusive Victory (Fairfax, 1984), pp. 256-263. Chaim Herzog, The Arab-Israeli Wars (New York, 1984), pp. 158-59.

31. FM 100-5, pp.2-3.

32. John L. Romjue, From Active Defense to Airland Battle: The Development of Army Doctrine 1973-1982, (Fort Monroe, 1984), p.33.

33. Starry, p.32.

34. FM 100-5, p. 38.

35. The data is computed for an AOE armored division of 6, M-1 equipped armor battalions and 4, M-2 equipped infantry battalions. Diesel usage was figured by operating time versus mileage. 10-11 hours operating time is approximately equal to one refueling, 585 gallons for M-1. This figure was determined by personal experience during numerous field exercises and NTC observations.

BIBLIOGRAPHY

Books

- Adan, Avaraham. On the Banks of the Suez. San Rafael, California: Presidio Press, 1980.
- Department of the Army Manuscript. Division Operations During the German Campaign in Russia. Washington, D.C.: US Government Printing Office, 1946.
- DePuy, Trevor N. Elusive Victory: The Arab-Israeli Wars 1941-1974. Fairfax, Virginia: Hero Books, 1984.
- Doughty, Robert A. The Evolution of U.S. Army Tactical Doctrine, 1946-76 (Leavenworth Papers, No. 1). Ft. Leavenworth, Kansas: U.S. Army Command and General Staff College, 1979.
- Fuller, J.F.C. Armoured Warfare. London: Eyre and Spotswoode, 1943.
- Gabel, Christopher R. The 4th Armored Division in the Encirclement of Nancy. Ft. Leavenworth, Kansas: U.S. Army Command and General Staff College, 1986.
- Glantz, David M. Toward Deep Battle: The Soviet Conduct of Operational Maneuver. Ft. Leavenworth, Kansas: U.S. Army Command and General Staff College, 1985.
- Herzog, Chaim. The Arab-Israeli Wars. New York: Vintage Books, 1984.
- Kemp, Anthony. The Unknown Battle, Metz 1944. New York: Stein and Day, 1981.
- Liddell Hart, B.H. Strategy. London: Faber and Faber Ltd., 1954.
- Liddell Hart, B.H. The Remaking of Modern Armies. Boston: Little, Brown and Company, 1928.
- Manstein, Erich von. Lost Victories. Munich: Bernard und Graefe Verlag, 1982.
- Reznichenko, V.G. Taktika. Translation, Bolling AFB, D.C.: HQ Department of the Air Force, 1985.
- Romjue, John L. From Active Defense to AirLand Battle: The Development of Army Doctrine, 1973-82. Ft. Monroe, Virginia: Historical Office, U.S. Army Training and Doctrine Command, 1984.

Simpkin, Richard. Deep Battle. London, England: Brassey's Defence Publishers Limited, 1987.

Simpkin, Richard. Red Armor. An Examination of the Soviet Mobile Force Concept. London, England: Brassey's Defence Publishers Limited, 1984.

Simpkin, Richard. Race to the Swift. London, England: Brassey's Defence Publishers Limited, 1985.

Simpkin, Richard. Tank Warfare. An Analysis of Soviet and NATO Tank Philosophy. London, England: Brassey's Defence Publishers Limited, 1979.

MANUALS

Field Manual 100-5, Operations. Washington, D.C.: HQ Department of the Army, 1986.

Field Manual 100-15, Corps Operations. Washington, D.C.: HQ Department of the Army, 1985.

Field Circular 100-15-1, Corps Deep Operations (S). Washington, D.C.: HQ Department of the Army, 1985.

Military Operations: Operational Concepts for the AirLand Battle and Corps Operations-1986. TRADOC Pam 525-5. Ft. Monroe, Virginia: HQ TRADOC, March 1981.

ARTICLES

Barbara, James C. and Brown, Robert F. "Deep Thrust on the Extended Battlefield," Military Review. October 1982, pp. 21-32.

Brinkley, William A. "Across the FLOT," Military Review. September 1986, pp. 30-41.

Deal, C. Lanier Jr. "BAI: The Key to Deep Battle," Military Review. March 1982, pp. 51-54.

Franz, Wallace P. "Maneuver: The Dynamic Element of Combat," Military Review. May 1983, pp. 2-12.

Franz, Wallace P. "Operational Concepts," Military Review. July 1984, pp. 2-15.

Hanne, William G. "The Integrated Battlefield," Military Review. June 1982, pp. 34-44.

Holder, L.D. "Maneuver in the Deep Battle," Military Review. May 1982, pp. 54-61.

Reiss David M. and Gary R. Lee. "How to Support Deep Operations," Army Logistician. December 1986, pp. 22-26.

Richardson, William R. "Winning on the Extended Battlefield," Army. June 1981, pp. 35-42.

Rosenberger, John D. and Thomas E. White. "The Armored Cavalry Regiment: Catalyst for Operational Success," Armor. April 1986, pp. 11-15.

Starry, Donn A. "Extending the Battlefield," Military Review. March 1981, pp. 31-50.

Tullbane, Joseph D. "RSTA: The Key to Success in Deep Battle," Signal. September 1986, pp. 37-40.

Von Sandart, Hans Henning, "Considerations for the Battle in Depth," Military Review. October 1987, pp. 2-11.

Walker, William A. "The Deep Battle," Army. July, 1986. pp. 26-38.

Wass de Czege, Huba. "Understanding and Developing Combat Power," Unpublished paper, Ft. Leavenworth, Kansas, 1984.

THESES and REPORTS

Deep Attack Programs Office Report, "Corps Battle Analysis Final Report." (S) Ft. Leavenworth, Kansas, US Army Combined Arms Center, 1985.

Handy, Melvin L. "The Deep Battle Against Mobile Armored and Mechanized Forces: The Role of the Army of Excellence Divisional Combat Aviation Brigade." Carlisle Barracks, Pennsylvania, 1985.

Letonoff, Victor T. and Edward H. Robertson. "Deep Attack." Headquarters, TRADOC, Fort Monroe, Virginia.

Mixon, Robert W. "Taking the Ultimate Risk: Commanding and Controlling Maneuver Forces in Tactical Deep Operations." Monograph, School of Advanced Military Studies, Fort Leavenworth, Kansas, 5 December 1986.

Sterling, Michael J. "Soviet Reactions to NATO's Emerging Technologies for Deep Attack." A Paper prepared for the U.S. Air Force by the Rand Corporation, August, 1985.