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STUDENT REPORT
OPERATION MARKET-GARDEN

MAJOR WILLIAM V. GREEN 84-1075

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requirements for graduation.

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ABOUT THE AUTHOR

Major Green is an Air Force officer with experience in a variety of commands. He graduated from the United States Air Force Academy in 1969 with a degree in Aeronautical Engineering. He attended the Air Force Institute of Technology and received a master's degree in Astronautical Engineering. He attended pilot training following graduation from the Air Force Academy and has served in ATC, PACAF, AFSC, and MAC. Prior to becoming a course officer at Air Command and Staff College, Major Green was the Assistant Chief of Wing Training for the 63rd Military Airlift Wing at Norton AFB, California.



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Chapter One

INTRODUCTION

The study of military history is a rich and rewarding area. Many of our great military leaders such as MacArthur, Marshall, and Patton were students of history. The lessons learned from history can be used in today's or tomorrow's operations. We can study history without the demand of making a decision and can analyze the vast array of elements which came together in a particular historical event. When faced with similar events, the student of military history will have a familiar experience upon which to base his judgements.

Today's military operations may occur anywhere in the world, in Europe, in Southwest Asia, or even in the Caribbean. The initial employment may require the use of airborne troops. For this reason it will prove very helpful to analyze previous operations which have involved airborne forces. This paper will discuss ⁶⁷¹¹²Operation MARKET-GARDEN, which occurred during World War II. This operation combined a massive airborne insertion with a coordinated ground attack to secure the territory. The operation ^{is} will be described as planned and as performed. The best tools for analysis of a historical battle are the principles of war. The events may change from one battle to the next, but the principles of war will always be the same. This paper will discuss ⁹⁵how the ^{is} operation

cont

→ principles of war were used or disregarded in this operation. The improper use of a principle of war by itself may not be the reason for a failure or loss; however, when one combatant disregards more principles than the other combatant, he is likely to be defeated.

The author provides several discussion questions which may be used for a seminar discussion period.

Chapter Two

OUTLINE OF THE PLAN

The Allies had established a beachhead in Normandy by the end of June 1944. They built up their avenues of supply and secured their beachhead. By D+50 (July 26, 1944) they began their breakout from the position they had originally planned to have at D+5 (1:267). They moved out of the beachhead and began pushing the German armies back. The 12th Army Group was commanded by Gen Bradley and consisted of the 3rd Army (Gen Patton), the 1st Army (Gen Hodges), and the 9th Army (Gen Simpson). The 21st Army Group was commanded by Field Marshal Montgomery and consisted of the 1st Canadian Army (Gen Crerar) and the 2nd British Army (Gen Dempsey). (See Appendix 1 for an organizational chart of the commands and commanders.) The breakout was a large pivoting action about the city of Caen. The 12th Army Group pushed east and south and was to secure the Brittany ports and the 21st Army Group was to bottle up the German forces along the front at Caen.

After the Allies broke out of the beachhead, the 3rd Army began a rush to the Saar. Gen Patton believed that he could push all the way to Berlin if he had the supplies. The British forces were moving northward to capture the city and port of Antwerp. This would alleviate the tremendous supply problem that faced the Allies as they advanced on all fronts. The 1st US Army was

stretched along a 150 mile front between the 2nd British Army and the 3rd US Army.

The concept of operation during July and August of 1944 was discussed many times. Field Marshal Montgomery favored a strong, single thrust into Germany, while Gen Eisenhower favored the concept of a broad front with breakthroughs wherever they occurred.

By early September all along the Allied front the Germans were losing faster than the Allies could win (4:59). Because of this rapid advance the problem of logistics was becoming more severe. Gen Eisenhower was continually required to allocate supplies and priorities based on political as well as military considerations. The capture of Antwerp would eventually relieve this problem. However, until both sides of the 54 mile estuary leading into the port were secured, the port was useless to the Allies. The supply problems of 21st Army Group were exacerbated by the discovery that 1400 British three-ton trucks were useless due to faulty pistons (4:70). By reducing supplies to 1st Canadian Army, bringing in additional supply units, and other expedients, Field Marshal Montgomery was able to supply his army group as far as Brussels and Antwerp but not much farther (5:472).

After capturing Antwerp, Field Marshal Montgomery considered two possible alternatives for his next attack. (See page 47 for the situation map.) The first choice was to proceed northeast crossing the Maas at Venlo and the Rhine at Wesel. The northeastern route had the advantage of being more aligned with

the front of 1st US Army, still stretched between the 2nd British Army in the north and 3rd US Army in the south. This route would also avoid the increasing German activity in the area of Arnhem, Eindhoven, and Nijmegen (5:488). The second alternative was to go north crossing the Maas at Grave, the Waal at Nijmegen, and the Rhine at Arnhem (5:488). The northern route was a circuitous approach which had several advantages: it was an unlikely route and might surprise the Germans, it would outflank the "Siegfried" defensive line, and the operation would be a reasonable air distance from England (2:21). There would be an additional advantage derived from the opportunity of capturing the launching bases of the V-2 rockets which were landing on London (5:488). Field Marshal Montgomery chose the northern route using a combined airborne, armored assault for his attack. The 1st Allied Airborne Army consisting of the US 101st Airborne Division, the US 82nd Airborne Division, the British 1st Airborne Division, and the Polish 1st Airborne Brigade, was assigned to 21st Army Group. Field Marshal Montgomery had decided to use the 1st Allied Airborne Army and XXX Corps to secure the major river crossings in the northern approach to the Rhine. (See page 47) This northern attack was designated Operation MARKET-GARDEN.

In the preparation for Operation MARKET-GARDEN, Field Marshal Montgomery requested additional supply priority. Gen Eisenhower finally agreed to provide extra supplies from American resources as long as this did not impact on Patton's advance (5:491). On 12 September 1944, Field Marshal Montgomery was promised an

additional 1000 tons a day in Brussels (5:491).

One of the major logistical problems presented by Operation MARKET-GARDEN was airlift for the forces involved in the airborne assault. This assault consisted of an airborne force of almost 35,000 men, transports for the airdrop, more than 2500 gliders, more than 1500 fighters in support, and various other support personnel and equipment (4:124). This was to be the largest airborne operation ever undertaken (5:498). There were not enough transport aircraft available to provide a single lift. The plan therefore called for drops on three successive days. The large number of transports used in this operation meant they could not be used to supply other units along the front while they were being refitted and practicing for this operation.

Operation MARKET-GARDEN was actually two operations. The first, Operation MARKET, was the airborne portion to secure the river and waterway crossings along a corridor some fifty miles long (5:498). The second, Operation GARDEN, was to drive through this corridor, liberate Holland, outflank the Siegfried Line and drive into the Ruhr industrial area (4:123). The key to the success of the operation lay in capturing the Rhine crossing at Arnhem (4:123).

To accomplish the overall mission objective each airborne unit had a specific objective. (See page 48) The ground units had to be coordinated with the airborne attack to provide maximum surprise. However, if the ground forces departed too late they would not have sufficient time to link up with the lightly armed

airborne forces.

The US 101st Airborne Division had the southernmost objectives. They were to capture canal and river crossings along a fifteen mile stretch between Eindhoven and Veghel. They were to capture the rail and highway bridges over the Aa River and the Zuid Willems Vaart Canal, the highway bridges over the Wilhelmina Canal near Zon and the Dommel River at both St. Oedenrode and Eindhoven (3:264). (See page 48)

The US 92nd Airborne Division was the next link in the road to Arnhem. They were responsible for approximately ten miles between Grave and Nijmegen. and had four major objectives: the Grave, Nijmegen, and Maas-Waal Canal bridges, and the Groesbeek Ridge. These objectives were widely scattered and Gen Gavin was directed not to seize the Nijmegen bridge until the other objectives had been secured (5:500). (See page 48)

The British 1st Airborne Division and the Polish 1st Airborne Brigade had the unenviable task of securing the bridge at Arnhem. This bridge was a three span highway bridge almost 2000 feet long spanning the 400 foot wide Lower Rhine. (See page 48)

XXX Corps was the main ground force of Operation GARDEN. They were to break out of their position near the Dutch-Belgian border and race northward to the river crossing at Arnhem over sixty miles away, with the British VIII and XII Corps protecting the flanks. Speed was the critical element in this operation. The plan called for the ground forces with their heavier firepower to reach the lighter equipped airborne forces at Arnhem within two days.

The airborne commanders were concerned about their drop zones and the equipment in each drop. Initially the plan called for the airborne forces to be dropped over a widely dispersed area for safety. Based on their experiences at Normandy, Gens Gavin and Taylor decided to accept the risk of having most of their forces jump on the same drop zone (DZ) instead of having to gather their forces on the ground. Gen Urquhart was forced to use drop zones well removed from his objective based on intelligence reports of heavy gun emplacements around the bridge at Arnhem. This decision impacted equipment and units scheduled on each day's drop.

The first drop called for most of the US 101st Airborne Division's paratroopers without engineering units, artillery or most of their transportation support. The US 82nd Airborne Division was also without its organic support elements on the first drop. The British 1st Airborne Division had to take a motorized reconnaissance squadron on the first drop to make a dash of approximately seven miles from the DZ to the bridge at Arnhem. This meant the entire division would not be able to go on the first drop. On the second day, another parachute brigade and the rest of the airlanding brigade were to arrive. On the third day, the Polish 1st Parachute Brigade was to drop. However, the Polish brigade's heavy equipment and ammunition were going in by glider on an earlier lift (4:179).

One of the critical concerns to some was the area of communications. The smaller radio sets called "22's" were to be used between the division headquarters and the dispersed units.

These same radios were to be used to communicate with the 1st British Airborne Corps headquarters at Nijmegen. The best area coverage of the 22's was a circle with a diameter of three to five miles. The distance from the DZs to the bridge at Arnhem was seven or eight miles and the 1st British Airborne Corps headquarters, near Nijmegen, was close to fifteen miles away (4:179).

Chapter Three

THE EXECUTION

The last requirement for execution of the plan was favorable weather. On the evening of Sep 16, 1944 three successive days of good weather were forecast for the area and the operation was given the green light. The next morning more than 2000 troop carrying planes, gliders, and tugs took off from 24 US and British bases. By the time this vast armada had reached the English coast, 30 gliders carrying troops and equipment were already down (4:195). Of these losses 23 were from Gen Urquhart's division. Crossing the Channel, Urquhart lost five more out of the eight gliders that were lost (4:197).

There was intense flak and anti-aircraft fire after crossing the Dutch border but the IX Troop Carrier Command pilots kept their planes on course and made a highly successful drop for the 101st Airborne Division. Of the 424 planes every fourth one was damaged and 16 were destroyed. However, 6669 out of 6695 troopers jumped successfully with the 101st Airborne Division and 53 out of 70 gliders arrived at their landing zones without mishap (4:216).

The 82nd Airborne Division was successful in landing 7467 paratroopers and glider-borne troops. Along with the 82nd Airborne Division, Gen Browning (See organizational chart, page 46) and his 1st British Airborne Corps headquarters also landed in the area of

Nijmegen (4:242). Of the 320 gliders scheduled for Arnhem, 36 were lost including the transport for A troop of the reconnaissance unit that was to make a dash for the bridge at Arnhem.

The attack by the GARDEN forces of Gen Horrocks' XXX Corps began at 1415 on the 17th. They were able to watch the airborne armada pass over their heads before they advanced. The initial assault was preceded by a 350 gun artillery salute which blanketed an area one mile wide by five miles deep.

The 101st Airborne Division initially seized the four bridges at Veghel and the bridge at St. Oedenrode. However, the bridge at Son was blown up by the Germans. When both sides were secured the engineers of the 101st Airborne Division built a single path with lumber to enable the rest of the unit to cross.

The 82nd Airborne Division had secured the bridge at Grave and secured a crossing at the village of Heumen over the Maas-Waal Canal. They did not succeed in capturing the bridge at Nijmegen.

The British 1st Airborne Division was having trouble accomplishing its tasks. Communication between Gen Urquhart at division headquarters and his battalion commanders in the field was nonexistent. The battalions that were to quickly cover the distance to the bridge, and seize it against light opposition, were facing increasing German resistance. Finally, two British units succeeded in taking up positions on either side of the northern ramp. The fighting in this area was extremely severe.

The first day XXX Corps was able to cover only about six miles. The German defenders were extremely adept at hiding until

the artillery barrage was over and then attacking the line of tanks that was pushing forward. Due to the single narrow road and poor ground when the tanks were disabled, they acted as roadblocks for the following tanks. On the second day XXX Corps was initially hampered by the low, heavy fog and by continual heavy fire from the Germans.

In the 101st Airborne Division's area, Gen Taylor found that he was committing more and more of his force to the fighting at Best. This area was a backup for the crossing at Son. The Allies were unaware that Gen Student, commander of the German 1st Parachute Army, had his headquarters just ten miles from their landing zones, and that part of the German Fifteenth Army was quartered nearby. These forces and some artillery support were met by the single company sent to capture the crossing at Best.

After the first day of the operation the Allies had secured most of their objectives. (See page 48) The 101st Airborne Division was working to rebuild the crossing at Son, the 82nd Airborne Division was trying to secure the bridge at Nijmegen and the British 1st Airborne Division was trying to secure the bridgehead at Arnhem. The Germans' situation was rather confused. They were initially unsure of the intent and intensity of the operation. To counter the attacks at Nijmegen, the Germans had to move their armored units from the north around Arnhem to the southern areas. As long as the British held the northern approach to the Arnhem bridge, they could only cross the Rhine on a ferry that was approximately eight miles southeast of Arnhem (4:291).

This ferrying operation would delay the use of heavy armored units in the southern areas and also demand a lot of resources to actually accomplish the ferrying operation. The only alternative was to retake the Arnhem bridge.

The drop for the second day was delayed several hours due to weather. When they reached their destinations they found a scene different from what they had expected. The 101st Airborne Division and 82nd Airborne Division had dropped most of their men in the first drop and were expecting many gliders and equipment drops of supplies.

Glider landings were most successful in the 101st Airborne Division area, with only 22 lost. However, the B-24 Liberators were less successful in their equipment drops. The German anti-aircraft gunners had found their range when the 252 B-24's came across the drop zones. The effect of anti-aircraft fire, and the confusion caused by smoke and haze obscuring the areas, resulted in the 101st Airborne Division recovering less than fifty percent of their supplies (4:366-368). The 82nd Airborne Division was more successful in their airdropped supplies, they managed to collect 80 percent of their supplies. They were not so lucky in their glider resupply. They lost 69 of the scheduled gliders destined for their area (4:367).

The most beleaguered forces were the British in the Arnhem area. Since they had been forced to take up valuable space on their first drop with the heavy vehicles to make the dash to the bridge, they were expecting manpower relief in the second drop.

The Germans were expecting the men in the second drop also and many were killed as they jumped from the planes or as they hung under their canopies. Their supplies were also not well placed. Out of the the 87 tons of supplies and ammunition they were to have received, they were able to collect only 12 tons (4:376). The Germans received the rest.

On the third day the weather again played a large part. The Polish 1st Parachute Brigade was scheduled to make a major drop to relieve the British 1st Airborne Division at Arnhem. The troop carriers which were taking off from northern bases in the United Kingdom were cancelled due to weather, however, the supply aircraft and gliders from the southern bases departed. Weather conditions were deteriorating as the formations were taking off. Of the 655 troop carriers and 431 gliders that took off slightly more than half reached the drop and landing zones (4:418). The 101st Airborne Division received only 1341 out of 2310 troops and 40 out of 68 artillery pieces (4:418). The 82nd Airborne Division's 325th Glider Infantry Regiment did not arrive at all. Only 40 out of 265 tons of supplies arrived (4:419). The beleaguered British again fared the worst. Out of 100 bombers and 63 Dakotas, 97 were damaged and 13 were shot down. An estimated 21 tons out of 390 tons were retrieved by the British. The Polish 1st Parachute Brigade was caught on the battlefield between the Germans and the British trying to disengage from the enemy. Surprisingly, ground casualties were light, but many of the men were captured as were most of the supplies

Gen Taylor's forces were finally able to capture Best, but the entire line was subject to continuous attack from the Germans (4:425). (See page 50) Gen Gavin's troops were desperately trying to capture the Nijmegen bridge intact to speed the armor's advance. Gen Gavin proposed a river crossing and an attack on both ends of the bridge simultaneously.

On the fourth day, the weather once again cancelled the Polish 1st Parachute Brigade's airborne assault. The 3400 man glider infantry regiment going to the 82nd Airborne Division's area was also grounded again (4:451). This was extremely important since they were to be instrumental in the assault on the Nijmegen bridge. The Germans made strong attacks throughout the Allied corridor attempting to break the thin supply line. (See page 51) On 20 Sep, they attacked the Son bridge in Gen Taylor's area and the Heumen bridge in Gen Gavin's area (4:453). This stretched the manpower of the 82nd Airborne Division even more. Gen Gavin's proposal was accepted, and a river assault was performed to cross the Waal and capture the other approaches to the railroad and highway bridges. These attacks were so quick and successful, the Germans did not attempt to blow up the bridges until the charges had already been defused (4:474).

On the fifth day, the Polish 1st Parachute Brigade was finally able to get off the ground. By this time, the fate of the British 1st Airborne Division was sealed. On the morning of 21 Sep, the lead elements of XXX Corps crossed the Nijmegen bridge for Arnhem, eleven miles away (4:487). The advance was soon held

up by the German positions which were able to shell the exposed dike road from their positions in Elst. Using a single self-propelled gun, the Germans had managed to stop the tank advance 6 miles from Arnhem (4:491). The steep dike walls prevented the tanks from getting off the road. Thus the ground thrust was stopped again.

The Polish 1st Parachute Brigade had been changed to drop south of the river around the town of Driel. They were without air cover in the drop and the Germans had observed their approach all the way from Dunkirk. The Poles were attacked in the air by intense anti-aircraft fire and by fighter aircraft; on the ground they were forced to fight their way off the drop zones; and then found their original rendezvous point in enemy control. To complete the string of bad luck, Gen Sosabowski was only now to learn that the ferry he had planned to use to cross the Rhine was not there.

Early on 22 Sep, an advance unit from Gen Horrocks' forces was able to use the cover of fog and made contact with British elements at Oosterbeek. The major thrust was still stopped at Elst. The infantry forces of XXX Corps were scheduled to launch an early morning attack to clear the gun emplacements. However, delays in arriving resulted in the attack starting later, after the enemy had been alerted by the small group earlier. In addition, the weather again prevented the RAF from providing air support to the attack. The Germans mounted a successful attack north of Veghel in the 101st Airborne Division area and cut the

precarious supply line. (See page 52) The flanking ground forces of XII and VIII Corps had just reached Son, south of Veghel. The Germans chose this area to attack because there were at least four major water crossings in the area. This break in the lifeline forced Gen Horrocks to send a brigade back to the south and assist in reopening the corridor. They were eventually successful, but the roads were closed for over 24 hours (4:534).

During the night of 22-23 Sep, Gen Sosabowski attempted to ferry his men across the 400 yard wide Rhine in four rubber boats, 2-two man and 2-one man dinghies (4:536). The operation was deadly since the Germans used flares, mortars, and automatic fire on those crossing and those waiting to cross. In all only 50 men were ferried across into the British bridgehead at Oosterbeek.

On the seventh day, 23 Sep, the last fleet of gliders were finally able to depart England. These provided Gen Taylor with nearly 3000 more men and Gen Gavin with 3385 (4:541). The remainder of the Polish Brigade could not get into the besieged positions at Driel. They were dropped into the 82nd Airborne Division's area. The supply missions for the 101st Airborne Division and 82nd Airborne Division were successful, but once again the enemy received the supplies meant for the British at Arnhem. By late on 23 Sep, the ground forces had reached Driel, but it was too late to join in an organized crossing with the Poles. Gen Sosabowski's men attempted to again cross the Rhine. This time they had 16 boats used earlier in the 82nd Airborne Division's assault at Nijmegen. The same intense fire from the

German positions greeted them. Of the 250 that crossed to the northern bank, only 200 made it to the British positions.

On Sunday, 24 Sep, the British and Germans worked out a two hour partial truce to evacuate the British casualties to the German hospitals in Arnhem. The Allied forces south of the Rhine continued to fortify their positions from Nijmegen to Driel to Elst. (See page 53) They still faced the task of crossing the Rhine in force. On 24 Sep, the decision was made by Gen Dempsey to evacuate the bridgehead at Oosterbeek. (See page 53)

On Monday the order was passed to Gen Urquhart to prepare for evacuation. Once again the Germans managed to cut the corridor north of Veghel and close the supply line for almost two days. The evacuation was planned by Gen Urquhart in a manner similar to one the British had used in 1916 at Gallipoli. The concept was like "the collapse of a paper bag" (4:576). The forces at Driel managed to get over 200 men across the river to support the withdrawal of Gen Urquhart's forces. The maneuver required an impression of normalcy during the operation. Perimeter positions would continue firing to cover the pullout. As they finally withdrew, they would move down the side of the bridgehead until the perimeter collapsed on itself and the troops were withdrawn. One of the major concerns was congestion at the river bank since the base of the perimeter was only 650 yards wide. The withdrawal was accomplished that night as well as could be expected from troops that had held out against the overwhelming forces massed against them. Of the 10,005 man force that went into battle with the British 1st Airborne

Division, only 2163 men came back across the Rhine (4:591).

Operation MARKET-GARDEN was planned as a quick thrust across the Rhine which would provide the Allies a secure base to attack the industrial areas of Germany. After seven days of fighting and the loss of many lives, the Allies had a tenuous hold on a thin salient through Nijmegen. (See page 53) The Rhine crossing, which was the major objective of the attack, was not gained.

Chapter Four

PRINCIPLES OF WAR

This chapter will examine the principles of war. The principles as defined in AFM 1-1 will be reproduced directly. Examples from Operation MARKET-GARDEN will be used to illustrate positive or negative applications of these principles. Although the examples are from World War II, the principles can be applied in today's modern warfare.

OBJECTIVE

The most basic principle for success in any military operation is a clear and concise statement of a realistic objective. The objective defines what the military action intends to accomplish and normally describes the nature and scope of an operation. An objective may vary from the overall objective of a broad military operation to the detailed objective of a specific attack. The ultimate military objective of war is to neutralize or destroy the enemy's armed forces and his will to fight. However, the intimate bond which ties war to politics cannot be ignored. War is a means to achieving a political objective and must never be considered apart from the political end. Consequently, political imperatives shape and define military objectives. It follows that the objective of each military operation must contribute to the overall political objective.

Success in achieving objectives depends greatly on the knowledge, strategy, and leadership of the commander. The commander must ensure that assigned

forces are properly used to attain the objective. This requires that objectives be disseminated and fully understood throughout all appropriate levels of command. Clear and concise statements of objective greatly enhance the ability of subordinates to understand guidance and take appropriate actions. For aerospace operations, the air commander develops his broad strategy based on the primary objective, mindful of the capabilities of friendly forces (both man and machine), the capabilities and actions of the enemy, the environment, and sound military doctrine. Broad strategies derived from this combination of factors form the basis for selecting targets, means of attack, tactics of employment, and the phasing and timing of aerospace attacks. Always, the primary measure of success in employing aerospace forces is achieving the objective through knowledgeable use of men and their machines.

Operation MARKET-GARDEN

The commander must be mindful of the capabilities of his forces, the enemy forces, the environment and sound military doctrine when determining his objective and strategy. In planning MARKET-GARDEN, due consideration was not given to the factors of environment, enemy capability, and logistics. The plan called for the airborne forces to make three successive drops and capture numerous water crossings before the Germans could destroy them. Any delays in resupply, destruction of a crossing, or even battle losses of key personnel and equipment could result in disaster. Proper intelligence might have provided the information that the trapped German 15th Army had escaped from its position around Antwerp and the 9th and 10th SS Panzer Divisions were being refitted in the Arnhem area (4:157-163). If the Dutch had been included in the planning of this major operation into their country, they would have objected to using the high dike road from

Nijmegen to Arnhem. (See page 48) The Dutch Staff College had an exam which dealt with the best way to attack Arnhem from Nijmegen, and those who chose to go straight up the road failed (4:509). The logistical supply line was along a single road from the Meuse-Escaut Canal all the way to Arnhem. This allowed the Germans many opportunities to cut the supply line and delay the operation. A realistic objective needs to allow for some options if the primary plan is fouled. In the fog of battle the plan is never executed exactly and proper allowance for these discrepancies must be made. The objective for MARKET-GARDEN was not realistic and required the Allied forces, the enemy forces, and the environment all perform according to the plan.

OFFENSIVE

Unless offensive action is initiated, military victory is seldom possible. The principle of offensive is to act rather than react. The offensive enables commanders to select priorities of attack, as well as the time, place, and weaponry necessary to achieve objectives. Aerospace forces possess a capability to seize the offensive and can be employed rapidly and directly against enemy targets. Aerospace forces have the power to penetrate to the heart of an enemy's strength without first defeating defending forces in detail. Therefore, to take full advantage of the capabilities of aerospace power, it is imperative that air commanders seize the offensive at the very outset of hostilities.

Operation MARKET-GARDEN

The principle of the offensive is amply demonstrated by the entire operation, however, the example of the US 82nd

Airborne Division, commanded by Gen Gavin, on 18 Sep, the second day of MARKET-GARDEN, is illustrative. The first drop had provided the basic men and equipment to accomplish a surprise attack and secure most of the objectives. With time, the element of surprise was lost. Without supplies and reinforcements, the unit would not be able to sustain their gains against enemy attacks. The German troops were able to push the defenders off two resupply drop zones between the Groesbeek Heights and the German frontier. These were vital for resupply and reinforcement of Gen Gavin's troops. He directed all available reserves, two companies of engineers, to attack immediately. This offensive action allowed the US 82nd Airborne Division to clear the drop zones. When Gen Gavin found out the airlift had been delayed two hours, he continued the offensive action to maintain the drop zones for the coming airdrop. The combination of offensive action and maneuver were able to secure the vital objective - the resupply drop zones.

SURPRISE

Surprise is the attack of an enemy at a time, place, and manner for which the enemy is neither prepared nor expecting an attack. The principle of surprise is achieved when an enemy is unable to react effectively to an attack. Surprise is achieved through security, deception, audacity, originality, and timely execution. Surprise can decisively shift the balance of power. Surprise gives attacking forces the advantage of seizing the initiative while forcing the enemy to react. When

other factors influencing the conduct of war are unfavorable, surprise may be the key element in achieving the objective. The execution of surprise attacks can often reverse the military situation, generate opportunities for air and surface forces to seize the offensive, and disrupt the cohesion and fighting effectiveness of enemy forces. Surprise is a most powerful influence in aerospace operations, and commanders must make every effort to attain it. Surprise requires a commander to have adequate command, control, and communications to direct his forces, accurate intelligence information to exploit enemy weaknesses, effective deception to divert enemy attention, and sufficient security to deny an enemy sufficient warning and reaction to a surprise attack.

Operation MARKET-GARDEN

Surprise is attacking an enemy at a time, place, and manner for which he is neither prepared nor expecting an attack. Operation MARKET-GARDEN met these criteria. Large bomber formations had been flying overhead on their way to German targets for days. This had made large airplane formations a normal occurrence. Gen Model, commander of German Army Group B, was having lunch when the British airborne troops landed almost on his table (they were actually slightly less than two miles away) (4:219). Gen Student, Germany's premier airborne commander, watched the airdrop with envy from his headquarters balcony (4:217). Neither commander was expecting the attack. The attack was definitely a surprise, however, the principle of surprise is achieved when the enemy is unable to react effectively. In the case of MARKET-GARDEN, the enemy reacted swiftly and correctly. Although the initial drops were unexpected, the

German commanders quickly mobilized their units and reacted. Within an hour of the airborne assault, Gen Bittrich, commander of the German II SS Panzer Corps, had dispatched one of his panzer divisions to hold the Arnhem area, and another division was sent to hold the Nijmegen bridges. Surprise was further reduced by the loss of a copy of the attack order for the operation. Gen Student, commander of the German 1st Parachute Army, was provided a complete set of the MARKET-GARDEN plans from a crashed glider. These plans indicated that the bridge at Arnhem was Field Marshal Montgomery's route to the Ruhr (4:254-255). The principle of surprise therefore, was countered by the quick, accurate actions taken by the enemy and the loss of the operational plans during the initial assault.

SECURITY

Security protects friendly military operations from enemy activities which could hamper or defeat aerospace forces. Security is taking continuous, positive measures to prevent surprise and preserve freedom of action. Security involves active and passive defensive measures and the denial of useful information to an enemy. To deny an enemy knowledge of friendly capabilities and actions requires a concerted effort in both peace and war. Security protects friendly forces from an effective enemy attack through defensive operations and by masking the location, strength, and intentions of friendly forces. In conducting these actions, air commanders at all levels are ultimately responsible for the security of their forces. Security in aerospace operations is achieved through a combination of factors such as secrecy, disguise, operational security, deception, dispersal, maneuver, timing,

posturing, and the defense and hardening of forces. Security is enhanced by establishing an effective command, control, communications, and intelligence network. Intelligence efforts minimize the potential for enemy actions to achieve surprise or maintain an initiative, and effective command, control, and communications permit friendly forces to exploit enemy weaknesses and respond to enemy actions.

Operation MARKET-GARDEN

The security of Operation MARKET-GARDEN was compromised by the loss of a set of plans to the enemy. The security of an operation is enhanced by effective command, control, communications and intelligence networks. During MARKET-GARDEN, the Dutch underground was not used in the planning phase and was only hesitantly used in the execution phase. In part this was influenced by previous misleading reports from Belgian and French resistance groups during 21st Army's advance to Antwerp (4:80). SHAEF intelligence identified the presence of the 9th and 10th SS Panzer divisions in the Arnhem area. When this information was provided Gen Eisenhower, he dispatched his Chief of Staff, Lt Gen Smith, to inform Field Marshal Montgomery and see if changes were needed (4:158). The intelligence officer for British I Airborne Corps had photographic evidence of tanks at Arnhem but they were dismissed by Gen Browning, the Corps commander, as being unserviceable (4:159). In general the enthusiasm for the operation seemed to discredit any adjustments based on last minute intelligence.

MASS AND ECONOMY OF FORCE

Success in achieving objectives with aerospace power requires a proper balance between the principles of mass and economy of force. Concentrated firepower can overwhelm enemy defenses and secure an objective at the right time and place. Because of their characteristics and capabilities, aerospace forces possess the ability to concentrate enormous decisive striking power upon selected targets when and where it is needed most. The impact of these attacks can break the enemy's defenses, disrupt his plan of attack, destroy the cohesion of his forces, produce the psychological shock that may thwart a critical enemy thrust, or create an opportunity for friendly forces to seize the offensive. Concurrently, using economy of force permits a commander to execute attacks with appropriate mass at the critical time and place without wasting resources on secondary objectives. War will always involve the determination of priorities. The difficulty in determining these priorities is directly proportional to the capabilities and actions of the enemy and the combat environment. Commanders at all levels must determine and continually refine priorities among competing demands for limited aerospace assets. This requires a balance between mass and economy of force, but the paramount consideration for commanders must always be the objective. Expending excessive efforts on secondary objectives would tend to dissipate the strength of aerospace forces and possibly render them incapable of achieving the primary objective. Economy of force helps to preserve the strength of aerospace forces and retain the capability to employ decisive firepower when and where it is needed most.

Operation MARKET-GARDEN

The US 82nd Airborne Division had four objectives in their area. However, Gen Gavin was able to use the principles of mass and economy of force to achieve his objectives. He massed his forces to secure first the river crossing at

Grave, then secured a crossing over the Maas-Waal Canal at Heumen, and also secured the high terrain around Groesbeek. After these positions were secured, he massed his forces to attack the Nijmegen bridge. This was the result of prioritizing the demands on his assets. With only a limited number of men and equipment, he was forced to secure the objectives with only the amount of force necessary. Had an attack on Nijmegen been attempted at the same time as the other three objectives, his forces would have been too weak to secure any of the objectives. Expending forces on secondary objectives may weaken the attempt on the primary objective.

MANEUVER

War is a complex interaction of moves and countermoves. Maneuver is the movement of friendly forces in relation to enemy forces. Commanders seek to maneuver their strengths selectively against an enemy's weakness while avoiding engagements with forces of superior strength. Effective use of maneuver can maintain the initiative, dictate the terms of engagement, retain security, and position forces at the right time and place to execute surprise attacks. Maneuver permits rapid massing of combat power and effective disengagement of forces. While maneuver is essential, it is not without risk. Moving large forces may lead to loss of cohesion and control.

Operation MARKET-GARDEN

Operation MARKET-GARDEN called for XXX Corps to advance from the Meuse-Escaut Canal, at the border, to Arnhem along a

single narrow road. During the initial advance, the Germans let the lead tanks go by then knocked out three tanks from the lead squadron and six from the next squadron. These disabled tanks blocked the road so that the entire advance was halted. The tanks coming up could not advance and the lead tanks could not withdraw. This lack of maneuver delayed the advance of XXX Corps so that by evening of the first day, they were just slightly more than half way to Eindhoven. (See page 48) This lack of maneuver was evident throughout the drive to Arnhem. Once the tanks began to move out of Nijmegen on the last eleven miles to Arnhem the terrain was even worse for maneuver. The road was on top of a dike and the tanks were restricted to a one tank front. If the lead tank was disabled, the flow again stopped completely. There was no way to either mass firepower or disengage when desired. The terrain limited maneuver of the armored forces.

TIMING AND TEMPO

Timing and tempo is the principle of executing military operations at a point in time and at a rate which optimizes the use of friendly forces and which inhibits or denies the effectiveness of enemy forces. The purpose is to dominate the action, to remain unpredictable, and to create uncertainty in the mind of the enemy. Commanders seek to influence the timing and tempo of military actions by seizing the initiative and operating beyond the enemy's ability to react effectively. Controlling the action may require a mix of surprise, security, mass, and maneuver to take advantage of emerging and fleeting opportunities. Consequently, attacks against an enemy must be executed at a time, frequency, and intensity that will do the most to

achieve objectives. Timing and tempo require that commanders have an intelligence structure that can identify opportunities and a command, control, and communications network that can responsively direct combat power to take advantage of those opportunities.

Operation MARKET-GARDEN

Operation MARKET-GARDEN as planned was a good example of the principle of timing and tempo. The execution of MARKET-GARDEN demonstrated the effect of not maintaining the timing and tempo throughout the operation. The German response to the MARKET-GARDEN forces provides an example of controlling the timing and tempo. Shortly after the first landings Gen Bittrich had directed the securing of the bridges at Arnhem and Nijmegen. A reconnaissance battalion of 40 vehicles commanded by Captain Paul Grabner, from the 9th SS Panzer Division, was sent to report on troop movements and secure the bridge at Nijmegen. This unit contained tanks, half tracks, and armored personnel carriers. The quick reaction and mobile orientation of Grabner's unit allowed them to cross the Arnhem bridge before the British could close the approach. They quickly moved south and set up defensive positions on the south approach to the Nijmegen bridge. The rest of the unit then returned to Arnhem. The north end of the Arnhem bridge was now almost closed due to the intense fighting and concentrated firepower being brought to bear. Capt Grabner again controlled the timing and tempo of the situation, and was initially able to break through the northern approach with his armored units. The timing of Grabner's movement allowed the German forces to contain the

Allied advance by slowing the capture of the bridge at Nijmegen. If the German forces had not acted quickly, they would not have been able to cross the bridge at Arnhem and the bridge at Nijmegen would not have been defended. With light resistance, the US 82nd Airborne Division would have been able to take the Nijmegen bridge easily, and the advance would not have been slowed by a long fight for the bridge.

UNITY OF COMMAND

Unity of command is the principle of vesting appropriate authority and responsibility in a single commander to effect unity of effort in carrying out an assigned task. Unity of command provides for the effective exercise of leadership and power of decision over assigned forces for the purpose of achieving a common objective. Unity of command obtains unity of effort by the coordinated action of all forces toward a common goal. While coordination may be attained by cooperation, it is best achieved by giving a single commander full authority.

Unity of command is imperative to employing all aerospace forces effectively. The versatility and decisive striking power of aerospace forces places an intense demand on these forces in unified action. To take full advantage of these qualities, aerospace forces are employed as an entity through the leadership of an air commander. The air commander orchestrates the overall air effort to achieve stated objectives. Effective leadership through unity of command produces a unified air effort that can deliver decisive blows against an enemy and exploit his weaknesses. The air commander, as the central authority for the air effort, develops strategies and plans, determines priorities, allocates resources, and controls assigned aerospace forces to achieve the primary objective. Success in carrying out these actions is greatly enhanced by an effective command, control, communications, and intelligence network.

Operation MARKET-GARDEN

The British 1st Airborne Division, commanded by Gen Urquhart, dropped in an area approximately eight miles west of their objective at Arnhem. They were to make a coordinated advance along different routes to eventually secure the bridge at Arnhem. The fighting produced a variety of incidents which required the commander to make decisions for the conduct of the battle. Gen Urquhart discovered early his reconnaissance unit had lost over twenty armed jeeps in which they were to race for the bridge. The communication systems broke down and Gen Urquhart was not able to maintain contact with the units advancing to the bridge. This breakdown in communications and the lack of direction it caused kept the three advancing battalion commanders in the dark about what was happening. Without an accurate picture of the battle or a way to communicate, Gen Urquhart was not able to apply any of the principles of war. These problems were compounded later when Urquhart was caught with the Germans between himself and his divisional headquarters. With Urquhart lost, command of the division fell to Brig Hicks. Urquhart had made this decision in England before the attack. However, the second airlift brought in Brig Hackett, who was senior to Hicks and unaware of Urquhart's decision. The principle of unity of command was lost in the confrontation between these two men.

SIMPLICITY

To achieve a unity of effort toward a common goal, guidance must be quick, clear, and concise—it must have simplicity. Simplicity promotes understanding, reduces confusion, and permits ease of execution in the intense and uncertain environment of combat. Simplicity adds to the cohesion of a force by providing unambiguous guidance that fosters a clear understanding of expected actions. Simplicity is an important ingredient in achieving victory, and it must pervade all levels of a military operation. Extensive and meticulous preparation in peacetime enhances the simplicity of an operation during the confusion and friction of wartime. Command structures, strategies, plans, tactics, and procedures must all be clear, simple, and unencumbered to permit ease of execution. Commanders at all levels must strive to establish simplicity in these areas, and the peacetime exercise of forces must strive to meet that same goal.

Operation MARKET-GARDEN

A good example of simplicity was the selection of drop zones by the US 101st Airborne Division, commanded by Gen Taylor. In the initial planning, they were assigned a number of drop zones dispersed over a wide area. Gen Taylor had experienced problems in the Normandy jumps due to dispersed drop zones. He argued for a limited number of drop zones for Operation MARKET based on this experience. Having a small number of drop zones allowed his units to quickly rendezvous and move to their objective. It simplified communications and massed his firepower quickly. Gen Taylor also selected sites that were close to his objectives. This simplified the logistics of moving his men and equipment to the objective and reduced the supply lines for resupply.

LOGISTICS

Logistics is the principle of sustaining both man and machine in combat. Logistics is the principle of obtaining, moving, and maintaining warfighting potential. Success in warfare depends on getting sufficient men and machines in the right position at the right time. This requires a simple, secure, and flexible logistics system to be an integral part of an air operation. Regardless of the scope and nature of a military operation, logistics is one principle that must always be given attention. Logistics can limit the extent of an operation or permit the attainment of objectives. In sustained air warfare, logistics may require the constant attention of an air commander. This can impose a competing and draining demand on the time and energy of a commander, particularly when that commander may be immersed in making critical operational decisions. This competing demand will also impose a heavy burden on a command, control, and communications network. The information, mechanics, and decisions required to get men, machines, and their required material where and when they are needed is extensive and demanding. During intense combat, these logistics decisions may even tend to saturate the time and attention of a commander. To reduce the stresses imposed by potentially critical logistics decisions, commanders must establish a simple and secure logistic system in peacetime that can reduce the burden of constant attention in wartime.

Effective logistics also requires a flexible system that can function in all combat environments and that can respond to abrupt and sudden change. For example, if weather or enemy activities force a move in operating locations, sustaining an air operation may depend on a logistics system that can respond to that exigency. Therefore, in preparing for war, air commanders must establish and integrate a logistics system that can keep pace with the requirements of air operations in combat. This requires a flexible logistics system that is not fixed, and one that can provide warfighting potential when and where it is needed.

Operation MARKET-GARDEN

The principle of logistics was violated several times in Operation MARKET-GARDEN. The airborne assault itself was restricted by the number of troop carriers, gliders, and other aircraft. This forced the operation to be planned in stages. Each force was less than full strength from the beginning. The resupply of the Allied forces was an example of the logistics system not responding to a change caused by enemy action. The resupply missions for the British 1st Airborne Division were successful from the enemy point of view, since the majority of the supplies were received by them. The British were severely short of food and ammunition for the entire operation. The shortage of ammunition forced Lt Col Frost to order his men on the north approach to the Arnhem bridge to reduce their rate of fire. This allowed the Germans to gain better positions, but he had no choice. The use of a single road from the breakout point to Arnhem was a bad logistical choice. The road was not protected by flanking forces and the Germans were able to sever the perimeter defense of the logistics lifeline twice. This caused not only a reduction of supplies but also a change in troop deployment to reestablish the supply lines.

COHESION

Cohesion is the principle of establishing and maintaining the warfighting spirit and capability of a force to win. Cohesion is the cement that holds a unit together through the trials of combat and is critical to

the fighting effectiveness of a force. Throughout military experience, cohesive forces have generally achieved victory, while disjointed efforts have usually met defeat. Cohesion depends directly on the spirit a leader inspires in his people, the shared experiences of a force in training or combat, and the sustained operational capability of a force. Commanders build cohesion through effective leadership and generating a sense of common identity and shared purpose. Leaders maintain cohesion by communicating objectives clearly, demonstrating genuine concern for the morale and welfare of their people, and employing men and machines according to the dictates of sound military doctrine. Cohesion in a force is produced over time through effective leadership at all levels of command.

Operation MARKET-GARDEN

Operation MARKET-GARDEN was an excellent example of cohesion in all units. However, the British 1st Airborne Division presented an example of what a unit can do with cohesion or esprit de corps. The members of Lt Col Frost's unit holding the north ramp to the Arnhem bridge performed an unprecedented holding action against an enemy with superior firepower and numbers. Their action prevented the Germans from moving more forces across the bridge to strengthen those at Nijmegen. If the Germans had gotten across the bridge in the numbers and strength they planned, the bridge at Nijmegen would not have been taken as quickly as it was. Alone this battalion had reached the objective that was meant for the entire division, and they held out longer than the division was meant to do (4:447).

Chapter Five

NOTES FOR SEMINAR CHAIRMAN

The objective for this lesson is to gain an understanding of how the Principles of War are used in Battlefield Strategy. The objective of Operation MARKET-GARDEN was to capture a bridgehead across the Rhine. This would allow the Allies to outflank the Siegfried Line and strike the industrial Ruhr area of Germany. Your task is to direct the discussion to provide examples of the principles of war in an actual operation. An important concept to emphasize is the relationship of the principles. Only one principle may be mentioned and the example will demonstrate only that principle, however, it will affect others and others may affect it. The principle of surprise covered in the previous chapter is an example. Although the operation was a surprise, the principle of surprise was not fully achieved due to the failure of security (loss of operations plans) and the enemy's timely application of maneuver. Thus, two different principles affected the application of a third principle.

DISCUSSION QUESTIONS

1. Lead-Off Question

Which principles of war were used advantageously, in planning Operation MARKET-GARDEN, to overcome the enemy's strength?

Discussion

The principles of Surprise, Maneuver, Offensive, Cohesion, Economy of Force, Timing and Tempo were all applied in planning Operation MARKET-GARDEN.

a. Follow-Up Question

Give examples of how they were used in planning MARKET-GARDEN.

Discussion

Surprise - This principle is the key to employment of airborne troops. They are lightly armed and must rely on surprise to gain their objectives before the enemy can organize a successful counter attack. Once airborne troops have gained an objective they must be reinforced to maintain it against a heavily armed opponent.

Maneuver - The use of airborne forces allowed Field Marshal Montgomery to initially by-pass the enemy ground forces and attack only the critical objectives of water crossings. He planned to secure the bridges before the Germans had time to destroy them.

Offensive - This principle had to be used to attack the German territory. The military objective of the Allies was total defeat

of the German Army. Only offensive action could accomplish this goal.

Cohesion - Airborne forces are unique in their mission and training. They are light, mobile and usually used behind the enemy lines. This provides them with an esprit that comes from fighting in circumstances where they must rely on other members of the unit for mutual support.

Economy of Force - MARKET-GARDEN was obliged to use economy of force due to the logistical constraint of aircraft numbers. Airborne operations require lightly armed forces due to payload limitations of transport aircraft. Thus, economy of force is a requirement in their employment.

Timing and Tempo - MARKET-GARDEN was planned to be executed at a fast tempo. To some degree this was slowed by the airlift available to make the drops. The speed of the ground forces was also considered. The plan called for the ground forces to continue ahead at their required pace. The flanking forces and airborne forces were to maintain the perimeter defense during the advance.

b. Follow-Up Question

As occurs in war, all plans are not accomplished as planned. In Operation MARKET-GARDEN the use of several principles of war changed in execution. Give some examples.

Discussion

The principles of surprise, maneuver, and timing and tempo did not occur in execution as planned. This demonstrated the interrelation

of the principles. The use of airborne forces usually relies on the principle of surprise. According to Army/Air Operations pamphlet prepared by the British Imperial General Staff in 1945, "Surprise should be regarded as a weapon of an airborne force"(6:30). This "weapon" allows the airborne forces to initially set the timing and maneuver according to their desires. Accordingly, the British pamphlet also says, "Where the enemy can counter-attack quickly the link-up by land forces should take place within 48 hours" (6:31). In MARKET-GARDEN the planning called for the ground forces to link-up with the most distant airborne forces within 48 hours. In the operation the enemy, although initially surprised, was able to quickly respond with an effective blocking force. This quick reaction allowed the Germans to slow the timing and tempo of the operation. The German defenses along the ground forces' route were able to successfully delay the advance. This delaying action and the terrain combined to reduce maneuverability, slow the timing, and eventually prevent the allies from gaining their ultimate objective. The loss of the benefits of the principles of surprise, maneuver, and timing and tempo worked together to thwart the Allied advance.

2. What principles of war were violated in planning Operation MARKET-GARDEN? What was the result of these violations?

Discussion

a. Mass, Logistics, and Maneuver were all discounted in the planning of MARKET-GARDEN. Mass was discounted due to logistical

constraints. Although this operation was the largest airborne operation ever performed, there were not enough transports and gliders to airlift the entire force in one lift. The use of three lifts on successive days allowed the Germans to pinpoint the drop areas after the first day and destroy or capture a majority of the equipment, supplies, and men on succeeding days. The lack of mass in terms of firepower was quickly evident as the German Panzer divisions moved against the outpost on the Arnhem bridge.

b. Logistics was poorly planned in both ground supply and airborne resupply. Ground logistics was dependent on the same narrow road that lacked maneuver for the armored advance. It was also long and weakly protected. The flanking forces were not able to keep up with XXX Corps on the road. This required the airborne forces to provide a perimeter defense on both sides of the road. A thin, lightly defended supply line invited numerous attacks by the Germans. They were able to disrupt the supply line many times, once for almost two days. The resupply was also logistically unsound due to lack of communication and flexibility. The resupply missions were not able to adjust their drops when the ground situation dictated. The British at Arnhem were greatly affected by this since their drop zones were overrun and their perimeter was continually squeezed tighter and tighter. This was a result of communication failure between the ground forces and the air forces.

c. Maneuver was also violated by the route selection for the ground forces. The single road was surrounded by marshy

terrain in the south and built on a high dike in the north. This constrained the armored units to the road. The enemy was able to stop the entire column by knocking out one tank. The tanks were then immobile targets and the infantry was without its mobile artillery support. These actions all acted together to prevent the capture of the bridge at Arnhem. If Lt Col Frost and his men had not exhibited the cohesion they did in preventing more of the German force from crossing the Arnhem bridge, the Allies might not have captured the bridge at Nijmegen either.

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APPENDICES

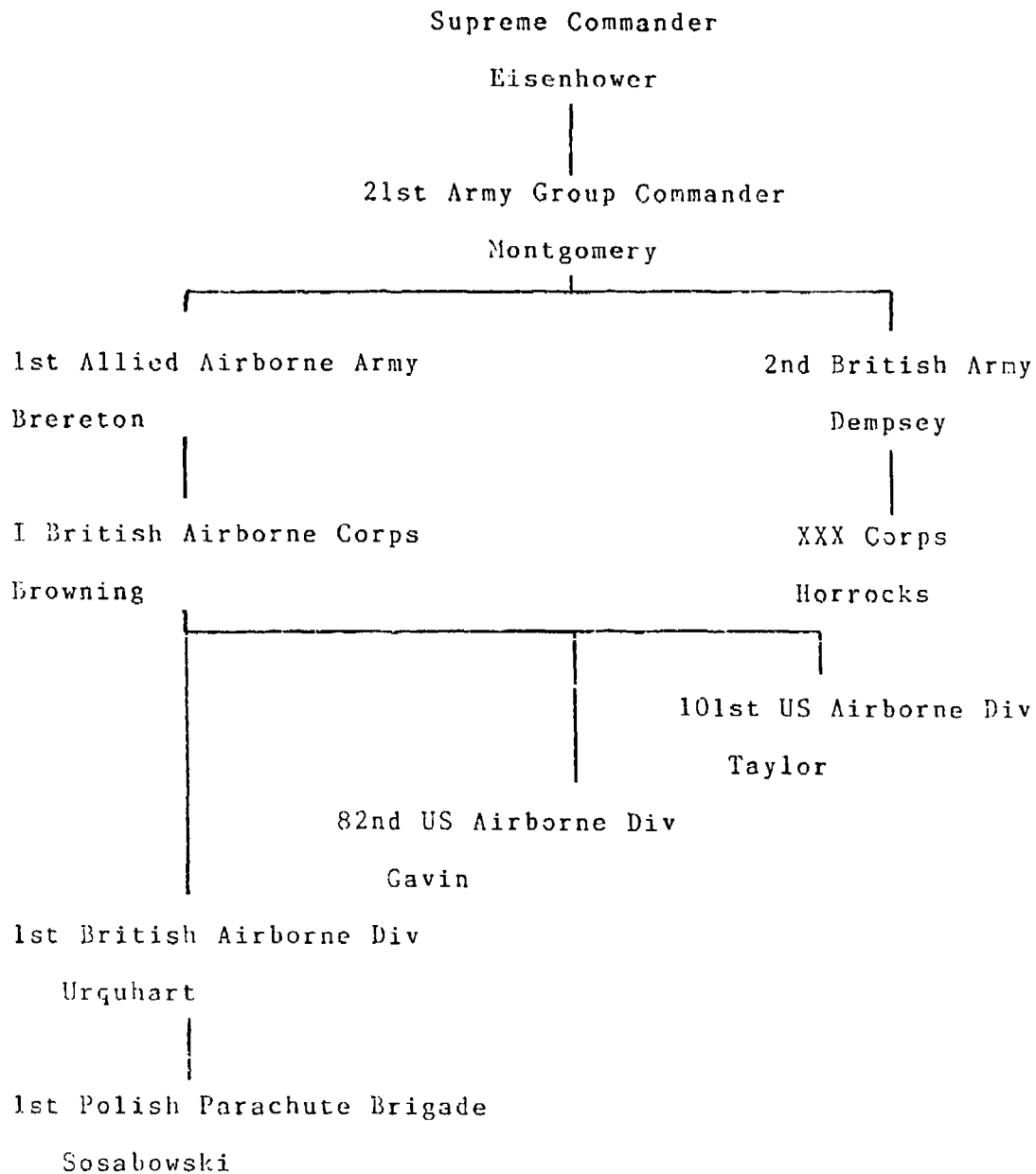
Appendix 1 - Allied Command Structure (1 page)

This appendix shows the chain of command for Operation MARKET-GARDEN. The major Allied commanders are indicated.

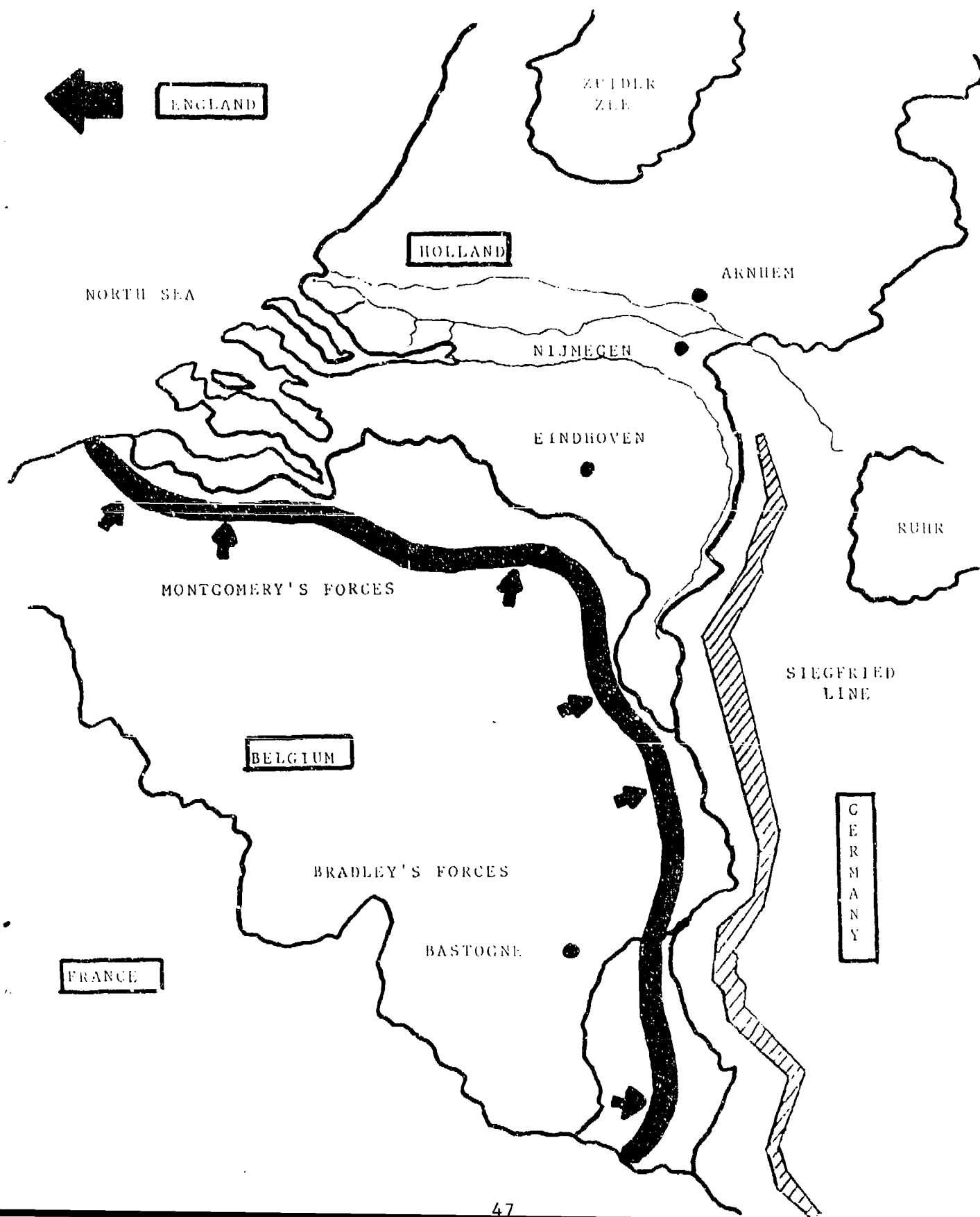
Appendix 2 - Maps of Operation MARKET-GARDEN (9 pages)

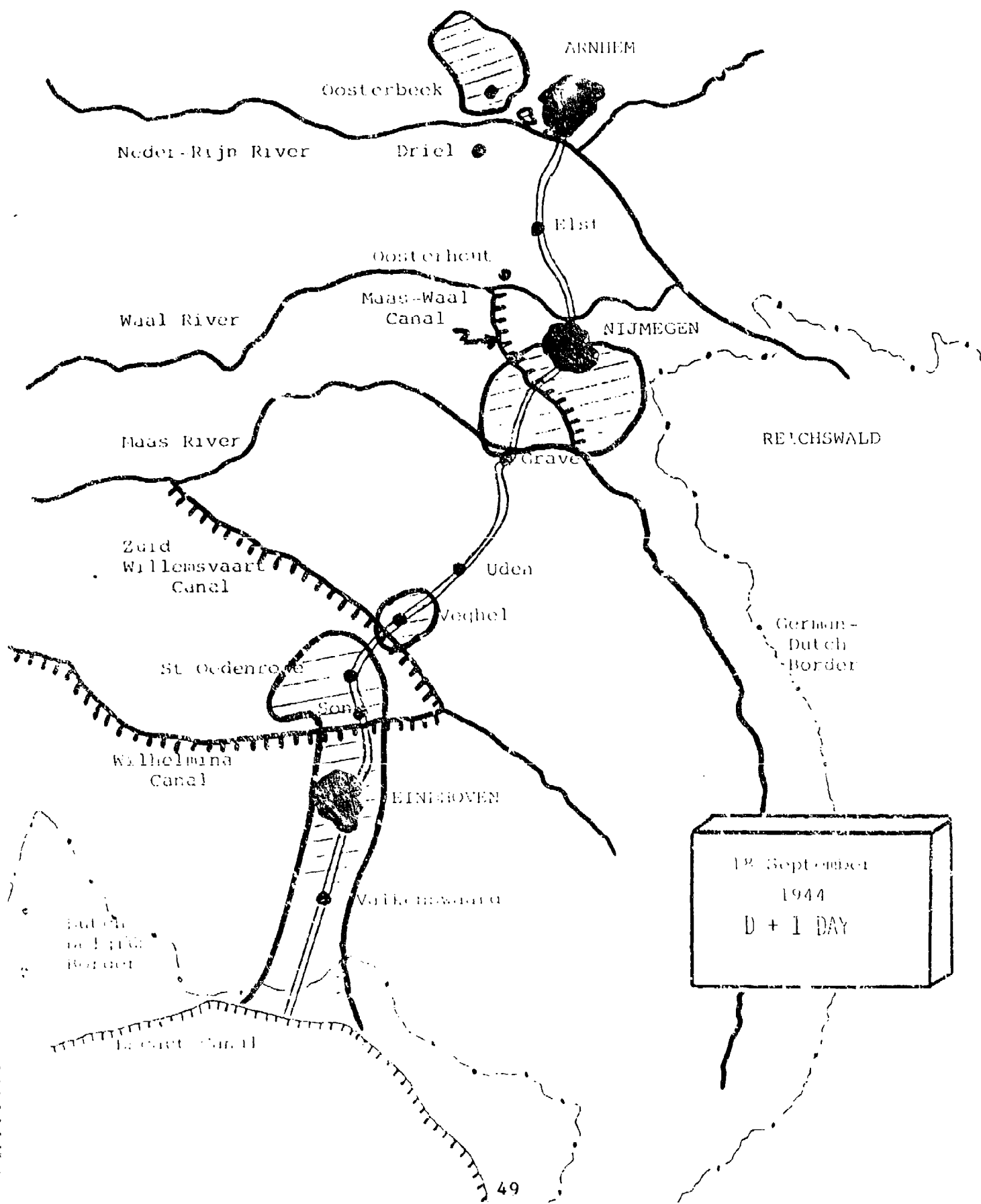
This appendix indicates the position of the Allied forces as the operation was executed. Each map indicates the positions of the Allied forces at sunset of the indicated day. Additionally, the dark arrows on 20, 22, and 24 September indicate the areas of German interdiction of the Allied positions. These maps are obtained from Major R. S. Young's unpublished report, "Operation MARKET GARDEN -- An Analysis of a Failure", written in 1983 (7).

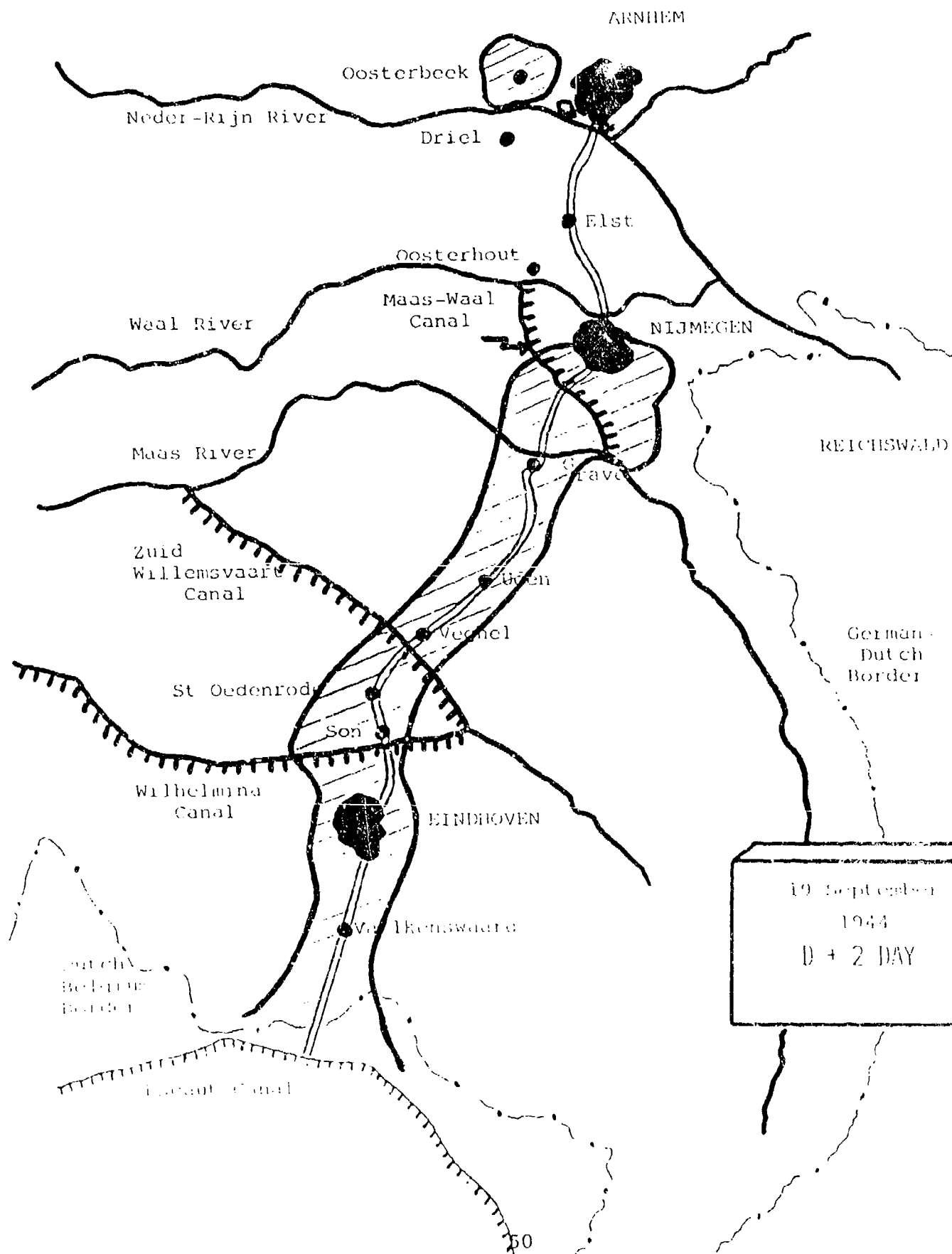
Allied Command structure for MARKET-GARDEN



FRONT LINES, 14 Sept 1944







19 September

1944

D + 2 DAY

