



Cannons Under Canopy

American Parachute Field Artillery in Operation Market-Garden

by Major Scott T. Glass, QM

The mission of parachute Field Artillery is to render fire in close support of airborne infantry...in the tactical operations after dropping.”

Employment of Airborne Field Artillery, 1943¹

The United States Army currently maintains four battalions and two batteries of cannon artillery on airborne status. Parachuted guns played roles in several World War II operations, Korea and, most recently, Panama in 1989. However, the airborne artillery has placed a battalion-plus under canopy successfully into combat only once—more than 55 years ago in September 1944 during Operation Market-Garden. In this operation, the 376th Parachute Field Artillery Battalion (PFAB) and B Battery, 377th PFAB dropped into Holland near Nijmegen and Eindhoven, respectively.

The Market phase of Market-Garden saw the largest wartime parachute insertion of Field Artillery by any combatant in World War II. It remains the largest and most successful to this day. Given the Chief of Staff of the Army’s recent initiatives for light forces that stress quick combat deployment, Field

Third Place



Artillery arriving on a battlefield by parachute will continue as a viable combat option. Cannoneers in the airborne artillery community can prepare their units for success by examining the experiences of the FA parachuted into Holland.

Cannons Light for Flight. “...paracrate packing make[s] necessary the occasional disassembly of various parts of the howitzer and carriage.” *Technical Manual 9-319 75-mm Pack Howitzer M1A1 and Carriage M8, 1943²*

American airborne Field Artillery units in World War II primarily employed the M1A1 75-mm pack howitzer on an M8 carriage. Initially designed in the 1920s as a weapon for disassembly into loads carried by mules, it delivered a 14-pound shell to a maximum range of 9,610 yards.³ The artillery community later developed the M8 carriage specifically for airdrop operations.

The gun weighed 1,339 pounds, and during the opening phases of airborne operations, the gun crews wheeled it by hand without a prime mover as standard practice.⁴ Indeed, the doctrinal manual for airborne Field Artillery at the time recognized crew muscle as the prime means of moving guns on the airborne battlefield.⁵

The 75-mm howitzer’s relatively small size and weight allowed disassembly into nine paracrate or parapack loads containing gun components and ammunition. (See Figure 1.) Gun crews packed loads One through Five and Nine and attached them to fuselage and wing racks of C-47 transport aircraft. The jumpmaster released the bundles over the drop zone (DZ) by toggling a series of switches. As he did so, gunners pushed out a bundle from the troop door containing 75-mm howitzer loads Six, Seven and Eight roped together and then followed the bundle out. A daisy-chain harness connected the loads jettisoned from outside the aircraft and ensured they arrived on the DZ close together.⁶ The M1A1 had few peers at the time as an airborne indirect fire weapon, and the British airborne forces used it instead of attempting to develop a similar weapon.⁷

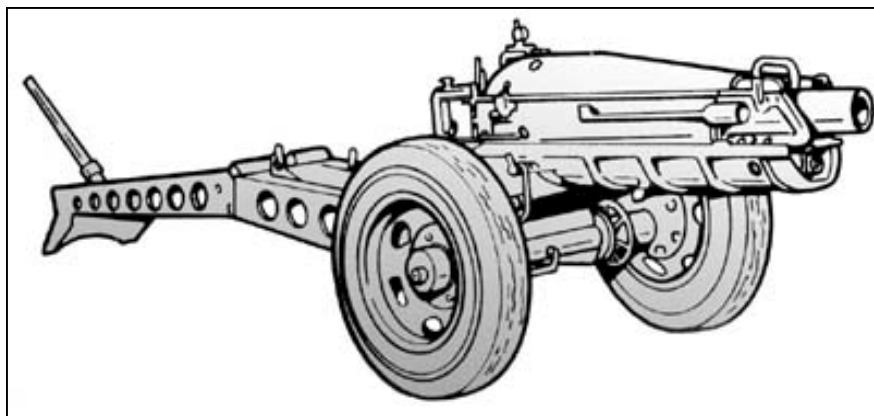
Challenges Not Conquered...Yet. “Parachute artillery didn’t fare too well in Sicily and Normandy.” Major General James M. Gavin, Former Commander of the 82d Airborne Division⁸

Airborne guns figured to play a prominent role during the assault onto the island of Sicily on 10 June 1943 when elements of two artillery battalions were to participate in a night drop. However, unusually high winds coupled with poor navigation by aircraft crews and friendly anti-aircraft fires scattered guns and gunners far from the DZs.⁹ This dispersion prevented the airborne artillery from making a battlefield contribution proportionate to its potential.

The parachute drops scheduled for the night of 5 and 6 June 1944 preceding the Normandy invasion also promised roles for the parachute Field Artillery. Perhaps influenced by his experiences in Sicily, Brigadier General Gavin, limited the 82d Division’s 456th PFAB to

1. Front Trail Section and Drawbar
2. Axle, Rear Trail Section and Toolbox
3. Sleigh and Gun Cradle
4. Top Gun Cradle
5. Cannon Tube
6. Breechblock and Sights
7. Carriage Wheels
8. 10 Ready Rounds of Ammunition
9. Paracaisson Handcart of Eight Additional Rounds

Figure 1: The 75-mm Pack Howitzer Disassembled into Paracrates or Parapack Loads. (Information taken from *The American Arsenal* edited by Ian V. Hogg and published by Stackpole Books, Mechanicsville, Pennsylvania, 1996, Pages 144-145.)



The 75-mm howitzer’s relatively small size and weight allowed disassembly into nine paracrate or parapack loads containing gun components and ammunition. The version shown here is the M1A1 on the M1 (M116) carriage (*TM 9-3305 Principles of Artillery Weapons*, Page 2-9).

two howitzers accompanying his first drops. The 101st Airborne Division envisaged a battalion mission for its 377th PFAB and planned to drop all 12 of its howitzers.¹⁰

But once again, the airborne cannon crews entered combat under extremely adverse conditions that rendered them unable to provide immediate fires to supported units. Aircraft scattered guns and crews over wide areas in the darkness. Very few howitzers could be recovered from the mostly marshy terrain, and those that could, in many cases, experienced irreparable drop damage. Of the 12 howitzers it dropped into Normandy, the 377th PFAB recovered and placed into action only one gun in the critical days after the drop.¹¹ The drop scattered and damaged guns so thoroughly that the battalion was nearly useless as an indirect fire force for the initial two weeks after the landing.¹²

At best, the performance of the airborne artillery during the Sicily and Normandy operations didn’t live up to

its potential. At worst, the artillery absorbed valuable airframes with little or no return on the investment. Batteries landed widely dispersed during hours of darkness across the wrong DZs. Efforts failed to concentrate the guns, crews and ammunition necessary to mass fires shortly after landing. Even so, several key airborne leaders still recognized the value of artillery during an airborne operation. Brigadier General Gavin was in this group and, although he dropped only two guns in Normandy, his influence played a large role in crafting the most successful airborne artillery drop of World War II.

Concept for Success. “...it looked as though artillery would come in very handy in the first 24 hours, so the decision was made to take it in by parachute.” Major General Gavin¹³

In late August and early September 1944, Allied mechanized forces broke away from the Normandy beaches and chased retreating German units across northern France. Planners in the recently created 1st Allied Airborne Army proposed a series of operations to trap major German maneuver formations. Allied ground troops overran the proposed DZs before the operations could be launched, but these events only increased enthusiasm for another mass parachute assault.

After the first week of September, a plan evolved to insert three divisions by parachute and glider to support a thrust across the Rhine River in Holland. By successfully vaulting the Rhine, Allied planners hoped to turn a major portion of the Siegfried Line defenses, threaten German industrial areas and remove the last great river obstacle to Germany’s interior.



Airborne gunners prepare parapacks next to their C-47 transport. Note the paratroopers are preparing the 75-mm howitzer bundles themselves.

The final plan called for the 101st Airborne Division to drop into St. Oedenrode north of Eindhoven to secure multiple canal crossings. (See the map in Figure 2.) The British 6th Airborne Division would drop into Arnhem to seize the bridge over the Lower Rhine River. The 82d Airborne Division formed the vital link between the 101st and British 6th airborne divisions by grabbing bridges and canal crossings around Nijmegen over the Maas and Waal Rivers.¹⁴ The three divisions' landing sites were connected by what became known as "Hell's Highway."

Simultaneous with the three divisions landing by parachute and glider, the British XXX Corps would advance along a narrow corridor through the two American divisions to Arnhem. This entailed a move of 50 miles in about two days.¹⁵ The allied leaders accepted the risk involved in this undertaking, given the opportunity to strike quickly across

the Rhine River. It was an operation tailor-made for airborne troops.

Major General Maxwell Taylor, Commander of the 101st Airborne Division, devoted almost all his first lifts to infantry. Because his division would jump closest to the advancing XXX Corps, he reasoned that his infantry could quickly capture their assigned objectives without needing the firepower options provided by parachute Field Artillery. B Battery of the 377th PFAB would jump on D+3 with the majority of the division artillery arriving by glider before the battery.¹⁶

Brigadier General Gavin took a much different perspective because his mission specified capture of the Groesbeek Heights. This was a rare piece of high terrain southeast of Nijmegen that dominated the area for miles. Included was the task of blunting German mechanized counterattacks on the Groesbeek Heights from the Reichswald, a heavily-

wooded forest astride the Dutch-German border.¹⁷ (See Figure 3.)

Gavin and his planners knew that a parachute artillery battalion would provide the firepower necessary for accomplishing these tasks. An added bonus was that a PFAB required 48 C-47 aircraft versus 95 to deploy a glider Field Artillery battalion. These 48 aircraft needed four minutes of airspace; the 95 towing gliders required 15 minutes.

Key to the airborne artillery's performance was the decision to execute the parachute drop in daylight. This eliminated the requirement of a time-consuming and confusing rehearsal of a night drop immediately before the actual operation. But most importantly, planners hoped this decision would help to achieve the high degree of troop and equipment concentration on the DZs, concentrations that were missing in the Sicily and Normandy operations.¹⁸

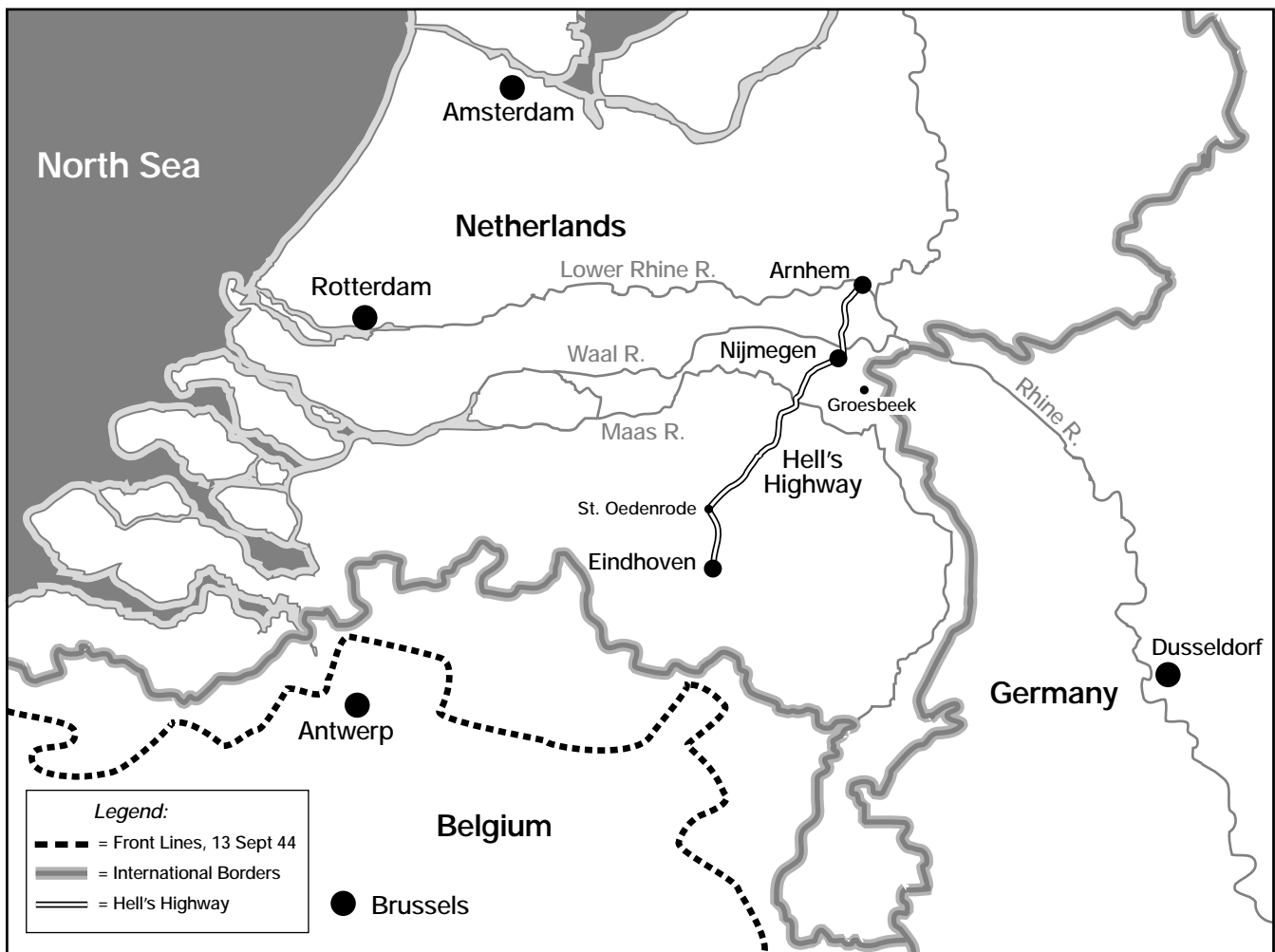


Figure 2: The Airborne Artillery Area for Operation Market-Garden, September 1944. During this operation, the 376th Parachute FA Battalion (PFAB), 82d Airborne Division, dropped into Groesbeek near Nijmegen and B Battery, 377th PFAB, 101st Airborne Division, dropped into St. Oedenrode near Eindhoven. Hell's Highway linked the airborne drop zones (DZs) from Eindhoven through Nijmegen to Arnhem.

Cross-Training, Crating and Chuting Up. “The 377th PFAB got back to England in late July 1944. From then on, we trained replacements and worked hard to fix things we knew did not work in Normandy.” Second Lieutenant Everett G. “Red” Andrews, Assistant S3, 377th PFAB¹⁹

While waiting in England for another opportunity to demonstrate the value of parachute artillery, the parachute Field Artillery had not been idle. Training intensified for new gunners, leaders and staff officers. Crews drilled constantly on recovering and assembling the component parts of airdropped howitzers. Changes in organization and support relationships required new liaison officers to train on evolving doctrine with their supported units.²⁰ Many senior artillerymen went about their tasks driven by the knowledge that their next chance to prove their worth might be the last one allotted by skeptical planners.

The 376th PFAB received orders on 11 September to prepare its equipment for a parachute jump behind German lines. Preparations continued with the move to the departure airfield (DAF) at Fullbeck, England, on 14 September. Crews disassembled the guns, prepared the parapacks and loaded 72 more rounds of ammunition per howitzer in airdrop bundles. Briefings, orders drills and rehearsals continued while liaison teams left the DAF to make jump preparations with their supported units.

The simplicity of the 376th’s mission greatly eased planning and preparation. The battalion was to land by parachute at 1340 on 17 September on DZ “N” south of Groesbeek and fire in direct support (DS) of the 505th Parachute Infantry Regiment (PIR). (See the map in Figure 3.) Follow-on missions included supporting the 504th and 508th PIRs and interdicting suspected German gun positions in the Reichswald.²¹

Canopies Over Colonjes. “Right after I landed, I knew this had been a good, tight drop. Crews started to assemble quickly. I saw a three-story house nearby and took it for the battalion headquarters. We were in business just minutes after hitting the ground.” Captain Robert A. Lally, Commander of Headquarters and Headquarters Battery and S2 of the 376th PFAB²²

Thirty-eight officers and 506 men of the 376th PFAB boarded 48 C-47 transports on Sunday morning, 17 September for the flight to Holland. Twelve guns and 42 tons of supplies would drop

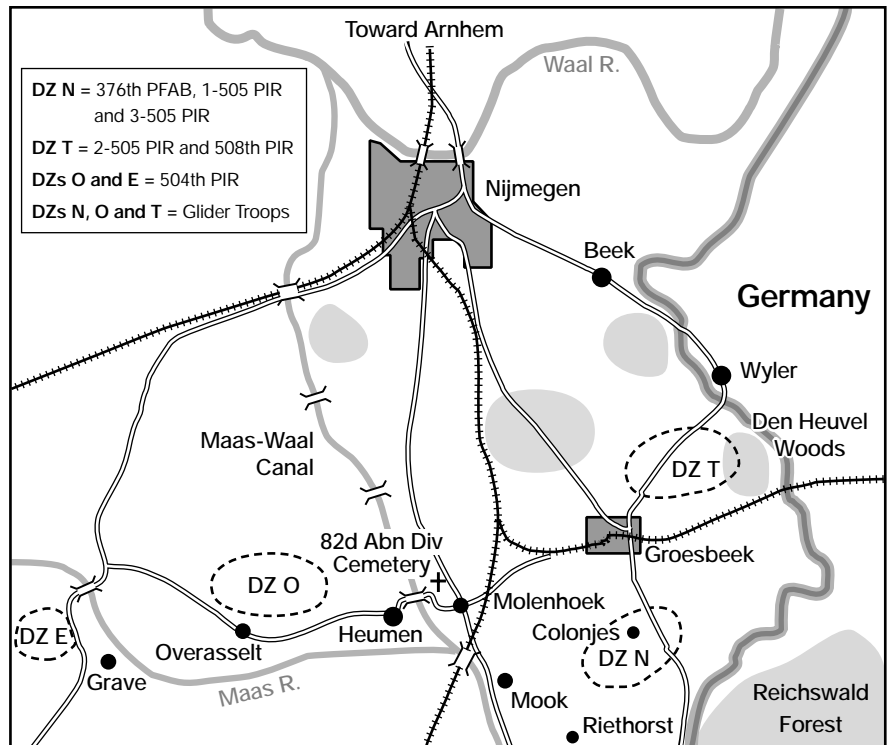


Figure 3: 376th PFAB Operational Area Around Groesbeek, Holland, 17 September 1944. In support of the 504th, 505th and 508th Parachute Infantry Regiments (PIRs), the 376th PFAB landed on DZ N where Germans fired on them from the Reichswald Forest. The battalion returned fire, engaged targets around Mook and moved into the town of Groesbeek. On D+1, the 376th helped evict Germans from DZs N and T to secure them for the arrival of glider troops.

with the cannon crewmen from 500 feet above DZ N. Some German anti-aircraft flak hit the transports on the way to the DZ, but all 48 continued on. At 1333, seven minutes ahead of schedule, paratroopers kicked out the first door bundle from the lead C-47. The 376th PFAB commander followed the bundle out into space and started the most successful wartime airborne delivery of artillery in history.²³

After just seconds suspended in their parachute harnesses, the airborne gunners rejoined the earth on the fields of DZ N around Colonjes. It was a beautiful Sunday morning southwest of Groesbeek, and every stick had landed within a mile of the planned impact point. Jumpinjuries, considering the seeming acceptance of high jump risk at the time, were remarkably light at approximately 30 men. A few soldiers didn’t jump due to wounds received from the German flak during aircraft flight. The transports carried the wounded back to England with one cannoneer dying from his wounds during the return flight.²⁴

376th PFAB at Groesbeek. “...the gunners brought in ammunition from parachute containers...only to fire it as fast as possible as the Germans attacked our

front.” Major Robert H. Neptune, Executive Officer, 376th PFAB²⁵

On the ground, the cannon crews rushed to accomplish their mission of supporting three infantry regiments in the division until additional artillery could arrive by glider more than a day later. Gunners hurriedly derigged the parapacks and assembled the howitzers. Other paratroopers assembled the supply bundles, their task greatly eased by the color-coding of parachutes with different loads.

German soldiers scattered in the local area fired on these activities. The gun crews fought back, killing several Germans and taking a total of 37 prisoners before their first 30 minutes on the ground had expired. The crews suppressed the enemy in their immediate area and manhandled the guns about 1,000 yards from the DZ toward the southern edge of Colonjes to the battalion collection point and initial firing position.²⁶ Leaders set up wire and radio communications, established an all-around defense and sited incoming howitzers in a 360-degree perimeter. Soldiers manning the battalion command post (CP) interrupted their work to attack the high ground north of the CP that sheltered a German flak position.²⁷

Twenty-two minutes after landing, one howitzer was ready for action with 24 rounds of ammunition standing by. Liaison teams had linked up with the 504th PIR and the aid station for battalion wounded was operational. By 1440, barely an hour after the jump, one battery was completely assembled. The other two firing batteries had one damaged howitzer each from the drop. Unfortunately, the damaged guns couldn't be repaired from the extremely limited repair parts and tools that the batteries brought with them.²⁸

At 1800, the 376th PFAB fired its first on-call mission for the 505th PIR, al-

though the battalion had several guns ready to fire for some time before 1800. The target was a German infantry force with some light vehicles moving out of the cover of the Reichswald. The 75-mm fires called in by the forward observer (FO) teams with the 505th PIR disrupted this movement.

A short time later, the 376th PFAB shifted fires nearly 2,400 miles to respond to calls-for-fire from the vicinity of Mook. Shells from the pack howitzers helped blunt a dismantled German attack north along the highway south of Mook that threatened the DZ areas. Throughout the afternoon and into the night, gun crews

fired missions, helped retrieve supply bundles by hand and stockpiled ammunition near the guns. Everyone expected the German reaction to be a violent one the next day.²⁹

Early on D+1, C Battery displaced to support the 508th PIR. The move encompassed 4,300 yards with the guns and ammunition moved by hand. C Battery almost immediately went into action, firing on German paratroopers and light armored vehicles. Less than an hour before the scheduled D+1 glider landings, a German force attacked out of the Reichswald and overran the planned landing areas.³⁰ The fires from C Battery assisted the 508th PIR in evicting the German forces and securing DZ T as one glider landing site. Both A and B Batteries successfully fired in support of the 505th PIR against a German force detected south of Riethorst and threatening DZ N.³¹

All three batteries materially assisted in securing the two DZs in the nick of time. Just after the German attackers retreated, gliders started pouring out of the sky with guns and equipment from the 456th PFAB and the 319th and 320th Glider Field Artillery Battalions. The 376th PFAB gunners fired suppression missions on German anti-aircraft positions while the gliders swooped down. As the three arriving battalions struggled to assemble, the airborne gunners once again engaged targets near Riethorst and the Reichswald.³²

The arrival of three reinforcing battalions ended the 6,400-mile responsibility of the 376th PFAB. As soon as each battalion assembled, it transferred six jeeps and two trailers to mechanize the 376th PFAB. Each FA glider battalion also established its fire direction center (FDC) and assumed support relationships with its respective PIR, relieving the 376th of that responsibility. The 376th PFAB went DS to the 504th PIR with the 456th providing reinforcing fires. The battalion continued to fight in the Nijmegen area until the second week of November, but by the evening of D+1 around DZ N, the strictly parachute role of the 376th PFAB was over.

B/377 PFAB at St. Oedenrode. The mission of B Battery, 377th PFAB was just beginning with its drop south of St. Oedenrode onto DZ C on D+3. (See the map in Figure 4.) The four parachuted guns, when added to the 12 already dropped by the 376th PFAB, made the Holland operation the largest artillery drop of the war.

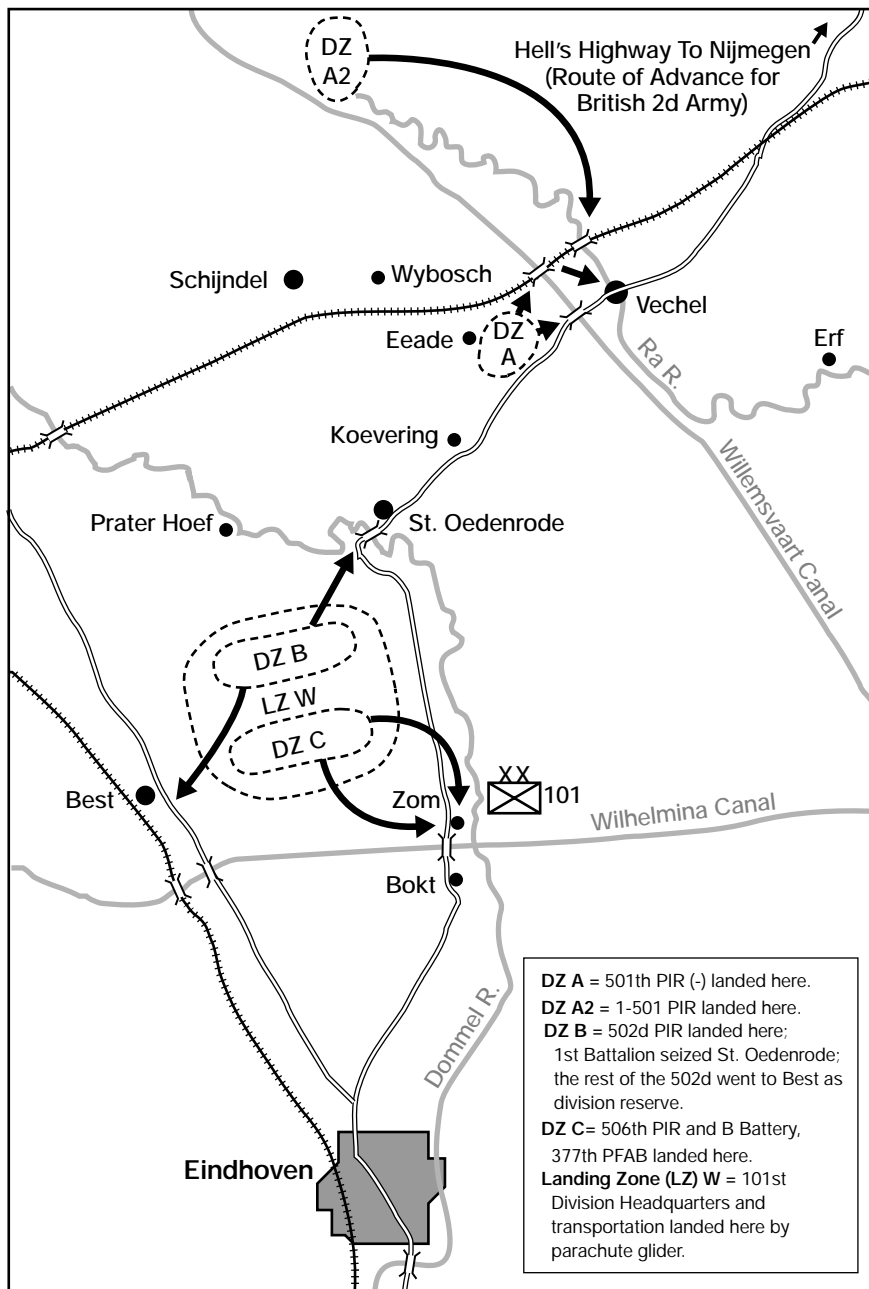


Figure 4: Initial Operational Area of B Battery, 377th PFAB, 17 September 1944, in Operation Market-Garden. B/377 PFAB parachuted into DZ C on D+3.

Like their brethren of the 376th PFAB, B Battery's gun crews quickly assembled their 75-mm guns and went into action. One of their first tasks involved firing in support of the 506th PIR, deflecting German attacks by the 33d Panzer Regiment on the Hell's Highway near Zom. The 75-mm fires helped the 506th PIR keep the road open for Allied tanks and supplies.³³

Artillerymen from the 377th PFAB did some of their best work as infantrymen around St. Oedenrode. German tanks and infantry attacked frequently, attempting to cut Hell's Highway. Sergeant Art Parker, a surveyor assigned to one of the batteries, secured a bazooka rocket launcher to help stop one of these assaults. Parker personally knocked out two tanks from close range, stopping the attack. For his actions, he received the Silver Star.³⁴

The Cost of Success. "That Holland jump was a good jump. We did our job and everything that we were called on to do. Every fire mission I called in was answered right away." Second Lieutenant Robert S. Hutton, FO, B Battery, 376th PFAB.³⁵

By every yardstick, the airborne cannoners achieved success around St. Oedenrode and Groesbeek. They assembled efficiently and displaced quickly when needed. For more than 24 hours they fired missions over a 6,400-mile arc, defending the perimeter and providing fire support to attacks on key water crossings. They broke up German counterattacks, interdicted enemy assembly areas and kept armored vehicles at arm's length from the perimeter. FO teams continued to call in fires, even after attacking German units had surrounded their positions.³⁶ German aircraft strafed their positions. Enemy artillery present on the battlefield consistently outranged them, and yet their fires were essential to securing the landing zones (LZs) for gliders on D+1.

Neither the 376th PFAB nor B Battery, 377th PFAB lost any guns due to enemy infantry attacks or counterbattery fires. In addition to the 30 men temporarily disabled during the jump, several were wounded by German defensive fire in the initial stages of the parachute assault. A handful died from enemy



1943 photo showing a pack howitzer crew moving the gun with a system on harnesses. These harness assemblies went in the paracrates and were dropped with the gun.

action, and, ironically, a landing glider struck and killed one 376th PFAB soldier on D+1.³⁷

Conclusions from Parachute Artillery in Market-Garden. "The Airborne troops accomplished what was expected of them." 1st Allied Airborne Army appraisal of Operation Market-Garden³⁸

The experiences of the airborne artillery around Groesbeek and St. Oedenrode contain many points of reflection for airborne as well as air assault and air-landed cannoners more than 55 years later.

Airborne Operations in Daylight. Unquestionably, darkness contributed greatly to dispersion, gun damage and lost time in assembling the PFABs in Sicily and Normandy. Scheduling the Holland drop for daylight hours resulted in unprecedented concentration on the DZs. Anti-aircraft defenses have improved markedly since 1944, but commanders still may consider parachuting Field Artillery during daylight. The gunners of the 376th and 377th PFABs showed that improved DZ concentration, increased efficiency of assembly, accurate call-for-fire and speed in getting the guns into action should be some of the primary factors weighing in this decision.

Class V Resupply. Ammunition is critical to artillery units inserted a great distance from their source of replenishment. In the airborne artillery, a key source of ready ammunition is the prime mover vehicle for the howitzer. Accompanying loads can be rigged on the 105-mm prime movers, the high-mobility multipurpose wheeled vehicles (HMMWVs).

However, the five-ton medium tactical vehicle (MTV), which functions as

a prime mover for the M198 155-mm system, only can be airdropped in emergency wartime situations. Even then, it will be without an accompanying ammunition load. Gun crews for the M198 system must rely on a small quantity of ammunition dropped with the gun.

Bundles and platforms rigged with 155-mm munitions are, at best, a half measure. Gunners in Holland struggled to recover ammunition bundles and reposition the contents at firing sites. This was a difficult task, even with the relatively light 75-mm shells; the 155-mm mu-

nitions in use today are about seven times heavier. The process of testing accompanying ammunition loads airdropped with the MTV is underway at Fort Bragg, North Carolina, in the XVIII Airborne Corps Artillery. A successful conclusion to this testing could not come too soon.

If possible, airborne artillery units should take maximum advantage of door bundle loads. The Holland operation dropped medical supplies, howitzer rounds and small-arms ammunition in their bundle loads. However, machine gunners wasted no time recovering bundles that didn't contain .50 caliber rounds.

How was this possible? The bundles parachuted to earth under color-coded canopies that greatly aided identification and retrieval. This system of many canopy colors for equipment bundles might be financially constrained today, but colored riser streamers for bundle parachutes might be a low-cost solution for daytime drops. Night drops should feature bundles adequately marked by chem lights with a specific color matching the material inside. Large markings on the canvas bundle covers in Holland also clearly identified the contents.³⁹ This saved critical time in separating items for which there was an emergency need.

Gunners as Infantrymen. Artillery gunnery is the most important shooting that gun crews can do, but it is not the only shooting that's important. The airborne artillerymen who jumped on DZ N landed within range of German flak crews. The automatic weapons could have been devastating to troop carriers, gliders and resupply aircraft. Nearly every cannoner participated in an infantry action immediately after landing,

voluntarily or not. These sharp fights were for individual survival, aiding assembly or securing the initial firing positions.

The table of organization and equipment (TOE) in effect at the time allotted a parachute cannon battalion approximately 24 .50 caliber machineguns,⁴⁰ with almost all arriving broken down in door bundles. Gun crews knew how to assemble and use them as effectively as their individual weapons. They knew how to shoot and conduct elementary tactical maneuver. Crew proficiency with small arms and small unit tactics paid a huge dividend in the 376th PFAB's assembly under fire. That all cannon battalions need to be good shooters with weapons, large and small, is an understatement.

Medical Support. Medics in the 376th PFAB loaded their own door and aircraft fuselage bundles with equipment and supplies for the battalion aid station. These bundles were easily identified on the ground from cover markings and parachute colors. The aidmen quickly found the bundles, classified them by contents and set up the aid station within minutes of landing to treat jump and enemy-fire casualties. The officer in charge reported the battalion aid station fully functional within an hour of landing.

The medics were able to achieve this efficiency and speed because they routinely practiced these operations during the battalion training events and jumps. They didn't have to learn how to do it under fire in the fields south of Groesbeek. The lesson is to involve medics in all medical aspects of airborne training

operations, not just administrative DZ coverage.

Maintenance Support. The 377th PFAB lost several guns to drop damage in Normandy. The 376th PFAB lost two of its 12 guns to drop damage in Holland. In 1989, Battery A, 3d Battalion, 319th Field Artillery [Indiana Army National Guard] lost one 105-mm howitzer to drop damage in Panama during Operation Just Cause. So this possibility exists for guns light, heavy, old and new. None of the units had the capability to immediately repair the guns and get them into action. However, units today can train for this contingency by embedding maintenance training in airborne operations.

When howitzer platforms are rigged for aerial delivery, due consideration should be given to incorporating mechanics' tools and selected demand-supported repair parts. Tools and parts also can arrive on the battlefield via door bundles. DZ training on simulated repairs by airborne artillery mechanics is key to enabling cannon units to cope with a maintenance contingency. Commanders can and should make maintenance training a challenging part of peacetime airborne mission planning and training.

Closing Shot. "Holland was an experiment. Every airborne operation was at the time. We always thought that we had proven ourselves when we were given the chance." First Lieutenant Herman Swope, Executive Officer, C Battery, 376th PFAB⁴¹

Parachuting Field Artillery is a viable technique that increases the battlefield

options available to the US Army. If airborne artillery leaders and soldiers remember the lessons learned in Market-Garden, the airborne artillery will remain a capable combat force in the next millennium. In future operations, airborne cannoners must ensure that an adversary learns, again, that American parachute FA will intervene decisively on a battlefield.



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