High Tech vs.

The striking battle of wits and ingenuity that kept about half of the war's choppers flying...and got about half of them shot down

BY DAVID F. CROSBY

NATIONAL ARCHIVES

Low Tech

"ALL OF US WHO fought on the ground in Vietnam, we rode to war in the Huey, and that 'whup, whup, whup,' is burned into our brains," says retired Lieutenant General Hal Moore, the first commander of the 1st Cavalry Division (Airmobile) in Vietnam. Indeed, Vietnam is rightly regarded as "the helicopter war," and the lessons learned there forever changed the way war is waged.

Rotary wing aircraft first saw use in World War II, and the Korean War and France's Indochina War had seen them mature into invalu-

CAV'S COMING When 1st Cavalry Division Hueys entered the fight, such as in May 1967 near An Khe, high-tech power and maneuverability was met by ingenious low-tech cunning.

NATIONAL ARCHIVES

GRUNTS' BEST FRIEND The sound of a Huey on its way was a welcome one, whether it was ferrying in reinforcements, rushing wounded to life-saving aid or laying a screen of smoke to provide cover for troops on the ground.

able transports, especially in the vital task of expediting wounded soldiers from the battlefield directly to a hospital. It was in Vietnam, however, that the "chopper" truly came into its own, expanding its military role with unprecedented versatility. Helicopters transported soldiers, conducted armed reconnaissance, provided fire support, evacuated wounded soldiers and performed a myriad of other missions in the jungles of Southeast Asia.

As the chopper became a ubiquitous component of the American arsenal, the Vietnamese Communist forces turned their ingenuity to the task of driving it from the sky. That in turn compelled the American copter crews to adopt weapons and tactics to counter the threat. Like the Vietnam War itself, this escalated into an ongoing struggle between guerrillas and North Vietnamese Army (NVA) regular forces in the jungle, and rotors in the air.

Out of the 12,054 American helicopters that served during the Vietnam War, 5,602 were destroyed during combat operations—a loss rate of 46 percent. More than 4,900 pilots and crewmen perished in these aircraft losses. Obviously, over time, the enemy had significant success with their anti-helicopter tactics, techniques and procedures (TTP).

From crude anti-helicopter ground obstacles used by the Viet Cong (VC) early in the war to the use of shoulder-fired surface-to-air missiles (SAMs) by the North Vietnamese during the later stages of the conflict, anti-helicopter weapons and tactics evolved over the breadth of the Vietnam War. The helicopters they confronted also changed over the course of the war as the U.S. Army constantly adapted its aircraft and tactics to counter the anti-helicopter TTP it confronted on the battlefield.

Early in the war, the Viet Cong normally fled when helicopters arrived on the scene. Using the canopy of the jungle or the cover of darkness for protection, they melted away into the vegetation and patiently waited to fight later, on their own terms. The VC were extremely adaptable and soon recognized vulnerability in the helicopter and began to gradually take advantage of it.

Three helicopters dominated the Vietnamese battlefields from 1961 to 1963: the CH-21B Shawnee, UH-1A/B Iroquois and the CH-34B Choctaw. Each had design problems that made it vulnerable to enemy ground fire.

The U.S. Army's Shawnee, a tandem-rotor helicopter nicknamed the Flying Banana, was already considered outdated when deployed to Vietnam. A piston-powered aircraft, it had only one engine that drove two rotors and long, exposed control and hydraulic lines that made it easy to shoot down. Regardless, the Shawnee could carry 21 fully equipped troops and became the workhorse of the airmobile war during America's early advisory period of the conflict. The Army also fielded a limited number of the UH-1A/B Iroquois, nicknamed the Huey, which normally functioned as an armed escort for the vulnerable Shawnee because it was faster, more nimble and could carry only a small number of troops. During this period, the Marine Corps deployed the CH-34 Choctaw, a more rugged aircraft than the Shawnee, but nonetheless possessing weaknesses that the enemy quickly learned to attack.

The turbine-powered UH-1 Huey proved much sturdier than the Shawnee, but it still only had the one engine—always a survivability issue for an aircraft flying low-to-the-deck in a heavy small-arms environment. Like the Shawnee, the Marine Choctaw was also piston-powered. Its single engine was in the nose, making it easy to maintain but also easy to target and hit; the cockpit sat high above the engine, making it another easy target; and its lightened magnesium alloy airframe, while more capable, was far too easy to set afire.

THE VIET CONG EMPLOYED simple tactics at first. One of their favorites involved booby-trapping landing zones. Because a limited number of landing zones (LZ) existed in the jungle, the enemy knew that sooner or later a helicopter would use these fields to land or extract personnel or supplies. Just as they booby-trapped areas where they knew enemy ground troops would walk, they laid anti-helicopter traps where they knew American choppers would land.

Using a hand grenade, mortar shell or similar explosive device with a trip wire rigged for detonation, the VC would run the wire across the landing zone and then loosely thrust a pole into the ground near the trip wire. The landing helicopter's rotor wash would push the pole across the trip wire and set off the explosive device—crude in design, but effective. The Viet Cong emplaced these booby traps in areas with high grass that helped to hide the device until the targeted helicopter would flare to land. Many variations of these booby traps existed, but they all worked on the principle of the chopper's rotor wash triggering the device.

JENNIFER E. BERRY; ABOVE: JOHN CONWAY/WWW.VHPAMUSEUM.ORG

CHOPPER'GANDA An American leaflet (top) warns of the outcome for firing on a helicopter; a North Vietnamese postage stamp celebrates a shootdown at Ap Bac.

American pilots quickly found the solution to this tactic: Helicopter gunships raked LZs with machine gun and rocket fire to eliminate any booby traps before troop-carrying choppers arrived. Once gunships became commonplace on the battlefield, the explosive booby traps only posed a danger to lone helicopters landing special operations troops in places where gunship prep fires would have exposed the covert insertion.

Another very basic enemy tactic proved ef-

fective for a time. When a helicopter flew low overhead, the VC would simply fall on their backs and fire straight up without aiming. They knew they had no chance of hitting the lead helicopter, but second and third helicopters following in trail of the first would take hits, flying into the wall of lead. To foil this, American helicopter pilots began flying staggered formations.

The Viet Cong quickly learned that the insertion of an American combat unit into an area would often entail multiple airlifts, giving them time to move their heavy machine guns and mortars near the active landing zone. They then would target the follow-on choppers at their most vulnerable position—while slowing and flaring for landing or while on the ground.

An early success of the tactic occurred during the battle of Ap Bac on January 2, 1963. The Army of the Republic of Vietnam (ARVN) 7th Division had been ordered to clear a suspected Viet Cong command center from the area, but rather than withdrawing from a large fight—as was their custom—the VC held their ground and fought. The ARVN and their American advisers, stymied by withering fire from about 350 well-armed guerrillas, asked for reinforcement. The 93rd Transportation Company (Light Helicopter) flying Shawnees airlifted the South Vietnamese reinforcements to the battle site while the Utility Tactical Transport Helicopter Co. (UTT), flying armed Hueys, provided aerial fire support. On the fourth lift of the day, the 93rd landed its Shawnees within 200 meters of an enemy bunker complex hidden in a tree line. Heavy and accurate fire from the bunker line immediately brought down one Shawnee and then a second as it struggled to rescue the crew of the first downed helicopter. A Huey then tried to rescue both downed crews and was also shot down. Two more Shawnees, badly shot up, made forced landings farther away in the same field. In all, five U.S Army helicopters fell to enemy gunfire, with two crew members dead and several wounded. The Viet Cong then slipped away into the night, leaving snipers behind to harass the maintenance crews they knew would arrive the next day to recover the downed choppers. While that tactic would remain successful throughout the war, in 1964 the more capable Huey completely replaced the Shawnee in the troop-carrying role, greatly reducing similar helicopter losses.

THE EARLY AMERICAN AND NORTH VIETNAMESE troop buildup phase of the war began in earnest in 1965, and the nature of the anti-helicopter war began to change as well. Increased NVA involvement in the South brought with it growing numbers of what became the most universally dreaded nemesis to the American and ARVN helicopter crews: The Soviet 12.7mm machine gun, also known as the .51-caliber. Improved training accounted for much of the enemy's success. Anti-aircraft training manuals were usually found among the documents captured by Americans at enemy base camps, and North Vietnamese Army cadre devoted a great deal of time using drawings to show troops exactly where to aim to bring down specific American helicopters. The effectiveness of this training proved itself as the war progressed and helicopter losses increased.

Most helicopter losses occurred when pilots had to fly into landing zones that were hot—directly under fire—to pick up wounded or deliver badly needed ammunition in the middle of a firefight.

After the hot LZ, the second most hazardous situation was in what crews called a hover hole. American troops in thick jungle would cut out small landing zones just big enough for a helicopter to hover down into, with its blades just feet away from tree limbs. The chopper pilots would skillfully lower themselves down into

INDIANS OF THE AIR

WHEN THE U.S. ARMY christened the Bell H-13A helicopter "Sioux" in 1948, it established a tradition that was formalized in the Department of Defense regulation on naming weapons systems, DoD 4120-15. Henceforth, all helicopters would be named after prominent Native Americans or their nations. American servicemen, however, have an ongoing penchant for coining their own terms for their equipment and the protracted Vietnam War gave birth to a rich alternative vocabulary from which helicopters were hardly immune. The U.S. Navy and Air Force did not adopt the Army's policy and used other official terminology for their helicopters.

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U.S. ARMY

Type	Official Name	Unofficial Name
 Piasecki CH-21B	Shawnee	Flying Banana
 Sikorsky CH-34B	Choctaw	Stinger (armed) HUS (Marine)
 Sikorsky CH37A	Mojave	
 Sikorsky CH-54	Tarhe	The Crane
 Bell UH-1	Iroquois	Huey Hog (rocket-armed) Cobra (gunship) Slick (troop or medivac)
 Bell AH-1	Cobra	Hueycobra, Snake
 Boeing-Vertol CH-47	Chinook	Shithook
 Hughes OH-6	Cayuse	LOH, Loach

U.S. NAVY/AIR FORCE/MARINES

Type	Official Name	Unofficial Name
 Kaman HH-43	Huskie	Eggbeater, Pedro
 Kaman UH-2	Sea Sprite	
 Sikorsky HH-3	Sea King	Jolly Green Giant
 Sikorsky CH-53	Sea Stallion	Super Jolly
 Sikorsky CH-46	Sea Knight	Phrog

COLOR CODED Finding a small target in a big jungle proved problematic, so marking landing zones was necessary. When the VC caught on and began using smoke to lure choppers in for an ambush, the Americans countered by using different smoke colors that would be verified by pilots before landing.

these hover holes but, unable to maneuver horizontally in the small confines, they were extremely vulnerable to small-arms fire should an intrepid guerrilla creep up on the makeshift landing zone. Even if the enemy fire did not strike the helicopter, it could so unnerve the pilot that he might crash his aircraft anyway. Helicopter crews grew to hate these death traps.

The North Vietnamese often tried to bait a helicopter into landing on an LZ they had rigged with an ambush. They would place sought-after weapons or dead enemy soldiers in plain sight. American commanders would then order troops in helicopters to land and search and secure the area; when the chopper landed, the enemy would spring the ambush.

The NVA also used target identification to their advantage. The American infantryman had a very limited view of the battlefield in Vietnam. While he could see a single tree line to his front, an attack helicopter pilot arriving on the scene to provide fire support might see three tree lines and would have to ascertain which held friendly and which harbored enemy forces. Finding the target took time, and the pilot was forced to linger at low altitude, orienting himself to the battle area before firing at the enemy. The North Vietnamese took advantage of this by engaging the aircraft while the pilot tried to discern the target area. Ground forces countered this enemy tactic by marking their own locations with colored smoke and using M-79 grenade launchers and mortars to place another color of smoke on enemy locations.

The North Vietnamese countered that by monitoring American units' radio transmissions—which were usually transmitted in the clear—and throwing out the same colored smoke as the Americans. This trick worked for a while, until the Americans changed their tactics once again. The American unit would throw out a colored smoke at its location but not identify the color. When the supporting helicopter arrived on scene, it would ask the friendly unit to identify the color of its smoke. If the American unit stated "Green" and the pilot saw a green smoke and a red smoke, he knew the red smoke belonged to an enemy unit and rolled in for an attack run.

CRASHED HELICOPTERS—WHETHER taken down by enemy action, an accident or mechanical failure—needed recovery. Typically, a team would arrive on the scene to secure the crash site and protect the arriving heavy lift recovery helicopter. The recovery chopper would sling load the disabled helicopter out of the crash site, and then the security force would withdraw by helicopter as well.

The North Vietnamese learned the routine and turned it to their advantage by timing their ambushes to strike at the recovery forces'


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most vulnerable times. They rarely struck the security force when it arrived by Huey. Instead the NVA patiently waited for the heavy lift helicopter to arrive and start its recovery operation. Low to the ground and in a hover with a disabled helicopter hanging by a sling underneath its belly, the recovery helicopter made a relatively easy target and the enemy would spring their ambush at this time. Should the heavy lift helicopter make good its escape, the Communists would cease fire and withdraw. Only when the security force boarded its own helicopters would the enemy reengage. To counter this measure, U.S. attack helicopters patrolled the perimeter of recovery operations. Still, a heavy lift helicopter in a vulnerable condition low to the ground made such an inviting target that not even attack helicopter protection could always stop NVA attempts to carry out these ambushes.


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SPECIAL DROP Rapid insertions of special landing forces, such as the men of the 2nd Battalion, 4th Marine Regiment near Camp Carroll pouring out of a Choctaw to pursue an elusive enemy in February 1968, was among the war's hallmark achievements.

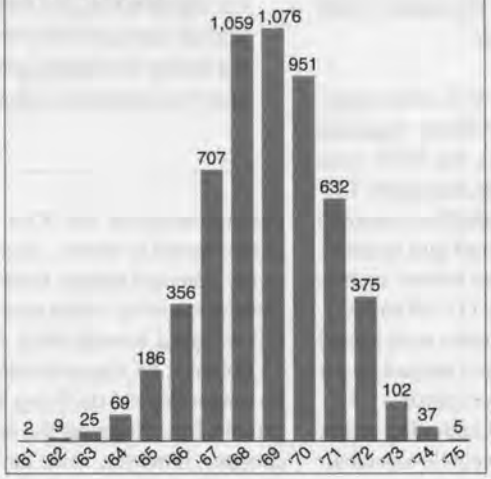
The U.S. Air Force used the CH-53 Sea Stallion for long-range search-and-rescue (SAR) operations in inhospitable places like North Vietnam and Laos, while fixed-wing aircraft such as the A-1 Skyraider provided air cover. The NVA gunners would often remain hidden and not fire on the fixed-wing aircraft, waiting instead for the CH-53 to go into a hover with the downed pilot on the rescue hoist before suddenly and unexpectedly opening fire. The North Vietnamese also realized that by remaining close to the targeted helicopter, they could make fixed-wing air support more difficult.

Habits die hard, and the North Vietnamese depended on helicopter pilots new in country to retain some of their stateside flying habits to successfully engage and shoot them down. The two most common deadly mistakes were taking off on course and slowly climbing to an altitude safe from small-arms fire—normally around 2,500 to 3,000 feet. The second was beginning a letdown well short of the intended landing area. Such noncombat area maneuvers put the helicopter in a low and slow position over enemy territory.

Experienced combat pilots varied their flying based on intelligence reports of enemy activity in an area. For example, they would use a spiraling climb on takeoff that entailed a rapid climb in a tight spiral over the protected landing area. Once they were around 1,000 feet, the pilots would turn on course. To land, pilots would descend to 1,500 feet and begin a spiraling descent over protected terrain to land.

An after-action report from the 3rd Brigade, 25th Infantry Division, operating in Quang Ngai Province from May to July 1967, noted the enemy's efforts to target helicopters using the same course to approach and depart a landing zone and early letdown: "U.S. units are almost entirely dependent upon the helicopter for resupply; therefore the volume of helicopter traffic in enemy infected areas is quite heavy. Numerous documents captured by this organization have contained extensive training material on techniques for shooting down helicopters with small arms. The enemy will watch as the helicopter goes into a U.S. position and will move to a good firing position along the final approach to the LZ. He will then select a position that will allow him a good shot when the helicopter is on its final approach and is most vulnerable to ground fire. The enemy position is often several hundred meters from the LZ, making counter fire by small arms difficult. The helicopter usually delivers its resupply to units during the afternoon hours and returns to pick up empty marmite containers before sundown. Observation: The enemy tactics mentioned above can be effectively countered by saturating the approach to the LZ with fire team size patrols. This technique effectively interdicts enemy movement and provides a quick reaction force when the

Helicopters Lost by Year 1961-1975



Vietnam Helicopters

Helicopters in service	12,054
Total Helicopters destroyed	5,602
Helicopter pilots served	40,000
Pilots KIA	2,192
Non-pilot crew KIA	2,717

The Huey in Vietnam

Hueys in service	7,014
Hueys destroyed	3,301
Pilots KIA	1,132
Non-pilot crew KIA	1,191

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MACHINE MEDEVAC Rescuing crashed copters, as this CH-53 does for a CH-46 in 1970, offered another prime opportunity for the enemy to strike.

enemy fires on the approaching helicopter."

Many U.S. helicopter pilots chose to counter this NVA tactic by flying close to the ground—but at a very high speed. In a sense, the pilots used the jungle to their advantage because the enemy could hear but not see the helicopter. If the helicopter did fly over a North Vietnamese gun position, it appeared suddenly and just as suddenly disappeared.

A 1968 report on the statistical success of enemy ground fire hitting helicopters found that 55 percent of all helicopters struck by ground fire were flying at an altitude of between 100 and 500 feet. Some 30 percent of ground fire hits struck helicopters flying between 1,000 feet and 500 feet. Helicopters flying between 2,000 feet and 1,000 feet took 13 percent of the ground fire hits; and helicopters flying above 2,000 feet took only 2 percent. The report also noted that helicopters flying below 100 feet rarely took hits because enemy gunners had little time to react to a helicopter sighting. The report's recommendations were clear: Fly above 2,000 feet or below 100 feet to avoid enemy ground fire.

NORTH VIETNAM LAUNCHED its Easter Offensive of 1972 with a large-scale, Soviet-style conventional attack on multiple fronts. Supplied with modern air defense weapons by the Soviets, the NVA units pouring into South Vietnam also changed their anti-helicopter TTP to that of a modern, conventional army. North Vietnamese armored units that were headed south had tracked anti-aircraft gun systems, ZSU-57s, that provided air defense from low-level threats such as helicopters and slower fixed-wing aircraft like the OV-10 and A-1. For the first time, too, North Vietnamese infantry units were armed with the SA-7 Grail, a man-portable, shoulder-fired surface-to-air missile similar to the U.S. Army's FIM-43 Redeye missile.

AH-1 Cobra attack helicopters and American fixed-wing attack aircraft quickly destroyed the ZSU-57s and any vehicle-towed air defense weapons the NVA had deployed, but the SA-7 posed a harder threat to defeat. Since the weapon was man portable and rarely detected before launch, American aircrews normally only saw the smoking rocket motor as it pushed the missile's one-pound HE warhead toward them. Also, the SA-7 could climb to nearly 15,000 feet, so American and South Vietnamese helicopters could no longer depend on flying above 2,000 feet for protection against ground fire. Hugging the terrain still provided protection to the chopper, however, since the SA-7's infrared seeker needed a few

MISSILE DEFENSE

THE SOVIET-MADE SA-7 Grail shoulder-fired infrared-seeking surface-to-air missile, first reported used by the North Vietnamese at An Loc on May 11, 1972, was a new threat to American and South Vietnamese helicopters in the war's waning years. When used by Egyptians and Syrians, they inflicted considerable damage on Israeli attack planes during the 1973 Yom Kippur War. The United States soon introduced a more sophisticated variant of its own, the FIM-92A Stinger, a fire-and-forget "man-portable air defense system" that first saw combat use by the British in the Falklands in 1982.

Meanwhile, helicopters had become a ubiquitous weapon on battlefields worldwide. After Vietnam, their next peak came in 1979, when the Soviets invaded Afghanistan, bringing with them the Mil Mi.24 (Hind). The Hind-D variant featured nose sensor pods for nighttime flying and a turret-mounted 12.7mm Gatling-type machine gun, as well as wingtip hard points for bombs, rockets or 23mm cannon weapons pods. Protecting their crews with titanium or steel armor and bulletproof Plexiglas, these rotary wing battleships threatened the mujahideen guerrillas resistance with utter annihilation.

After much resistance to arming any Islamic forces with Stingers, in 1985 President Ronald Reagan approved the secret export of the weapons to the Afghan guerrillas. Many American officials claimed that the Stinger was "too sophisticated technically for illiterate Afghan rebels to handle." They were wrong. Although 11 of the first 12 missiles failed during their operational debut in mid-1986, within a year the Afghans were claiming 80-percent hits, destroying an average of one aircraft per day, and eroding Soviet confidence. The National Islamic Front of Afghanistan reported, "This has raised our morale and allowed us to go on the offensive."

Ultimately, in February 1989, the Soviets withdrew from the "Vietnam" they had made for themselves in Afghanistan. The Stinger's debilitating impact on Soviet helicopters had played a pivotal role in the Afghan guerrilla victory—a victory in which the United States took its own considerable share of satisfaction and pride. That elation was not destined to last when, in response to the terrorist attacks on September 11, 2001, the United States invaded Afghanistan a month later.

The generation of helicopters that evolved from those that prevailed in Vietnam, now supporting American, Afghan and allied troops in a heightened war, find themselves facing an equally well-equipped, tactically savvy and motivated foe—an ironic legacy of the weapons and training the Taliban fighters had received from the United States when they battled the Soviets. The helicopter war goes on.

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DANGER ZONE Hot landing zones were the most deadly venue for choppers, as just a few well hidden guerrillas could inflict serious damage to men and machines during the critical seconds required to hover over an open space to allow troops to safely jump out and quickly find cover from small-arms fire.

seconds to acquire the target, and the gunner then had to elevate the weapon before firing. After launch, the warhead of the SA-7 did not arm until it had flown at least 60 feet.

While a few helicopters fell to the SA-7, American commanders quickly fielded effective countermeasures. Exhaust deflectors were installed that channeled the engine exhaust up into the rotor blades, where it was dissipated. Also, crewmen carried flares and when they saw the smoking rockets streaking up at them, they tossed them out of the helicopter. The SA-7 seeker followed the much hotter flare rather than the targeted aircraft. Although simple in design and concept, these countermeasures worked, and the SA-7 threat became manageable for the remainder of the war.

EVEN THOUGH THE VIET CONG and the North Vietnamese Army had some significant success with their anti-helicopter tactics, they never came close to denying the skies of Vietnam to American helicopter pilots. The men who flew those aircraft were far too intrepid and flexible for that. Still the Communists did exact a heavy toll in aircraft and crewmen. The lessons learned from those low and slow aerial combats of so long ago remain with us today in such technological advancements as choppers designed to protect vital flight systems and crew from ground fire, two-engine combat helicopters, low-visibility goggles and sighting systems that allow helicopters to fly and fight at night.

But above all, the evolution and use of helicopters during the war helped transform the U.S. Army. The Army has always preferred rapid maneuver and shock as vital components of its war fighting, and the helicopter and the units that employ it on a grand scale—such as the 101st Airborne Division (Air Assault)—gave it a deep thrust capability that no other army in the world could match. Operations Desert Storm and Iraqi Freedom revealed the deadly effectiveness of having air assault units that could jump far ahead of the forward edge of the battle area to cut off a retreating enemy.

Despite all this, the cat and mouse game of enemy anti-helicopter tactics, techniques and procedures, and U.S. helicopter crew counter-measures, continues unabated today in the skies over Iraq and Afghanistan. When, on occasion, the enemy fields a new weapon or device or tactic that makes itself felt with an increase in downed helicopters and dead or wounded crewmen, rotary-wing aviators quickly devise a tactical counter-measure. Therefore, the true legacy of the Vietnam-era helicopter war might not be the technical achievements it inspired, but the brave and innovative spirit and determination it infused in the helicopter warriors to never give up control of the sky to the enemy no matter what the cost. They never have. ☆

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