

he Ho Chi Minh Trail ran southward for 500 miles from the mountain passes of North Vietnam through

the Laotian panhandle into Cambodia. All along the way, exit routes led across the border into South Vietnam.

Laos was supposedly neutral, but from 1959 on, Hanoi used the panhandle as an infiltration lifeline to sustain and support its war against South Vietnam. The US Air Force first attacked targets on the Ho Chi Minh Trail in December 1964 and a few months later expanded the effort into a continuing operation named Steel Tiger.

The Air Force tried all kinds of airplanes to interdict the trail, from World War II-vintage A-1s and A-26s to F-4 jet fighters and B-52 heavy bombers. Of all of them, the most effective were gunships, a category of weapon systems that had not even existed when the war began.

Gunships were aircraft—such as old Douglas C-47 transports—originally built for other purposes and retrofitted with heavy armament for a new mission of attack. Gunships, however, were not simply airplanes with guns. Their defining characteristic was a trademark tactic, the pylon turn, in which the aircraft flew a counterclockwise orbit around a point on the ground.

The guns were mounted on the left side of the airplane, which laid down

a field of fire that was both devastating and precise as it circled the target. The crews called it "flying geometry."

The gunship program consisted of a series of modifications to aircraft that could be wheedled out of the system. Advocates had to fight, almost airframe by airframe, for the conversions. Critics did not believe that gunships would work or that they could survive in a combat environment.

The first Air Force gunships in Vietnam were AC-47s, followed by AC-119s and AC-130s. There were never more than a few dozen gunships at a time operating on the Ho Chi Minh Trail, but they were so successful the presence of a single gunship could make a difference. Intelligence agencies and doubters in Washington refused to believe the results.

Fortunately, the gunship overcame the resistance well enough to keep going, and 50 years later, the gunship is still an important part of the Air Force's combat inventory.

A BUCKET AND A ROPE

The pylon turn maneuver, in which an airplane flies in a perfect circle while keeping the target in the exact center, had been discovered and rediscovered several times. In 1926, Lt. Fred Nelson, at Brooks Field in San Antonio, demonstrated the accuracy of a .30 cal. machine gun fired from a DH-4 biplane in a pylon turn.

The concept was next proposed in 1942 by 1st Lt. Gilmour Craig MacDonald and again in 1961 by MacDonald, who by then was a lieutenant colonel.

Lt. Gen. Gabriel P. Disosway of Tactical Air Command called it "the silliest idea I've ever heard."

Bell Aerosystems engineer Ralph Flexman picked up the gunship notion from MacDonald in 1963 and pursued it. Flexman had heard about Nate Saint, an American pilot and missionary to Ecuador who used the pylon turn to deliver mail and supplies to remote villages. Saint would lower a long piece of rope with a weighted pouch-or a covered leather bucket as some tell it-from his airplane. When the pouch was about where he wanted it, he would orbit and fly a pylon turn around it. The pouch stayed in place long enough for the villagers to take out their supplies and mail.

Flexman and Capt. John C. Simons persuaded the the Aerospace Medical Research Laboratory to conduct limited tests but that effort, Project Tailchaser, soon stalled out as well.

Momentum was restored in 1964 when Capt. Ronald W. Terry of the Cargo Test branch at the Aeronautical Systems Division at Wright-Patterson AFB, Ohio, found the Tailchaser files.

Terry, a former fighter pilot disinclined to take no for an answer, is recognized by the Air Commando Association as "the undisputed father of the gunship."

Terry somehow managed to borrow a C-131 aircraft and a 7.62 mm

Spectre and Stinger flew rings around the enemy on infiltration routes in Southeast Asia.

E DI DI SI D

The gunship, banked in a pylon turn, concentrates enormous firepower on a target in the center of the circle. Gatling gun and organize, under ASD auspices, a live-firing test at the Eglin AFB, Fla., range, which demonstrated the validity of the concept. Tests with a C-47 repeated the success.

"Captain Terry felt the aircraft could be effective flying above the range of small-arms fire expected in South Vietnam," said gunship historian Jack S. Ballard. "Certainly it would be less vulnerable than the helicopters already being used extensively as gunships." The gunship's destiny on the Ho Chi Minh Trail was not yet imagined.

It is not completely clear how Terry talked his way into the Pentagon office of Gen. Curtis E. LeMay, the Air Force Chief of Staff, but LeMay authorized Terry to take his team and equipment to Vietnam, modify three aircraft there, and test them in combat. Tactical Air Command attempted to block Terry's expedition to Vietnam until the TAC commander got a pointed message from LeMay.

SPOOKY

In Vietnam, Terry and his team modified three C-47s as gunships and trained crews to operate them. When the fighter community took exception to designation of the aircraft as FC-47s (for "Fighter Cargo"), they were renamed AC-47s (for "Attack Cargo").

The AC-47 had three 7.62 mm Gatling miniguns, two of them mounted in window ports and one in the open cargo door. In later AC-47s, all three miniguns fired from window ports. They were called "miniguns" because other guns with similar mechanisms used larger ammunition.

Firing together, the miniguns could spit out 18,000 rounds per minute, enough that a three-second burst could theoretically place a round in every square foot in an area the size of a football field.

The gunsight was to the left of the pilot, who fired the guns. The responsibility of the gunners, on the AC-47 and other gunships, was to keep the weapons loaded and operating.

The gunships began combat operations in the Mekong Delta in December 1964, attacking the Viet Cong where they found them, supporting ground troops, defending villages and outposts, and blowing the enemy away in spectacular fashion.

The results were stunning and made instant believers. Without waiting for completion of the combat evaluation, Air Force leaders in Vietnam asked for a squadron of gunships as soon as possible. In the summer of 1965, the Air Force took 20 C-47s out of storage, modified them, and sent them to Vietnam to form the 4th Air Commando Squadron.

Their initial call sign was Puff (after a then-popular song, "Puff, the Magic Dragon") but was soon changed to Spooky, suggested by the signature night operations. That also became the nickname by which the AC-47s were known.

Spooky's domain was mainly South Vietnam, but in early 1966, four AC-47s moved to eastern Thailand where they averaged two interdiction sorties a night on the Ho Chi Minh Trail.

They had some success against enemy trucks but encountered several problems. The miniguns were too small for the job and their range was too short. The low wing of the aircraft prevented full view of the target. The top speed was 200 knots, which left them vulnerable to ground fire.

"For the AC-47s to be effective, they had to fire at the trucks from about 1,500 feet," Terry said. "Mainly the pilot was shooting with his eyes. He had nothing to go on in the AC-47 other than what he saw on the ground. You're not going to see things at night much higher than that, even dropping flares."

The greater difficulty was the steadily improving antiaircraft defenses on the trail. In August 1966, the Spooky squadron withdrew to South Vietnam,

The AC-47 Spooky was highly effective in supporting ground forces and defending villages and outposts in South Vietnam, but it did not have the weapons or the defenses to operate on the Ho Chi Minh Trail. Note the 7.62 mm Gatling miniguns.



Pictured here in 1969, then-Maj. Ronald Terry, the recognized "father of the gunship," got the program started in 1964 and remained in charge until 1973.





as the Ho Chi Minh Trail called for new and better gunships. Terry, continuing as chief of gunship programs at Wright-Patterson, was on the job—but so were others.

BOTH FORKS OF THE ROAD

To provide for heavier and more accurate firepower, a larger aircraft was required. A high wing was also needed to allow an unobstructed field of fire. By 1967, it had come down to a decision between the aging twin-engine C-119 and the newer four-engine C-130 turboprop. Faced with two options, USAF took both of them.

Commanders up and down the line thought the C-130 was the best choice. In January 1967, the Air Staff directed Systems Command to configure a C-130 for testing as "Gunship II." This configuration added four 20 mm Vulcan Gatling guns—which qualified as cannons—and a fourth minigun to the ordnance.

Gunship II had barely begun when Secretary of the Air Force Harold Brown threw a wrench into the works. He was persuaded by advice from an Air Staff board that C-130s could not be spared from airlift duty and convinced that an older airplane would do. C-119s were readily available for transfer from Air Force Reserve units.

Brown overrode the opinions of his generals and in June 1967 picked the C-119G to replace the AC-47.

That went against the advice of Brown's own board, which regarded the C-119G's two piston engines as marginal and had recommended instead the C-119K, which had auxiliary jet engines under the wings.

Gen. William W. Momyer at 7th Air Force in Vietnam complained that he did not want "another obsolete weapon system." Pacific Air Forces, Tactical Air Command, and Air Force Chief of Staff Gen. John P. McConnell also endorsed the AC-130 option, but Brown held his ground.

Meanwhile, Gunship II proceeded. A modified C-130A went to Vietnam for combat testing in September 1967. It proved to be three times better than the AC-47 at destroying trucks. Brown backtracked somewhat in April 1968, announcing that he had approved a



gunship mix to include 26 AC-119Gs, 26 AC-119Ks, and 18 AC-130s. The first G models began their combat evaluation in Vietnam in January 1969, followed by the first Ks in November.

In official parlance, the AC-47 was Gunship I, the AC-130 was Gunship II, and the AC-119 was Gunship III—even though it was less advanced than the AC-130, which became the definitive gunship. Taking their names from their call signs. The AC-119G was Shadow, the K was Stinger, and the AC-130 was Spectre.

Gunship II was developed by Air Force Systems Command with Terry in charge of the project, whereas Gunship III was handled by Air Force Logistics Command at the Warner Robins Air Materiel Area in Georgia.

The gunship was never a standard acquisition program. As Momyer pointed out, it was "a series of ad hoc actions." The conversions were made in small increments with considerable differences among them.

SHADOW, STINGER, SPECTRE

The airframe for Shadow and Stinger was the ubiquitous C-119 Flying Boxcar, which had shoulder-mounted wings and a low-slung fuselage, situated well forward between the twin tail booms.

The G-model Shadow was a modest improvement over the AC-47. It had four miniguns instead of three, carried more ammunition, and had computerized fire control and a night observation device. It was used mostly along with the AC-47 Spooky within South Vietnam, where it was especially valuable in defense of isolated outposts.

The K-model Stinger had two 20 mm cannons in addition to the miniguns and sensors for night attack. The J85 jet engines under its wings added almost 6,000 pounds of thrust. The AC-119K Stinger worked effectively on the Ho Chi Minh Trail, although it did not have the same firepower or capabilities as the AC-130 Spectre. The auxiliary jet engines raised Stinger's operating ceiling to 5,500 feet.

Spectre, with four engines and bigger guns, operated from higher altitudes and greater range.

The AC-130A in 1967 was the first of four Spectre variants, leading up to Vietnam's ultimate AC-130E model, which was armed with two 20 mm Gatling guns, one 40 mm Bofors cannon, and a huge 105 mm howitzer. The 40 mm was the standard anti-truck weapon. The howitzer, which chambered a 42-pound shell, was reserved for the most formidable targets.

Spectre had forward-looking infrared and low-light-level television sensors, plus the mysterious "Black Crow," which could detect spark plug impulses in truck engines 10 miles away. The gunships also made use information from the acoustic and seismic sensors strewn along the trail by Project Igloo White.

The gunships could attack trucks singly or in convoys, moving or stopped, at road cuts or in truck parks, or when forced to halt by the gunship itself. "The sensor operators got very good at judging the speed of a truck," said Terry, who returned to Vietnam in 1967 for testing of the AC-130. "You could pick out a point in front and then down from the gunship. The infrared sensor needed no visible light source.

The roster of gunships sometimes includes the experimental "Black Spot" aircraft, designated as AC-123Ks. Two Black Spot prototypes operated for 14 months in Southeast Asia. They had no guns, instead dispensing cluster bombs from canisters in the fuselage through openings in the cargo floor. They often damaged trucks and sometimes killed the drivers but seldom completely destroyed a truck or its cargo.

12,000 MILES OF ROAD

When the Rolling Thunder campaign in North Vietnam ended in November 1968, the Air Force was able to apply more of its effort to the Ho Chi Minh Trail, which had diction campaigns over the next four years—designated Commando Hunt I through VII to correspond with the monsoon seasons—reduced the infiltration considerably.

Everything the Air Force had, including B-52s, took part in Commando Hunt, but the gunships had special advantages in their ability to operate at night and persist with a precision attack.

There were never many of them. At the peak of their involvement, 53 gunships were deployed to Southeast Asia and only about half of those—the AC-119Ks and the AC-130s—worked the Ho Chi Minh Trail. Their effectiveness, however, exceeded their numbers.

In Commando Hunt VII, for example, the AC-130s destroyed or





the truck would run into [the fire] when he gets there. We'd hit the truck on the move sometimes. Sometimes the driver would stop and get out and run. We never shot at the driver [when he ran]. We wanted the truck to stop. It was much easier to hit."

When Spectre entered its pylon turn to attack, the copilot flew the altitude and airspeed while the pilot flew the ailerons—controlling bank angle and kept his eyes on the ground. On moonless nights, illumination for the TV sensor was provided by a laser light not visible to the naked eye, beamed The AC-119 represented a mid-level of capability between the AC-47 and the AC-130. Both the Shadow and Stinger variants were strong performers. Here, a Shadow saturates a target with shells during a pylon turn west of Phan Rang AB, South Vietnam. Every fifth bullet was a red tracer.

become a labyrinth with 12,000 miles of road, including five main roads, 29 branch roads, and various cutoffs and bypasses.

The trucks sometimes moved south in convoys of 50 or more. There was no real chance of shutting down the trail altogether, but seven air interdamaged an average of 5.37 trucks per sortie. The AC-119s were next best with 2.14. That compared with 0.29 trucks per sortie for the F-4, the best of the Air Force fighter-bombers. AC-130s alone accounted for almost 70 percent of the trucks.

"At first, I was skeptical about the advertised capability of the aircraft to kill trucks," said Momyer. "Not long after these aircraft were in combat, however, the results more than confirmed the advertised potential." Momyer, whose enthusiasm for gunships was limited, acknowledged, "The AC-130 became the best truck-killing weapon of the war."

The gunships were so good that the North Vietnamese could no longer count, as they had previously, on darkness as a sanctuary. They rescheduled their heaviest traffic for dawn and dusk, when the silhouette of the gunships against the sky was easy for the gunners to see and when the infrared and lowlight-level TV sensors worked poorly.

By 1972, the North Vietnamese had hundreds of AAA guns and surface-toair missiles protecting the trail and the gunships could no longer survive there, even with fighter escort. Commando Hunts VIII and IX were canceled, but the emphasis on interdicting the trail was about over anyway.

North Vietnam's Easter invasion in March 1972 drew most of the availclaims. Congressional staffers, even further from the action, quipped in a report for a Senate Foreign Relations subcommittee in 1971 that "the total figure for the last year exceeds the number of trucks believed by the embassy to be in all of North Vietnam."

If the Air Force claims could be cast in doubt, so could the criticism. Then as now, the bomb damage assessment process was flawed on both ends. Operations tended to claim too much; Intelligence tended to credit too little. Political axe-grinding was most likely an element in the smart remarks by the congressional staffers, who may not have known that North Vietnam was importing almost 10,000 trucks a year to stay abreast of the losses.

"The interdiction campaign was able to limit the number of forces the North



able airpower, including the gunships, back to defend South Vietnam and the invasion led to a resumption of the bombing of North Vietnam in Operation Linebacker I.

COUNTERS AND DOUBTERS

The Air Force estimated more than 35,000 trucks destroyed or damaged on the trail by gunships and other aircraft. Analysts at the Central Intelligence Agency and Defense Intelligence Agency back in Washington refused to believe the numbers and arbitrarily discounted 75 percent of the Air Force An AC-130A at Ubon RTAB, Thailand, in 1969. The AC-130 Spectre was the ultimate gunship in Southeast Asia, better than any other weapon system at destroying trucks.

Vietnamese could support in the south," Momyer said. "Not until the interdiction campaign ended with the termination of US involvement could the North Vietnamese logistically support and deploy their full strength of 18 to 20 divisions. Before the 1975 offensive, they never deployed more than 11 or 12 divisions, apparently for fear of the destruction they would suffer by exposure to our airpower."

In all, 135 aircraft were converted into gunships during the Vietnam era. Of these, 53 were AC-47 Spookys, 30 were AC-130 Spectres, 26 were AC-119G Shadows, and 26 were AC-119 Stingers.

The leading gunship hero of the war was A1C John L. Levitow, loadmaster on an AC-47 that was suppressing an enemy mortar attack on the Long Binh Army post near Saigon during the Tet Offensive of 1969.

When a live flare fell inside the aircraft, Levitow threw himself on it, crawled to the cargo door, and threw it out, saving the entire crew. He was severely wounded, but lived to be awarded the Medal of Honor.

The US Air Force flew its last mission with the AC-47 in December 1969, but it remained in service in Southeast Asia with the Vietnamese, Laotian, and Cambodian air forces. The AC-119 was out of the USAF inventory by 1973, with both the G and K models passed on to the Vietnamese air force.

Ronald Terry continued as chief of the gunship program at the Aeronautical Systems Division until 1973. He returned to Southeast Asia several times during testing of the gunships and training of crews, accumulating 56 combat missions in the AC-47 and 140 in the AC-130. He retired in 1983 as a colonel.

The gunship had proved its point well enough that in 1971 USAF was ready to promote it from an on-again, off-again modification project to official status as a formal Air Force Systems Command acquisition program. The experimental approach had put gunships in the field in record time, but the formal acquisition program would require two years to produce the next airplane. After that, the program went back to informal status and gunships were rolling off the line in six months.

The AC-130 gunship is still going strong. It has been a valuable asset in every US military action for the past 50 years, including Iraq and Afghanistan.

The fourth generation gunship, the AC-130J Ghostrider, entered developmental test and evaluation in 2014. USAF plans to acquire 32 of them to replace older gunship models.

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