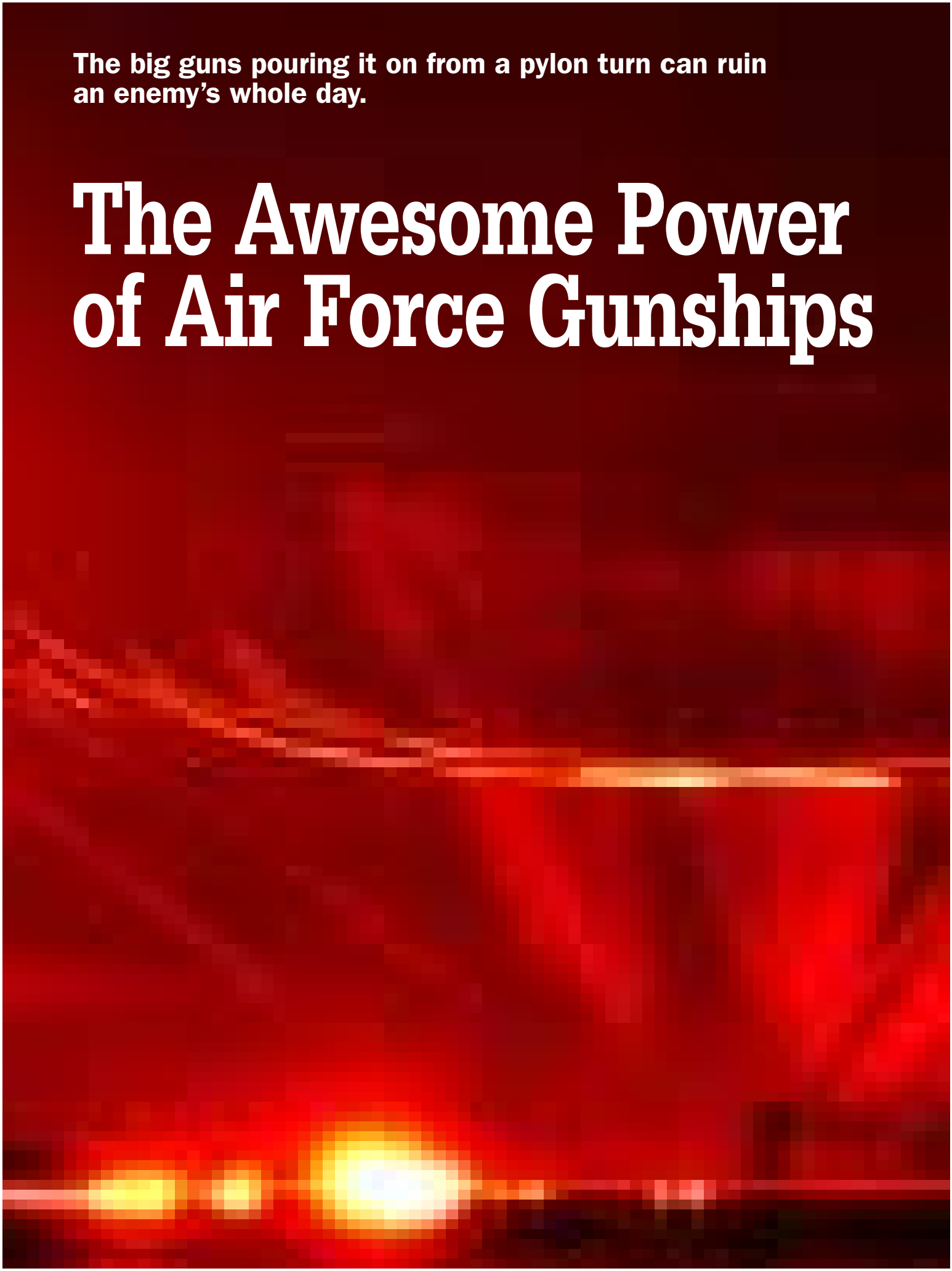
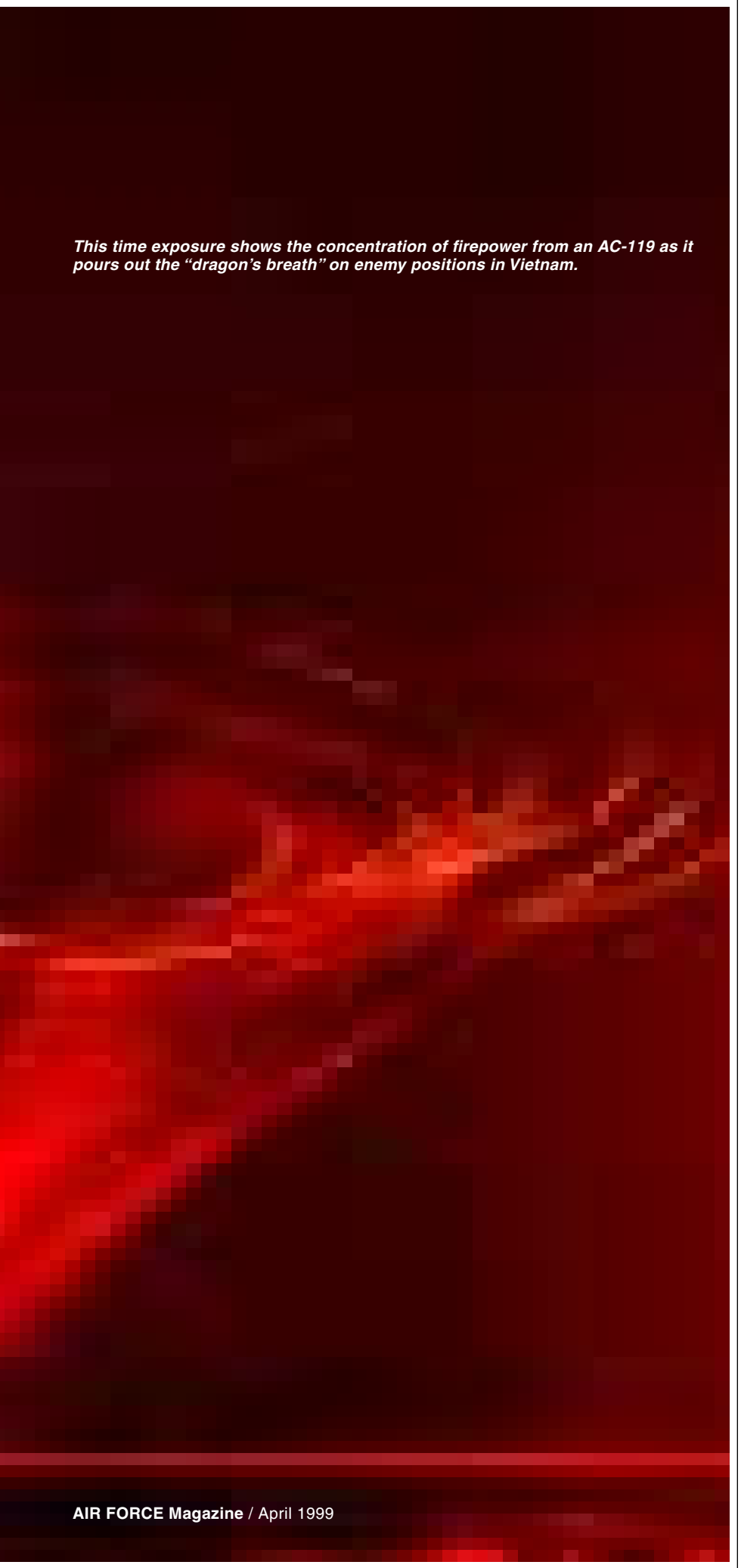
The big guns pouring it on from a pylon turn can ruin an enemy's whole day.

# The Awesome Power of Air Force Gunships





*This time exposure shows the concentration of firepower from an AC-119 as it pours out the "dragon's breath" on enemy positions in Vietnam.*

**By Walter J. Boyne**

In warfare, timing is critical, and few weapons have had better timing than the gunship, the epitome of on-scene firepower in the Vietnam War. History, requirements, resources, and—most of all—personalities, all came together at a critical moment to create a piece of side-firing airborne artillery, a weapon North Vietnam considered one of the most important of the war.

Whether they were Puffs, Spookys, Spectres, Shadows, or Stingers, the gunships brought intense, lethally accurate fire to the enemy's doorstep, busting trucks and saving the lives of countless friendly personnel.

Putting a fixed side-firing weapon on an aircraft was first proposed in 1926, when 1st Lt. Fred Nelson experimented with a de Havilland DH-4 at Brooks Field, Texas. Nelson mounted a .30-caliber Lewis machine gun on the wing and flew "pylon turns" to keep the gun on target, thus demonstrating the very essence of the concept almost 40 years before it appeared on the battlefield.

The United States did not have a monopoly on the idea. In 1932, French military designers installed a fixed side-firing Schneider P.D. 12 75 mm cannon in a four-engine Bordelaise A.B. 22 bomber. The A.B. 22 was intended for use in France's colonial possessions, one of which, ironically enough, would become the venue for US gunships—Indochina.

In April 1942, 1st Lt. Gilmour C. MacDonald of the 95th Coast Artillery proposed fitting a Piper Cub with a side-

Robert Tolstead via Warren Thompson

and SSgt. Estell P. Bunch developed a gun sight for the pilot, Capt. Edwin J. Hatzenbuehler.

The stage was set for arrival of Capt. Ronald W. Terry as project pilot. Working with 1st Lt. Edwin Sasaki, Terry brought a unique combination of skills to the program. He had great common sense; while using existing technology, he kept his eye on the latest developments to improve the system. Terry was able to work the bureaucracy to his advantage, finding those who could say yes to his program needs and avoiding those who might say no.

The results were gratifying; Terry is one of the few individuals in military history who helped create a totally new weapon system and tested it in combat

firing machine gun for anti-submarine operations. MacDonald's gunship idea was passed over, but he resurrected it in 1961 when, as a lieutenant colonel, he advocated transverse firing of rockets and machine guns by liaison aircraft. This time, he was backed by Ralph E. Flexman, an assistant chief engineer at Bell Aerosystems, who was intrigued by the challenge of limited war and counterinsurgency actions and was drawing inspiration from an unusual source.

USAF photo

***The first gunships—designated FC-47s—began operations, using the call sign "Puff," out of Bien Hoa, South Vietnam, in December 1964. The designation was soon changed to AC-47, like this one (top), photographed at Bien Hoa in 1965. Above, airmen check over an original homemade mount for a minigun aboard an AC-47.***

### Missionary Work

Flexman had heard stories of a missionary named Nate Saint who had been able to air-deliver mail and supplies to remote villages by lowering them in a weighted pouch. The pouch remained stationary over a point on Earth at the end of a long rope as he flew pylon turns around the point. Flexman reasoned that the straight line of the rope would translate into a straight line of gun fire at a single point on Earth if the gunship were flown in a similar pylon turn.

The requirement for additional firepower in Southeast Asia gave impetus to the side-firing idea. Preliminary tests of the concept were conducted at Air Force Systems Command's Aeronautical Systems Division at Wright–Patterson AFB, Ohio, by Capt. John C. Simons, as a part of Project Tailchaser. Simons encountered opposition; many people believed that a side-firing aircraft, particularly the C-47, would be far too vulnerable to enemy fire. There was also doctrinal concern that use of a fixed-wing gunship was playing into the hands of the Army, which was becoming ever more dependent upon the helicopter gunship.

Nonetheless Simons persisted, "bootlegging" missions in a North American T-28. No guns or sights were fitted, but Simons was able to validate the concept by marking the canopy with a grease pencil and flying the pattern.

More experiments were done by Capt. J.D. Boren and Capt. J.A. Birt in 1964, using a Convair C-131B. Cameras were used in place of guns, himself. He then went on to create improved systems and test them in battle, as well. By taking available equipment and conforming it to new requirements, he was able to compress development into amazingly brief periods; as an example, he took the first gunship from project to combat in only six months.

For Lt. Col. Jack S. Ballard, author of *Development and Employment of Fixed-Wing Gunships, 1962–1972,* MacDonald rated as the "originator," Flexman the "catalyst," Simons the "tester," and Terry the "seller" of the gunship system.

Terry was the architect of the first and all subsequent gunship weapon systems, proving them in design, test, and combat evaluation. His small team designed and built the installations themselves, scavenging parts and ideas. They combined the most innovative technology (first use of low-light-level devices and infrared sensors in combat) with a 1935-era airframe.

### LeMay Says Go

A personal briefing to Gen. Curtis E. LeMay, Air Force Chief of Staff, on Nov. 2, 1964, secured permission for Terry to modify a C-47 and test it in combat. The need was great. With Viet Cong guerrillas and North Vietnamese regulars infiltrating the South, a flexible, rapid, and effective means of defense was required. The gunship offered a solution.

Terry began operations out of Bien Hoa AB, South Vietnam, during December 1964. The Air Force had created two FC-47s ("FC" meant "Fighter Cargo," an unusual designation) by installing GE SUU-11A 7.6 mm Gatling guns, a gun sight cobbled up from a crosshair reticle and a 16 mm camera reflex viewfinder, and a supply of flares. Terry trained crews of the 1st Air Commando Squadron in techniques of gunship operation, which involved boresighting the equipment, acquiring a target, entering an orbit pattern, and then adjusting it as required to fire on the target.

Dec. 15 marked the first of several successful day missions with Capt. Jack Harvey as aircraft commander. Eight days later, the first night mission had a double success. The first part of the sortie was flown at Thanh Yend, in the Mekong River Delta, where the FC-47 dropped 17 flares and expended 4,500 rounds of ammunition, causing the Viet Cong to break off their assault. Then it was sent to Trung Hung, where, under a barrage of 4,500 rounds of ammunition, the Viet Cong again were forced to leave.

Reports streamed in validating the usefulness of the weapon. There were challenges: A night illumination system was needed, and the flares, some dating to World War II, often did not work. But no one who saw the fountain of fire pouring from the FC-47s could ever forget it. The very sound and fury of the FC-47 raised South Vietnamese morale even as it "spooked" the VC, and the aircraft soon got affectionate nicknames such as "Puff" and "Dragonship." The call sign "Spooky" was assigned to early gunship operations.

USAF photo

***This view from the open cargo door of an AC-47 shows the fountain of fire the gunships unleashed. Looking for an aircraft that could carry more equipment and weapons safely for longer periods, USAF then converted C-130s to gunships.***

In summer 1965, Pacific Air Forces asked to have a 16-gunship squadron in place by the following November. The 7.62 miniguns were excellent weapons but were in short supply. Terry improvised, getting authorization from the commander of Air Force Logistics Command, Gen. Mark E. Bradley, to take 300 old M-2 .30-caliber machine guns from a McClellan AFB, Calif., warehouse and install them, 10 at a time, in four C-47s.

The 4th ACS arrived at Tan Son Nhut on Nov. 14, 1965, and began combat training a week later. It was soon operating on a full-time basis, defending hamlets in South Vietnam and flying day armed reconnaissance in the Steel Tiger area of Laos. By the end of 1965, the 4th ACS had flown 277 combat missions—but had lost two aircraft. The gunships, now designated AC-47s, had to operate low, slow, at night, and in bad weather. Forty-seven AC-47s went to Vietnam, but the courageous men who flew them were aggressive and determined to bring the war to the enemy. Casualties were inevitable, and 12 were lost.

The success of the AC-47s set in motion a dynamic that continued through the war and beyond. Spooky's mission expanded to include interdiction of roads, trails, and rivers, and this greatly increased the demand for its services.

### Communist Reaction

As Terry fought to improve the AC-47s, he pointed out the advantages a larger, faster aircraft would bring, particularly in halting supply efforts. On the other side, the North Vietnamese responded to each improvement in gunship capability by increasing the number and the caliber of their anti-aircraft guns and by positioning them as far south as possible. It took a maximum effort by Terry and his team to measure the real requirement for gunships, create their improvements, get them into the theater within the limitations on manpower, and then develop the tactics to use them effectively.

A major fact of the war was that Communist troops, trucks, and supplies all moved along the extensive Ho Chi Minh Trail, which in various forms had been used for centuries. Some 1,500 square miles of territory were woven together by the complex and ever more sophisticated network of roads, supply depots, truck stops, barracks, hospitals, repair yards, and other elements necessary to keep the rice and bullets moving south. Most of the route was covered by a jungle canopy that made reconnaissance difficult by day and almost impossible by night.

Nonetheless, the US had to try to interdict the flow of supplies, and the best tool for the job was obviously an

USAF photo

***In summer 1967, this AC-130 in camouflage was tested off the coast of Eglin AFB, Fla., for the Gunship II project. The AC-130 prototype arrived in South Vietnam that fall and proved to be three times more effective than the AC-47.***

improved gunship. In the meantime, the pitifully few AC-47s (parceled out in twos, threes, and fours at five different bases) valiantly defended the strategic hamlets. It was the air commando's proud boast that none was ever lost when a gunship was overhead.

A surprisingly wide variety of aircraft, ranging from the Cessna Model 337 to the Boeing B-47, were considered for the role of improved gunship. The goal was an aircraft that could carry more equipment for longer times with greater safety. A high wing was preferred for ease of gun and sensor installation.

Terry proposed Project Gunboat, based on a converted C-130A with improved sensors and weapons, more ammunition, and immensely improved performance. (The maritime Gunboat designation was soon replaced by the more logical Gunship II title.) Four 7.62 miniguns and four M-61 Vulcan 20 mm cannons were installed in Gunship II, along with a side- and forward-looking radar, a Starlight scope night observation device, and a computerized fire-control system linking sensors and guns. Also installed were overt and covert illuminators, armor plate, and better navigation equipment. Fuel tanks were "inerted" against ground fire.

## Gunship, Times Three

A prototype arrived at Nha Trang AB, South Vietnam, on Sept. 21, 1967, for combat evaluation. It was a resounding success. After a brief refurbishment, Gunship II re-entered combat in February, flying out of Ubon RTAB, Thailand, against the Ho Chi Minh Trail in Laos. Code-named Spectre, the AC-130 was an unmitigated success, destroying hundreds of trucks. It was then returned to operations in South Vietnam. Analysis of results showed that the AC-130 was about three times as effective as the AC-47.

Air Force Secretary Harold Brown had authorized the C-119G as the AC-47 replacement. Gen. John P. McConnell, Chief of Staff, continued to press for the AC-130, stressing it had a "search and destroy" capability in addition to a close-support mission. The two most telling arguments for the AC-130 were its survivability and its effectiveness. It cost $5,100, on average, for Gunship II to destroy or damage a truck. For an F-105, the cost per vehicle was $118,000.

The opposing views were ultimately reconciled in a costly compromise that led to the creation of three types of gunships in the fleet—AC-47s, AC-119s (Gs and Ks), and AC-130s.

In December 1968, four Gunship II aircraft arrived at Ubon. Operated by 16th Special Operations Squadron, the four AC-130s were pressed into combat and forced to adapt to a variety of missions, but they concentrated on night interdiction. (The Air Commando Squadron designation changed to Special Operations Squadron Aug. 1, 1968.) Within three months, the four aircraft, with still-inexperienced crews, had destroyed 607 trucks, more than a quarter of the theater total.

The 16th SOS continually experimented and improvised as it gained experience in operating the advanced Gunships. As massive numbers of anti-aircraft guns moved in to defend the Ho Chi Minh Trail, new tactics were devised. Among them were the F-4–AC-130 teams that operated together to kill trucks and suppress anti-aircraft fire. It was an unlikely combination, given the vast difference in their performance, and the tactics were inherently dangerous. When the guns opened up on the Spectre, the Phantoms would pass through the AC-130's orbit twice, first to drop its cluster bomb unit, then again on the climb back to altitude. The combination proved effective against both trucks and the defending anti-aircraft guns.

It was hazardous work, and an AC-130 was hit by anti-aircraft fire March 3, 1969. Only a few weeks later, Gunship II strength was reduced by a quarter when on May 24 the Air Force lost its first Spectre. Severely hit by 37 mm anti-aircraft, the AC-130 crashed on landing at Ubon. Two crew members were killed, and the aircraft was destroyed.

Meanwhile, Terry had become chief of the AC-130 Gunship Program Office. He and a small band of enthusiasts in July 1969 proposed the first of a series of improvements to the Spectre. Their aim was to improve lethality and survivability.

They did so with heavier armament, a digital fire-control system, an air-to-ground moving target indicator system, and a low-light-level television to improve target acquisition at night. The four 7.62 miniguns were replaced by two 20 mm Gatling guns and two 40 mm Bofors guns. A two-kilowatt illuminator and a Paveway I laser designator were added to facilitate cooperation with tactical aircraft. The location of detected targets could be stored in an inertial navigation system, for later use.

## Surprise Package

Terry's proposal received quick approval. The improved aircraft, dubbed "Surprise Package," was tested at Eglin

AFB, Fla., in late October 1969. Things went so well that it was deployed to Southeast Asia on Nov. 25, where it proved to be a great advance over the earlier AC-130.

The advanced AC-130 was less vulnerable because it was able to operate at higher altitudes and was better armored. Its 40 mm guns and laser designators made it far more lethal; it destroyed or damaged trucks at a rate of 7.34 per sortie. The standard AC-130 was its closest competitor, with an average of 4.34.

The success of Surprise Package altered opinions in the Pentagon. Estimates were that about 200 trucks per day were sent down the trail. Previous interdiction efforts peaked at 30 truck kills per day. Now, a force of 18 AC-130s and 26 AC-119K aircraft could kill 100 to 200 trucks per night.

In these days, there was a running bureaucratic debate about the proper number of gunships and the degree to which they should be modified. By the summer of 1970, no fewer than five AC-130 gunship programs were under way.

A fleet of six "new" AC-130 gunships entered combat in November 1970, initially with disappointing results. The aircraft were more advanced and the new crews did not have sufficient experience in operating them. Terry, now a lieutenant colonel, was assigned to correct the situation, and under his tutelage, the success rate on truck kills rapidly improved.

## "Move Back 18 Feet"

Brig. Gen. Carl A. Hagan of US Army Forces Command, speaking at an Air Force Association symposium in February 1990, shared a soldier's view of the awesome power of the Air Force gunship. Hagan's son Steve, a captain in the 82d Airborne Division, had taken part in Operation Just Cause in Panama in December 1989. On the first night, his unit found itself in a difficult spot.

Fortunately, the captain told his father, there was an AC-130 gunship overhead: "We explained our situation and the guy [in the gunship] said, 'Where are you?' and we showed him, and he said, 'Where are the bad guys?' and we showed him that. There was a pregnant pause for a couple of seconds, and then he said, 'You need to move back 18 feet.'"

"They did that," the elder Hagan reported, "and the AC-130 did its thing and eliminated all opposition. Now, that's close air support."

Interdiction efforts in Laos were intensified, and the war was expanded to include missions in Cambodia. As experience was gained, the success of the gunships continued to rise; by March 1971, they were destroying an average of 13 trucks per sortie, with as many as 3,240 destroyed and 787 damaged per month, almost 90 percent of the number attacked. By June, a total of almost 14,000 trucks had been destroyed and damaged, three times as many as in the previous year. The claims, doubted at first as being too high, were subsequently validated as accurate. Unfortunately, trucks were less expensive than gunships, and the Soviet Union supplied them in quantity, with as many as 8,000 per month rolling down the trail.

In 1971, a decision was made to acquire six additional AC-130Es, and the need to decrease further their vulnerability resulted in the Pave Aegis program. The Pave Aegis aircraft received a 105 mm gun in addition to the 40 mm and two 20 mm guns. It also had improved radar and was provided with a Mk 24 flare capability, to counter the Surface-to-Air Missile threat.

It should be noted that the unusual monsoon cycle of weather in Southeast Asia allowed gunship modifications to be made during the rainy season and available for combat as soon as the weather cleared.

### Project Hornet

A contract was awarded in 1968 for project Combat Hornet, for a total of 52 additional gunships. The first 26 were to be AC-119Gs, equipped with four 7.62 GAU-2B/A miniguns, gun sight, armor, night observation sight, DPN-34 and SPR-3 radars, 20 kw airborne illuminator, and an LAU-74/A flare launcher. The second 26 were to be AC-119Ks, with similar equipment plus two 20 mm Vulcan guns, AN/APQ-133 beacon tracking radar, FLIR, and a Doppler navigation system. The AC-119Ks were almost five times as expensive as the AC-119Gs.

The Gunship III program was not without its difficulties, but four AC-119G Shadows arrived at Nha Trang by the end of December 1968, along with advance elements of the 71st SOS, whose personnel were largely called up from reserve units. Combat operations began Jan. 5, with the Shadows operating in South Vietnam. All 18 aircraft assigned arrived by March 1, and the AC-119Gs proved acceptable in all the roles accomplished by the AC-47 except for that of forward air control. (In June 1969, the 71st SOS became the 17th SOS.)

Staff photo by Guy Aceto

***Pave Aegis upgrades added a 105 mm gun to the AC-130, making for less space in an already cramped gunner's station. The yellow safety cage protects crewmen from the gun's recoil. This gunship was photographed in the late 1980s.***

In 1969, the AC-119Gs would fly more than 3,700 sorties over 14,251 combat hours, fire almost 35 million rounds of ammunition, and expend 22,000 flares. They killed some 1,500 enemy troops and, most important, had allowed no outpost to be overrun while they were overhead. Flying the Shadow was not without hazard; many recorded hits from AAA. One was lost to ground fire, and another crashed on takeoff.

By the end of 1970, the AC-119s were spread over four bases: Phan Rang (seven AC-119Gs and three AC-119Ks), Tan Son Nhut (nine AC-119Gs) and Da Nang (seven AC-119Ks) in South Vietnam, and Nakhon Phanom (six AC-119Ks) in Thailand. The 17th SOS had been replaced by the activation of the 18th SOS, which was given duties primarily in the Steel Tiger area of Laos. The 18th SOS distinguished itself in truck-killing operations from the very first. By April 1970, less than two months after the arrival of the last AC-119K, the unit claimed its 1,000th disabled truck.

Countless men and supplies poured down an expanded Ho Chi Minh Trail, now defended by heavier anti-aircraft guns and SAMs. In March 1972 two AC-130s were shot down in the Steel Tiger area in Laos. In May, the brand new SA-7 Strela was introduced. This SAM was a shoulder-fired weapon with an infrared seeker for which there was no immediate defense. The North Vietnamese also responded to American technology with more sophisticated techniques, including better camouflage, better convoy discipline, and the increased use of waterways.

Airpower became increasingly important as North Vietnam began its spring 1972 offensive. The most sophisticated methods were employed to oppose it. The Spectres and Stingers worked from their Thai and South Vietnamese bases against targets in Cambodia, South Vietnam, and Laos. As North Vietnam stepped up its efforts, the work of the gunships expanded to provide more close support of the South Vietnamese army. The Pave Aegis AC-130s were particularly successful, using their 105 mm gun to destroy tanks and the increasingly heavy artillery being deployed. There were many instances when the heavy fire from gunships halted overwhelming assaults on South Vietnamese positions, as in the defense of An Loc.

The importance of the gunship had grown out of all proportion to its numbers. It was a hands-on, into-the-teeth-of-the-storm weapon, flown by courageous crews under hazardous conditions. And the gunship continued to distinguish itself in USAF service after Vietnam. Today, eight AC-130Hs and 13 AC-130Us form a vital part of the Air Force Special Operations Command. If the need arises for a new generation of gunships, the technology is available. ■

***The Gunship III program included the AC-119G (top), which began to arrive in South Vietnam in December 1968. The even more deadly looking AC-119K had two small jet engines under the wings, newer sensors, and 20 mm guns. Today, gunships, in the form of AC-130 Spectres, remain a vital part of AFSOC.***

*Walter J. Boyne, former director of the National Air and Space Museum in Washington, is a retired Air Force colonel and author. He has written more than 400 articles about aviation topics and 29 books, the most recent of which is* Beyond the Horizons: The Lockheed Story. *His most recent article for* Air Force *Magazine, "El Dorado Canyon," appeared in the March 1999 issue.*