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THE UNITED STATES AIR FORCE IN SOUTHEAST ASIA  
DEVELOPMENT AND EMPLOYMENT OF  
FIXED-WING GUNSHIPS  
1962 - 1971

by

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## FOREWORD

This is the sixteenth of a series of historical reports on Air Force plans and operations in Southeast Asia prepared by the Office of Air Force History. The author, a former history instructor at the Air Force Academy, interviewed many key participants involved in the development and employment of gunships and has amassed extensive data relating to this unique weapon system. Among the primary sources he consulted were official letters, messages, memoranda, reports, and minutes of meetings. He also consulted a number of historical studies dealing with gunships. Most of his research was conducted in the Office of Air Force History, the Albert F. Simpson Historical Research Center and Air University Library, Maxwell AFB, Ala., and in the records of the Air Staff and Office of the Secretary of the Air Force. In addition, he visited the Aeronautical Systems Division, Wright-Patterson AFB, Ohio, and flew as an observer aboard a gunship during a training mission at Eglin AFB, Fla.

In this history, the author discusses the little-known origin of the gunship and the important pioneering efforts of a handful of dedicated men. He records the remarkable improvisations in aircraft and equipment that continually marked the progress of the gunship as a weapon system. Further, he examines the controversy that the gunships provoked as they evolved toward greater sophistication. Throughout the narrative, the author details the successes, problems, and failures of the gunship force. The result is a very informative study which will be of long-term interest and value to the Air Force.

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## PREFACE

In an age of supersonic jet aircraft, megaton atomic weapons, and sophisticated electronic devices, nothing seemed quite so incongruous as a lumbering C-47 transport evolving into a potent weapon system. Counterinsurgency warfare, as exemplified by the Southeast Asian war, had generated modern air weaponry paradoxes such as old T-28 trainers serving as attack aircraft. The gunship\* joined this group as an improvisation that surprised nearly every one. From a humble modification of the apparently ageless C-47 (DC-3), the gunship grew into a highly complex weapon system. In doing so, it pioneered new research developments and revolutionized aerial counterinsurgency tactics.

Basically, in the case of the fixed-wing gunship, the U.S. Air Force installed side-firing guns in available aircraft (mostly transports) and tactically employed them while in an orbiting maneuver. This unlikely conversion of relatively slow, large-cabin aircraft into heavily armed aerial firing platforms filled the need for an air weapon system that could direct saturating, extremely accurate firepower on generally small--even fleeting--targets in difficult terrain, varying weather, and particularly during hours of darkness. Very simply, the Air Force's combat aircraft of the early 1960's often could not find nor accurately strike enemy targets at night or under cover of the great jungle canopy. The urgent need for such a capability became dramatically obvious as guerrilla warfare expanded in South Vietnam.

From the outset, the AC-47 gunship and its successors--the AC-130 and AC-119--were inseparably linked to the war in Southeast Asia. More and more, the enemy used the cover of darkness and jungle to mask his supply movements and attacks on South Vietnamese forts, hamlets, and forces. Because the gunship could orbit, lock on a target with special sensors, and carefully apply firepower, it became a vital weapon in the overall U.S.-South Vietnamese war strategy. It quickly proved its worth as a night protector of friendly villages, bases, and forces. Its

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\*In this study "gunship" refers to the fixed-wing, side-firing aircraft of the U.S. Air Force or allied air forces.

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matchless effectiveness in night operations helped strip away the enemy's "shield of darkness."\* Of the three principal types of gunships the Air Force employed, the powerful AC-130 became the preeminent truck-killer of the war. As a primary interdiction weapon, it was employed to try to choke off North Vietnamese support of Communist insurgent forces infiltrating into South Vietnam.

Gunship successes sparked enemy countermeasures, especially along the Ho Chi Minh trail in Laos. The struggle to keep ahead of the enemy's defenses and to impede his largely seasonal combat and resupply surges is a recurring theme of this history. During the wet summer months when enemy logistics movement all but ceased, the Air Force undertook crash programs to refurbish and improve the gunships in anticipation of the end of the monsoons and a new enemy surge of personnel and supplies down the trail. These USAF efforts had one goal--to return a more effective and less vulnerable gunship to combat in the dry winter months to counter the stepped-up enemy activity. Also, the Air Force steadily refined its combat tactics to better cope with enemy defenses. The gunship was teamed with other aircraft over strongly defended areas, thus its tactics grew more complex. The story of these cyclical equipment changes and the effect of changing combat missions takes up a large but essential part of this narrative.

Besides spotlighting various combat activities in Southeast Asia, a significant and engrossing story about Air Force research and development is contained in the chapters that follow. The gunship evolved dynamically through modification of several cargo aircraft--C-47's, C-130's, and C-119's--with serious consideration also given from time to time to other aircraft, such as light planes. Colorful names--Spooky, Spectre, Shadow, and Stinger--kept pace with major aircraft changes. Moreover, this pluralistic gunship development became multinational by way of the U.S. Military Assistance Program, with several types of gunships turned over to the Vietnamese and other allied Air Forces. The following account chronologically traces the story of these unique weapon systems in terms of the models of aircraft used, their numbers, and their operational performance.

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\*Maj William R. Casey, "AC-119: USAF's Flying Battleship," Air Force/Space Digest, Feb 1970, pp 48-50.

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The gunship's rapid progression toward greater sophistication touches and illuminates many of the problems associated with weapon system advancement. Thus, this study covers such matters as Air Force management, contractor relations, technical problems, funding, and high-level debate and decisions concerning the size, character, and effectiveness of the gunship force. Especially at the beginning, the labor pains incident to the birth, acceptance, and employment of a relatively new idea prove noteworthy. The solutions to some development problems and issues carry lessons far transcending the gunship program.

An outstanding theme of the gunship story was the Air Force's constant improvisation and tinkering as the system evolved. The weapon system did not spring out of the think tanks, move from the drawing boards to the wind tunnels, or undergo exacting scientific-engineering analysis. Instead, its growth largely stemmed from the Air Force making do with basic equipment already in the inventory. It consisted of molding parts from various systems and blending operational concepts from widely different sources. While most technological advances involve borrowed ideas and hardware, the gunship development reflects this to an unusual degree.

People are crucial in any program but a relatively small group of key men determined the gunship's progress. Facing opposition and skepticism, these men battled first for a concept and then for a weapon system employing it. The gunship's success and eventual acceptance hinged chiefly on their personal effort. This, then is a history of men as well as machines.

The text discusses gunship developments well into 1971. At that time, some interesting and important new equipment additions were entering the test stage. Ahead lay the enemy offensive of 1972 as well as other significant and fresh combat challenges. These later activities must await future coverage.

Much of this study could not have been written without the prior historical work of others and the kind assistance to the author by numerous individuals and organizations. Their contributions can be seen in the sources cited.

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## I. ORIGIN AND EARLY DEVELOPMENT

(U) The genesis of the gunship idea has remained relatively obscure, even though it was tested as early as 1926-1927 and appeared in various proposals during 1939 and 1942. The concept, in its simplest form, combined a long-known aerial maneuver with previously employed weapons. Nonetheless, nearly two decades passed before firing laterally from an aircraft in a pylon turn caught on as a useful combat tactic. Its development stemmed directly from battlefield needs of the war in Southeast Asia. Like many new ideas, this one nearly succumbed in infancy. That the gunship eventually evolved into an effective and impressive weapon system was due mainly to a handful of men who early saw its potential and doggedly urged its adoption.

(U) One of the strong proponents of the gunship idea was Ralph E. Flexman,\* an Assistant Chief Engineer with Bell Aerosystems Company, Buffalo, N.Y. In early 1962 he became intrigued with the problems of limited war and counterinsurgency operations. Bell had received several contracts to work on hardware associated with limited war, coincident with rising American involvement in the Vietnamese guerrilla war. From this focus of concern came a proposal for a gunship. On 27 December 1962 Flexman submitted to Dr. Gordon A. Eckstrand, Behavioral Sciences Laboratory, Wright-Patterson AFB, several ideas that he and his Bell associates were working on. He wrote that

...with respect to aircraft, we believe that lateral firing, while making a pylon turn, will prove effective in controlling ground fire from many AA units. In theory at least, this should more than triple the efficiency of conventional aircraft on reconnaissance and destructive missions.<sup>1</sup>

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\*In 1962 Flexman was an Air Force Reserve Major with an M-Day assignment to the Behavioral Sciences Laboratory, Wright-Patterson AFB, Ohio. In 1958-1959 he had served as a human factors engineer and Technical Director, Human Factors Office, Air Proving Ground Center, Eglin AFB, Fla. His interest in human factors engineering enabled him to contribute to cockpit design and controls. He is presently Professor of Psychology and Director, University of Illinois Institute of Aviation. In 1970, he co-shared the first annual Alexander C. Williams, Jr. award of the Human Factors Society of America for his gunship efforts.

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(U) Of course, the idea of firing a weapon from the side of an aircraft was not new. Swivel-mounted machineguns on World War I aircraft fired laterally at air and ground targets. In 1926-27, 1st Lt. Fred Nelson, a supervisor of one phase of an air training program at Brooks Field, San Antonio, Texas, successfully experimented with a DH-4, equipped with a fixed-mounted, side-firing, .30-caliber machinegun. Nelson flew in a pylon turn, sighted through an aiming device on a wing strut, and scored accurate hits on a ground point marked with lime. \* In 1939 Capt. Carl J. Crane, recalling the Nelson exploits, proposed a side-firing pursuit aircraft in an Air Corps Tactical School thesis.<sup>+</sup> The famed Flying Fortresses and Liberators of World War II relied on waist gunners to help ward off attacks of German and Japanese interceptors. Several C-47 transports of the 443d Troop Carrier Group--in support of British Brigadier Wingate's operations against Japanese-held Burma--carried .50-caliber machineguns that fired from both sides of the aircraft.<sup>2</sup> These historical precedents were largely forgotten, however.

(U) The pylon turn harked back to the air races and flying training of early aviation. A unique recent use, however, stuck in Flexman's mind. He had read an account of a South American missionary, Nate Saint,<sup>‡</sup> who executed the maneuver with a long rope extending from the aircraft to the ground. This had permitted amazingly accurate delivery of mail and other objects to remote villages.<sup>3</sup> In addition, Flexman recalled his experiences as a flight instructor, when he had pivoted his plane over a fencepost and held the post in view at the tip of the wing. He therefore believed it reasonable that with a very small sight one could fire ammunition along the sight path to a target. All this pointed to possible counterinsurgency applications.<sup>4</sup>

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\*Gen. Orval R. Cook, Retired, helped Nelson by designing the triggering mechanism. Intvw (U), author with Gen. Orval R. Cook, Ret, Wash., D.C., 16 Jan 74.

<sup>+</sup>Capt. Carl J. Crane, "Range Finding and Fire Control Equipment for Pursuit Armament," Air Corps Tactical School thesis, 1939.

<sup>‡</sup>Wings of Praise and Prayer, a newsletter published by the Missionary Aviation Fellowship of Los Angeles, described Saint's exploits in May 1953. The missionary's work with the Arica Indians drew national attention.

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(U) Perhaps most influential to the development of Flexman's proposal was his contact with Gilmour Craig MacDonald\* of Ames, Iowa. In fact, this inventive and imaginative individual should be credited with the first formulation of the gunship concept. On 27 April 1942, as a first lieutenant in the 95th Coast Artillery (AA), he had suggested a way to vastly increase the effectiveness of civilian aircraft on submarine patrol:

With a view of providing means for continuous fire upon submarines forced to the surface, it is proposed that a fixed machine gun be mounted transversely in the aircraft so that by flying a continually banked circle the pilot may keep the underseacraft under continuous fire if necessary.

MacDonald further pointed out the advantage of the side-firing pylon-turn maneuver, in keeping the submarine crew from bringing its own AA guns into action. He contrasted this with the normal forward-firing aircraft, that might make one pass at the submarine, then lose precious minutes in positioning for another.<sup>5</sup> Nothing came of the proposal.

(U) MacDonald wrote on 2 May 1945 to the Research and Development Service Sub-Office at Dover Army Air Base, Dover, Del., suggesting a transverse-firing T-59 Superbazooka be installed in a liaison-type aircraft. He visualized that a plane so armed, flying a pylon turn, could pin down enemy soldiers in their foxholes and strike tanks effectively. World War II was waning, however, and the proposal died.<sup>6</sup>

(U) Sixteen years later, however, with President John F. Kennedy's new administration emphasizing counterinsurgency operations, MacDonald resurrected his old ideas. On 14 September 1961, (then an Air Force lieutenant colonel) he submitted a recommendation,

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\*MacDonald earned an engineering degree and ROTC commission at Iowa State University. A born mechanic and tinkerer, MacDonald built and flew gliders, and raced cars and airplanes in good barn-storming fashion. On active duty with the Army he became expert in anti-aircraft (AA) operations and suggested weapon improvements. A prolific inventor, he produced the caltrop (an airdroppable device for puncturing tires), an AA machinegun sight, a smoke-trail rocket, and a rocket thrust-termination device. His inventions earned him two Legions of Merit. A retired Air Force colonel, he works at the Air Force Armament Laboratory, Eglin AFB, Fla.

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"Transverse Firing of Rockets and Guns," to a Tactical Air Command (TAC) panel on limited war problems. To his way of thinking, lateral firing could offer some real benefits to spotter and liaison aircraft.<sup>7</sup> In a follow-up submission to the panel on 19 September 1961 he declared: "By flying a banked circle, the airplane can keep the gun pointed continuously at a target, and by flying along with one wing low, limited longitudinal strafing can be done without worrying about pullout." His proposed project would "investigate launch, fire control, and ballistic problems," cost an estimated \$100,000, last about 6 months, and take 100 hours of test time on a liaison-type aircraft using the Eglin AFB land and water ranges.<sup>8</sup> But again the MacDonald proposal failed to arouse a response.

(U) During a Reserve active duty tour in late 1961 at Eglin AFB, Ralph Flexman first met Gilmour MacDonald. From the latter he learned of MacDonald's proposal to the TAC Limited War Committee and of the flying missionary's feats.<sup>9</sup> Back at Bell Aerosystems, Flexman mulled over the pylon-turn/lateral-firing concept and introduced it at a Bell brainstorming session in late 1962.<sup>10</sup> This led to his letter to Dr. Eckstrand (page 3).

(U) Flexman had concluded by 16 April 1963 that lateral firing from a pylon turn was definitely feasible. He reported to his Air Force professional colleagues the concept's advantages in limited war operations. Aircraft often lost guerrilla-war targets between first sighting and the time of the second pass.\* In contrast, an aircraft rolling immediately into a pylon turn could sweep a target with instant effective fire from a fixed aiming point. Flexman further foresaw that lateral fire from a low-flying slow-speed aircraft could provide wider coverage, a high angle of fire, and a capability for pinning down enemy troops.

(U) Nevertheless, the concept contained three major questionable areas: ballistics of the projectiles as they were fired and their dispersion, ability of the pilot to aim his lateral weapon and hold the target, and the reaction time necessary to change from straight-and-level flight to an on-pylon turn.

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\*Flexman called this the mismatch between the visual and weapon-delivery envelopes.

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Flexman suggested to Capt. John C. Simons\* that a test program examine these points and at the same time demonstrate the validity of the concept.<sup>11</sup>

(U) Captain Simons had known Ralph Flexman for several years as a result of their mutual interest in aeronautically related human factors research. Flexman had sent him a copy of the 1962 letter containing the idea of a pylon-turning side-firing gunship.<sup>+</sup> Additionally, Simons was familiar with the South American missionary's long-rope delivery techniques while flying a pylon turn.<sup>12</sup> Simons carefully weighed the informal proposal for testing,<sup>‡</sup> discussed it with Flexman by phone, and became an advocate.<sup>13</sup> He strongly supported the concept, viewing it as opening up a profitable new research area, and would "bet anyone a case of beer it will be much larger than 'lateral firing' as its only use."<sup>14</sup>

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\*Captain (now Colonel) Simons was then a research psychologist and pilot at the 6570th Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio. Simons, a native of Buffalo, graduated from the University of Buffalo and earned an M.A. in psychology from Hofstra College. Entering the service in 1943, he served as a combat pilot in World War II (Italy), the Korean War, and Vietnamese War. His decorations include: Distinguished Flying Cross (1967) for landing his enemy-damaged B-26K aircraft while wounded; Legion of Merit (1966) for initiating the Air Force zero-gravity program using a large-cabin aircraft as a weightless facility; Legion of Merit (1969) for gunship development efforts; first annual Alexander C. Williams, Jr. Award of the Human Factors Society of America (1970) for "Design of a major man-machine system"--side-firing gunships. More recently Simons promoted and improved long-line loiter techniques, a USAF follow-on to flying missionary practices and Flexman's ideas. [See Lt Col John C. Simons and B.C. Dixon, Long-Line Loiter: Improvement of Some Free-Fall and Circling-Line Techniques, Technical Report ASD-TR-69-95 (U) (Aeronautical Systems Division, AFSC, Wright-Patterson AFB, Ohio, September 1969), I.]

<sup>+</sup>Flexman wrote on the copy: "John, I hope this will be of some use to you. I'd be glad to discuss any aspect of it in more detail with you. I might suggest you'd be a good man to participate in such a field study."

<sup>‡</sup>Captain Simons was a fan of Cecil Scott Forester's tales of the sea, and Flexman's lateral-firing concept brought to mind a broadside from a warship.

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(U) On 26 April 1963 Captain Simons forwarded Flexman's tentative test proposal to several offices of the Aerospace Medical Research Laboratory (AMRL) and Wright-Patterson AFB offices interested in limited war and counterinsurgency development.<sup>15</sup> Replies to this referral for comment and support, however, did not reflect Captain Simons' complete confidence in the concept. An 8 May 1963 response, for instance, named general areas needing investigation (reminiscent of Flexman's concerns): "What is the dispersion due to sighting wander? Under what conditions can a pilot sight a 'pop up' target and convert to an 'on pylon' attack against the target?" Again, would the lateral gun firing be an "operational useful technique" and would a gunner-operated waist gun have advantages over a pilot-aimed one? There was the suggestion some of the questions might be answered by using cameras rather than actual gunfire and by consulting on ballistic matters with Eglin AFB units.<sup>16</sup>



Lt. Col. John C. Simons

(U) Meantime, one of Captain Simons' supervisors referred the concept to two different Aeronautical Systems Division (ASD) review boards of weapon and ballistics experts. Both boards evaluated the idea, raised serious doubts about the ballistics associated with side-fired weapons, then rejected the concept as technically unsound. This was in marked contrast to Flexman's position when he wrote Simons on 16 April 1963, commenting on questions involving the ballistics of laterally fired weapons. He cited the published work of Dr. W. H. T. Loh, Associate Chief Engineer of Bell Aerosystems. Dr. Loh had developed equations that could be computer-programmed to define the trajectory of weapons fired from aircraft in an on-ylon turn. Flexman estimated that for about \$200,000 a computer study would verify

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the concept's feasibility, provided the weapons used were of high muzzle velocity such as .30-caliber or above.<sup>17</sup>

(U) Captain Simons firmly believed only an actual firing test would clear away all concern with ballistic problems. So in May 1963, he proposed to sidestep local flight-support requirements and request the United States Army Laboratory, Ft. Rucker, Ala., to determine the dispersal patterns of the side-firing guns. This effort collapsed, however, when supervisors told him he "should not get involved with the weapons aspect."<sup>18</sup> Even though success of the concept might hinge on live-firing test results, they considered dabbling in weapon trajectories as stretching a research psychologist's duties a bit too far.

(U) Nevertheless, Captain Simons persisted in his search for support. An important factor was the encouragement of his immediate supervisor, Dr. Julian Christensen, who did not want to see the idea die without a test.<sup>19</sup> On 20 May 1963 Simons submitted to the Deputy for Engineering, ASD, a "Request for Support of Limited War Study." It proposed a 9-month study: 6 months to check dispersal patterns by sightings from an unarmed aircraft in an on-pylon maneuver; 2 months for testing a weapon mounted in a T-28 aircraft; and 1 month of operational analysis to weigh such factors as vulnerability, time-over-target (TOT), and ultimate design. Some of the groundwork for this request grew out of Simons' discussions with two interested pilots of the ASD office, Captains J.D. Boren and J.A. Birt. Already the proposed air-to-ground firing study bore the tentative nickname, "Project Tailchaser."<sup>20</sup>

(U) Meanwhile, Captain Simons diligently pursued test arrangements. In June he prepared a flight-test plan for his branch to establish skill and display requirements and to develop sighting techniques. Rejection of the concept by the ASD review boards had seemingly blocked support from the flight-test section. Simons therefore sought permission to fly some of the sighting tests in conjunction with other projects. One of his superiors gave him under-the-table approval for a few test flights.<sup>21</sup>

(U) Later that same month, Simons flew a T-28 at Wright-Patterson AFB, accompanied by test pilot Capt. Harley Johnson. He executed the pylon turn and visually tracked a target from the left cockpit window. A grease-penciled horizontal line on the glass served as a rudimentary sight. Target-tracking continued

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for 10 minutes under varying lateral distance, airspeed (110-220 knots), altitude (500-3,000 feet), and pitch angle. On a second T-28 flight that took off after dusk, Simons found that by turning up the cockpit lights he could track a light on the ground with his makeshift sight.<sup>22</sup>

(U) Both these flights added convincing evidence that an aircraft could track line, point, and area targets while in a pylon turn. A prime case in point was Captain Simons' holding a truck in the sight as the vehicle drove from a route parallel to the aircraft to one at right angles--a portent of the tracking that was to make the gunship justly famous. Simons observed that on- pylon tracking in low-speed aircraft was free of the "yaw rigidity and changing control forces" that often degrade the performance of high-speed planes. He marveled at the pylon turn's simplicity and the ease with which a target could be acquired and held in the sight.<sup>23</sup>

(U) Near the end of June, Simons and Captain Boren flew a C-131 for 3 hours to check lateral-sighting techniques in a cargo aircraft. Flying low over southern Ohio, the pilot banked the aircraft about 10° and with rudder control followed a road, keeping it in view with the single horizontal line on the left-side cockpit window. Tracking this continuous target proved easy both from the standpoint of flying and sighting. Next the pilot singled out silos, barns, moving horses, and even fighting geese as point targets. The aircraft rolled into a pylon turn around the object selected. Finally, he changed the horizontal line on the window to a vertical one. This did not affect ease of tracking but precise sighting along a line was lost. From this flight Simons concluded that cargo aircraft could acquire and keep targets in the sight during a pylon turn, and saturate them with assumed ballistic dispersion patterns.<sup>24</sup>

(U) The first T-28 test flight had convinced Captain Simons the concept's ballistic problems could be overcome. A ballistic expert agreed they might be ironed out provided there was a fixed-mounted gun.<sup>25</sup> Advocating ever more strongly the air-to-ground study, Simons started to improve the gunship apparatus. Working from Simons' suggestions, SSgt. Estell P. Bunch, also of the AMRL, prepared the plans and supervised the fabrication of a holder into which gunsight reticles could be inserted.<sup>26</sup> Reticle designs included a horizontal line, a vertical line, concentric circles, a cross, and combinations of these.<sup>27</sup>

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(U) Plans to verify sight and gun alignments followed. In June 1963 one of the C-131B's at Wright-Patterson was fitted with a new sight, mounted at the pilot's left cockpit window. The sight's optical axis was perpendicular to the aircraft's flightpath. Next three synchronized cameras were installed. One 16-mm motion-picture camera was positioned to record the sight alignment. Another, in the cargo compartment back of the wing, aimed through a window where a gun might be positioned. A third camera was placed to photograph the special flight instrument panel in the cargo compartment. The panel showed altitude, airspeed, turn and bank, and attitude factors--a light came on when the pilot pressed the trigger button. From this test equipment Simons hoped to obtain enough data to plot pilot error involving altitude, line-of-sight distance, wind, indicated airspeed (IAS), and to secure realistic inputs for computing the firing geometry.<sup>28</sup> Later, a second version of a camera installation was prepared including one camera to record the pilot's sight alignment and three cameras to represent guns. This concept was presented to the ASD flight test organization (Major Gough project pilot) but was delayed indefinitely because of lack of priority.

### CAMERA INSTALLATION FOR LATERAL SIGHTING

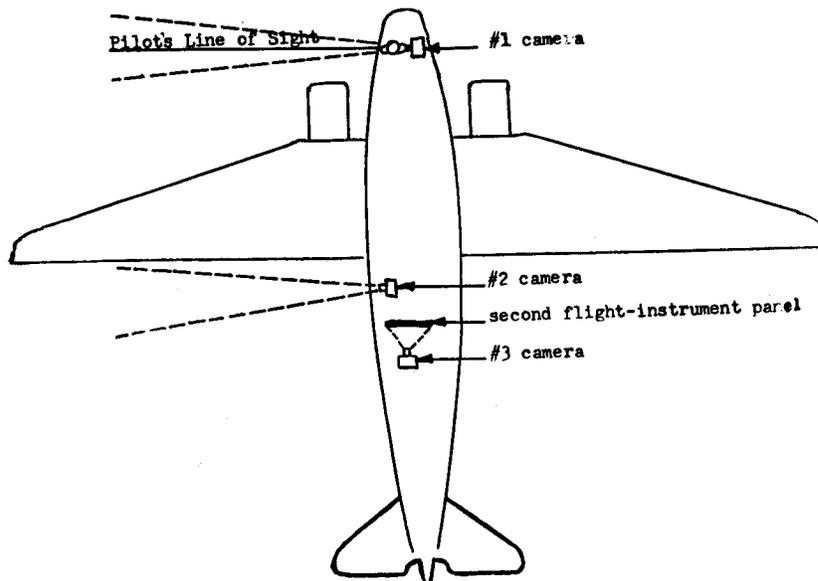


Fig. 1 (U)

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(U) In July 1963 Captain Simons gave his supervisor a progress report on test flights and preparation of test equipment. He highlighted his success in tracking various targets and urged that the next step be turnover of the C-131 to ASD cargo flight-test personnel. Suggested test equipment was installed in this aircraft. Flexman believed two flights should supply ample data to adequately analyze the essential firing functions before actual firing tests. Looking to the future, he foresaw ASD research into minimum and maximum tumbling characteristics of ammunition fired from the waist gun, the prospect of using the on-pylon technique for pickup and delivery, and possible use of a laser beam to designate targets, or side-looking infrared equipment to acquire night targets during the pylon turn.<sup>29</sup> That these three areas had significant development later establishes Simons as farsighted indeed.

(U) As a "fallout" from the Simons proposal of 20 May 1963 (page 7), a meeting was held on 1 July. Attending were Captain Simons, Lt. Col. James L. Hight and Captains Birt and Boren--the latter three from ASD's Directorate of Crew Subsystems Engineering. On 3 July this group officially supported testing of the concept.<sup>30</sup> By August Captain Simons had the part-time services of Captains Birt and Boren to help set up sighting-definition flights. On 28 October a new flight-test plan, ASNM 63-1, changed Project Tailchaser from a lateral-firing to a lateral-sighting project because of resistance to the firing phase. The plan prescribed use of a C-131 and later a T-28 in flights from Wright-Patterson AFB, possibly Ft. Rucker, Ala., and Eglin AFB. Captain Boren became project manager, with Captains Birt and Simons and Staff Sergeant Bunch designated engineers. Capt. Edwin J. Hatzenbuehler was named project pilot.<sup>31</sup>

(U) The plan projected 300 testing hours spread over 1 year. It allotted 2 weeks for installing test apparatus, followed by 25 flying hours in a C-131 to select targets, check out equipment, and develop pilot techniques. A second phase specified that flight-test pilots validate experimental designs and techniques. The final phase stipulated that a C-131 evaluate designs by "tactical" pilot subjects. After analysis of these C-131 flights, a T-28 would fly a pattern similar to the initial flight tests but keep adaptation to a particular counterinsurgency aircraft in mind. Flight tests were expected to include simulated firing passes at point, line, or

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area targets, and at varying altitudes and airspeeds. All tests were to be recorded on film.<sup>32</sup> At last it appeared a firm test plan was ready.

(U) Heartened by the latest flight-test plan, Captain Simons reported to Ralph Flexman on 13 November that all test equipment had been installed in the C-131B aircraft and checked out. The first flight was set for 15 November but Simons cautioned that problems persisted--chief among them a need for funds to sustain a complete flight-test program.<sup>33</sup>

(U) Crablike progress ensued and the C-131B camera test equipment stood idle. The part-time officers, Captains Birt and Boren, were recalled by their units for higher-priority duties. Project Tailchaser was virtually at the bottom of the list of priorities and was likely to stay there, in view of the increased attention given Vietnam-related counterinsurgency developments. Test flights were hard to arrange. In 7 months the C-131B made just two flights and these were preliminary procedure checkouts.<sup>34</sup> Not a single actual or camera-verified firing test had taken place. People remained skeptical of the whole concept. Frustrations mounted with the seemingly endless delays.

(U) With undimmed enthusiasm Captain Simons, Staff Sergeant Bunch, and other pioneers of the concept's early testing, remained convinced of Tailchaser's potential. On 10 February 1964 they were cheered by news from Captains Boren and Birt of a flight set for the near future, "hopefully in February." Technicians re-installed the cameras (they had been removed from the C-131B) and boresighted them like guns.\* Test pilots scanned aerial photos of Ohio's Clinton Country seeking test targets. But over this activity loomed the priorities problem--a roadblock to the tests. At one point ASD returned the sighting-project files to the AMRL, commenting the project deserved total attention of several people whom it could not provide and admitting "limited surveillance and informal management of the project" had fostered delays.<sup>35</sup> Again the planned flights failed to take place.

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\*A boresight line is an optical reference line used in harmonizing guns, rockets, or other weapon launchers.

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(U) Finally a few flights were made in the summer of 1964. By this time, however, the press of his other duties forced Captain Simons to give up his gunship responsibilities. He picked 1st Lt. Edwin Sasaki, a fellow AMRL researcher interested in the project, to act in his stead as human performance engineer on the lateral-firing team.<sup>36</sup> In addition, the project pilot, Captain Hatzenbuehler, was replaced by Maj. Richard M. Gough and he in turn by Capt. Ronald W. Terry. Despite these changes, Simons kept up his interest in Project Tailchaser's development, reiterating that the concept's acceptance hinged on live-firing tests.<sup>37</sup>

(U) The appearance of Captain Ronald W. Terry\* as a project pilot proved a propitious development. His personality projected a subtle blending of tact and tenacity, self-confidence and openness, intelligence and common sense, and, most significant for the progress of the gunship, an uncommonly convincing salesmanship. Also, his past mental conditioning made him keenly receptive to the gunship's possibilities. In the spring of 1963 he had served on an Air Force Systems Command (AFSC) team in South Vietnam. Its job was to assess problems in the field and suggest hardware developments to deal with them--the overall goal being a 5-year development program to satisfy Southeast Asia requirements. The team probed for almost 6 weeks, visiting bases and talking with the men who worked alongside of and advised the South Vietnamese.<sup>38</sup> Combined with this firsthand knowledge was Terry's fighter pilot experience. He knew how hard it was to place ordnance on a target in bad weather, at night, and in tight tactical situations.<sup>39</sup>

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\*A native of Vinton, Va., Captain (now Colonel) Terry enlisted in the Air Force in 1952, became an aviation cadet, and received his commission and wings in May 1954. For 4 years he flew F-86's with TAC at Clovis AFB, N.M. In 1961 he received a B.S. in management from Indiana University, then participated in a nuclear test series. In 1963 he was part of an AFSC team that studied limited war in Vietnam. Among his decorations are: Legion of Merit (1968) for leadership on the Gunship II combat test and evaluation team (Sep-Dec 1967); Distinguished Flying Cross and Air Medal for aerial combat missions Southeast Asia.

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Lt. Col. Ronald W. Terry

(U) Captain Terry first came across Project Tailchaser while perusing the files in Flight Test Operations at ASD. Obviously, the project had been dormant for some time. Yet as he read, Terry was intrigued by the potential of the idea for development and use in Vietnam. Disregarding the ballistic skeptics who branded the concept unworkable, he obtained permission to work on Tailchaser. Immersed in the project, Terry's interest heightened and he gained approval at several points to evaluate the idea further. Finally, he drafted a scenario\* for a tactical operation employing a side-firing weapon system--mainly in defense of hamlets and forts. He viewed this system as performing a policeman-on-the-corner or prowler-car role--prepared for anything and able to respond anywhere at most anytime. ASD's Limited War Office warmly welcomed the scenario and promised to sponsor it.<sup>40</sup> This achievement, together with Terry's first C-131 flight where he practiced lateral-firing techniques, fueled his enthusiasm.<sup>41</sup> He became primarily responsible for restoring momentum to the gunship idea.

\*An outline plan of the actions to be undertaken during a projected exercise or maneuver. Simons originally prepared a Southeast Asia scenario describing the advantages of the system--time on target, long search time, amount of ordnance, extended strike time, the same sensor-gun orientation--and its disadvantages--vulnerability, slow enroute time. Terry obtained this scenario when he took over as Tailchaser pilot.

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(U) In August 1964 the ASD Limited War Office and Flight Test Operations, together with the AMRL, took a significant step in the testing of the lateral-sighting study. An amendment to the flight-test plan specified that one or two small-caliber guns, remotely fired by the pilot, be installed in the cargo doorway of a C-131 (53-820) "to determine the feasibility of firing guns with the lateral sighting system." Eglin AFB would help install the guns and conduct the ground tests, firing blanks to determine if the mounts could stand the recoil. The amendment also prescribed preflight boresighting and safety precautions.<sup>42</sup> Groundwork had been laid for the long-awaited firing test.

(U) The C-131 was flown to Eglin AFB to become the test bed\* for the firing. A relatively new weapon was selected and installed on the left side of the aircraft's cargo compartment. The General Electric (GE) SUU-11A, 7.62-mm gun pod (Gatling gun) could fire 6,000 rounds-per-minute.<sup>43</sup> Staff Sergeant Bunch, who worked on fabricating the sight and other test equipment, played a key part in mounting the Gatling gun.<sup>44</sup>

(U) The first live-firing tests occurred in late summer.<sup>‡</sup> The pilot flew the C-131 with line-of-sight (LOS) distance to the target varying from 1,750-9,000 feet. Altitudes ranged from 500-3,000 feet and airspeed, 115-250 knots. On Eglin's water range a 1-second firing burst scored 25 hits on a minimum 10-foot-square raft and 75 hits on a maximum 50-foot-square one.<sup>45</sup> A testing phase on the land range saw 25 manikins scattered in different positions over three-quarters of an acre. A 3-second firing run on

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\*A stand at which some mechanism or engine is tested out.

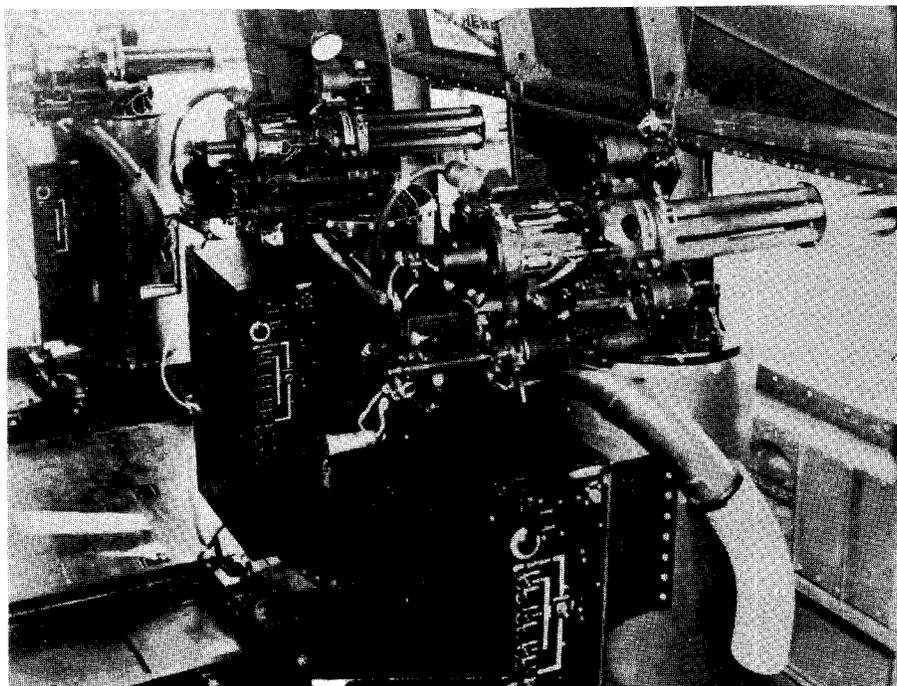
†By coincidence the Air Proving Ground Center (APGC) at Eglin had 11 Gatling guns on hand when the C-131 arrived. A May 1962 operational support requirement had authorized the weapon's development for use on counterinsurgency aircraft. GE's missile and armament department at Burlington, Vt., produced the Gatling gun and APGC tested the first model from 19 November 1963 to 25 January 1964. In May 1964 the first four prototype gun pods arrived at Eglin for inflight evaluation.

‡ASD's Limited War Office and Flight Test Operations, the AMRL, along with the APGC and 1st Combat Application Group at Eglin participated in these tests.

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this area target hit 19 manikins with 10 of them considered "killed."<sup>46</sup> The test results exceeded expectations.<sup>47</sup> As Captain Simons had long predicted, they adequately confirmed the concept's feasibility and convinced many of the skeptics that this was indeed a worthwhile weapon system. At this point ASD assumed management of the program.

(U) The C-131 test results aroused the interest of 1st Combat Application Group\* personnel. They asked Captain Terry, Staff Sergeant Bunch, and other Tailchaser crewmembers if a gun kit<sup>+</sup> in side-firing mode could be built into other aircraft. Specifically, they wanted to modify a C-47 or C-123, since USAF Special Forces units in South Vietnam were using these aircraft.<sup>48</sup> Captain Terry jumped at this opportunity--in short order three SUU-11A Gatling guns (miniguns) were installed in a C-47 cargo compartment.<sup>49</sup> The C-47 side-firing tests in September 1964 repeated the successes of the C-131 tests.



SUU-11A Gatling Guns (miniguns)

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\*An organization at Eglin active in testing and adapting equipment and tactics for counterinsurgency operations.

<sup>+</sup>A gun kit included wiring, gun, pilot's sight, and other equipment needed to convert a cargo aircraft to a weapon system.

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(U) The Air Force carefully weighed the combat advantages and disadvantages of this C-47 with laterally-firing guns. The aircraft was available as were the crews to fly it. The plane could carry a large volume of ammunition and flares and could be used for cargo, troop, and reconnaissance missions. It possessed 2-engine safety, long alert capability, lengthy time-over-target, and capability to loiter for flaredropping. In-flight the crew could select ordnance; choose varied weapon dispersion patterns; arm, disarm, maintain, and repair weapons; and carry out immediate bomb damage assessment (BDA).<sup>\*</sup> Some of these things any slow-mover could do, others only could be done in large cabin aircraft.<sup>50</sup> Admittedly one major disadvantage did exist--the C-47's vulnerability to ground fire and aerial intercept. Critics swiftly seized upon this weakness and argued that it was formidable enough to cancel out all the aircraft's advantages and nullify its usefulness.

(U) Captain Terry was articulate in pointing up the advantages of the side-armed C-47 in a Vietnam-like setting. He considered the Gooney Bird a Johnny-on-the-spot that could cover a hamlet with continuous fire, holding off the enemy until arrival of additional air or ground support. Terry knew his fighter operations and pictured the serious problem of precise ordnance delivery in tight situations involving rugged terrain, bad weather, night flying, hard-to-detect targets, and exact location of friendly forces. The fighter pilot relied mainly on a forward air controller (FAC) for target acquisition and location of friendly forces. Once on his own, the pilot faced a sea of green jungle that often thwarted his efforts to acquire or reacquire targets.<sup>51</sup>

(U) On the other hand, the C-47 could fly over the terrain and spot friendly forces and the probable location of the enemy. Then, after acquiring and locking on a target in a pylon turn it could deliver continuous fire with a near-surgical precision of artillery. If the first bursts missed the target, instructions quickly furnished by an observer on the ground or in the aircraft put the fire on the mark. Moreover, the accuracy of the side-firing mini-guns allowed wider discretion in attacking within basically friendly

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<sup>\*</sup>This term encompasses the determination of the effect of all air attacks on targets (e.g., bombs, rockets, or strafe); also referred to as "battle damage assessment."

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territory. In contrast, use of napalm, bombs, and rockets could-- and did--break up attacks on hamlets but might require an aid program later to rebuild these same villages.<sup>52</sup> As to the C-47's vulnerability, Captain Terry felt the aircraft could be effective flying above the range of small-arms fire expected in South Vietnam. Certainly it should be less vulnerable than the helicopters already being used extensively as gunships. Arguments on the gunship went on in a similar vein at various Air Force command levels.

(U) Captain Terry kept talking to different people about the potential of the modified C-47 and briefings moved steadily up the command chain. These efforts culminated with a presentation on 2 November 1964 by Captain Terry and Lieutenant Sasaki to Gen. Curtis E. LeMay, Air Force Chief of Staff, and other Air Staff members. General LeMay reacted favorably and directed that a team go to Vietnam, modify a C-47 and test it in combat.\*† Six SUU-11A miniguns were also to be installed in aircraft there. Staff Sergeant Bunch's projected assignment to Turkey was deferred while he prepared another gunsight for the test.<sup>53</sup> The administrative machine moved to high gear to support the oversea combat test.

(S) At this time American concern over Vietnam mounted, as South Vietnamese ability to repel Vietcong and North Vietnamese attacks appeared to be deteriorating rapidly. By the spring of 1964 the initiative had passed to the Communists; 200 of 2,500 villages lay in enemy hands, and "incidents" surged to 1,800 per month. South Vietnamese forces faced serious recruiting problems. Troop morale was low, losses of weapons and desertions were high.

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\*Later General LeMay spoke of gunships with less favor: "It's not a very good platform and you can't carry the load. You don't have the range, staying capacity, or anything else. They're too vulnerable both on the ground and in the air." Despite these sentiments the General was the one who first committed the Air Force to the aircraft. [Intvw (U), Dr. Thomas G. Belden, Chief Historian, Ofc/AF Hist, with Gen. Curtis E. LeMay, 29 Mar 72.]

†Besides Captain Terry, Lieutenant Sasaki, and Staff Sergeant Bunch, the team included TSgt. Thomas E. Ritter [Aerospace Studies Institute (ASD)], Capt. Peter E. Carnevale (ASD), 2d Lt. Ralph D. Kimberlin (APGC), and A3C Allen W. Sims (APGC).

Increased Vietcong activity in the Mekong River Delta area climaxed with a major defeat of the South Vietnamese in July 1964. In August came the Tonkin Gulf incident and attacks on U.S. facilities, which deepened American concern and involvement. On the night of 31 October/1 November the Vietcong attacked Bien Hoa AB, inflicted serious damage, and cast serious doubt on airbase security. Seven U.S. and 3 VNAF aircraft were destroyed, 16 U.S. and 2 VNAF aircraft, damaged. In addition, the political turmoil in Saigon grew.<sup>54</sup> These events generated a need for greater U.S. aid and air power if the country was to be saved. In beefing up Vietnam units, the Air Force eagerly sought new ways to bolster counter-insurgency operations.<sup>55</sup>

(S) The Air Staff prepared the way for the C-47 combat tests by telling the Commander in Chief, Pacific Air Forces (CINCPACAF) of the side-firing aircraft's advantages. The plane could loiter around targets, change firing patterns, correct malfunctions in flight, and deliver great quantities of ordnance accurately on the target. While best fitted for night and counterinsurgency operations, its great slant range\* might enable it to strike targets on steep mountain slopes or in other previously inaccessible spots.<sup>56</sup>

(S) Word of the tests spread. CINCPACAF notified both the Commander in Chief, Pacific Command (CINCPAC) and the Commander, United States Military Assistance Command, Vietnam (COMUSMACV). The latter requested the program be expedited, estimating an effective test and evaluation should take from 60 to 90 days.<sup>57</sup> On 12 November 1964 Lt. Gen. James Ferguson, Air Force Deputy Chief of Staff for Research and Development, wrote to Maj. Gen. Joseph H. Moore, Jr., 2d Air Division Commander in Vietnam. He asked General Moore to personally evaluate the system, chiefly from the standpoint of its value on night missions. He added that tests at Eglin had shown it "highly effective against troops in wooded terrain," and stressed that the upcoming C-47 test and 7.62-mm minigun evaluation reflected the swing of research and development (R&D) application to counterinsurgency requirements.<sup>58</sup>

(S) The testing decision posed a dilemma to the Air Staff, for it had begun to oppose unrestricted evaluation of equipment in South Vietnam. The opposition sprang mainly from a feeling that

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\*Slant range--The line-of-sight distance between two points not at the same elevation.

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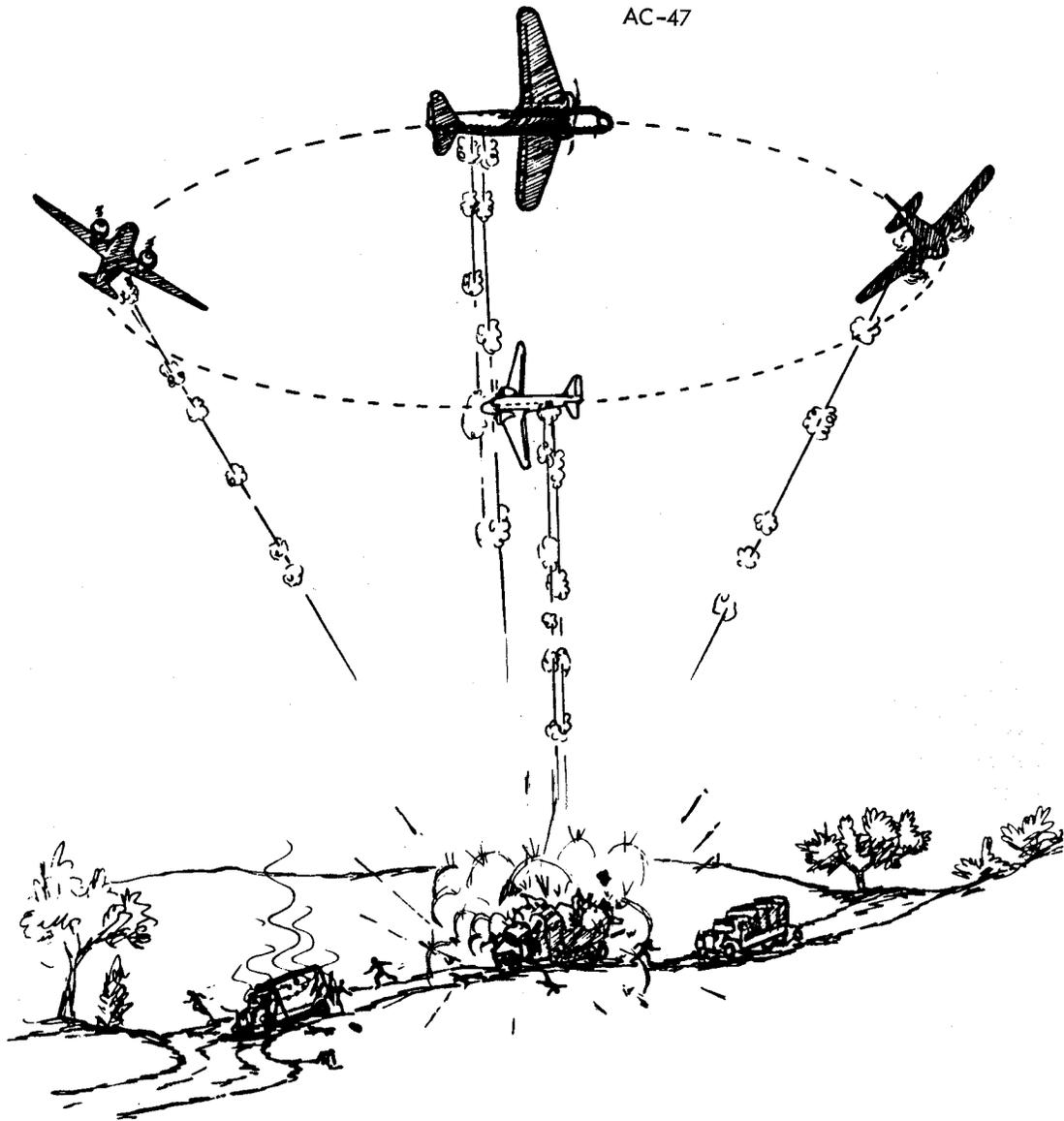


Fig. 2 (U)

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the U.S. Army had used such tests to support its case on service roles and missions. Nevertheless, the gunship needed some kind of combat trial to prove its validity. The Air Staff therefore steered a middle course by considering the gunship a "unique" R&D item to be closely controlled as to roles and missions controversies.<sup>59</sup> It told MACV that interest in the gunship test was primarily on "operational use of this equipment in RVN [Republic of Vietnam] rather than a test of the equipment."<sup>60</sup> Walking this fine line between operational and hardware evaluation would not be easy.

(S) Meanwhile, Gen. Walter C. Sweeney, Jr., TAC Commander, doubted that the gunship could survive the gunfire expected in Vietnam and fulfill its mission. He flatly said, "This concept will place a highly vulnerable aircraft in a battlefield environment in which I believe the results will not compensate for the losses of Air Force personnel and aircraft." He further saw a successful gunship test weakening the Air Force in its battle with the Army over use of helicopters in offensive fire-support missions. Conceivably, it might encourage the Army to use transports in a ground-support role. What's more, if the gunship was made a permanent weapon system, its use might be "disastrous in some future conflict." [He seemingly had in mind a more conventional war such as a NATO\*Soviet conflict on the Great Plain of Europe.] General Sweeney could only conclude: "...we should continue to vigorously oppose the offensive. . . employment of all such highly vulnerable aircraft."<sup>61</sup> His criticism presaged an enduring opposition among many people in TAC. Significantly, TAC was the command charged with employing the gunship!

(S) The Air Force Chief of Staff rejected the TAC Commander's position on gunships. Gen. John P. McConnell, Vice Chief of Staff, explained the USAF position to General Sweeney. He pointed out that the side-firing C-47 was to be evaluated for specific counter-insurgency missions, and it gave every appearance of being well-suited for the Southeast Asian environment. He accented the gunship's anticipated role of defending hamlets and outposts under night attack. Thus he indirectly fingered an alarming weakness in tactical air, i.e., night operations capabilities and strike aircraft responsiveness. There were too few strike aircraft for airborne alert. Furthermore, those on ground alert could not react quickly

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\*North Atlantic Treaty Organization.

enough to prevent the enemy from overrunning outposts and villages. At least the armed C-47 might be able to hold off the enemy until strike aircraft arrived. General McConnell admitted the survivability problem of transport aircraft but deemed it most desirable to test the concept in counterinsurgency situations.<sup>62</sup>

(S) The test team headed by Captain Terry arrived in South Vietnam on 2 December 1964. Gun kits for modifying two C-47's, gunsights, and ammunition arrived on 9 December.<sup>63</sup> Bien Hoa Air Base, near Saigon, became the staging base as it was the center of C-47 operations. As personnel and equipment arrived, the whole operation fell under the supervision of the Joint Research and Test Activity (JRATA).<sup>64</sup> In quick order the team installed the gunsight (a converted 16-mm camera reflex viewfinder with crosshair reticle),<sup>65</sup> guns, and other ancillary equipment in C-47's made available.<sup>66</sup> The team had modified the first aircraft by 11 December, the second by 15 December, but did not modify the third because two guns had failed during early operation of the first aircraft.<sup>67</sup> A simple reliable manually-operated flare dispenser for night tests was installed in the cargo-compartment door. These modified aircraft were first known officially as FC-47's due to their tactical role and for want of a better designation.<sup>68</sup>

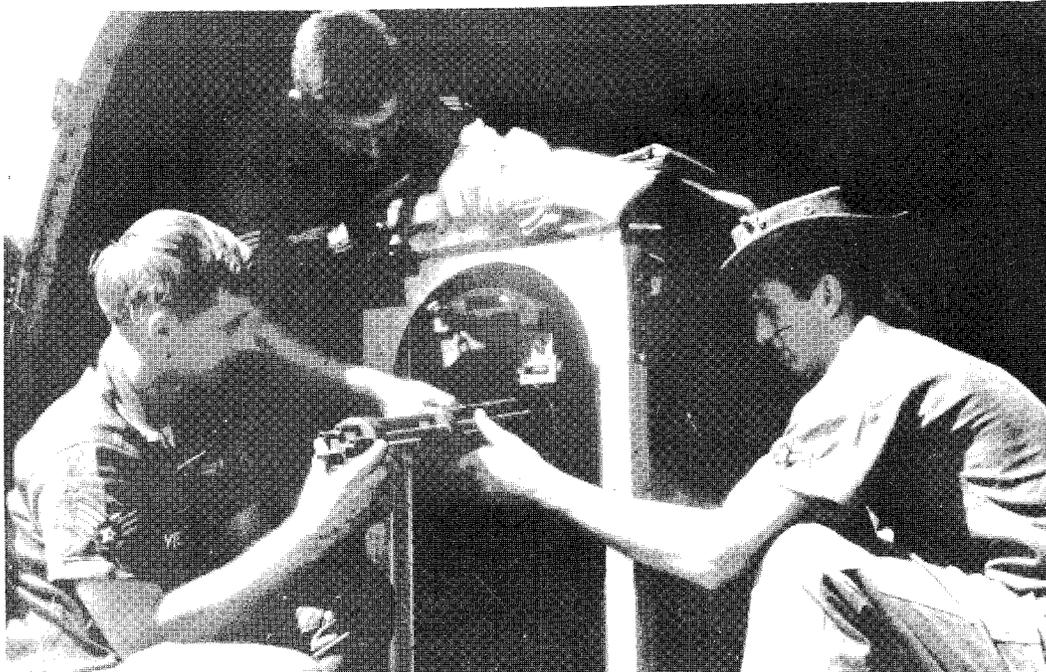
(U) Captain Terry set about introducing the gunship concept to the C-47 crews assigned to the project from the 1st Air Commando Squadron.<sup>69</sup> He especially stressed boresighting the mini-guns because firing was anticipated near friendly troops. Rough boresighting was done by depressing the guns about 10° and aiming at a target some 2,500 feet away. For inflight boresighting the pilot flew a 20° bank at 2,000 feet above mean sea level (MSL)<sup>+</sup> around a Mk-6 flare dropped in the sea. After making an approximate mil ‡ setting in the gunsight he flew parallel to the direction of the flare's smoke. While in the 20° bank he kept the gunsight

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\*In February 1964 the JCS ordered all Vietnam research and test agencies combined in one command. COMUSMACV therefore established JRATA on 23 April 1964 consisting of representatives from the U.S. Army, the Air Force, and OSD/Advanced Research Project Agency (ARPA). The Commander, JRATA, advised COMUSMACV on research development, testing, and evaluation.

<sup>+</sup>The average height of the surface of the sea for all stages of the tide; used as a reference for elevation.

<sup>‡</sup>A mil is 1/6400 of 360°.

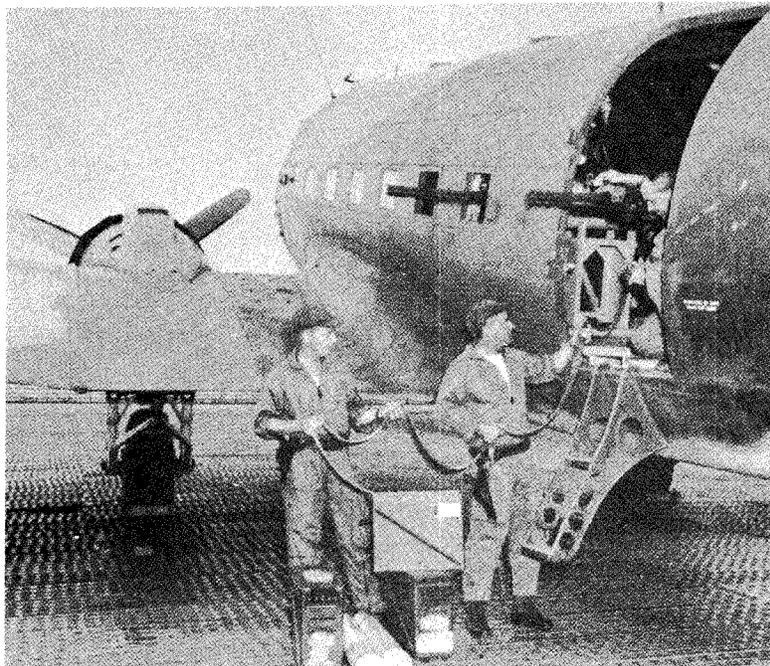


Installing Minigun in AC-47



Members of the First AC-47 Team

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Airmen load ammunition into an AC-130<sup>47</sup>

pipper on the head of the smoke and fired a 3-second burst from one gun--watching with the other observers the rounds kick up the water. Next he executed upwind and downwind passes to negate wind effect then adjusted the gunsight for windage.<sup>70</sup>

(U) The pilot also made checks for proper elevation, using the mil setting determined for one gun to adjust the other guns. This setting was valid for only a single given slant range. An altitude/angle-of-bank relationship had to be established for computing settings of other slant ranges. As a rule of thumb, compensation for range was set at about 10 mils for each 500 feet of altitude. In sum, these boresighting tests produced mil settings accurate enough for tactical use. Above 2,500 feet, however, observers could scarcely see the rounds hit the water unless weather and sea conditions were excellent. The basic mil setting for each aircraft was posted near the gunsight but most pilots had no trouble remembering it under battle stress. Finally, to keep things simple and insure firing accuracy, a decision was made to fly firing passes at a constant altitude.<sup>71</sup>

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(U) Additionally, Captain Terry used these overwater flights to teach the C-47 pilots how to acquire a target (the Mk-6 flare) and roll in on it and fire. Approaching the target area the pilot would position the FC-47 to keep the target off the left wing, banking the instant it passed under the left-engine nacelle. This dropped the left wing and permitted the gunsight piper to pick up the target. There followed just a few seconds of tracking before the pilot fired a 3- to 5-second burst while in the pylon turn. Most firing passes were made at 3,000 feet, a slant range of 5,000 feet, and airspeed of about 120 knots. During the tracking/firing pass, the copilot warned the pilot if he was exceeding any of these established limits. If so, the pass would be discontinued at once. The training progressed smoothly. After a few flights, the C-47 pilots mastered the proper angle of bank and other maneuvers involved in attacking a target with a side-armed aircraft.<sup>72</sup>

(U) The FC-47 carried a crew of seven USAF personnel plus one Vietnam Air Force (VNAF) observer. The pilot (aircraft commander) fired the guns while controlling the aircraft as the copilot monitored instruments and coordinated crew activities. A flight mechanic monitored operation of various aircraft systems. The navigator checked the aircraft's position, and in the target area worked with the VNAF observer to verify target information and establish liaison with ground forces. Two gunners were assigned to pre-flight, load, and troubleshoot inflight operation of the miniguns. A loadmaster armed and dropped flares from the rear cargo door.<sup>73</sup> Additional observers frequently accompanied this normal crew complement during the test and evaluation period.

(S) The FC-47 flew the first of several day combat missions on 15 December 1964.<sup>74</sup> On this sortie Captain Terry and the crew worked with a FAC, seeking targets of opportunity and trying to become familiar with counterinsurgency operations and theater rules of engagement.<sup>\*75</sup> The gunship fired accurately on enemy sampans, buildings, trails, and suspected jungle staging areas. The afternoon of 21 December, a FAC called on the FC-47 to attack a large structure into which 14 Vietcong had reportedly run. Shortly after the strike, friendly forces found the building "looking like a sieve" and 21 bodies scattered about.<sup>76</sup>

(S) The FC-47's first night mission on 23/24 December went equally well. While on airborne alert, the gunship was directed

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\*Directives delineating the circumstances and limitations under which U.S. forces will begin and/or continue combat engagement with other forces.

## PROCEDURE TO DECREASE LATERAL DISTANCE TO TARGET

PILOT DISCOVERS HE IS TOO FAR OUT FROM THE TARGET, IMMEDIATELY STEEPENS BANK TO 45° TO 50° AND CUTS INSIDE PRESENT CIRCLE.

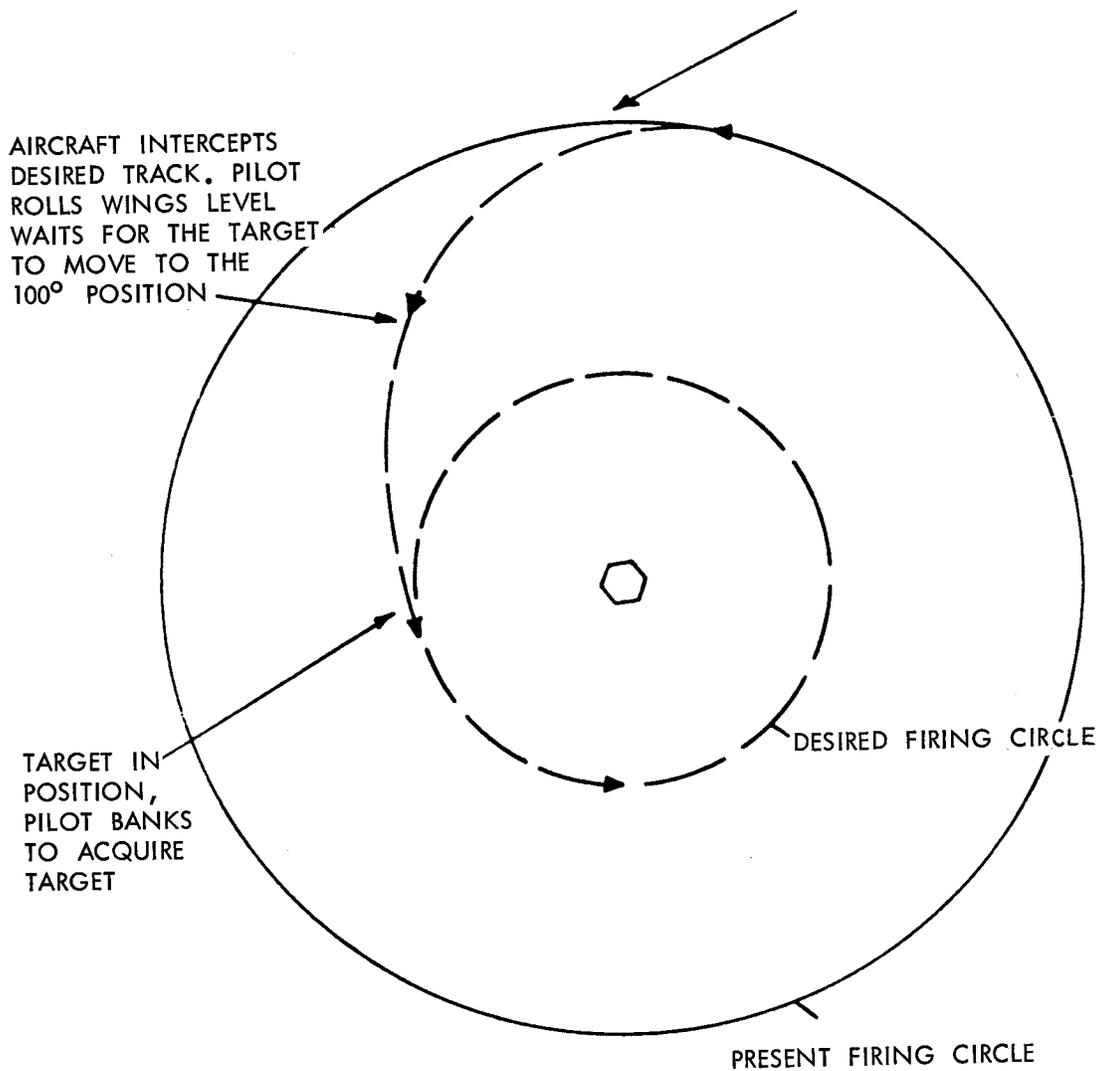


Fig. 3 (U)

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## PROCEDURE TO INCREASE LATERAL DISTANCE TO TARGET

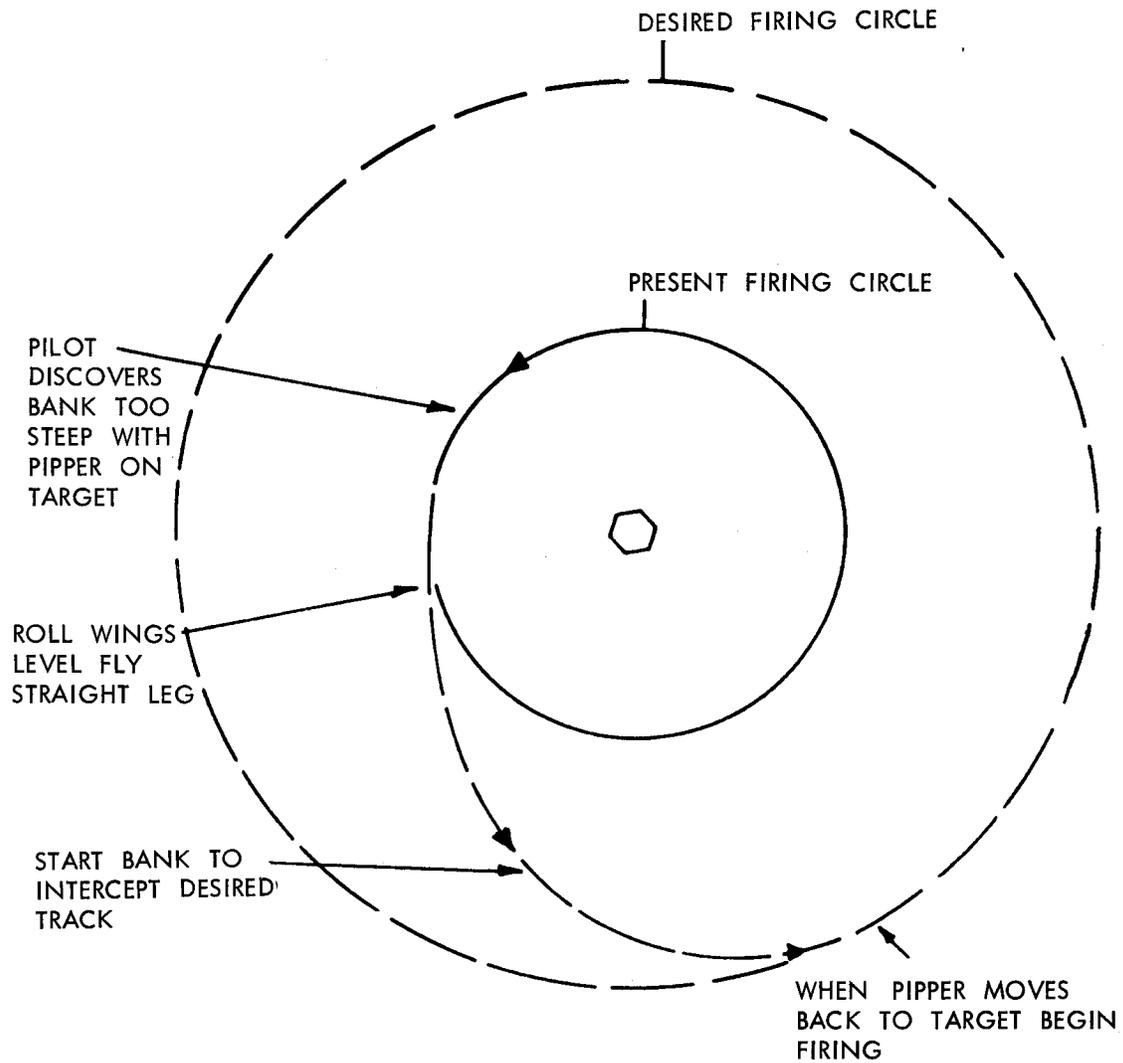


Fig. 4 (U)

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at 2237 to go to Thanh Yend (west of Can Tho in the Mekong River Delta area), where the Vietcong had the outpost under heavy attack. Arriving at 2312, the FC-47 dropped 17 flares and expended 4,500 rounds of 7.62 ammunition. The outpost defenders reported the Vietcong broke off their assault. Next the aircraft was diverted at 0020 to aid Trung Hung outpost 20 miles farther west. A VNAF C-47 had already dropped 70 flares over the area but the Vietcong continued their onslaught. At 0040 the gunship started operations using 8 flares and 4,500 rounds of ammunition. Trung Hung defenders announced the Vietcong offensive ceased with the first burst of fire from the skies.<sup>77</sup> This performance marked the FC-47 as a night operator. As Captain Terry put it, saving forts or hamlets at night "was the only thing we ever got to do."<sup>78</sup>

(S) The sudden significance of the gunship's night role was easy to understand. Since 1963, night attacks on South Vietnam outposts and hamlets had soared alarmingly. During the first half of 1964 these assaults spotlighted the need for a much greater night air effort. At stake was the entire RVN pacification program, as the Vietcong under the cover of darkness assaulted and overran forts and strategic hamlets in government-designated "safe areas." Continued enemy successes would lay bare the RVN's incapability to protect these villages and outposts and effectively stifle its attempts to re-establish control over vast areas.<sup>79</sup>

(S) June 1963 saw a sharp upswing in USAF night flare and strike-support missions.<sup>80</sup> By September C-123's had joined VNAF flare-ships on airborne alert.<sup>81</sup> No longer did the mere dispensing of flares from a C-47 or C-123 intimidate the enemy in night attacks.<sup>82</sup> Now the Vietcong adopted more aggressive tactics. When the flare-ship (or attack aircraft) arrived, they stopped the attack only to renew it when the plane left. After these softening-up forays, the fort or village would be overrun.<sup>83</sup> Small wonder the Air Force hurried the gunship into night operations, putting it on airborne alert to compensate for its slow reaction speed and to enlarge its coverage. By 26 December 1964--11 days after its first combat mission--the gunship had flown 7 training and 16 combat sorties, expending 179,710 rounds and experiencing 33 malfunctions.<sup>84</sup>

(C) Brig. Gen. John K. Boles, Jr., USA, Director of JRATA, flew as observer on the gunship night mission of 28 December. Captain Terry piloted the FC-47 to Ngai Giao, a district capital 37 miles from Bien Hoa. The Vietcong were attacking the town and its fort. Arriving over the area at 2030, the aircraft found each corner

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of the small triangular fort outlined with flarepots and designated by a fire arrow.\* The gunship dropped Mk-6 flares and swept the embattled fort's perimeter with gunfire. To prolong support Captain Terry fired the guns singly. Over 1 hour and 21 minutes 18 flares were dropped and 7,000 rounds fired--the miniguns being reloaded once.<sup>85</sup> Vietcong tracer fire failed to hit the gunship. General Boles noted: "At the end of the mission the personnel at the post reported that due to the air support, the VC attack had<sup>86</sup> been broken off and they were extremely grateful for this support. As the aircraft departed Ngai Giao for its orbiting station over Saigon, the crew reloaded the guns. At about 2230 the FC-47 was directed to support another outpost, but the Vietcong ended the assault before the aircraft could fire a shot. At 2400 this airborne alert mission ended. It had demonstrated once more the gunship's unique capability in night operations.

(S) A still more dramatic demonstration of gunship power unfolded on the night of 8 February 1965. The aircraft was sent to the Bong Son area to help blunt a Vietcong offensive in the Vietnamese highlands. From 1850 to 2310 the miniguns blazed, pouring 20,500 rounds onto a hilltop where the enemy had dug in. This strike killed about 300 Vietcong.<sup>+87</sup>

(C) Gunship techniques were essentially the same in day and night operations with adjustments to accommodate flares. Few targets, for example, required a lateral pass (flying parallel to a target). Hence the pilot attacked in a pylon turn and returned to "his most advantageous flare drop position in a minimum of time."<sup>88</sup> Nonetheless, night operations did disclose problems. General Boles highlighted one--dropped flares started fires in woods, rice stacks, or houses. He cited the Ngai Giao support mission with six or eight confusing fires started near flare markers on the corners of the fort. This made it difficult for the gunship crew to find the fort as operations progressed, and location might have become impossible

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\*The fire arrow could be made of many materials; metal gas cans filled with gasoline-soaked sand were often used. Ignited, it was easy to see at night. Hamlet defenders relayed to strike aircraft the enemy's position with reference to the fire arrow.

<sup>†</sup>Operations of the gunship test and evaluation stayed classified until the 4th Air Commando Squadron deployed to South Vietnam on 22 November 1965. Nevertheless, an Associated Press correspondent saw the FC-47 in January 1965 and reported some information. [Hist (U), USAFSAWC, 1 Jul-31 Dec 65, p 15.]

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had one of the fort's corner flares burned out. General Boles suggested that TIARA\* replace flares for marking enemy targets and use of an airborne floodlight be considered.<sup>89</sup>

(U) In response to General Boles' suggestion, the Air Force fix-mounted a large searchlight in the doorway of an unarmed C-47 and tested it. From the normal operating altitude of 3,000 feet above ground level (AGL), the searchlight's intensity was too weak on the ground for easy target identification. With the C-47 simulating the gunship, tests showed the searchlight when fixed-mounted for level flight lost effectiveness as the plane banked to fire. If aligned with the gunsight, it likewise detected few targets. Seemingly, the best answer would be to install an improved lighting system in a separate aircraft that would work with the gunship.<sup>90</sup>

(U) As the Air Force sought an effective airborne lighting system, the gunship relied on flares for illumination. The most commonly used flare, the Mk-24 Mod 3, could illuminate an area with 2-million candlepower for 3 minutes. The Mk-24 would not complete air burnout if released below 2,500 feet AGL. Most crews therefore dropped it at 3,000 feet AGL on a crosswind heading upwind from the suspected target. After flaredrop the pilot held the same heading for 15 seconds, meanwhile trying to avoid having the gunship illuminated with its own flares and attracting ground fire. This interval also gave the flares time to ignite and permitted the pilot to survey the area before executing a pylon turn and acquiring the target. An attack technique evolved whereby the pilot would dip the left wing, fire, level out, dip the left wing again, fire, and level out again. After two to four firings and 2 1/2-3 minutes, the pilot would have returned to the original flaredrop position. Then by dropping more flares, constant illumination could be maintained over the target area. At times the flares alone discouraged enemy night attacks or halted those in progress.<sup>91</sup>

(U) Two or three flights were usually required to check out the pilot and other gunship crewmembers in combined flare and firing operations. This presupposed, however, a crew experienced

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\*Nickname for a chemi-luminescent material which the Army tested for possible use in bombs or mortar projectiles. When released in the air, TIARA glowed rather than flamed and gave off little light. It worked poorly in humid and hot weather. For these reasons the Army did not put TIARA in bombs or other projectiles.

in day-firing and night flaredrops. The dive, bank, and climbing-turn maneuver was quickly discarded as too complex and not needed. Its varying airspeed and angle of bank proved far more dangerous at night than the pylon turn and hampered target acquisition and firing accuracy as well.<sup>92</sup> Most of these gunship test missions were flown over the flat Mekong River Delta area where terrain problems were few.<sup>93</sup>

(U) The gunship fired tracer ammunition on night missions to see where the minigun rounds were hitting. The gun's rapid fire appeared as tongues of flame spewing from the black sky accompanied by a distinctive sound. An impressive sight, it boosted the morale of fort and hamlet defenders but terrorized the enemy. It didn't take long for the FC-47 to earn the nicknames of "Puff the Magic Dragon"\* and "dragonship."

(C) FC-47 missions--particularly night ones--highlighted the language difficulties and equipment problems in air-to-ground communication. Adequate communication was crucial to precision firing during close support of a besieged post. Few American advisors were in the many forts and villages. Most contact was therefore with Vietnamese and the gunship carried a Vietnam observer to facilitate conversations. The navigator's task was determining what support the ground personnel needed. To eliminate confusion this sometimes involved a painstaking exchange of notes with the observer. On one night mission Captain Terry received orders to attack to the north of the fort under assault. In the flarelight he saw what appeared to be another fort north of the one being supported. He requested confirmation of the direction and was told it was to the south he was to attack.<sup>94</sup> General Boles considered the Ngai Giao mission of 28 December "quite successful in that the communications worked fine and the man on the ground was able to speak and be understood by us and by our Vietnamese Air Force Officer aboard." Nevertheless, the General noted that inadequate communication was a common deficiency.<sup>95</sup>

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\*Stories differ on the nickname's origin. Captain Terry believed it derived from a mix of 1964 being the Chinese Year of the Dragon, stories from captured enemy prisoners about tongues of fire from the gunship, and recollections of the fairy tale, Puff the Magic Dragon. Others trace its origin to the child's song, popular in late 1964, regarding a magic dragon.

(S) Additionally, the gunship test accented the difficulty of bomb damage assessment (BDA)\*--a problem common to all combat air operations in South Vietnam. Ground teams frequently found it too risky to penetrate enemy territory and assess results of a FC-47 attack. Furthermore, the Vietcong carefully removed their casualties under cover of darkness. Having no BDA capability of their own, the gunship crew turned to the man on the ground who had to report what had happened. Playback on the aircraft's tape recorder produced little more than "number one"; "more, more, same thing"; "good shooting"; until that sure indicator of success "OK enemy go away now" was heard. Added to this was a trickle of intelligence on some strikes that filtered to the test team via American advisors. Despite this dearth of BDA detail, the gunship attacks did keep forts and villages out of enemy hands.<sup>96</sup> General McConnell and other top Air Staff members had followed the combat test with intense interest. Even without the specifics, they warmly greeted the FC-47's tactical success and foresaw its efficiency in outpost defense freeing fighters from some night commitments.<sup>97</sup>

(S) The SUU-11A 7.62-mm gunpod (the minigun) was a key component of the test gunship and its performance received close evaluation in combat operations. The final evaluation report on the SUU-11A was not published until February 1965. But in late January, Headquarters PACAF notified Air Force Headquarters it had ample information and could project the number of pods needed for future operations. It said the tests had shown the pod "easy to load, maintain, and capable of quick turn-around." The malfunction rate was low and the maintenance personnel needed no extensive special training. PACAF concluded that "A high degree of accuracy and reliability has been demonstrated," making the minigun an effective weapon for both day and night missions in Vietnam.<sup>†</sup> It requested 126 pods to equip up to 50 aircraft.<sup>98</sup> The Air Staff had been pressing for this SUU-11A figure because of an established 1-year lead time for procurement.<sup>99</sup> It notified PACAF a few days later that procurement action was under way, with a \$4.3 million authorization in Fiscal Year 1965 funds for the first 82 pods.<sup>100</sup>

(S) The Air Force test team's final report considered the minigun an excellent weapon for the side-firing aircraft but not

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\*Used generically. Obviously, the gunship did not carry bombs.

<sup>†</sup>Later experiment with the 7.62-mm guns revealed they were excellent against unprotected personnel but ineffective against troops in bunkers or fortifications. The guns likewise proved inadequate against trucks--particularly those sandbagged or carrying bags of rice.

entirely trouble-free. At times the locking lug on the GAU-2/A gun rotor service would break. This allowed the gun to overspeed because no provisions were incorporated to interrupt power when all ammunition had been expended. Life of the gun was thereby reduced. There was a further need for greater cooling of the gun. The report recommended modifications to correct these deficiencies and develop a more compact and accessible pod.<sup>101</sup>\*

(C) While the combat tests failed to silence critics who deemed the gunship vulnerable to ground fire, they did demonstrate the FC-47's capability to operate in South Vietnam at the 1965 counter-insurgency level. During the missions the aircraft met with small-arms fire--mostly .30-caliber--but took few hits. Due to the gunship's orbiting altitude most of the rounds arrived nearly spent. In one case a round penetrated the cabin, hit the navigator in the heel, but caused no injury.<sup>102</sup> Such incidents were enough, however, to generate recommendations for armor to protect the FC-47 during close-range strike operations. The test team's report concluded that the gunship could hit the majority of targets yet be relatively invulnerable to ground fire.<sup>103</sup>

(S) Commanders found it unnecessary to await completion of the combat evaluation before charting the gunship's future course. Interim test results so intrigued General Moore, 2d Air Division Commander, that he asked for a squadron of FC-47's as quickly as possible.<sup>104</sup> On 23 February 1965 General Ferguson, then serving as Commander, AFSC, strongly seconded the request to Headquarters USAF. He noted that

...the reports which have been received indicate spectacular success in killing Viet Cong and in stopping attacks together with concurrent great psychological factor way out of proportion to effectiveness of other aircraft strike efforts and ground force efforts.<sup>105</sup>

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\*"GAU-2/A" referred to the 7.62-mm minigun that could fire 6,000 rounds-per-minute with a muzzle velocity of 2,750 feet-per-second. The gun with accessories and mounting comprised the SUU-11A pod. [In-Country and Out-Country Strike Operations in Southeast Asia, 1 Jan 65-31 Dec 69 (S), DCS/Ops, PACAF, Nov 1970, II, 51.] Capt. Joseph Yarrish, 2d Air Division Avionics Officer, flew on 12 FC-47 missions and saw 1 gun barrel explode during firing. A ballistics cloth shielded the gunners from injury. [End of Tour Report (S), Capt Joseph Yarrish, 2d Air Div, 1 Mar 65.]

Ferguson urged prompt production of gunpods and planning for conversion of a better transport aircraft to a gunship. He called for a "highest Air Force and DOD level" review, so that every possible channel can be cut in producing this capability that is needed.<sup>106</sup>

On 2 March the Air Staff requested the PACAF Commander's requirement for gunships, stressing the special significance of the associated minigun requirement.<sup>107</sup> Study on the type and extent of the gunship force had begun.

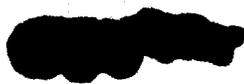
(S) The Air Force test team's report noted the FC-47's size kept it from realizing its full potential in night strike operations. For future gunships, the report recommended an aircraft having more cargo compartment space and greater payload.<sup>\*108</sup> A PACAF capabilities study of 12 March 1965 suggested the Air Force use the C-131 (or its T-29 counterpart) as the gunship airframe and that a squadron of 16 aircraft be deployed to South Vietnam. On 20 March the PACAF commander proposed Headquarters USAF adopt the C-131 for its advantages of speed and double-payload over the aging C-47.<sup>109</sup> After reviewing the test team's and PACAF's recommendations, the Air Staff ordered a feasibility study on 20 April to weigh them against the availability of aircraft.<sup>110</sup> On 12 May the Air Staff decided to utilize the C-47 as the gunship for Southeast Asia.<sup>111</sup> No serious questions were raised regarding the suggested size of the gunship force.

(S) On 18 June PACAF formally proposed a 16-plane FC-47 squadron to Headquarters USAF. Foreseeing difficulties in GAU-2/A minigun production, the proposal specified four C-47's should be modified with .30-caliber machineguns at once. The 12 minigun-equipped aircraft were to follow as soon as possible. When their supply permitted, miniguns would replace the interim .30-caliber guns. Aircraft, aircrew, support personnel, and equipment were to be provided in one package from outside PACAF. Of the 329 personnel (79 officers and 250 airmen) projected, about one-fourth had to be in place for the first 4 gunships. Upon Air Staff approval of this proposal, PACAF would seek CINCPAC and COMUSMACV concurrence in the deployment.<sup>112</sup> On 13 July 1965 Headquarters USAF directed the deployment of a gunship squadron to South Vietnam, the move to be completed by 9 November.<sup>113</sup>

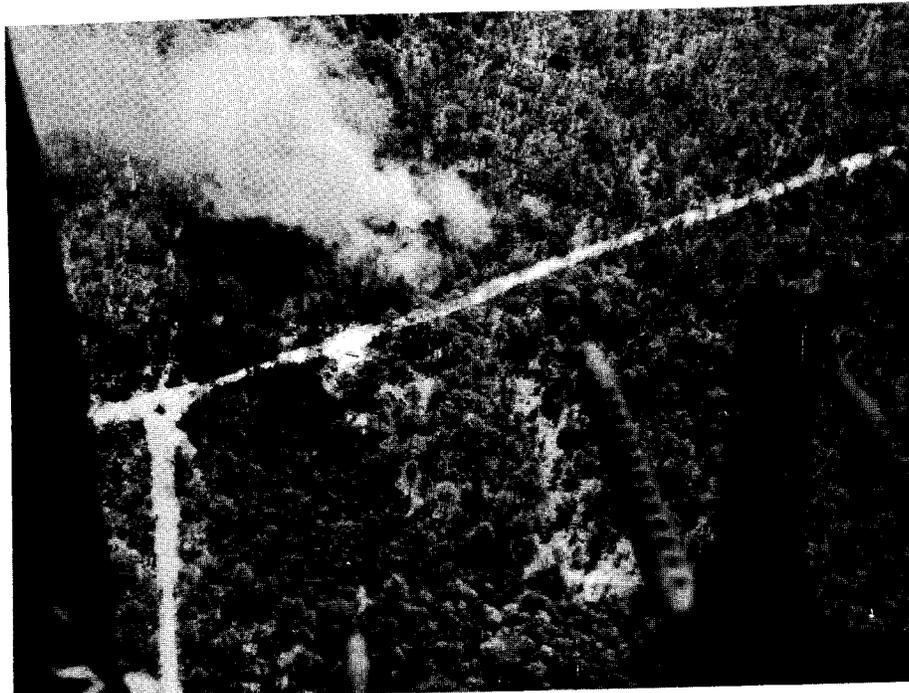
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\*The sum of the weight of the passengers and cargo that an aircraft can carry.

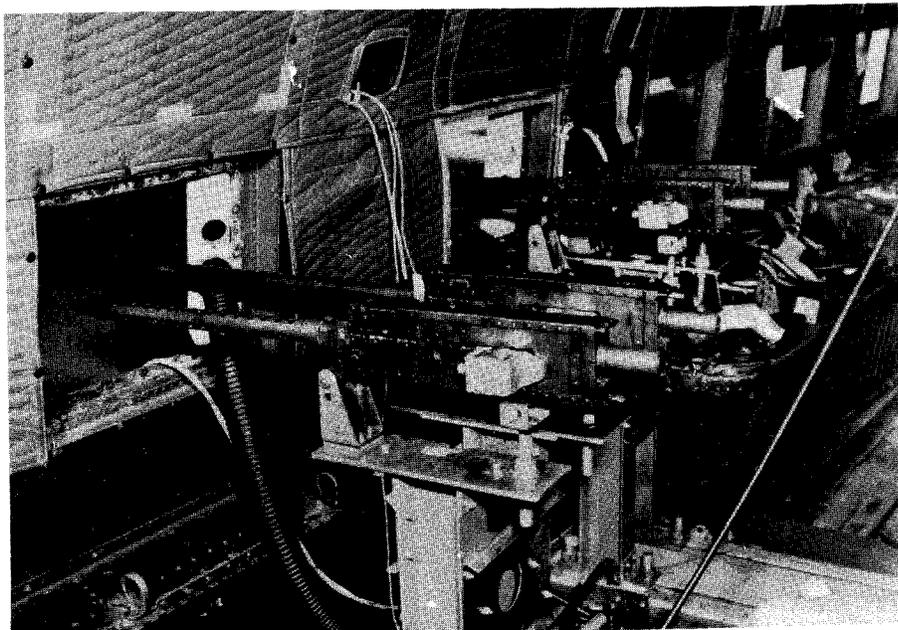
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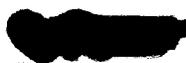


Machinegun Equipped Gunship Tracking Target



Machinegun (.30 caliber) Equipped Gunship

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(S) After the Air Force completed FC-47 combat testing\* and the study of a future gunship force, many essential items had fallen in place. Operational tactics had been defined, problem areas pinpointed, the need for the gunship capability established, available airframes and equipment determined (the minigun remaining a trouble spot), and the first gunship squadron ordered deployed. A new weapon system moved into the USAF inventory.<sup>114</sup>

(U) In retrospect, several significant points of the gunship's early history stand out. One threading through the entire story of gunship development is the part played by improvisation. Captain Simons first tested the concept in the old T-28 and later in the C-131. Combat evaluation took place in the C-47, one of the oldest planes in the Air Force. A camera viewfinder served as the gun-sight. The miniguns, although new, just happened to be available at Eglin AFB where the gunship tests were held. Assembling gunship components was largely a matter of tapping local shop resources and ingenuity. Improvisations seemed endless and contrasted sharply with the long slow stages of engineering, test, and manufacturing required for most modern weapon systems. Likewise, the gunship tactic of side-firing from the pylon turn synthesized old aerial maneuvers and weaponry ideas. This make-do-with-what-you've got attitude gave the gunship system rare economy and availability that would continue to spur its future evolution and sophisticated development.

(U) A related salient factor was the tortuous path the side-firing concept traveled before being accepted as a valid basis for a combat weapon. At several critical junctures the proposal almost died. It faced bureaucratic oblivion, burial in government files, rejection by ballistic experts, plus the usual delaying problems of time, manpower, and money. Some critics doubted an aircraft employing the concept could survive in combat and some believed the idea violated Air Force doctrine.<sup>+</sup> Only the dogged persistence of key individuals enabled the concept to emerge from such a deadly thicket.

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\*Thirty-three missions were flown.

<sup>+</sup>General Sweeney, for example, said the concept was counter to Air Force doctrine.

(U) The role of four imaginative and determined men was outstanding. Most Air Force developments involve team effort with credit for improvements and changes broadly shared. The gunship was no exception. Nevertheless, in evaluating the gunship's origin, one is soon struck with the singular results produced by MacDonald, Flexman, Simons, and Terry. Each of these men focused on problems of counterinsurgency warfare. Each studied the Vietnam War with intense interest and saw new combat challenges. Each pushed the gunship concept to help meet counterinsurgency requirements after he discovered that current Air Force aircraft, tactics, and weapons could not. MacDonald's inventive mind seized upon the old pylon turn, merged it with a laterally-fired weapon, and introduced a new concept. Flexman pursued and transmitted the idea, stressing all the while its value in the Vietnam War. A pilot in three wars, Simons recognized the problems in placing munitions on targets with the preciseness called for in guerrilla warfare. Since the side-firing aircraft could help attain this accuracy, Simons refused to let the idea die. On his Southeast Asian trip in 1963, Terry learned firsthand what was needed to deal with attacks of insurgents. He therefore felt the concept had to be tried. In the tenacious attack on the problems at hand, each of the four men served in a distinctive yet overlapping role. MacDonald can be tabbed the "originator," Flexman the "catalyst," Simons the "tester," and Terry the "seller." Their evolutionary efforts combined to create what was probably the most unique weapon system employed in Southeast Asia--the gunship.

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## II. GUNSHIP I (AC-47)

(U) The selection of the C-47 as the first USAF gunship put the new 7.62-mm minigun into one of Air Force's oldest operational aircraft. In fact, it was not unusual for gunship crew members to discover their aircraft had been built before they were born. The first flight of the Douglas Aircraft DC-3--the C-47 in military guise--took place on 18 December 1935, and only a few years thereafter it became the most widely used transport in the world. The armed forces ultimately received 10,123 production models, most of them during World War II.<sup>1</sup> Despite its age and apparent obsolescence, the aircraft's great versatility, reliability, and all-round ruggedness kept it in use. These characteristics prompted the Air Force to rely heavily upon it during the Korean war and to deploy it to Vietnam during the escalating counterinsurgency warfare of 1961.<sup>2</sup>

(U) The first USAF commitment of four C-47's occurred with the arrival of the Farm Gate detachment\* in November 1961. By this time the South Vietnamese already had two squadrons of U.S.-supplied aircraft and were using them in a variety of roles. Both USAF and South Vietnamese C-47's flew extensive airdrop, medical evacuation, and transport-type missions. Gradually they moved into flareship operations in support of besieged hamlets and forts. In late 1965 the deployment of the first squadron of gunship-configured C-47's added still another operational<sup>+</sup> dimension. These armed C-47's began one more chapter<sup>+</sup> in the illustrious and seemingly endless history of the old Gooney Bird.

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\*Detachment 2, 4400th Combat Crew Training Squadron, Tactical Air Command.

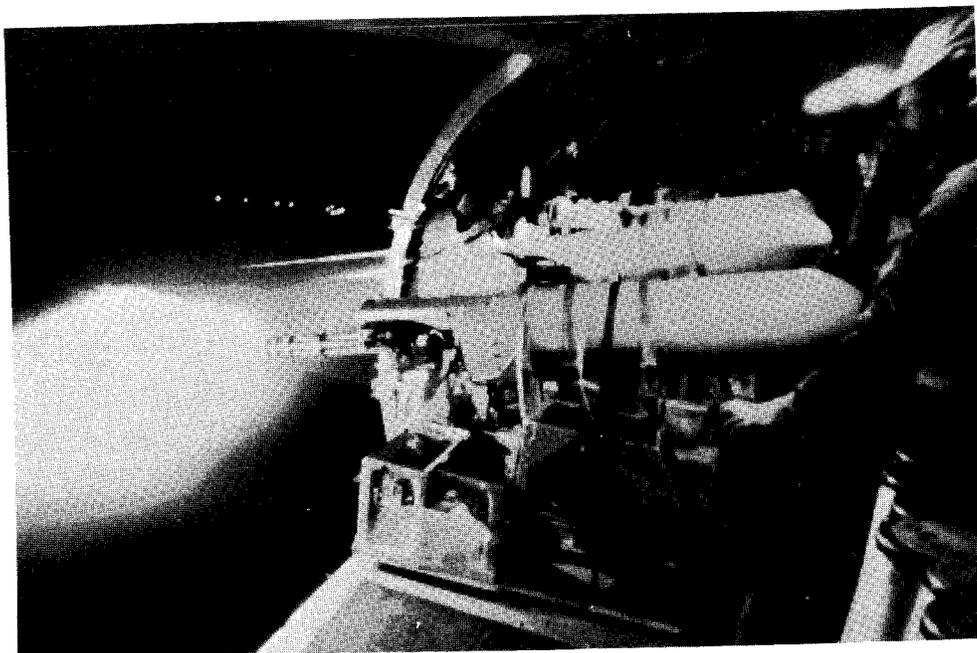
<sup>+</sup>Among the articles on the C-47's employment in counterinsurgency situations are: Major George T. Deken, "Adaptable 'Birds' for Counterinsurgency," TAC Air Warfare Center Quarterly Report, II (Sep 1970); J.L. Cole, "An Old Airplane in a New War," Aerospace Historian, 18 (Summer, 1971); Robert R. Rodwell, "A Night with Spooky," Flight International LXXXXXI (Jan 1967); "Vignettes from Vietnam," The Airman, XI (Jun 1967); and Lt Col Ross E. Hamlin, "Side-Firing Weapon Systems: A New Application of an Old Concept," Air University Review, XXI (Jan-Feb 1970).

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Early Gunship Operations

(S) One FC-47 continued operations in Vietnam after the Air Force test team completed its work and returned to the United States. This gunship was soon pressed into service to counter a serious enemy threat to cut Vietnam in half through the highlands. Gen. William C. Westmoreland, Commander, MACV, ordered all-out air support for a large-scale troop deployment to block the enemy push. During this operation the FC-47 flew two interdiction strikes between 1850-2310 on the night of 8 February 1965. It fired 20,500 rounds of 7.62-mm ammunition and ground observers reported 100 Vietcong killed by strikes. On the afternoon of the 8th the Vietcong captured a sergeant of the Army of the Republic of Vietnam (ARVN). After the gunship attacks, the sergeant escaped and told of helping carry away 80-90 enemy bodies of the 250 he believed had been killed. He cited the confusion of enemy troops as to the source of the firepower. Some thought they had been hit by a heavy ground attack, while others thought it was a new gun of some kind. An impressed U. S. Army advisor in the II Corps area requested the FC-47 be permanently committed to support operations there.<sup>3</sup>



7.62-mm Gun Pods

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(U) Other C-47's were available for possible gunship missions in various parts of Vietnam, but the limiting factor was the shortage of guns, particularly replacement gun barrels. Captain Terry felt interim weapons might be used and began scouting the USAF inventory to see what might be available. At McClellan AFB, Calif., he found some old World War II .30-caliber machine-guns about to be salvaged. A personal appeal to Gen. Mark E. Bradley, Jr., Commander, Air Force Logistics Command (AFLC), resulted in all .30-caliber assets being allocated for the gunships. Captain Terry and other members of an AFSC team designed a kit using 10 of the .30-caliber guns. The team flew to Vietnam and by June 1965 had modified four more C-47's with this interim arsenal. The machine gun-equipped aircraft proved successful but the guns wore out rapidly. Nonetheless, the 300 guns, extra barrels, and spare parts kept the aircraft going until the arrival of the first gunship squadron.<sup>4</sup>

#### Readying the Gunship Squadron

(U) A number of steps, preliminary to a gunship squadron deployment, began soon after the first FC-47's combat success. As previously noted, Headquarters USAF weighed proposals for utilizing other aircraft for the gunship role but elected to go with the C-47, largely on the basis of its availability. Hence the Air Staff directed AFLC in May 1965 to prepare a feasibility study on installation of GAU-2/A guns\* in 20 C-47's. Warner Robins Air Materiel Area (WRAMA) completed the study on 2 July 1965 and submitted it to AFLC and Air Force Headquarters for review.<sup>5</sup> The Air Staff then asked AFLC and AFSC to coordinate all plans for the aircraft modifications as the gunship squadron moved closer to reality.

(C) Headquarters AFLC assigned modification number 1729, "Install GAU-2/A gun," to the gunship program. WRAMA and ASD worked together on the modification proposal and specified

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\*Previous miniguns in SUU-11 pods had problems with weight, accessibility, and ammunition loading. The new General Electric module with the GAU-2A gun would occupy less space than the SUU-11 pod and have 30 percent fewer parts. Its simpler feed system was expected to extend the barrel life of the guns by about one-third. [AFLC Historical Study 374, AFLC Support of Forces in Southeast Asia: Special Aircraft Projects, 1965-1968 (S-NOFORN) (Hq AFLC, Feb 1971), p 38.]

  
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these items in each aircraft: three GAU-2A miniguns; a gunsight; a ballistic cloth; associated racks, controls, and wiring; communication and navigation equipment.\* Projected cost for modifying 20 aircraft totaled \$4,288,975. This included the new General Electric module, the GAU-2/A gun, and over \$2 million for spare items.<sup>6</sup>

(C) Still another addition to the gunship equipment was a flare launcher. Interest in a flare-launch capability for the gunship had developed almost at the very beginning of the tests at Eglin. The Special Air Warfare Center (SAWC) had asked Headquarters USAF for such capability, and on 13 August 1965 the Air Staff directed flare launchers be installed. WRAMA awarded a contract to the Gary Corporation, San Antonio, Tex., to manufacture the launchers and install an actuator mechanism obtained from Navy excess. Although officials knew these actuators differed from those used at Eglin, they were considered suitable. Tests showed, however, that the slightly faster firing time kicked rather than pushed the flare. WRAMA and SAWC adjusted the actuator mechanisms (called Pogo Sticks) to the original production model configuration. The contractor then completed this further modification by the end of November 1965. By mid-April 1966 SAWC had completed extensive and successful tests of the flare launcher.<sup>7</sup>

(C) During the early planning for the gunship program, the Air Force decided to modify a total of 26 C-47's with a side-firing capability. Sixteen gunships would be assigned to PACAF, 6 to TAC for training purposes, and 4 would be used for command support and attrition.<sup>8</sup> The Joint Chiefs of Staff (JCS) and the Secretary of Defense approved the USAF gunship plans and on 13 July 1965

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\*Communications and navigation equipment included: VHF (very high frequency)/FM (frequency modulation) radio with homing adapter [this equipment was key to close air support since it was compatible with U.S. Army field communications equipment]; a standard USAF VHF (very high frequency)/AM (amplitude modulation) radio; an UHF (ultra high frequency) radio; an interphone system; plus other equipment to provide VOR (very high frequency omnirange), ADF (automatic direction finder), TACAN (tactical air navigation system), ILS (instrument landing system), and IFF (identification, friend or foe). [For meaning of these terms see Glossary.]

the Air Force ordered the squadron deployed to South Vietnam, to arrive there not later than 9 November. On 16 July AFLC set the modification program into motion. All aircraft were to be completed and ready to depart by 7 November.<sup>9</sup>

(C) The early deployment date meant a tight modification schedule. To speed the program, C-47's would be taken from storage--most of them from Davis-Monthan AFB--and modified concurrently with IRAN (inspection and repair as necessary). On 20 July a prototype C-47 would begin IRAN/modification with all other aircraft beginning by 15 August. A 40-day flow time was planned.<sup>10</sup> On 12 August Headquarters USAF amended the modification requirement to include more specifics on electronics equipment.<sup>11</sup> (It allowed acceptable substitute items to prevent any delay in the delivery schedule.) The modification program was assigned a high priority, the contract being let on 28 July 1965.

(U) The program moved along rapidly. All other IRAN inputs were suspended in order to concentrate on the C-47's. Contractor and WRAMA personnel, virtually working as one team, completed the prototype's IRAN/modification on 1 September. Production of the other C-47's started 16 September with the last one finished on 25 October--ahead of the deadline. Twenty of the modified aircraft had been delivered to Forbes AFB, Kans., by 19 October. One week later, the remaining six were sent to Eglin AFB for use in training.<sup>12</sup>

(U) The modification of the C-47's called for three GAU-2B/A gun pods on each aircraft. The Air Force recognized these pods would not likely be available as they were just entering production. It therefore ordered the separately procured SUU-11/A gun pods installed until the GAU-2B/A's arrived.\* Even the supply of SUU-11/A's

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\*MR 1445-1 (FS-1729/C-47) (U), Dir/Opl Rqmts & Dev Plans, Amendment to Modification Requirement for C-47 Aircraft, 12 August 1965. This amendment pointed out "the GAU-2B/A and SUU-11/A pod installations are identical with the exception of the pod mounting frame and the gun module mounting brackets. When the GAU-2B/A with modules becomes available, the pods and mounting frames will be removed in the field and the guns and modules installed." In July 1965 the Air Force considered modification of the SUU-11's pod's 7.62-mm miniguns into the GAU-2B/A module. Four months later it signed a sole-source contract with General Electric to do this work for \$100,000, funded under Project 1559-22. [Study (U), Hq AFSC, Puff, the Magic Dragon, in Doc 108, II, Research and Development Time to Operational Needs in Southeast Asia (U) (ASI, Project Corona Harvest, Aug 1969).]

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however, proved inadequate as the modification progressed.

(S) In line with the C-47 modification effort, Headquarters USAF ordered TAC on 13 July 1965 to organize and train a FC-47 squadron for deployment. Within TAC the SAWC and its 1st Air Commando Wing (ACWg) had the main responsibility for readying the unit.<sup>13</sup> TAC Headquarters requested SAWC to submit an air-crew training schedule, suggest locations for squadron activation and training, and specify help needed beyond SAWC resources. It stipulated that SAWC personnel would support the project, but aircraft and aircrews would come from other Air Force sources.<sup>14</sup>

(S) Selection of a base for squadron activation and gunship training posed an immediate problem. Headquarters TAC directed SAWC to survey the Eglin AFB complex for an available auxiliary field.<sup>15</sup> The excellent Eglin land and water ranges were naturally a prime consideration. Hurlburt Field and the entire Eglin area, however, were already overtaxed as to space for aircraft and transient quarters for personnel. After much discussion, message traffic, and consideration of such bases as Tyndall, Maxwell, MacDill, and Cannon--Forbes AFB, Kans., was selected as the training location.<sup>16</sup> A conference at TAC Headquarters on 22 July, attended by representatives from various TAC and SAWC agencies, hammered out a concept of operation.<sup>17</sup> One decision was to establish Training Detachment 8 of the 1st Air Commando Wing at Forbes AFB to administer the program. On 27-28 July a SAWC/1st ACWg staff team visited Forbes to survey support facilities and to coordinate range training with Headquarters 838th Air Division.<sup>18</sup>

(S) Activation of Detachment 8 took place on 9 August with a small advance party on hand.<sup>19</sup> The SAWC listed the detachment's training requirements as 11 C-47 and 4 FC-47 aircraft plus a cadre of instructors: 15 pilots, 15 navigators, 10 flight engineers, 10 loadmasters, and 5 weapons mechanics. Additional manning included 44 officers and 115 airmen.<sup>20</sup> Some of the instructors were also expected to support the concurrent training of the 5th Air Commando Squadron, a newly formed psychological warfare unit at Forbes. Most of the detachment's cadre came on temporary duty (TDY) from other TAC units and was in place by 15 August. Lt. Col. William C. Thomas, former commander of the 319th Air Commando Squadron at Hurlburt Field, was chosen to command Detachment 8. The entire program was now labeled Big Shoot\* and the FC-47 unit designated the 4th Air Commando Squadron (ACSq).<sup>21</sup>

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\*The 5th ACS training program was designated Quick Speak.

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Arrival of the men to be trained wrapped up the major preliminaries. Rigorous training got under way on 29 August.<sup>22</sup>

(U) Major problems quickly turned up in the Forbes program. Only one FC-47 was equipped with the minigun due to a shortage of gun pods. To meet the pressing need for firing training, M-2 .30-caliber machineguns were mounted in the other three FC-47's. Use of the M-2 caused maintenance trouble for armament personnel unfamiliar with the weapon. Assistance was obtained from U.S. Army personnel at Ft. Riley, Kans., to resolve some of the difficulties.<sup>23</sup> It was first assumed M-2 equipped aircraft would provide enough firing training. SAWC noted, however, "debriefs of FC-47 crews returning from SEA indicated that training with the .30 caliber guns would not be sufficient because of the dispersal pattern and lateral thrust of the SUU-11/A guns." Hence training was revised to include maximum possible time in the one minigun-equipped FC-47.<sup>24</sup>

(U) Modification problems likewise came to light that required correction by contractor personnel. Detachment personnel discovered during October a serious deficiency in ferry-tank installation on FC-47's destined for Vietnam. The two 500-gallon auxiliary ferry tanks had been installed backwards in the cabin thereby permitting fuel to siphon in flight. Furthermore, the navigator had little working room because the Loran set had been placed on his table instead of on brackets above it. These contractor difficulties, the pressure to use every possible flying hour, and the extensive maintenance required on some of the C-47's exacted long hours from maintenance personnel to keep an acceptable in-commission rate.<sup>25</sup>

(U) Big Shoot created singular supply problems as well. Besides the usual complications caused by dispersal of SAWC operations, a critical shortage existed in survival equipment such as parachutes, radios, individual survival kits, and flareguns. These were eventually secured from SAWC or TAC resources. Use of .30-caliber guns on the FC-47's for training entailed special procurement of ammunition,<sup>26</sup> a successful but slow task.

(S) A number of training hitches developed and were resolved as the program progressed. Approximately 50 percent of the men who arrived for training had never attended survival school at Stead AFB, Nev. Time now prohibited their attendance so TAC formed a mobile training team of survival specialists who

administered the training at Forbes. Likewise, a Ft. Bragg Special Warfare School team arrived and gave the men field training necessary for defending forward operating bases (FOB's) in Vietnam.<sup>27</sup> Capt. Ronald R. Ellis, who had flown one of the original FC-47's in Vietnam, was diverted to Forbes enroute to a new stateside assignment. This afforded the trainees an opportunity to talk with someone having combat experience.<sup>28</sup> Thus, in many cases, unusual effort was essential to insure members of the squadron were operationally ready by the November deadline.

(S) The FC-47-equipped 4th Air Commando Squadron faced the many problems that beset any unit preparing for deployment to a combat theater. Yet it moved steadily toward operational status and its November deployment date. The advantages in the unit's utilization of an old, but reliable, aircraft like the C-47 had been offset by complications arising from the unique gunship modifications and the new pylon-turn, side-firing training. Nevertheless, these challenges had been met. On 1 November Big Shoot came to an end with the inactivation of Detachment 8 and return of its personnel to Hurlburt and other TAC bases. Deployment of aircraft and personnel of the 4th Air Commando Squadron to Vietnam also began under code name Operation Sixteen Buck.<sup>29</sup>

#### Project Red Sea

(S) While the 4th Air Commando Squadron was still at Forbes AFB, a significant test project, called Red Sea, had commenced in Vietnam. Forward-looking infrared (FLIR) was installed in a FC-47 based at Bien Hoa AB to determine if it would enhance the gunship's night effectiveness. Red Sea represented part of a major USAF drive to improve night operations capability. The need for an improved capability was clear since analysts estimated in 1964 and 1965 that 80 percent of Vietcong logistics support moved during darkness. In July 1965 the Air Force Chief of Staff ordered a FLIR test program. On 28 July an infrared system developed by Texas Instruments was tested at Eglin AFB using a company DC-3. The plane flew over simulated Vietcong targets such as small boats, huts, personnel, and trucks.<sup>30</sup> Next came the Red Sea tests in Vietnam with the FC-47 trying the FLIR system during different climatic conditions and over various terrain features. The many variables, the moisture, and the equipment's inadequate sensitivity created many problems. The FLIR operator was unable to distinguish village perimeters but could spot markers such as a

fire arrow.<sup>31</sup> The scant success of these tests led the Air Force to return the equipment to Texas Instruments for further development. General Boles, Director of JRATA, recommended that development of aerial infrared systems be pushed despite these discouraging test results.<sup>32</sup> Although Red Sea was not successful, it was a forerunner of future attempts to give the gunship better eyes in the night.

#### 1965 Gunship Operations

(S) Deployment to the Republic of Vietnam of the 4th Air Commando Squadron with its 20 AC-47's\* (16 plus 4 for command support and attrition) was part of a hurried attempt by the United States to shore up the crumbling South Vietnamese government and its slipping control over the countryside. The threat of a Communist victory in the South had been growing more serious month by month. Looking back from 1971 the Air Force Chief of Staff, General John D. Ryan, commented:

In 1965 such a takeover seemed inevitable. Communist forces controlled most of the country. South Vietnamese morale was low and the fall of the government was imminent unless the Vietnamese were given substantial assistance. Air power was the only way of providing assistance quickly in amounts large enough to take the initiative and victory away from the Viet Cong.<sup>33</sup>

(S) It was into this situation that the 4th ACSq arrived at Tan Son Nhut AB, outside Saigon, on 14 November 1965. The squadron was assigned to the 2d Air Division and placed under the operational control of the 6250th Combat Support Group.<sup>34</sup> The gunships were readily welcomed, as the test of interim FC-47's in Vietnam had proved extremely effective for night close air support. Furthermore, a Vietcong monsoon (summer) offensive had underlined the urgent need for more gunships, especially for outpost and village defense.<sup>35</sup> Headquarters USAF now officially took the wraps off the AC-47 gunship. A 2d Air Division news release of 23 November (22 November

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\*The "FC-47" designation for the 4th ACSq's gunships had been questioned in September 1965. A review led to the new designation "AC-47D." Henceforth, all transport aircraft modified into a gunship configuration were to carry the modified mission symbol "A".

in Washington) discussed the aircraft and the 4th's move to Vietnam.<sup>36</sup> For the first time the American public had official information on this new weapon system.

(S) Bringing aircrews to operationally ready status was the 4th ACSq's first order of business. Pilots, copilots, navigators, and flight mechanics had come with the aircraft. Loadmasters and weapons mechanics, however, did not arrive until December 1965. Cross-training of the loadmasters and weapons mechanics began at once so enough fully qualified crews would be available without delay. Training was conducted between missions. By 1 May 1966, 26 crews had become combat qualified which actually exceeded the 1.5 aircrews allotted for each authorized aircraft.<sup>37</sup>

(S) The long-standing armament problem remained an early operational headache. To cut weight for the long overwater flights,\* the limited number of miniguns on unit aircraft had been removed at Forbes. From 20 November to 17 December 1965--pending arrival of the gun pods in South Vietnam--the AC-47's flew 58 courier and cargo missions.<sup>38</sup> The aircraft also carried out flare-drop sorties and provided familiarization for aircrews.<sup>39</sup> By 17 December the ground crews had enough miniguns to install one or two in each AC-47. None of the gunships received its full complement of three miniguns in 1965. Nevertheless, their existing armament enabled the squadron to operate on a full-time basis.<sup>40</sup>

(S) Seventh Air Force Operations Order 411-65 stated the 4th Air Commando Squadron's mission in Vietnam was "to respond with flares and firepower in support of hamlets under night attack, supplement strike aircraft in the defense of friendly forces, and provide long endurance escort for convoys."<sup>41</sup> Given the Vietnam situation of 1965, these were demanding tasks. The gunship's versatility, however, attracted special assignments--search and rescue, forward air controlling, and reconnaissance.<sup>42</sup> The 4th Air Commando Squadron faced unexpected challenges almost at once. In June 1965 the 2d Air Division had drawn up a proposal for gunship

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\*To avoid adding cold-weather equipment for the northern route, the AC-47's crossed the Pacific via Hawaii. The flight from Hamilton AFB, Calif., to Hawaii took 13 hours. [Historical Study 17 (S), Hq WRAMA, WRAMA's Role in Southeast Asia, AC-47 Gunship, 1 Jan 60-1 Apr 70, p 99.]

operations which CINCPACAF later backed. One-fourth of the proposed 16-plane squadron would be used in each of Vietnam's four military corps areas. Tan Son Nhut would be the main operating base with forward operating locations at Da Nang, Pleiku, Nha Trang, and Binh Thuy to better support combat in the corps areas.<sup>43</sup>

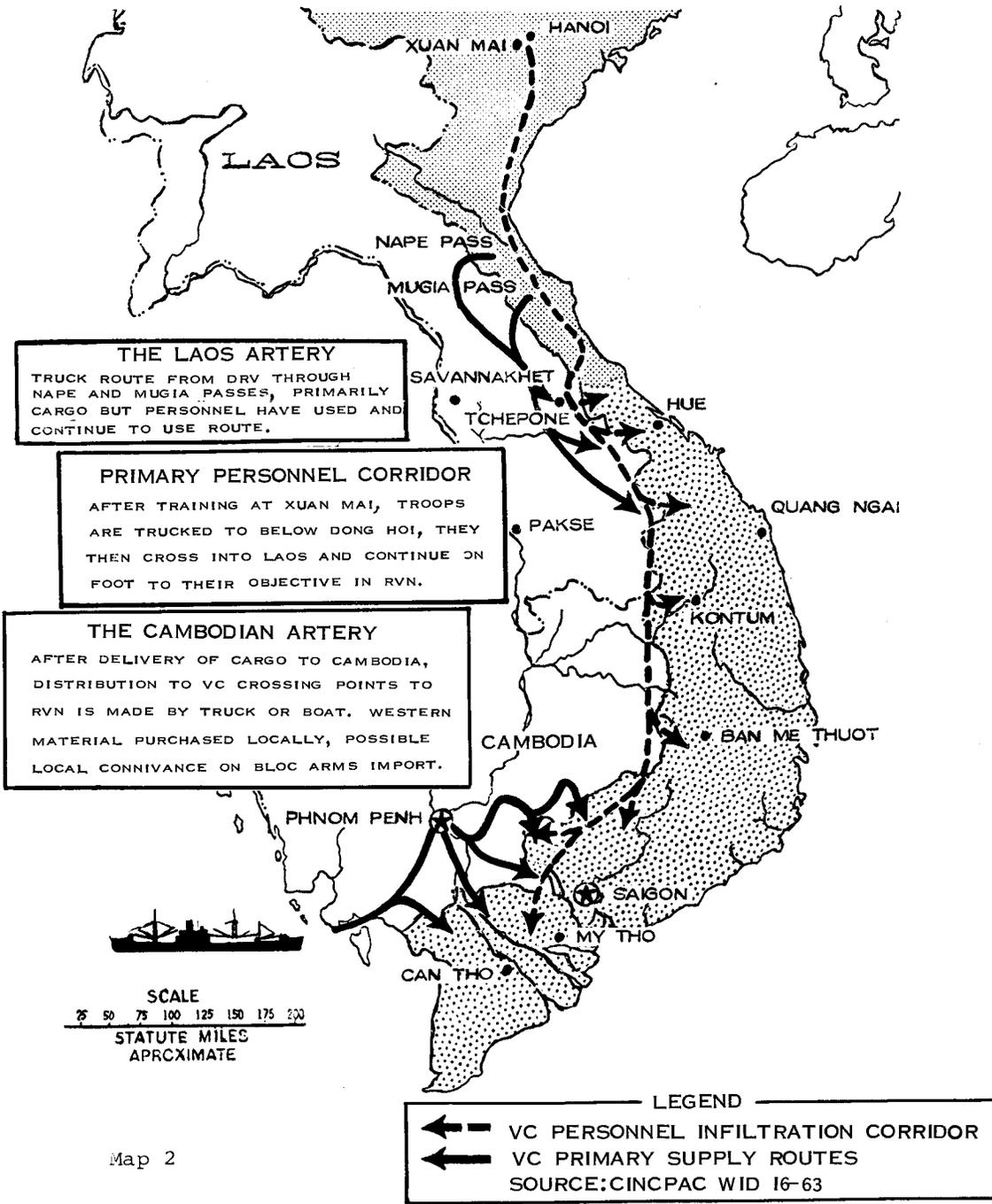
(S) In line with the proposal and shortly after the 4th ACSq's gunships touched down at Tan Son Nhut, a contingent of the unit moved to Da Nang. There followed, however, an unanticipated shift of four AC-47's from Tan Son Nhut to Udorn Royal Thai Air Force Base (RTAFB), Thailand, to support the war lapping over into Laos. These gunships began flying day armed reconnaissance in late December 1965 over the Steel Tiger\* area of Laos. It was the Laotian dry season and the AC-47's were to strike at enemy traffic moving down the Ho Chi Minh Trail complex to South Vietnam or to help control strikes of other aircraft on the Trail targets. This interdiction role required development of new tactics and techniques partly because operations over Laos proved far more hazardous than over South Vietnam. Antiaircraft fire was heavier, the Laotian terrain mountainous, maps poor, and weather conditions difficult.<sup>44</sup> No one foresaw at this time that the gunship would become famous in Laos and that its effectiveness in an interdiction role would have far-reaching impact.

(S) The heavy gunship commitment both in South Vietnam (in-country) and Laos (out-country) produced notable records within a short time. In the remaining days of 1965, the 4th Air Commando Squadron flew 1,441 hours and 277 combat missions, mostly during the hours of darkness in support of fort and village defense. The gunships expended 137,136 rounds of 7.62-mm ammunition and 2,548 flares and received credit for 105 Vietcong killed.<sup>45</sup> This was a remarkable effort from a recently organized unit, a new weapon system, and "rookie" crew personnel--fighting a unique war in an unfamiliar environment. Two AC-47's were lost, however. Enemy ground fire downed one on 17 December<sup>46</sup> as it flew cross-country from Tan Son Nhut to Phan Rang. Its wreckage

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\*Steel Tiger, initiated in April 1965, was the code name given to an operational area south of the 17th parallel in Laos where strikes were made against enemy infiltration routes.

### VIET CONG INFILTRATION SYSTEMS



Map 2

with no survivors was spotted on 23 December. The next day a gunship on a mission over Laos was heard transmitting "Mayday" and "Spooky 21" as it neared the target area. This ended all contact with the aircraft and the crew was officially listed as missing.<sup>47</sup> Thus the squadron's debut in Southeast Asia was not without its grim moments.

(S) The appearance of a complete gunship squadron in Southeast Asia during late 1965 mirrored the fast-changing face of the war. The year saw the United States give up its restricted advisory-type role for a clear air-and-ground combat commitment. This switch saved South Vietnam from almost certain collapse but the survival struggle had just begun. Strong Vietcong and North Vietnam forces, estimated at 265,000, remained undefeated. Allied strength consisting of 651,885 Vietnamese (regular and paramilitary), 184,314 Americans, 20,000 Koreans, 1,500 Australians, and 100 New Zealanders was still increasing. Phase I of U.S. air and ground deployments--of which the 4th Air Commando Squadron was a part--ended in the last half of 1965 with Phase II set for 1966. Air Force strength in Southeast Asia had already mushroomed to more than 20,000 men and 514 aircraft in South Vietnam and 9,000 men and 1,207 aircraft in Thailand. The U.S. buildup was to continue in step with the intensified air and ground effort.<sup>48</sup>

#### 1966 Gunship Operations

(S) AC-47 gunship operations and deployments in 1966 reflected the rising American involvement in Southeast Asian fighting. Some deployment adjustments were made to improve command or strengthen operational responses. In May 1966 the 4th Air Commando Squadron shifted its headquarters from Tan Son Nhut to Nha Trang<sup>49</sup> where its newly formed parent unit, the 14th Air Commando Wing,\* was based. In June, AC-47's were deployed to Bien Hoa AB (III Corps area). These aircraft were in addition to those previously placed at the bases of Da Nang (I Corps area), Pleiku (II Corps area), and Binh Thuy (IV Corps area).<sup>50</sup> The missions of this dispersed gunship force expanded in number and variety. Most fell into these main categories: hamlet and fort defense, close air support for ground combat units, convoy escort, control

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\*Activated on 8 March 1966 by Special Order G-45, Headquarters PACAF, 10 February 1966.

of airstrikes, armed reconnaissance, and interdiction. Often gunships flew with other aircraft and several types of missions might be combined in a single evening's operations. Missions were not limited to the hours of darkness but the majority of them took place at night.

(S) Defense of hamlets and forts was a key gunship mission that often began with a relay of a call for help to a Spooky\* on airborne alert. This was the case when the Vietcong attacked a hamlet in Phu Yen Province on the night of 8 January. Arriving over the village, the gunship fired 13,000 rounds of 7.62-mm ammunition within 100 meters of friendly positions. The fire silenced one .50-caliber machinegun and the Vietcong broke off their attack.<sup>51</sup> During the night of 9 April, Majors Jack Haller and Jack Graden, pilots of Spooky 23, were called to defend a special forces camp close to the Cambodian border. The nearness of the border and heavy AA fire passing within feet of the plane severely hampered the pilots. They nevertheless pressed their attack, then provided flares and fire suppression for a F-100 flight that followed. Finally, with ammunition exhausted and fuel low, Spooky 23 returned to base. The Commander of Detachment B-41 of the Special Forces Group reported, "The superb airmanship and aggressiveness displayed by the AC-47 was the major determining factor in preventing the fort from being overrun." United States personnel counted 168 Vietcong killed by the air strikes. Many weapons were captured including the first Vietcong flamethrower found in the IV Corps (Delta) area.<sup>52</sup> On 15 July a company of Vietcong assaulted a 32-man Popular Force outpost in Phong Dinh Province. The attackers proclaimed by loudspeaker, "We are not afraid of your firepower." Thereupon, 4 AC-47's dropped 75 flares and expended 48,800 rounds. Two F-100's next napalmed the enemy positions and the Vietcong stopped the attack.<sup>53</sup> During the night of 11 October, a record was set for the most 7.62-mm rounds fired in a single night by an AC-47. The gunship expended 43,500 rounds and 96 flares to aid a besieged outpost in Kien Phong Province. After using up its

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\*The designations of the AC-47 gunship, "Spooky", "Puff", and "Dragonship", are used interchangeably in this chapter. Puff was once used as a call sign when the 1st Air Commando Squadron had the first of the gunships. The 4th Air Commando Squadron began using Spooky as their radio call sign, based on their night flying in camouflaged aircraft.

entire flare and ammunition load, the aircraft landed, reloaded, and returned to the attack. The outpost commander credited the AC-47 with saving the fort.<sup>54</sup>

(S) Hamlet defense was not entirely restricted to South Vietnam. On 4 March six enemy battalions attacked the strategic city of Attopeu, Laos, defended by outnumbered Royal Laotian troops. Two AC-47's, commanded by Maj. George W. Jensen and Capt. Theodore M. Faurer, helped route the enemy forces. Major Jensen's Spooky 41 used a starlight scope\* for locating the enemy. With the dawn of 5 March a FAC reported spotting 26 enemy dead. General Ma, commander of the Laotian forces, was highly pleased with the gunship strike results. Later, Spooky 41 sighted 300 of the enemy and the regional commander gave permission to strike. The outcome was a body count of 52 in groups of 6 to 20.<sup>55</sup> The Deputy Commander, 2d Air Division/13th Air Force, commended this action:

Outstanding airmanship, personal bravery and hard work of your AC-47 crews (Spooky 41 and 43) no doubt saved Attopeu from possible capture the night of 4 March 1966 and dealt a devastating blow to attacking enemy battalions. A review of the reports of the action indicates a minimum of 100 killed by air, an actual number probably over 250, with many more wounded. My congratulations on a most effective display of tactical air power.<sup>56</sup>

(U) The case of the fort of Thanh Anh best illustrates the importance of these many gunship missions in defense of hamlets and outposts. This fortification was part of the "oilspot" concept for dealing with counterinsurgency. It called for providing the people and villages protection and physical security. From these fortified areas, a circle of "strategic" and "defended" villages would expand outwards to eventually extend the Republic of Vietnam's rule to the borders of Cambodia and Laos. Such a fortified ring was begun in the Mekong Delta (IV Corps) area of Vietnam, circling Binh Thuy AB and the provincial capital of Can Tho. Thanh Anh, 8 miles south-southeast of Binh Thuy AB, defended a point where the Bassac River meets a canal. It denied the Vietcong use of an excellent waterway into the more secure interior area and was also the first fort of the next larger circle. Thanh Anh's

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\*An image intensifier using reflected light from the stars or moon to identify targets.

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significance made it a prime Vietcong target. In July 1966 Vietcong bullhorns blared: "Leave the fort. Leave now and you will live. Stay until the next dark of the moon and you will be killed. No one will be spared."<sup>57</sup>

(U) Firing on Thanh Anh intensified as the no-moon period neared. The fort's 26 defenders were besieged by an estimated two companies of Vietcong. Nightly the enemy dug narrow zig-zag trenches that eventually edged to within 250 yards of the triangular fort's perimeter. The Popular Forces men at Thanh Anh filled the trenches by day only to find them booby-trapped and redug during the night. Nightly, it became routine for a single gunship to keep the Vietcong close to their trenches. During the darkness of 13 July, however, four gunships fired almost 50,000 rounds of 7.62-mm ammunition and about 90 flares to repulse mass attacks. The 4th ACSq responded so frequently to aid this beleaguered fort that pilots concluded Thanh Anh was the only tiny Vietnamese village with its own private air force.<sup>58</sup>

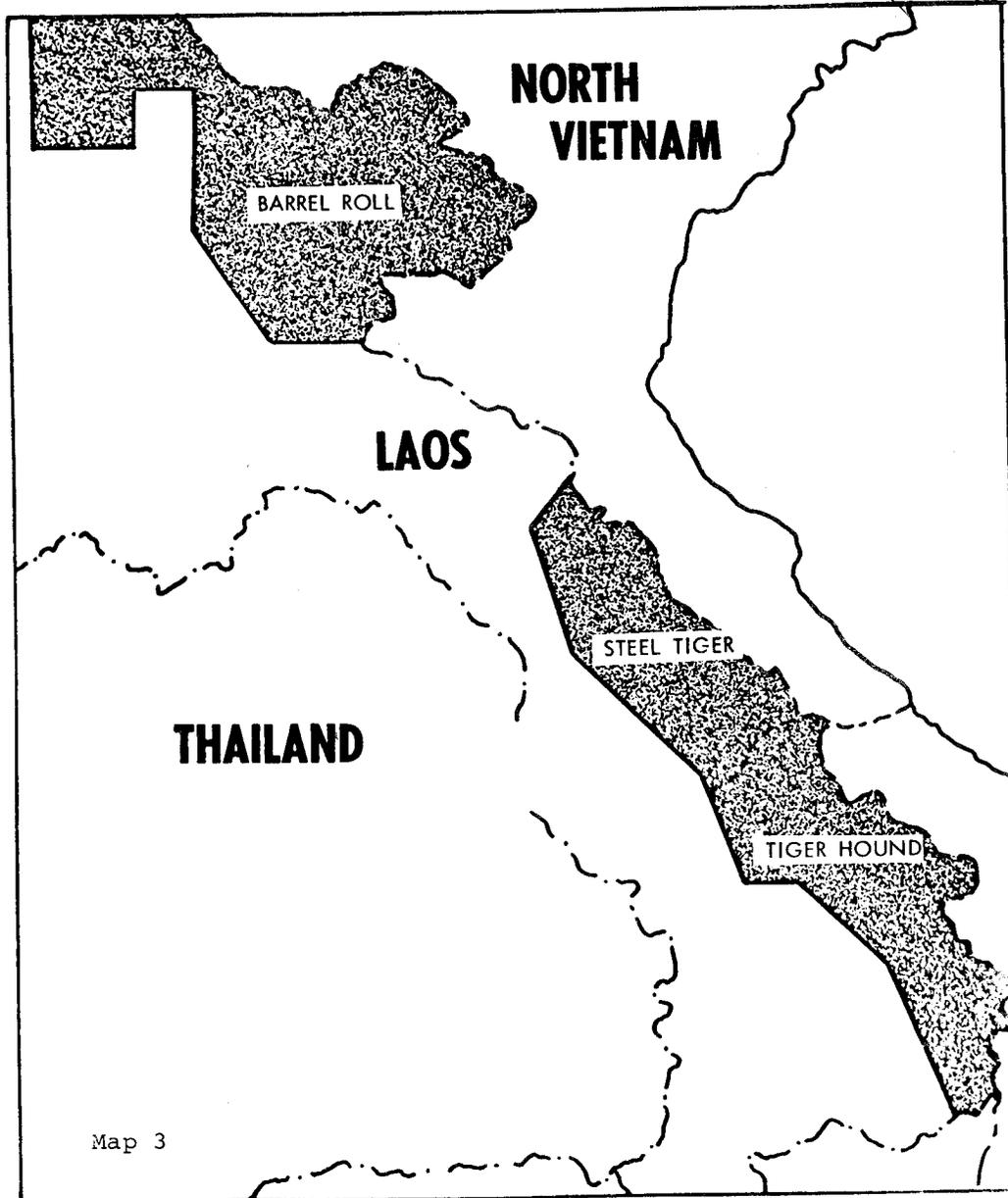
(U) Thus, the gunships' role developed as a key element in the Vietnamese government's reassertion of control over the countryside. The outposts might be small and seemingly insignificant. Notwithstanding, for the first time effective and long-sustained night air support meant the difference for survival of many remote fortified points. In the eyes of most observers, this could steel the will to resist the Vietcong and bolster support for the government.

(S) Despite considerable success in defending hamlets and forts, the gunships could not avert the fall of the A Shau Special Forces camp in early March. The camp nestled at the base of a narrow valley about 20 miles southwest of Hue and 2 1/2 miles from the Laotian border. The triangular-shaped fort and adjoining 2,300-foot airstrip was a watchpost on an enemy infiltration route. At 0200, 9 March 1966, the fort came under heavy Vietcong and North Vietnamese attack. Fire barrages from mortars, 75-mm recoilless rifles, and automatic weapons killed two Americans and eight Vietnamese. Another 30 Americans and 30 Vietnamese were wounded. A low cloud ceiling made air strikes prohibitive. The Vietcong pressed this advantage until dawn and resumed the assault that night. C-123 flareships dropped 377 flares trying to keep the area illuminated for the defenders.<sup>59</sup>

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**MAJOR INTERDICTION AREAS**  
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(S) At 1120 on 9 March an AC-47 was dispatched to A Shau. The camp had reported it was in immediate danger of being overrun. Despite a ceiling near 400 feet the pilot, Capt. Willard M. Collins, and the copilot, 1st Lt. Delbert R. Peterson, tried to get under the clouds and aid the camp defenders. On the third attempt the plane reached the fort and made a firing pass at the besiegers. During a second pass, intense ground fire tore the gunship's right engine from its mount and silenced the other engine only seconds later. The Spooky crashlanded on a mountain slope and one crewmember had his legs broken. The uninjured crewmembers prepared for an expected enemy attack. Barely 15 minutes after the crash, the crew repulsed the first enemy probe but a second one killed the pilot and the injured airman.<sup>60</sup>

(S) A USAF HH-43 rescue helicopter dropped through the clouds to pick up the remainder of the crew just as another enemy assault began. Using a M-16 rifle and a .38-caliber pistol, Lieutenant Peterson charged an enemy .50-caliber machinegun position. This permitted rescue of three survivors<sup>\*61</sup> but prevented his own evacuation. Later, A-1E strike aircraft were directed to destroy the downed AC-47, if possible, during their missions in support of the camp.<sup>62</sup> At the same time, U.S. Marine jets employing radar bombing and other aircraft attempted to penetrate the cloud cover. Nevertheless, abandoning the camp during the day was considered the wisest course in the face of the estimated 2,000 attackers. The fall of A Shau on 10 March showed the enemy's awareness of the value of nighttime attacks during weather that restricted air operations.<sup>63</sup> In spite of Spooky's heroic defense efforts, a gunship had fallen victim to that awareness.

(S) Another gunship mission--assisting defenders of U.S. air bases--was closely related to that of supporting village and outpost defense. The rapid American buildup had brought more hit-and-run attacks on U.S. installations, particularly air bases. An orbiting gunship on airborne alert apparently deterred some base assaults. At times, however, Spooky defended bases with firepower. For instance, the enemy launched a mortar attack on Binh Thuy AB on 20 February 1966. In spite of incoming mortar rounds, Capt. Theodore Faurer and his crew took off in an AC-47 and struck the mortar positions, helping break up the attack.<sup>64</sup> A like action took place at Pleiku AB on 22 April. Capt. Albert Haddad and

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\* The aircraft was short one crewmember that day.

his crew were having a weather briefing when the mortar attack began. They rushed to their gunship while others ran to shelters. Fuel flooded the ramp area. Debris and dud mortar rounds littered both the ramp and runway. Ignoring their own safety, the aircrew saved the AC-47 by getting it airborne and later assisted in silencing the Vietcong fire.<sup>65</sup> Another mortar attack on Binh Thuy took place on the night of 8 July. Two gunships responded within 3 minutes and their firepower ended the bombardment. Again, squadron gunships flew a special orbit nightly for 2 weeks around a Saigon POL (petroleum, oil, and lubricants) tank farm. It was feared the enemy would retaliate to the initial bombing strikes on POL dumps in the Hanoi and Haiphong areas.<sup>66</sup> Spooky's success in helping deter and quell attacks on bases led the Commander, 14th Air Commando Wing, to remark: "I think we're going to find that the 4th Air Commando Squadron is the greatest thing since sex, so far as protecting a base is concerned."<sup>67</sup>

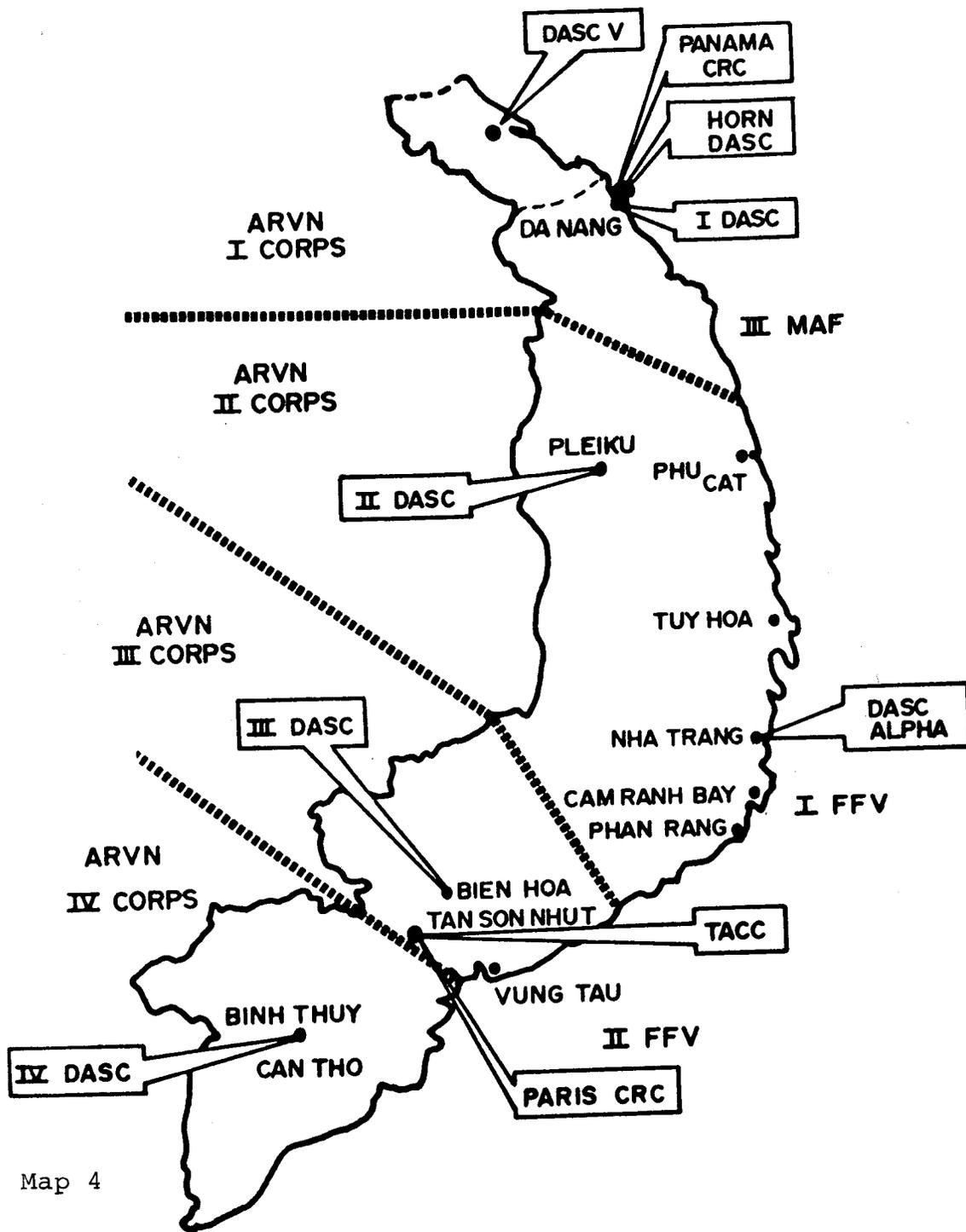
(S) Several spectacular 1966 actions typified another gunship mission--the close air support of ground combat units. On 15 April such a unit trapped an estimated battalion-size Vietcong force at night in the crook of a river near Tan An. Helicopters sprayed the river with bullets to cut off escape in that direction. Six AC-47 sorties were flown, led by Lt. Col. Max L. Barker, 4th Air Commando Squadron commander. The gunship attack was pushed until all ammunition was gone. Flares were dropped to light up the area for ground troops and other air strikes. By American count, air action killed 470 Vietcong that night.\* Close air support involving the AC-47's also recorded high enemy casualties later in the month. During daylight of the 23rd, elements of the 21st ARVN Division engaged in Operation Dan Chi 219 closed with the Vietcong. The fight lasted into the night. Three dragonships dropped 68 flares and fired 23,000 rounds into enemy positions. Six A-1H and 19 F-100 strikes supplemented the gunship fire. At dawn 228 Vietcong dead were confirmed with an estimated 170 carried away. The air liaison officer (ALO) of the 21st ARVN Division stated that "the application of TAC air during the period of heavy contact probably saved the friendlies from being overrun and prevented heavier friendly casualties from being inflicted."<sup>68</sup>

(U) On the afternoon of 2 August, a 2-platoon task force of the 2d Battalion, 35th Infantry, U.S. Army, came upon a Communist base camp. In the ensuing fight the American task force was surrounded and suffered heavy casualties including the

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\*Quite accurate counts of men killed were possible in some cases but in others they were approximations.

# GEOGRAPHY OF CONTROL



Map 4

(This page is Unclassified)

company commander and first sergeant. The enemy also surrounded a company-size relief force and dealt it severe blows by mortars from high ground. At about 2200, whistles, bugles, and screams seemed to signal a Communist pep rally prior to a full-scale assault. The ground commander requested air support and a gunship\* was directed to provide cover. Rays of a single flashlight through a tiny hole in the jungle canopy marked the task force's defensive position. Working via radio with this force, the gunship poured gunfire around the position. Aided by Spooky both encircled forces beat off the enemy's attacks. The next morning U.S. patrols counted 106 enemy bodies and found evidence that others had been removed. The 2d Battalion Commander commended the 4th Air Commando Squadron, stating that "the men of this battalion have great appreciation for and full confidence in the United States Air Force and point to this particular action as an outstanding example of interservice cooperation at its finest."<sup>69</sup>

(S) The gunships played an increasingly significant role in major ground combat operations. These included Operation Hawthorne (a search-and-destroy mission in II Corps), Masher, Paul Revere (a long operation to intercept enemy forces crossing into South Vietnam from Cambodia), and Prairie (a search-and-destroy operation along the Demilitarized Zone).<sup>70</sup> Close air support missions were chiefly in the northern half of South Vietnam due to the American counterstrategy of blocking the enemy's infiltration and any drive to cut the country in two. To support American Marine operations near the Demilitarized Zone, one gunship based at Da Nang was placed on special ground alert at Dong Hoa on 25 August. The short narrow runway (3,900'x 56') of pierced aluminum planking over sod and the lack of maintenance, refueling, and armament resupply facilities made operations doubly difficult in this area.<sup>71</sup> As additional U.S. Army and Marine troops arrived, the support sorties for ground units steadily rose.

(C) In 1965 the 2d Air Division had begun to emphasize night aerial armed reconnaissance of South Vietnam's rivers, coasts, and roads. Nicknamed Snipe Hunt, the surveillance carried over into

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\*The AC-47 crew consisted of: Capt. Douglas C. Whipple, pilot; Capt. William R. Fredenberg, copilot; Capt. John K. Birchfield, Jr., navigator; SSgt William R. Reddick, flight engineer; SSgt Charles L. Sanders, air gunner; A1C Robert W. Soals, air gunner; and A1C John H. Yoskelevitch, loadmaster.

1966 and involved U.S. Army OV-1 aircraft, FAC's in O-1 aircraft, and C-123's or AC-47's using flares.<sup>72</sup> During the night of 8 January 1966 a Spooky detected and rolled in to attack a Vietcong junk along the South Vietnamese coast. The gunship forced the craft aground, then flew cover as Vietnamese naval units boarded it and took off ammunition and equipment.<sup>73</sup> A like operation occurred on 20 June. An AC-47 on alert at Binh Thuy was ordered to assist the U.S. Coast Guard cutter Point League in apprehending a Vietcong supply vessel moving up the coast to a Mekong River outlet. The gunship silenced a machinegun on the ship, dropped flares, and squelched fire from the shore. This air-sea action resulted in the capture of a steel-hulled vessel and over 7,000 weapons.<sup>74</sup>

(S) The great versatility of the AC-47's became clearer as the months went by. It could be a deadly strike aircraft or protective mother hen. In February, for example, the gunship flew cover for an American ship lying helplessly offshore after an enemy attack. In March it attacked 40 Vietcong sampans. In April it resumed its protective role of flying escort for a truck convoy--ready to strike in case of ambush.<sup>75</sup> Spooky's flare capability, loitering time, and firepower combined to give it a flexibility that military commanders in Vietnam quickly grasped.

(S) At times gunships acted as forward air controllers in the Tiger Hound area of Laos and within Vietnam. All pilots of the 4th ACSq took an abbreviated course in this kind of mission. Overcoming poor cockpit visibility<sup>76</sup> the gunship crews competently controlled strikes by most aircraft in Vietnam--A-1E's, B-57's, F-100's, F-4C's, F-5's, and a number of Navy aircraft. In some cases the AC-47's supplemented the firepower of the strike aircraft they were controlling by suppressing ground fire with the miniguns.<sup>77</sup>

(S) Of all gunship interdiction missions, perhaps the most telling ones were flown outside South Vietnam. Ambassador to Laos William H. Sullivan requested that gunships be committed to support a major American attempt to locate and destroy enemy supplies and equipment moving along infiltration routes in southern Laos. The AC-47's were to be part of interdiction operations

designated by the code name, Cricket,\* flown in the Tiger Hound<sup>†</sup> geographical area of Laos bordering on South Vietnam. (See Map 3). In response to Ambassador Sullivan's request, American officials in Vientiane, Laos, urged on 10 January 1966 that the 2d Air Division deploy six to eight gunships to Nakhon Phanom RTAFB in Thailand for operations over Laos. On 5 February the 2d Air Division set up the requirement for these gunships. Twelve days later, however, attention was momentarily diverted from the Laotian interdiction mission by urgent phone calls from the Deputy Commander of the Thailand-based headquarters of the 2d Air Division/13th Air Force. The calls asked for AC-47's to help defend the Air America airstrip in northern Laos (Lima Site 36) which was under heavy enemy pressure. The two gunships immediately sent to Udorn RTAFB, Thailand, performed well but failed to save Lima Site 36. Nevertheless, the Ambassador to Laos and the Air Attache were sufficiently impressed with the gunships' capability that they requested the AC-47's be left at Udorn permanently.<sup>78</sup>

(S) Meantime, Admiral Ulysses S. Grant Sharp, Jr., Commander, Pacific Command (PACOM), approved on 19 February the original request to position AC-47's at Nakhon Phanom. Then, after Thailand gave the go-ahead on 25 February, the 2d Air Division deployed four AC-47's and five aircrews to Udorn RTAFB for 179 days temporary duty (TDY).<sup>79</sup> The gunships were sent to Udorn in lieu of Nakhon Phanom as two of the gunships were already there.<sup>‡</sup> Also, it was believed they could better fulfill Ambassador Sullivan's requirements for both site defense and interdiction missions from that base. Subsequently, the AC-47's were shifted to Ubon RTAFB in April because the arrival of A-1E aircraft at Udorn overcrowded the ramps.<sup>80</sup>

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\*Operation Cricket (sometimes called Truck Buster) grew out of a conference in Vientiane, Laos, 1-2 February 1966. Representatives of the U.S. Ambassador and U.S. Attache to Laos and the Commanders of Task Force 77 and 2d Air Division attended the conference.

<sup>†</sup>The Tiger Hound mission was to impede to the maximum extent possible the infiltration of personnel and equipment from North Vietnam through the southern area of Laos to South Vietnam. [7th AF OpOrd 435-66, subj: Tiger Hound, 22 Jan 66.]

<sup>‡</sup>The AC-47's and crews at Udorn became Detachment 5, 4th Air Commando Squadron.

(S) Two major types of AC-47 interdiction missions emerged in Laos: (1) armed reconnaissance over the intricate network of roads and trails known collectively as the Ho Chi Minh Trail, and (2) assisting in interdiction of Trail traffic by controlling strikes of other aircraft.<sup>81</sup> Thailand-based gunships as well as Spookies from Pleiku and Da Nang flew Tiger Hound area missions.<sup>82</sup> The busy gunships averaged two armed reconnaissance sorties a night with each sortie lasting about 6 hours.<sup>83</sup> These were pioneer flights over a rugged and inadequately charted mountainous area where the enemy had long been skillful in concealing Trail development. Col. John F. Groom, Tiger Hound Task Force Commander, sized up the Spooky interdiction effort: "We put them over known roads and trails when we were sure there was truck traffic, and with their own flare capability and side-firing guns, they have done exceptionally well in the Tiger Hound area."<sup>84</sup>

### THREE PHASES OF THE GUNSHIP INTERDICTION TASK

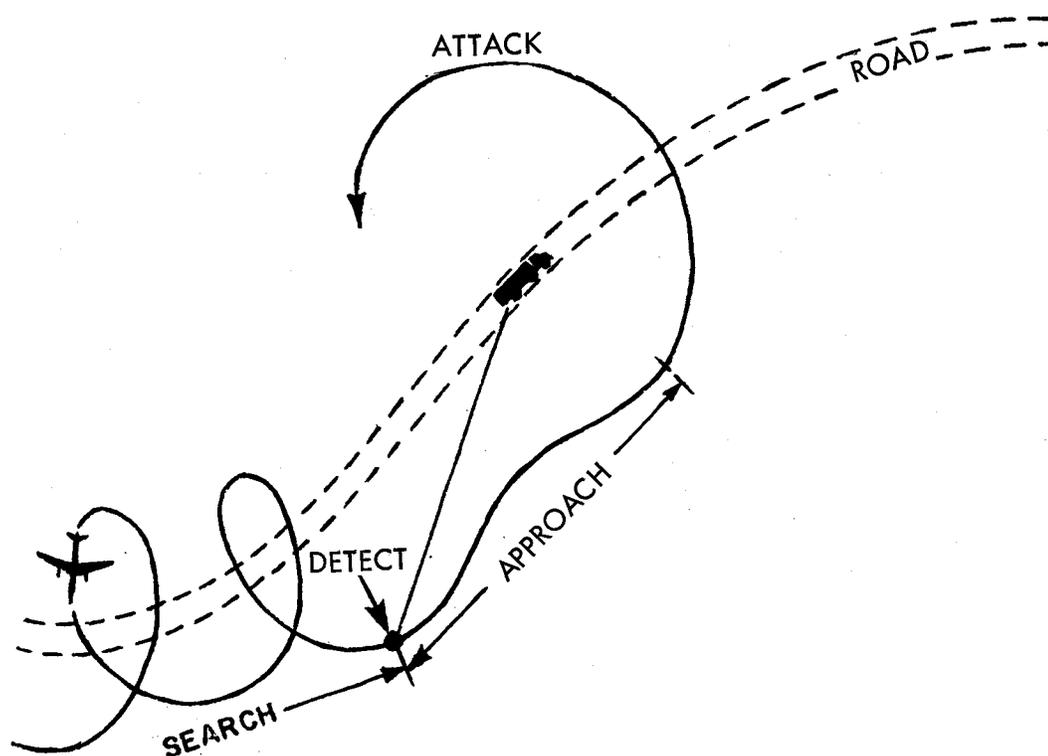


Fig. 5 (U)

(S) The roadwatch "truck-busting" mission on the night of 23 February was typical. Capt. William Pratt and his AC-47 crew spotted a truck convoy halted where a bomb crater gutted the road. Working in a valley with sheer cliffs, the gunship first struck the rear truck setting it afire. Next the aircraft began an orbiting strike maneuver around the trapped trucks. The convoy replied to the attack with intense small arms fire. The gunship stayed on the target, destroying 11 trucks and damaging many more.<sup>85</sup>

(S) As the number of AC-47 interdiction sorties rose, a system of truck-busting began to take shape. Two Spooky gunships from Udorn were scheduled to fly continuous coverage at night over the Cricket area and part of the Steel Tiger area of Laos. One aircraft took off at 1800, the other at 2400. The gunships flew a planned schedule that allowed at least four contacts per night with each of the roadwatch teams operating clandestinely around the Ho Chi Minh Trail network. After flying to the designated area, a Lao observer on board the gunship radioed the roadwatch team. If a target was indicated in the area the gunship would drop flares along a road or trail in an effort to acquire the target. Once a truck was spotted the gunship went into its strike orbit and fired away. At times it would call for additional strike aircraft. This system was first employed on 21 March and proved effective. The success in striking and harassing trucks at night was tempered by the enemy's dogged persistence in using hundreds of troops and coolies to quickly repair roads, build new ones, remove damaged or destroyed vehicles from the roads, and in the strengthening of his air defenses.<sup>86</sup>

(S) The AC-47 gunships also flew reconnaissance and forward air control missions at night to complete the 24-hour roadwatch begun by O-1E aircraft during the day. The gunships covered the Tiger Hound area toward the south end of the Laotian panhandle and Cricket operations were flown in the north portion. Hence for the first time effective around-the-clock capability seemed possible. In addition, the gunships shared airborne battlefield command and control center (ABCCC) functions with C-130A aircraft, thus providing on-the-scene coordination, target validation by Laotian authority, and forward air controlling.<sup>87</sup>

(S) The interdiction success of the gunships attracted trouble. The enemy responded with more and better air defense. Communist forces were equipped with various AA weapons including 37-mm guns, which outstripped the range of Spooky's miniguns. As a result,

by 30 June 1966 four gunships were lost to ground fire, three of them downed over Laos.<sup>88</sup> This was nearly one-fourth of the entire Southeast Asia gunship force and triggered a reassessment of gunship utilization in the more hostile environment of Laos. The 4th Air Commando Squadron had replaced half the losses with aircraft based in South Vietnam. Nevertheless, the squadron commander recommended to the 14th Air Commando Wing that the gunships be returned to close air support in South Vietnam.<sup>89</sup> Entering into his recommendation were the improved enemy defenses, the AC-47's vulnerability due to slow speed and aerial tactics used, the difficulty in operating over the rugged terrain, the combat exposure time (about 800 hours of night combat per crew in a 12-month period), the questionable suitability of the gunship for the FAC mission, and the need for more air support in South Vietnam for hamlet and outpost defense. The wing commander, Seventh Air Force,<sup>90</sup> PACAF, and PACOM, agreed with the proposed redeployment. On 20 July the 4th Air Commando Squadron flew its last Tiger Hound mission.<sup>91</sup> By the end of August all gunships had departed Thailand.<sup>92</sup>

(S) The withdrawal of the AC-47's from Thailand tied in with other deployment planning and actions. A case in point was the deployment of A-26's for interdiction missions over Laos. When the Air Force first directed AC-47's be sent to Thailand, Gen. Hunter Harris, Jr., Commander in Chief, PACAF, doubted the gunships could survive the hostile environment over Laos. He expressed some of his reservations to General McConnell, Air Force Chief of Staff. The latter noted that the gunships would have to operate within range of enemy ground weapons in Laos. He proposed A-26 aircraft as a possible alternate to the gunship and offered eight of them for evaluation.<sup>93</sup> General Harris accepted this substitution for the AC-47's with the concurrence of Ambassador Sullivan and the Thai government. In June 1966 the A-26's began interdiction sorties over southern Laos.<sup>94</sup> Also reinforcing the AC-47 withdrawal decision was the urgent need to relieve C-123's of their Vietnam night flare duties so they could return to an air-lift role. It was felt the AC-47's redeployed from Thailand could probably handle the flare requirements.<sup>95</sup>

(S) Previous to the decision to withdraw the AC-47's, the Air Force had planned to deploy eight more AC-47's and aircrews from the United States to Thailand to support a full-fledged interdiction effort over Laos. In January 1966 Ambassador Sullivan had asked for aircraft suitable for Operation Cricket and the gunship

was considered as part of the force to meet the requirement.<sup>96</sup> The Air Staff and JCS approved the proposed deployment of additional AC-47's. The Secretary of Defense (SECDEF), however, was a bit reluctant to proceed, stating that he wanted to "limit Thailand deployments to those which are essential to fulfill mission requirements."<sup>97</sup> On 25 May General McConnell requested CINCPACAF to furnish further information in support of the deployment request.<sup>\*98</sup>

(S) Based on this extra information provided by Headquarters USAF, the Office of the Secretary of Defense (OSD) approved the AC-47 deployment. A date of 1 October 1966 was set for the aircraft to be in Thailand.<sup>99</sup> Meantime, to make up for the loss of gunships, A-26 Counter Invaders assumed the interdiction role over Laos. This led Seventh Air Force to request in September (with PACAF's concurrence) diversion of the additional AC-47's to South Vietnam for defense of military bases.<sup>100</sup> When Pacific Command concurred in and forwarded this request to the JCS on 22 October 1966, the supplemental AC-47's had already touched down at Clark AB, Philippines, on the way to Thailand.<sup>101</sup> The gunships were ordered held at Clark until the JCS approved the diversion. The JCS approval was not received until 22 December and the additional AC-47's did not arrive at South Vietnamese bases until January of 1967.<sup>102</sup>

(S) Col. Gordon F. Bradburn, Commander, 14th ACWg, had coupled his proposal for withdrawing AC-47's from Thailand with anticipated improvements in South Vietnam gunship operations. He pictured one AC/C-47 flying airborne alert from 1/2 hour before sunset to 1/2 hour beyond sunrise at each of the bases in the four corps areas of Vietnam. One more AC/C-47 would be put on 15-minute ground alert at each base. Colonel Bradburn expected these actions to enhance gunship support in the corps areas, strengthen command control, and better centralize flare requirements. He estimated a 78 percent in-commission rate could be maintained under his proposed schedule. Accepted by Seventh Air Force, this airborne/ground alert program commenced on 22 July 1966.<sup>103</sup>

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\*PACAF was to answer these questions: What was the necessity for deploying gunships to Thailand rather than South Vietnam? How were operational requirements currently being met? What was the estimate of AC-47 vulnerability? What was the detailed rationale for employment of A-1E, B-26, and AC-47 aircraft? What was the success of the present night interdiction operations?

(C) While most attention focused on combat operations in South Vietnam and Laos, the United States set in motion a major effort to shore up counterinsurgency forces in Thailand and Laos. Northern Thailand and Laos, so close to the central area of conflict, appeared marked for "national liberation" movements as South Vietnam had been in the late 1950's. In both countries the ingredients were there--poor transportation and communication networks, an economy at bare subsistence level, frictions among ethnic groups, rugged isolated terrain suited for guerrilla bases, an inadequately trained and equipped constabulary, and inequitable distribution of land and resources. To thwart this growing threat the United States launched an extensive assistance and training program along with large base construction projects. Since mid-1964 the U. S. Air Force had assumed a large role in the effort by setting up a counterinsurgency training detachment--called Water Pump--at Udorn RTAFB in northern Thailand. By late 1965 another project (encompassing Water Pump) saw formation of the composite 606th Air Commando Squadron at Nakhon Phanom RTAFB. The squadron and augmented operation bore the name of Lucky Tiger. The 606th was to have C-123's, T-28B's, U-10B's, and CH-3's. In early June 1966 it was decided to also add AC-47's because of their operational success. Eight AC-47's and 214 personnel were to be deployed to Nakhon Phanom in September 1966.<sup>104</sup>

(C) Headquarters USAF designated Warner Robins Air Materiel Area as weapon system control point for AC-47's destined for the 606th ACSq. The contract with Air International of Miami specified that four Gooney Birds begin modification into AC-47's by 15 July, four more by 1 August, with SEA deployment of the first four due in early September. When September arrived, however, the gunships were not ready and the deployment date was slipped to October.<sup>105</sup> PACAF then revised the 606th's target date for full operational readiness to 1 November.<sup>106</sup> Arrival of the AC-47's in the last months of 1966 introduced the gunship concept to the Thais and Laotians. Spooky's utility as a counterinsurgency weapon was spreading.

(S) The first full year of gunship operations had already demonstrated the weapon's system's versatility and value. The gunship had successfully flown a wide range of missions, from protective cover for friendly convoys to destroying those of the enemy. Its around-the-clock operations extended over all areas of South Vietnam and Laos.\* Its ABCCC and FAC functions became a

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\*At this date Cambodia had not been engulfed in the fighting.

[REDACTED]

valuable adjunct to other air operations. Most important, it helped fill the crucial void in night air operations--a void the enemy had been so skillfully exploiting both in South Vietnam and Laos. In early December 1965, for instance, only 25 percent of armed reconnaissance missions had taken place at night while 80 percent of the enemy traffic moved during darkness.<sup>107</sup> The gunship had a major part in the effort to correct this imbalance.

(S) Impressive statistics for 1966 pointed to the extent of AC-47 operations and the gunship's effect on the enemy. The 4th Air Commando Squadron, the sole gunship unit, claimed successful defense of its 500th fort on the last day of 1966. Three more forts were added that night to officially end the year with a total of 503.<sup>108</sup> Men of the squadron were very proud of their role in helping defend outposts/hamlets and running totals (the Spooky Count) were kept of the successes.<sup>109</sup> In all, during 1966 they dropped 81,700 flares and expended 13,616,643 rounds of 7.62-mm ammunition. In January more than 2,500 flares and 611,600 rounds were used, compared to a peak in December of 10,451 flares dropped and over 2 million rounds expended. The squadron flew 5,584 sorties which consumed about 25,000 hours of flying time--all accident-free. As for interdiction, the gunships had been credited with 204 enemy trucks damaged or destroyed by the time they withdrew from Laotian operations in midyear.<sup>110</sup> Only an estimate could be made of total enemy killed by gunship strikes but it was conservatively placed at well over 4,000.<sup>111</sup> In sum, the statistics showed the scope of operations. However, it was often the letters and messages expressing the gratitude of embattled defenders--"if it had not been for the Spooky Birds"--that most heartened the men of the 4th.<sup>112</sup> Lt. Col. Robert E. Gibson, the new squadron commander, summed up 1966: "We're proud of our record and hope to meet the challenge of 1967 with the same success."<sup>113</sup>

(S) The compilation of operational statistics often does not reveal the extent of a unit's problems. As might be expected, the gunship squadron wrestled with some notable ones during its full year of combat operations. Most critical, of course, was the loss of four AC-47's during the first 6 months of 1966 (six gunships lost since November 1965). Projecting this loss rate over a year would have meant an 80 percent attrition rate for aircraft and 61.5 percent for personnel.<sup>114</sup> These figures graphically highlighted the AC-47 vulnerability in areas heavily defended by AA weapons such as Laos and led to the decision to commit the gunships exclusively to South Vietnam operations. The 4th also had difficulties with

command control of its widely dispersed operating locations (aggravated by inadequate communications),<sup>115</sup> turnover of personnel,<sup>116</sup> a high dud rate in flares,<sup>117</sup> and inadequate facilities.<sup>118</sup> Inasmuch as the squadron had deployed in late 1965, most of its experienced personnel wound up the 1-year Vietnam tour around the same time. Hence, the personnel turnover in October 1966 hit the unit far harder than a normal rotation would have. An investigation of the rise in flare duds looked into "kicker"\* practices and moisture problems of outside flare storage. It turned up no specific cause for the many flare duds but investigators did recommend better protection of the flares from the Vietnam weather.<sup>119</sup>

(U) Almost from the moment the gunship arrived in the combat theater, efforts got under way to improve its capability. Gunners of the 4th Air Commando Squadron recommended an important change--declination of the miniguns  $12^{\circ}$ . Under direction of SSgt. Wayman E. Hicks, gunner on the 4th's standardization crew, the guns were declined in  $3^{\circ}$  increments and  $12^{\circ}$  was found most desirable. In March advantages and disadvantages of the  $12^{\circ}$  declination were analyzed and the modification was approved. The first gun mounts entered the machine shop on 1 April and the new mounts were installed in 12 gunships by 30 June.<sup>120</sup> Captains Russel R. Young and Robert K. Stein, with Sergeant Hicks, further researched and tested the  $12^{\circ}$  declination, then published a new squadron manual on minigun operations.<sup>121</sup> The Air Force Armament Research and Technology Division at Eglin analyzed the squadron test results and published its findings in a brochure.<sup>122</sup> Adoption of the  $12^{\circ}$  declination decreased the angle of bank required, making it easier for the pilot to roll onto the target. It added stability to the gunship permitting easier flare-handling and gunnery operations, decreased the slant range of the guns allowing for an increase in altitude, and raised the minigun's impact velocity.<sup>123</sup>

(S) Two communication modifications and a flareholder improvement were likewise completed. All the gunships were equipped with a dual-headset capability at the navigator position. This allowed the VNAF observer and the crew navigator to simultaneously monitor aircraft-ground communications, thereby saving time in this critical operation. In addition, an improved multichannel

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\*A "kicker" was the gunship crewmember charged with dropping the flares.

radio (Wilcox 807 VHF) was installed.<sup>124</sup> Construction and installation of steelplated flare boxes by the rear cargo door allayed a nagging fear of crews that ground fire might set off a flare. The new boxes also kept flares from shifting in flight.<sup>125</sup>

(S) Though not entirely successful, the tests made of the starlight scope and the .50-caliber machineguns in the AC-47's had great portent for the future. The Army-developed starlight scope enabled troops to see in the dark by intensifying reflected moonlight or starlight. On 4 March 1966, Major Jensen piloted a gunship that used a starlight scope over Attopeu with huge success in locating enemy troops (p 53). Tests of the scope on other occasions were inconclusive. Seeking a better truck-busting weapon, gunship crews evaluated the .50-caliber machinegun as a possible substitute for the 7.62-mm minigun. Both equipment tests were delayed after the Ubon-based test gunship was shot down over Laos. Aboard were the squadron and Seventh Air Force test project officers--Major Jensen and Major Joe Reilly. Some armament tests continued on gunships out of Da Nang but the results were inconclusive.<sup>126</sup> Despite problems, this testing pointed the way to major future development of gunship sensors and armament.

#### 1967 Gunship Operations

(U) The momentum and success of 1966 gunship operations carried over into 1967. A major gunship augmentation got under way, reflecting the still-rising intensity of the fighting in South Vietnam and an even greater commitment of U.S. forces. Gunship operations roughly followed the 1966 pattern. Close air support missions predominated in the north of the country and outpost/hamlet defense in the south. In the middle, or highland region, it was mostly air support but mixed with sorties to defend forts, U.S. Army Special Forces camps, or to assist in base defense.

(S) Heavy fighting in South Vietnam's midsection led the 4th Air Commando Squadron to replace C-47 flareships assigned to C Flight at Nha Trang with AC-47's in January. C Flight and also B Flight at Pleiku now operated in the II Corps area but no formal division of the tactical area of responsibility (TAOR)\* existed for either flight. B Flight normally covered the area mainly to the

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\*A defined area of land in which a designated commander controls assigned forces and coordinates support.

north and west of Pleiku, C Flight from Bong Son south to Qui Nhon.<sup>127</sup> Locations, and corps areas supported, of other 4th ACSq flights remained the same: A Flight (Da Nang), I Corps; D Flight (Bien Hoa), III Corps; and E Flight (Binh Thuy), IV Corps. All these flights operated on the same basic plan: Two aircraft orbited on airborne alert to cover areas of usual enemy activity while one backup aircraft on ground alert provided additional assistance as required (only E Flight in the Mekong Delta kept two gunships on ground alert).<sup>128</sup>

(S) In the northern part of South Vietnam (I Corps), A Flight gunships continued to provide close support of U.S. Marine Corps (USMC), Republic of Korea (ROK), and ARVN troops. Gunship action in the first phase of Operation Lien Ket I--a joint USMC, ROK, and ARVN thrust 16 miles southwest of Chu Lai--typified the support of multinational forces. Six AC-47's supported friendly troops in close contact with the enemy from dusk to dawn on 19 February. The gunships fired 123,000 rounds during more than 12 hours over the embattled area.<sup>129</sup> It was just such missions that prompted Lt. Gen. Robert E. Cushman, Jr., Commander of the III Marine Amphibious Force, to commend the 4th Air Commando Squadron on 26 September:

Please extend to the members of the "Spooky" crews that have served with us here in I Corps my best wishes and congratulations for a continuing outstanding performance of duty. Immediate response and enthusiastic and devastating support have become the trademarks of "Spooky" in I Corps. "Spooky" crews have earned the profound respect of all whom they have supported of free world armed forces and have accounted for over 200 enemy confirmed killed and 520 enemy probably killed. Their splendid display of professionalism and devotion to duty have been a significant contribution to the defeat of enemy forces in I Corps. Well done!<sup>130</sup>

(S) In early 1967 poor weather over the I Corps area masked the Vietcong movement to positions closer to bases near the coastal cities and bases at Hue, Da Nang, and Chu Lai. This more southerly enemy activity caused abandonment of alert aircraft at Dong Ha near the Demilitarized Zone and generated more II Corps gunship missions. In addition, major ground sweeps against infiltration routes from Cambodia (Operation Sam Houston) called for many AC-47 sorties.<sup>131</sup>

(C) Defense of forts and hamlets, however, remained the major gunship effort. On the night of 27/28 June, Dragonships from Binh Thuy AB in the Delta region flew four sorties in defense of Tra Ech outpost in Phong Dinh Province. About 100 Vietcong were launching a heavy attack on the post with 82-mm mortars and 75-mm recoilless rifles. By the time the first Spooky arrived and fired into Vietcong positions along canals adjacent to the outpost, the intense enemy fire had killed 10 of the defenders and wounded 2. When flares lighted the area, the Vietcong ceased their attacks but resumed them the instant the flares flickered out. Another AC-47 was called in when flares of the first were used up. Three armed helicopters added their fire-power as did fighters directed by the gunships. By the time the fight was over, the gunships had fired 29,500 rounds in helping to repulse the Vietcong. The night's performance constituted a milestone--the 1,000th outpost successfully assisted by Spooky crews.<sup>132</sup> A similar defense of Headquarters Quang Tin Province on the morning of 6 September drew praise from General Westmoreland, MACV Commander, who offered his "heartiest congratulations to air-crews involved for this outstanding example of quick reaction and professional airmanship resulting in significant loss to the enemy."<sup>133</sup>

(S) Earlier in 1967, high-level interest in the greater use of the gunships for base defense was aroused after the Vietcong bombarded Da Nang AB and the adjoining Vietnamese village of Ap Do during the early morning hours of 27 February. The shelling killed 47 persons and wounded 45 others, including 12 and 30 U.S. servicemen respectively. Eleven U.S. aircraft were destroyed or damaged.<sup>134</sup> This was the first time the enemy had put into action his 140-mm rockets which gave him an effective range beyond the base's defense perimeter. The implications for base defense throughout South Vietnam were immediately obvious. Any airfield the enemy judged worthy of attack was now a potential target. He could fire from previously prepared sites and drastically cut his time in position during an attack. What's more, the vast fire-power of the Russian-made 122-mm and 140-mm rockets could be devastating. These factors underscored an urgent need for more aircraft to bolster the static ground defenses of airbases.<sup>135</sup>

(S) The Da Nang attack touched off a reassessment of the base defense system and a fresh look at the gunship role. The first reaction was to expand the alert orbit over Tuy Hoa and several other bases.<sup>136</sup> This proved largely an expedient since the Vietcong timed their attacks while the AC-47's were on the far side of their orbit. What was really needed to help counter

the expected upturn in enemy attacks was an AC-47 alert orbit over every base throughout the critical night hours. As one base security officer sized up the situation: "At the present time and in the foreseeable future the AC-47 is the best deterrent we have to attack by mortar, recoilless rifle, or rocket."<sup>137</sup>

(S) Reacting to the Da Nang attack, Headquarters USAF queried the Commander in Chief, PACAF, on 28 February if he needed additional AC-47's for airbase security.<sup>138</sup> On 8 March the latter replied that more AC-47's were desirable but not if a "trade-off of other priority items would be required."<sup>139</sup> Seventh Air Force pressed PACAF on 20 March for an increase in the 4th Air Commando Squadron's total AC-47 authorization from 22 to 32 along with 297 additional manpower spaces. In support of this request, Seventh Air Force cited the Da Nang attack, noting that the AC-47 had continually proved an effective weapon system in combating night attacks but that "the present force of 22 AC-47's is insufficient to provide all-night airborne alert over major U.S. military bases."<sup>140</sup> In fact, about one-half the bases could not be covered. Faced with more frequent and aggressive night attacks on South Vietnamese bases and military complexes, Seventh Air Force believed the extra gunships essential. As an interim measure, it would divert four psychological warfare-equipped C-47's to nightly flare missions beginning 23 March. An analysis of enemy attacks had shown the hours from 2200 to 0300 as most crucial. The AC-47's on hand would fly most sorties during these hours.<sup>141</sup> Intermittent flaredrops would be made around Bien Hoa AB with all-night flaring in a 6- to 9-mile area surrounding Da Nang.<sup>142</sup>

(U) Headquarters PACAF urged CINCPAC to approve the Seventh Air Force request without a trade-off.<sup>143</sup> In turn, CINCPAC sought JCS approval of the requirement but warned that manpower spaces were not available "to compensate for requirements submitted."<sup>144</sup> On the 13th of April CINCPACAF told the Air Force Chief of Staff the base security situation was critical and that the additional gunships were a priority matter.<sup>145</sup>

(S) Two enemy attacks further highlighted the crucial condition of base defense--one on 7 May at Binh Thuy AB destroying four A-1 aircraft and two VNAF H-34 helicopters, another on 12 May at Bien Hoa AB destroying one F-100, one O-1, one VNAF A-1H, and some facilities.\* COMUSMACV and Seventh Air Force therefore

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\*Thirteen other aircraft (USAF and VNAF) received major damage. Eight persons were killed at Bien Hoa. [Hist (TS), PACAF, 1967, I, p 492.]

moved quickly to convert some C-47's obtained from VNAF's 417th Transport Squadron to gunships. Ten were to be converted by 1 September and another six by 1 January 1968 but supply shortages, primarily guns, plagued the conversion program. There was some hope that new MXU-470 guns for USAF AC-47's would arrive and free the older SUU-11 guns for the VNAF. The MACV commander went all out to spur the lagging operation, declaring that "the requirement for the tactical firepower capability of the AC-47 aircraft is immediate."<sup>146</sup> He also added his weight and solid backing to the request for additional gunships in a message to CINCPAC.<sup>147</sup> In the meantime, Seventh Air Force informed COMUSMACV it was arming UH-1F helicopters for defense of jet airbases.<sup>148</sup>

(S) The request for extra gunships hit Headquarters USAF and the DOD at a time when debate was under way to find a better aircraft as follow-on for the AC-47.\* Consequently, there was some hesitancy in approving an increase in AC-47's. Then too, the Air Staff advised CINCPACAF that even after the Secretary of Defense's approval, it might be 6 to 8 months before the gunships could be in place. Alarmed, the PACAF commander replied that he saw the "six to eight month delay in receiving additional capability inconsonant with urgency of requirement" and urged the time be sharply reduced. He proposed "beginning modification" of the aircraft at once on the basis of advanced attrition. This would--his argument ran--point up the possibility of fast deployment of the additional AC-47's and might help get the request approved.<sup>149</sup> At the same time, PACAF directed that Seventh Air Force survey its current resources to see if more gunship capability might be obtained in some way.

(S) With base defense still a hot subject in Vietnam, MACV planned a seminar for 10 June 1967 to discuss it. In preparing for the seminar and conducting the PACAF-directed survey of current resources, Seventh Air Force examined various aircraft as possible substitutes for gunships.<sup>150</sup> It evaluated but rejected the C-7A Caribou as inferior to the AC-47 in loiter time and armament capability.<sup>151</sup> In the eyes of Seventh Air Force officials the quickest way to beef up airbase defense was to expedite the VNAF C-47 conversion. To this end, a Southeast Asia Operational Requirement

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\*Seventh Air Force and PACAF took part in the debate and recommended the C-130 as the follow-on gunship.

(SEAOR) was submitted to Headquarters USAF on 28 May. It covered the modification of 16 VNAF C-47's with SUU-11 guns then being removed from USAF AC-47's to make way for the new MXU-470 guns.<sup>152</sup>

(S) On 27 May Headquarters USAF advised the PACAF Commander that five "advanced attrition replacement AC-47's" would be rushed in response to urgent airbase defense requirements--delivery hopefully to begin about 15 August. Simultaneously, the Air Staff asked TAC to see if it could spare PACAF some AC-47's, then receive replacements from among the five AC-47's due out of modification around 15 August.<sup>153</sup> TAC replied it could send PACAF two gunships without seriously harming its SEA training program.<sup>154</sup> Air Force Headquarters therefore directed TAC to have the best available crews ferry the aircraft to PACAF as soon as possible. Near the end of June--and before the two gunships left TAC--the Air Staff informed the CINCPACAF that substitutions of equipment would insure delivery of the additional AC-47's within 4 months of SECDEF's approval of the AC-47 request--an approval still pending. The Air Staff further stipulated that upon such approval the five advanced attrition gunships would be applied against the 10 additional AC-47's.<sup>155</sup> The PACAF Commander, approved the accelerated deployment of the five gunships. He turned down TAC's offer of the two gunships, noting that expenditure of funds and equipment for their transfer seemed unwarranted.<sup>156</sup>

(U) While these steps were being taken to shore up airbase defenses and augment the gunship force, the enemy launched a second major attack on Da Nang. It came early on 15 July--a 17-minute barrage of 140-mm and 122-mm rockets that created havoc. Eight Air Force men were killed and 138 wounded. Eleven aircraft were destroyed, 31 damaged. Structural damage was slight except in the bomb-storage area. Five AC-47's supported Da Nang during the attack, dropping flares and raking the rocket-firing positions with 26,000 rounds.<sup>157</sup> Once again the base defense problem was spotlighted but not resolved.

(S) On the 14th of August, OSD's revised guidelines for additional military deployments to Southeast Asia\* authorized an additional 10 AC-47's for Southeast Asia effective October 1967. In line with this, the Air Force directed the 14th Air Commando

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\*SEA Deployment Program No. 5.

Squadron (Fire Support) be activated in October 1967 with an authorization of 16 AC-47's. It also cut the gunship authorization of the 4th Air Commando Squadron (Fire Support) from 22 to 16.<sup>158</sup> Thus the 32 authorized AC-47's were evenly split between the two gunship squadrons. To fill the increased authorization and to meet attrition requirements, Headquarters USAF instructed AFLC to modify eight more AC-47's for December 1967 deployment.<sup>159</sup> It noted that the aircraft were available from command excess and should be programmed promptly into the contract facility for inspection and repair as necessary (IRAN), camouflage paint, and modification. On 9 September 1967 the Air Staff requested TAC and PACAF to coordinate deployment schedules, personnel requirements, and SEA base problems.<sup>160</sup>

(S) Representatives of the Seventh Air Force and the 14th Air Commando Wing (the gunship parent unit) met on 15 September 1967 to plan operations for the larger gunship force. They produced a new plan for AC-47 deployment (Table 1). The operational concept called for a better contribution by gunships to airbase defense.<sup>161</sup> The FOL at Da Nang would be augmented and a new FOL added at Phang Rang. The special value of Da Nang stemmed from its nearness to an operationally active area. Phan Rang gave greater tactical dispersion and better coverage in that area.<sup>162</sup> The larger (five aircraft) flights at Da Nang and Binh Thuy would have the heavier firepower essential in the highland and delta regions. The two flights at Nha Trang on the central coast would form a supplementary pool for support either to the north or south.<sup>163</sup> The entire concept pivoted upon the dispersal of flexible and quick-reacting units of workable size.

(S) The 14th Air Commando Squadron was to be activated on 25 October 1967 at Nha Trang AB and assigned to the 14th Air Commando Wing. Since the squadron would be organized on a one-officer-and-one airman basis,\* it would most likely be December before all its aircraft and aircrews arrived to implement the new operational plan. In the interim the 4th Air Commando Squadron would continue as before.<sup>164</sup> When the additional aircraft and aircrews arrived in the theater, they would first go to the main operating base at Nha Trang then to the 14th ACSq's operating flights.<sup>165</sup>

(S) Amid these preparations a modified C-130A--the prototype Gunship II--reached Nha Trang AB on 21 September to undergo SEA

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\*PACAF SO G-189 (S), 23 Oct 67.

TABLE 1 \*

## AC-47 DEPLOYMENT

<u>Flight</u>	<u>Air Base Location</u>	<u>Aircraft</u>	<u>Aircrews</u>	<u>Operational Frags<sup>+</sup></u>
<u>4th Air Commando Squadron--16 aircraft UE (1 NOA)</u>				
A	Da Nang (FOL)	5	7	4
B	Fleiku (FOL)	4	6	3
C	Phu Cat (FOL)	4	6	3
D	Nha Trang (MOB)	3	5	2
<u>14th Air Commando Squadron--16 aircraft UE (1 NOA)</u>				
A	Nha Trang (MOB)	3	5	2
B	Phan Rang (FOL)	4	6	3
C	Bien Hoa (FOL)	4	6	3
D	Binh Thuy (FOL)	5	7	4

\*Abbreviation key: UE--unit equipment  
 FOL--forward operating location  
 MOB--main operating base  
 NOA--nonoperational aircraft

<sup>+</sup>A "frag" (fragmentation operations order) was the daily supplement to standard operations orders governing the conduct of the air war in SEA. It contained mission number and function, type of ordnance, time on target, and other instructions.

SOURCE: Staff Summary Sheet (S), 7th AF, AC-47 Realignment, 16 Sep 67.

(This page is Unclassified)

combat evaluation. This follow-on gunship carried four (M-61A1) 20-mm Vulcan cannons, four (MXU-470/A) 7.62-mm miniguns, sensors, and illumination devices.<sup>166</sup> It represented a major advancement in gunship development but its effectiveness could only be surmised at this time.<sup>167</sup> Seventh Air Force, however, had already gone on record as recommending just this aircraft to replace the effective but aging AC-47. Still, the substitution of AC-130 gunships for AC-47's remained uncertain at this point.

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(S) Refinements to perfect the AC-47 went on. In January 1967 the Air Force received the first MXU-470/A minigun modules for the Spooky aircraft.<sup>168</sup> Features of the new gun surpassing those of the SUU-11A included: electric loading, a vertical drum holding 500 more rounds, easier access for inflight maintenance, and a simplified boresight. The MXU-470/A's vertical design also took up less space. It was anticipated that mounting the guns closer together would leave the cargo door clear for quicker egress. Further, the MXU-470/A was expected to overcome a serious problem of the SUU-11A<sup>\*</sup>--the need to manually load and delink belted ammunition during combat which at times dented or damaged rounds that could jam the drum-feeder system.<sup>169</sup> Two of the new guns were mounted on each of three AC-47's from C Flight, 4th ACSq. Unfortunately, the mounting proved unsatisfactory so all MXU-470/A modules were withdrawn pending a review of

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\* On 9 March 1966 WRAMA had received a funded purchase request from ASD for procuring GAU-2A miniguns and MXU-470/A modules at a cost of \$42,000 per unit (\$80,000 per unit including spares and labor). Previously, General Electric had signed a \$2 million contract with AFSC for development of the MXU-470/A with this 1966 delivery schedule: 7 in June, 25 in July, 25 in August, 25 in September, and 6 in October. Slippage, however, led WRAMA to notify Seventh Air Force in September 1966 that the first of the new modules would not be delivered until October 1966. [AFLC Historical Study 374 (S), AFLC Support of Forces in Southeast Asia: Special Aircraft Projects, 1965-1968 (AFLC, Feb 1971), pp 42-43.]

installation instructions.\*<sup>170</sup> The difficulties were largely overcome a few months later except for spare parts. These became so critical during July-September 1967 that the firing rate was cut back from 6,000 to 3,000 rounds-per-minute to prolong barrel life and reduce feeder mechanism wear. Concerted action of units in South Vietnam and WRAMA eventually eased the gun problems.<sup>171</sup>

(C) Other AC-47 modifications centered on increased safety of operations.<sup>+</sup> In Southeast Asia a newly designed ceramic, armorplated flareholder was installed along with a 2 1/2-gallon, 100-pound-per-square-inch, water fire extinguisher.<sup>172</sup> Meanwhile, in the United States the Air Force and Navy jointly developed and tested a 4-tube, 24-flare, semiautomatic flare launcher. This remotely controlled launcher could be reloaded in flight and jettisoned automatically should a flare accidentally ignite inside the aircraft. AFLC concentrated on an emergency smoke-removal system for the AC-47. Experience had shown crew survival to depend on swift removal of toxic smoke resulting from an onboard flare ignition. Evaluation of smoke-removal kits began in late 1967.<sup>173</sup> Lastly, flak curtains were hung behind gun positions to protect gunners from shrapnel flying off an operating weapon.<sup>174</sup> All these developments aimed at more crew security.

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\*Mounting the rear module was the chief problem in installing the new MXU-470/A. After pinpointing the difficulties in January 1967, the engineers redesigned the installation. On 5 April 1967 the 14th ACWg notified WRAMA that 26 new modules had arrived without installation instructions. WRAMA's reply of 12 April outlined the difficulties in the rear module installation and agreed to send engineering information and drawings. The need to reinforce the window for the third minigun brought further delays. Not until June 1967 were modification kits and instructions ready for shipment to Nha Trang AB. [*Ibid.*, pp 43-45.]

<sup>+</sup>By mid-1967 several electronic changes had been made FM-622A radios with homing adapters were substituted for ARC-44 VHF-FM radios with ARA 31 adapters. ARN-7 radio compasses replaced the ARN-6 models and APX-25 AFF/SIF replaced the APX-6 IFF. Red night lighting was provided for the cargo area to improve safety during total blackouts. [AFLC Historical Study 374 (S), AFLC Support of Forces in Southeast Asia: Special Aircraft Projects, 1965-1968 (AFLC, Feb. 1971), pp 50-51.]

(C) As 1967 ended the U.S. Air Force could point to another highly productive year of gunship operations. The Spooky Count had soared to 1,596 outposts and hamlets successfully defended. Crews spoke proudly of not having an outpost overrun while a dragonship was overhead.<sup>175</sup> Ammunition expenditure, peaking in September at 4,733,633 rounds, testified to the intense activity of the AC-47's.<sup>176</sup> Operations expanded even more as stepped-up enemy attacks impelled military commanders to look to the gunships as a critical supplement to base defenses. A total of 3,650 enemy were credited as confirmed kills for the AC-47's with about an equal number categorized as probable.\* The 4th Air Commando Squadron lost three aircraft to enemy ground fire. A fourth disappeared while on normal orbit off the coast near Cam Ranh Bay. A fifth crashed on landing and was destroyed at Binh Thuy AB. All losses happened during the first half of the year.<sup>177</sup>

(U) Significantly, the first major gunship increase began in 1967. The year saw a new gunship squadron added, 10 more AC-47's authorized, and conversion of some VNAF C-47's to gunships started. Entering the picture for the first time was the follow-on aircraft for the AC-47. Debate in Washington had seemingly settled on the C-119 as the best available replacement for the AC-47. Nonetheless, the AC-130A (Gunship II) had arrived in South Vietnam for combat evaluation. The gunship force was not only expanding in Southeast Asia--a sign of its efficiency--it was also on the climb to greater sophistication.

#### 1968 Gunship Operations

(U) As 1968 opened, there was an air of optimism in South Vietnam and Washington that the tide in the war had turned against the Vietcong and the North Vietnamese. U.S. and South Vietnamese officials warmed at the thought of their vastly reinforced air, ground, and naval forces arrayed against a believed weakening foe. They singled out the enemy's loss of men, decline in control over the population, and failure to mount major offensives as proof the Allies were closing in on their objectives. This optimism was severely jolted during the early morning hours of 30 January as the North Vietnamese touched off their month-long Tet Offensive. Coincident with the shock came a depressing American concern over the enemy's encirclement and siege of 6,000 U.S. Marines and a South Vietnamese Ranger battalion at Khe Sanh.<sup>178</sup>

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\*Figures totaled from four quarterly historical reports of the 14th Air Commando Wing.

(S) Before the Tet Offensive, military commanders in South Vietnam had shared the pervading optimism but considered a large-scale enemy assault as highly possible. Gen. William W. Momyer, Commander, Seventh Air Force, and General Westmoreland both expressed such concern in January. Nevertheless, the period of Tet\* was a most important celebration and the Saigon government did not disrupt holiday plans. Liberal leaves and passes left ARVN units (outside I Corps) at 40 to 50 percent of their normal strength. Some units were on alert, many were not. Consequently, the severe and widespread attacks rocked American and South Vietnamese troops. Heavy fighting hit Saigon. The old Vietnamese capital Hue was overrun and largely destroyed in the ensuing battle. The enemy struck 36 of 45 provincial capitals, 64 of 242 district capitals, and 50 hamlets. His attacks on major airfields and other installations destroyed 53 aircraft and damaged 344.<sup>180</sup> One of the enemy's greatest offensives of the war, it inflicted immense damage. Its timing, strength, and psychological shock (particularly on the American public) overshadowed the equally disastrous impact on Vietcong and North Vietnamese strength.<sup>179</sup>

(U) The enemy's Tet Offensive dictated an almost complete commitment of air power. Spooky gunships were hard-pressed to keep up with demands on them. On several occasions AC-47's on airborne alert were able to instantly pinpoint rocket and mortar positions firing on friendly installations. For example, as the offensive began, the 4th ACSq AC-47's and crews deployed from Nha Trang and Phu Cat to Da Nang to bolster security in that often hit area. On the night of 3-4 March the Vietcong and North Vietnamese assaulted 12 separate locations in the Da Nang tactical area of operations but did not strike the airbase. At the time, Spooky 11 and Spooky 12 were flying airborne combat air patrol (CAP) over Da Nang and its helicopter satellite field Marble Mountain. Minutes after the enemy attacked southwest of the main base, Spooky 11 engaged the site firing the rockets. Secondary explosions erupted. The next day, ground parties came upon unused rocket rounds denoting a premature end of the enemy attack.<sup>181</sup> The quick response of the gunships in striking enemy firing locations was credited with curtailing the attacks and reducing damage and losses.

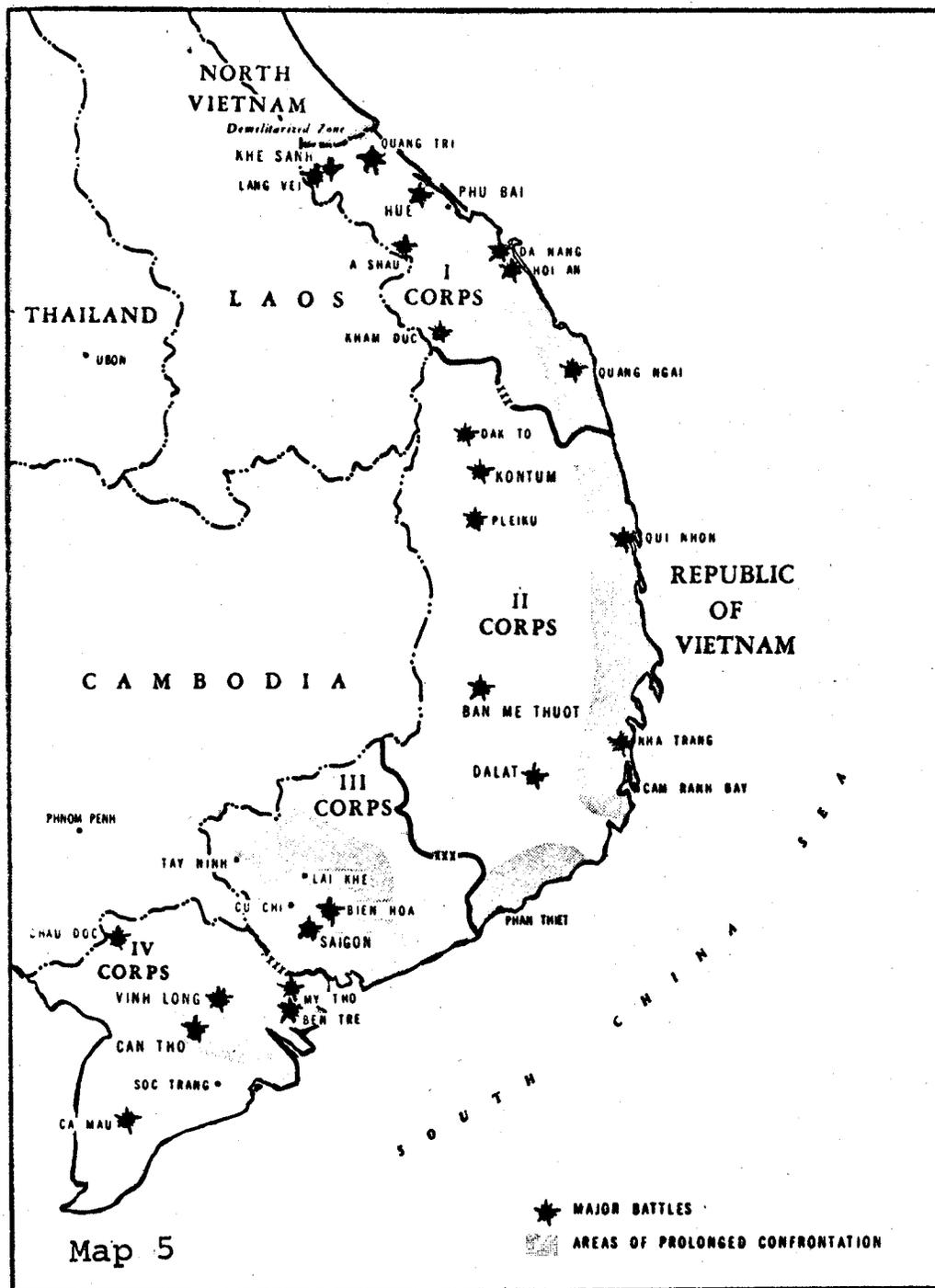
(U) The 14th Air Commando Squadron, under the command of Lt. Col. Charles A. Hodgson, became operational on 15 January.

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\*The Vietnamese New Year based on the first day of the lunar year. In 1968 it fell on 30 January.

# MAJOR BATTLES AND SIGNIFICANT LOCALITIES

## Tet: 1968



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Almost at once its AC-47's were tested in the southern half of the country by the Tet Offensive. During February, with only 13 aircraft, the 14th averaged 11 missions and 168,000 rounds expended each night. In the first 3 months its gunships flew 170 missions in support of troops in contact, 491 in defense of villages, and 6 in defense of airbases. Gunship and maintenance crews had to exert an all-out effort to handle the expanded flying requirements.<sup>182</sup>

(U) Two other operations underscored the potent advantages of the Spooky gunships in 1968. The night of 1 March, Spooky 41 and Spooky 42 attacked a 700-ton munitions trawler at Bai Cay Bay --11 miles north of the gunships' base at Nha Trang. The trawler was exchanging fire with gunboats of the U.S. Navy and the Vietnam Navy. In the words of Spooky 41's commander, Lt. Col. Richard C. Lothrop:

We had been firing on the ship and it had run aground about 20 yards from the shore. It began burning. In a few minutes, the intensity of the fire had greatly increased. Then it just blew up. It was a spectacular explosion. . . .A fireball went 1000 feet into the air. It was obviously a load of munitions.<sup>183</sup>

Lt. Col. Robert C. Dillon, commander of Spooky 42 (which relieved Spooky 41), reported:

There was a large secondary explosion when we fired on the tree line just north of the beach area where the ship was grounded. Ten minutes later we were working over an area southwest of the burning ship when we caused another secondary explosion about 180 feet up the side of a hill.<sup>184</sup>

Together, Spooky 41 and Spooky 42 expended over 38,000 rounds while on the scene from 0130 to 0700. They were credited with sinking one ship and destroying tons of enemy munitions.<sup>185</sup>

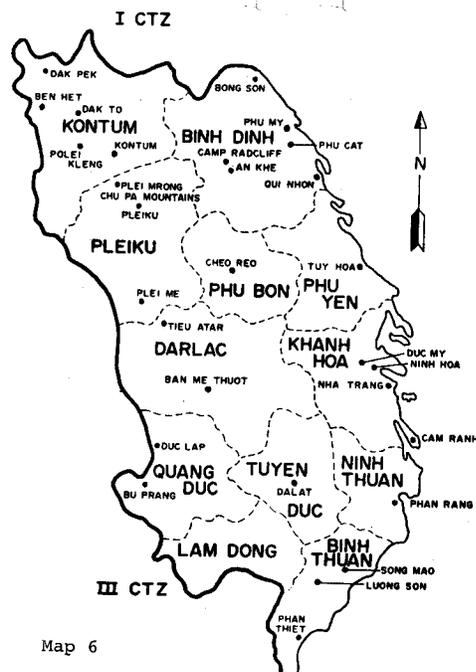
(U) The second Spooky operation occurred in western Quang Duc province. It was in defense of a compound at Duc Lap consisting of MACV Subsector Headquarters, Civilian Irregular Defense Group (CIDG) camp, and outposts. The Vietcong and North Vietnamese opened up on the compound at 0105 on 23 August. Firing of rockets and mortars was instantly followed by a sapper attack on key positions. U.S. Army helicopters arrived within 30 minutes

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of a call for air support. Two Spookies from Nha Trang and Pleiku joined the action 15 minutes later. At once they illuminated the area and raked the defense perimeter with minigun fire. Enemy sappers cut through extensive wire emplacements and several fire fights broke out within the compound. Eight American advisors--six wounded--abandoned their burning bunker at 0700 to take up positions on the northeast defense perimeter. The gunships experienced heavy automatic fire from at least 10 AA sites spotted around the embattled area. Major Daniel J. Rehm, pilot of Spooky 41, observed:

When we arrived, the buildings in the compound were all afire and the men were grouped in a blockhouse below the burning operations center. I set up a quick orbit of the area and began firing on targets about 200 to 300 meters from the camp. Almost immediately we began receiving intense anti-aircraft fire from four different points. I began with a long burst at a target from my mini-guns but when the tracers started to fly close to us, I moved to another altitude and began to "peck" with short bursts at the enemy locations. 186

**LOCATION OF ENEMY INITIATED INCIDENTS**  
**II Corps Tactical Zone**  
**1969**



Map 6

(U) The enemy held to the attack in the teeth of an onslaught of gunships, tactical fighters, B-52's, and assorted Army aircraft. For the next several nights at least one Spooky supplied flare illumination and firepower over Duc Lap. In 228 flying hours the gunships expended 761,044 rounds and 1,162 flares. During the first days of the assault as many as four AC-47's worked the area simultaneously. The heavy air traffic led to the designation of the first aircraft over the target (usually a gunship) as onscene commander. His job was to assure safe altitude separation, target entry and departure, and maximum ontarget fire of all aircraft. Most important, however, was that all this air effort saved another outpost. The AC-47's not only dealt the attackers savage blows but stiffened the confidence of the defenders--particularly at night. As the men at Duc Lap put it, Spooky truly became their "Guardian Angel."<sup>187</sup>

(U) Excellence of gunship operations brought the Presidential Unit Citation in June 1968 to the 14th Air Commando Wing and thereby to the 4th Air Commando Squadron. The award covered the wing's operations in South Vietnam from 8 March 1966 to 7 March 1967.<sup>\*188</sup> On 3 July the 14th Air Commando Wing also passed the 100,000th mission mark in the Republic of Vietnam.<sup>189</sup> The gunships figured prominently in the attainment of both these milestones. Moreover, as the mission milestone was reached, the gunship squadrons celebrated their own successful defense of 2,284 Allied outposts<sup>190</sup> and the Spooky count continued to mount.

(U) The nature of AC-47 operations deviated little during the year but there were some organizational changes. On 1 May the 14th Air Commando Squadron became the 3d Air Commando Squadron (Fire Support).<sup>191</sup> After a further redesignation on 1 August the wing and two squadrons became the 14th Special Operations Wing, 3d Special Operations Squadron, and 4th Special Operations Squadron.<sup>192</sup>

(S) The need for closer relations with ground units became evident at midyear. The constant turnover of ground personnel prompted some Spooky crews to report that ground controllers did

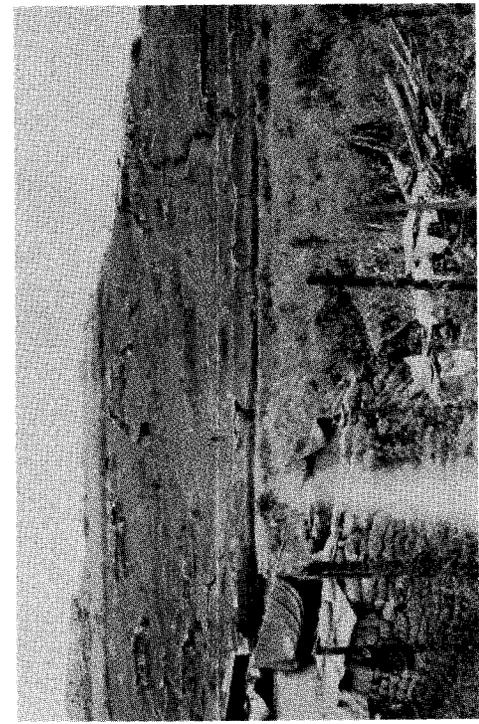
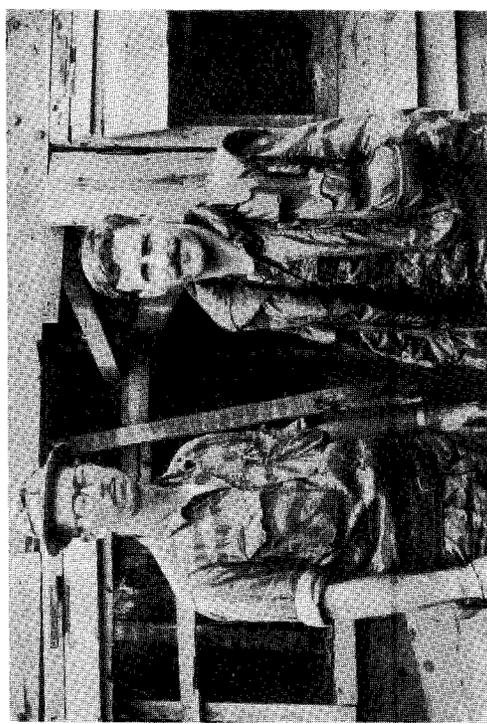
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\*The citation read in part: "Flying the venerable C-47 aircraft, one squadron of the wing helped abort a large number of night hostile operations against friendly forts and hamlets through flare drops and minigun saturation fire."

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The Duc Lap special forces camp, August 1968, where USAF gunships beat off a 4,000-man enemy force. In upper left photo is Army Lt. W. L. Harp (l.) and Capt. W. F. Arnold, USAF, a FAC who directed air strikes at the camp.



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not know what a gunship was or what it could do. This gap in understanding impaired the quality of gunship ground support. Hence the 14th Special Operations Wing (SOWg) and the gunship squadrons tried to brief Spooky's operational capabilities to members of the Direct Air Support Centers (DASC's) and air liaison officers in each of the four corps areas.<sup>193</sup> Some progress along this line had been made over the years since the gunships first appeared in Southeast Asia. For example, the U.S. Army's I Field Force Vietnam had written a regulation\* explaining the missions, characteristics, capabilities, limitations, rules of engagement, and operations of the gunships. It briefly covered what a ground commander needed to request and employ a gunship. In addition, an effort was made to keep the regulation up to date. Nevertheless, maintaining liaison with the Army on Spooky operational capability seemed a recurring problem.<sup>+</sup>

(C) The Direct Air Support Center in each corps area formed the key link in gunship operations. Ground units requested Spooky support through the proper DASC by giving a unit call sign along with a primary and alternate radio frequency (FM, UHF, VHF, or HF). The DASC relayed this information to a Spooky on airborne or ground alert. In light of the scarcity of gunships, it was understood they would be diverted only to assist troops in contact with the enemy. Once Spooky and the engaged unit were in contact, the ground controller marked the location of friendly elements and the enemy's position by fire arrow (or other pyrotechnic), strobe light,<sup>‡</sup> or flashlight. If possible, the ground controller also supplied information on probable enemy routes of approach and withdrawal, location of any friendly artillery fire, and the maximum arc of such fire above the terrain. Next the gunship dropped flares on order of the ground commanders. The rules of engagement forbade Spooky's firing on a target until contact with the ground commander was made directly or through forward air controllers. Furthermore, Spooky could not open fire without a FAC clearance unless

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\*IFFORCEV/Reg 525-11, AC-47 (Spooky Weapons System), 20 Aug 68.

<sup>+</sup>To improve communications with ground troops, an informal pamphlet on "Gruntisms" (terminology and vocabulary used by ground troops) and SEA radio terminology was available at FOL's. [Hist (S), 14th SOWg, 1 Oct-31 Dec 69, Standardization Section.]

<sup>‡</sup>A light that produces short intense flashes.

the ground commander identified himself and reported an emergency.\* At times a "walk-in"<sup>+</sup> adjustment of fire would be coordinated between the ground controller and gunship crew.

(C) In September 1968 the Air Force experimented with employing an AC-47 with Marine helicopter gunships. Dubbed Night Hawk, this night hunter-killer operation had the helicopter use a night observation device (NOD) to locate enemy troop concentrations and mark the target area for Spooky's superior firepower. The first mission on 16 September obtained no results. The same was true of a later "well planned and well executed" mission.<sup>194</sup> Commanders considered the concept promising but Night Hawk never became a standard operation. It did, however, bring to the fore the need for a NOD in the AC-47 so it could detect and destroy targets without aid from other aircraft.<sup>195</sup>

(S) Several AC-47 modifications were considered and tested during the year. The Special Air Warfare Center requested a semiautomatic flare launcher for its gunships, complete with bulletproof jettisonable flare-storage containers. SAWC coupled to this request the proposed installation of an emergency smoke-removal (eraser) system for six AC-47's.<sup>196</sup> Both these improvements were eventually to become standard on gunships. Additionally, to vary the use of C-47 aircraft, SAWC asked that some of the AC-47's flare launchers be pallet-mounted for rapid installation and removal. Since August, Microtale sensor-monitoring receivers had been evaluated in Southeast Asia. The results turned out so well that Seventh Air Force proposed in October that 26 AC-47's be so equipped. It maintained that with the growth of airdropped sensor fields, the gunship's sensor monitor refined target detection in enemy base areas, along trails, and around friendly bases. Seventh Air Force accordingly recommended the portable receiver be used in all gunship aircraft.<sup>197</sup>

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\*These procedures were spelled out for U.S. Army personnel in I Field Force Vietnam Regulation 525-11, 20 Aug 68. For a detailed discussion of gunships and techniques see Major Victor B. Anthony's Tactics and Techniques of Night Operations, 1961-1970 (TS) (Ofc/AF Hist, Mar 1973).

<sup>+</sup>A step-by-step adjustment of fire by the FAC until the gunship had zeroed in on the target.

(U) The year 1968 had commenced with frenzied response to the enemy's Tet Offensive. It closed with the AC-47's showing steady solid performance in a variety of missions. Perhaps but a few people realized that 1968 was to be the peak year of USAF AC-47 operations and strength. Signs of decline came into view--the equipping of the VNAF with Spookies and the planned arrival of the more advanced AC-119's. Still the strength of AC-47 operations at year's end differed little from the year's start.

#### 1969 Gunship Operations

(U) The year 1969 would mark the final year of USAF Spooky operations in the Southeast Asian War. Both the 3d and 4th Special Operations Squadrons would be deactivated and their aircraft turned over to the Vietnamese Air Force and Royal Laotian Air Force. The return of the Spookies to Laotian operations after an absence of over 3 years would leave in Thailand at year's end only a trace of the once-strong USAF AC-47 force. While most attention fell on unit deactivation and the return to Laotian operations, Spooky would fly the usual missions in South Vietnam almost up to the year's close.

(S) The dragonships went back to Laos because that portion of the Southeast Asian War took a sudden turn for the worse. The conflict there had seesawed since 1962. Each dry season--roughly from mid-September to mid-May--the North Vietnamese and Pathet Lao\* would move from bases in northeast Laos toward the Plain of Jars. Every wet season the Royal Laotian forces and those under the Meo† General Vang Pao would strike back as the enemy met with resupply problems. In December 1967 the enemy set about making the roads more serviceable in bad weather and stockpiling supplies. This let him push farther into central Laos, where he ensconced himself as poor weather arrived. From 1 January to 15 May 1969 an enemy offensive had wrested 34 major operational or support (Lima Site)‡ bases from pro-government forces in the northern (Barrel Roll) area of Laos.<sup>198</sup> The rapid loss of Lima Sites and splintering of government forces brought on a crisis by March.

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\*A Laotian Communist military force or person.

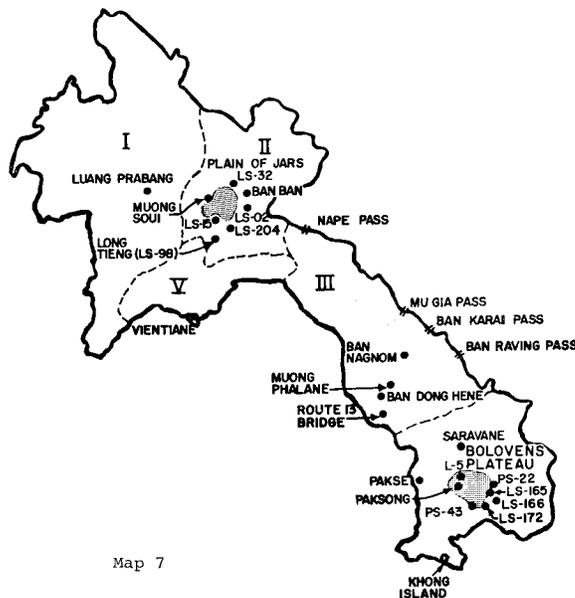
†Meo--An aboriginal people of China inhabiting Southwest China and the northern parts of Laos, Thailand, and Vietnam.

‡Lima Site--An aircraft landing site (dirt strip) used as a resupply point.

(S) The 1969 crisis siphoned aircraft from Commando Hunt operations: C-130 Blindbat flareships, AC-130 Spectre gunships, and at times C-123 Candlestick flareships. This diversion grew until it hurt Commando Hunt operations. To fill the gap temporarily, Seventh Air Force decided to shift some AC-47's to Thailand to help meet flare drop/fire support requests from commanders in Laos.<sup>199</sup>

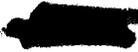
(S) Col. William H. Ginn, Jr., Deputy Commander for Operations, 14th SOWg, flew to Laos to visit General Vang Pao to explain how the Thai-based Spooky gunships could best be used. He found the Meo leader hard-pressed by North Vietnamese attacks in Military Region II, the enemy apparently intending to oust Meo and Laotian units from the area north of the Plain of Jars. Colonel Ginn projected an aura of professional toughness in his meeting with Vang Pao as he sought to bolster Meo morale and convince his hosts "we knew our business and that we were good at it." He provided the General strobe lights for better marking of Meo

## LAOS



Map 7

\*Commando Hunt I, III, V--Air interdiction campaigns directed against the flow of supplies from North Vietnam to Vietcong and North Vietnamese forces in South Vietnam and Cambodia. These campaigns in southern Laos (Steel Tiger area of operations) bore numerical designations that changed with the semiannual monsoonal shift. The three northeast-monsoon, or dry-season campaigns, took place in 1968/1969, 1969/1970, and 1970/1971. They covered roughly the period from October through April.

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positions and briefed Vang Pao on gunship capabilities.\* The Colonel assured the General that he "had lost his last Lima Site."200 The Meo chief responded enthusiastically and Colonel Ginn departed believing he had not only given Vang Pao more combat effectiveness but also a tremendous morale boost.

(S) Seventh Air Force in coordination with Thirteenth Air Force ordered the Spooky gunships to Udorn RTAFB for support of Lima Site defense in the Barrel Roll area. Two AC-47's and 23 personnel from the 4th SOSq went to Udorn on 12 March<sup>+</sup> followed by an additional 2 AC-47's and 28 personnel 3 days later.201 Blue Chip--the out-country control agency at Headquarters Seventh Air Force--would direct Spooky operations over Laos. The orders would be relayed through Alleycat, the nighttime orbiting ABCCC controlling the Spookies.202 One AC-47 would be on night airborne alert backed up by another on ground alert.

(S) Quickly the AC-47's moved into action. On the night of 15 March 1969, a ground forward air guide (FAG)--called Swamprat--directed a Spooky and two A-1 aircraft against enemy troops attacking a friendly outpost (UG-922059). One ground unit reported: "Fire from the 'Spooky' was extremely accurate and following the attack, friendly troops reported seeing enemy troops carrying their wounded to high ground northeast of the target area." The outpost stayed in friendly hands.203

(S) During 19-20 March, Spooky put withering fire on enemy troops assaulting a friendly outpost. The site commander saw 175-200 enemy dead and wounded being carried from the battlefield. He attributed most of these casualties to AC-47 miniguns. On 20 March a FAC in the Bouam Long area reported an enemy withdrawal from an 82-mm mortar position in the wake of accurate Spooky fire.204 Such actions did double duty. They broke up enemy attacks and at the same time lifted the morale of the besieged men. As in South Vietnam, the gunships were at their best against

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\*When Colonel (now Brig. Gen.) Ginn returned to Udorn RTAFB, he called the Spooky crew members together and informed them it was up to them to make good his pledge. [Intvw (U), author with Brig. Gen. William H. Ginn, Jr., Maxwell AFB, Ala., 9 January 1974.]

<sup>+</sup>The date varies. History (S), 14th SOWg, 1 Jan-31 Mar 69 (no page number) says the new operating location at Udorn was established "11 March." Page 20, same source, says: "On 14 March 7th Air Force directed that the Wing assign AC-47s and crews to Udorn RTAFB...."



concentrations of troops breaking into the open in attacks on outposts.\*

(U) Profuse praise poured in for gunship deeds in Laos. In May the American Air Attache in Vientiane, the Laotian capital, congratulated Seventh Air Force for the "outstanding support" supplied by the Udorn Spooky detachment. He wrote: "The concentrated firepower provided by AC-47s of this detachment has been a major factor in site defense and air to ground support for tactical operations in northern Laos."<sup>205</sup> Site commanders expressed similar sentiments.<sup>206</sup> After commitment of the Spookies in March, no Lima Site fell--thus making good Colonel Ginn's promise to General Vang Pao. Indeed, the General recaptured some Lima Sites previously lost.

(S) Recommendations that the AC-47's be left at Udorn grew out of their success in the Barrel Roll area of Laos.<sup>207</sup> Moreover, North Vietnamese strength in Laos had risen by four to five battalions. As of 5 May 1969 about 9 battalions threatened 900 friendly troops defending Lima Sites 32 and 50.<sup>208</sup> In July the CINCPACAF agreed gunship operations might have to continue from Udorn but he suggested to Seventh Air Force a possible permanent deployment of AC-119G gunships instead of the Spookies.<sup>209</sup> Meantime, the onset of the southwest-monsoon rain so limited air activity that two Udorn-based AC-47's were sent back to Vietnamese bases on 9 June.<sup>210</sup>

(S) Spooky successes in Laos also gave impetus to a program for converting Royal Laotian Air Force C-47's to gunships. Originally, four were to be modified. A series of events, however, caused abandonment of the conversion. The transfer of eight VNAF C-47's with 7.62 SUU-11 Mod kits to the RLAF was arranged instead. The first five VNAF aircraft were turned over on 5 July 1969

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\*To spread awareness of Spooky's capabilities, a firepower and flare-illumination demonstration was planned for the Laotians around unoccupied Lima Site 113 on 20 June 1969. [Msg (S), 7/13AF to 7AF, subj: Spooky Capability Demonstration, 13 Jun 69; Maj Richard F. Kott, The Role of USAF Gunships in SEASIA (S) (Hq PACAF, Project CHECO, 30 Aug 69), p 19.] Maj. Gen. David C. Jones, Deputy Chief of Staff, Operations, Seventh Air Force, sounded a note of caution amid the glowing praise for Spooky. On 28 March 1969 he wrote to Maj. Gen. Louis T. Seith, Deputy Commander, 7/13AF: "As you will recognize in our operations in Barrel Roll, we have to walk a fine line between giving support when needed but not to whet their appetites for air to the extent that they fall back and count only on air."

and the last one on 2 October 1969. By 30 September 1969 five of these aircraft had been modified into gunships.<sup>211</sup> This equipping of the RLAF with gunships was assisted by transfer of the 3d Special Operation Squadron's AC-47's to the VNAF.<sup>212</sup>

\* \* \*

(S) The significant downturn in USAF Spooky strength marked the mounting stress on Vietnamization of the war--a highly publicized national policy embraced by the Nixon administration. The arrival of the follow-on AC-119G gunships began the one-for-one trade-off that was to make the AC-47 surplus to USAF needs. On 26 June 1969 all Spookies of D Flight, 3d SOSq, were flown from Binh Thuy to Nha Trang,\* where their ceremonial transfer to the VNAF took place on 30 June.<sup>213</sup> The 3d SOSq flew its last mission on 7 August and was inactivated on 1 September 1969.<sup>214</sup> This left the 4th SOSq the sole surviving USAF Spooky unit and it was scheduled for inactivation on 15 December 1969.<sup>215</sup> The end of USAF Spooky operations was definitely in sight.

(S) As the 3d SOSq left the scene, the 4th SOSq had to re-shuffle its AC-47 forces. It closed out its forward operating location at Phu Cat and took over the former 3d SOSq FOL at Bien Hoa. Squadron deployment then stood:<sup>216</sup>

<u>Air Base Location</u>	<u>Aircraft</u>	<u>Missions Per Night</u> <sup>+</sup>
Da Nang (FOL)	4	3
Pleiku (FOL)	2	1
Nha Trang (MOB)	4	1
Bien Hoa (FOL)	3	2
Udon (FOL)	2	2

\*The 3d SOSq transitioned toward deactivation as early as 13 February 1969 when B Flight at Phan Rang was abolished, its aircraft redistributed to other FOL's, and its frag missions deleted. [Hist (S), 14th SOWg, 1 Jan-31 Mar 69.] Two 3d SOSq aircraft had been transferred to the 4th SOSq on 10 February 1969. Also, the Military Personnel Center had been alerted to a cut in crew authorizations stemming from the transfer of AC-47's to VNAF. [Msg (S), CINCPACAF to USAFMPC, subj: AC-47 Transfer, 28 Jun 69.]

<sup>+</sup>All were airborne missions except for one airborne and one ground alert at Udon.

The 4th SOSq's return to control of AC-47 flights in the III and IV Corps areas of South Vietnam harked back to its 1965 operations in the war theater. Seemingly the 4th had come full circle after nearly 4 years of war.

(S) Spooky deployment after the deactivation of the 3d SOSq was rather short-lived. The change of bases planned in the Nha Trang Proposal\* and the anticipated arrival in late 1969 of the AC-119K's would bring additional realignment in gunship force locations. However, the 15 October 1969 relocation of the 4th SOSq's flight and squadron headquarters from Nha Trang to Phan Rang was the sole major move involving AC-47's.<sup>217</sup> Before this shift, a Bien Hoa Spooky fell to enemy ground fire on 1 September and two others suffered damage from mortar fire at Pleiku. This forced a reduction of the 4th's fragged missions to six airborne and one ground alert in September.<sup>218</sup>

(U) As the Spookies gradually reduced operations, they could proudly look back over the year at a fattened statistical record. The AC-47's had averaged 20 sorties each night throughout the Republic of Vietnam. Flight A of the 4th SOSq, based at Da Nang, hit a new daily high on 27 February when it fired 219,800 rounds in defense of friendly forces.<sup>219</sup> During the first 6 months of 1969, the two Spooky squadrons were credited with 1,473 enemy killed.<sup>220</sup> The boast of having successfully defended over 3,000 outposts, villages, and hamlets was often heard. The intense pride in this record stood out strongly in 14th Special Operations Wing's vigorous opposition to a Seventh Air Force suggestion that the call signs of the AC-47 and AC-119 be changed regularly.<sup>+</sup>

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\*The Nha Trang Proposal was approved by CINCPACAF and CSAF between 15-18 January 1969, COMUSMACV 6 February 1969, CINCPAC 19 February 1969, and JCS 26 February 1969. Purpose of the move was to: (1) save military manpower spaces, (2) let the VNAF use Nha Trang's jet training facilities and thereby avoid construction to modernize and update such facilities elsewhere, (3) curtail spending of U.S. currency at Nha Trang for villa rents and hotel leases, and (4) ease the growing friction between large numbers of U.S. military personnel and the civilian population in the Nha Trang area. [Hist (S), 14th SOWg, 1 Oct 69-31 Dec 69, Plans & Programs Officer Section.]

<sup>+</sup>Seventh Air Force believed the continued use of the call sign Spooky alerted the enemy to the nature of the mission and allowed him to prepare defensive countermeasures.

In light of the gunship's reputation, the Wing reported, the call sign Spooky "identified the aircraft and its capabilities and is used frequently as the method for requesting the required support."<sup>221</sup> For the moment that argument won out.

(U) With respect to Spooky's renown, a fitting event occurred on the night of 2 March 1969. Col. Conrad S. Allman, Commander of the 14th Special Operations Wing, climbed into a 3d SOSq AC-47 to mark the Wing's 150,000th combat mission. This milestone total surpassed that of any other Air Force combat unit in Vietnam and the gunships had contributed a major portion of it. Two days later the 14th Wing was awarded the Vietnamese Cross of Gallantry with Palm--the first USAF unit so honored by the Vietnamese Government. In the course of the recognition, attention was called to such engagements as Dak To, A Shau, and Duc Lap where the Spookies had played important roles.<sup>222</sup>

(U) An act of heroism on the night of 24 February 1969 epitomized the valor of Spooky crews. A 3d SOSq AC-47 (Spooky 71) was on combat air patrol in the Saigon area. Nearly 4 1/2 hours passed before Maj. Ken Carpenter, aircraft commander, received word of enemy activity in the vicinity of Bien Hoa. As Spooky 71 turned to meet the enemy, the pilot and copilot spotted muzzle flashes on the southern and eastern perimeters of Long Binh Army Base. With hot activity below they moved into attack orbit and fired about 3,000 rounds. After the second pass, they were directed to give the ground troops more flare illumination--specifically about 2 kilometers south of Long Binh--and to remain over the area. In the cargo compartment, Spooky 71's loadmaster, A1C John L. Levitow from Connecticut, was busily setting ejection and ignition controls on the Mk-24, 2-million candlepower, magnesium flares. He would carefully hand the flares to one of the gunners, Sergeant Ellis C. Owen, who hooked them onto the lanyard. The sound of mortar fire rose above the engine noise. A turn of the aircraft indicated the pilot was fixing on a new target. Then came the sudden shock of a blast, a white flash, showers of flying metal, and the sinking sensation of the aircraft veering sharply right and down. Crewmembers in the rear of the aircraft were thrown violently about and injured. Unknown at the time, a North Vietnamese Army 82-mm mortar shell had hit Spooky 71's right wing.<sup>223</sup>

(U) At the moment of the blast, Sergeant Owen had one finger through the safety pin ring preparatory to dropping a flare. Knocked from his hand, the armed flare rolled on the floor. The crew knew

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it took but 20 seconds for the flare to ignite. They also knew the consequences of an ignited flare on board--the 4,000° Fahrenheit burn and the incapacitating toxic smoke. In that instant of crisis, A1C Levitow, severely injured with shrapnel on his right side, was dragging himself to the open cargo door to pull away one of his injured comrades. Suddenly he saw the armed flare for the first time. It was rolling between number one minigun and a jumble of spilled ammunition and storage cans. Filled with terror at the sight of the smoking flare, Levitow knew he had to get it out at once or all would be lost. Moving in pain and with great difficulty in the pitching gunship, he finally reached the flare. He grasped it and crawled slowly but determinedly to the open door. At last he pushed the flare out--it ignited almost instantly. Major Carpenter regained control of the aircraft and managed to get it and the injured crew back to Bien Hoa AB. Later he said, "It is my belief that this story could not have been told by any other member of my crew had Levitow failed to perform his heroic action." But the story was told and A1C John L. Levitow received America's highest military award--the Medal of Honor. 224

(U) The flight of Spooky 71 and A1C Levitow's brave actions were, in a sense, a fitting climax for all the many missions of AC-47 crews over a span of 4 years. Numerous crewmembers had responded courageously to emergencies and the enemy effort to knock them from the skies. Now the gunship missions had almost become routine.

(U) In late October 1969 the 4th Special Operations Squadron Spookies engaged in their final major operation in South Vietnam. North Vietnamese regulars and Vietcong had attacked between Bu Prang and Duc Lap on the II Corps border with Cambodia. Evidently the enemy wanted to push new supply routes into the interior of II Corps. In the ensuing 30 days the AC-47's flew two missions nightly. Frequently they landed, restocked ammunition and flares, then returned to the attack. The gunships fired over 400,000 rounds and dropped over 8,000 flares in support of ground units. Heavy ground fire, however, compelled adoption of modified combat techniques. The AC-47's maintained complete blackout over targets where they received intense ground fire, desynchronized the engines to hinder ground fire that keyed on engine noise, and moved off target for safer and faster reloading of the miniguns. 225

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(S) As in past years, AC-47 operations had their difficulties in 1969. A serious shortage of 7.62-mm tracer ammunition developed in late May. Immediate steps were taken to conserve tracer rounds and thereby avoid having solely ball ammunition left for the miniguns. Units were ordered to use only ball ammunition in daytime training missions and to restrict the rounds expended for pilot upgrading. Expenditure of rounds on interdiction targets was held to 6,000 unless the firing touched off a secondary explosion or ground fire. By July the tracer shortages had tapered off. <sup>226</sup> In October and November all C-47's were scheduled for fuel-cell explosive-suppressant modifications which put more work on a burdened maintenance section. <sup>227</sup>

(S) Problems arose in the manning of certain crew positions, mainly enlisted ones. Early in the year a shortage of gunners hampered the 4th SOSq's operational readiness. AC-47 loadmasters were also in short supply. <sup>228</sup> By the end of March, however, assignees began to catch up with projected inputs and shortages eased. High personnel turnover--nothing new to a gunship squadron or any other Southeast Asian unit--required continuous and aggressive in-country training programs. Moreover, a higher percentage of newly assigned personnel were recent flying-school graduates. This demanded more stress on training, standardization, and checkout of aircrew members than ever before. It also dictated care in balancing the crew experience level at all FOL's. <sup>229</sup>

(S) Force changes further hindered gunship operations. Arrival of the AC-119's and the phaseout of the AC-47's added, deleted, and moved gunship forces. Under the Nha Trang Proposal the 14th Special Operations Wing and other units left Nha Trang and that base was returned to the Vietnamese. More force reshuffling was planned when the AC-119K's deployed to Vietnam. <sup>230</sup> All this activity aggravated the normal difficulties in communication between many operating locations.

(S) The upcoming deactivation of the 4th SOSq and phaseout of USAF AC-47 operations forced a further review of AC-47 missions flown over Laos from Udorn RTAFB. Since it would probably take the RLAf over 6 months to attain a AC-47 capability, <sup>231</sup> proposals were made to support Lima Sites in the Barrel Roll area with AC-119G's in lieu of AC-47's. On 12 August, Seventh Air Force

therefore directed two AC-47's at Udorn be replaced by two AC-119G's effective 9 September. This exchange included the idea of using the AC-119G to fly armed interdiction over the Ho Chi Minh Trail and also act as a FAC. While arranging the exchange, 14th SOWg pointed out that the AC-119G offered no particular advantage over the AC-47 in Lima Site defense, troop-in-contact support, or armed reconnaissance (considering its limited sensor capability). In fact, over the rugged Laotian terrain the AC-47 might possess a better recovery advantage in an emergency than the AC-119G. Covey\* FAC reports and debriefings of AC-119G crews following FAC missions also raised questions as to the AC-119G's suitability in a FAC role.<sup>232</sup> The AC-119K was likewise considered as a substitute for the AC-47 but rejected at this time because Udorn could not properly support this jet aircraft.<sup>233</sup> These arguments, plus the strong support from the U.S. Ambassador to Thailand for continued AC-47 operations from Udorn, led to cancellation of the exchange order on 23 August.<sup>234</sup> It was later decided to assign three AC-47's and five gunship aircrews to the 432d Tactical Reconnaissance Wing at Udorn. These AC-47's would fly missions until the Laotians were ready to handle them.<sup>235</sup>

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(S) On 30 November Lt. Col. Adam W. Swigler, Jr., Commander of the 4th Special Operations Squadron, boarded Spooky 41 and took off on a very routine yet momentous mission. When he landed at Phang Rang AB at 0710, 1 December 1969, the last fragged mission of the squadron had been flown.<sup>+</sup> Fifteen days later the 4th SOSq was deactivated and its AC-47's redistributed as follows: 432d TRWg at Udorn, three; VNAF, three; and RLAF, eight, under the Military Assistance Program (MAP).<sup>236</sup>

(U) Since November 1965, the 4th SOSq had pioneered in the deployment and tactical development of the gunship. It had flown a broad spectrum of missions over varied terrain, covering all of

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\*The call sign of the O-2 and OV-10 FAC aircraft of the 20th Tactical Air Support Squadron operating in North Vietnam and Laos.

<sup>+</sup>A landing and "wetting down" ceremony had been set for 0630 but Spooky 41 was busy defending troops-in-contact at that time.

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South Vietnam and parts of Laos. At one time or another it provided fire support during many major battles of the war. Over 4 years of operations the Spookies successfully defended 3,926 hamlets, outposts, or forts. The unit fired 97 million rounds and was credited with killing 5,300 enemy soldiers. It dropped nearly 270,000 flares as it sought to strip away the cover of darkness from the enemy. Thus the 4th Special Operations Squadron departed the war with an enviable record.\*

(U) As the curtain closed on 1969, so ended the role of USAF AC-47's in the Southeast Asian War. For 4 years Spooky had met a critical need beyond all expectations. It early earned a reputation as a nighttime defender and never lost it. Whether it was convoy, special forces camp, isolated Vietnamese hamlet, air-base troops engaging the enemy, or medical evacuation team-- Spooky's stream of minigun fire dealt attackers deadly blows and lifted defenders' spirits. Spooky could loiter over and illuminate an area then strike with pinpoint precision--proving the predictions of its originators that it was well-suited for counterinsurgency situations. The Spooky Count and the airmen's boast that no outpost or village was ever lost while under gunship protection--these reflected Spooky's great contribution to the war. The gunship's full impact on Vietcong and North Vietnamese strategy is hard to pin down. It is clear that from 1965 on Spooky countered the enemy's previous advantage of picking out friendly positions for striking and over-running at night. It forged key links in a security chain that protected the pacification effort and strengthened friendly control over the South Vietnam countryside. Most important, it was just this

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\*The 4th SOSq was presented its third Air Force Outstanding Unit Award for achievements during 21 June 1968-15 June 1969. This last presentation included the "V" device denoting valor. The accompanying citation stressed that the 4th SOSq had "contributed immeasurably to counterinsurgency actions by delivering highly effective firepower against enemy forces." During the award period the squadron accumulated almost 4,700 sorties totaling about 16,500 combat hours and defended successfully more than 2,000 Allied positions. (In late December, eight AC-47's from Phan Rang AB were ferried to the Thai-AM facility, Bangkok, Thailand.) [Hist (S), 14th SOWg, 1 Oct-31 Dec 69.]

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pacification aspect of guerrilla warfare that counterinsurgency experts claimed would spell final success or failure.

(U) While pointing to the importance of the first gunship effort, one should not lose sight of its limitations. The AC-47 was an aging aircraft--to say the least. Its design did not afford the best view of a target, and the miniguns proved ineffective against troops not in the open. Spooky's firing orbit had to be at a fairly low altitude which put it in range of enemy small-arms fire. Its limited power and slow rate of climb magnified operational problems over mountainous areas. Lack of sensors made it a marginal performer on night armed reconnaissance. 237

(U) What's more, the AC-47's initial commitment over the Ho Chi Minh Trail in 1966 was questioned after a combination of rugged terrain and heavy AA fire laid bare Spooky's vulnerability. The successful return of the AC-47 gunships to Laotian operations in 1969 failed to silence critics of the aircraft's survivability, since Spooky was defending Lima Sites in a lightly defended environment similar to that in South Vietnam.\* Also, in spite of Spooky successes in airbase defense, some consideration was given to alternative aircraft. On 7 April 1969 PACAF submitted a required operational capability (ROC: PACAF-6-69) for a helicopter to replace Spooky. PACAF believed a helicopter more flexible, faster-reacting, and capable of operating within base perimeters. 238 Age, design, and armament clearly circumscribed the AC-47's role.

(U) The end of USAF AC-47 operations did not mean that Spooky was being retired to storage or put out to pasture. Despite the aircraft's lengthening years, its simplicity of operation,

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\*Spooky crews declined several Alleycat-assigned targets in Laos during April 1969. These targets, reported as trucks and roads, were turned down mainly "because of the high risk." [Ltr (S), E Flight Comdr, 4th SOSq, to Col Ginn, Dep Comdr/Ops, 14th SOWg, subj: Spooky Targeting, 4 Apr 69.]

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versatility, and legendary dependability\* made it an almost ideal weapon system for transfer to indigenous air forces. Consequently AC-47 operations went on under new banners. A total of 53 AC-47's had been built costing about \$6.7 million so a considerable number of them would be around for some time.<sup>239</sup> As the gunship pioneer, the USAF AC-47 was the progenitor of gunship operations by Allied air forces and a second generation of improved USAF gunships as well.

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\*It was remarkable this 25- to 26-year-old aircraft had so few maintenance problems. Its operational readiness stayed high over the years. Quality maintenance was a critical factor in SEA, made more difficult to attain due to high personnel turnover and a manning level of 90 percent at times. [See Hist (S), 14th SOWg, 1 Apr-30 Jun 69.]

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## III. GUNSHIP II (AC-130)

Seeking Improved Capability

(U) The imaginative and resourceful men who spurred on the first gunship's development foresaw the weapon system's immense potential for growth, refinement, and improvement. Captain Simons\* suggested various missions a more sophisticated gunship might perform. As early as 1963 he mentioned the possible inclusion of infrared and laser-beam equipment to enhance night target acquisition. Captain Terry<sup>+</sup> noted, as the AC-47's first combat test and evaluation got under way, that his thoughts turned to using bigger and better aircraft that could accommodate the more advanced sensory components and heavier armament.

(U) The ideas of these men picked up support. The initial test unit's evaluation report ended with a recommendation that an aircraft of greater payload be considered for future gunships. In February 1965 AFSC urged planning for a better transport than the C-47 for the gunship role. Thus, from the beginning ideas and recommendations abounded for greater gunship development.

(U) Various AC-47 shortcomings were apparent despite its combat successes and reliability. An old aircraft of limited cargo space, its low wing prevented a full view of the target and posed problems in minigun placement. Its top speed was a relatively slow 200 knots and its takeoff weight restricted ammunition and flare loads. A follow-on gunship had to overcome some of these disadvantages and permit equipment changes or additions that would strengthen the weapon system.

(U) Most attention focused on a higher-performance aircraft, although some thought was given to a smaller side-firing airplane. One such proposal, Operation Little Brother, stemmed from June 1966 discussions of a Limited War Study Group and AFSC Task Force. Talk dwelt on a prototype aircraft that could provide close support of counterinsurgency ground forces with an accuracy "equal to or better than Army organic ground-based fire support." On

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\* See pp 5-6.

<sup>+</sup> See pp 12-13.

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## LITTLE BROTHER CONCEPT

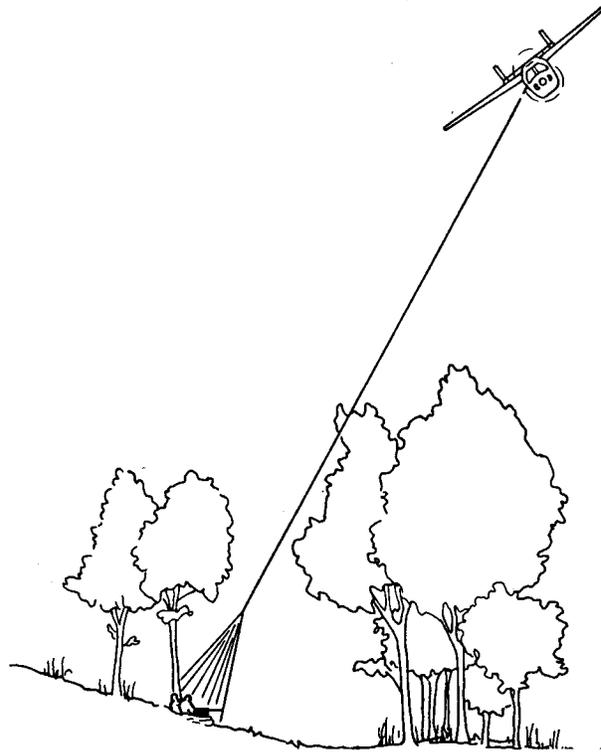


Fig. 6 (C)

21 June 1966 Captain Terry and Captain James Wolverton\* briefed the Study Group on side-firing operations. On 1 July the Group proposed a twin-engine aircraft of 2,000-pound payload and high-wing design. The Cessna Super Sky Master Model 337 was initially deemed appropriate. The projected aircraft's armament would be a semi-recoilless, 40- to 42-mm gun capable of firing 500 rounds-per-minute. The MXU-470/A Minigun Module was proposed after studying availability, cost, weight, recoil, and reliability. A pilot and gunner would crew the aircraft which could operate from unimproved landing and takeoff areas. The plane would be equipped with an automatic pilot and instruments for VFR day and night operations. It would cruise at speeds between 100-190 mph and fly 10 hours without refueling. Inclusion of a fire-control system would afford the pilot/gunner the best firing position for greatest accuracy.<sup>1</sup>

The development of a fire-control system was assigned to the Air Force Avionics Laboratory (AFAL).<sup>+</sup> Wing Commander Thomas C. Pinkerton, a Royal Air Force (RAF) officer with

\*Captain Terry's close associate at the ASD gunship office.

<sup>+</sup>Under AFSC's Director of Laboratories.

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AFAL, largely designed the critical system and it was then fabricated in the Air Force shops. For flight tests AFAL leased an aircraft from Cessna Aircraft Corporation and ASD's shops modified it. After several successful flight tests, the fire-control system's potential was so apparent that work on a suitable system for a bigger aircraft like the C-130 began before Little Brother ended. The improved and more reliable AC-130 fire-control system owed a lot to the Little Brother tests.<sup>2</sup>

(U) The Air Force pursued the Little Brother project for a few months during the latter half of 1966. The project died from the shortage of available funds and resource demands of other projects, including the development of heavier gunships to replace the AC-47.

(U) Developments regarding the Air Force's night attack capability dovetailed with its desire to improve the gunship. Deeper U.S. involvement in the Southeast conflict put problems of USAF night operations in stark relief. The Vietcong were obviously attacking and moving supplies during darkness to exploit Air Force inability to strike effectively 24 hours a day. Putting it simply--

### THE BASIC GUNSHIP WEAPON SYSTEM

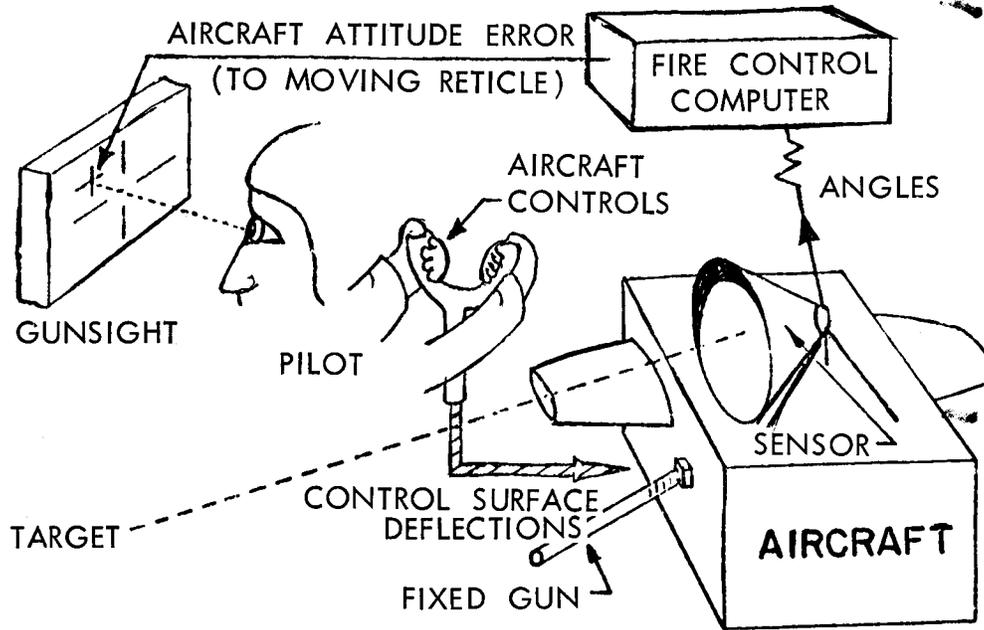


Fig. 7 (U)

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the Air Force had to see a target to hit it. Furthermore, the rugged terrain and dense foliage in many parts of SEA offered day-and-night cover for insurgent base camps and truck parks. The Air Force faced the fact it had no around-the-clock capability and launched an all-out effort to get one. This in turn was to shape gunship improvements.

(S) In 1964 and 1965 the Military Aircraft Panel of the President's Science Advisory Committee (PSAC) turned its attention to night operations. The Panel reviewed and recommended expansion of the Army's night vision program. On 18 May 1965 it urged Dr. Donald F. Hornig, Special Assistant to the President on Science and Technology, to push the application of night vision developments to aircraft, suggesting the technical status of current projects justified a crash program. On 3 June Dr. Hornig conveyed the Panel's recommendations to Dr. Harold Brown, Director Defense Research and Engineering (DDR&E), OSD. He pointed to the need for "early experimental assessments" and giving night capability "to our units in Vietnam as rapidly and on as large a scale as practicable." Dr. Brown replied on 18 June that, in line with the PSAC recommendations, high-priority programs had been "designed to assure the utility of the devices in helicopter and slow- and high-speed fixed-wing aircraft."<sup>3</sup>

(S) In early December President Lyndon B. Johnson expressed interest in the night vision program and asked Deputy Secretary of Defense Cyrus R. Vance about it. Secretary Vance informed the President that helicopter-mounted systems were to be tested in Vietnam in March 1966 and A-1E-mounted systems in August 1966. A transport aircraft reconnaissance-strike system, primarily designed for interdiction missions, would be evaluated in Vietnam during January 1967. President Johnson likewise questioned Mr. Hornig about the subject. The Science Advisor's response of 3 January 1966 stressed the importance of the problem, noted the program's limited funding, and voiced the opinion that faster progress could be made.<sup>4</sup>

(S) This White House interest spawned several conferences attended by: Dr. Vincent V. McRae, Technical Assistant to the President's Advisor on Science and Technology; Dr. Richard S. Garwin, member of the President's Science Advisory Committee; Gen. Bernard A. Schriever, Commander, Air Force Systems Command; Lt. Gen. James Ferguson, Air Force Deputy Chief of Staff for Research and Development. These meetings and others involving the Office of Defense Research and Engineering set the

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stage for an extensive Air Force effort to attain a night/strike reconnaissance capability. The high-priority program that took shape was labeled Operation Shed Light.\*5

As the first step in Operation Shed Light, Headquarters USAF designated a team on 7 February 1966 to "clarify the capability as well as limitations of the night attack problem." On 5 March the team ended its deliberations and made 29 specific recommendations for insuring the best around-the-clock capability. It identified the main development needs as: (1) a self-contained night attack capability in the low-threat environment for targets of opportunity on lines of communication, (2) a battlefield illumination airborne system (BIAS) to perform real-time reconnaissance for Army field units and serve as hunter-illuminator for strike aircraft carrying out close air support, (3) a night hunter for high-threat environment, and (4) enhancement of ground and airborne forward air controller capabilities. The team also set development requirements in the fields of navigation, illumination, target marking, and sensors for target detection and acquisition. After review of the team's findings, the Air Staff commenced an Air Force-wide program on 18 March 1966 to achieve a creditable, tactical, night attack capability without delay. It informed the major commands of Operation Shed Light the same day. Central supervision of the program was vested in the Deputy Chief of Staff, Research and Development, who asked other Air Staff agencies concerned and all major commands to organize offices for coordinating Operation Shed Light matters.<sup>6</sup>

On 23 March Air Force Headquarters instructed AFSC to prepare a plan showing time phases and cost of the 29 recommendations. The Limited War Office at ASD did the spadework on the plan and became the focal point for planning work on the 29 items. From the various in-house discussions proper integration of sensors and weapons emerged as the key to improved night capability. The completed AFSC Program Package Plan was coordinated with the Army and Navy to foster better sharing of developments among the military services. The Air Staff reviewed the plan on 9 June and on 15 July the Air Force Chief of Staff told AFSC to implement it.<sup>7</sup>

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\*At the same time the Navy established a requirement for aircraft capable of night operations.

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Project Gunboat emerged as one of the proposals under Operation Shed Light. It was viewed as an extension of the AC-47 side-firing system. It would, however, realize vastly increased operational effectiveness by putting heavier and more accurate firepower in a bigger aircraft. By adding guns of different caliber and a larger ammunition load, firing could continue longer and with improved fire patterns. An image intensifier--obtained from the Army's night-vision development--would team with the fire-control system to pick up targets in the dark. A radar beacon, DF homer reception, and loran D\* could--when available--bolster night and bad-weather operations. Stronger armorplate would protect the crew and the inerted fuel tanks would retard fire. The Gunboat aircraft would have about the same mission as the AC-47: close support of hamlets, special forces camps, and installations. But in addition, the new gunship with 20-mm guns and sensor equipment could far better interdict targets, even fleeting ones.<sup>9</sup>

In July 1966 the Director of Development, Deputy Chief of Staff, Research and Development, USAF, took charge of Project Gunboat. The first planning meeting was held on 2 September at Wright-Patterson AFB with representatives of Headquarters AFSC and ASD. Project objectives were discussed and configuration of the prototype aircraft considered. Next, ASD quickly surveyed various laboratories and companies for necessary equipment and rushed into development components not on hand. The Air Force Armament Laboratory started an armament effectiveness study on use of high-caliber weapons. While ASD laid the groundwork for the prototype test program, Headquarters USAF analyzed mission requirements.<sup>10</sup> On 16 November Project Gunboat personnel tentatively picked the C-130 as the prototype, the same aircraft selected for the BIAS-Hunter<sup>+</sup> project. Armament would consist of 7.62-mm miniguns, 20-mm guns, and maybe .50-caliber machineguns. Funding for

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\*See glossary for definitions of "DF", "homing", "loran", "loran C", and "loran D".

<sup>+</sup>BIAS--A battlefield illumination airborne system consisting of an illumination unit of 28 xenon arc lamps, downward-looking infrared radar, and forward-looking radar with moving target indicator (MTI). The lamps' illumination was equivalent to 4 times a full moon over a circle 2 miles in diameter from an altitude of 12,000 feet. [Herman S. Wolk, USAF Plans and Policies R&D for Southeast Asia 1965-1967 (TS) (Ofc/AF Hist, Jun 1969); Hist (S), ASD, Jul 1968-Jun 1969.]

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# BASIC C-130A TRANSPORT—GENERAL ARRANGEMENT

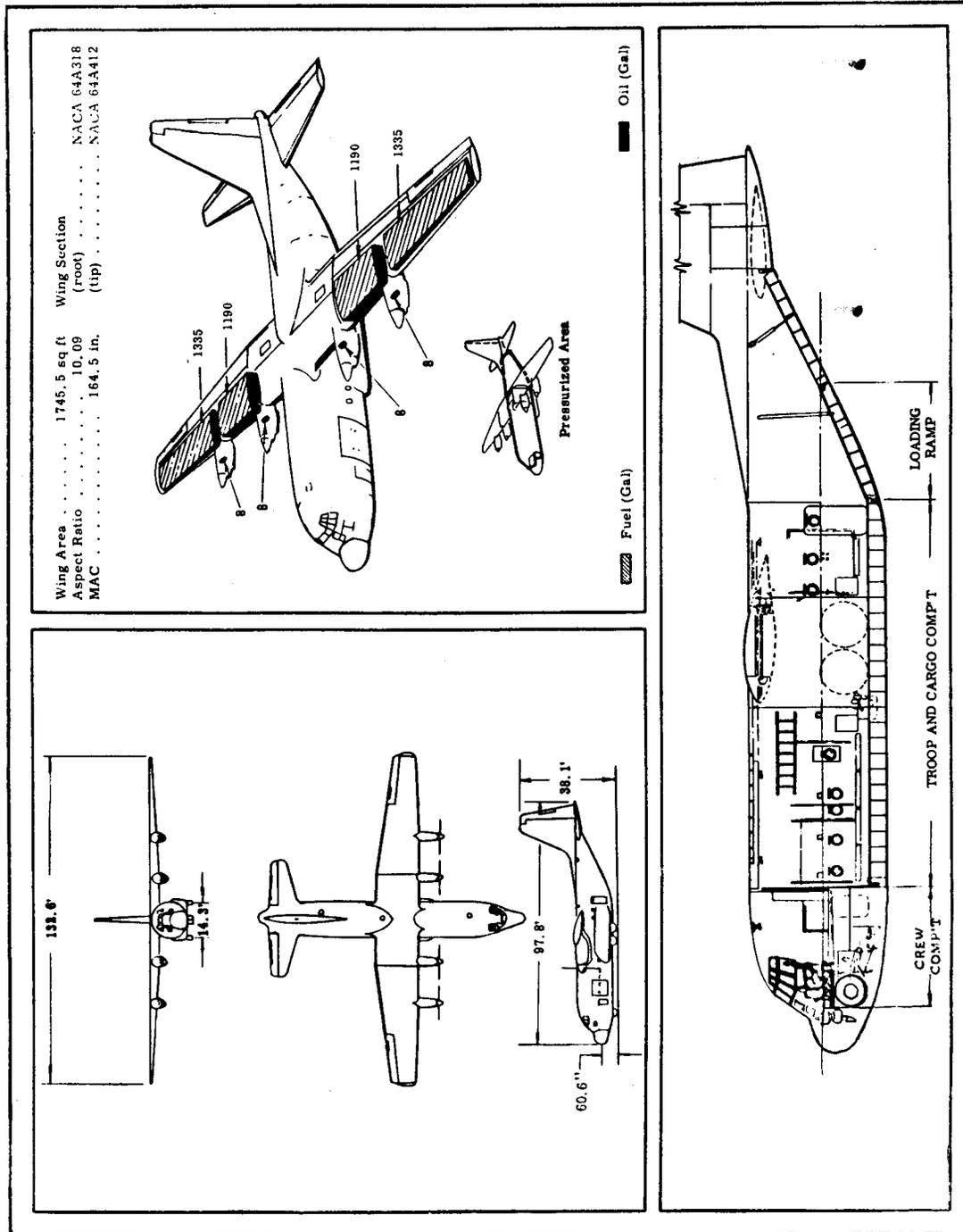


Fig. 8 (U)

(This page is Unclassified)

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the Gunboat prototype was put under Project 1559. \*11

(C) The Air Staff directed AFSC in January 1967 to configure a C-130 under Project Gunboat, an in-house effort expected to take 6 months. Planned tests were to determine: if it was desirable to use the 20-mm cannon at altitudes of 6 to 10 thousand feet; how well the starlight image intensifier optical viewer and fire-control system worked in pinpointing targets at night; and the best mix of 7.62-mm and 20-mm guns.<sup>12</sup>

(C) Choice of C-130A (serial number 54-1626)<sup>13</sup> as the Gunboat aircraft on 26 February 1967 marked a momentous milestone



First AC-130A Gunship

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\*Project 1559--An effort for "quick reaction programming and funding" for counterinsurgency R&D. On AFSC's request, Headquarters USAF allocated \$500,000 to launch Project 1559 on 6 January 1965. Expenditures increased in later fiscal years and AFSC used the money to support testing and evaluation of existing equipment or to exploit technical advances in new equipment. [Herman S. Wolk, USAF Plans and Policies R&D For Southeast Asia 1965-1967 (TS) (Ofc/AF Hist, June 1969, p 19.)

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but there was no great rejoicing. The aircraft had been in three major accidents before being assigned to the project. At one time number "626" had been nicknamed "sick-two-six."<sup>14</sup> Be that as it may, ASD commenced modification of the aircraft on 1 April 1967 at Wright-Patterson AFB.<sup>15</sup>

Benefits from selection of the 4-engine, high-wing, Lockheed-built Hercules transport became apparent at once. A chief advantage lay in the manifold increase in compartment space and load capacity over the C-47, making room for more equipment. Four 7.62-mm miniguns and four 20-mm M-61 vulcan cannon (able to fire 2,500 rounds of high-explosive incendiary shells per minute)\* were installed. Sensor equipment included a night observation device, an AN/OPN-34 (V) side-looking radar, and an APS-42 forward-looking radar. A computerized fire-control system linked guns and sensors. This was a giant step toward giving the gunship crew a target acquisition<sup>+</sup> system that could aim and strike precisely--even at night. Also added were: a Bell Optical sight; a steerable illuminator containing two 20-kilowatt xenon arc lamps giving off visible, infra-red, or ultraviolet light; a semiautomatic Fairchild Hiller Mk-24 flare dispenser; armorplating; inert fuel tanks; APN-153 doppler radar for navigation; direction-finding homing instruments; and an FM radio transceiver.<sup>16</sup>

(U) As modifications made headway, the Air Force decided to substitute Gunship II for the more nautical Gunboat designation.<sup>17</sup> Gunship II was more in keeping with a follow-on gunship to the AC-47 and also denoted the second-generation nature of the C-130 prototype.

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\*The night observation device--also called starlight scope--intensified images through use of ambient (surrounding) moonlight or starlight. This telescope-like instrument had a limited capability to detect personnel and vehicular/riverboat traffic. The Air Force tested the NOD in its aircraft, putting one in an AC-47 in Southeast Asia. Some results were negative and some highly successful as in the battle over Attapeu on 4 March 1966 (see Chap II). In April 1966 the NOD development became Project Combat Wall under Shed Light in response to Southeast Asia Operational Requirement (SEAOR) 37-FY-66. Most of the 1966 NOD tests concerned suitable mounting brackets for the scopes. [Hist (S), Dir/Ops, 1 Jan-30 Jun 67, p 220.]

<sup>+</sup>Target acquisition--The detection, identification, and location of the target in sufficient detail to permit the effective employment of weapons.

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## AC-130A GUNSHIP II SPECIAL EQUIPMENT ARRANGEMENT

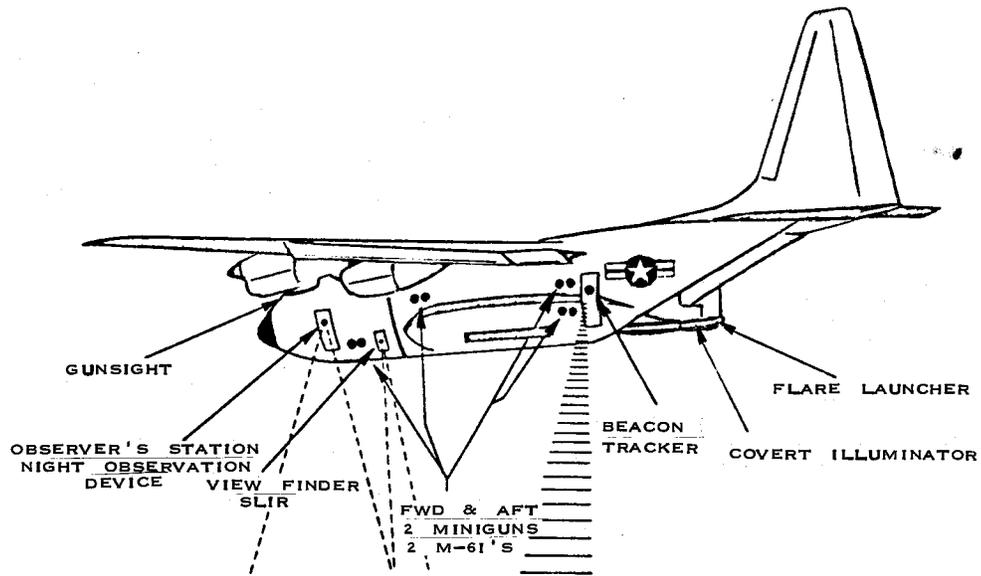


Fig. 9 (U)



AC-130A Gunship

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Modifications were completed on the Gunship II prototype and it entered the flight-test phase\* on 6 June 1967.<sup>18</sup> It was flown to Eglin AFB for checkout of sensors, fire-control system and armament. Initial flight tests (12-23 June) demonstrated the successful integration of the NOD, fire-control system, and gunsight. The pilot aimed, fired, and hit the target without ever seeing it with the naked eye.<sup>19</sup> Next the aircraft went through a "cut and try" cycle that included tests and modifications then more tests and modifications.<sup>20</sup> After about 1-month testing at Eglin, another 45 days were spent at Wright-Patterson AFB putting in more equipment. Eventually three major sensors for locating and identifying targets were installed: a NOD, a side-looking radar (SLR), and a FLIR system--all mounted on the left side of the aircraft. A major improvement, the FLIR enabled the Gunship II to detect the heat from vehicles after they turned off their lights or drove under jungle canopy. The fire-control system integrated inputs from the three sensors and provided position and attitude information to the pilot. This allowed him to place the aircraft in a search or attack orbit. Signals from the fire-control system drove a pipper (bead) in the pilot's gunsight. When the fixed reticle (system of lines) in the gunsight was aligned with the pipper, the pilot had completed aiming and was ready to fire.<sup>21</sup>

In a final series of tests at Eglin, Gunship II scored high on a number of covert search and attack missions. The NOD and other sensors searched a designated area on the range to detect, identify, and track targets. The aircraft then made firing passes utilizing the BIAS. It also proved its ability to detect targets at night on the water range. The weapon firing was devastating and accurate, hitting the target 29 times of 30 firing passes.<sup>22</sup> Based on these results, the prototype was certified ready for September deployment to Southeast Asia for combat evaluation.<sup>23</sup>

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\*The flight-test program comprised five phases. The first, conducted at Wright-Patterson AFB, tested the experimental fire-control system and the integration of several sensors. The II, III, and IV phases flown at Eglin AFB entailed boresighting and alignment of the armament; testing the integrated fire-control system and guns by firing from various slant ranges and altitudes; and checking the effectiveness of the sensors in acquiring simulated targets. Phase V was the combat evaluation in SEA. [AFLC Historical Study 374 (S), AFLC Support of Forces in Southeast Asia: Special Aircraft Projects, 1965-1968 (AFLC, Feb 1971), Doc 186.]

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(C) The flying tests likewise helped establish basic crew requirements for the AC-130. These positions were identified:<sup>24</sup>

Aircraft Commander	Flight Engineer
Pilot	Loadmaster
Fire Direction Officer	Master Armorer/Scanner
Navigator	Armorer/7.62-mm
Navigator/Sensor Operator--NOD	Armorer/20-mm
Navigator/Sensor Operator--IR and Radar	

(C) At first, the new experimental subsystems in Gunship II required crewmen who were scientists and engineers in the various technical areas. The AFSC development team had these skills and thus made up half the crew when the aircraft was tested and deployed. (The rest of the crew came from TAC.) An outstanding example was Lt. Col. James R. Krause, master navigator, former AFAL engineer, and one of ASD's leading infrared experts. He showed what the infrared system could really do in the hands of an operator with skill and know-how. Moreover, he instilled confidence in the future crewmembers who would operate the sensor. Majors Terry and Wolverton\* similarly carried their expertise into crew positions. A remarkable group of men, they flew thousands of hours in tests and combat-evaluation missions, often working on their equipment by day and flying combat at night. They formulated tactics and procedures for using the systems and instructed follow-on crews.<sup>25</sup> Perhaps even more significant, these intensely dedicated men formed a nucleus around which future development effort would flourish.

#### Evaluating the Prototype in Combat

(C) The AFSC-TAC crew flew the prototype Gunship II to South Vietnam for a 60- to 90-day combat evaluation, arriving on 21 September 1967.<sup>26</sup> The evaluation task force, commanded by Maj. Jack L. Kalow and based at Nha Trang AB, divided the

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\*Both these officers had been promoted to major. Major Wolverton, Chief Engineer of Gunship II, had developed the basic pylon-turn equations. He was often called a "technical optimist" for his unshakeable belief that things would always work.

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### FIRE CONTROL SYSTEM

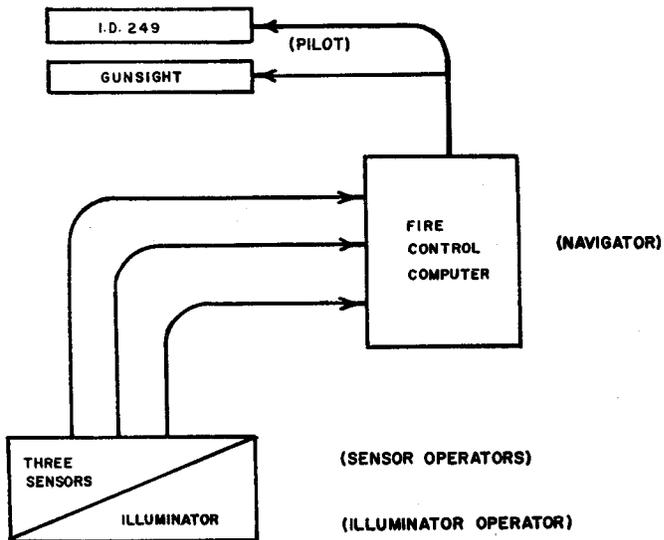


Fig. 10 (U)

### OPTICAL GUNSIGHT

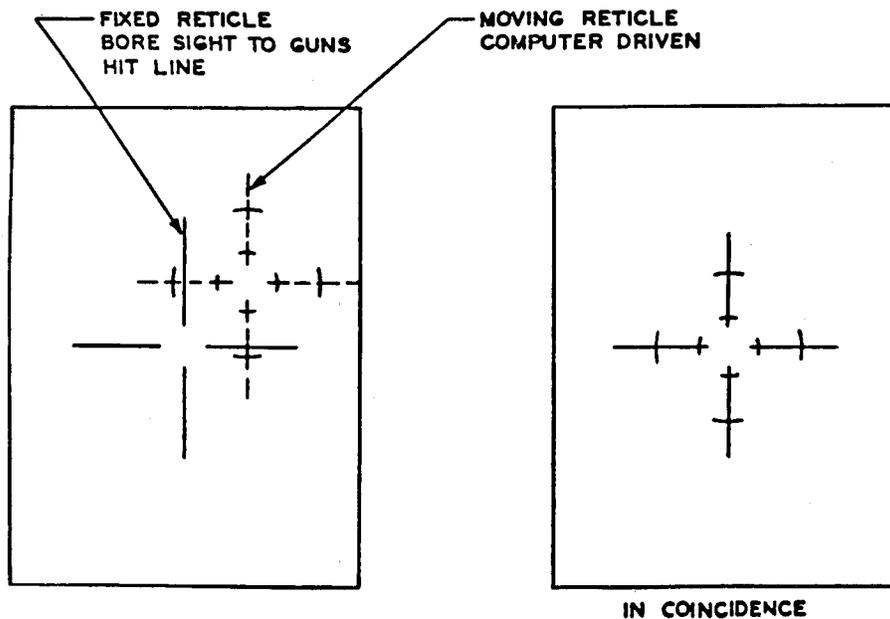


Fig. 11 (U)

**BASIC FIRING GEOMETRY (NO WIND - NO OFFSET)**

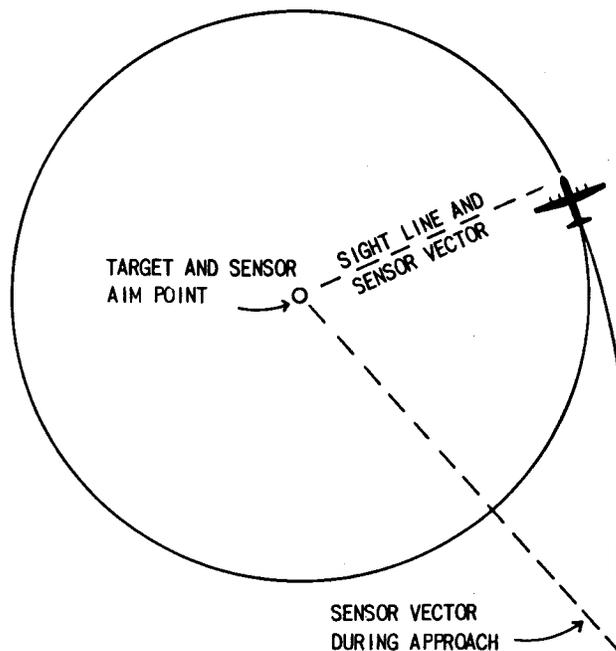


Fig. 12 (U)

**FIRING GEOMETRY (WIND CORRECTED - NO OFFSET)**

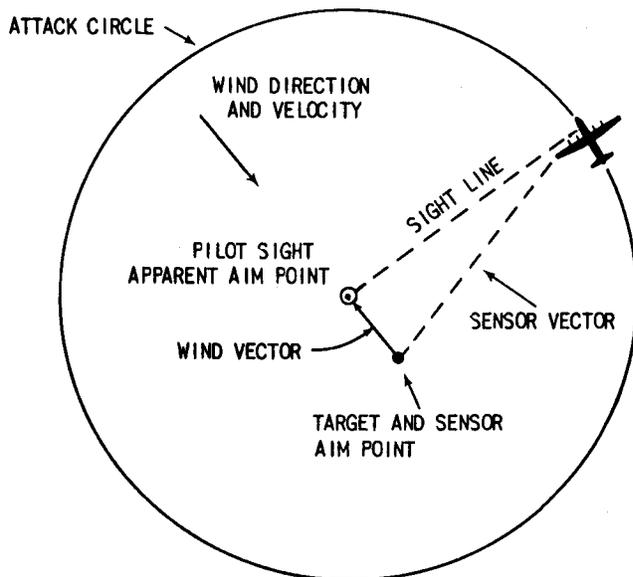


Fig. 13 (U)

combat test into three phases. The first was devoted to close air support missions from airborne alert in the delta region (IV Corps Tactical Zone) around Binh Thuy. (This traced the pattern of the AC-47's combat evaluation wherein the first flights were over areas posing the least terrain or enemy-defense problems.) The second phase tried the Gunship II weapon system against enemy lines of communication in Tiger Hound). The third phase involved armed reconnaissance and ground support missions in the highlands of II Corps (CTZ).<sup>27</sup> The first evaluation sortie was flown on 24 September, the last on 1 December.<sup>28</sup> The phased test program ended on 8 December 1967. \*<sup>29</sup>

(●) The Air Force invited the U.S. Army to participate in the test and evaluation to insure a realistic program. From the outset they were partners<sup>30</sup> and contributed people and equipment to the test. After combat missions involving its troops, Army test personnel reported Gunship II operations in support of ground combat units were "significantly better than that of other comparable existing gunships."<sup>31</sup> They expected even more improvement "by increased reliability of equipment and further development and refinement of operational techniques and procedures." The Army evaluators stopped short of an unqualified indorsement, however, pending "receipt and review of the Air Force proposal for further development, production, deployment and employment."<sup>32</sup>

(●) The prototype Gunship II test results were most favorable, <sup>33</sup> particularly as to interdiction. During September to December, the AC-130 sighted 94 trucks and destroyed 38.<sup>34</sup>

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\*Interestingly, the 3 April 1967 issue of Aviation Week and Space Technology reported that a Lockheed AC-130 aircraft, "an armed attack version of the C-130 turbo-prop transport," was being used in Laos. "The AC-130s have been fitted with seven fixed, side-pointing .50 caliber rapid fire machine guns plus heavy armor plate," said the article. This account so surprised the Office of the Secretary of the Air Force (OSAF) that it asked CINCPACAF "whether armed C-130 'gunships' are in fact operating in SEA." Seventh Air Force replied: "Armed C-130 'Gunships' are not repeat not operating in SEA and do not anticipate they will be in foreseeable future." [Msg SAF-OPPC 77406 (S), OSAF to CINCPACAF, Apr 1967; msg (S), 7th AF to OSAF, 080753Z Apr 67.]

+ The AC-130 flew a special mission near Udorn, Thailand, that proved the 7.62-mm and 20-mm projectiles could penetrate the typical single-canopy jungle in that area. [Hist (S), TAWC, 1 Jul-31 Dec 67, p 34.]

Major Terry was piloting the prototype on an armed reconnaissance mission in November when a large convoy of enemy vehicles was detected. He repeatedly attacked and destroyed or damaged eight vehicles. (Later he received the Distinguished Flying Cross for his performance on this mission.)<sup>35</sup> Maj. Gen. William G. Moore, Air Force Deputy Chief of Staff, Research and Development, praised the new system, stating that "the C-130 Gunship II test bed aircraft had unprecedented success in identifying and destroying enemy lines of communication both in South Vietnam and Laos." In doing so it had "far exceeded fighter type kill ratios on enemy trucks and other equipment."<sup>36</sup> In fact, the interdiction strikes went so well the prototype almost didn't finish the close-support part of the evaluation. 37 During the entire evaluation period, Gunship II fired 87,720 rounds of 20-mm and 222,800 rounds of 7.62-mm ammunition and dropped 310 flares.<sup>38</sup> By the end of 1967, the SEA evaluation showed the prototype "a three-fold improvement over its predecessor--the AC-47."<sup>39</sup>

(C) During the tests the prototype's main system components were used for both close support and armed reconnaissance of enemy supply lines. Only the APS-42 navigator radar failed to measure up--a serious shortcoming over rugged terrain.<sup>40</sup> At a Wright-Patterson AFB conference on 11-12 December 1967 this item was discussed, along with about 200 engineering changes proposed for Gunship II. The meeting failed to reach a firm decision on a navigation-radar change but the conferees did decide to add radar homing and warning (RHAW) equipment to the prototype for better defense.<sup>41</sup>

(C) Gunship II's strenuous testing, which involved at least one and sometimes two or three missions a day, generated maintenance problems with the "breadboard"\* equipment. Whereupon, General Momyer decided to return the prototype to the United States for a general refurbishing. When he so informed General Westmoreland, the MACV Commander was reluctant to let the aircraft go for an estimated 7-month reworking. He asked General Momyer to look into "all alternatives which might accomplish the modifications and still get some use out of it before the end of the Northeast Monsoon." General Momyer then directed only a minimum overhaul of Gunship II so it could be back in the theater by the first half of February.<sup>42</sup> This demanded an all-out effort to refurbish sensors and other equipment. Nevertheless, the job was done and the prototype returned to Southeast Asia on 12 February 1968.<sup>43</sup>

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\*A term for equipment put together for test purposes, often on rather crude mountings, to detect trouble spots before final engineering design.

~~(S)~~ Almost at once Seventh Air Force committed the prototype to working the Ho Chi Minh Trail in Laos.<sup>44</sup> The aircraft was based at Ubon RTAFB\* in eastern Thailand, a strategic staging point for missions over the southern Laotian panhandle.<sup>45</sup> After several fire-control harmonization flights, the AC-130A began flying combat on 27 February. On the third sortie it destroyed nine trucks and two storage areas.<sup>46</sup>

~~(S)~~ Gunship II flew combat in Southeast Asia from February to November 1968. The prototype sighted 1,000 trucks, destroying 228 and damaging 133. It attacked 481 trucks with no visible results. The aircraft destroyed 9 and damaged 8 of 32 sampans or boats sighted.<sup>47</sup> These figures kindled enthusiasm in commanders and officials about the gunship's operations. It appeared that at last an effective weapon system was available for night strikes on the supply trails. ‡

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\*The first USAF personnel had arrived at Ubon RTAFB on 25 April 1962. It became the home of the 8th Tactical Fighter Wing on 8 December 1965. [Hist (S), 8th TFWg, 4 Jul-30 Sep 69, p 1.]

‡Although based at Ubon RTAFB, Thailand, the prototype and crew were organized as Detachment 2 of the 14th ACWg at Nha Trang AB, South Vietnam.

‡On 15 August 1968 Maj. Gen. Harry E. Goldsworthy, ASD Commander, cited 22 persons for their contributions in development and deployment of the Gunship II prototype: Maj. Ronald W. Terry (ASD) and Maj. James R. Krause (AFAL)--Legion of Merit and Distinguished Flying Cross; Maj. James R. Wolverton (ASD)--Legion of Merit; Wing Commander Thomas C. Pinkerton, RAF (on duty with AFAL)--Special Citation; Elbert W. Larrick (ASD), Edwin E. Hall (ASD), John H. McAdow (ASD), Calvin C. Reese (ASD), Charles J. Weiskittel (ASD)--Award for Exceptional Civilian Service; Lovell Mahood (ASD), Herman J. Lafferty (AFAL)--Decoration for Meritorious Civilian Service; Col. Louis Schaffer (ASD), Col. Richard P. Tipton (ASD), Maj. Robert D. Mouw (ASD), TSgt Estell P. Bunch (AMRL)--Air Force Commendation Medal; Lt. Col. Richard M. Gaugh (ASD), Capt. Jerome P. Dufour, Jr. (ASD), MSgt Farris C. Hein (ASD), TSgt Robert B. Davis (ASD), Robert E. Wittman (Air Force Materials Laboratory (AFML)--Certificate of Merit. [News Release 68-751 (U), ASD, 15 Aug 68.]

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(S) The prototype compiled most of this interdiction record during its relatively short time\* in Laotian operations. In June 1968 the 14th Air Commando Wing recommended Gunship II be returned to South Vietnam. It pointed to the deteriorating weather over Laos, the drop in truck traffic, and the mounting threat of AA fire in many Trail areas. With the monsoon change the prototype's truck-kill rate had fallen from nine trucks per night to one.<sup>48</sup> The 14th suggested the aircraft operate from Da Nang and thus remain close to Laos so the ABCCC could still divert it there for lucrative truck targets. It was also pointed out that the prototype could perform test and evaluation projects in South Vietnam before the AC-119's arrived. This would give crews experience in close air support.<sup>49</sup>

(S) On 14 June General Momyer, Seventh Air Force Commander, ordered the prototype transferred to Tan Son Nhut AB near Saigon for about 60 days.<sup>50</sup> The next day representatives from Headquarters Seventh Air Force, 834th Air Division, 14th Air Commando Wing, and the prototype crew met to discuss Gunship II's in-country employment.<sup>51</sup> This group believed the gunship could, if necessary, help meet an expected third phase of the enemy's big Tet Offensive in the III and IV CTZ's and combat the rocket threat in the Saigon area.<sup>52</sup>

(S) Gunship II flew all sorts of missions during its deployment in South Vietnam. Twenty-eight of 151 missions (246 sorties) supported troops in contact with the enemy and accounted for 240 enemy killed.<sup>53</sup> Missions ranged almost the length of South Vietnam and several special ones went as far north as the Demilitarized Zone in search of suspected enemy helicopters. Even while supporting troops, the prototype continued to interdict sampan and truck traffic on the rivers, canals, and roads.<sup>54</sup>

(S) Besieged with equipment malfunctions, the Gunship II prototype flew its last mission on 18 November 1968. It was then ferried back to Wright-Patterson AFB, arriving on 26 November 1968.<sup>55</sup> Subsystem problems had reached "such proportions as to critically limit operational capability" of the prototype in SEA. An ineffective infrared system and failures in other equipment had dimmed chances of the aircraft's success in the forthcoming

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\*In April 1968 the prototype stayed briefly at Naha AB, Okinawa, for maintenance and installation of a new fire-control computer.

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interdiction campaign. The 14th Air Commando Wing and Seventh Air Force recommended the prototype be exchanged for a production model AC-130 as soon as possible.<sup>56</sup>

(\*) After the prototype wound up combat operations, the Air Force examined its cost effectiveness. Development costs totaled \$724,237, including \$166,312 for the refurbishment. Spares and services ran another \$357,399. Flying costs were estimated at \$552,784, figuring 1,484 hours at \$326 an hour plus the salaries of crewmembers. A 20-month depreciation cost of \$539,500 was tacked on despite the aircraft's having already passed its 8-year depreciation period. Ammunition costs (\$1,469,606) constituted a sizable chunk of the overall expenditures. The flares cost \$99,300. Amounts for flares, ammunition, depreciation, development, and flying pushed the overall cost of the prototype's development and operation to \$3,742,826. Dividing this total amount by the results of the missions would give an estimate of Gunship II's cost effectiveness. To find a yardstick for operational results, the number of trucks destroyed or damaged, boats destroyed or damaged, secondary fires and explosions recorded, gunsites destroyed, and every five enemy killed were each considered a major event. A total of 749 major events was arrived at which brought the cost per event to less than \$5,000.<sup>57</sup> This computation proved the Gunship II prototype to be one of the most cost effective close support and interdiction systems in the U.S. Air Force inventory.\*

#### Forging the Follow-on Force

(\*) During the early phase of the prototype's combat evaluation, weekly reports were so promising that the Air Staff proposed to Dr. Harold Brown, Secretary of the Air Force, that seven

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\*The flying hour total included: 150 test flying hours, 100 ferrying hours, and 1,234 combat hours. Original cost of the C-130 was \$2.6 million, depreciated over the 20 months ASD used the aircraft as a gunship. Each 20-mm round cost \$2.11 and each 7.62-mm round, \$0.14. The 749 major events (during both phases of the combat evaluation) consisted of 266 trucks destroyed, 133 trucks damaged, 9 boats destroyed, 8 boats damaged, 273 secondary fires and explosions, 12 gunsites destroyed, and 240 troops killed (each 5 fatalities counted as an event). [Hist (S), Gunship II Proj Div, 1 Jul-31 Dec 68, pp 5-7.]

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JC-130A aircraft be modified into gunships. Eleven JC-130A's used for telemetry\* acquisition on the Eastern Test Range (ETR) had recently become available for other missions.† On 27-28 September 1967 twelve generals from Headquarters USAF, TAC, PACAF, and Seventh Air Force reviewed the Shed Light program. These officers proposed four of the JC-130A's be modified for a near real-time‡ reconnaissance intelligence function (BIAS-Hunter) and the other seven be configured like the Gunship II prototype.<sup>58</sup> When he eventually reviewed the proposal, Secretary Brown approved the four BIAS-Hunter aircraft but cut the number of JC-130A's for Gunship II modification to two. He desired "that the number of additional Gunship II type aircraft be limited to a test quantity that can be covered within the allocated R&D and modification funds."<sup>59</sup> The Secretary was not sure how well the gunship's sensor systems would work. He also questioned the need to add another costly gunship type to

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\* Telemetry is the radio link between an aerospace vehicle and a ground station used to transmit information.

† The ETR had to change its telemetry system to S band by 1970 in accordance with DOD frequency reallocations. It was decided to abandon the old and limited JC-130A telemetry systems rather than undergo the expense of a major configuration to accommodate the telemetry changes. [Memo (S), Alexander H. Flax, Asst SAF (R&D) to SAF Harold Brown, subj: Gunship II, 17 Oct 67.]

‡ Real time is the absence of delay, except for the time required for the transmission by electromagnetic energy, between the occurrence of an event or the transmission of data, and the knowledge of the event or reception of the data at some other location.

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the AC-47 and the AC-119, \* his choice for the follow-on gunship.

(U) Secretary Brown's selection of the C-119G to replace the AC-47 disappointed gunship proponents and most Pacific air commanders. It had come about, however, after much debate and serious study.

As early as May 1967, General McConnell, Air Force Chief of Staff, had informed CINCPACAF and TAC of AFSC's work on the C-130 gunship test bed and of a "separate project under way to determine a follow-on aircraft for the AC-47." The Air Staff made clear the C-130 and C-123 were not being seriously considered for the role because they were needed for airlift. An on-going study was already comparing the C-121, C-119G/K, C-54, C-118, P2E, and C-97. The study group sought an aircraft of greater payload, longer loiter time, and better survivability than the AC-47, capable of carrying the new sensor equipment under development. The Air Staff Board set 12 May 1967 for review of the follow-on aircraft.<sup>60</sup> From the study and review came a recommendation to the Secretary of the Air Force that the C-119K be the substitute for the AC-47.

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\*Secretary Brown's decision was probably influenced to some extent by a memorandum from Dr. Alexander H. Flax, Assistant SAF (R&D), who wrote: "I have doubts about the merit of proliferating Gunship II at this time. We have had almost no satisfactory experience with night sensors other than LLLTV (which does indicate the possibility of some success in operations, particularly at low speed or at brighter light levels than cloudy moonless nights). Forward-looking IR has not worked well at long range. Downward-looking IR in the RF-4 has required hours of post-mission interpretation to get useful results. The IR unit here has higher resolution which is better, but we don't know how much better. The good LLLTV results on the B-57 have all been obtained at speeds of 175 knots or less. Radar MTL, properly designed and applied, works on moving trucks, but there is apparently little interest in this. On a recent visit to Eglin AFB, I found no evidence of work in this area (although some was planned)....I think that your suggestion that one or two additional aircraft may be needed for test (very comprehensive tests at Eglin AFB and possibly in Panama, followed by in-theatre test if warranted) is a sound approach. I do not recommend going ahead with seven aircraft at this time." [Memo (S), Alexander H. Flax, Asst SAF (R&D), to Secretary Brown, subj: Gunship II, 17 Oct 67.]

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(U) Important factors entered into the C-119K selection. Developers of the AC-47 had recognized that a high-wing design was most desirable for a side-firing gunship. Such design afforded a clear line-of-sight along the length of the fuselage for both firing and use of sensors. This point alone tended to eliminate the C-121, C-54, C-118, and C-97. Also the availability of the aircraft had to be considered due to the need for early deployment to Southeast Asia. A ready source of C-119's was to be found in Air Force Reserve units. The power-limited payload of the more plentiful C-119G's, however, could not accommodate the sensor and other equipment planned for the gunship. This serious problem could be somewhat overcome by turning to the C-119K which had two additional J-85 jet engines. Modification of the C-119G's into the C-119K configuration seemed feasible from the standpoint of funds, time, and resources. For these reasons the Air Staff Board recommended the C-119K as the best follow-on gunship aircraft.

(U) Secretary Brown considered several factors in acting on this recommendation. In January 1967 he had talked with people in SEA about the need for greater payload, longer loiter, and better survivability of the AC-47 replacement. Hence he knew the requirements as well as the preference of commanders for the C-130. Dr. Brown believed, however, that once modified into gunships the C-130's would most likely remain so. This would therefore adversely affect critical USAF airlift resources.<sup>61</sup> On 8 June he approved selection of the C-119 but directed the C-119G be modified as the immediate AC-47 successor. He further agreed the jet pod-equipped C-119K could be modified later should an increased payload seem necessary. In effect, the Secretary adopted a wait-and-see policy on weight demands and sensor equipment pending outcome of the AC-130 prototype tests. If the tests proved out, the C-119K could be used to accommodate the new target acquisition systems.<sup>62</sup> In the wake of this decision, Headquarters USAF sponsored a conference on 22 June for representatives of Headquarters TAC, AFLC, and WRAMA to figure how best to execute the C-119 program. At this time the Office of the Secretary of Defense was reviewing the PACAF request for 10 more AC-47's for base defense and weighing the possibility of filling it with AC-119G's.<sup>63</sup>

(U) Choice of the C-119G as the AC-47 replacement aroused considerable resistance in the field. General Momyer, Seventh Air Force Commander, strongly opposed the selection in a 30 June

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message to General Ryan, CINCPACAF. He argued that "maintenance and logistics problems alone attendant to the introduction of yet another obsolete system into the theater weighs heavily against the C-119." The General felt "employment of the C-119 aircraft in the gunship role would be mere substitution, and possibly regression rather than an advance." He recommended use of the C-130 because of its "four-engine survivability, a relatively low time airframe, greater speed, altitude, and loiter time, and growth potential." He pointed out further the economical use of the AC-130 prototype design offered important advantages. General Momyer said impact on the airlift mission from selection of the AC-130 would be "slight and that the base defense, hamlet and outpost protection" warranted this inroad into the airlift fleet.<sup>64</sup> General Ryan supported these views for they echoed his earlier expressed preference for the C-130.<sup>65</sup> TAC also backed use of the C-130.<sup>66</sup>

(U) Amid the swirl of controversy over a follow-on gunship, the Secretary of the Air Force's authorization on 7 November 1967 for modification of two JC-130A's was warmly welcomed. The two conversions were viewed as an opening wedge which would yield extra data to support a decision for an expanded AC-130 gunship force--a foot-in-the-door so to speak. Meantime, ASD gathered cost and schedule data for Gunship II aircraft. On 1 December 1967 \$200,000 was authorized to procure long-leadtime equipment for the first production AC-130.<sup>67</sup>

(S) The interim report of the Gunship II prototype's combat test and evaluation<sup>68</sup> opened the way to approach Secretary Brown on modifying the remaining five JC-130A's. In forwarding the evaluation, General McConnell said "this report responds to our desires for test results, and I consider it justifies the conversion of the remaining five (5) C-130A aircraft made available for the Shed Light program from ETR resources."<sup>69</sup> He added in a handwritten memo: "I have gone into this subject in considerable detail, both the study and in conversation with the users in SVN. In my opinion Gunship II is the most effective 'break-thru' we have experienced in tactical aviation. I believe we should exploit it as far as we reasonably can."<sup>70</sup> The Air Force Chief, while arguing for more Gunship II's, felt for the present the C-119G/K program should go on "as a matter of correlative priority." In the meanwhile, the Air Staff would probe deeper into Gunship II's impact on the gunship force.<sup>71</sup>

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On 20 December 1967 the Air Force Secretary broke new ground when he authorized modification of the five remaining JC-130A's.<sup>72</sup> First the Secretary noted that the AC-130 was a new weapon system which would "go a long way toward providing an improved night/all weather interdiction capability in an environment of low-to-moderate risk." As such, it represented a "clear distinction between the more localized support and protective role of the AC-47 and the predominantly search-and-destroy concept envisioned for the AC-130." At the same time the AC-47's--until replaced by AC-119's--would have to provide: (1) local base defense, and (2) hamlet defense and supporting fire for the Army. Consequently, to firm up the AC-119's exact configuration and its modification/deployment schedule without delay, Dr. Brown asked the Air Staff for AC-119G and AC-119K modification/deployment options by 5 January.<sup>73</sup> Clearly the Secretary was not abandoning the AC-119 selection. His approval of eight Gunship II aircraft (including one prototype) and breakout of mission categories spelled the start of a mixed gunship force.\* This marked a major departure from what had been the main consideration--merely the replacement of the AC-47.

Seventh Air Force reacted strongly to the idea of a mixed gunship force. It was not convinced the concept was valid. In fact, it maintained that day/night all-weather operations entailing either interdiction or firepower in support of ground forces required

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\*On 7 December 1967 Harry Davis, Deputy Assistant SAF (Special Programs), reported to Secretary Brown that the prototype's combat evaluation results "have proved the capability of Gunship II to inflict significant damage: (1) in support of friendly outposts under mortar and automatic weapons attack, (2) against VC training camps, (3) against VC troop concentrations, and (4) in suppressing VC fire on friendly ground forces...both FAC's and Army ground observers have credited Gunship II with outstanding accomplishments... Mr [Leonard D.] Sullivan of the ODDR&E termed Gunship II an 'outstanding success!'" Dr. Brown responded: "This is all fine, but do we know which of the sensors and which of the ordnance contributes to this great success, and which do not, and do we know whether the former can be successfully included in C-119Gs or C-119Ks which cost 2.5 and 2M less, respectively than the C-130 airframes which are in (we say) desperately short supply for airlift."

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the same gunship capability. Seventh Air Force considered the AC-130 the right aircraft for the gunship force. Its speed permitted more rapid reaction, greater area coverage, and minimum exposure to hostile fire. Besides, it possessed the load capacity for improved sensors, heavier firepower, and armorplating. The command further argued that use of three different aircraft would be weighted with disadvantages.\*<sup>74</sup>

Seventh Air Force had already reinforced its stated preference for an AC-130 gunship force. On 18 November 1967 it had informed PACAF that Gunship II requirements were 32 with replacement of the AC-47 on a one-for-one basis during fiscal years 1969 and 1970.<sup>75</sup> Then, on 14 December the Commander in Chief, Pacific Command, recommended that PACAF give this program full support and prompt action.<sup>76</sup> The next day PACAF asked Seventh Air Force to submit a concept of operation for the proposed Gunship II force to cover such matters as: deployment, unit of assignment, personnel requirements, support concept, and possible trade-offs to keep personnel within the country manpower ceiling.<sup>77</sup> On 31 December 1967 Seventh Air Force outlined the organization, basing (eight AC-130's in Thailand and the rest in South Vietnam), and personnel/support requirements. It figured that the AC-130's would require 1,402 additional personnel over the AC-47's and suggested the increase might fit within the ceiling if Blind Bat aircraft<sup>†</sup> and some similar missions were terminated.<sup>78</sup>

Gen. John D. Ryan, CINCPACAF, pondered Seventh Air Force objections to the mixed gunship force, its counterproposals for an all AC-130 force, and the final report on the prototype's combat test and evaluation. On 12 February 1968 he strongly set

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\*Chief disadvantages expected were: a sharp increase in maintenance/operating personnel over the current program; costs for major construction to billet more people and provide additional apron space and maintenance facilities for the AC-119's; not enough added capability of the AC-119 over the AC-47 to warrant the sharp upturn in personnel/construction costs; and steep maintenance/supply support costs.

<sup>†</sup>Blind Bat aircraft were unarmed C-130's used for flare FAC operations.

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forth his views on the future SEA gunship force in a message to the Air Force Chief of Staff:

Recent highly successful combat evaluation Gunship II favors AC-130 as logical replacement for AC-47. AC-130 possesses needed capabilities as follows:

Speed (rapid reaction, area coverage, minimum exposure).

Sensors (locate enemy and friendly positions, deliver accurate firepower).

Increased payload (essential to carry increased firepower, sensors, armor).

Further advantages of C-130 are superior performance/flexibility, worldwide maintenance/supply support, contemporary navigation systems, established pilot training, schools and post-hostility airframe reconversion potential.... Gunship II C-130s should not be considered at expense of current and projected airlift assets. New production C-130 aircraft appears warranted in view recent mortar attacks on forward installations. Requirement for 32 UE AC-130 gunship force... considered urgent as it provides most effective reaction capability against attack on installations.

Recommend reconsideration C-130 as follow-on gunship for AC-47 on one-for-one basis.<sup>79</sup>

(U) These recommendations, timed as they were, reflected once more a hope that Air Force Secretary Brown might reconsider his selection of the C-119 as follow-on for the AC-47. Pacific commanders seized upon the Gunship II prototype's success to urge further review of the AC-130's merits.

Despite the arguments emanating from the Pacific, plans for a mixed gunship force continued to unfold. As requested by Secretary Brown when he approved the five additional AC-130's, the Air Staff furnished him by 5 January 1968 a study of operational, basing, and organizational concepts. It recommended a SEA gunship contingent of 6\* AC-130's, 32 AC-47's, and 32 AC-119's. The two

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\*Two of the eight AC-130's authorized would be used for training in the United States.

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squadrons of AC-119's would now augment rather than replace the AC-47's. The AC-119's and AC-47's would perform day/night missions of hamlet defense, close air support, convoy escort, and fire support for ground forces. Six orbit points were visualized in South Vietnam from which the AC-119's/AC-47's could respond to targets within a radius of 100 nautical miles from the orbit point. The AC-119's would be on orbit station during all hours of darkness and at other times when needed. The AC-119's and AC-47's would operate from bases at Nha Trang, Da Nang, Phu Cat, Pleiku, Phan Rang, Bien Hoa, and Binh Thuy. The existing tactical air control system (TACS) would exercise command control. As the AC-119's became operational, the AC-47's would gradually turn over all missions except local base defense. Existing organizational or operating location arrangements would not change.<sup>80</sup>

In addition, a new squadron of AC-130's would be organized and based at Ubon with some of its aircraft possibly detached to Nakhon Phanom, Thailand. As their main mission, the six AC-130's would interdict enemy resupply routes in Laos around the clock utilizing the Gunship II's night/all-weather sensor equipment and heavier armament. The first operational AC-130 was projected for June 1968, the seventh in October 1968. The first AC-119 was not expected to be on hand before December 1968 due to component procurement leadtimes. The Air Staff took note of the 1 July 1968 date set by the Secretary for deployment of at least six AC-119G's to Southeast Asia. They believed, however, that AC-119G's modified by that time would differ little from the AC-47 configuration. Consequently, they recommended to the Secretary the resources be applied toward the AC-119K configuration.<sup>81</sup>

The Air Staff plan for the mixed gunship force was adopted in the main and became the keystone for later actions. The major exception was the Air Force desire to push for AC-119K instead of AC-119G aircraft. On 8 February 1968 the Air Force Secretary sought OSD's approval of a 32-UE AC-119G/K gunship force. Deputy Secretary of Defense Paul H. Nitze granted the request on 24 February. However, when the deployment adjustment request (DAR) was submitted for the AC-119's, Secretary Nitze asked for an "analysis on the continued need for the AC-47 force."<sup>82</sup> This seemed to again inject some uncertainty regarding the composition of the final gunship force.

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(S) In early February TAC proposed all eight AC-130A's be sent to Southeast Asia in lieu of keeping two in the United States for crew training. TAC said the small number of replacement crews could not fully utilize two training aircraft.<sup>83</sup> PACAF agreed on 20 February 1968 and suggested the first production AC-130A be held for crew training then deployed when training was over. PACAF reiterated its eagerness to have as many AC-130A's as possible at the start of the Northeast Monsoon season.<sup>84</sup> After weighing the two major command proposals, Headquarters USAF ordered all AC-130A's deployed to Southeast Asia.\* This would boost the planned gunship force for the theater to 72 aircraft (32 AC-47's, 32 AC-119G/K's, and 8 AC-130A's).

(S) The Vietcong and North Vietnamese Tet Offensive in early 1968 and gunship successes in the war helped trigger studies of an even larger gunship force. In late March Secretary Brown wanted the Air Staff to see if the current and programmed gunship force could be tripled as soon as possible. The Secretary requested a report by 29 March 1968 covering identification and selection of available aircraft, aircraft configurations, delivery schedules, support requirements, costs, manning and training requirements, and force recommendations. The Air Staff was to assume the program would have top national priority.<sup>85</sup>

(S) The hurried request to examine a greatly expanded gunship force prompted study of three alternatives. In each the Air Force Secretary set guidelines on aircraft type, aircraft configuration, and the force ceiling. The Air Staff was to determine the most cost-effective mixed gunship arrangement. It recommended a mix of 44 AC-47's, 26 AC-119G's, 52 AC-119K's, and 32 AC-130A's as more desirable and one of 18 AC-130A's, 26 AC-119G's, 26 AC-119K's, and 14 AC-97(X) turboprop aircraft as least desirable.<sup>86</sup>

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\*With all AC-130A's in SEA, controversy flared over training future crew replacements. TAC proposed that future crewmembers be C-130A-qualified, given ground training on sensors in the United States then brought to combat readiness in SEA. Maj. Jack L. Kalow, Gunship II Task Force Commander, sharply disagreed: "The idea of training missions in theater should never even be considered" because of the heavily committed aircraft and scarcity of practice areas and ammunition in SEA. [Msg (C), ASD to TAC, 152115Z Feb 68.]

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(S) Consideration of the C-97 as a gunship stemmed in part from AFLC's preliminary evaluation of the aircraft, modified with either J-47 jet pods or turboprop engines.<sup>87</sup> The C-97 had the size and it was available. On the other hand, its higher maintenance/support costs, need of a longer runway for takeoffs, higher acquisition costs, manning implications, and the time required for modification made it less attractive as a gunship than the AC-130A or AC-119K.<sup>88</sup>

(S) Secretary Brown perused the pros and cons of the proposals and on 12 April 1968 decided to limit any program to 110 gunships. Within this force ceiling the Secretary asked the Air Staff to: modify current AC-119G's and AC-119K's into a single-type aircraft employing two 7.62-mm miniguns and one 20-mm gun; develop and modify 40 AC-97 gunships with J-47 jet pods; and add no more than 10 AC-130's (18 total).<sup>89</sup> In response, the Air Staff recommended 26 AC-119G's, 52 AC-119K's, and 32 AC-130A's as most cost-effective. In light of the limitation of 18 AC-130A's, the next most cost-effective would be 18 AC-130's, 26 AC-119G's, 52 AC-119K's, and 14 AC-97 (X) turboprop aircraft. Air Staff analysis disclosed that any amendment of existing AC-119G/AC-119K contracts would cost \$7,630,000 and delay deployment 4 months. The Air Staff did not recommend J-47 jet engines for the AC-97 since they added 10,000 pounds to the basic aircraft's weight and operated poorly at planned operating altitudes.<sup>90</sup>

(S) On 29 April 1968 Dr. Brown announced he was approving a force of 55 AC-47's, 26 AC-119G's, 26 AC-119K's, and 18 AC-130A's. His decision changed no aircraft type but did expand the gunship force to 125 aircraft, including 10 more AC-130A's.<sup>91</sup>

(S) Approval of a 125-gunship force took Seventh Air Force aback. It deemed the 72 gunships previously programmed ample for SEA needs and argued against a bigger force. In Seventh Air Force's view, the forthcoming improved truck-killing munitions would augment the truck-busting capability of fighter and attack aircraft. Hence, only 8 to 12 AC-130's would be needed for the out-country interdiction effort.<sup>92</sup> In-country, larger forces would touch off agonizing trade-offs to stay within manpower ceilings. The AC-119 gunships had been "well down on the 7AF Priorities List" until pressures from the Joint Chiefs of Staff and the Air Force Chief of Staff forced them to the top at the "expense of many requirements considered more urgent by 7AF."<sup>93</sup> Finding

headroom\* for further gunship expansion would be truly difficult.

(S) Arguments over the proposed mixed gunship force again pushed to the fore and entered into the protest over a larger force. Seventh Air Force pointed out that only AC-130's had a reasonable chance to survive the enemy defenses protecting southbound truck traffic in the Steel Tiger and Tiger Hound areas of Laos. Seventh further said the C-119G and C-97 aircraft were unsuitable. The C-119G would apparently lack the firepower, sensors, and single-engine performance for mountainous regions. The C-97 fell short in maneuverability, climb performance, maintenance, logistics, and in support requirements. Seventh Air Force again suggested the AC-47 be replaced one-for-one by the AC-130 or--as a second preference--one-for-one by the AC-119K. The latter trade-off would at least lift gunship capability. The higher performance AC-130 or AC-119K would pare response time and strengthen support coverage.<sup>94</sup>

(U) Seventh Air Force's views were noted but other more immediate factors shaped the gunship force. Secretary Brown held to the use of the AC-119G, primarily because he believed it could most quickly fill SEA requirements. Use of the C-97 as a gunship was only tentatively discussed due to its deficiencies previously highlighted. OSD dashed any hope for more AC-130A's when on 15 July 1968 it rejected the planned 10 additional ones.<sup>95</sup>

(S) Ironically, the turndown of 10 additional AC-130A's came just as an increase in Gunship II aircraft appeared justified by cost-effectiveness data beginning to circulate among Secretary Brown's staff. The AC-130 had flown few interdiction-type missions by the end of 1967. Its superiority nevertheless showed up in comparison with other 1967 leading truck killers.<sup>96</sup>

<u>1967 Armed Reconnaissance</u>	<u>Sorties</u>	<u>Vehicles D/D<sup>+</sup></u>	<u>Sorties per Vehicle D/D</u>	<u>Cost Per Vehicle D/D</u>
All U.S. Aircraft	13,846	2,160	6.4	\$ 55,700
F-105	2,836	262	10.8	\$118,000
A-26	1,156	1,281	0.9	\$ 5,900
Gunship II (Test Results in Laos Oct-Nov 1967)	9	51	0.2	\$ 5,100

\*This term was frequently applied to availability of space under the manpower ceilings.

<sup>+</sup>Destroyed or Damaged.

(S) The Air Force bolstered its arguments for a bigger Gunship II force and promptly sent them to the new Secretary of Defense, Clark M. Clifford, but to no avail. The OSD systems analysis office advised Mr. Clifford to defer the decision on modifying an additional 10 AC-130A's "pending further review of SEA experience."<sup>97</sup> In a program change decision of 27 November 1968, the Deputy Defense Secretary ruled against the AC-130A augmentation. He argued that the Air Force "had not provided satisfactory justification for further increase in the size of this force."<sup>98</sup> The Air Force, however, could look forward to a possible change in this decision with the impending inauguration of a new political administration under President-elect Richard M. Nixon. In the interim, however, no change would occur in the total number of AC-130A's.<sup>99</sup>

(S) The next major move affecting the mixed force planning came from SEA. By mid-1968 the Seventh Air Force Commander and CINCPACAF had resolved to trade-off AC-47's on a one-for-one basis for the AC-119G/K's.<sup>100</sup> Gen. Creighton W. Abrams, Jr., MACV Commander, agreed to this plan<sup>101</sup> but the Air Force Chief of Staff took the position that "all possibilities should be exhausted before AC-47/AC-119 one-for-one trade-off is considered."<sup>102</sup> Interestingly, a situation had unfolded where Headquarters USAF was planning a larger gunship force than the Pacific commanders wanted. This conflict of views continued until later in 1968 when the Air Force Advisory Group in South Vietnam recommended equipping a Vietnamese unit with Spooky gunships. This opened a way for the Air Force to keep some AC-47's active in the war, yet drop one gunship type from the USAF inventory.

(U) What had begun as a search for an aircraft to replace the AC-47 evolved into a mixed force--a family of gunships. Soon the gunship would become multinational as several U.S. Allies in SEA adopted it. Spirited debate had accompanied the mixed gunship force development and altered its course from time to time. Dynamic change would continue to yield more and better gunships but the greatest emphasis was on the AC-130 aircraft due to its richer growth potential.

#### Facing Modification/Support Problems

(S) Amid discussion of the gunship force, the Air Force tried to hurry modification of seven JC-130A aircraft into Gunship II's. A modification program directive, dated 14 December 1967, authorized conversion of two JC-130A's into gunships.<sup>103</sup>

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Secretary Brown approved a 13 February 1968 amendment to this directive which upped the number to seven JC-130A's at a total cost of \$19,366,475.<sup>104</sup> A letter contract with Ling-Temco-Vought Electrosystems (LTVE), Greenville, Tex., got conversion work rolling in December 1967. Delivery of the first gunship was set for June 1968, the seventh by October 1968. The prototype Gunship II had performed so well in SEA that it served as a guide for production of the seven gunships.<sup>105</sup>

(C) The Air Force took a close look at modification program management. The mixed gunship force meant two concurrent aircraft modification programs--one for the AC-130, the other for the AC-119. Headquarters USAF split responsibility for gunship program management, designating AFSC program manager for the AC-130's and AFLC for the AC-119's.\* The matter of coordination bothered the Air Staff, however, since the two managers would be competing for such subsystems as sensors, guns, and illuminators. Hence, the Chief of Staff instructed AFSC and AFLC on 6 January 1968 to set up a joint project office for coordinating action on priority programs.<sup>107</sup> AFLC questioned the need for the office, pointing out that normal contacts with AFSC on the programs gave ample opportunity to negotiate and resolve priorities and allocation of critical items.<sup>108</sup> The Chief of Staff accepted this view and the management remained as first divided.<sup>+</sup>

(C) In late January 1968 at Greenville, Tex., representatives from LTVE, TAC, AFLC, WRAMA, and ASD reviewed the Gunship II program and defined responsibilities of the various parties. It was agreed that LTVE would provide all peculiar support to include aerospace ground equipment (AGE), spares, contractor field support, and depot maintenance. LTVE's support would also extend to training units at Lockbourne AFB, Ohio, and to the SEA detachment at Ubon RTAFB, Thailand. The Air Force Logistics Command

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\*Apparently the AC-130 program was given to AFSC because it had the experienced prototype team on hand. Also, with only seven aircraft to be modified, ASD might escape some of the support problems that had plagued similar modifications.

<sup>+</sup>Although AFSC was the AC-130 program manager, WRAMA had many related responsibilities as the systems support manager for the USAF C-130 fleet. Very early, AFLC's Directorate of Plans and Programs and WRAMA counterparts joined with AFSC personnel to select a modification contractor.

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would furnish common support through usual supply channels. AFLC warned that the program's urgency would require certain deviations from normal procedures, mainly related to the limited testing.<sup>109</sup>

Gunship II's more sophisticated equipment, some of it relatively new to the Air Force, generated difficult support problems. These had begun with the prototype AC-130A.<sup>110</sup> With AFLC agreement, Aeronautical Systems Division had contracted with LTVE for equipment support of systems peculiar to the prototype. On 12 February 1968 ASD announced that a LTVE field team would oversee supply and maintenance of all Gunship II peculiar items. A 16-man team was to be in place in SEA on 1 August 1968 to care for: the fire-control system (computer, gunsight, and safety display unit), the forward-looking infrared FL2C/13, the airborne illuminator-xenon lights, the night optical device, the AN/APQ-133 beacon tracking radar set, the Mk-24 flare dispenser system, and the ARQ-25 UHF homing and ranging system.<sup>111</sup>

This provision for contractor support contained seeds of controversy that surfaced on 23-24 April 1968 during a joint AC-130A and AC-119G/K gunship logistic support conference at WRAMA. The Air Staff questioned the efficiency of such support and expressed concern about balancing support for both the AC-130 and AC-119 programs. CINCPACAF backed the Air Staff position and stated its concern regarding the impact on the AC-119 program.<sup>112</sup> On the other hand, AFLC and ASD pointed out the lack of "organic depot level maintenance" capability and time delays associated with "separate contracts to various vendors." They insisted that contract maintenance and field service offered the only feasible solution to the high priority AC-130 modifications.<sup>113</sup> WRAMA argued "the significant reason for using the contractor to fully support this program is the fact that for this initial operational deployment we will be supporting the program from the contractor's production line and from the contractor's vendors."<sup>114</sup>

The conferees did not agree on the plan for logistic support so considerable message traffic followed to hammer one out. The initial logistic support concept was revised 24 May 1968 in line with Headquarters USAF instructions and an ASD-proposed compromise. The revision signified a shift from total contractor support for 1 year to basically Air Force support but with a large role for the contractor.<sup>115</sup> By July 1968 a Gunship II materiel support plan had firmed up major responsibilities. ASD would continue as the modification program manager with responsibility

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for "engineering, prototype, configuration, testing and modification of the end item." WRAMA or AFLC would be the AC-130 system manager. As prime contractor, LTVE was to modify the aircraft, manage a supply system of peculiar components, and operate a depot for repair of peculiar equipment when necessary. Air Training Command would train the crews and test their ability to operate Gunship II's equipment. Finally, TAC and PACAF would be the using commands. 116

(U) To further review support progress and problems, 24 representatives from seven organizations gathered at the LTVE plant in Greenville, Tex., on 19-23 August 1968.\* Attention centered on preparing technical publications and identifying requisitioning, and shipping of all necessary spare parts and aerospace ground equipment. The status of the logistic support was increasingly critical because the first two AC-130's were already in use for crew training. The conference estimated that 100 percent of the initial spares would be identified and under procurement by 1 September 1968. Completion date for the final technical orders was expected on 1 November 1968. Eventual success of the whole rush project--as with many others--would hinge on the vast and coordinated logistic effort. 117

~~607~~ The Aeronautical Systems Division struggled through most of 1968 to keep the AC-130 modification program on schedule. Seventh Air Force, PACAF, and TAC pressed for early deployment of the Gunship II aircraft to SEA. They wanted the AC-130's at the start of the Northeast Monsoon season when Laotian roads and trails were sufficiently dried out for the enemy to push through most of his supplies. 118 It seemed, however, a number of difficulties conspired to defeat attainment of this deployment goal. Original proposals to prospective contractors said the Gunship II prototype would be on hand as a guide for modifications. Nevertheless, after winning the contract in December 1967, Ling-Temco-Vought Electrosystems had scant access to the prototype before its return to SEA in February 1968. Moreover, LTVE failed to use the time effectively and delays occurred as the Air Force sought to clarify its requirements with drawings and in meetings. All this boosted costs. 119 An Air Force decision in February 1968 posed a

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\*Organizations represented were: LTVE, Headquarters USAF, PACAF, TAC, AFLC, WRAMA, and ASD.

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second complication. It specified the first two contractor-modified aircraft be used for combat crew training, enabling the other five AC-130's to arrive in SEA with trained crews. This meant a later SEA arrival date for the first two aircraft.<sup>120</sup>

The situation grew more complex when it was realized that the first two AC-130's would have slightly different equipment than the other five. This resulted from changes made after the first two modifications had been approved.<sup>121</sup> On 5 March 1968, for example, Headquarters USAF amended the modification program directive to install terrain-avoidance and terrain-following radar (APQ 136) at an additional cost of \$2,553,225 (new total modification cost: \$21,919,700).<sup>122</sup> In addition, the last five aircraft would have an improved forward-looking infrared system. While all seven AC-130's were to receive this new equipment, the first two AC-130's would require a later retrofit. This caused TAC to question use of the first two aircraft for combat crew training, seeing that it would send crews to SEA unfamiliar with the new electronics equipment of the deployed aircraft. Although TAC and AFLC debated the problem,<sup>\*</sup> the program proceeded as first planned.<sup>123</sup>

The Air Force contended with another difficulty--slippage in delivery schedules for the first two AC-130's that in turn delayed crew training. At first the training cadre had hoped the two aircraft would be on hand in June 1968.<sup>124</sup> Near the end of June, however, ASD told TAC and AFSC that contractor flight tests had "revealed airframe, sensor, and integration problems" and the best estimate for delivery of the first AC-130 was now mid-July.<sup>125</sup> The slippage forced adjustment in class schedules and personnel suffered inconvenient delays. In April 1968 TAC had informed PACAF that the 4413th Combat Crew Training (CCT) Squadron at Lockbourne AFB would fill AC-130 crew requirements with three crews each in September, October, and November 1968.<sup>126</sup> This had to be adjusted and in August the Pacific Air Forces'

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\*TAC suggested use of the first and fourth production aircraft for crew training. AFLC opposed the idea due to logistic problems; Seventh Air Force and CINCPACAF opposed it because they wanted the best AC-130's sent to SEA.

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deployment schedule was revised as follows:

	<u>Number of Crews</u>	<u>Number of Aircraft</u>
Oct 1968	3	3
Nov 1968	3	1
Jan 1969	2	0
Feb 1969	1	1

The two AC-130's used for training and their crews would deploy to SEA as soon as retrofitting was completed.<sup>127</sup>

(S) As July 1968 moved to a close, PACAF became alarmed about the slippage in AC-130 modifications and again stressed the urgent need for the aircraft by the Northeast Monsoon season. Seventh Air Force, equally concerned, underscored the importance of the upcoming Project Commando Hunt--an "intensive interdiction truck killing campaign."<sup>128</sup> It urged that the contractor be pressed to deliver the last two AC-130's in November 1968 rather than in January 1969. ASD and the contractor managed the following schedule:<sup>129</sup>

<u>Aircraft Number</u>	<u>Placed for Modification</u>	<u>Estimate of <sup>130</sup> Original Completion</u>	<u>Contract Schedule</u>	<u>Returned to Air Force</u>
1	21 Dec 1967	Jun 1968	9 Aug 1968	6 Aug 1968
2	9 Jan 1968	Jun 1968	12 Aug 1968	8 Aug 1968
3	26 Jan 1968	Jul 1968	4 Oct 1968	10 Oct 1968
4	6 Feb 1968	Aug 1968	6 Sep 1968	22 Oct 1968
5	18 Mar 1968	Aug 1968	15 Sep 1968	29 Oct 1968
6	1 Apr 1968	Sep 1968	1 Oct 1968	7 Nov 1968
7	15 Apr 1968	Oct 1968	15 Oct 1968	9 Dec 1968

(S) Just about the time the first AC-130A's off the LTVE production line were deploying to Southeast Asia, the prototype aircraft was on its way back to the United States. In view of the logistic problems in supporting the AC-130A's one-of-a-kind equipment, the Air Force decided to modify the prototype as the other

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AC-130A's.\* How to do this was open to question, however, because of a dispute with LTVE over the cost of modifying this eighth Gunship II. Moreover, the Air Force was not entirely satisfied with LTVE's performance.<sup>131</sup> During December 1968 and January 1969, ASD therefore considered contracting for the modification with another company or doing the job itself. If neither of these options seemed feasible, ASD might recommend the prototype's modification be canceled. On 23 January 1969 Maj. Gen. Harry E. Goldsworthy, ASD Commander, proposed the work be done in ASD shops and the Air Staff agreed. In February, ASD's Gunship II Project Branch sent the necessary work orders and contractor's production drawings to the shops so fabrication of parts could begin. The Gunship II prototype was in place at Wright-Patterson AFB on 10 May for the conversion. Its delivery to PACAF was projected for 1 October 1969.<sup>132</sup>

### Combat Operations Begin

(S) Before the end of 1968, four AC-130 gunships were in Thailand flying combat. However, despite vigorous efforts of support personnel,<sup>+</sup> equipment malfunctions plagued operations almost from the start. On 20 December 1968 Seventh Air Force reported 3 major<sup>‡</sup> and 57 other discrepancies to AFSC and AFLC. An AFSC maintenance assistance team, headed by Brig. Gen. Guy M. Townsend, arrived at Ubon on 17 January 1969 and at once explored the problems and assisted in their correction. Texas Instruments, subcontractor for the AN/AAD-4 Infrared set, rushed a technical representative to Ubon to keep the units operating.<sup>133</sup> By 31 December 1968 seven sets had been built and conditionally accepted. (The first two were later deemed unsatisfactory and returned to Texas Instruments for reworking).<sup>134</sup> LTVE personnel

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\*A 5 December 1968 amendment to Modification Requirement 1885 (FS-2209/JC-130A) raised the number of aircraft to eight.

<sup>+</sup>AFLC had deployed a rapid area supply support (RASS) team to assist the four AC-130A's when they arrived at Ubon.

<sup>‡</sup>Major discrepancies were: terrain-avoidance radar problems because of insufficient radome air conditioning (probably a design error); inoperative forward-looking infrared system due to unusable vacuum jackets; and AN/APN-99 doppler radar difficulties caused by lack of test equipment and applicable technical orders.

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analyzed and repaired the radar air conditioning. Use of technical orders and test equipment--which had been on hand but overlooked--resolved the doppler radar difficulties. In spite of these equipment troubles, Gunship II sorties over Laos had risen considerably by year's end.<sup>135</sup>

~~(S)~~ The effort to rush development and logistic support arrangements had not removed serious problems and delays. The high-priority modification program fell behind the desired schedule. Only half the planned Gunship II's were in SEA by the spring of 1969. Production of critical subsystems accounted for most of the delays but some reflected changing Air Force requirements. Too little time for a complete systems approach led to a lack of trained personnel, particularly on new subsystems.<sup>136</sup> Initially, AFLC was slow to identify and stock sufficient spare parts, publications, and supporting ground-equipment.<sup>137</sup> Costs climbed to \$47 million due mainly to expanded spare requirements. Shortage of Class V modification funds further slowed procurement of spare/support items.<sup>138</sup> Nevertheless, while falling short of its goals, the development support effort did get AC-130's into combat during the Northeast Monsoon season.

~~(S)~~ Certain organizational steps had been taken in preparation for the arrival of the Gunship II's. At first there were differences of opinion concerning command and control of the Ubon-based AC-130's. The 14th Air Commando Wing, which supervised the prototype, proposed in July 1968 it continue to command the AC-130's, stressing the idea of a single manager for the gunships.<sup>139</sup> Seventh Air Force replied that on 5 January 1968 it had recommended to PACAF just such an arrangement. The Air Force Chief of Staff and PACAF, however, decided to activate a new AC-130 unit--the 16th Air Commando Squadron--under command of the 8th Tactical Fighter Wing at Ubon. They rebutted the Seventh Air Force plan with these points: (1) The 16th ACSq by being colocated with its parent wing could maintain a "close and more responsive logistics relationship" with the Ubon support base, (2) the Royal Thai Government had continually showed reluctance to have Thailand-based units assigned to a headquarters outside the country, and (3) Seventh Air Force would still exercise operational control over the AC-130's, permitting great flexibility for missions in South Vietnam and Laos.<sup>140</sup> The 16th Air Commando Squadron was set for activation on 1 August 1968.<sup>141</sup> This date began to slip, however, because of the need to obtain approval of the higher manpower ceiling from the Royal Thai Government.<sup>142</sup> It was 31 October 1968

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when the 16th Special Operations Squadron\* came into being with only one aircraft, the prototype.<sup>143</sup> This marked the first time a gunship unit was organized outside the jurisdiction of the 14th Special Operations Wing and highlighted the role planned for the AC-130's--out-country interdiction.

### OPERATIONAL CONTROL OF AIR UNITS IN SEA

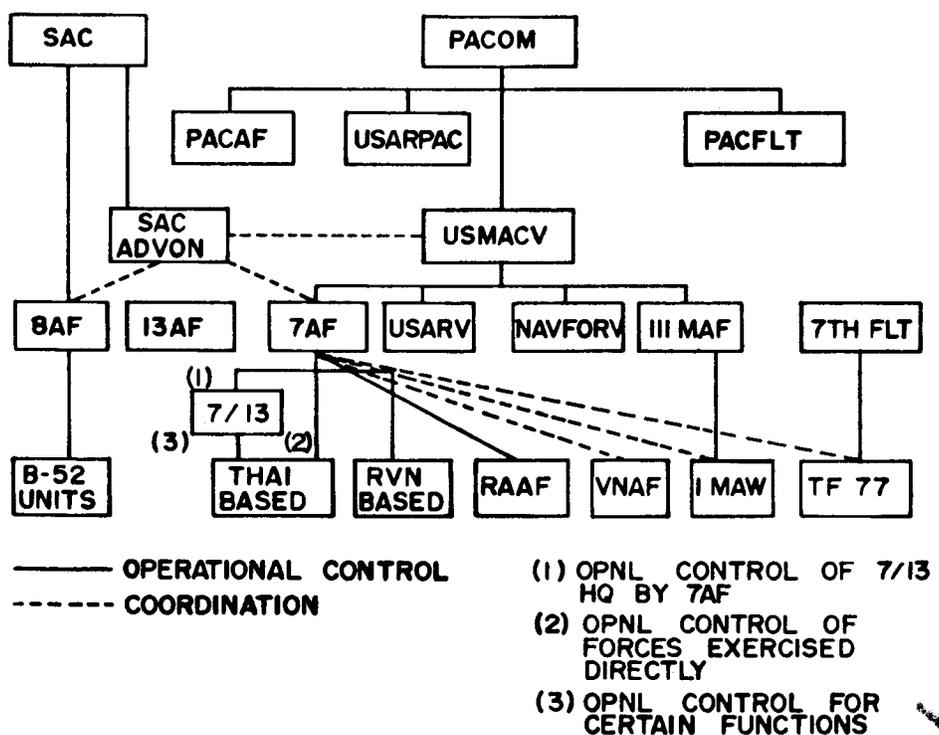


Fig. 14 (U)

\*On 1 August 1968 the "Air Commando" designation was changed to "Special Operations."

(S) The 16th Special Operation Squadron's mission was "to provide firepower offensively and defensively in support of USAF combat support activities and other U.S. sponsored activities in SEA. The 16th Special Operations Squadron may deploy to and maintain continuous alert posture at operating locations [OLs] and designated bases in its area of responsibility."<sup>144</sup> Seventh Air Force Operations Order 543-69 spelled out priorities for airborne firepower support that supplemented this broad mission statement:<sup>145</sup>

<u>Priority</u>	<u>Type of Mission</u>
1	Night interdiction and armed reconnaissance to destroy wheeled/tracked vehicular traffic on roads and sampans on waterways.
2	Night interdiction of targets that have been bombed and then hit with fire-suppression missions.
3	Close fire support of U.S. and friendly military installations including forts, outposts, and strategic towns and cities.
4	Search and Rescue support.
5	Offset firing in support of troops in contact by use of aircraft radar and ground beacons.
6	Daylight armed escort of road and offshore convoys.
7	Harassment and interdiction.

Clearly, Priority I missions were designed to capitalize on the AC-130's new sophisticated sensors, heavier armament, and greater slant range capabilities.

(S) Upon arrival, the AC-130's quickly adapted to various missions. In December 1968 the ABCCC diverted them from interdiction sorties to support defenders of a fortified post on the southeast corner of Ban Thateng, Laos. This position in central-southern Laos commanded one of the major north-south supply routes and was under constant threat of being overrun.\*<sup>146</sup>

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\*In November 1968 a successful close air support mission saved a 100-man Royal Laotian reconnaissance force that had been surrounded by a greater enemy one. [See Maj. James R. Wolverson's "Gunships and Guerrilla Warfare," USAFTAWC Quarterly Report, Sep 70, pp 25-26.]

For four nights the AC-130's supplied illumination and firepower helping to thwart the attacks. They used 16,200 rounds of 20-mm and 16,500 rounds of 7.62-mm ammunition to break the town's siege. The gunship strikes touched off a large fire and a great explosion and during the first two nights killed an estimated 240 of the enemy.<sup>147</sup> These AC-130 defensive-type missions recalled those of Spooky.

(U) Although AC-130's might be diverted to save Laotian hamlets, their primary commitment was night interdiction. Since 1964 USAF aircraft had flown interdiction strikes in Southeast Asia. As the conflict persisted, the interdiction aspect took on fresh importance and absorbed more of the available resources on both sides. Through January 1968 the ordnance delivered by the gunships during interdiction strikes equaled half the total ordnance expended in the Korean War.<sup>148</sup> The tempo of the conflict beat faster and by 1968 the North Vietnamese and Vietcong required a heavier flow of supplies to South Vietnam. The need stemmed from the more intense fighting (1968 Tet Offensive) following the enemy's introduction of bigger and more conventional forces. At the same time, the United States and South Vietnamese were determined to choke off as much of the supply flow as possible and render the enemy forces ineffective.

(U) The supplies reached Communist forces in South Vietnam by (1) infiltration through the DMZ, (2) via coastal vessels through the Cambodian port of Sihanoukville then on northward and eastward, and (3) southward over the maze of roads in the Laotian panhandle. It was the latter route that carried the greatest supply tonnage and number of troops. Consequently, it received the greatest interdiction effort--particularly from the Air Force and its gunships.

(U) Interdicting the Ho Chi Minh Trail was a difficult task. By the beginning of 1969, this extensive road and trail network\* (for movement of material by truck or on the bicycles/backs of porters) had threaded through steep mountainous terrain frequently covered by jungle canopy. In caves of the limestone karsts,<sup>+</sup>

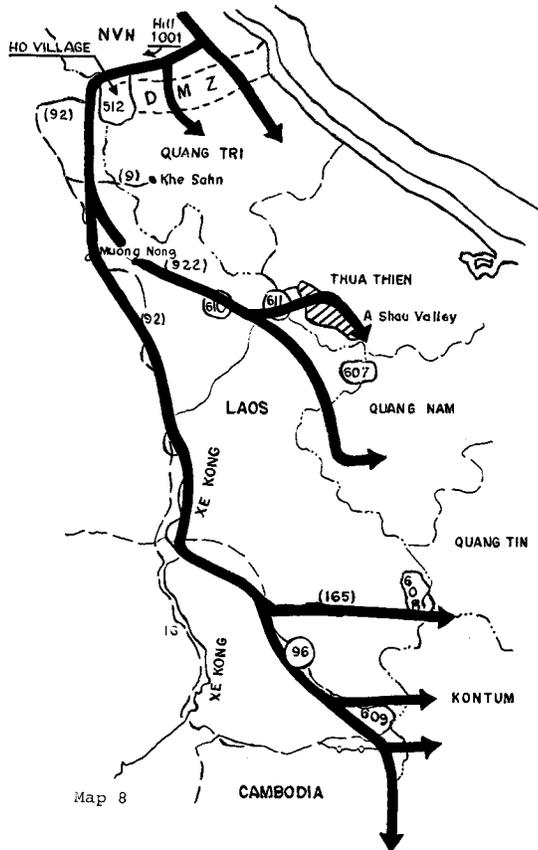
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\*The network contained an estimated 450 miles of primary roads. [Hist (TS), MACV, 1 Jan-31 Dec 68, I, 409.]

<sup>+</sup>A karst is a limestone region marked by sinks and interspersed with abrupt ridges, irregular protuberant rocks, caverns, and underground streams.

INFILTRATION CORRIDORS  
1967

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the enemy stored supplies and occasionally concealed AA guns. Wherever possible, he also transported cargo by river. Numerous road crews labored diligently to repair roads and construct quick detours and alternate routes. Most roadwork and movement of supplies took place at night under the cover of darkness. Peak traffic hours would be shifted if air attacks seemed concentrated at certain times.\* Antiaircraft guns defended particularly vulnerable Trail points, a protection that continually expanded with more and better weapons. In short, interdicting this rugged region of approximately 1,700 square miles--used by a firmly determined enemy--presented a most formidable challenge.

\* A CINCPAC Scientific Advisory Group analysis of the Laotian interdiction program from October 1965 through June 1967 pointed out: "April and May [1966] truck movements show what may be a significant trend to greater movement in the early morning hours. This period appears to be only lightly covered by armed reconnaissance effort." [Working paper 16-67 (C), CINCPAC Scientific Advisory Group, Evaluation of Laos Interdiction Program October 1965 through June 1967 (U), 5 Sep 67, p 29.]

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(U) As for most air operations, weather proved pivotal in the interdiction effort. The Southeast Asian monsoon seasons generated periods of bad and good weather that were definitely cyclic. This in turn forced relatively sharp peaks and deep valleys of air activity. The warm moist air shifted inland from the seas during the Southwest Monsoon, striking and flowing over the Annam Cordillera to produce cloudy rainy weather. Hence from about May to November air operations over Laotian trails faced very rough going and enemy truck traffic declined over the nearly impassable roads. With the Northeast Monsoon (November to May) came comparatively good dry weather over Laos as the airflow came from the colder, less humid land mass to the north.<sup>150</sup> Since this weather favored air operations and vehicular movement, it was dubbed the "hunting season." These rhythmic weather periods shaped AC-130 operations and the aircraft's ongoing development as a weapon system. Equipment changes and modifications were keyed to the Southwest Monsoon so the aircraft could be in combat at the time of greatest need.

(S) By the fall of 1968, interdiction of enemy supply routes had evolved into a complex many-faceted operation. Covert road-watch teams--mostly indigenous--spotted trucks and determined main traffic routes. Other Trail intelligence flowed from intensive aerial reconnaissance, FAC observations, and captured North Vietnamese. Two geographically defined operational areas, Barrel Roll in the north and Steel Tiger in the southern panhandle, had been designated for organizational convenience. Chief interest lay in Steel Tiger with its important routes running south from two major mountain passes on the North Vietnamese border--Mu Gia and Ban Karai. Within Steel Tiger several past programs such as Tiger Hound and Cricket had sought better ways for target generation, strike control, and damage assessment.<sup>151</sup> A wide range of aircraft types, B-52's to A-1's, flew over trails and passes to locate and impede traffic. The Air Force tried new tactics such as hunter-killer teams and new equipment in an unending search for better results. Planning, coordinating, and managing the entire interdiction operation taxed the most skillful leadership.

(S) In spite of improved interdiction effectiveness, the enemy still supplied his units in South Vietnam to the dismay of some military and government leaders. Most disturbing in early 1968 was evidence of a truck-kill plateau. An analysis of 1967 truck detections and truck attrition showed sightings of trucks in Laos

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during 1967 up 165 percent over 1966, yet truck kills stayed roughly the same. One report commented: "The fact remains we are seeing far more trucks in Laos than we are able to destroy."<sup>152</sup>

(S) A number of reasons accounted for the enemy's success in getting his supplies through. First, North Vietnamese ability to reconstruct roads at night and in adverse weather always offset much of the interdiction effort.<sup>153</sup> Ironically, years of bombing some good interdiction points had changed them into easily repairable gravel piles. Second, the enemy had astutely capitalized on USAF deficiencies in night and all-weather operations both in the realm of detecting targets and destroying those of a fleeting nature (e.g., trucks).<sup>154</sup> Third, despite a major push to gain more intelligence, Air Force traffic analysis was incomplete and insufficient. It lacked information on road capacities, length of time to transit areas, extent of roads and trails, and the number of available trucks. Fourth, the Air Force had not yet found the right aircraft or aircraft team combining target detection, tracking, and destruction capabilities.\* Fifth, the interdiction effort was fragmented and without an overall strategy.<sup>+</sup> Sixth, the Air Force concentrated its interdiction very close to the utilization area. This contrasted with the preferred concept of striking

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\*A debate over jet versus propeller aircraft was typical of the problem. The Joint Chiefs of Staff told CINCPAC in December 1967 that a JCS study had shown "Propeller aircraft are approximately 9 times as effective as jet aircraft per sortie in destroying trucks and water craft in Laos." [Msg (S), JCS to CINCPAC, subj: The Use of Propeller and Jet Aircraft In Laos, 201740Z Dec 67.] Commanders of jet units argued that speed was essential for survivability in many areas. The JCS message admitted that "loss rates for propeller aircraft operating in Laos are approximately 4 times greater than the comparable loss rates for jet aircraft."

<sup>+</sup>The Military Aircraft Panel, President's Science Advisory Committee recommended establishment of a Joint (Tri-Service) Task Force operating under the aegis of the JCS to develop a high-priority, integrated interdiction effort for the fall of 1968. [Memo (S), PSAC Military Aircraft Panel to Dr. Donald E. Hornig, subj: Establishment of a Joint (Tri-Service) Task Force to Develop a Coherent Truck Interdiction Plan for the Fall of 1968, 2 Jul 68.] Lt Col William H. Greenhalgh, Jr., The Interdiction Campaign 1 April-31 October 1968 (S) (ASI, Jul 1969), describes various operations that preceded Commando Hunt. These fluctuated in intensity and design without an encompassing strategy.

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deep at supplies close to their source and at troops in training/staging bases.<sup>155</sup> Without improvement in most of these areas, there was doubt the Air Force could significantly impair the enemy's logistic support.

(6) New developments made the Air Force far more optimistic about interdicting the Ho Chi Minh Trail when the 1968-1969 hunting season opened. The greater quantity of new equipment from the Shed Light program gave promise of trimming the enemy's night-time advantage. A case in point was the night observation device (starlight scope) tested in 1966 and introduced in early 1967. The scope's impact was reflected in a comparison made by the PACAF Directorate of Tactical Evaluation of the period 30 November-2 December 1966 (before the scope's introduction) with a 3-day period in 1967 following its extensive use:<sup>156</sup>

<u>Trucks sighted</u>	<u>1966</u>	<u>1967</u>
Visually	20	30
Night observation device	-	597
Destroyed	8	83

The Air Force had installed low-light-level television (LLLTV) in two A-1's and two B-57's during 1968. Test programs for this night sensor development were under way in SEA under the nickname Tropic Moon. The use of airborne-deployed sensor fields (labeled Igloo White) tied via relay aircraft to the infiltration surveillance center (ISC) at Nakhon Phanom, Thailand, was expected to improve traffic analysis. Task Force Alpha (a wing-level unit) would control this all-weather, around-the-clock surveillance network of seismic and acoustic sensors. In addition, a completely integrated interdiction effort for the Laotian panhandle (code name Commando Hunt) had been developed.<sup>157</sup>

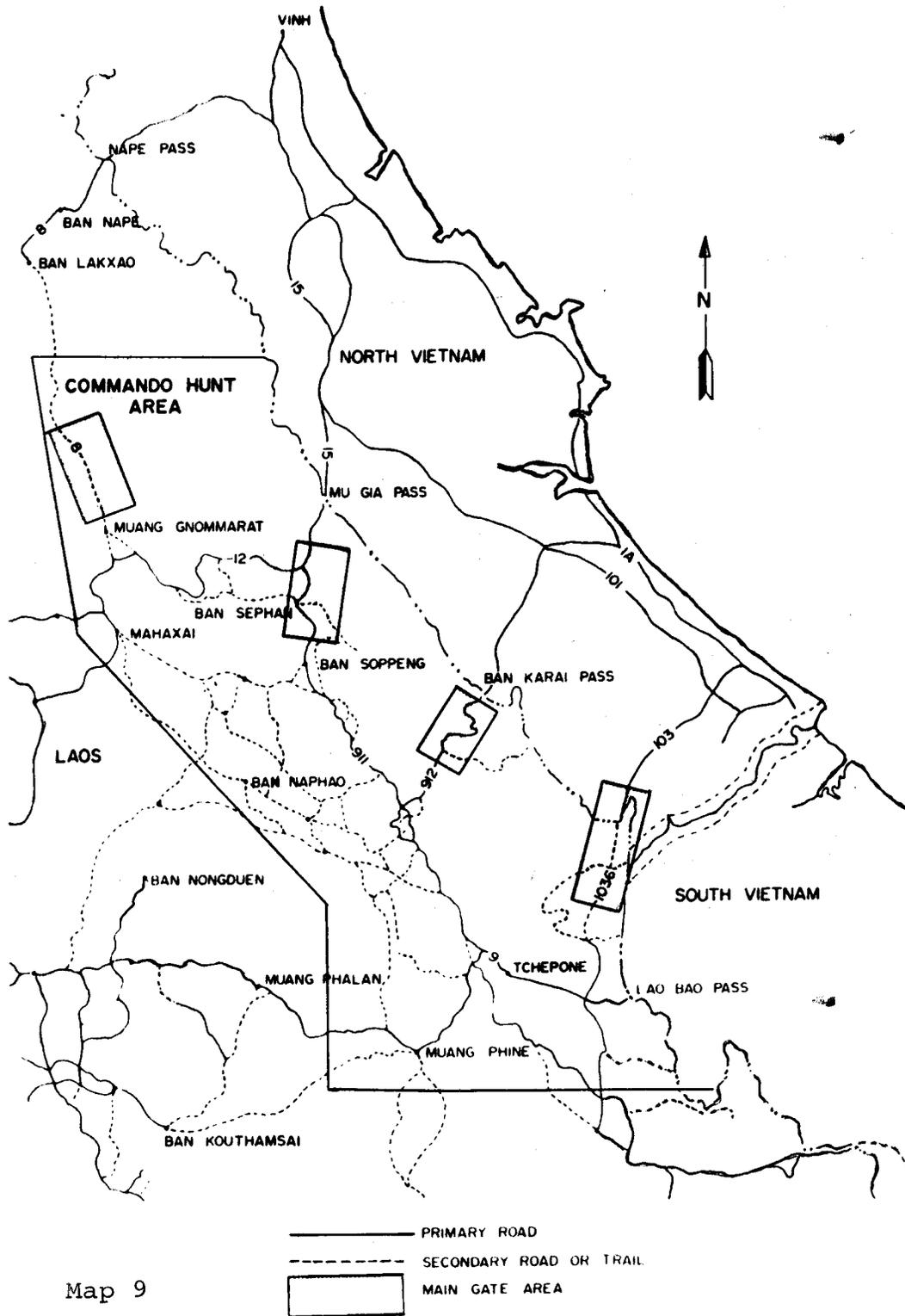
(7) Furthermore, President Lyndon B. Johnson had ordered a halt to the bombing of most all North Vietnam on 1 November 1968 allowing more attention and resources to be concentrated on the interdiction campaign.\* New specialized munitions for suppressing

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\*The bombing halt had a negative side. It permitted the North Vietnamese to move supplies unhindered up to the Annam mountain range along the Laotian border. Soon after the bombing halt, large convoys of uncamouflaged trucks--traveling bumper to bumper--were reported heading for the Laotian border in daylight.

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# COMMANDO HUNT MAIN TARGET AREAS



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AA guns and killing trucks were available.\* Finally, Gunship II's potent combination of sensors, illuminator, fire-control system, and heavier armament could be employed. Secretary Brown pinned his hope for a "good interdiction campaign" on the better traffic analysis, new equipment, and improved tactics. Noting that one or more of these factors was lacking in the past, the Secretary considered use of AC-130 gunships one of the important positive changes.<sup>158</sup>

~~(S)~~ Air Force Commando Hunt strategy in 1968-69 called for a flexible allocation of forces against priority-listed targets. First priority was assigned interdiction points, specific road segments difficult to detour or which, when blocked, would divert traffic into predictable areas.<sup>+</sup> These were carefully selected from aerial photography, FAC observations, and Igloo White sensor information.<sup>159</sup> They were attacked with precision bombing followed by use of delayed-action-fused bombs, air-delivered landmines, or area-denial munitions. The strikes took place in late afternoon making it harder for repair crews to reopen the roads before nightfall. As darkness came, the AC-130's and strike aircraft, supported by flak-suppression flights and flareships, attacked vehicles backed up or attempting alternate routes. The second target priority went to truck parks and supply caches, the third to moving trucks, and the last to AA artillery.<sup>160</sup> Coordinated use of aircraft<sup>‡</sup> against these

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\*Maj. Gen. Gordon F. Blood, 7th AF Deputy Chief of Staff for Operations, emphasized the value of the improved truck-killing munitions to Maj. Gen. Sam J. Byerley, Air Force Deputy Director of Operations: "This will allow the actual truck kill (secondary explosions and fires) effectiveness of the strike force to approach the efficiency of the basic sensor system and the target acquisition elements." [Msg (S), 7th AF to CSAF (AFSS), subj: Commando Hunt, 081020Z Aug 68.]

<sup>+</sup>In testimony before a subcommittee of the Senate Committee on Armed Services Maj. Gen. Carlos Maurice Talbott, Air Force Director of Operations, said: "The Commando Hunt interdiction plan was executed on November 15, 1968, without the North Vietnam option. The objective was to reduce the flow of supplies by destroying vehicles and vulnerable road segments and water crossings." [Hearings before the Electronic Battlefield Subcommittee of the Preparedness Investigating Subcommittee of the Senate Committee on Armed Services, 91st Cong. 2d sess, 18, 19, and 24 Nov 70, p 107.]

<sup>‡</sup>Aircraft types used were the B-52, B-57, F-4, F-105, F-100, Navy A-4, A-6, A-7, A-26, A-1, AC-130, and AC-123.

target categories created an integrated interdiction effort in depth. It substantially slowed the enemy's transit of Laos and afforded more opportunities for up to 500 sorties a day to destroy his trucks and supplies.<sup>161</sup>

(S) Reports of over 14,000 trucks moving through Laos in April 1968 imparted a sense of urgency to the interdiction effort. This unprecedented traffic flow was placed against the knowledge that the enemy had successfully moved some 100,000 tons of supplies to prepare for the 1968 Tet Offensive. Moreover, the bombing halt would now free thousands more trucks from support requirements north of the 19th parallel. It was becoming obvious that the "insatiable logistic demands of heavy mortars, modern rocket weapons, and a complete family of light infantry automatic weapons" widened the enemy's dependence on truck transportation. It seemed highly possible a surge of truck traffic would be in the offing for support of a "third general offensive."<sup>162</sup>

(S) As a key element of the overall interdiction strategy, the AC-130's were used at once in armed reconnaissance of roads. The first flights kept to the less heavily defended southern portion of Steel Tiger while crews got to know the area and control procedures. As proficiency progressed, missions shifted northward.<sup>163</sup>

(S) On familiarization sorties the AC-130 combat crews first mastered the command and control system and the theater rules of engagement. The command structure consisted of dual channels. An administrative channel ran from Thirteenth Air Force through the 8th Tactical Fighter Wing to the 16th Special Operations Squadron at Ubon, Thailand. An operational channel--for mission assignments or fragging--flowed from Seventh Air Force through 8th TFWg to the 16th SOSq. The Seventh Air Force tactical air control center (TACC) exercised battlefield direction through the airborne command and control center, with sensor inputs from Task Force Alpha and finally with on-the-spot assistance from forward air controllers.<sup>164</sup> Restraints on airstrikes in Laos supplemented this control arrangement. Attacks were forbidden near specified villages and use of certain types of ordnance was tightly controlled. The U.S. Ambassador in Vientiane, Laos, had to approve plans for air operations in some parts of Laos so not to disturb the delicate relationships with the neutral Royal Laotian Government.<sup>165</sup>



flares and 6,000 rounds of 20-mm ammunition.\* Meantime the crew studied the nights armed reconnaissance mission. The aircraft lifted off before dusk (at 1705) and while still over Ubon a checkout of equipment commenced. Operators aligned and prepared for operation the night observation device and other sensors. Gunners loaded and checked the weapons. Within 10 minutes the gunship was "crossing the fence" (the Mekong River separating Thailand and Laos) and making radio contact with Moonbeam, the ABCCC operating over southern Laos. Using current intelligence information the ABCCC assigned the AC-130 to a specific operating area whereupon the gunship's navigator assumed a key role as he plotted coordinates. The Gunship II's radio call sign was Spectre 01.†

Spectre 01 reported "on station" at 1720. For the next 55 minutes it practiced intercepts with F-4 flights in case their help was needed to suppress AA fire. At 1815 gunship sensor operators probed infiltration route 922 working a 15-mile road segment until 2035. At 1840 four eastbound "movers"‡ were detected. (Normally one sensor was used to maintain a fix while another searched.) The sensor inputs fed the fire-control computer and the information reflected in the pilot's gunsight as he turned into a left orbit at 4,500 feet AGL. Selecting the lead truck to stall traffic, the pilot pushed the trigger button as the movable and fixed target reticles superimposed in his gunsight. The 1,000 rounds of 20-mm fired in a 4-minute attack damaged 1 truck.

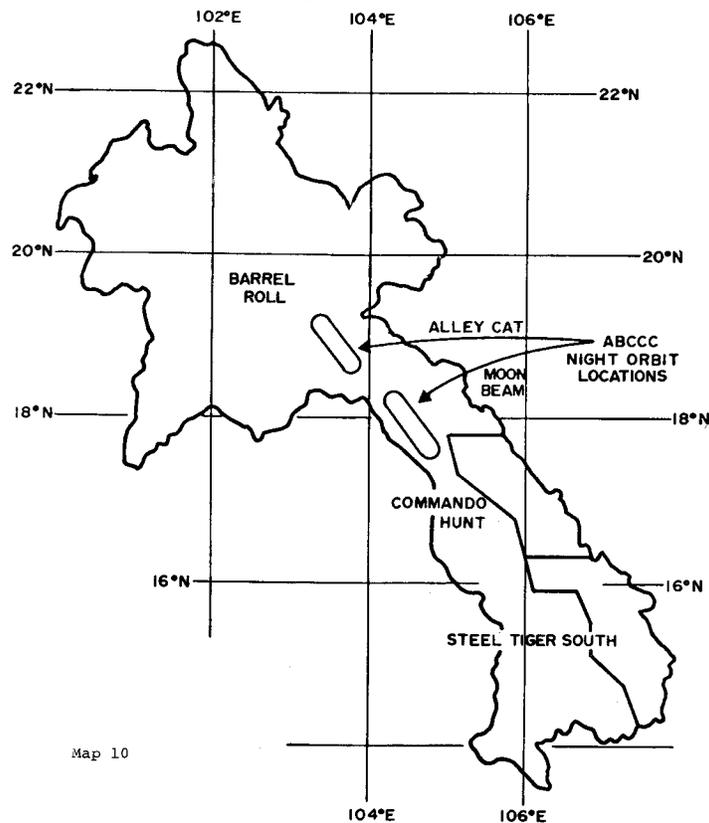
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\*The 8,000 rounds of 7.62-mm ammunition normally loaded on each AC-130 was not loaded on aircraft 1629.

†Spectre became the common name of all AC-130's just as Spooky did for all AC-47's.

‡Moving enemy vehicles.

AIRBORNE BATTLEFIELD COMMAND AND CONTROL CENTER  
Night Orbit Locations



At 1855 Spectre 01 detected target 2--1 mover--and in a 2-minute attack orbit fired another 1,000 rounds of 20-mm damaging 1 truck. Farther down the road the gunship discovered three stationary trucks and a suspected truck park. While marking the area with flares Spectre 01 met with 37-mm AA fire. From 1902 to 1925 the pilot squeezed off 1,000 more rounds of 20-mm on both the suspected truck park and the 37-mm site. An explosion and fire told of the AA emplacement's destruction.

Two more stationary trucks became target 4. Spectre 01 attacked from 2002 to 2006 and damaged both of them. Two F-4 flights--call signs Schlitz and Combine--worked on AA sites together with Spectre strikes and claimed two sites destroyed. From 2021 to 2026, Spectre 01 once more fired 1,000 20-mm rounds upon return to the scene of the suspected truck park of target 3. No visual results were obtained of this final attack. Spectre 01 left the target area at 2035 after an elapsed time of 3 hours and 15 minutes with 6,000 rounds of 20-mm ammunition and 15 Mk-6 flares expended. The night's work totaled four

trucks damaged, one 37-mm AA site destroyed, and one 37-mm AA site silenced. Spectre 01 recrossed the fence and touched down at Ubon at 2115. Total mission time stood at 4 hours and 10 minutes.

Such a mission illustrated the growing effectiveness of AC-130's in the interdiction effort. They quickly compiled an unusual record. In January 1969, with but four aircraft and relatively inexperienced crews, they accounted for 28 percent of the truck kills (table 2).<sup>169</sup> As the months passed, their role took on even more significance. In April 1969 the 16th Special Operations Squadron flew just 3.7 percent of the sorties but accounted for over 44 percent of the trucks destroyed or damaged in Laos.<sup>170</sup>

An example of a near flawless Gunship II mission occurred on 7 April 1969 when aircraft 627--equipped with a fully operational FLIR--attained a 100 percent kill ratio.<sup>171</sup>

The AC-130, labeled Schlitz for the night mission, took off at 1905 and the crew went through the usual prestrike checks of sensor equipment, pilot's gunsight, and fire-control system. (A central traffic circle in downtown Ubon, easily seen by sensor operators and the pilot, was used for the checks.) Equipment in order, the gunship flew to the fringed area of routes 23 and 917 in central Laos. In the face of light AA fire the aircraft sighted, attacked, and destroyed 2 vehicles within the first 30 minutes.

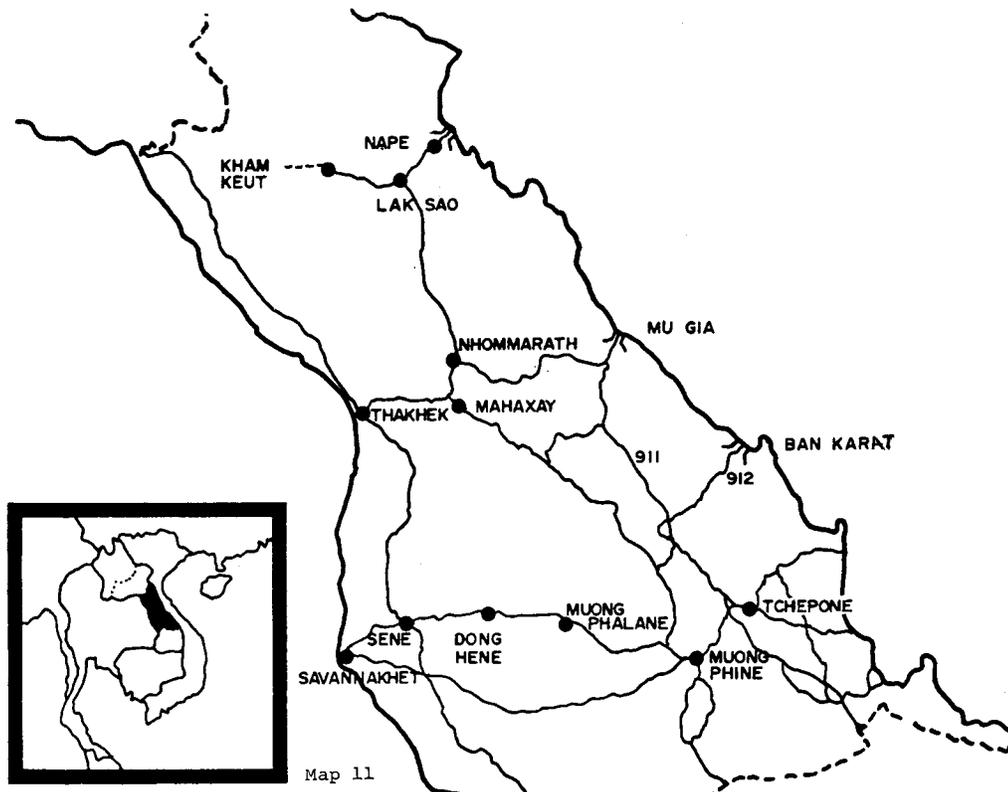
The ABCCC next diverted Schlitz to interdict vehicles spotted on one of the most heavily defended areas of Laos--route 911, just south of Mu Gia Pass. The route segment pushed northwest to southeast through rolling jungle country with karsts soaring 2,000 feet above the road its entire length. Many rivers and creeks bisected the route slowing traffic. Utilizing the NOD and FLIR, the gunship crew sighted 23 trucks. All were struck, the 27 secondary explosions and 12 secondary fires destroyed 23 trucks. Even more remarkable the job was done amid an estimated 900-round barrage of 37-mm fire. Schlitz's work for the night totaled 25 vehicles detected and 25 destroyed.

TABLE 2  
 GUNSHIP II RECORD  
 (First Quarter 1969)

	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Total</u>
Missions fraged	65	81	99	245
Missions flown	63	73	89	225
Air aborts	3	7	4	14
Ground aborts	2	3	11	16
Trucks sighted	542	618	693	1,853
Trucks destroyed	105	210	292	607
Trucks damaged	115	138	98	351
Trucks (results not observed)	140	181	226	547
Boats sighted	1	22	0	23
Boats destroyed	1	10	0	11
Helicopters sighted	0	0	4	4
Helicopters destroyed	0	0	0	0
Troops-in-contact	8	2	3	13
Secondary fires	126	421	630	1,177
Secondary explosions	182	514	805	1,501
20-mm ammunition expended	237,436	376,652	312,147	926,235
7.62-mm ammunition expended	31,221	344,621	324,594	700,436

SOURCE: Major Richard F. Kott, The Role of USAF Gunships in SEASIA (S)  
 (HQ PACAF, Project CHECO, 30 Aug 69), Fig. 18.

## MILITARY REGION III, LAOS Routes 911/912



Not all missions matched the excellence of the 7 April Schlitz sortie. One week later, fire-control system trouble beset aircraft 627 (call sign Carter). Only 2 of 15 trucks sighted could be destroyed due to unreliable roll-in guidance and erratic gun patterns. Moreover, about halfway through the mission, Carter's NOD operator detected a convoy of southbound vehicles on route 911. The ABCCC turned down the gunship's request to strike because other aircraft were working in the area. It approved Carter's second request but by then the trucks had vanished into the jungle. The night's mission ended with 2 vehicles destroyed of 37 spotted.<sup>172</sup>

The 16th Special Operations Squadron and the gunships scored a notable first on an 8 May mission. At 0140 the NOD operator of aircraft 629 (call sign Bennet) detected a blurred, gray object moving across the jungle canopy at less than 1,000 feet above the terrain. He reported sighting a possible helicopter. The navigator quickly plotted the position and called Moonbeam (the ABCCC) for firing clearance. While awaiting strike approval the gunship tracked the helicopter to a landing in a rectangular

clearing. The NOD operator could make out several trails in the area. The FLIR operator, despite degraded equipment, was able to track the helicopter during one small segment of the firing orbit. After 20 minutes, Bennet received permission to fire and began attack passes. Several 20-mm cannon bursts struck the clearing's perimeter and set off many small secondary explosions. The NOD operator reported seeing five rounds hit home and small explosions come from the helicopter. Several gunship crews had reported suspected helicopter sightings before. Bennet was the first gunship to claim destruction of one.<sup>173</sup>

### Strengthening Survivability

From the very first commitment of AC-130's to Southeast Asia, there was considerable concern about their vulnerability in operations over Laos. During its development the Air Force had tried to strengthen Gunship II's survivability by adding some 7,000 pounds of armor in the lower fuselage to protect the crew and vital components. It had also put polyurethane in the fuel cells (tanks) to make them explosion-proof.<sup>174</sup> Other survival advantages were expected from (1) the AC-130A's higher operational altitude made possible by greater-performance engines and 20-mm guns, (2) the aircraft's capability to fly on two engines at normal combat weight, and (3) the planned night and poor weather operations.<sup>175</sup>

The enemy's buildup of anti-aircraft guns in Laos countered these efforts for gunship survivability. By June 1968 the prototype AC-130A had taken enemy fire on 56 of 57 sorties--sighting an average of 60 rounds.<sup>176</sup> The North Vietnamese welcomed the November 1968 bombing halt and redeployed many AA guns to Laos just as the production AC-130's were about to arrive in SEA. When the Spectres began flying over the Trail, the Ubon-based AC-130 squadron reported quite simply: "Where there are trucks there are very many 37-mm positions." Before 1 November 1968 the enemy had an estimated 200 guns of all calibers in Laos. From that date to May 1970 the number of guns in Laos (some of large caliber) jumped 400 percent.<sup>177</sup> The 37-mm fire--by far the most common--grew so intense and more accurate that some major roads were no longer deemed permissive for the gunship. Headquarters USAF concern over gunship vulnerability deepened in June 1968 upon studying the AC-130A prototype's reports.

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Henceforth, the Air Staff asked for more information on the extent of battle damage so it could further monitor the survivability aspect of gunship operations.<sup>178</sup>

### AA WEAPON THREAT

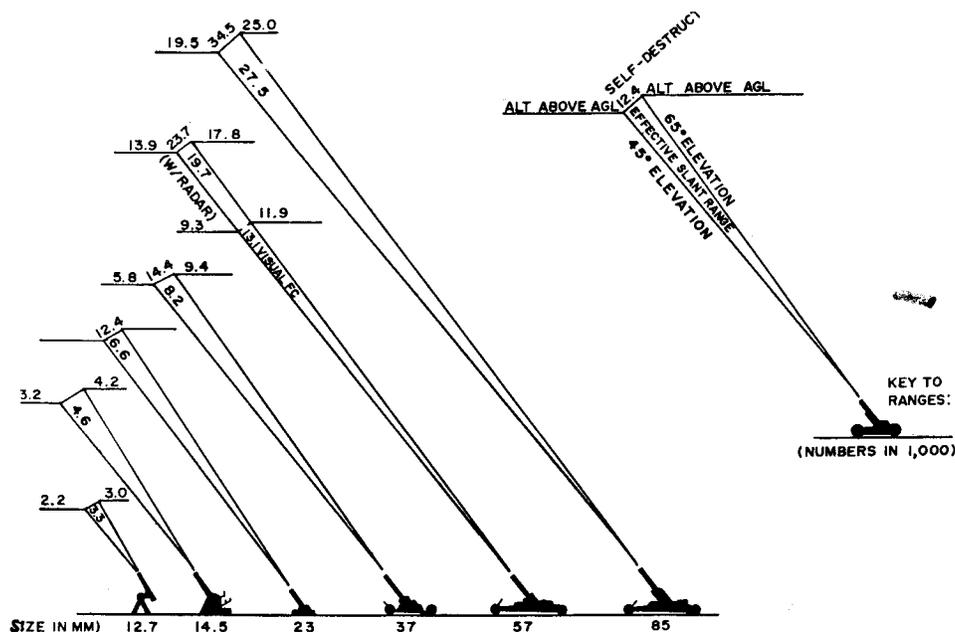


Fig. 16 (S)

(S) Of necessity gunship tactics adjusted to antiaircraft defenses. Although gunship fire silenced a number of 37-mm positions, the operational rule was to avoid contact if possible.<sup>179</sup> To skirt them dictated careful plotting of known gun emplacements then accurate navigation. Experienced crews could work safely between guns and as close as 4 or 5 miles to them.<sup>180</sup> The gunship found it best at times to wait for targets to move out of a heavily defended area or to call for fighter strikes if they did not.<sup>181</sup> Yet avoiding AA batteries was not always feasible nor desirable if the interdiction mission was to be carried out. In such cases the crews learned to strike targets swiftly. They would seek to acquire the target, roll into a firing orbit, fire while completing a 90°-120° arc, and roll out again.<sup>182</sup> Normally, the gunship could fire only one burst if ground fire was very intense.<sup>183</sup>

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(S) Aircraft took extra care to shun high-threat areas on bright moonlit nights. Even worse were nights of thin overcast. Then the moon illuminated the clouds and diffused the light to form a perfect background that silhouetted the aircraft for enemy gunners. In the first 6 months of 16th SOSq operations, 9 of 13 hits on AC-130's came on nights with clouds and the moon in half-phase or more.<sup>184</sup>

(S) From 1 February to 31 May 1969 the 16th Special Operations Squadron studied the effects of lunar illumination on combat operations. The resulting report, "Project Moonwatch," determined that under certain conditions "moonlight does tend to increase the gunners' accuracy." It found, however, no correlation between the "phase of the moon and the amount of AAA," as "some of the heaviest AAA reactions have occurred during periods of less than a half moon." The study of data suggested to the investigators that the enemy was increasing traffic when the moon was less than half full--possibly to reduce detection by the NOD--and employing more AA fire to cover the peak traffic times.<sup>185</sup>

(S) To help spot AA batteries and to assist the pilot in evasive actions, two crewmembers had the additional duty of scanner. Usually a gunner was positioned on the right side and the illuminator operator (IO) looked out the rear of the gunship. Over target areas the IO spent much time flat on his stomach. He peered down from the open cargo-compartment door and called the location of AA flashes over the interphone to the pilot. Tethered by a strong cable to the fuselage, the IO obtained a measure of safety. Still, in the eyes of IO Sergeant Thomas Sellner: "All IOs are crazy. They have to be."<sup>186</sup> Both scanners gave the pilot evasive directions, if required, by calling "break" or "hard break" right or left. The pilot responded with a 60° bank to "break" and a 90° bank to "hard break."<sup>187</sup>

(S) Development of fighter-escort tactics was the most telling counter to enemy defenses in Laos. When the AC-130 prototype met with more intense AA fire, it had called for flak suppression by fighter-bomber aircraft. However, this had been done largely at random with little planning. The solution to the dilemma of getting at lucrative targets in heavily defended areas seemed to lie in the gunship/fighter team approach. A 10 December 1968 study by the Seventh Air Force Directorate of Tactical Analysis concluded that F-4's and AC-130's could kill more trucks by operating together

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rather than separately.<sup>188</sup> Twenty days later, the 8th Tactical Fighter Wing's 497th Tactical Fighter Squadron--the "only night attack squadron in the Air Force"--ushered in a new mission--armed escort and flak suppression for Spectre aircraft. On the gunship/fighter team's first night, F-4D's of Schlitz and Combine flights destroyed or silenced two 37-mm sites that were firing at Spectre 01.<sup>189</sup>

(S) Four F-4D Phantoms were initially assigned to escort Spectre. Two hovered over the AC-130 while the other two refueled at the KC-135 tanker. It soon became clear that the gunship spent excessive time acting as a FAC for the fighters. The escort was therefore cut to three Phantoms and the Spectre's FAC role fell back to its proper position with respect to the interdiction mission.<sup>190</sup>

(S) Assignment of F-4 escorts for the AC-130's demanded close coordination between the two types of aircraft both in pre-mission planning and in combat. For one thing, the new tactics developed had to consider the very different airspeeds and fuel-consumption rates. This began with the takeoff of the AC-130 and F-4's. The Phantoms left the base at staggered intervals to relieve the AC-130's escort at 20- to 25-minute periods. Two to three refuelings from a KC-135 tanker were additionally required\* to maintain a continuous escort with the gunship during its 3- to 4-hour missions. The tanker was commonly over Thailand within 100 nautical miles of Spectre or no more than 15 minutes flying time for the F-4.<sup>191</sup>

(S) As escorts, the fast F-4's chiefly flew at 12,000-14,000 AGL and 2-3 miles behind the 145- to 160-knot AC-130A. The Phantoms maneuvered in an S-pattern while the gunship flew a straight course. When Spectre entered into its attack orbit, the F-4's swung into a larger one. They stayed within Spectre's 10 o'clock to 8 o'clock position and held an airspeed of 300-320 knots. The gunship's radial speed was greater in its smaller circle. Hence, the F-4's had to periodically turn into the gunship's wake making it difficult to hold a smooth orbit. When an enemy gun opened up on Spectre, the gunship coordinated with the Phantoms by radio to grant clearance for attack and to insure aircraft

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\*Referred to as the "Spectre Shuttle."

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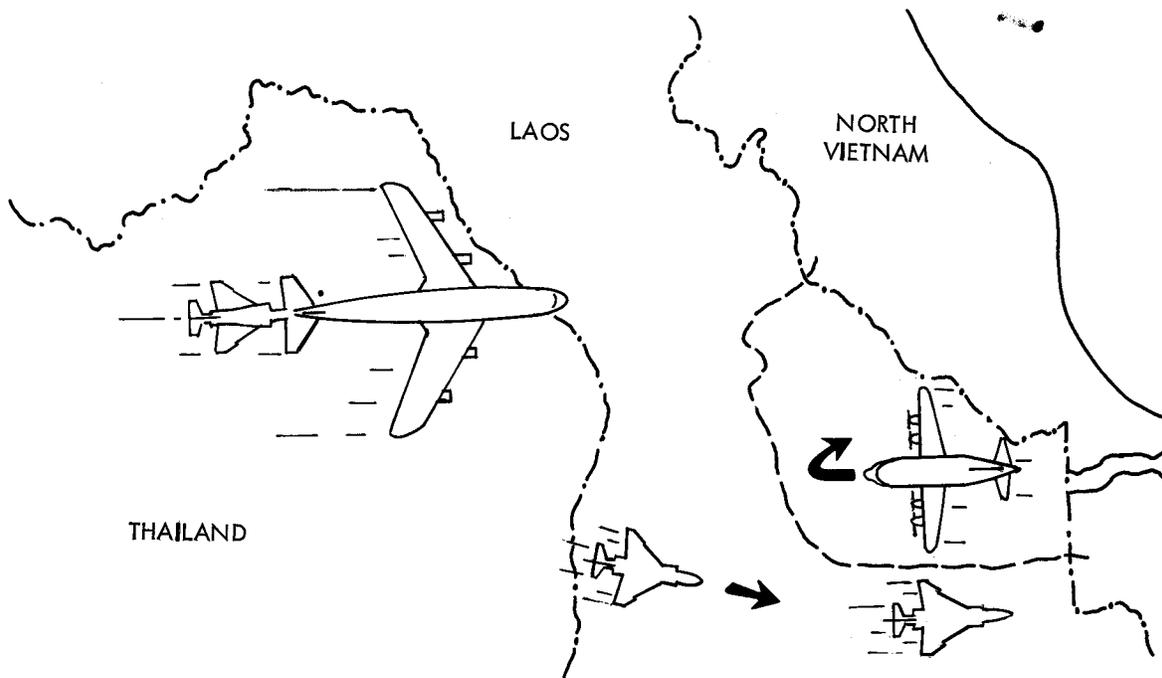
**THE AC-130 SPECTRE SHUTTLE**

Fig. 17 (U)

separation. This was vital as the F-4's firing pass--dropping a single cluster bomb unit (CBU) or bomb\*--carried it twice through Spectre's orbiting altitude. Consequently, the escort had to know the gunship's position at all times. This became far harder when the escort and gunship were on the same side of the orbit. Then the F-4 pilot could not easily see the shielded rotating beacon<sup>+</sup> on top of the AC-130 nor its formation lights. At times the hostile guns fired but occasionally and the Spectre acted as FAC. It dropped logs (ground flares to create reference points) to mark the enemy gun emplacements and cleared the Phantoms for attack.<sup>192</sup>

\*Armament on the three escorts ordinarily included:

First and Third F-4: 6 x CBU-24 and/or CBU-49  
3 x Mk-82 (fuze extender)

Second F-4: 6 x CBU-24 and/or CBU-49  
2 x Mk-84 (fuze extender) or  
2 BLU-27 (finned)

[Rprt (S), Tactical Doctrine, 8th TFWg, F-4 Escort of AC-130 Gunship, undated, chap 10, 5-106.]

<sup>+</sup>Use of the shielded rotating beacon was borrowed from the O-2 FAC's

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These tactics were gradually refined and the AC-130/F-4 team proved a potent gun-killer as well as truck-killer. Maj. Gen. Robert L. Petit, 7th AF/13th AF Deputy Commander, thought it evident "The enemy pays a hell of a price to go after a Spectre."<sup>193</sup> Most important, however, the AC-130/F-4 team enabled interdiction strategists to continue exploiting the great truck-killing capabilities of Gunship II throughout the Laotian panhandle. The Gunship II fighter escort compiled the following BDA in the first 4 months of 1969:

	<u>11 Jan-28 Feb</u>	<u>Mar</u>	<u>Apr</u>
37-mm guns destroyed	19	26	18
37-mm guns silenced	23	16	20
Secondary explosions	166	393	367
Large fires	287	482	383
Road craters	2	1	0
Trucks destroyed	10	4	12

Interestingly, the gunship/fighter tactical combination had to bridge the unit esprit de corps gulf that tends to divide combat airmen. Now and then the good-hearted banter and spirit between gunship and fighter men cut deeper than intended. Some "fast mover" men believed the subsidiary escort role misused their strike capabilities. On the other hand, "slow mover" men recoiled at what they felt was a lack of recognition for their contribution. Some in both camps resisted the change of tactics but by degrees accepted the gunship/fighter team concept. As time went on, most saw the arrangement's mutual advantages and came up with new ideas on how their units could do more in combined operations.<sup>195</sup>

In the Laotian interdiction battle, the wily and determined North Vietnamese often turned the apparent advantage of gunship/fighter task forces into a tenuous and fleeting one. The enemy built decoys to lure aircraft into flak traps. He positioned machine-guns and heavier AA artillery randomly on ridgelines along roads and the gunners held their fire during several aircraft passes to

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### F-4 ESCORT TACTICS

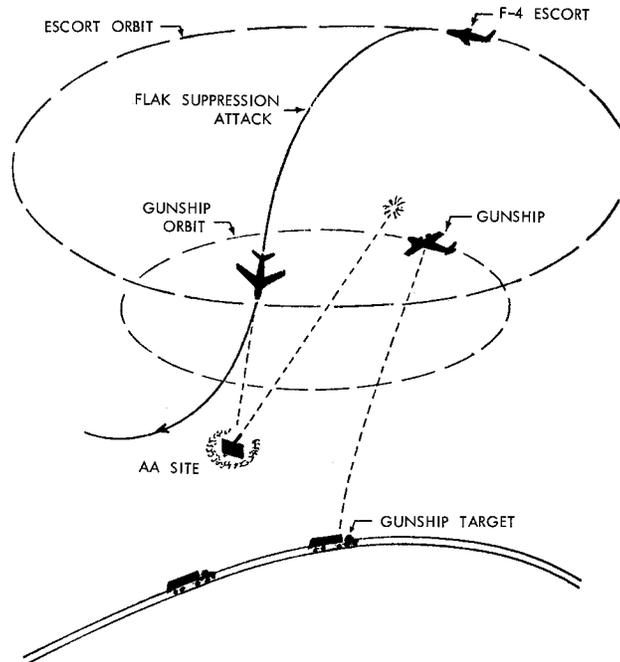


Fig. 18 (U)

lull aircrews into complacency. Gunners found that barrage fire at a crucial moment could be successful if they studied the terrain for approach routes, estimated range by the base of clouds, and determined the aircraft pattern and altitude.<sup>196</sup> Antiaircraft guns were moved about so aircraft had more trouble finding them. Of major concern to the gunships were the enemy's improved defenses through use of 57-mm or larger weapons and possible incorporation of gun-laying radar. The effective slant range of a 57-mm piece, for example, was 13,100 feet with optical sighting and 19,700 feet with radar assistance.<sup>197</sup> In 1969 the enemy fired unguided rockets and the firings rose in 1970. The missiles--probably 122-mm and 140-mm--lacked proximity fuses and miss-distances were fortunately great. Nonetheless, the hazard of better ground-to-air missile fire existed.<sup>198</sup> All such defensive developments gravely menaced the gunship's operations in view of its predictable attack maneuver\* and transport speed.

\*The Project Moonwatch report (page 155) stated: "The attitude of the aircraft appears to have little or no effect upon the ability of the gun crew to track the plane. More aircraft were hit while in straight and level flight than were hit while in orbit, but results here are inconclusive, as in several instances the crews report that they were hit just after breaking out of an orbit." It nevertheless appears most USAF personnel worried about the orbit's vulnerability. [Kott, The Role of USAF Gunships in SEASIA, p 38.]

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(S) One way to undercut enemy defensive advancements was to upgrade the gunship's systems. Back in February 1968 the TAWC at Eglin AFB had recommended an electronic countermeasure (ECM) capability for the AC-130's to combat AA radar.<sup>199</sup> Early attention also centered on overcoming the operating altitude limitation of gunship weapons. Mounting larger-caliber guns with longer slant range on the aircraft would let it fly a higher orbit out of range of more antiaircraft fire.<sup>200</sup> A good deal of Gunship II's further development became geared to a seesaw struggle to best the enemy's defensive response.

(S) Concern over AC-130 vulnerability mounted when a 37-mm round hit a Spectre on 3 March 1969.<sup>201</sup> It rose even higher with the loss of the first AC-130 on 24 May. According to the battle damage report:

Aircraft 1629 reached its Laotian target at 1935 local time and was joined by a fighter escort. Spectre made a firing pass 5 minutes later at a moving truck. It then flew to a road intersection and began a 120° turn to reconnoiter the new route. As the turn was completed, illuminator operator SSgt Jack W. Troglen reported AA fire at 6 o'clock and accurate. Ten 37-mm rounds were seen--four on each side, one striking the gunship's tail section, and one hitting an undetermined spot on the fuselage.<sup>202</sup>

The wounded Spectre turned westward toward home base. Its utility hydraulic system was out followed by the booster hydraulic system a few seconds later--leaving the aircraft temporarily out of control. The aircraft commander and copilot brought the gunship out of a nearly uncontrollable climb by bracing the control column to full forward position and by bringing all crewmembers to the flightdeck.

Further aircraft checks disclosed Sergeant Troglen wounded and dying and the rudder, elevator trim, and autopilot inoperative. The gunship was nursed back toward Ubon by use of aileron trim and engine power. Near the base the aircraft commander ordered non-essential crewmembers to bail out. Left aboard were pilot/aircraft commander Lt. Col. William Schwehm and copilot Maj. Gerald H. Piehl (to control the aircraft),

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flight engineer SSgt Cecil F. Taylor (to manually lower the gear), and a navigator sensor operator who wanted to stay. 203

As Colonel Schwéhm slightly reduced power the aircraft's nose dropped hard on the runway. The gunship bounced and hit heavily on the landing gear. An attempt to reverse engines was futile. Some 2,000 feet down the runway the gunship veered to the right, despite application of more power to number 3 and 4 engines (nose-wheel steering was inoperative). The right wing struck an arresting-gear shelter and was sheared off. The gunship burst into flames as the pilot, copilot, and navigator sensor operator safely evacuated. The body of Sergeant Troglen and the flight engineer were lost in billowing flames and explosions of burning ammunition. All crewmembers who had bailed out were rescued. 204

An heroic attempt to save the AC-130 had failed. North Vietnamese gunners had scored their first success against a Gunship II. Ominously, investigators of the loss believed it possible the gunship had fallen victim to a flak trap and that the enemy was aware of the AC-130's maneuvers and characteristics. 205

(C) The loss of one AC-130 jolted the tiny Gunship II force. In a single stroke it cut operational aircraft 25 percent. 206 Luckily, the three remaining AC-130's (other than the prototype) arrived from the United States about the same time as the first gunship loss. 207 The 16th Special Operations Squadron thus had six AC-130's on hand for the closing months of the 1968-69 North-east Monsoon season.

#### Weighing Commando Hunt Results

(S) As bad weather moved in over the Trail network, the interdiction hunting season drew to a close. The Air Force carefully weighed the performance of the Spectre gunships in Commando Hunt. Results of the primary mission--destruction of trucks--continued impressive for second quarter of 1969:208

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	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Total</u> <u>1st &amp; 2d quarter)</u>
Trucks sighted	963	985	140	3,941
Trucks destroyed	493	427	46	1,573
Trucks damaged	100	120	21	592
Trucks (results not observed)	356	247	45	1,195

~~(S)~~ The Seventh Air Force pointed with satisfaction to the high percentage of total truck kills versus the gunship's share of the sorties:209

The contribution of the AC-130 gunships to the air interdiction campaign in Laos has been truly magnificent. During the period from January through April, the Spectre accounted for over 29 percent of the total destroyed and damaged trucks in Laos while flying less than 4 percent of the total sorties used to attack moving vehicles.

This gunship success against trucks hampered support of enemy forces in South Vietnam and southern Laos. Seventh Air Force judged it a factor in "limiting the magnitude of the NVA's northeast monsoon offensive."<sup>210</sup> The American Embassy in Laos shared this satisfaction in the AC-130's performance. It cabled the State Department that employment of Spectre gunships was an "unqualified success" and urged that "additional C-130's be configured as gunships ASAP."<sup>211</sup>

~~(S)~~ On 9 June 1969 Gen. George S. Brown, Seventh Air Force Commander,\* commended the 8th Tactical Fighter Wing on progress made in the first Commando Hunt effort. He noted that truck kills in April and May had reached new highs forcing the enemy "to replenish his entire truck inventory at frequent intervals." In summing up, General Brown stated that: "Our actions

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\*He succeeded General Momyer in August 1968.

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combined to slow the movement of materiel and forced the enemy to consume enroute an increasing amount of the supplies intended for stockpile or delivery to RVN. So effective were our efforts that of each five tons of supplies the enemy started southward through Laos, only one entered the Republic of Vietnam."\*212

### Barrel Roll

As the Air Force pushed Commando Hunt interdiction operations in Steel Tiger, military developments in northeastern Laos (Barrel Roll) forced it to consider using AC-130's there. An enemy dry-season offensive had strongly pressured General Vang Pao and his Meo Army and threatened USAF radar and air navigation sites. At the close of November 1968, the Joint Planning and Targets Conference requested Seventh Air Force to supplement AC-47 Spooky operations in Barrel Roll with Spectre gunships. Seventh Air Force alerted 8th Tactical Fighter Wing in January 1969 that Spectre crews should get to know northeast Laotian terrain and Barrel Roll operational procedures. 213 By March 1969 the North Vietnamese and Pathet Lao had largely

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\*While General Brown was commending this interdiction record, some analysts, critics, and skeptics of the Air Force's interdiction role were not so sure. They pointed to the complementary need for in-country ground operations to destroy or capture supplies of the enemy and force him to consume more. It was argued the enemy's monthly output into South Vietnam was just about enough to meet his minimal requirements for "normal" operations in the I and II Corps. Hence, the one-fifth of input into Laos that was output to South Vietnam was sufficient to replace supplies the enemy expended in combat or lost to U.S. and allied forces. (This was based on an estimate that a net balance of 59 short tons per day--the equivalent of 16 truckloads--was considered the minimum needed to sustain "normal" operations in I and II Corps.) [Col George P. Bahler, The Air Interdiction Campaign 1 Nov 68-31 May 69 (S) (ASI, Dec 1969), p 27.] On the other hand, it was estimated that a steady flow of 3,600 tons per day could exit the southern end of the enemy system if not interdicted during dry-season air operations. This tonnage would far exceed enemy needs to resupply his troops in South Vietnam and stockpile for large operations. [William H. Greenhalgh, Jr., The Interdiction Campaign 1 April-31 October 1968 (S) (ASI, Jul 1969), p 12.]

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shifted to night attacks. Maj. Gen. Louis T. Seith, 7th AF/13th Deputy Commander, therefore recommended AC-130 diversions to aid Lima Site defenders and attack truck traffic moving in the Plaine des Jarres area.<sup>214</sup> Air commanders were also aware of the morale/psychological boost the gunship would impart to friendly forces under night attack and its deterrent effect on the attackers.

(S) An operation typical of Spectre's Barrel Roll activity occurred on 25-28 June 1969, when AC-130's were diverted to assist Lima Site 108--a neutralist Laotian camp at Muong Soui, 47 miles east-southeast of Luang Prabang. From mortar and rocket positions on hills surrounding the friendly forces, the North Vietnamese and Pathet Lao began bombardment the night of 25 June. The friendly forces ground controller, "City Hall," called for the gunship to direct fire on enemy positions. Some 16 secondary explosions were recorded as the AC-130 helped suppress enemy assaults during nearly 2 1/2 hours in orbit over the area. On subsequent nights the Spectres answered requests to aid the embattled camp. Several times ground forces called for attacks on tanks but bad weather prevented acquisition of such targets. On the fourth night poor weather stopped gunship attacks altogether. Only several large fires in the friendly camp itself could be seen as the position was overrun.

(S) Even in Barrel Roll the AC-130's made important truck kills. The enemy had to step up logistic support of his offensives so truck traffic and road improvements rose dramatically. The Spectres found choice targets and thus opened up a second major area of Gunship II operations. From this point on, the Air Force would exploit the AC-130 as a truck-killer in Barrel Roll as well as Steel Tiger. What actually started out as a diversion turned into an additional commitment.

(U) While Gunship II operations progressed in Southeast Asia, plans were made to send a TAC AC-130 to the other side of the world to participate in a NATO exercise in Europe. On 19 January 1969 the AC-130A sustained damage during a landing accident at Goose Bay, Labrador, following an in-flight emergency. Due to the limited number of AC-130's and the pressing SEA training requirements, no replacement aircraft was provided. This constituted the only attempt to demonstrate AC-130 fire power in an European environment.

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(U) The faith of the promoters and developers of Gunship II was well rewarded by the SEA combat reports. If anything, the AC-130--with its sensors, fire-control system, and better armament--had proved more convincingly effective than hoped. Its reputation as the number one truck killer in Southeast Asia had been steadily enhanced as the interdiction effort intensified. As a self-contained night attack aircraft--combining the capabilities of target search, acquisition, tracking, and destruction--it had no equal. Even its most glaring weakness--vulnerability--had, in low- and medium-threat areas, been at least momentarily overcome by the gunship/fighter team. But despite these solid achievements, the weapon system did not remain static in a prolonged and ever-changing war. Gunship II was but one phase in the side-firing weapon system's dynamic evolution.

(This page is UNCLASSIFIED)

## IV. ADVANCED AC-130 GUNSHIPS

Development Proceeds

(U) The year 1969 marked a turning point of American involvement in the Southeast Asian War. During the summer, President Richard M. Nixon made the first notable reduction of U.S. military strength in South Vietnam. He embarked on a long-range course to strengthen indigenous forces and at the same time withdraw U.S. troops. This momentous change of policy affected the role of U.S. air power the least. As before, air power pressured enemy supply lines and aided ground units in defensive and offensive operations. As the air war continued, the high hopes for the AC-130 gunships fueled efforts to make them less vulnerable and more effective. The end result was a force of advanced AC-130's. Paradoxically, as overall U.S. strategy called for disengagement, gunship operations mounted and the AC-130 grew into an ever more sophisticated and deadly weapon system.

(S) As previously indicated, gunship development had been a continuing interest right from the side-firing aircraft's beginning. Various messages, for example, were sent from Seventh Air Force-- and Pacific Air Forces in turn--identifying needed improvements in gunship-type aircraft. One field request in June 1968 called for an all-weather capability, an improved fire-control system, and larger-caliber guns (such as the 25-mm).<sup>1</sup> Air Force Systems Command believed it possible to furnish these capabilities, the AFSC Commander having already suggested approaches to them to the Chief of Staff on 6 April 1968. AFSC pointed out one difficulty, however--the lack of specific, documented, operational demands from SEA. AFSC urged these be submitted.<sup>2</sup> Headquarters USAF backed AFSC on its call for more precise field requirements but cautioned that "procurement of new and/or improved items for gunship aircraft will be at the expense of other RDT&E and modification programs also identified as vital to SEA operations."<sup>3</sup> This concern with and progress on gunship improvements did not diminish in SEA or the United States. Nevertheless, it took unusual anxiety about gunship operations to trigger a package improvement plan.

(S) Secretary of the Air Force Robert C. Seamans, Jr., visited the Far East from 19-31 May 1969. In his trip report to Secretary of Defense Melvin R. Laird, he conveyed concern about the increasing AA threat to AC-130 operations in Southeast Asia. (One AC-130 had just been lost and another badly damaged 5 days later.) He said: "Seventh Air Force is presently escorting the AC-130 gunships with some F-4 aircraft but is conscious of the fact that a more survivable aircraft must be used for the gunship mission."<sup>4</sup>

(S) An intelligence analysis of the enemy's counter to Spectre's attacks fed the cause for alarm and induced a study of ways to render the AC-130 less vulnerable. In July 1969 Mr. James A. Reamer, Directorate of Technology, Deputy for Tactical Warfare, ASD, reacted to the challenge by bringing together a group that had worked with the AC-130 program before. Maj. Ronald W. Terry (Chief, AC-130 Gunship Program Office), Lt. Col. James R. Krause, and Maj. James R. Wolverton--all key men in the first AC-130 gunship deployment--joined Mr. Reamer in "vigorous" discussions on how to meet the expanding threat to the gunship. After intensive study the group came up with a new gunship proposal, later known as Surprise Package.<sup>5</sup>

(S) The envisioned gunship would have a greater standoff range (to improve survivability) and better night-targeting equipment. The group recommended, for example, two 20-mm M-61 Gatling guns and two M-65 40-mm Bofors AA-type guns to replace the standard AC-130A armament of four 20-mm guns and four 7.62-mm miniguns.\* It also suggested new sensor systems to complement this armament and enhance night vision and detection capability: Black Crow (an ignition system detector), low-light-level television, and improved infrared equipment. The fire-control system's analog computer would give way to a digital computer having more capacity and flexibility to handle the better sensor inputs. It was planned that the Surprise Package aircraft pinpoint tactical targets for conventional strike forces by use of a

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\*The 40-mm manually loaded (four-round clip) weapons had a muzzle velocity of 2,870 feet-per-second with a selectable firing rate from 1 to 120 rounds-per-minute. Most important, the gun could fire accurately up to a 35,000-foot slant range.

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2-kilowatt (kw) illuminator\* and a laser designator compatible with Pave Way guided bombs. An inertial navigation system would store in its memory the location of targets to be struck later by the gunship or fighters. Several of these Surprise Package components were available on-the-shelf but others were just emerging from the development phase.<sup>6</sup>

~~(S)~~ A plan within the group's proposal would take the approved eighth AC-130A--then being modified in ASD shops--and convert it to this new configuration.<sup>7</sup> Originally, the recycled prototype gunship (number 54-1626) had been picked as the eighth AC-130A. When the prototype returned from Southeast Asia, however, its airframe was carefully inspected at Wright-Patterson AFB and judged to be below combat-duty standards. Moreover, the rebuilding price tag would exceed that of converting another C-130A.<sup>+8</sup> The Bias Hunter<sup>‡</sup> resource then furnished a C-130A (number 56-0490) for conversion to the eighth gunship. It was this aircraft that was now proposed for the Surprise Package modification.

#### Surprise Package

~~(S)~~ On 18 July 1969 ASD presented the Surprise Package concept--drafted by Reamer and team--to General James Ferguson, Commander, AFSC. Accompanying it was a recommendation that the aircraft be modified in ASD shops on a high-priority basis-- 1 August 1969 being the projected starting date. General Ferguson supported the plan and the Surprise Package program made the

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\*The 2-kw illuminator was substituted for the 40-kw illuminator. The heavy 40-kw equipment on the AC-130A mainly supported hamlets, camps, or troops in contact with the enemy. When the AC-130 became largely a truck-killer, the 2-kw illuminator was considered sufficient for this purpose, thus gaining a considerable weight advantage.

<sup>+</sup>The Air Force later sent the prototype to Hayes International Corporation for IRAN. Hays reconverted the gunship to a configuration for support of ASD research and development activities. [Hist (S), Dir/Development, 1 Jul-31 Dec 68, p 167.]

<sup>‡</sup>Bias Hunter--C-130 aircraft equipped with a battlefield illumination airborne system (BIAS) and other sensor equipment (e.g., infrared devices) to locate the enemy.

~~SECRET~~

### SURPRISE PACKAGE CONFIGURATION

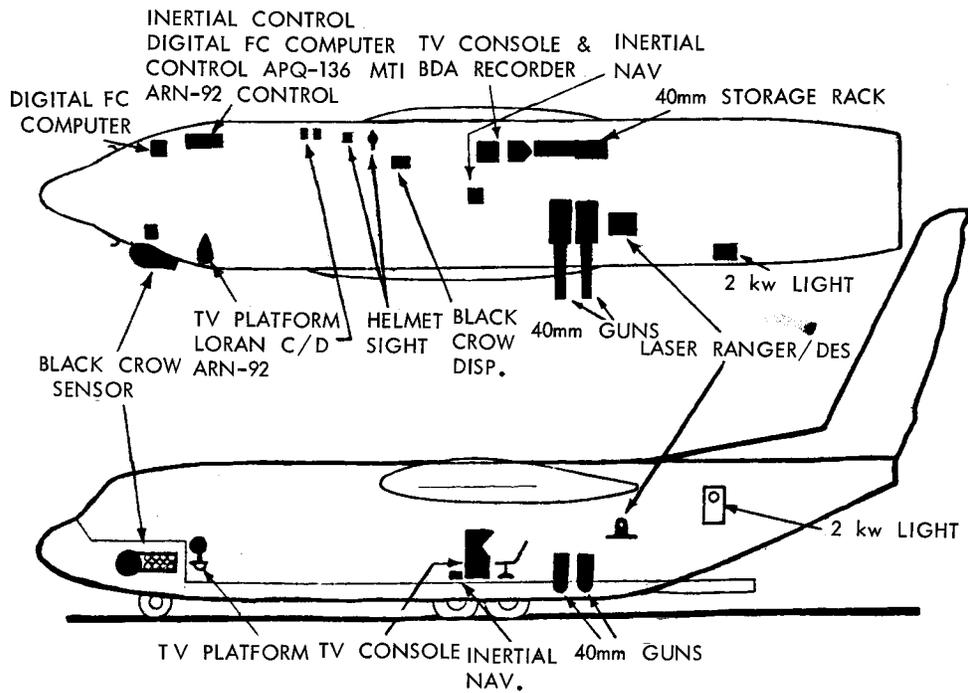


Fig. 19 (S)



Night Observation Device

rounds in rapid succession to the Air Staff, PACAF, and Seventh Air Force.<sup>9</sup> Serious opposition to the proposal developed in the Air Staff and CINCPACAF wanted: the aircraft deployed not later than 15 November 1969, the capability to restore it to a standard configuration in-theater if tests were not successful, and AFSC support for the specialized subsystems at Ubon RTAFB.<sup>10</sup> General Brown, Seventh Air Force Commander, endorsed the project on 12 August 1969 provided these provisions could be met.<sup>11</sup>

~~(C)~~ General Ryan told General Ferguson on 2 September 1969 to go ahead with the proposed Surprise Package program. "Your engineers are to be commended for evolving an inventive and unique proposal to counter a potentially serious threat to our gunship operations," he said. The Air Force Chief rejected any thought that the gunship, either in a primary or secondary role, might counter AA sites. Nevertheless, he agreed with the idea of bolstering its survivability with the 40-mm standoff range. General Ryan made certain stipulations to his approval of Surprise Package. The projected deployment of the eighth AC-130 could not be delayed beyond mid-November. Provisions could be made for the specialized subsystems but only the new guns and the digital fire-control system were to be mandatory. Beyond these items, the present AC-130 equipment would be used to meet the deployment date.<sup>12</sup> Authorized funding for the project was pegged at \$1.5 million.

~~(C)~~ The time limit imposed by the Chief of Staff was a stiffer challenge than the ASD group had expected. The Surprise Package developers literally worked day and night to modify the aircraft. Each day new problems exacted the utmost in managerial skill and technical ingenuity. Harmonization of sensors, computers, and the fire-control system--basically Major Wolverton's job--demanded daily coordination with various subcontractors on the development of components. Colonel Krause, the expert on infrared systems, set about integrating the infrared equipment, the display systems, and LLLTV. Simultaneously, Major Terry issued daily instructions to installation design engineers and to the ASD shops preparing the aircraft for the subsystems. The small task force was totally immersed in solving installation or fabrication problems, often out in the shop or at the aircraft.<sup>13</sup>

~~(C)~~ Use of the 40-mm Bofors gun from Navy excess typified the problems faced by the team. These guns had never been fired downward, so a new gun mount needed to be designed, fabricated,



Surprise Package Aircraft

and evaluated. During the first ground-firing tests at Eglin AFB, firing overpressure produced cracks on the underside of the aircraft's left wing. It took more analysis and tests to show that the cracks would not occur in actual flight.<sup>14</sup> This consumed valuable time and time was at a premium.

#### Testing and Combat Evaluation

By 27 October 1969 the Surprise Package aircraft stood ready for systems testing at Eglin. The test flights (28 Oct-15 Nov 1969) were delayed due to bad weather and some slow equipment deliveries. Nevertheless, they sufficiently proved the technical integrity of the gunship's systems. On 15 November General Ferguson recommended to General Ryan the aircraft be deployed. Orders received 2 days later directed that the aircraft proceed to Southeast Asia for combat evaluation.<sup>15</sup> The ASD group had met the deployment goal. Subsequently, Major Terry received the

the Dr. Harold Brown Award\* for 1969 because his professional leadership, skill, and energy played so important a part in making the deployment possible.<sup>16</sup>

The Surprise Package gunship (labeled Coronet Surprise by TAC) left for Southeast Asia on 25 November 1969.<sup>+17</sup> An engine change at Guam<sup>18</sup> put off the gunship's arrival at Ubon RTAFB until 5 December 1969.<sup>19</sup> Major R. C. Binderim of TAC commanded the main Coronet Surprise task force which reached Ubon on 27 November 1969. The force included Major Terry and consisted of aircrew personnel from TAC, AFSC, and Air Force Academy; ground crew from TAC and PACAF; and technical personnel and engineering specialists from ASD and contractors. Tactical Air Command Operations Plan 132, 17 October 1969, guided the combat evaluation.<sup>20</sup> On 12 December--just 7 days after the aircraft touched down at Ubon--the TAC/AFSC task force flew its maiden operational mission against North Vietnamese truck traffic.<sup>21</sup>

The early Surprise Package sorties went far better than hoped. From 12-19 December the gunship flew six missions that were in effect equipment tests left over from the short evaluation period at Eglin. Still the aircraft destroyed 11 and damaged 9 of 24 trucks sighted. Attacking three AA sites, it destroyed one and caused two explosions. From 19-30 December the gunship destroyed 19 and damaged eight of 30 trucks detected. It also attacked 14 storage areas, touching off 6 explosions and 7 fires. The gunship compiled this record in spite of equipment problems that were annoying and at times crippling.<sup>22</sup> The final combat evaluation mission was flown on 18 January 1970.

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\*The Air Force presents this award annually in recognition of outstanding achievement in research and development leading to substantial improvements in operational effectiveness. The award honors Dr. Brown for his contributions as Secretary of the Air Force; Director of Defense Research and Engineering, OSD; and as a consultant to the Air Force Scientific Advisory Board.

<sup>+</sup>Guns, sensors, and computers had been removed before the gunship's long ferry flight and shipped separately.

The evaluation team termed the performance of the Surprise Package weapon system "very satisfactory" during the 38-day combat test. The gunship spotted 313 trucks with 178 destroyed, 63 damaged, and 37 results not observed while flying 86.8 percent (33 total sorties) of the combat sorties scheduled. There were 140 fires and 153 explosions recorded. The enemy had responded to these missions with an estimated 3,475 rounds of 23-mm AA fire, 3,845 rounds of 37-mm, and 59 rounds of 57-mm. Evaluators believed Surprise Package had clearly established a capability to detect trucks or similar-size targets at altitudes of 8,500-9,500 feet.<sup>23</sup>

From Evaluation to Combat

Although the combat evaluation ended on 18 January 1970, Seventh Air Force continued Surprise Package missions over the Ho Chi Minh Trail. Engineering adjustments strengthened certain areas of the aircraft's performance.<sup>24</sup> As April and Commando Hunt III closed, Surprise Package had accounted for 604 trucks destroyed and 218 damaged.<sup>25</sup> A comparative study of trucks destroyed/damaged per sortie showed Surprise Package far more deadly than other gunships and tactical fighters.<sup>26</sup> Moreover, it had proved nearly twice as effective as the standard AC-130's.<sup>27</sup> Seventh Air Force declared it the "single most successful truck killer in SEA during Commando Hunt III."<sup>28</sup>

Several missions in January 1970 graphically illustrated how potent and versatile the Surprise Package gunship (sometimes called Super Chicken) was in the interdiction role.<sup>29</sup>

The Case of the Vanishing Bridge

Sensor transmission had indicated the North Vietnamese were bypassing a main Laotian road and escaping air-power harassment. A target study of the area turned up a new road carved through dense jungle parallel to the main line of communication (LOC) but no bridge spanning a major river the enemy had to cross. Seventh Air Force fragged Surprise Package and escorts into the area on 5 separate nights. Each time the gunship detected a bridge over the river at any of four points. During daylight the bridge could not be found. The enemy evidently put it in place at his choosing, sent 30 or more trucks across, then hid the span from FAC reconnaissance by

day. Surprise Package attacked and destroyed trucks on the bridge and marked the target for escort fighters. Even though the disappearing bridge was Loran-targeted, it was not successfully destroyed.

#### The Case of the Interdicted Pipeline

From friendly ground teams infiltrating the Laotian area, Task Force Alpha obtained photographs and approximate routing of an enemy pipeline with pumping stations. Alpha passed this information to Surprise Package crewmembers on 7 January 1970. Fraggged into the area 2 days later, Surprise Package put 40-mm fire on two pumping stations and the pipeline setting off intense petroleum fires. An escort F-4 placed 500-pound bombs on a pumping station. The soaring flames spread over an area the size of a city block. The same mission destroyed 16 trucks.\* Returning on 10 January, Surprise Package and F-4 escorts destroyed 30 trucks apparently awaiting fuel. Two large gasoline-tanker vehicles appeared during the attack and succumbed to 40-mm fire. Similarly, the Surprise Package/F-4 team claimed destruction or damage of 25 more vehicles the next night.

#### The Case of the Amphitheater

Day FAC pilots nicknamed a karst area covered by heavy jungle the "Amphitheater." A study of strip photographs had singled out the area as a potential storage point or truck park so Seventh Air Force sent a task force to reconnoiter it. The force consisted of Surprise Package, three F-4 fighter escorts, one Loran-equipped F-4, and six additional fighter-bombers allocated by ABCCC. On 7 January 1970 Surprise Package discovered and destroyed four trucks near Amphitheater then found the area a hotbed of activity with supplies, trucks, and defending AAA.

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\*Major Terry received the first oak-leaf cluster to his Distinguished Flying Cross for his part in this night armed reconnaissance mission. He also received the fourth through sixth oak-leaf clusters to his Air Medal for flying 140 combat missions from February 1968 to January 1970.

After an electromagnetic sensor detected a radar site collocated with a 57-mm gun, TV and IR sensors verified the presence of vans. The 57-mm gave its position away by firing at the aircraft and airstrikes on various Loran-targeted sites left many secondary fires and explosions. Surprise Package moved north of the position locating and destroying 12 vehicles. As low fuel forced task force elements to return to base, the target locations were relayed to ABCCC and Task Force Alpha. At daybreak an F-4 Wolf\* FAC led an 8th Tactical Fighter Wing F-4 flight, equipped with laser-guided bombs, to the Amphitheater. The attacks destroyed the radar vans--just 50 meters from the given Loran coordinates.

Surprise Package shattered all 16th Special Operations Squadron records on 14 February 1970 by destroying 43 trucks and damaging 2 in a single mission. Contributions like this enabled the unit to claim on 21 February 1970 its 5,000th truck destroyed or damaged. †30

#### Equipment Innovations

New and better equipment largely produced Surprise Package's outstanding combat results. Many components had been borrowed from other projects or the other services. LLLTV came from Project Tropic Moon. The 40-mm Bofors gun and Black Crow had been obtained from the Navy. Others had developed to meet past AC-130 problems and operational needs. Not all subsystems worked as expected nor without troubles--the helmet sight being a prime example. ‡ Still Surprise Package's new equipment

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\*Wolf was the call sign of the 8th Tactical Fighter Wing's F-4 FAC's at Ubon RTAFB.

†The 16th Special Operations Squadron received the Presidential Unit Citation on 23 August 1970 in recognition of its performance during 1 December 1969 to 1 March 1970. General Brown, Seventh Air Force Commander, presented the award to the squadron commander Lt. Col. Young A. Tucker.

‡A complex instrument, the helmet sight incorporated an eyepiece with illuminated reticle into a crewmember's helmet. The sight basically sought to convert data from the scanner's visual sighting of a target (e.g., an AAA site) into computer-derived coordinates. Being at such an early stage of development when added to the Surprise Package systems, it was little used. Few people knew how to use it correctly or particularly how to maintain it.

served simultaneously to make the gunship weapon system unique and a veritable testbed (or flying laboratory) for proving new hardware. It also was a further illustration of what skillful improvisation could do.

One innovation under evaluation was the Black Crow sensor. In early August 1969 the Air Force Chief of Staff informed the Pacific Air Forces Commander that the Black Crow system "warranted consideration" as an addition to Gunship II equipment. This ignition detector was visualized as going beyond visual sensors such as LLLTV, IR, or NOD in being able to detect trucks and boats through haze, smoke, and clouds.<sup>31</sup> General Brown, Seventh Air Force Commander, shared the interest. He noted that despite work on the concept since 1967, the only operational capability had been obtained on C-130 Blindbat aircraft. The General saw advantages in further development, however, and Black Crow's use in AC-130 gunships.<sup>32</sup> During October-November 1969, AC-130's of the 16th SOSq tested the ignition detection system. The 18 test sorties between 1-15 October were inconclusive due in part to marginal weather. In addition, interference emanating from the aircraft flaps produced operational problems--Black Crow's fine sensitivity and its positioning bringing about unusual pickups. Missions in early November fared better as the system picked up seven targets on one sortie.<sup>33</sup>

Tactical Air Command tested Black Crow after its installation in Surprise Package. The limited evaluation at Eglin before deployment cast doubt about the sensor's success in detecting targets under foliage so TAC ended its test.<sup>34</sup> Further work in Southeast Asia made Black Crow in time a most valuable cuing sensor. It could identify ignition signals in varying terrain and foliage at an average range of 5 to 6 miles. When teamed with the infrared, it was at its best in pinpointing the location of foliage-concealed truck parks and storage areas.<sup>35</sup> Crews normally handed off Black Crow detections to the LLLTV or the FLIR for target acquisition during combat. Yet at times they used Black Crow as the prime attack sensor in poor weather. In fact, it detected 65 percent of all Surprise Package targets.<sup>36</sup>

Low-light-level television, a second major sensor addition to Surprise Package, was mounted in the left-side crew-entrance door, just back of the crew compartment. It consisted of two cameras--one with a wide field of view for the area search and one of narrow field for precise target tracking. The LLLTV

could view targets in light levels varying from bright sunlight to nighttime. It had specially designed protection against accidental burnouts that might occur when the gunship struck a heavy cargo of munitions, generating a bright explosion. It could detect trucks at night at a slant range up to 4 nautical miles (NM's). After early troubles with short tube life and sluggish tracking were overcome, the LLLTV turned out to be a most important gunship sensor.<sup>37</sup> Unfortunately, haze or clouds limited its vision.

A moving target indicator\* supplemented Black Crow, IR, and LLLTV. This air-to-ground radar picked up moving targets (3-4 mph or faster) at a distance of 10 NM's even through light to medium foliage. Thus the aircraft could fly to the target's locale, skipping a prolonged short-range search with the LLLTV. The MTI's alert feature signaled moving targets to the operator while he was looking at the video. He could then pinpoint the moving target's geographical location. Evaluators rated the MTI "outstanding" during the combat test.<sup>38</sup>

(S) As early as 2 May 1969, a standard AC-130 aircraft (number 623) had arrived at Ubon equipped with extensively improved AAD-4 forward-looking infrared. Deeply impressed with the equipment changes,<sup>39</sup> gunship personnel pressed for installation of the updated AAD-4 in the other AC-130A's. Acting as gunship spokesman, 8th Tactical Fighter Wing told Thirteenth Air Force on 1 June 1969 the improved infrared system had fewer components, simpler adjustments, a more reliable design, a superior picture presentation, and was easier to maintain.<sup>40</sup> The Wing argued that since the infrared was becoming the most important truck-detection system, it was imperative the advanced equipment be on all the AC-130's. It underlined this point to Seventh Air Force and CINCPACAF on 29 August: "The value of the updated AAD-4's to the gunship is immeasurable as the AC-130's truck killing capability is tied directly to this system."<sup>41</sup> Gradually, the advanced FLIR became a part of the standard AC-130A systems and naturally those of Surprise Package.

(S) Despite the obvious advantages in a mix of advanced sensor systems, the sensor tracking ranges now set altitude limits for Surprise Package tactics. Previously, effective gun range had been most restrictive as to operational altitude but not after the gunship received 40-mm armament.<sup>42</sup>

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\*Full designation: air-to-ground moving target indicator processor (AGMTIP).

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## 40-mm Bofors Guns

~~(S)~~ A chief goal of Surprise Package equipment was to reduce the gunship's vulnerability (chances of being hit) and increase its survivability (chances of not being lost if hit). Surprise Package's higher operating altitude stemmed from the 40-mm gun, improved sensors, and the finer precision of the inertial navigation and digital computer. The gunship operated from 8,500-10,000 feet AGL--contrasted with the 4,500-5,500 feet AGL of other AC-130's--and employed slant ranges of 2.5-3 NM's.<sup>43</sup> This put Surprise Package above effective 23-mm fire in spite of the AA round's self-destruct range rating of 9,200-11,500 feet AGL. The 23-mm rounds could hit other AC-130A's but Surprise Package crews did not experience 23-mm rounds at their flight altitudes. On the other hand, the self-destruct range of the 37-mm AA round was 14,400 feet. Surprise Package was not above this fire but its crew had a few more seconds for evasive action. The higher altitude also made it harder for enemy gunners to track the gunship either by sight or engine noise.<sup>44</sup> Surprise Package's reduced vulnerability was substantiated by a comparison with the standard AC-130A during Commando Hunt III (winter 1969):<sup>45</sup>

	<u>Direct Hits</u>	<u>Shrapnel Hits</u>	<u>Losses</u>
AC-130A	6	1	1
Surprise Package	0	2	0

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The possibility that the North Vietnamese might bring radar-directed guns into Laos prompted the addition of electronic countermeasures for jamming radar-equipped weapons. The 8th Tactical Fighter Wing pointed out this need to both the Seventh and Thirteenth Air Forces in early 1969.<sup>46</sup> Also apprised of this concern, ASD (on 6 January 1969) proposed testing ECM pods on Gunship II aircraft even though CINCPACAF had not yet validated the equipment request.<sup>47</sup> Headquarters USAF selected the TRIM-7\* (transmit-receive-inverse-modulation) ECM system for the gunship and on 22 April 1969 approved TRIM-7 modification of eight AC-130A gunships under the nickname Rivet Trim. Lockheed Air Systems would make a prototype installation and field teams at Tachikawa AB, Japan, would modify the other seven AC-130As.<sup>48</sup> TAC reviewed the TRIM-7 program and on 25 June recommended adding an electronic warfare officer (EWO) to AC-130 crews and a further "quick-look" test of the ECM equipment in gunship mission tactics. These proposals mirrored a TAC belief that "the automatic mode of the TRIM-7 could not be relied upon to provide the desired protection under all circumstances" and that one sensor operator could not competently monitor so many systems at the same time.<sup>49</sup> The Air Staff evaluated TAC's views and accepted them as modification planning advanced. When the Surprise Package proposal was conceived, it contained the TRIM-7 ECM capability to help lessen the aircraft's vulnerability.

Surprise Package received a laser target designator (LTD) during its combat evaluation. This permitted the pinpointing of AA emplacements by a laser beam for F-4 delivery of laser-guided bombs. In addition, Surprise Package's loran C/D (AN/ARN 92) navigation equipment produced truer target locations in loran coordinates. This, when combined with loran-equipped F-4's, aided positioning of these aircraft for both laser and unguided bomb deliveries.<sup>50</sup> These innovations perfected accuracy of fighter-escort attacks and put more overall potency in the gunship/fighter team.

#### Bomb Damage Assessment

Further equipment changes developed from renewed interest in solving an old BDA problem--the validation of truck kills.

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\*Simply stated, TRIM-7 gave enemy radar a much magnified false target signal which the radar would move to, leaving a weaker signal of the actual target behind.

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As the recorded number of trucks mounted--especially of those destroyed by AC-130 strikes--skepticism of the claims had risen. In December 1967, for example, General Westmoreland, COMUSMACV, had questioned the validity of the truck-kill rate. He noted the figures were above anything recorded the previous year and seemed very high. He further asked what hard evidence the Air Force had to confirm the truck-kills. In response to these queries, General Momyer, Seventh Air Force Commander, ordered a reexamination of the rules for recording trucks destroyed and damaged.<sup>51</sup> This triggered fresh emphasis on accurate reporting and a search for some device to document strikes.

To better assess strike results, Detachment 2 of the 14th Air Commando Wing conducted a firing test on a moving vehicle and stationary containers at a Ubon range on 31 March 1968. From information gathered, Detachment personnel believed the gunship attacks destroyed or damaged a good many trucks and targets reported in the "no visible results" category.<sup>52</sup> Gunship crews believed their scoring procedures bordered on the conservative. In counts of "destroyed," "damaged," or "no visible results" under March 1968 BDA criteria: a vehicle or storage area hit then exploding was "damaged"; (a vehicle taking a direct hit from Surprise Package 40-mm fire was "destroyed" regardless of secondary explosions or fires); hits in the vicinity of a vehicle or with the target obscured were counted "no visible results." The NOD operator, the TV operator (on Surprise Package only), and/or the infrared operator had to observe that 40-mm/20-mm ordnance was impacting and detonating on target. The higher slant ranges of Surprise Package operations required two sensor operators to confirm claims of "destroyed."<sup>53</sup>

The review of reporting procedures was not likely to convince skeptics of gunship BDA so the search went on for a mechanical means of validating claims. Seventh Air Force first tried using RF-4C reconnaissance aircraft to photograph the area of Spectre night strikes early the next morning. The RF-4C had trouble pinpointing the previous night's kills because of the

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\*Colonel Donald N. Stanfield, 8th TFWg Commander, declared: "I would like to emphasize that we are following General Brown's instructions to be conservative in Gunship claims. From reports from non-interested personnel who fly with the gunships such as senior officers from 7 and 13 Air Forces, I feel the 16SOS is complying with Gen Brown's instructions to the best of their ability."

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Spectre's imprecise navigational equipment, the poor-quality maps of many Laotian areas, and the small sensor look-angle of RF-4C photo equipment. Reconnaissance tactics were modified by dropping the altitude, scanning the crooked Laotian roads visually, and filming short road segments. In this manner the reconnaissance missions found 19 trucks in 10 days (15-25 May 1969) although weather hampered the missions.<sup>54</sup> Even with reconnaissance improvements the Spectre crews remained convinced they were destroying more trucks than the RF-4C's could seem to locate. At one point, cartoons and jokes circulated in the 16th Special Operations Squadron about the "Great Laotian Truck Eater" that mysteriously gobbled up the night's truck-kills so reconnaissance aircraft could not find them.<sup>55</sup>

Two things prompted Seventh Air Force's next step to improve BDA--the high-level interest in identifying the best truck-killers and a concern of many (especially gunship personnel) to make BDA claims credible. Hence, in early 1969 Seventh Air Force directed the 432d Tactical Reconnaissance/Fighter Wing at Udorn RTAFB to obtain BDA of Spectre strikes by night photoreconnaissance.<sup>56</sup> When Spectre strikes set secondary fires, reconnaissance crews would acquire the target visually and run a night pinpoint. Spectre crews, however, disliked these tactics which required them to suspend their attacks for 6 minutes after a fire was noted to let reconnaissance aircraft make a photo pass.<sup>57</sup> This BDA method photographed more truck-kills but it was not considered satisfactory. The problem of telling a damaged truck from an able one remained.<sup>58</sup> There were also difficulties with film quality. The major disadvantages of using more aircraft to support Spectre and the added complexity of operations were obvious.

On 7 January 1969, PACAF validated Seventh Air Force SEAOR 180 to place a BDA recorder on board the AC-130A and AC-119K. A kinescope-type recorder was recommended that could fix on film sensor inputs, chiefly infrared imagery.<sup>59</sup> An AFSC assistance team\* agreed some means had to be found for recording gunship strikes. It likewise recognized that reconnaissance photo problems reinforced the need for better navigational equipment in gunships.<sup>60</sup>

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\*The team, headed by General Guy M. Townsend, Deputy for Systems Management, ASD, and including Major Terry, arrived at Ubon approximately mid-January.

(5) While a BDA recorder was under development, Seventh Air Force decided to film BDA with onboard cameras. On 18 May 1969 Brig. Gen. Robert J. Holbury, Seventh's Director of Combat Operations, emphasized to the 8th Tactical Fighter Wing the urgent need for photos to document Spectre truck-kills. General Holbury proposed to produce them by filming burning targets through the AC-130's NOD and by the closest coordination between AC-130 and RF-4C aircraft.<sup>61</sup> A photographer from the 600th Photo Squadron at Tan Son Nhut AB was put aboard the AC-130's. He tried filming with a 16-mm motion-picture camera on the NOD eyepiece. This approach was eventually abandoned because the NOD could not be held steady enough on the target without the NOD operator sighting it. Of several methods tried, the best photography came from a camera mounted on a second NOD.<sup>62</sup> The extra NODs, borrowed from Security Police stock, were positioned forward of the left paratroop-door and behind the 20-mm guns.<sup>63</sup> Another step boresighted the second NOD with the weapons. To this was added a video-recorder camera mounted in the fixed NOD, with recording and playback equipment being located in the cargo-compartment booth.<sup>64</sup> Step by step a satisfactory BDA recorder was evolving.

(6) The BDA equipment distinctly developed for Surprise Package represented a further advancement. The Westel-built equipment joined a video-audio recorder with the infrared sensor instead of the NOD.<sup>65</sup> The Westel WR-201 came close to giving the desired documentation of gunship strikes. Refinements eventually enabled it to obtain video/audio tapes of high resolution from several sensors (especially the LLLTV). A complete film validation of the gunship's strikes thus became possible. In March 1970 Seventh Air Force accepted the Westel WR-201 used on Surprise Package as the "final satisfactory solution to SEAOR 180."<sup>66</sup>

#### Fire-Control

(5) The standard AC-130A fire-control system fell far short of Surprise Package's vastly improved one.\* Its unreliable roll-in guidance and erratic gunstrike patterns had seriously handicapped a number of Spectre missions in spring 1969.<sup>67</sup> The system's poor approach-azimuth guidance steered the gunship either inside or outside the correct firing orbit.<sup>68</sup> The errors were not constant

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\*Designated "fire-control computer system, digital."

so the sensor operator could not manually correct them. The fire-control system malfunctions accordingly forced Spectre to enter the attack orbit several times with greater exposure to enemy AA fire.<sup>69</sup>

Fire-control system problems also hurt offset firing.\* A "close round" incident while using offset-firing mode occurred on 8 July 1969 during Spectre's defense of a friendly camp. The NOD observer saw 20-mm rounds strike near or touch the camp perimeter even though a camp strobe light served as an aiming point.<sup>70</sup> Offset-firing tests on the Ubon range worked on the problem. Test results induced Seventh Air Force to continue offset firing operations if a 300-meter offset limit was observed.<sup>71</sup> Yet in August 1969, Seventh reported to PACAF the suspension of offset firing due to a growing distrust of its safety. It asserted the deficiencies must be corrected because the stepped-up enemy activities called for greater precision in offset firing.<sup>72</sup>

### FIRING GEOMETRY (OFFSET AND WIND CORRECTED)

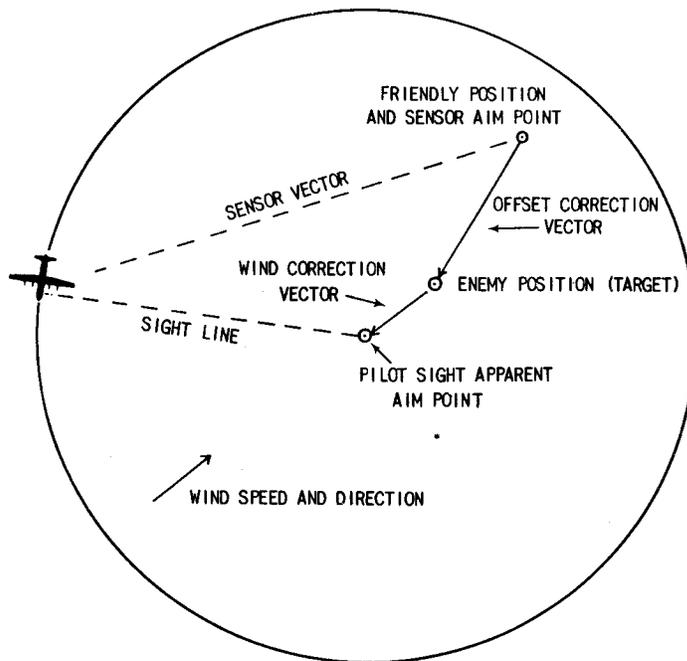


Fig. 20 (U)

\*A firing procedure employing a reference or aiming point other than the actual target.

(S) In the summer of 1969, ASD gunship personnel spent a great deal of time on the fire-control system malfunctions. They went over the gunship carefully to root out the problems. Officers from the Department of Astronautics and Computer Science, Air Force Academy, offered valuable assistance. For example, Lt. Col. Bradford W. Parkinson and Maj. Richard E. Willes helped troubleshoot and resolve system deficiencies.<sup>73</sup> It was finally found that by installing a dual-axis gyro and a complete-resolution computer the system would be free of errors.<sup>74</sup> TAC verified the new equipment's accuracy and on 30 August 1969 Headquarters USAF approved modification of the AC-130 and AC-119G/K fire-control systems.<sup>75</sup> Surprise Package equipment benefited from these changes and a digital computer as well. The new fire-control system accepted azimuth and elevation data from up to six sensors. Its relay closure inhibited firing whenever possible error exceeded a preset point.<sup>76</sup>

#### Loran

(S) The Loran navigation set (AN/ARN-92 C/D) proved so accurate and reliable on the Surprise Package aircraft that the Air Force ordered it installed in all AC-130A's on a quick-reaction basis. Good navigation had long been a must for armed reconnaissance missions in Laos. As added advantages, this set gave target coordinates for later strikes by Loran-equipped F-4D fighter bombers, accurately-pinpointed radar sites, and assured strict adherence to rules of engagement. In addition, it served as a cross-check for Surprise Package's inertial navigation/targeting subsystem. The latter fed accurate attitude and velocity inputs to the digital fire-control system computer and kept minimum positional error over the entire flight. The computer was sensitive to erratic electric power-changes, however, during which times it was unreliable in storing targets and generating synthetic azimuth.<sup>77</sup>

#### Equipment Problems

(S) During Surprise Package's combat evaluation, electrical troubles had hindered total integration of new equipment. Erratic electrical power from engine generators caused erroneous computations, uncertain target storage, accidental memory wipes, incorrect azimuth, and wander of sensor input angles. Additionally, platforms for pointing the LLLTV, laser designator, and 2-kw illuminator were poorly designed for the precision required--

especially when it came to compensation for the aircraft's movement.\* Then too, Black Crow was not tied into the fire-control system and the helmet sight was not used, primarily due to a shortage of qualified maintenance men. Furthermore, cannibalization could only partially overcome the problems with LLLTV tubes.<sup>78</sup> As the months rolled by, concern mounted over possible structural fatigue from the 40-mm gun's recoil which loosened locking bolts and the aircraft-cargo floor. In-theater construction of a new floor support took care of the gun-mount problems. Nonetheless, to guard against future troubles, an Air Force Academy team instrumented Surprise Package to measure recoil effect on the mount and basic structure.<sup>79</sup> Despite these problems, eight special subsystems had shown "acceptable reliability" and "effective operation."<sup>80</sup>

#### Impact of Equipment Changes

The equipment additions did not significantly alter the normal gunship tactics, except for a higher altitude and much longer slant range. The gunships, including Surprise Package, employed two basic interdiction methods. The first entailed a rapid search of the fragged area and striking of targets acquired. If targets were observed, Surprise Package crews would identify and strike using the first sensor acquiring the target. If the MTI failed to quickly pick up a truck, the gunship flew a spiraling search pattern along a road usually at a road speed of 25-50 mph. Black Crow normally detected any trucks missed by the MTI unless the vehicles turned off their ignition. As Black Crow scanned, FLIR, LLLTV, (or the NOD in the first AC-130A's) probed the roadsides for parked trucks or storage areas. Of the three main sensors, FLIR was best able to penetrate enemy concealment but required a highly skilled operator.<sup>+</sup> Once a target was acquired, firing followed using FLIR, LLLTV, (or the NOD). As to the

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\*An Air Force Academy laboratory later reworked and improved the platforms. Toward the end of Commando Hunt III, the new LLLTV platform gave the operator smoother and more accurate/responsive tracking than previous models. [Combat Evaluation Surprise Package (S), 7th AF, Jun 1970, p 7.]

<sup>+</sup>The final report of the combat evaluation observed there were few infrared sensor operators "after one year's experience, who can make use of all the capability available in this piece of equipment."

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TABLE 3

CONFIGURATION COMPARISON  
AC-130A GUNSHIP AND SURPRISE PACKAGE

<u>AC-130A</u>	<u>Surprise Package</u>
<u>Armament</u>	
4 M-61 20-mm cannons	2 M-1 40-mm guns
4 GAU-2B/A 7.62-mm miniguns	2 M-61 20-mm cannons
<u>Airborne Illumination System</u>	
40-kw illuminator flare launcher (LAU-74/A)	2-kw illuminator
<u>Sensors</u>	
forward-looking infrared (AN/AAD-4)	forward-looking infrared (AN/AAD-4)
night observation device radar set (AN/APQ-133)	low-light-level television radar set (AN/APQ-133) helmet sight (cueing sensor) Black Crow moving target indicator
<u>Fire-Control System</u>	
AWG-13 analog computer fire-control display optical gunsight ID-48 steering indicator sensor and light angle display	digital fire-control computer fire-control display optical gunsight ID-48 steering indicator sensor and light angle display inertial navigation targeting system
<u>Other Equipment</u>	
	helmet sight laser target designator

SOURCE: Tech rpt TAC OPlan 132 (S), Final Report Combat Introduction/  
Evaluation (Coronet Surprise), Aug 1970, pp 1-2.

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second interdiction tactic, it relied on intensive premission coordination and planning coupled with a 15- to 30-minute complete search of an area for difficult targets. The several sensors best complemented one another when combing a densely forested area.<sup>81</sup>

(●) New equipment sparked a change in the composition of Surprise Package's crew and their stations. As previously mentioned, TAC had pointed to the requirement for an electronic warfare officer when the TRIM-7 system was put on the AC-130. There had also been recommendations to increase the number of weapons mechanics or gunners from three to five. The rise was based on the requirement for a right-side AA scanner plus the maintaining, reloading, and clearing ejected brass at separate gun stations.<sup>82</sup> By the same token, Southeast Asian operations accentuated a need for more weapons mechanic manning to cover ordnance-loading for premission and turnaround (rapid reloading for another sortie) times. At Ubon RTAFB, neither the maintenance munitions squadron servicing the gunship nor the 16th Special Operations Squadron thought it had enough people to handle this job.<sup>83</sup>

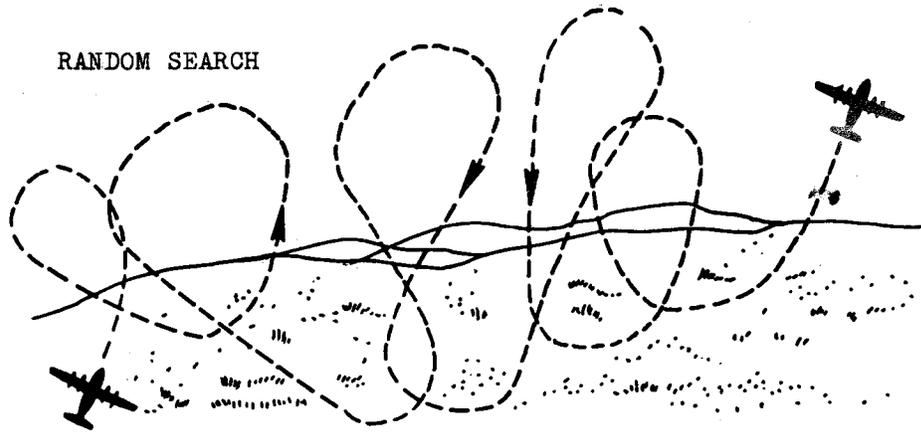
(●) On 4 June 1970 PACAF requested Headquarters USAF to raise weapons mechanic spaces on AC-130 crews from three to five. On 6 July it asked for an electronic warfare officer based on Surprise Package's new Black Crow equipment. Meanwhile, the AC-130 Gunship Program Office at ASD believed Surprise Package ought to have still another navigator position to monitor the various sensor inputs and assist the aircraft commander in firing operations.<sup>\*84</sup> This and the positions requested by PACAF were in time approved. Surprise Package then set the standard for other upgraded AC-130's with its 14-man crew: pilot, copilot, flight engineer, fire-control officer, table navigator, LLLTV operator, FLIR operator, electronic warfare officer, illuminator operator, and five gunners. The AC-130A compartment booth at about midfuselage was revamped to house the Black Crow EWO, FLIR operator, LLLTV operator, and fire-control officer.

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\*The increase of more sophisticated equipment overburdened the pilot who tried to cope with firing data while flying the aircraft. The new position--called "mission commander" and later "fire-control officer"--became part of Surprise Package's crew complement when the gunship began combat operations. It turned out to be a valuable addition. [Intvw (S), author with Lt Col Charles F. Spicka, Dir/Ops, 19 May 72.]

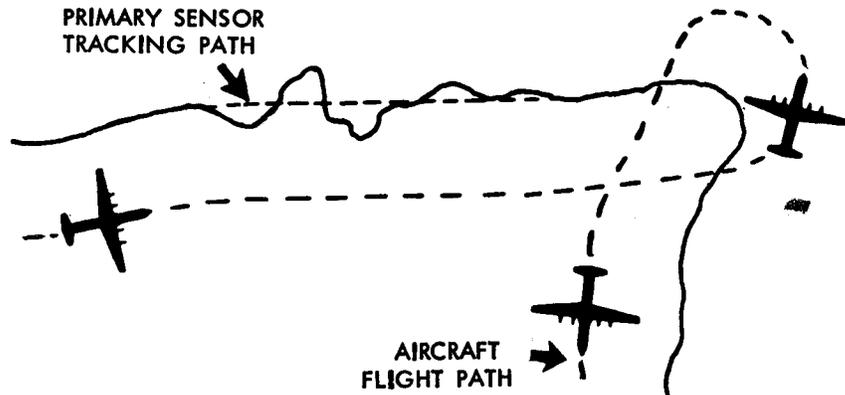
# AC-130 SEARCH PATTERNS

RANDOM SEARCH



PARALLEL SEARCH

PRIMARY SENSOR TRACKING PATH



SPIRAL SEARCH

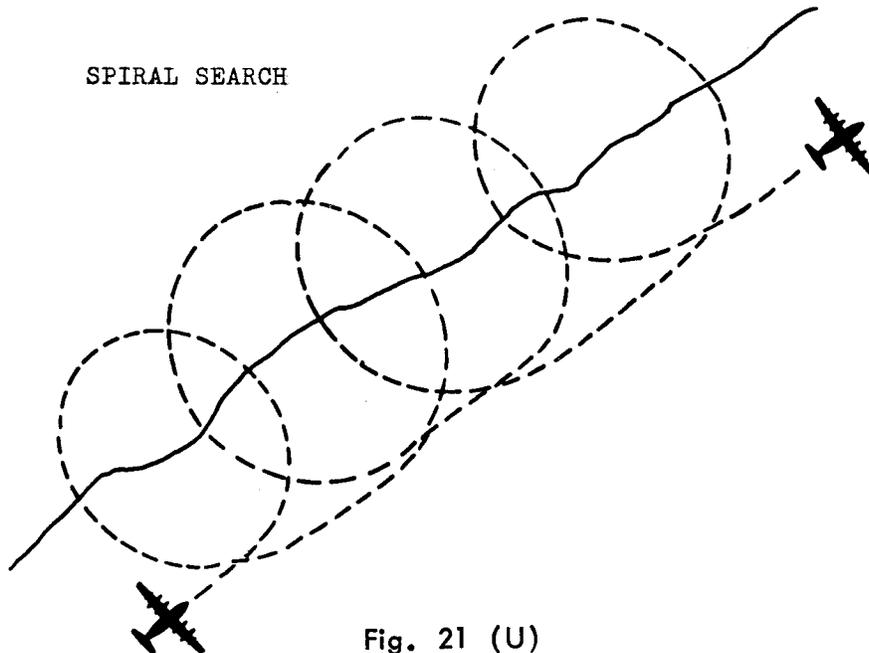


Fig. 21 (U)

(This page is Unclassified)

(U) Because of its many crew and equipment changes, Surprise Package was a big jump forward in gunship development. Just as the AC-130 excelled the AC-47, so Surprise Package displayed great superiority over the standard AC-130A. Thus the weapon system dynamically grew--evolving in effectiveness and complexity.

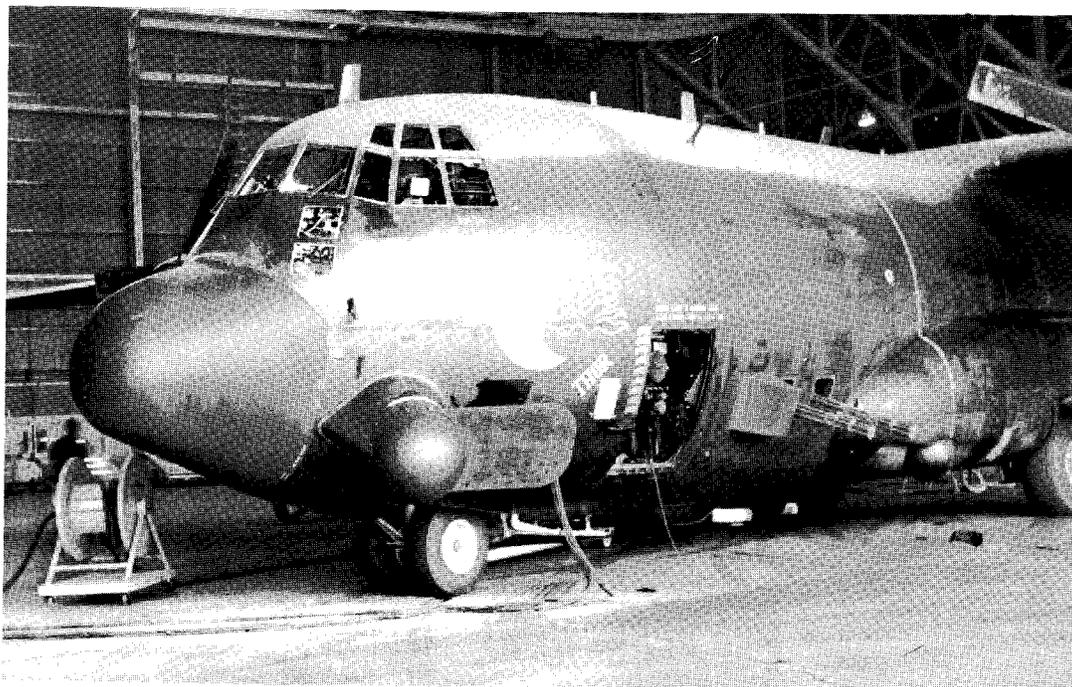
(U) Being pioneers, the AC-130A prototype and Surprise Package were test-bed aircraft and experienced similar combat-evaluation troubles. Surprise Package's performance fell off with time despite remarkable in-theater support from ASD, Air Force Academy, and contractor personnel. Like the AC-130A prototype, Surprise Package's new systems and their breadboard installation (often on rather crude mountings for testing) brought on numerous maintenance headaches. In March 1970 Secretary of the Air Force Seamans asked why weekly summaries of truck-kills/sorties in Southeast Asia reflected greater improvement of AC-119K and AC-130A performance relative to Surprise Package.<sup>85</sup> The Air Staff gave as a reason a decrease in truck traffic in Surprise Package's area of operations along with some technical and maintenance problems in the aircraft and equipment.<sup>86</sup>

(U) A later recommendation was made that Surprise Package be reconfigured to a standard AC-130 because it was difficult and expensive to maintain<sup>87</sup> but this was swiftly rejected by Seventh Air Force. On 1 May 1970 ASD proposed spending \$3.4 million to refurbish the aircraft and return it to Southeast Asia for the 1970-71 dry season.<sup>88</sup> Seventh Air Force agreed on 6 May 1970,<sup>89</sup> PACAF on 20 May,<sup>90</sup> and Headquarters USAF ordered the return of Surprise Package on 21 May.<sup>91</sup> The aircraft arrived at Wright-Patterson AFB on 4 June and immediately underwent refitting in ASD shops for return to combat in the fall. Surprise Package had ably demonstrated the advantages of the advanced Gunship II and quickly generated requests for more such aircraft.

#### Debating Gunship Development

(U) Surprise Package's performance in the Southeast Asian war exacerbated long-standing, high-level debate on gunship limitations and the size and nature of the gunship force. Secretary of the Air Force Seamans visited Southeast Asia from 10-21 January 1970 and one of his chief aims was to look at the gunship program, Surprise Package operations in particular.<sup>92</sup> The Secretary arrived

at Ubon RTAFB on 18 January, the day the combat evaluation ended.<sup>93</sup> He was so impressed with the advanced gunship's effectiveness that he called Under Secretary of the Air Force John L. McLucas in Washington, saying he believed all Spectre aircraft should be modified to the Surprise Package configuration.<sup>94</sup> Under Secretary McLucas passed this information to the Air Staff on 19 January 1970.<sup>95</sup>



Key Sensors on Surprise Package

~~107~~ In his 23 January 1970 trip report to the Secretary of Defense, Dr. Seamans said he had directed the Air Staff to modernize the other AC-130's with "those portions of the Surprise Package equipment that can be installed in the field during the current dry season."<sup>96</sup> At about this time, General Brown, Seventh Air Force Commander, asked for faster action on Surprise Package modification of other AC-130A's then in combat. He also sought support in getting AC-130E's to replace aging AC-130A's.<sup>97</sup> These proposals for updating all Gunship II's more clearly focused opposing views on the gunship force evolution. On one side, TAC, Headquarters USAF, and the Joint Chiefs of Staff urged restrained expansion and improvement. On the other, the Secretaries of the Air Force and Defense wanted greater force development.

When AFSC proposed Surprise Package, TAC had gone along with the need for a better gunship but with concern on how far the Air Force should pursue this weapon system. TAC believed the AC-130 had reached its limit when it required F-4 jet protection from AA fire.<sup>98</sup> Satisfied with Surprise Package's combat debut, TAC still viewed AC-130 gunships as suitable only for special warfare forces in low-order conflicts and lightly defended areas. Talk of turning additional C-130 aircraft into gunships and updating more into the Surprise Package configuration touched off further TAC alarm and opposition. That command wanted no more C-130's diverted to roles other than airlift. It argued that the fiscal year 1971 budget contained no new C-130's and the tactical airlift force was declining through attrition. TAC was opposed to conversion of the E model C-130 to gunships unless there was a new buy of this aircraft. Wanting to escape another "panic program" on gunships, TAC strongly suggested the Air Staff spell out the future of the AC-130--a weapon system it saw survivable only if the enemy chose not to use all his weapons.<sup>99</sup>

In contrast, the Secretary of Defense adopted a far more favorable stance toward gunship growth due in part to pressure from the President's Science Advisory Committee. Dr. Lee A. DuBridge, PSAC head and Science Adviser to President Nixon, stressed to Secretary of Defense Laird on 26 June 1969 the "problems of getting more effective weapons into the Vietnam theater." Dr. DuBridge scored the "severe delays" in applying new weaponry and cited gunships as a chief case in point. The Science Adviser said gunship development had not been fully exploited despite the weapon system's proven potency as a truck-killer in Laos. DuBridge told Secretary Laird:<sup>100</sup>

It was clear from the initial tests of the AC-130 gunship, which demonstrated kills of about five trucks/sortie, that the 18 AC-130 and 26 AC-119K gunships should possess a potential truck killing capacity of 100 to 200 trucks/night if a sortie rate of one per day could be maintained. Comparing this with the infiltration rate of around 200 trucks/day entering Laos in 1968 from North Vietnam, and an estimated truck inventory in Laos of about 1300 trucks, and the kill rate of 20-30 trucks/day otherwise being achieved, we see that the gunships could have made a truly significant impact on the infiltration of supplies. To be sure they would

encounter AAA, and a massive suppression effort would be needed. However, as an interim program it might well have been highly successful. It was surely worth the gamble at the price tag involved. The fact that the DOD was haggling about cost effectiveness studies, delaying authorization from the total buy, etc. with a program of such imagination and potential for helping the war effort, supported by the Executive Office of the President and the Secretary of the Air Force, gives eloquent support to the contention that changes in the system are vital.

(b) Dr. DuBridge's keen interest in the gunship program spurred a closer look at Air Force plans. Secretary Laird wanted to know: How many gunships were now in SEA? How many were programmed to be there? If all gunships were not yet in place, when would they be? What thought had been given to greater use of gunships as opposed to other means of attack?<sup>101</sup> Replying the same day, the Air Force Secretary said there were presently 45 USAF gunships in SEA (43 gunships plus 2 AC-123K Black Spot aircraft.) By the end of 1969, the completely deployed force would number 7 AC-130's, 18 AC-119K's, 18 AC-119G's, and 2 AC-123K's. Also at that time, a few remaining AC-47's might not have been transferred yet to the Vietnamese Air Force.<sup>102</sup>

(c) Almost simultaneously, General John D. Ryan--then Air Force Vice Chief of Staff--reported to the Air Force Secretary that the time was not right for expanding the AC-130 gunship fleet. The Vice Chief indicated no actions were under way to procure additional gunships and gave these main reasons: (1) More gunships would mean deeper unacceptable cuts into critical airlift assets, (2) recent deployment of 16 AC-119K's, 2 AC-123K's, and 3 AC-130's to SEA represented a 300 percent rise in truck-killing resources, (3) vulnerability of gunships dictated their use in lightly defended areas, (4) the enemy was rapidly reinforcing his AA defense, (5) fund limitations and proposed budget cuts made modification costs prohibitive in view of the gunship's limited operations, and (6) a better use of limited funds would obtain an improved and advanced self-contained night attack (SCNA) system with greater survivability.<sup>103</sup> Likewise on 28 July 1969, General Ryan reiterated

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\*Later, the OSD said the Air Force reply need not cover this last question.

some of these same points to AFSC and declared the "additional gunships and Black Spot aircraft currently planned for deployment in the October-December time frame should be adequate to meet existing requirements."104

( ) Secretary Laird came back to the Air Force on 5 August 1969 for pros and cons on greater use of gunships and USAF plans based on its analysis.105 The Air Force Secretary set forth to Mr. Laird the several advantages and disadvantages, incorporating many of General Ryan's points. Secretary Seamans recommended continued deployment of gunship assets, funds be spent to advance a self-contained night attack system, and evaluation of the soon-to-be-deployed B-57G. Dr. Seamans did not recommend more gunships. Instead he concluded that "while the gunships have proved to be effective truck killers, we believe that we have responded as well as the tight budget will allow in providing gunships to SEAsia."106 At this stage of the discussion the Air Force Secretary backed the views of the Air Force military chiefs.

( ) The Joint Chiefs of Staff supported the Air Force position that the gunship force was adequate for Southeast Asian operations. Responding to Secretary Laird's query of 27 December 1969 on SEA gunship requirements, the JCS pointed to the sizable upturn in gunships for Laotian operations since the 1969 Northeast Monsoon season and said the current 68 gunships appeared sufficient. They believed the Vietnamese and Laotian Air Forces could neither operate nor maintain more gunships than they now had. The JCS recommended gunship requirements be tied to overall theater needs and not to separate ones for Laos and South Vietnam. MACV could assure satisfactory gunship support through flexible allocation of gunship sorties.107

( ) Deputy Secretary of Defense David Packard stepped decisively into the gunship force discussion in December 1969. After participating in a live-firing AC-130A flight at the Lockbourne AFB range, the Deputy Secretary wrote Secretary Seamans that the gunship was an "impressive weapon" and that "its enviable record in SEA is easily understood." Mr. Packard favored "at least a vestigial capability" for the future to carry out tactical night detection and attack missions. He also thought the aircraft might be suitable for the Military Assistance Program. He therefore requested the Air Force to "formulate an R&D program for improved GUNSHIPS and that a minimal number be included in . . . plans for the decade 1970-1980."108 This most significant directive clearly

opened up a future for gunships beyond the Southeast Asian war. Coming as it did from top Defense Department leadership, it formed the cornerstone for further gunship development.

#### Updating the AC-130A's

After his January 1970 trip to Southeast Asia, Secretary of the Air Force Seamans replied to Deputy Secretary of Defense Packard: "I share your keen interest in gunship capabilities and have carefully monitored and encouraged our current programs since becoming Secretary of the Air Force to assure that we continue to make progress in this important field." Secretary Seamans then told of his investigating AC-130 effectiveness in the combat theater and dwelt upon Surprise Package's impressive record. Dr. Seamans said he had already taken three actions: directed that the other AC-130's be modified into the Surprise Package configuration, started the Air Staff examining requirements for additional improved AC-130's possibly using the C-130E,\* and continued prototyping of other gunship-equipment improvements. The latter took in foliage attenuation<sup>+</sup> tests of a ground beacon to be used with the side-looking beacon-tracking radar, 20-mm depleted-uranium<sup>‡</sup> ammunition, and Have Auger, a project for advanced development of lasers with sensory systems. Seamans declared the Air Force intended "to support vigorously a wide range of efforts to help assure the maintenance and improvement of the effectiveness of gunship weapon systems in the future."<sup>109</sup>

On 21 January 1970 Aeronautical Systems Division briefed the Air Staff on the cost of updating all AC-130A's to the Surprise Package configuration as desired by the Secretary of the Air Force. On 22 January Headquarters USAF directed AFSC and AFLC to modify five Gunship II aircraft incorporating six of the Surprise

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\*In January 1970 ASD held a meeting of engineers and technicians (including some from WRAMA) to consider possible use of the B- or E-model airframes for future modification. [Hist (S), WRAMA, 1 Jul-30 Jun 1970, IV; Historical Study 25 (S); WRAMA's Weapon Systems: The AC-130E Aircraft (Gunship) (Project Pave Spectre) (WRAMA, Jan 1972), pp 8-9.]

<sup>+</sup>The tests tried to find out how much the foliage retarded the ground beacon's signal.

<sup>‡</sup>The depleted uranium added an incendiary quality.

Package subsystems\* at an approved cost of \$1,570,000.<sup>110</sup> Known as the Limited Surprise Package Update Program,<sup>111</sup> it specified that a joint AFSC/AFLC team modify the AC-130's in the field during the summer to have them ready for the forthcoming 1970-71 hunting season. The Air Force later considered this impractical and moved the work to the United States. A key factor in the shift was the need of the five AC-130A's for a general inspection (IRAN)--it had been at least 2 years since they had undergone a periodic overhaul.<sup>112</sup>

#### Considering C-130E's as Gunships

The AC-130A update program approved, the Secretary and Air Staff turned to a far more controversial issue--the proposed use of C-130E's as gunships. Still vigorously resisting the idea unless more C-130E's were procured from Lockheed, General Momyer, TAC Commander, told the Vice Chief of Staff on 24 February 1970: "I reiterate that I oppose diversion of urgently needed airlift C-130E's to the gunship role."<sup>113</sup> In contrast, the concern of the Seventh Air Force and other gunship proponents centered on the older AC-130A airframes. They deemed it far more economical to put the sophisticated and expensive subsystems on an airframe that would last into the 1980's. Secretary Seamans--aware of the impact on the tactical airlift force of using E-model aircraft--asked the Air Staff to examine alternatives to the use of these airframes.<sup>114</sup>

The Air Staff requested PACAF to furnish more definite Seventh Air Force requirements.<sup>115</sup> PACAF replied that either the C-130B or C-130E would represent the desired improvement. The command pointed to the increase in gross-weight capability over the AC-130A--10,000 pounds for the C-130B and 30,000 pounds for the C-130E. This could stretch mission time 1 and 2 hours respectively. Additional armor could also be provided. The more reliable B and E models had experienced fewer maintenance and support problems. Furthermore, the present AC-130A's were 15-years-old or more and

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\*The six subsystems were: ARN-92 loran C/D, moving target indicator for the APQ-136 navigation radar, two 40-mm guns, 2-kw illuminator, and a 2500 VA inverter to supply reference power for the fire-control system.

†AFSC Program Directive 1559-31-70-298, 11 June 1970, got the work officially under way.

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still being flown at maximum sortie rates. PACAF accordingly recommended that the modernization program begin by adding two new AC-130E's by the end of 1971. The other AC-130E's would be phased in replacements with at least six in place by December 1972. PACAF envisioned a final force of nine AC-130E's.<sup>116</sup>

The Air Staff and Air Force Secretary weighed PACAF's statement of new gunship requirements and on 12 March 1970 considered options of 5, 9, and 12 AC-130 aircraft. Secretary Seamans tentatively approved securing the aircraft in this priority: (1) new production of C-130E's, (2) use of C-130B's modified to C-130E gross-weight capability, and (3) C-130E's from airlift assets. Time had ruled out adequate staffing of the options so the Secretary directed this be done with a study of costs and a further review of the desired gunship force structure.<sup>117</sup>

A series of meetings ensued during the latter part of March and the first of April involving the Force Structure Panel, Program Review Committee, Air Staff Board, and Air Force Council.<sup>118</sup> Among the problems studied were the expected cutoff of C-130E production in 1971 and TAC's objections. On 18 March 1970 Headquarters USAF asked ASD for facts on a conversion program of two or six C-130E's.<sup>119</sup> ASD's Gunship Program Office, which favored using C-130E's, supplied the data. Both AFSC and AFLC had given the Air Staff on 2 January 1970 their "unqualified recommendation" that the C-130E model be used for a semipermanent or permanent force. After much discussion, the Air Force Chief of Staff approved on 28 April 1970 the modification of two inventory C-130E's to the Surprise Package configuration.<sup>120</sup> He directed WRAMA to modify the two prototypes at an estimated cost of \$17.3 million<sup>121</sup> and have them in SEA for combat by October-December 1971.<sup>122</sup> As an interim solution to the improved/expanded gunship-force issue, this would meet the PACAF 1971 requirement and form the nucleus of the 1970-1980 gunship force. It would also buy more time for evaluating the AC-130E and fixing on the number of AC-130E's to be built. When the Chief of Staff's decision went to the field for action on 7 May 1970,<sup>123</sup> the AC-130E modification program was then nicknamed Pave Spectre.

On 1 May 1970 Presidential Science Adviser DuBridge recommended to Air Force Secretary Seamans that the number of Surprise Package gunships be upped to 20. He believed such a program of less-vulnerable gunships could only be carried out with

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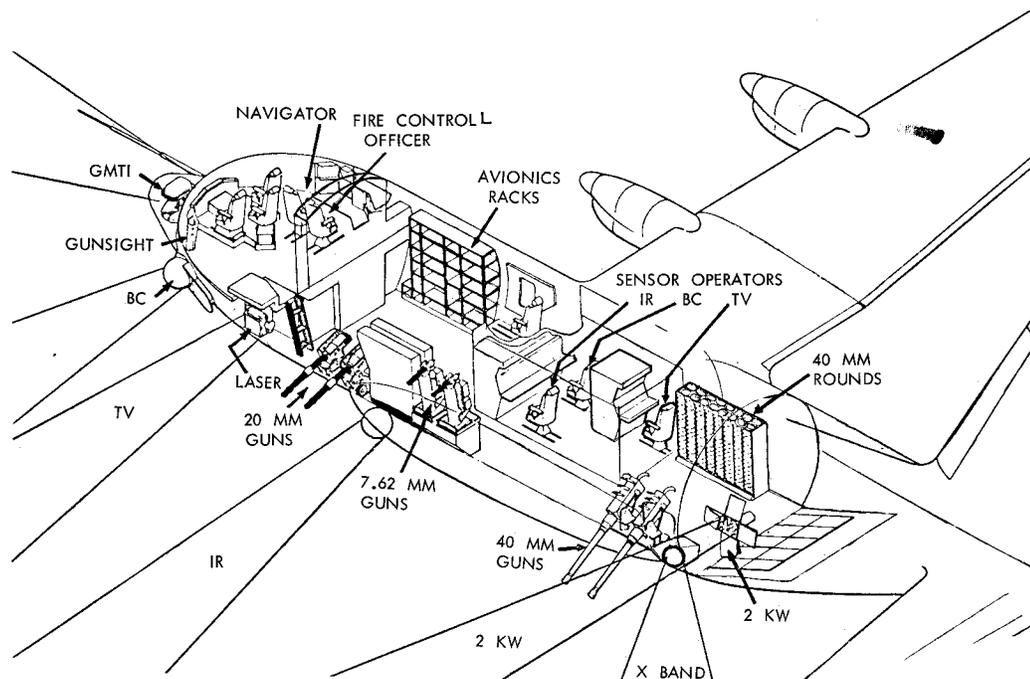
**AC-130E GUNSHIP**

Fig. 22 (U)

the wholehearted support of top government and DOD officials, since it posed difficult budget problems and force-structure questions for a wide range of conflicts. Dr. DuBridge called attention to some past disappointing decisions: withdrawal of the A-26 (one of the better truck-killers) from SEA, and the acquisition of just 7 AC-130's when at one point in 1967 the Secretary of the Air Force had approved as many as 20.<sup>124</sup>

Replying to Dr. DuBridge for the Air Staff on 11 May, Maj. Gen. Joseph J. Kruzal, Deputy Director of Operations, stated that the small number of Surprise Package gunships stemmed from a desire to conserve critical airlift aircraft. Nevertheless, all AC-130A's were to be modified to the more effective Surprise Package configuration by December 1970 and two AC-130E's added by November 1971. Beyond these actions, General Kruzal said, "further expansion of the AC-130 gunship force is not now planned, pending combat evaluation of the two prototypes."<sup>125</sup> The Air Staff's reply could have cited several complementary USAF actions expected to solidly strengthen night interdiction capability. In addition to the upgrading of the six AC-130A's, the actions embraced:

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OV-10 aircraft as night FAC's, F-4 laser seekers, an additional loran-equipped F-4 squadron, loran-targeting for gunships, and employment of B-57G's.<sup>126</sup>

(S) On 14 May 1970 Secretary Seamans was briefed on the status of the gunship programs. A delay of 2 to 4 months in the AC-130E prototype modification (Pave Spectre)--due to insufficient experienced ASD personnel--was mentioned as a possibility. Dr. Seamans emphatically rejected a possible 2- to 4-month delay in modifying the AC-130E prototypes. He called for broadening the experience base in AFSC to keep on schedule.<sup>127</sup> Under Secretary McLucas, who was also present, questioned the procurement of only two AC-130E's. General Meyer, Vice Chief of Staff, explained that the two aircraft could serve as prototypes for follow-on procurement and a decision on this could come after further Air Staff study. Decisions were made to review the gunship programs quarterly and for the Secretary to decide in January 1971 whether more AC-130E's would be built.<sup>128</sup> The Air Staff well knew Tactical Air Command's reservations concerning the AC-130E program. On 17 June 1970 it asked TAC for "comments and recommendations" by 1 September 1970 "regarding the post-SEAsia gunship concept of operation, force level and combat crew/maintenance support training requirements."<sup>129</sup>

#### Seeking Improved Interdiction

(S) On 20 May 1970 Defense Secretary Laird refocused attention from the postwar force to AC-130 gunships for the Southeast Asian war. He asked the Chairman of the JCS for a new interdiction strategy and specifically mentioned the successes of the gunships with a relatively small percentage of the total sorties. Secretary Laird suggested "that more concentration on gunship sorties, coupled perhaps with judicious choke-point strikes by B-52s or TAC air equipped with modern ordnance could produce major increases in interdiction results or free the less productive air resources for other purposes."<sup>130</sup>

(S) Also in May, Seventh Air Force reported results of the Commando Hunt III (1969-70) interdiction campaign. It reached the following conclusions after analyzing the effectiveness of various aircraft against enemy supply trucks:

1. A majority of the aircraft showed significant increase in effectiveness in attacks against trucks.

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2. Jet fighter and attack aircraft destroyed or damaged 3,900 trucks, 39 percent of the campaign total.
3. Gunships were the most effective truck killer, obtaining 48 percent of the trucks destroyed or damaged while flying only 8 percent of the sorties.
4. Gunships required two to three escort sorties for each attack sorties they flew, reflecting a team effort.
5. The AC-130 Surprise Package was the most effective individual aircraft in destroying or damaging trucks.<sup>131</sup>

These conclusions and the more precise data in Table 4 furnished extra ammunition to gunship adherents.<sup>132</sup>

Adm. Thomas Moorer, Chairman of the Joint Chiefs of Staff, defended present interdiction programs in a 10 June reply to Secretary Laird. Admiral Moorer declared the new munitions and systems being added and the upgrading of all AC-130's would yield still more interdiction strength. He nevertheless cautioned that "enthusiasm [for the gunship] must be tempered with an awareness of its vulnerability to enemy defenses." Two of the limited AC-130 fleet had been lost in the past 13 months and gunships were "precluded, even with fighter escort, from operation along certain defended LOCs."<sup>133</sup>

Meantime, the President's Science Advisory Committee discussed ways to improve the Laotian interdiction effort. The PSAC outlined several conclusions to Deputy Defense Secretary Packard and invited him to attend sessions on the subject near mid-June. The Committee continued to stress the effectiveness of gunships as one of the main issues--48 percent of all trucks destroyed or damaged while flying only 8 percent of the total attack sorties, the Surprise Package being even more deadly. In contrast, the F-4's flew 39 percent of the sorties but accounted for only 16 percent of the trucks. In the Committee's view, it would be wise to buy more Surprise Package aircraft and fewer F-4's. After sitting in with the PSAC, Secretary Packard phoned Dr. McLucas, the Air Force Under Secretary, for more information on the USAF gunship program. When told of the prototype AC-130E (Pave Spectre), Mr. Packard wanted to pare the projected 18-month development time. He asked McLucas to examine utilization of C-130 resources and let him know what could be done to significantly increase the number of available gunships by year-end.<sup>134</sup>

TABLE 4

## EFFECTIVENESS OF COMMANDO HUNT III AIRCRAFT

<u>Aircraft</u>	<u>Trucks Destroyed or Damaged</u>	<u>Sorties Attacking Trucks</u>	<u>Trucks Struck</u>	<u>Trucks Destroyed or Damaged per Sortie</u>	<u>Trucks Destroyed or Damaged per Truck Struck</u>
AC-130 Surprise Package	822	112	1,104	7.34	.74
AC-130 Other	2,562	591	4,742	4.34	.54
AC-123	440	141	854	3.12	.52
AC-119	987	435	2,005	2.27	.49
A-6	977	1,486	2,708	.66	.36
A-1	1,271	2,332	4,602	.55	.36
A-7	959	3,147	3,866	.30	.25
F-4	1,576	6,310	11,178	.25	.14
A-4	245	1,223	1,446	.20	.17
<u>Total</u>	<u>9,839</u>	<u>15,777</u>	<u>32,505</u>	<u>.62</u>	<u>.30</u>

SOURCE: Rept (S), 7th AF, Commando Hunt III, May 1970; hist (S), MACV, I, annex A, VI-95, VI-96.

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The Air Staff argued against the PSAC position with these principal points: (1) no clear Presidential guidance exists on retention of U.S. air support after overall U.S. military withdrawal, thus the uncertainty as to future interdiction campaigns; (2) Surprise Package is peculiarly suited for a Southeast Asian-type war, but the post-SEA force faces difficult budget choices and must be tailored in light of other-type conflicts; (3) there must be a balanced force of gunships and F-4's inasmuch as the aircraft complement each other; and (4) the Air Force is developing and documenting support for a Surprise Package program. 135

Caught in the debate crossfire, Under Secretary McLucas contended that the Air Staff planned too conservatively for future gunship use. He said the Air Force would most likely be in Southeast Asia for some time and the demand for air power would probably rise with the withdrawal of ground forces. He considered the gunship record and its cost effectiveness in truck-killing beyond dispute. Furthermore, the Air Force needed airplanes with effective guns in planning for the future. Dr. McLucas spoke of the detrimental decline in this capability from the Korean to the Vietnam War. He discounted the great objections on gunship vulnerability and claimed that at about \$5 million per gunship he didn't "see how we can go wrong in converting a dozen or so." 136

The Air Staff buckled down to planning for the larger gunship force for December 1970 desired by Deputy Defense Secretary Packard. An 18 June briefing of Air Force Undersecretary McLucas set forth the Air Staff position on Surprise Package-type production and laser-guided bombs. After the briefing, the group present reviewed Pave Spectre and AC-130A updating then discussed proposals for additional gunships. One suggestion considered would modify three to four AC-130A's by January 1971 at \$6 to \$7 million per aircraft (excluding airframe cost) by resorting to a sole-source contract with LTVE at Greenville, Tex. Even then, ASD and WRAMA personnel would need unlimited authority and a virtually open purse to expedite the program. The discussion turned to other possible limitations such as the need for night observation device yokes, scarcity of management talent, computer and gun unavailability, and the uncertainty of LTVE's work force. Next, Dr. McLucas addressed Air Staff concern over the Air Force's future role in the Southeast Asia war. He pointed out that Dr. Henry A. Kissinger, the President's Assistant for National Security Affairs, had acknowledged the need for more positive guidance for

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the longer view. Meanwhile, he said, Mr. Packard looked to the gunships to replace in some degree the decrease in tactical air sorties.<sup>137</sup> More detailed briefings and discussions followed this one: General Meyers, Vice Chief of Staff, on 22 June; Secretary Seamans, 23 June; and General Ryan, 29 June. From these meetings emerged a plan for modifying six additional C-130A's with a 90-day contract option to modify three more. Subsystems for the latter aircraft would be procured during the contract-option period.<sup>138</sup>

As these Headquarters USAF discussions went on, various opinions on additional AC-130 gunships percolated in the lower commands. Maj. Gen. Abe J. Beck, WRAMA Commander, thought it unwise to use more C-130A airframes for SEA gunship requirements. He saw definite advantages in adopting the C-130E-- bigger payload, 3 more hours of loiter time, longer ferry range, better reliability, and a newer state-of-the-art airframe. General Beck felt the problems of mixing A and E models\* would be offset by gaining a more permanent force and by investing much valuable equipment in a better airframe.<sup>139</sup> Earlier, General Momyer had complained of the gunship program being "a series of ad hoc actions" and argued that whatever the number and type of C-130's finally selected they should be the same. Only this would obtain "economy of training, supply support, and standardization of tactical employment."<sup>140</sup> These views spotlighted the many complex ramifications involved in what on the surface seemed a relatively simple decision.

On 2 July 1970 the Secretary of the Air Force presented Mr. Packard the proposal for increasing AC-130A gunships. Secretary Seamans said the January 1971 deployment goal would exact a three-shift, seven-day-a-week production schedule from LTVE. The cost would run about \$45.3 million for six aircraft, \$52 million for nine. The AC-130A's would be fitted with Surprise Package 40-mm guns, special equipment, and sensors. However, the tight delivery schedule ruled out installation of the digital fire-control computer and inertial navigation system. Program

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\*Still a debate arose over choosing an early or late E-model airframe for Pave Spectre. TAC and PACAF recognized that late E models were better for the future but the early E models were more easily supported logistically. [Msg (S), CINCPACAF to CSAF, subj: AC-130E Surprise Package (PAVE SPECTRE), 11 Jun 70.]

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funding would have to come from the Special Activities portion of fiscal year 1970 Air Force missile procurement and RDT&E\* appropriations. Dr. Seamans cautioned that the planned delivery date demanded all-out effort and support. He additionally outlined the Pave Spectre program to the Deputy Defense Secretary and said it would move the Air Force "well down the road toward a more survivable self-contained night attack aircraft."<sup>141</sup>

Deputy Defense Secretary Packard verbally approved Air Force plans for acquiring the additional AC-130A's that would eventually double the Gunship II force. On 10 July 1970 Air Force Secretary Seamans notified Mr. Packard that procurement was under way and three contractors<sup>+</sup> besides LTVE were being considered. Secretary Seamans referred to a "learning curve associated with producing an acceptable Gunship weapon system" and considered LTVE "further ahead of this learning curve than any other contractor." LTVE had taken 11 months to modify the first AC-130A but only 4 months to finish the last one which also included a complete IRAN of the airframe. Dr. Seamans remarked he was setting up briefings of congressional committees concerned to advise them of Air Force plans to reprogram funds for the modification and to release funds for buying long-lead subsystem items.<sup>142</sup> Mr. Packard formally approved the program on 11 July.

#### Pave Pronto

On 14 July 1970 the Air Force Chief of Staff informed interested field commanders that he had approved modification of

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\*Research, development, test and evaluation.

<sup>+</sup>Lockheed Aircraft Corporation, manufacturer of the C-130; Fairchild-Hiller, which produced the AC-119 and had done IRAN work on C-130's; and Hayes International Corporation, presently doing work on AC-130A gunships.

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six additional C-130A aircraft to an upgraded gunship configuration.\* The program's approved cost (including some equipment items for three optional gunships) totaled \$46,659,000. The project was officially designated Pave Pronto.<sup>143</sup>

(C) Having orders to begin the AC-130A modification program, ASD held a Pave Pronto conference at Wright-Patterson AFB from 22-25 July 1970. Representatives from interested commands worldwide met to work out a coordinated plan for acquiring and logistically supporting the aircraft and to review their tasks. The high precedence DOD rating 1-3 backed the deployment schedule to SEA of three AC-130A's by 1 January 1971 and three by 1 February 1971. The conferees concluded that with modest construction and rehabilitation Ubon RTAFB facilities could accommodate the six Pave Pronto aircraft. In general, they did not expect equipment procurement to pose any serious problem.<sup>145</sup>

(C) A related conference of command and agency representatives drew up a preliminary plan for the total Pave Pronto training effort and plans for other AC-130 gunship training programs.<sup>146</sup> Much discussion yielded the decision to conduct aircrew training in the United States at Lockbourne AFB, Ohio. Utilizing two AC-130A's and two AC-119K's, TAC would conduct the flying training, while ATC/TAC the ground training. To support a 12-gunship force in SEA, the conferees forecast a future need to assign three AC-130's to TAC for aircrew training.<sup>147</sup>

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\*The modification program included this equipment: flare launcher (LAU-74); 40-kw illuminator (AUQ-8); moving target indicator modification to AN/APN-59 radar; Black Crow (S-band); battle damage assessment system; laser target designator; Southeast Asia communications package; low-light-level-television; fire-control system (improved-solution analog computer, gunsight, and fire-control display); two-axis gyro; 7.62-mm miniguns (2 each); 20-mm guns (2 each); 40-mm guns (2 each); interphone (AIC-18/25); electronic countermeasures (TRIM-7) and airborne radar receiver (APR 25/26); sensor-light angle display system; loran C/D (ARN-92); survivability package (foam in fuel tanks and armor added); 2-kw illuminator; X-band beacon-tracking radar; ac/dc distribution modification; sensor operator console; mission commander (later called fire-control officer) console; forward-looking infrared (AAD/4).

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(S) Counting Pave Pronto, the Air Force had five advanced gunship programs under way in the summer of 1970:

<u>Program</u>	<u>Approved Funds</u> ( <u>in millions</u> )
AC-130A Update	\$ 4.3
Surprise Package Second Season*	3.4
SEAOR Improvements <sup>+</sup>	5.4
Pave Pronto	46.7
Pave Spectre	17.3
<u>Total</u>	<u>77.1</u>

The Air Force geared this great gunship activity to: (1) producing a vastly more potent gunship force for the 1970-71 Laotian hunting season, and (2) forming a core for the gunship force beyond the Southeast Asian war.<sup>148</sup>

#### Gunship Debate Goes On

(S) Pleased with the Air Force's planned increase in gunship capabilities, Deputy Defense Secretary Packard wrote the Chairman of the JCS and the service secretaries on 11 July 1970. He singled out this "aggressive program" as an example of what was needed to bolster the interdiction effort in the 1970-71 campaign. Mr. Packard urged departure "from normal operating procedures and customs wherever significant benefits" could be derived in strengthening interdiction. He recommended the Air Force consider greater use of AC-119K's in Laos, employ additional F-4 Pave Sword<sup>‡</sup> aircraft, maintain adequate supplies of truck-killing ordnance, reduce B-52 sorties because of truck-park dispersal, and commit more aircraft 149 at night and in bad weather (partly to cut daylight aircraft losses).

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\*Surprise Package Second Season was the term sometimes applied to the Surprise Package refurbishment.

<sup>+</sup>SEAOR Improvements contained SEAOR 180 for a BDA subsystem, SEAOR 198 for Black Crow, and SEAOR 200 for the laser target designator.

<sup>‡</sup>Pave Sword was the F-4's laser seeker pod. It detected the laser beam from a gunship's laser target designator (LTD), giving the fighter pilot steering information to the laser cone ("basket") for release of a laser-guided bomb.

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●) On 23 July 1970 Secretary of Defense Laird drew Dr. Kissinger's attention to plans for doubling the AC-130 gunship fleet. He told the Presidential Assistant he was recommending lower sortie rates in light of the growing number of AC-130's, development of better ordnance, lower combat levels in South Vietnam, and U.S. ability to meet new airpower requirements. 150

●) Replying on 29 July to Mr. Packard's interdiction recommendations, General Ryan maintained it was virtually impossible to put more AC-119K's over Laos. Two AC-119K's had been lost and some were needed in the U.S. for replacement crew training. Moreover, the AA threat forced gunship operations up to 7,000 feet, requiring Seventh Air Force to submit suggested solutions to this new combat required operational capability (ROC). Testing of Pave Sword aircraft continued as did constant efforts to enhance anti-truck ordnance, counter the AA threat, and extend truck-killing capability by such actions as updating AC-130's. Lastly, B-52 sorties could be decreased if more leeway was allowed in diverting airborne B-52's to other targets. 151

●) One day later, Admiral Moorer, Chairman of the JCS, reemphasized his coolness toward gunships to the Chairman of the Vietnam Special Studies Group (VSSG): "The primary limitation of the gunship is vulnerability due to their slow speed and low operating altitude." He thought it likely the enemy would plan counter-measures to forestall a repeat of the gunship successes during the 1969-70 campaign:

Because gunships made a significant contribution to the overall truck campaign, they would seem to be likely candidates for enemy response. He has found he can offset gunship effectiveness and even in some instances deny them an area of operations by increasing the density of his defenses. With a high level of AAA reaction, the gunship is forced to spend more time in evasive action than in searching for and attacking trucks. Particularly dense AAA environments such as in Mu Gia and Ban Karai Pass and around Tchepone were prohibitive to gunship operations. The enemy must be aware that moonlight (50% illumination or more) forced gunships off the heavily travelled and heavily defended eastern routes on to the less lucrative western and southern routes. 152

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The Admiral stressed some of these same points in defending current interdiction practices to Defense Secretary Laird. He believed the most improvement in interdiction would come from better air munitions.<sup>153</sup>

### Gunship Programs Progress

Amid discussions and plans for the 1970-71 dry-season interdiction campaign, work on advanced gunship programs went on. On 23 July 1970 the Air Force contracted with LTVE to integrate subsystems in the six Pave Pronto AC-130's. Four days later, ASD wound up a survey of Fairchild-Hiller Corporation and Hayes International Company as possible second sources for the optional three AC-130A's. ASD sent the survey results to Air Force Headquarters for final decision.<sup>154</sup>

In May 1970 the five unmodified AC-130A's (dubbed Plain Janes) began deploying from Ubon RTAFB, Thailand, to the United States for limited Surprise Package updating.\* Actually, ASD/WRAMA technicians set the modification program in motion at Ubon by installing the loran C/D (ARN-92) before the AC-130A's departed.<sup>155</sup> At this point the Air Force authorized a change in the modification. The Deputy for Limited War at ASD had been at work on Black Crow, lasers for target designation, and BDA equipment as part of Shed Light<sup>†</sup> development programs. Headquarters 8th Tactical Fighter Wing and PACAF, impressed with Surprise Package results from these systems, urged all Gunship II's be so equipped. On 2 June 1970 Headquarters USAF approved installation of the three SEAOR subsystems.<sup>156</sup>

From 6 June-16 November 1970--at about 1-month intervals--the five AC-130A's received BDA equipment<sup>‡</sup> and the previously

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\*The last Plain Jane sortie took place on 21 September from Ubon. The aircraft (54-1630) departed on the 27th for modification in the United States. [Hist (S), 8th TFWg, 1 Jul-30 Sep 70, Chronology of the 16th SOSq.]

<sup>†</sup>The overall USAF program to improve its night attack/interdiction capability.

<sup>‡</sup>It consisted of: a Westel 201 video-tape recorder, Westel 301 video-tape playback, and the Minneapolis Honeywell electron-beam recorder which converted video tape to 16-mm sound film. The system could record inputs from either the FLIR or LLLTV.

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Secretary Seamans Briefed on AC-130 in SEA

authorized 40-mm guns, MTI, and 2-kw illuminator. Hayes International Corporation, Birmingham, Ala., installed the equipment in conjunction with the IRAN program.\*<sup>157</sup> Lockheed Air Service, Ontario, Calif., put Black Crow in four AC-130A's before their final trans-Pacific movement. Hayes International fitted the fifth AC-130A with Black Crow as part of the IRAN work. Competing requirements of the Pave Pronto program deferred the laser target designator for installation at Ubon by a contractor/ASD team.<sup>158</sup>

With regard to the refurbishment of the Surprise Package aircraft, special test plans took shape. On 4 August 1970 TAC, PACAF, and ASD representatives met at Wright-Patterson AFB to formulate concepts and tactics for a gunship to designate targets which fighters would strike with laser-guided bombs. Surprise Package was to perform this test (Combat Scar) at Eglin AFB and

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\*After updating, the first AC-130A (54-1623) flew to Lockbourne AFB on 21 July to assist the crew-training program. It was joined in the effort about 1 month later by the second AC-130A (54-1628). The two aircraft left Lockbourne for Thailand in October. [ASD Pave Pronto Conf Rprt (S), 22-25 Jul 70, p 5.]

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at the same time check out the aircraft and train its crew.<sup>159</sup> In addition, Surprise Package was to support a SAC test of B-52's bombing targets. Precisely, the SAC/ASD concept of operations (Combat Sierra)\* called for Surprise Package to relay to the B-52 offset-aiming data from an airdropped or implanted radar transponder. The gunship would score a single bomb-release and furnish any offset-aiming adjustments for the B-52 to make a full or partial bomb-release. After a feasibility test of this concept at Eglin in October 1970, SAC recommended a SEA evaluation. In January 1971 the Air Staff approved and so informed TAC and PACAF. During a planning conference at Air Force Headquarters on 8 February, TAC representatives opposed the tests on the grounds of 'non-availability of excess AC-130 sorties and lack of suitable targets for the B-52s.' PACAF and Seventh Air Force added their objections. The Air Staff canceled the project on 10 March 1971.<sup>160</sup>

### COMBAT SIERRA OFFSET BOMBING (AC-130/B-52)

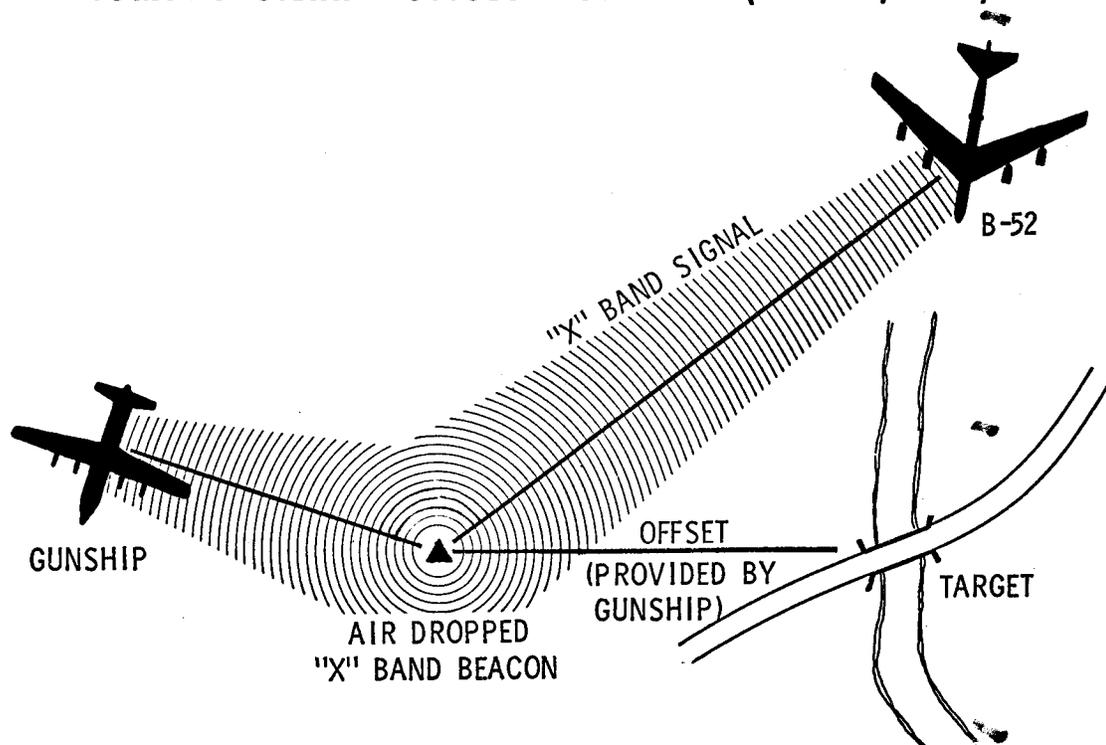


Fig. 23 (S)

\*Combat Sierra was presented to the Air Staff on 18 January 1971.

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After refurbishment and ground-testing at Wright-Patterson AFB, Surprise Package touched down at Eglin on 8 September 1970. By 28 September the gunship had flown 15 test missions.<sup>161</sup> For the Combat Scar evaluation, Surprise Package teamed with a Pave Phantom, an F-4 equipped with a loran bombing system and a laser-guided bomb. The gunship detected the target, passed loran coordinates to the fighter, which fed them into the loran bombing system. The fighter could drop its bomb by (1) using exact loran coordinates, or (2) employing the Surprise Package laser-designator to release its bomb in the laser cone (basket) then letting the laser-guided bomb follow the beam to the target.<sup>162</sup> Of six laser-guided bombs dropped into the gunship laser-designator beam, the F-4's scored four direct hits or near misses and one 50-foot miss. One bomb failed to glide.<sup>163</sup> The evaluators concluded that all gunships should be capable of designating targets for F-4 delivery of laser-guided bombs.<sup>164</sup>

Besides these tactical tests, Surprise Package continued its role as a flying laboratory. An Air Force Academy group of officers, for example, installed many strain gauges and accelerometers with associated recorders to find out the aircraft's stresses and strains during firing passes.<sup>165</sup> This testing and other check-outs showed that Surprise Package could competently operate at more survivable altitudes--up to 14,500 AGL compared to 9,500 feet AGL in 1969. Except for the inertial targeting system, "all installed equipment performed well." Evaluators thought the combination of MTL, Black, Crow, and high-density 20-mm rounds would allow truck-strikes in marginal weather.<sup>166</sup>

Actively interested in the gunship programs, Air Force Secretary Seamans visited the Ling-Temco-Vought Electro-systems plant at Greenville, Tex., on 15 September 1970. He checked LTVE's progress in carrying through its \$7.2 million contract for Pave Pronto modification.<sup>167</sup> That evening he visited Eglin AFB and flew on a Surprise Package test flight.<sup>168</sup> This was but one indication of high-level concern in seeing advanced gunship development completed on time.

At the end of September, a decision on procurement of three optional Pave Pronto aircraft became necessary. Putting the option off meant revised acquisition schedules and increased cost.<sup>169</sup> On 1 October Secretary Seamans informed Deputy Defense Secretary Packard the Air Force would buy the additional aircraft. It would

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use them in the 1970-71 interdiction campaign, as attrition replacements, and in support of replacement aircrew training. Amendment of LTVE's contract added the three aircraft with delivery scheduled from 1 February-1 March 1971.<sup>170</sup> It moved total funding up \$5.4 million to an amount near \$80 million for the entire advanced gunship program. (This new total reflected an approximate \$2.5 million savings in the Pave Spectre program.)

(\*) Pave Pronto's priority slowed the Pave Spectre program. At first, ASD's Gunship Program Office hoped to build the two AC-130E prototypes at ASD but the consequent disruption of flight tests and personnel shortages ruled out the idea. The Air Staff therefore instructed WRAMA to take over the task with shop personnel who normally handled C-130 IRAN work. The differing structure and electrical systems of the C-130A and C-130E caused extra engineering effort to integrate gunship systems into the E model.<sup>171</sup> While work began as soon as authorized, Pave Pronto's overriding precedence delayed installation of some Pave Spectre subsystems by at least a month. One contract procured those subsystems identical in A and E models and some engineering effort for Pave Pronto applied to Pave Spectre. Nonetheless, the notable differences in other areas canceled out these advantages.<sup>172</sup> Even so, doing the work in house rather than by contractor trimmed C-130E modification costs \$2.5 million.<sup>173</sup>

(\*) The first C-130E (69-6567) arrived at WRAMA on 6 October 1970,<sup>174</sup> the second (69-6568) on 6 January 1971.<sup>175</sup> The modification entailed glove-close coordination and teamwork between ASD engineers and WRAMA personnel. The engineers sifted data from other advanced gunship projects to see what could be adapted to the C-130E airframe. Considerable new engineering effort sought to enhance the aircraft's survivability by relocating hydraulic tubing and reservoirs and by improving the emergency exit for crewmembers located near the right scanner's position.<sup>176</sup> Lt. Col. Bradford W. Parkinson led a group of Air Force Academy specialists who assisted in the major task of improving the fire-control system. The A-7D fighter's fire-control system was eventually selected. The entire project took on unusual significance for both WRAMA and ASD. It soon broadened to include six more AC-130E's and become one of the largest aircraft modification programs ever conducted in house by an AFLC complex.<sup>177</sup> Despite Pave Pronto's higher priority for equipment procurement and engineering imposed delays, the two prototypes nevertheless met their completion schedule of 15 June 1971 and 15 July 1971 respectively.<sup>178</sup>

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AC-130 Pave Pronto

Improvement of 20-mm and 40-mm ammunition moved in step with these AC-130 programs. In need of a better 20-mm round to compensate for higher operating altitudes, the Air Force on 20 October 1970 approved acquisition of improved high-density (depleted uranium) 20-mm rounds. In addition, improved 40-mm ammunition enlarged the incendiary pattern by fitting a standard round with Misch-metal\* liner. Airborne tests at Eglin on 27 October disclosed that near-misses by Misch-metal rounds set trucks on fire, those by regular 40-mm rounds did not.<sup>179</sup> In December 1970 the Air Force sent 1,000 of the improved rounds to Ubon for combat evaluation. Pending the results it ordered 400,000 40-mm rounds modified.<sup>180</sup> An 8th Tactical Fighter Wing combat test on 21 January 1971 revealed that Misch-metal rounds kindled four to five times more secondary fires and explosions than the standard 40-mm and also marked targets better. During the complete combat evaluation (21 Jan-10 Feb 1971), it took 16 Misch-metal rounds to destroy one truck compared to 51 regular 40-mm.<sup>+</sup> In

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\*Resembling cigarette flints, Misch-metal was highly pyrophoric (spark producing) on impact. The Naval Weapons Laboratory, Dahlgren, Va., developed Misch-metal.

<sup>+</sup>Some debate arose concerning the conditions of the test and whether it accurately compared the two rounds.

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April 1971, shell-extraction problems temporarily halted use of the improved round. Air Force Armament Laboratory tests completed in September found the standard 40-mm round better for inflicting fragment damage and leaks in POL cargo but the Misch-metal round most effective for touching off fires.<sup>181</sup>

### Back to Combat

During early fall 1970, AC-130A gunships were winding up their modification in the United States and going back to South-east Asia. Surprise Package flew its first combat sortie of the 1970-71 interdiction campaign on 25 October 1970, 16 days ahead of schedule.<sup>182</sup> The AC-130A Update aircraft began arriving at Ubon in October and got ready for combat.<sup>183</sup> The first Pave Pronto aircraft entered the war theater on 17 November, 45 days before the planned time.<sup>184</sup>

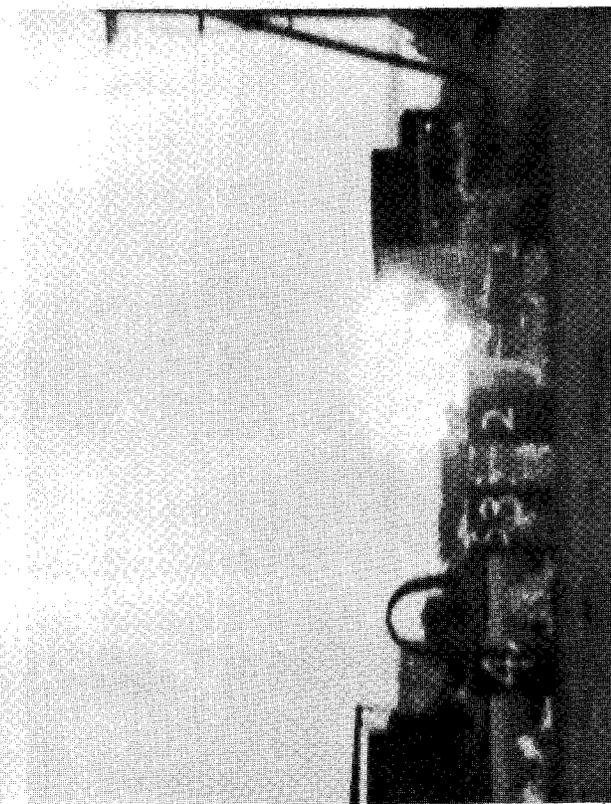
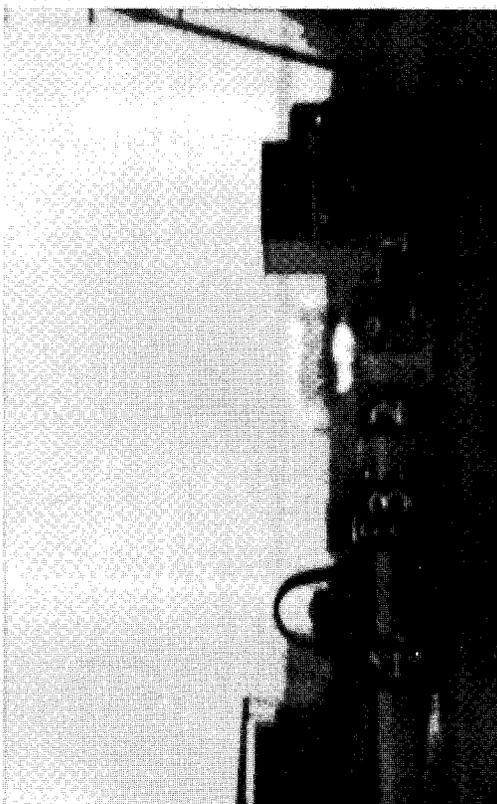
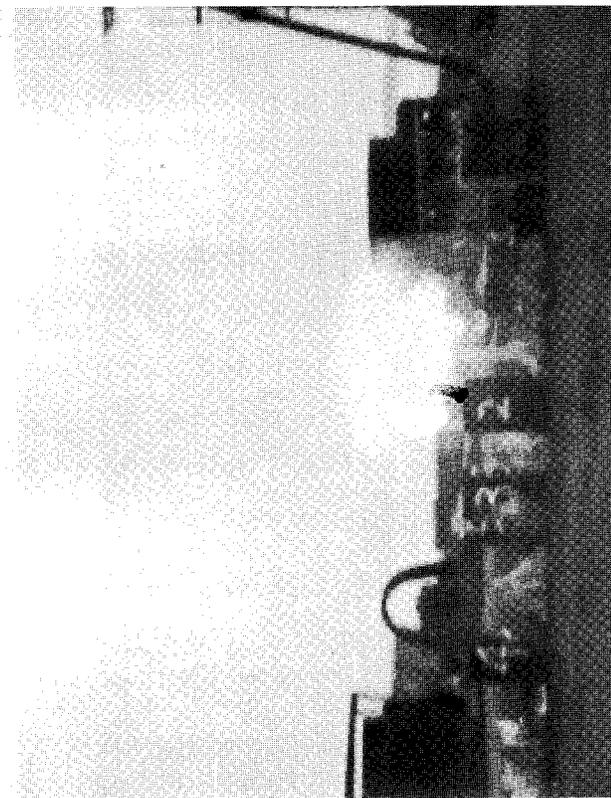
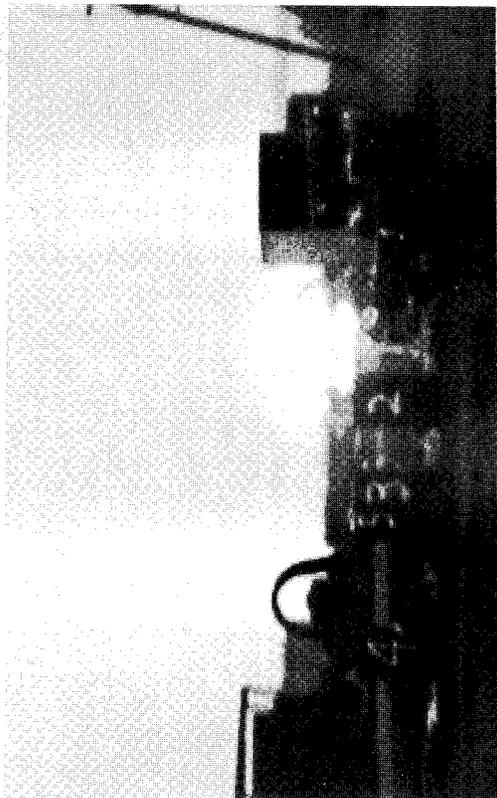
As this "new" gunship fleet conducted combat operations against the enemy's network of trails and roads, disappointment grew over the results. In November the gunships destroyed or damaged only 37 of the 202 trucks attacked--a poor 18-percent record. The Seventh Air Force commander was concerned over this less-than-expected effectiveness.<sup>185</sup> He and the PACAF Commander backed the 8th Tactical Fighter Wing's urgent request for an ASD assistance team to find out the reasons. Colonel Terry headed the team of seven other "gunship experts" that got to Ubon on 1 December 1970.<sup>186</sup> Colonel Terry undertook combat missions at once to discover the difficulty. Very quickly the team established that the deficiencies stemmed largely from technical procedures and a relatively low level of aircrew experience. The results changed dramatically between 1-22 December as Terry and his group showed how it should be done. Of 532 trucks attacked, 361 (68 percent) were destroyed or damaged.<sup>187</sup>

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\*Major Edward J. Bauman, one SEA observer, said Terry's leadership charisma was very significant. Like a "White Knight on a white horse," he swept aside complaints, focused on the equipment, and reestablished general confidence. Squadron personnel respected Terry as he seemingly could hit the target with the gunship at any angle and had great insight into the functioning of the various subsystems. Major Bauman also suggested that high winds during the start of the hunting season may have contributed to some of the disappointing gunship results. [Intvw (S), author with Maj Edward J. Bauman, Dept of Astronautics & Computer Sci, USAFA, 5 May 71.]

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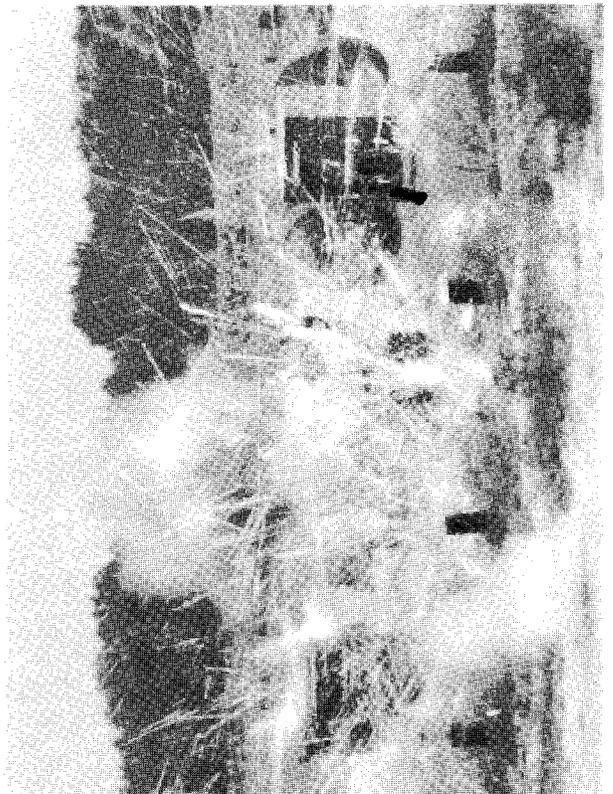
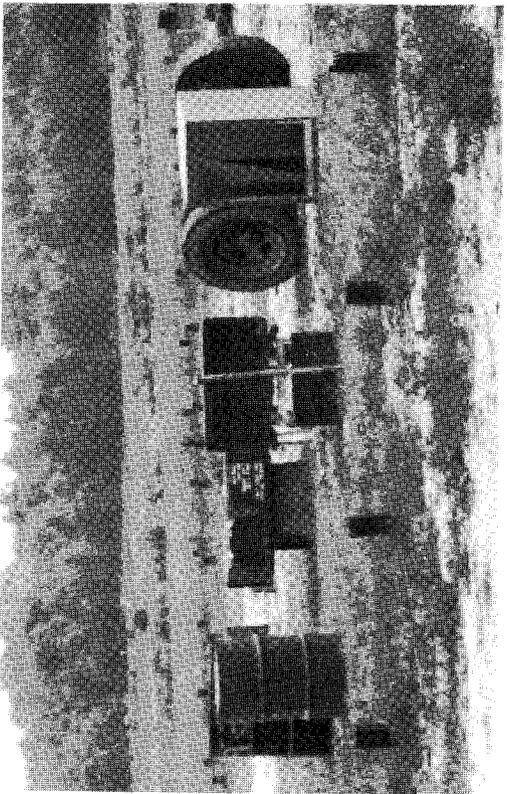
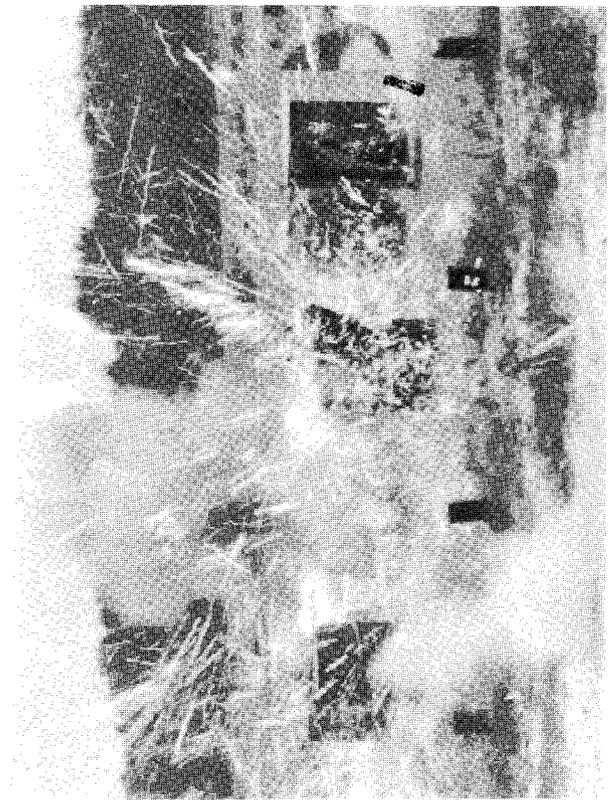
Standard 40-mm Round Effect



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Misch Metal 40-mm Round Effect



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The AC-130 gunship fleet's expansion and improvement increased pressure on the replacement crew training program. Already problems had arisen because of the all-out emphasis on operations. Every available gunship was committed during the dry hunting season with most gunship updating and refurbishing deferred to the wet off-season. The crew-manning curve reflected this pattern. The 1-year duty tour in SEA often brought an influx of green or inexperienced crews to Ubon just before the hunting season commenced and operational demands soared. These crews needed more checkout time in the aircraft to become familiar with the new and more sophisticated equipment frequently installed during the off-season. Moreover, to free AC-130's for combat, flight training sorties at Lockbourne AFB were conducted at times in the AC-119K. For approximately 18 months, AC-130A aircrews flew five orientation missions in an AC-119K before entering combat in the AC-130A. Surprise Package greatly widened the disparity between the AC-130 and AC-119K, seriously weakening the effectiveness of such training.<sup>188</sup> When the AC-130A Plain Janes returned to the United States for IRAN and modification, it stopped the training and upgrading of incoming crews (the "New Guys) at Ubon for about a month. The first two Plain Janes finishing IRAN and two instructor crews went to Lockbourne. They assisted the 415th CCT Squadron in training Pave Pronto crews and better preparing other replacements headed for SEA.<sup>189</sup> These training problems contributed to the decision to procure the three optional Pave Pronto aircraft which later joined the crew-training program at Lockbourne.<sup>190</sup>

As 1970 closed, General Ryan reported to Air Force Secretary Seamans: "All primary objectives of the PAVE PRONTO program have been exceeded or met and the critical phases of the Gunship Acquisition Program for this interdiction campaign have been completed."<sup>191</sup> Considering the complexity, speed, and size of the AC-130 expansion and improvement program, the Air Force had compiled a remarkable record. It had updated five basic AC-130A gunships with 40-mm guns, improved sensors, and a new computer. Back in time for the 1970-71 dry season, these gunships came close to Surprise Package as truck-killers. In October Surprise Package had been refurbished and redeployed for combat. The six Pave Pronto AC-130A's arrived in Thailand "significantly ahead of schedule" to fly combat sorties.<sup>192</sup>

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<u>Gunship</u>	<u>Scheduled SEA Arrival Date</u>	<u>Date Deployed</u>	<u>Actual SEA Arrival Date</u>	<u>Days Early</u>
1	1 Jan 71	10 Nov 70	17 Nov 70	45
2	1 Jan 71	18 Nov 70	1 Dec 70	31
3	1 Jan 71	24 Nov 70	1 Dec 70	31
4	1 Feb 71	12 Dec 70	21 Dec 70	42
5	1 Feb 71	20 Dec 70	4 Jan 71	28
6	1 Feb 71	31 Dec 70	16 Jan 71	16*

Three additional AC-130A's were being procured to shore up crew training. The AC-130A force available for the 1970-71 interdiction effort (Commando Hunt V) had not only been vastly improved but doubled in strength as well. Furthermore, Secretary Seamans told the Secretary of Defense: "it appears on initial review that the program will stay within, if not under, the budgeted amount."<sup>193</sup> Indeed--at a time headlined with serious cost overruns for many weapon-system developments--some eyebrows arched in disbelief as the Gunship II program office announced on 27 August 1970 the turnback of \$625,704 in surplus fiscal year 1969 funds.<sup>194</sup> On 21 January 1971 the gunship program director declared he was returning \$5 million of the funds (then totaling \$52 million) allocated by the Air Force for the Pave Pronto program.<sup>195</sup>

(●) Good reasons underlay this management feat. In the first place, there had been "excellent support by all Air Force agencies and contractors involved."<sup>196</sup> Much debate accompanied and affected the gunship program's course but once a decision was made, strong support followed. Central to this were the personal contacts nurtured at all command levels by the comparatively small gunship program staff at ASD. Lt. Col. Charles R. Gentzel and Lt. Col. Charles F. Spicka<sup>+</sup> were among the chief gunship advocates

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\*Delayed by bad weather at Adak Island in the Aleutians.

<sup>+</sup>Known as "Gunship Charlie" for his aggressive sponsorship of gunship development.

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at Headquarters USAF. They expedited and strengthened the program, speaking persuasively at times of important decisions. Key organizations--such as ASD's Deputy for Tactical Warfare, Deputy for Engineering, and AF Avionics Laboratory; Shed Light Office at Headquarters USAF; the Air Force Academy; and WRAMA--interacted smoothly and efficiently.<sup>197</sup> Especially important was the backing of high-ranking government officials from the White House down through the Defense Department.

(S) In spite of the keen top-level interest, ASD's Gunship Program Office had wide management latitude in the funds and systems area. The Gunship Program Director could use letter contracts\* and go to single-source contracts.<sup>+</sup> Even more important, a small, dedicated group of officers and civilians expertly managed the program. The group's character held the key to management success. Terry, Krause, Wolverton, Hubbard,<sup>‡</sup> and Pinkerton had shared the early development of the side-firing system and it gave them strong personal identification with its progress. Highly motivated and goal-conscious, they felt this was their weapon system and its ultimate fate hinged on their actions. An officer who had observed and worked with the group said this was "management by objective rather than by control."<sup>198</sup>

(S) By the same token, this balanced group of engineers, managers, and combat-capable\*\* men could develop, then try out their systems. Knowing firsthand what the systems could do in combat buoyed their confidence in the gunship. This in turn reinforced their courage to defend its role and sell its advantages. Furthermore, the team's broad spectrum of experience and continuity permitted it to quickly spot unreliable equipment, unrealistic support, and contractor overcharges. Its flexible pragmatic approach rested not on a dogmatic desire to prove the worth of theoretical views, but on a desire to see if a system worked

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\*A letter contract is a written preliminary instrument to get work under way immediately. It is later confirmed by a formal contract.

<sup>+</sup>A single-source contract is awarded to a single firm without competitive bidding or under circumstances that dictate the contract be given to a single firm.

<sup>‡</sup>Maj. Lawrence R. Hubbard, Deputy Program Director for Subsystems, managed crucial subsystem programs.

\*\*Terry, for instance, had flown 56 AC-47 and 140 AC-130 combat missions from February 1968 through January 1970.

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and discard it if it didn't. Always alert to improvising with equipment and systems at hand, the group could concentrate on high-payoff improvements. Terry's leadership and implicit trust in his subordinates accounted for part of this flexibility. In recognition of these qualities, the Gunship Program Office of ASD received the Air Force Organizational Excellence Award on 28 January 1972. At the Pentagon ceremony, Secretary Seamans cited the management team for outstanding initiative, leadership, and professional ability.<sup>199</sup>

(U) The makeup of the gunship management team and the constant prototyping and experimenting for gunship improvement dovetailed with Deputy Defense Secretary Packard's ideas on weapon-system management. "I told the Services to select people with the right background and education for management, give them appropriate training, give them recognition, and leave them on the job long enough to get something done," Mr. Packard told members of the Armed Forces Management Association on 20 August 1970.\* Certainly the gunship team came close to this prescribed model and produced timely results. Packard scored the drawnout development in the Air Force's "formal system" and noted that gunship management got more gunships in 6 months by working outside it.<sup>200</sup> Moreover, advanced gunship development typified Deputy Secretary Packard's so-called "fly before buy" concept.<sup>+</sup> The AC-130A prototype and then Surprise Package turned out to be test beds leading to future production models. Admittedly, the gunship program was characterized more by improvising on older known airframes than by developing an entirely new, sophisticated, and complex weapon system. Yet this improvisation helped point a course for research and development in other areas.

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\*Mr. Packard said in a May 1970 memorandum: "If our people are to develop the experience necessary for program management and are to utilize their experience, they must be assigned to a given program long enough to be effective." Also, DOD Directive 5000.1 (U), Acquisition of Major Defense Systems, declared: "The assignment and tenure of program managers shall be a matter of concern to DOD Component Heads and shall reflect career incentives designed to attract, retain, and reward competent personnel." [TIG Brief, 31 Dec 71, p 4.]

<sup>+</sup>The ongoing influence of this concept is treated in Aviation Week & Space Technology, 1 May 1972, p 13.

~~SECRET~~Commando Hunt V

(U) The payoff of the big AC-130 gunship development program in 1970 came during Commando Hunt V--the 1970-71 dry-season interdiction campaign. Doubling the AC-130A force and stepping up the commitment of AC-119K's reflected the determination of U.S. military planners to choke off as much enemy logistic effort as possible.\* Under the Nixon policy of Vietnamization and gradual U.S. withdrawal, air interdiction assumed a critical role. It had to prevent disruptive enemy offensive actions and to buy valuable time for the overall policy to succeed. Yet North Vietnamese determination to put supplies through the gauntlet had certainly not diminished. Backed by a steady and unrestricted flow of provisions and trucks from the Soviet Union and China, the Communists marshaled their resources and ingenuity for the annual logistic surge south. This time the battle promised to be more intense--and crucial--than ever before.

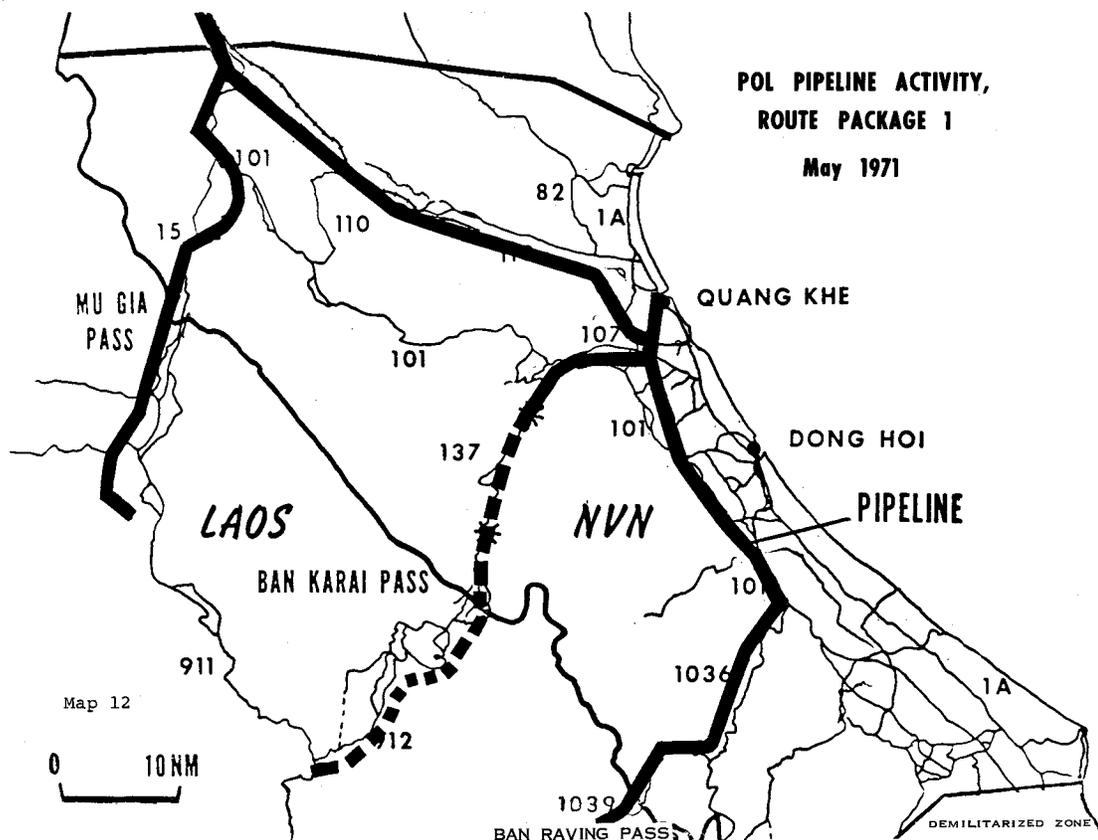
(U) Several new elements changed the 1970-71 interdiction picture. A leadership more hostile to the North Vietnamese Communists replaced the Cambodian Government of Prince Norodom Sihanouk in March 1970. This shut off the North Vietnamese's use of the port of Sihanoukville and the so-called Sihanouk Trail supply line from the port northeastward. Forced to expand their Ho Chi Minh Trail operation, the North Vietnamese supplemented it by floating barrels down streams and by pipelines. Enemy AA defenses also grew in strength and improved in quality. SAM emplacements gradually moved southward and westward, more seriously threatening air operations. In January 1971 the South Vietnamese Army launched a ground offensive (Lam Son 719) into the Laotian panhandle to cut the enemy's logistical umbilical cord. The operation was but briefly disruptive.

~~(S)~~ Commando Hunt V commenced on 10 October 1970. It consisted of variations on the basic pattern of other dry-season interdiction campaigns. The Air Force allocated intensive sorties against

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\*~~(S)~~ The force increased but the JCS imposed in August 1970 the first sortie ceiling on fixed-wing gunships--1,000 sorties per month. [Hist (TS), MACV, 1970, annex A, p TSS-24.]

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four "interdiction boxes" on the main routes and passes from North Vietnam into Laos. B-52 (Arc Light)\* and jet fighters strikes centered on the heavily defended interdiction boxes, seeking to set up chokepoints or to channel the traffic. Gunships, B-57G jet bombers, and other tactical aircraft attacked trucks slipping through to the south.<sup>201</sup> The Igloo White sensor system had been refined so now gunships and other aircraft could be assigned more efficiently against trucks moving along certain road sections. These many elements--combined with FAC's, control aircraft, tankers, photo-reconnaissance, and search and rescue aircraft--yielded a complex yet more flexible team effort. It was a major attempt at interdiction in depth against a logistic network increasingly redundant.

In the massive interdiction effort, the Russian-built ZIL 157 vehicle emerged as the chief gunship target. Dependable, with six-wheel drive, it could convey 5 tons at 40 mph over Laotian routes. The driver inflated or deflated the tires while in motion to suit the changing road surface. One estimate put the enemy truck

\*B-52 operations in SEA.

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## COMMAND AND CONTROL OF INTERDICTION TASK FORCE

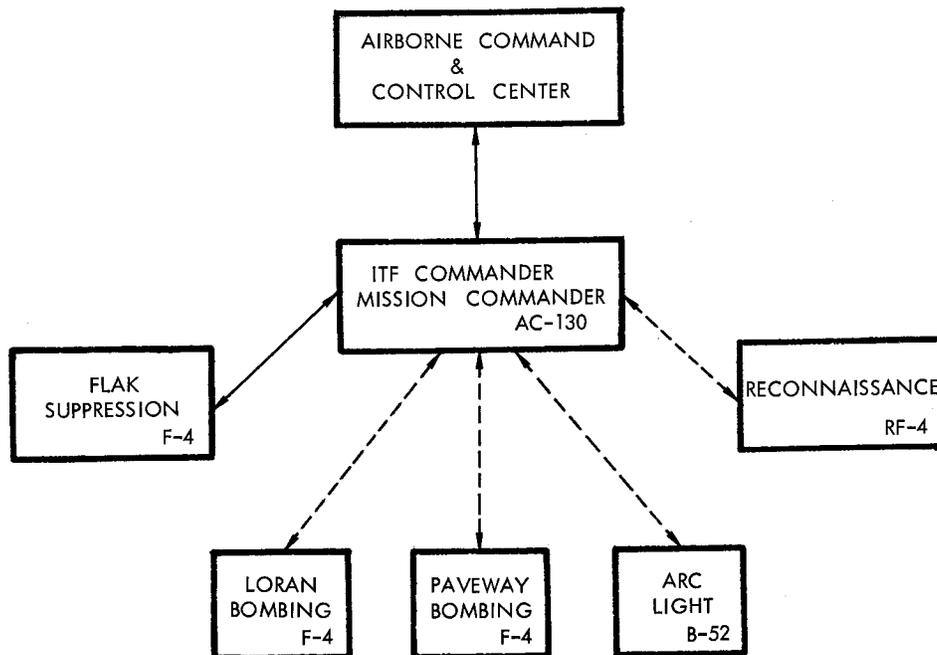


Fig. 24 (U)

inventory at 2,400,\* 72 percent of which were in-commission at all times in the Steel Tiger area. An average of 450 trucks operated nightly. A series of short hauls and many transfers marked most truck movements; each driver knew his assigned road segment thoroughly.<sup>202</sup> As truck traffic mounted, the North Vietnamese faced a serious shortage of fuel--hence their fresh stress on floating barrels down streams and extending pipelines.

The dry-season interdiction campaign got off to a slow start. Air Force Secretary Seamans reported to Defense Secretary Laird on 19 November 1970: "The combination of bad weather and the current strategy seemed to have produced four straight weeks in which no trucks were counted as having transited key interdiction points."<sup>203</sup> As the weeks passed, however, the enemy truck traffic picked up dramatically and AC-130's compiled new records in truck-kills. On 14 January 1971 an AC-130 crew set a new squadron mark--58 trucks destroyed and 7 damaged on a

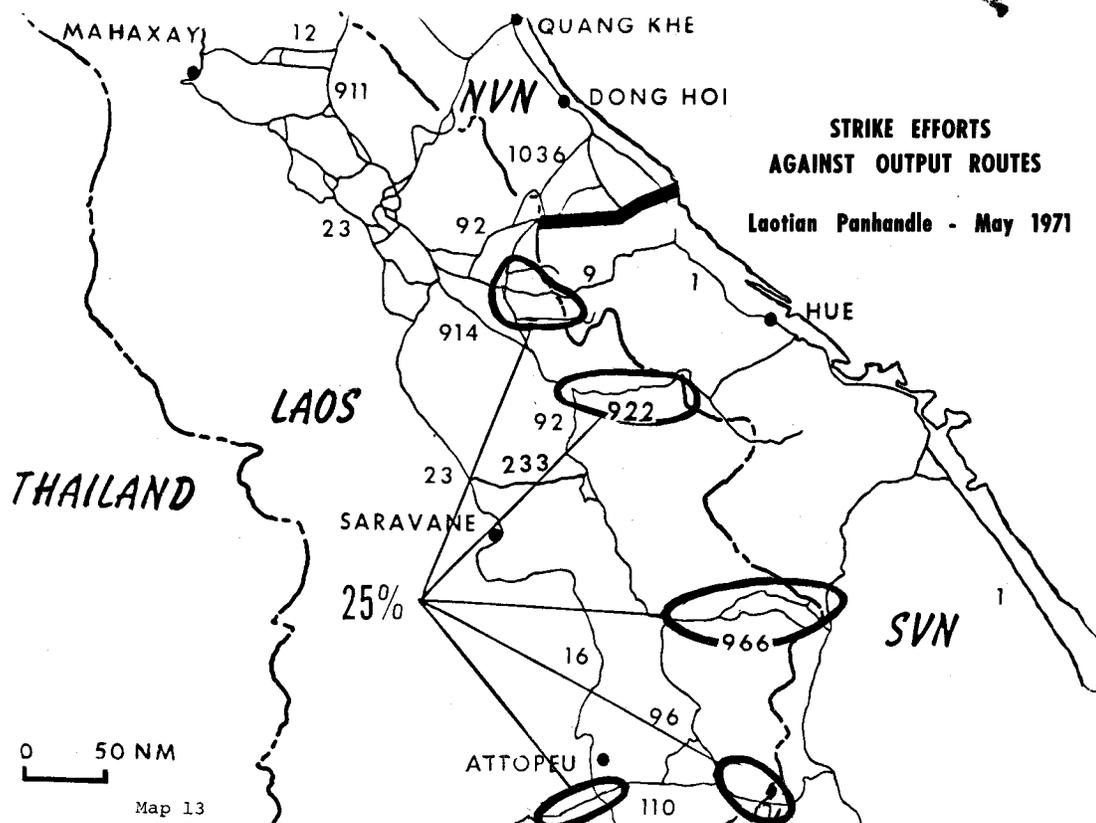
\*A figure later to prove ridiculously conservative.

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single mission.<sup>204</sup> By March the Spectres were averaging 13 trucks destroyed per sortie. Results for the first quarter of 1971 were:<sup>205</sup>

	<u>Trucks</u> <u>Attacked</u>	<u>Trucks</u> <u>Destroyed</u>	<u>Trucks</u> <u>Damaged</u>	<u>Percent Trucks</u> <u>Destroyed/Damaged</u>
January	1,998	1,253	343	80
February	3,088	2,083	529	85
March	4,515	3,240	787	89

Despite an upturn in sorties, total trucks destroyed/damaged in April dipped to 3,687 and to 1,063 in May. With onset of the wet season in June, sorties plunged to 57, trucks destroyed/damaged to 118.<sup>206</sup> Nevertheless during Commando Hunt V (1 November 1970-30 June 1971) the AC-130's amassed a total 13,809 trucks destroyed/damaged--a three-fold rise over a like 1969-1970 period.<sup>207</sup> In the peak month of March, Spectres scored 70 percent of all truck-kills in the Steel Tiger area.<sup>208</sup>



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The truck-killing record of escort fighter aircraft rose as well, due largely to new laser-guided bomb development. The first successful team test of Pave Sword in actual combat took place on 3 February 1971. F-4's escorting Spectre 12 destroyed a 37-mm gun with a laser-guided bomb, using the laser beam from the gunship's LTD. Sixteen days later the F-4's destroyed two trucks with laser-guided bombs.\*209

Other interdiction indicators matched the impressive gunship/fighter-escort results and statistics. The percentage of trucks destroyed/damaged of those attacked soared from 44.2 percent in 1970 to 72.4 percent in 1971<sup>210</sup>--strongly indicating greater effectiveness. The key, however, was the amount of supplies (the "throughput") getting through to South Vietnam. The Air Force estimated that in March 1971--the peak month of enemy effort--14,560 short tons of supplies entered the Laotian panhandle and 2,088 reached South Vietnam.<sup>211</sup> The Air Force Secretary presented charts to a press conference on 6 December 1971 that favorably compared results of the last three interdiction campaigns.<sup>212</sup>

Disturbing elements dampened this positive 1970-71 assessment. The number of trucks had grown, 8,000 being seen from the air in each of the first 4 months of 1971.<sup>213</sup> An estimated 400 new trucks a month arrived from Russia and other Communist countries. More and more trucks were destroyed or damaged. Still they kept coming. One pilot observed: "North Vietnam must be one huge truck park."<sup>214</sup> In addition, the enemy's ability to repair and enlarge his road network had not diminished. Interdiction of the North Vietnamese pipeline and of expanding waterway shipments had not been adequately done. Some supplies slipped

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\*The June 1970 Surprise Package combat evaluation report had recommended the operational capabilities of the specialized F-4D squadrons be exploited: 433d TFSq (Pave Way I laser-guided bomb), 435th TFSq (Pave Way II electro-optical guided bomb), and the 25th TFSq (loran Pathfinder operations using a lead aircraft's loran for navigation.) These squadrons escorted AC-130's on combat missions.

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through to South Vietnam, others were stockpiled along the way.\*  
These facts undercut any feelings of complete success.

### ESTIMATED SUPPLY "INPUT" VS. "OUTPUT" LAOS PANHANDLE NOVEMBER-JUNE

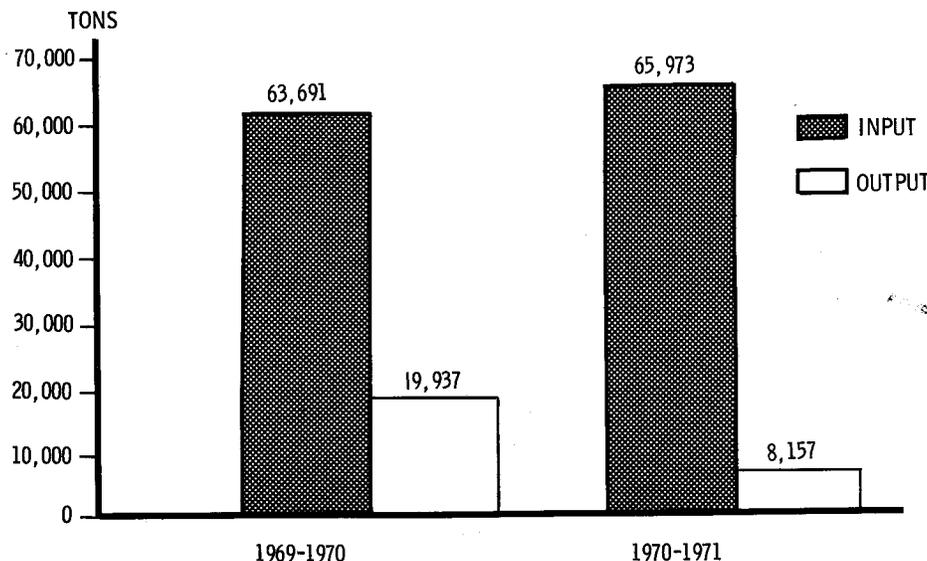


Fig. 25 (U)

#### Renewed Questioning of Truck-Kills

The truck-kill count by AC-130 and AC-119K crews was so high that its accuracy was once again thrown into question. During a 7 April 1971 briefing of Lt. Gen. Donald V. Bennett, Director of the Defense Intelligence Agency (DIA), concern arose over possible false impressions gained from gunship BDA films. Precisely, recorded crew comments that a truck had been

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\*Most Air Force leaders realized the flow of supplies couldn't be completely cut off. General Curtis E. LeMay, for example, said all supplies had not been intercepted in the Korean War or in the World War II interdiction campaign in Italy. He fingered the added difficulty in the Southeast Asia war: "You can't stop a trickle of supplies that somebody can throw on their back or a bicycle and wiggle through a jungle." [Intvw (S), Dr. Thomas G. Belden, Chief Historian, USAF, with Gen Curtis E. LeMay, retired, 29 Mar 72.]

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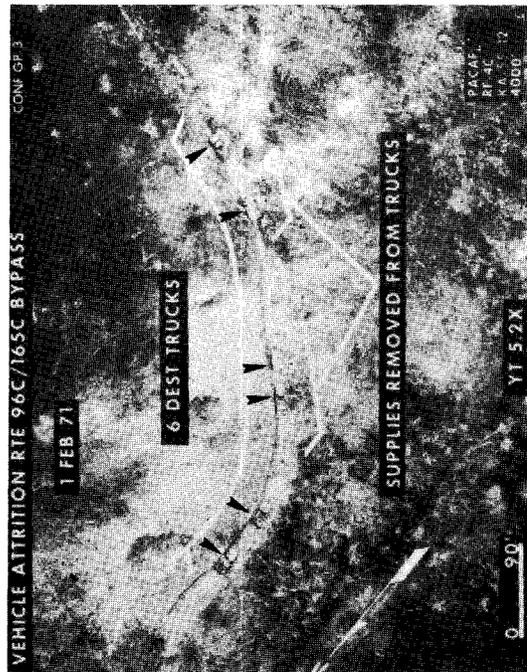
destroyed could not be positively verified by viewing the film. The DIA Director said he did not doubt the gunship figures but some top-level officials in Washington did in light of their estimates of enemy truck totals. The Air Staff relayed the doubts about the credibility of truck-kills to USAF commanders in SVA with a result reflected in this comment: 215

AC-130 BDA is the hottest thing in the theater at this moment. Seventh Air Force is really concerned about the validity of the BDA reported by the AC-130 gunships in their truck killing operation. They stated all aircraft BDA for this hunting season indicates over 20,000 trucks destroyed or damaged to date, and if intelligence figures are correct, North Vietnam should be out of rolling stock. The trucks continue to roll however.

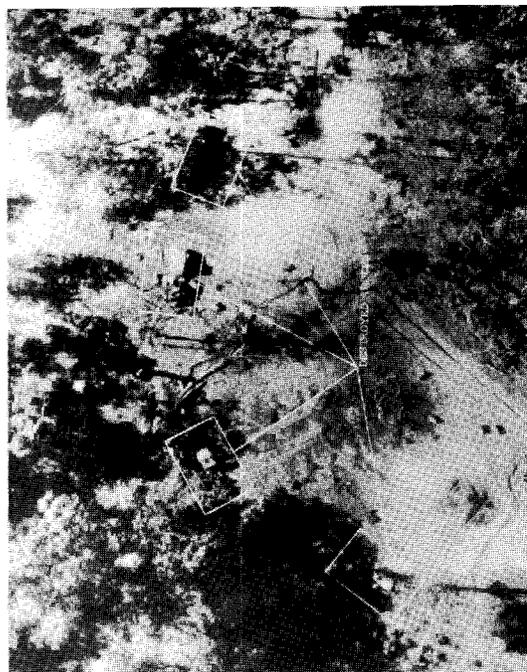
(S) The Seventh Air Force Commander convened a conference on 28 April 1971 to examine gunship truck claims. The conferees concluded that gunship crews were making honest, accurate reports. Seventh Air Force nonetheless adjusted the criteria on 1 May 1971. It now required a secondary explosion or a sustained fire for a truck to be listed as destroyed. Direct hits counted as damaged only. The 40-mm near-miss, previously accepted for a damaged-truck listing, was dropped. The tightened BDA criteria rested in part on the realization that bags of rice on a ZIL 157 truck might absorb most of a 40-mm blast. A special test of Spectre gunship munitions took place on 12 May 1971 at Bien Hoa AB as part of a continuing study of truck-kill assessment. Test results supported the revised BDA criteria. The BDA revision reduced the proportion of trucks claimed as destroyed but changed overall statistical effectiveness very little. 216

(S) Questioning of gunship claims was joined by criticism of the emphasis on truck-kill statistics. Several intelligence analysts argued for more attention to through-put of supplies rather than the number of trucks destroyed or damaged. 217 It proved far harder, however, to assess through-put than results of the attacks. The challenging of the statistics nevertheless revealed one thing: Regardless of more sophisticated gunship BDA and some

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Truck Kills

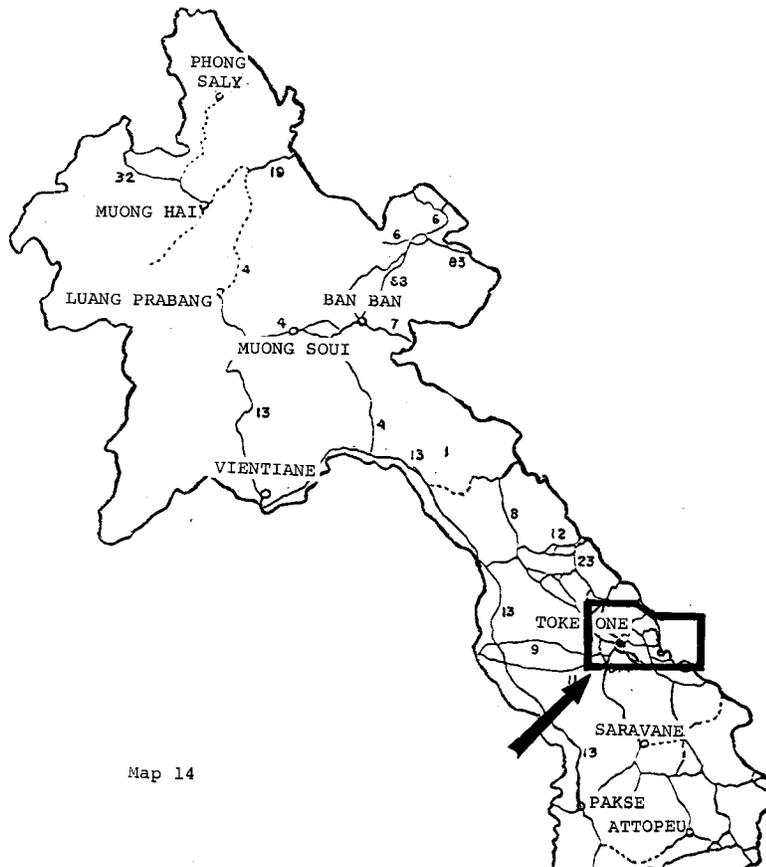


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outstanding film records, there were those who discounted the claims and the overall interdiction effectiveness as well.\*

**LAM SON 719 SUPPORT**  
30 January - 31 March 1971



Map 14

\*Interest in gunships and their effectiveness remained high. On 5 March 1971, briefings (including BDA films) were presented at the State Department to Secretary of State William P. Rogers and his Deputy Assistant Secretary for Far Eastern and Pacific Affairs William H. Sullivan. Three days later, briefings were given to: Dr. Robert L. Johnson, Assistant Secretary of the Army (R&D), and others, with emphasis on close air support; members of the National Security Council and those of Dr. Kissinger's personal staff, at the White House. The next day, Brig. Gen. Alexander M. Haig, Deputy to Dr. Kissinger, was briefed. Presentations had also been given to: Admiral Elmo R. Zumwalt, Jr., Chief of Naval Operations (1 February) and General William C. Westmoreland, Army Chief of Staff (9 February).

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Strikes in Northern Laos, in Cambodia, and in Support of Troops

The interdiction effort in the Laotian panhandle held the spotlight but Seventh Air Force also sent AC-130's and AC-119K's to strike targets in northern Laos (Barrel Roll) and in Cambodia. Gunship attacks on supply lines leading to both these fronts resembled those in the Steel Tiger area. The gunships destroyed 800 trucks in Barrel Roll during the first 6 months of 1971.<sup>218</sup> Additional sorties supported hard-pressed Laotian and Cambodian ground forces in both countries. Over 1,100 gunship sorties were flown in Cambodia during the first half of 1971.<sup>219</sup>

A major ground-support effort developed when the South Vietnamese Army launched its offensive against the Ho Chi Minh Trail in the area between Khe Sanh and Tchepone. Operation Lam Son 719 continued from 30 January to 24 March 1971. The AC-130's and AC-119K's flew 239 sorties\* in support of the operation, one-fourth of them in the critical last 5 days when the South Vietnamese were withdrawn.<sup>220</sup> In 39 attacks the gunships destroyed 24 enemy tanks,<sup>221</sup> the AC-130 share of the total being 14 PT-76 light tanks in 28 attacks.<sup>222</sup>

Like the Spookies in South Vietnam, the Spectres hovered constantly over threatened posts in the Lam Son 719 operation. One AC-130, for example, remained over an ARVN position at Objective 31 for 3 nights straight.<sup>223</sup> Its intensive fire inflicted heavy losses on the enemy. Several times the North Vietnamese troops tried to get in close to the ARVN perimeter to counteract the gunship attacks, requiring calls in some cases for Spectre fire on the post's trenches.<sup>224</sup> An American observer described how this gunship night support at Objective 31 prevented serious friendly losses:<sup>225</sup>

In between gunships, three to four minutes, the enemy would be up and into the wire. The gunship would then shoot them back from the wire and do this until the next gunship came up. It continued all night. There is no doubt in my mind that Hill 31 would have been overrun that first day or at least that first night, if it had not been for tac air and gunships.

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\*Ninety of the sorties supported troops-in-contact.

~~SECRET~~Pave Mace

With Project Pave Mace the Air Force tried to sharpen gunship support of ground troops when cloud cover hid the battlefield and no communication existed between gunship and friendly forces below. Pave Mace used Black Crow and a beacon-tracking system to get target bearings from a ground TEMIG/Coded Beacon a soldier could hold in his hand. An AC-130 equipped with Pave Mace would approach the general target area, acquire the beacon, generate the proper offset data, and fire on the enemy. In a 2 June 1971 combat test, an AC-130 worked with a forward air guide (FAG) at Lima Site 32 in the Barrel Roll area. About 400-1,000 meters from the friendly position, the gunship fired through a cloud deck. The FAG confirmed the successful results of the firing passes. Though not trouble free, Pave Mace equipment shored up AC-130 ground-support capability. 226

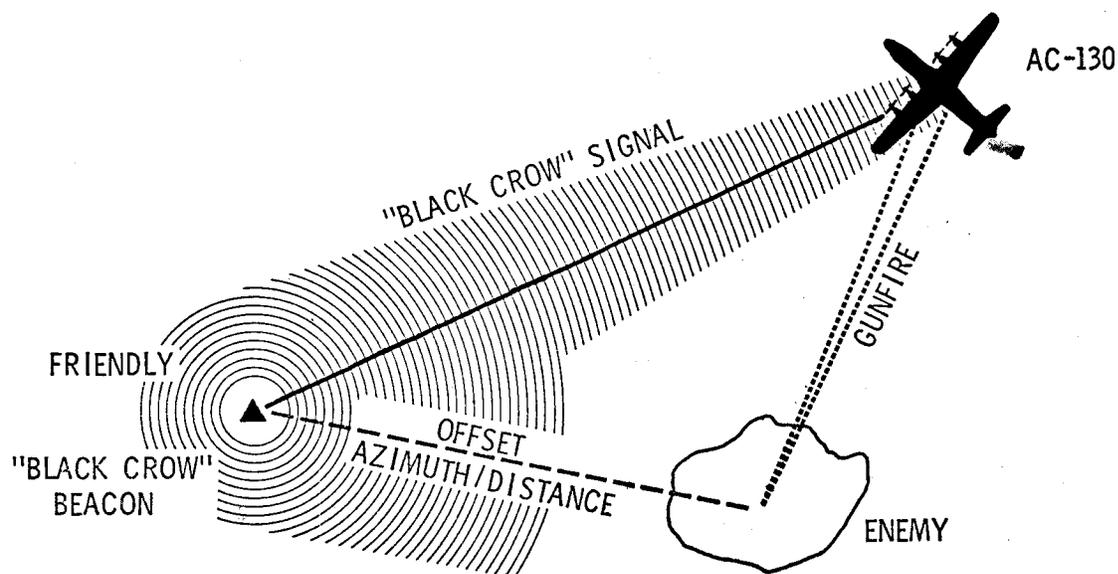
**PAVE MACE OFFSET FIRING**

Fig. 26 (S)

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Extensive attack operations without loss was one gratifying result of the AC-130 role in Commando Hunt V and throughout Southeast Asia. On 22 April 1970 the enemy had downed a second AC-130A over the Trail.\* Despite growth of enemy defenses and a rise in sorties, however, no more gunships were lost in the 1970-71 campaign. The Commando Hunt V evaluation reported: "The AC-130 and AC-119 gunships experienced the largest number of AAA reactions per sortie flown, although a small fraction of these sorties were hit and no aircraft were lost."<sup>227</sup> This singular record for the "vulnerable gunships" stemmed largely from AA suppression by fighter escorts, higher operating altitudes, careful tactics, and aircraft armor.

The Commando Hunt V no-loss record did not lessen concern for AC-130 gunship survivability. Concern in fact soared when the enemy suddenly fired two SAM's at Spectres in March 1971 and two more in April.<sup>+</sup> Seventh Air Force rushed through a combat required operational capability (CROC) for equipping all AC-130's with ECM against SAM's. PACAF validated the CROC and tagged it priority one.<sup>228</sup>

#### Development Decisions

Meantime, the Air Force reached other AC-130 gunship development decisions. During the quarterly gunship review for the Air Force Secretary on 20 January 1971, General Meyer, Air Force Vice Chief of Staff, said a decision was needed soon on additional AC-130E's.<sup>229</sup> A minute examination of the AC-130E program followed. On 19 February the Air Staff asked AFSC and AFLC for data on the possible addition of an AC-130E squadron of 12\* aircraft. Of special concern were the cost and the scheduling of such an expansion and the impact at ASD and WRAMA on existing programs. An ASD-WRAMA coordinated program was presented on 21 February.<sup>230</sup>

Five days later the Air Staff recommended: (1) 6 instead of 12 AC-130E's be acquired for the 1971-72 interdiction campaign, and (2) the 5 Plain Jane AC-130A's be sent back to the United States

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\*One crewmember was recovered but 10 were listed as missing in action.

<sup>+</sup>Figures vary on the exact number of "confirmed" SAM firings.

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during the summer interdiction lull for a full Pave Pronto modification. The second part of this proposal was motivated by a desire to standardize the AC-130A configuration and thereby ease logistic and maintenance problems. General Ryan and Secretary Seamans approved the entire recommendation and set up the following program and deadlines:<sup>231</sup>

1. Eleven Pave Pronto AC-130A's in SEA by 1 October 1971 (including the 5 Plain Janes to undergo Pave Pronto modification).
2. Surprise Package IRAN and refurbishment (including standardized Pave Pronto configuration) and return to SEA by 1 October 1971.
3. Six AC-130E Spectres in SEA by 1 January 1972.
4. Two AC-130E prototypes to remain in the United States for crew training.
5. Procurement of 12 sets of gunship subsystems (looking to eventual modification of a total of 12 AC-130E's).

This decision went to the field on 23 March 1971.<sup>232</sup> Cost of the modification program was set at \$56.2 million (\$33.9 million for modifying inservice aircraft, \$14.9 million for spare equipment, \$7.4 million for spare equipment support and for operation and maintenance labor). This required a reprogramming approval by Congress.<sup>233</sup>

A budget squeeze to accommodate cost overruns in other areas dictated the decision to add 6 AC-130E's rather than a squadron of 12. Air Force planning still retained the goal of a 12-aircraft squadron, however. This showed clearly in the procurement of 12 subsystems and the request to earmark 12 C-130E's for future modification.<sup>234</sup> These were further important steps in shaping the overall advanced gunship force in the post-SEA period-- a squadron of 12 AC-130E's and one of 12 standardized AC-130A's. Two AC-130E's and three AC-130A's for combat training would support this force. The training gunships would soon have a new home at Hurlburt Field, Fla., after the 415th Special Operations Training Squadron moved out of Lockbourne AFB, Ohio, in July 1971.<sup>\*235</sup>

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\*The 415th continued training during the transition from Lockbourne AFB to Hurlburt Field. The squadron's student classes graduated on time despite the move.

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Secretary of Defense Laird reported to President Nixon on 10 March 1971 that "immediate action to purchase an additional six AC-130 fixed-wing gunships" was under way, to comply with the Chief Executive's desire for greater gunship capability in Southeast Asia. At the same time, 27 more Cobra helicopter gunships were being sent to South Vietnam. Laird stressed that he was impressed with the gunship's truck-killing effectiveness. Nevertheless, he believed it important to "maintain a balanced posture for our assets in Southeast Asia." The environment ranged from permissive to extremely hostile and high-performance aircraft were needed to fly gunship escort in case of the latter.<sup>236</sup> Even with the increase in gunships, Mr. Laird said there were still those who doubted if it was big enough.

The Chief of Staff's decision to return the five updated Plain Jane AC-130A's for Pave Pronto configuration ran counter to PACAF's and Seventh Air Force's desire. They wanted to keep the maximum number of AC-130 gunships in SEA until the wet season. To have all AC-130A's back in SEA by fall, however, two had to be sent to the United States in May and one in June. On 3 March Seventh Air Force asked that the three training AC-130A's be sent to SEA as replacements<sup>237</sup> but General Ryan agreed to deploy only two.<sup>238</sup> The return of the five Plain Janes then began and modification work made headway during the summer at LTVE.

The summer of 1971 was one more round in the continual struggle to keep AC-130 gunships one step ahead of enemy defenses. The six Pave Spectre aircraft being modified would have a digital fire-control computer that would continuously solve the fire-control problem permitting faster target acquisition. Relocating and re-routing the hydraulic system and adding armorplate (under the floor and 5-feet-up the left side of the cargo compartment) promised better survivability. The AC-130E's higher gross-weight limit permitted greater fuel capacity, longer operating time, and a bigger ammunition load. Also on 20 August 1971, the Air Force selected ALQ-87 ECM pods for the AC-130E's to strengthen protection against SAM's.<sup>\*239</sup> In addition, it let a modification contract for

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\*On 11 August the Air Force approved installation of three ALQ-87 pods on each wing of the AC-130A's.

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for 1,000 Mk-24 flare canisters loaded with chaff to counter the anticipated SAM threat.\*240

The ceaseless concern with gunship survivability and potency turned ASD attention to the U.S. Army's 105-mm howitzer as a possible AC-130 weapon. On an aircraft this gun's 5.6 pounds of high-explosive (compared with the 40-mm gun's 0.6 pounds) could multiply the chances of target destruction. The gun's shell would leave a valuable ground-mark for fighter escorts and its longer range would enable the gunship to fly higher.<sup>241</sup> The Air Force Academy team's careful stress analysis on Surprise Package indicated the larger gun could be used safely.<sup>242</sup> Next came quietly conducted ground and airborne feasibility tests during August-September 1971. Briefed on test results, the Chief of Staff gave the go-ahead on 18 November to ongoing development leading to combat evaluation.<sup>243</sup> The project was named Pave Aegis.<sup>+</sup> An ASD conference in early December prepared the development program. Plans prescribed installation of the 105-mm cannon in place of the aft 40-mm gun and the APQ-150 beacon-tracking radar. AC-130E armament would then consist of: one 40-mm gun, two 20-mm, and the 105-mm. ASD expected no trouble nor need for special modification in integrating the heavy gun with the fire-control computer and other gunship subsystems.<sup>244</sup>

(U) The Pave Aegis program and preparations for the 1971-72 interdiction campaign (Commando Hunt VII) seemed to encapsulate the advanced AC-130 gunship's history. In the first place, it typified the ongoing evolving weapon-system development that had now stretched over 5 years. It also reflected the innovative and imaginative minds of the gunship-development team. They were

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\*Gunship tactics against SAM's evolved. The Black Crow operator, IO, and the scanner would try to detect a SAM launch. If detected, the IO would observe the missile until impact was imminent then call for the pilot to dive. This maneuver had the drawback of increasing the AA threat. [Cole, Fixed Wing Gunships in SEA, p 45.]

<sup>+</sup>The Greek word Aegis commonly meant protection, sponsorship, or support. In Greek mythology it was the shield or breastplate of Zeus and later of Athena.

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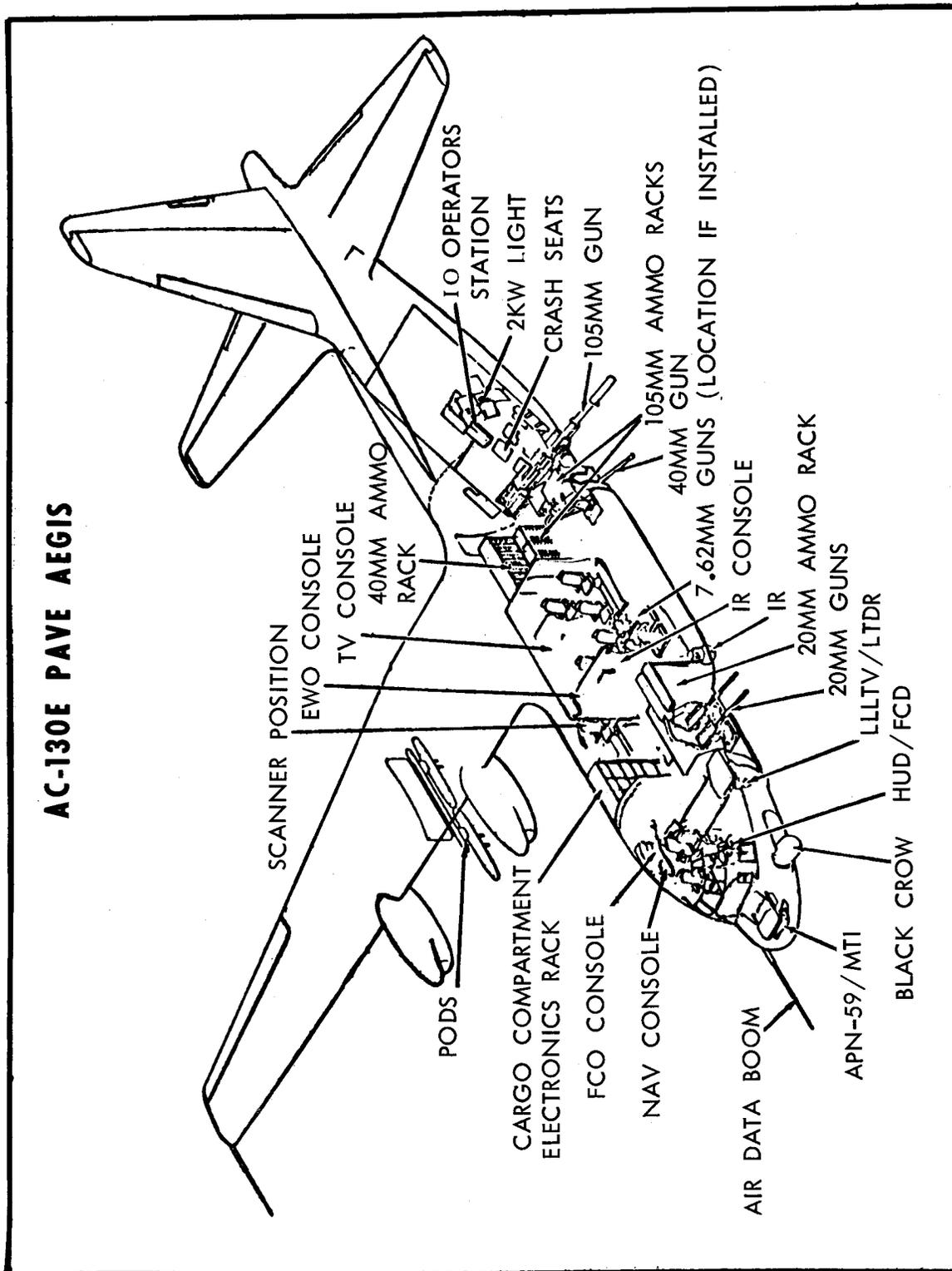


Fig. 27 (U)

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ever alert for new ways to bolster the gunship's effectiveness and enhance its chances for survival. There was a concerted effort to keep ahead of the enemy's defenses and not always respond after the fact.

(U) Second, the 1971 summer gunship-improvement and -expansion program attested to unfailing confidence in the gunship's worth. The Air Force leadership and others knew all enemy supplies could not be interdicted. The AC-130 gunships nevertheless stood out as the most economical and most productive weapon system for destroying enemy vehicular traffic. Task force operations clustering around the AC-130 spotlighted the gunship's limitations but at the same time its importance. The extra force of six AC-130E's was one more attempt to capitalize on the weapon system's proven capabilities.

(U) Third, the Air Force gunships progressed in a cyclic pattern of summer refurbishment/development after winter combat. Confidence in the management team's ability to finish the required modification in a few months paralleled the trust placed in gunship operations. Thus the actions involving AC-130 gunships in 1971 exemplified a larger train of events packed with more meaning than was certainly apparent at the time.

(U) By 1971 the AC-130 gunship had grown into a weapon system far removed from the 1967 prototype. As noted, this change contained some unique aspects of management, research and development, and combat operations. After much controversy, success in these areas had been crowned with plans to retain a small gunship force within the Air Force's post-Southeast Asian war structure. While this did not convert all skeptics of the gunship's vulnerability, it did carve a more substantial niche for the gunship as one of the Air Force's valued combat aircraft.

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V. GUNSHIP III (AC-119G/K)

The Program Begins

(U) A visitor to one of the offices associated with AC-119 gunship operations might find conspicuously posted a small business card:

When Uninvited Guests Drop In Call for "The Shadow."

We provide: Lighting for all occasions  
Beaucoup 7.62  
Mortar Suppression

We defend: Special Forces Camps  
Air Bases  
Outposts  
Troops in Contact

Who knows what evil lurks below the jungle canopy?  
The Shadow knows!\*

This card summarizes in brief the operations of the AC-119G Shadow after its deployment to the Southeast Asian war in late 1968. Add "Beaucoup 20-mm," "Interdiction Services," and change the name to "Stinger," then one can also fairly state the activity of the AC-119K (Stinger). These two models of the old C-119 Flying Boxcar transport were the chief replacements for the AC-47's and the most numerous of USAF gunships. They represented "Gunship III" in chronology and a distinct chapter of the total gunship story.

(S) In 1967 the search for a follow-on aircraft to the AC-47 Spooky had narrowed down to the C-119 and C-130. The Air Force deemed these high-wing aircraft best suited as gunships. Commanders in the Pacific favored the advantages of the larger four-engine C-130. Nonetheless, urgent SEA gunship requirements, the definite need of C-130's for airlift, and the availability of C-119G

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\*The card's tone is a takeoff on the once-famous radio serial mystery, "The Shadow."

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airframes--these tilted the scale to the C-119.\* The Air Staff wanted the jet-assisted C-119K but in June 1967 Air Force Secretary Brown chose the AC-119G (with a later option on the AC-119K) as the AC-47's immediate successor. His decision sparked considerable controversy (chapter III) but the program of converting C-119G's into gunships began in earnest.

Soon after Secretary Brown's decision, Headquarters USAF instructed AFLC to submit a cost and feasibility study on the modification of 34 and 46 C-119G's. The requirements action directive also called for similar data on conversion of C-119K's.<sup>+1</sup> The Air Staff planned to deploy 12 AC-119G's to Southeast Asia in or shortly after October 1967.<sup>2</sup> So on 20 July, Dr. Brown asked Secretary of Defense Robert S. McNamara to allow transfer of 46 Air Force Reserve C-119G's to the active force.<sup>3</sup> Mr. McNamara tentatively agreed on 10 August but requested more facts for a detailed review.<sup>4</sup>

Though approved in June 1967, the AC-119 gunship program progressed at a snail's pace. Modification scheduling slipped due to a major funding problem, Mr. McNamara's hesitant approval to release C-119 airframes, and changes in plans for equipment.<sup>5</sup> All hope for an early AC-119 deployment rapidly vanished. While needed decisions were pending, however, action got under way on an AC-119G prototype. On 20 October 1967 Air Force Headquarters issued modification program directive 1851 (FS 2150/C-119G) directing installation

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\*Fairchild-Hiller Corporation said it had made unsolicited proposals to the Air Force for use of its aircraft (the C-119). How significant these were in the decision is uncertain. [WRAMA Historical Study 18 (S), AC-119K Gunship Program, 1967-1970 (Project Combat Hornet), (WRAMA, Mar 1971), pp 2, 28.

<sup>+</sup>Items specified for the AC-119G included: standard SEA communications equipment; four GAU-2B/A (7.62-mm) guns; 50,000 rounds of ammunition for day operations (35,000 rounds and 60 flares for night); inert fuel tanks; gunsight; jettisonable flare launcher and 60 flares; and ceramic armor protection for 6-8 crewmembers and critical components. Conversion of the C-119K would add these items: an improved fire-control system, four 20-mm guns, 1,500 rounds of 20-mm ammunition (35,000 rounds of 7.62-mm and 60 flares), night observation device, infrared capability, doppler radar, and an illumination system.

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Further review of the AC-119 program took place toward the close of 1967. By dint of favorable SEA reports on the AC-130 prototype, the Air Force Secretary decided on a mixed AC-130/AC-119 force. The Air Staff follow-up study on this proposal, required by Dr. Brown and submitted on 26 January 1968, recommended 32 AC-119's for SEA, backed up by extra training/attrition aircraft. In the mixed gunship force concept the AC-119 "would specialize in in-country day/night tasks associated with hamlet defense, fire support for ground forces, close air support, and convoy escort."<sup>8</sup> The projected 32 AC-119's would be organized into two squadrons of the 14th Air Commando Wing and operated from six bases suitably spaced throughout the length of South Vietnam. The AC-119's could take up continuous orbit stations during the hours of darkness at about a 100-NM radius from such bases as Nha Trang, Da Nang, Phu Cat, Pleiku, Phan Rang, Bien Hoa, and Binh Thuy. Seventh Air Force would exercise command support and operational control. The AC-119's would of course assume the AC-47's role in South Vietnam as the Spookies shifted more and more to base defense missions.

The Air Staff study also addressed the AC-119 configuration and costs. It highlighted the problems in holding down aircraft gross weight to insure a 200 foot-per-minute, single-engine rate of climb under SEA hot-day conditions.\* The desired configuration clearly implied that the AC-119K would excel the G model, what with its jet pods, 25 percent more loading capacity, and significantly greater single-engine performance. The study said the deployment<sup>†</sup> schedule would be about the same whether the G or K model was selected--gun procurement possibly being critical. The K model would afford the best configuration, the G model would cut costs.<sup>9</sup>

	<u>AC-119G</u>	<u>AC-119K</u>
	(millions of \$)	(millions of \$)
1 prototype aircraft	.5	2.0
Unit cost (production aircraft)	.3	1.3
51 aircraft	16.2	68.7
Spares and support <sup>†</sup>	1.8	16.6
Total program cost	18.8	88.6

\*Hot-day conditions were 100° Fahrenheit, 80 percent dewpoint, and 400-foot-pressure altitude--the worst SEA climate conditions in which the aircraft could safely conduct operations.

<sup>†</sup>Includes equipment and technical data for the AC-119G equipment and engines for the AC-119K.

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If the Air Staff entertained hopes of persuading Secretary of the Air Force Brown to turn to the AC-119K, they succeeded only in part. The Secretary reviewed the mixed gunship force data then let the Chief of Staff know on 2 February 1968 he was approving one squadron (16 aircraft) of AC-119G's and one squadron (16 aircraft) of AC-119K's. A total 52 C-119's would be modified (26 of each model) to take care of losses and crew training. Dr. Brown believed at least six AC-119G's with crews should be in SEA by July, four AC-119K's with crews by November. He agreed that Phase I training be conducted at Clinton County AFB, Ohio, and Phase II at England AFB, La. The Secretary went beyond the Air Staff proposal and suggested the AC-119G include a better illuminator and a night observation device along with the associated fire-control system. Dr. Brown thought this equipment's weight could be handled by cutting back on flare storage and removing the beacon-tracking radar. "The important element," he said, "is that we provide a substantially improved gunship as augmentation to the AC-47 force--at an early date and at reasonable cost." An option could be taken later--if needed--to upgrade more AC-119G's to AC-119K's. For the present, however, the AC-119K offered "very little more in the way of capability" yet cost far more than the AC-119G. In fact, the AC-119K program surpassed "the AC-119G program cost by a factor of almost five."\*10

On 8 February Secretary Brown asked Secretary McNamara to approve the AC-119G/K force of 32 gunships for Southeast Asia and modification of a total 52 aircraft. Dr. Brown said: "I see a clear distinction between the more localized support and protective role of the AC-119 aircraft and the predominantly search-and-destroy concept envisioned for the AC-130." He planned to "proceed with the AC-119G in the interim, while working at full speed on the AC-119K as well." Approval of this force would lift the total to 70 combat-unit gunships--32 AC-119G/K's, 32 AC-47's, and 6 AC-130's (a total of 72 was attained by adding 2 more AC-130's). The enemy's 1968 Tet Offensive had injected a note of urgency in the Air Force Secretary's request. 11

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\*On 1 February Secretary Brown had told the Secretary of Defense of his plan for one squadron each of AC-119G's and AC-119K's. Dr. Brown had commented: "I believe we should make these forces additive to the AC-47's already in SEA." [Memo (S), SAF to SECDEF, subj: AC-130 Gunship II and C-130 BIAS/Hunter Aircraft, 1 Feb 68.]

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During Secretary of Defense review of the AC-119G/K force, the Air Staff on 10 February 1968 assigned AFLC management of the AC-119 program and directed an all-out effort.\* The first AC-119G's were due in SEA by July 1968, AC-119K's by November 1968. Inasmuch as the program funding was already assured, AFLC could go ahead with procuring long-leadtime items. The Air Staff harbored misgivings over possible competition between the AC-130 and AC-119G/K programs for sensor, gun and illuminator subsystems. It cautioned AFLC and AFSC the aims of both programs had to be met.<sup>12</sup>

The Air Force Logistics Command picked WRAMA as project manager for the AC-119 modifications on 10 February and the latter created a program office the same day. Maj. Gen. Francis C. Gideon, WRAMA Commander, quickly selected Col. John M. Christenson as overall manager and formed a special engineering team within the WRAMA Service Engineering Division to expedite the work.<sup>13</sup> WRAMA perused the proposed program and advised AFLC a higher priority for the project "compatible with or greater than that assigned the C-130" would be needed if schedule deadlines were to be met. It further proposed the C-119's undergo IRAN concurrently with the reconfiguration and that some equipment be removed from other aircraft to overcome delays foreseen with new procurement.<sup>14</sup>

WRAMA believed Fairchild-Hiller, manufacturer of the C-119, could best accomplish the modification program.<sup>15</sup> The firm had completed engineering work on the AC-119G prototype in early February which lent further weight toward its selection.<sup>16</sup> On 17 February 1968, WRAMA awarded a letter contract to the company for modification and IRAN of 51 C-119's (the prototype was separate). Fairchild-Hiller's Aircraft Service Division at St. Augustine, Fla., would do the bulk of the work. Cost estimates

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\*Informal discussions had already revealed that OSD recognized deployment of more gunships as "an immediate and valid requirement." [Memo (S), SAF to SECDEF, subj: AC-119 Gunship Force, 8 Feb 68.]

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for the project--including IRAN spares, and aerospace ground equipment (AGE)--totaled about \$81 million.\*17

On 21 February the Air Staff designated the AC-119G/K project "Combat Hornet."<sup>18</sup> It also told AFLC and AFSC the high precedence rating of AC-130 components now applied to certain equipment items of the AC-119G prototype and the first six follow-on aircraft. These were: NOD's, FLIR's, DPN-34 radars, 20-kw illuminators, SPR-3 radars, associated fire-control system computers, as well as 7.62-mm and 20-mm guns. The Air Force kept tight rein on these high ratings and used them solely to meet aircraft delivery schedules. Other Combat Hornet items were procured under the previously assigned precedence rating.<sup>19</sup>

(U) WRAMA suggested to AFLC that the C-119's be obtained from one or two units of Continental Air Command (CAC) rather than securing a few aircraft from several units. The one or two units could then give up AGE and spare parts along with the aircraft and thereby expedite the eventual AC-119 deployment to SEA.<sup>20</sup>

On 24 February Deputy Secretary of Defense Nitze approved Secretary Brown's mixed gunship force plans, including the 32 AC-119 gunships for SEA. He stipulated that the actual AC-119 deployment be funneled through the deployment adjustment request (DAR)<sup>+</sup> system and contain an analysis on the continued need for the AC-47 force.<sup>21</sup>

The Commander in Chief, Pacific Command, sent the Joint Chiefs of Staff a deployment request for the mixed gunship force on 3 March 1968. The proposal would add 1,161 personnel in South Vietnam for supporting 32 AC-119's, 387 in Thailand for 8 AC-130's, and 20 in Okinawa for maintaining AC-119's/AC-130's.<sup>22</sup>

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\*Air Force Modification Requirement 1932 (FS-2151/C-119K), 20 March 1968, formally directed conversion of 26 C-119G aircraft to AC-119K gunships. These aircraft would have two additional J-85GE-17 jet engines at an approximate cost of \$110,000 per airframe. The Air Force chose the J-85 engine for its 5,700 pounds of thrust at an additional weight of 1,500 pounds and because it was already in use on the C-123K which eased its logistic support.

<sup>+</sup>The DAR enabled OSD to monitor force changes with regard to theater manpower ceilings.

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At about this time, the President had announced a new ceiling on SEA force increases, based on MACV recommendations. Known as Program 6 and disclosed by the JCS on 6 April, it lifted the South Vietnam ceiling by 24,500 to a total of 549,500. It did not provide for the 1,161 spaces CINCPAC asked for to support the AC-119's, however.<sup>23</sup> The JCS held off seeking a further rise in the ceiling because of the timing of CINCPAC's request with respect to the new ceiling approval. Instead, the JCS asked CINCPAC to rework the AC-119 requirement to fit Program 6 manpower limits.<sup>24</sup> This quickened study of ways to squeeze more gunships into South Vietnam.<sup>25</sup> For at stake now was a possible trade-off with another desired program. Discussions on the matter continued for some months.

#### Planning AC-119 Crew Training

Amid AFLC modification actions and high-level force decisions, TAC planned AC-119 crew training. It had tailored a fairly complete training program by the middle of February. Continental Air Command--responsible for releasing the Reserve C-119's--would also conduct simulator, field, and Phase I training through the 302d Tactical Airlift Wing at Clinton County AFB.<sup>26</sup> CAC evaluated base facilities on 6-7 February and reported it could handle the planned training.<sup>27</sup> It set a 20 March 1968 starting date for Phase I training which was essentially crew checkout. ATC and TAC would administer peculiar equipment and sensor training and all Phase II flight training. TAC activated the 4413th CCT Squadron (under SAWC) to begin Phase II training on 1 March at Lockbourne AFB.<sup>28</sup>

#### Modification Proceeds

The Air Force Secretary's queries\* on tripling the number of gunships triggered a flurry of activity in late March 1968 (see Chapter III). Several force options furnished the Secretary by the

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\*One question put to the Air Staff by Secretary Brown: "Does the staff recommend a mixture of 'G' and 'K' models within SEA units in order to meet Army fire support requirements in the most economical fashion, yet also have an improved day/night interdiction and truck killing capability at hand?" [Memo (S), Brig Gen Fred W. Vetter, Jr., Mil Asst to SAF, to Asst Vice C/S, subj: Increased Gunship Force, 2 Apr 68.]

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Air Staff impacted little on final AC-119 plans. The AC-119G/K program of 52 gunships remained firm.<sup>29</sup>

Slippage in the procurement of several equipment items (other than sensors and guns) loomed in April 1968. To keep gunships and gas turbines on schedule, Headquarters USAF extended the high precedence rating to them. During the first 3 weeks of May, it likewise put electronic components worth \$1.3 million on priority lists, pushing up total program costs. To curb repeated requests for high precedence ratings and rising expenditures, Air Force Headquarters told AFLC it would turn down any further appeals for special coverage. Forced to relent on 3 July, it granted a high precedence authorization to cover illuminators, image-intensifier tubes, and control switches when it seemed that slippage of these items would retard the overall program. Air Force Headquarters later reviewed procurement actions and discovered a number of high-priority contracts for AC-119 items being funded from production allotments in place of research and development money. It accordingly cracked down harder on the more costly high-priority procurement.<sup>30</sup>

Trouble beset procurement of guns for the AC-119G as modification got under way. At first it was thought 7.62-mm guns from the AC-47's could be switched to the AC-119G's. The AC-119 fleet expanded beyond mere AC-47 replacement, however, and new sources had to be found. A search uncovered sufficient SUU-11 gun pods for 10 AC-119G's and 39 SUU-11 pods in Seventh Air Force hands slated for AC-47's operated by the VNAF. The AC-119 program's higher precedence halted the VNAF installation. In addition, Seventh Air Force had another 16 gun pods inoperative due to parts. PACAF cautioned against using these pods and urged instead that AFLC speed up procurement of MXU-470A modules.<sup>31</sup> WRAMA originally intended to use the 39 SUU-11 pods earmarked for the VNAF but in the middle of March 1968 arranged with the Army for enough guns to satisfy the program's monthly requirements.<sup>32</sup> On 18 March WRAMA notified PACAF it no longer needed the SUU-11 gun pods in SEA.<sup>33</sup> In May WRAMA awarded the General Electric Company a \$1.3 million letter contract for new 7.62-mm gun modules (MXU-470A's) that would in time meet gunship needs.<sup>34</sup>

(U) Difficulties with Fairchild-Hiller on certain items surfaced at the outset of the modification program--the smoke-evacuation system being a chief case in point. Survival of aircraft and crew was at stake if a magnesium flare ignited. The fire would fill the



plane with blinding choking smoke, impairing vision and movement. The Air Force specified that to be safe a smoke-removal system had to clear the smoke in 10 seconds. Since the AC-47 had such a system, Fairchild-Hiller was expected to have little trouble with an AC-119 design. Notwithstanding, on 19 April 1968 the Air Force notified the company it was dissatisfied with their system's potential deficiencies and the contractor's attitude toward fulfilling requirements. Tests supported WRAMA's position and the contractor made adjustments largely in the location of the air-inlet scoops. Successful tests of the smoke-evacuation system at Eglin AFB on 26 June ended months of strained relations between the Air Force and Fairchild-Hiller over the matter.<sup>35</sup>

WRAMA hosted logistic support conferences from time to time as the C-119 modifications made headway. A 23-25 April 1968 meeting on AC-130/AC-119 support was one of the most meaningful. The representatives\* discussed ways to ease problems and coordinate aircraft delivery actions. They hammered out a revised production schedule specifying delivery of 26 AC-119G's from 21 May through 22 October 1968 and the AC-119K's from 14 October to 31 March 1969. The monthly forecast was:

	1968						1969				
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
AC-119G	2	3	8	4	5	4					
AC-119K						1	2	4	6	6	7

The conferees confirmed the distribution of 18 AC-119G's to PACAF and eight to TAC with a like breakout for the AC-119K's. They agreed that deployment deadlines would tightly limit testing of the AC-119's in the United States. As for logistic support, the representatives believed it would take up to a year for the Air Force to assemble an inventory of necessary spares. Up to that time, contractor support would supply peculiar items and AGE for the AC-119 program.<sup>36</sup>

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\*Representatives were from Headquarters USAF, AFLC, PACAF, TAC, CAC, Air Training Command (ATC), ASD, WRAMA, Oklahoma City Air Materiel Area (OCAMA), Ogden Air Materiel Area (OOAMA), San Antonio Air Materiel Area (SAAMA), 1st ACWg, 4413th CCT Wg, SAWC, General Electric, and Fairchild-Hiller.

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(S) Fairchild-Hiller delivered the first AC-119G gunship to the Air Force on 21 May 1968.<sup>37</sup> TAC received it on 9 June and instantly began limited flight-testing side by side with instructor-cadre upgrading. By 15 June two instructor pilots drawn from AC-47 instructor crews had trained four new instructor pilots. The achievement owed much to TAC's borrowing two CAC C-119G's to accelerate its training program.<sup>38</sup> With this limited instructor upgrading, the 4413th CCT Squadron accepted its first training class for Southeast Asian duty on 3 July.<sup>39</sup>

#### AC-119G Testing and Evaluation

(S) Tactical Air Command's Special Operations Forces conducted the AC-119G test and evaluation (Category III OT&E) at Eglin AFB. It included testing of the fire-control system, NOD, illumination systems, smoke-removal system, flare launcher, and overall aircraft performance. The total 25 test sorties flown during 9-30 June took over 53 flying hours. Equipment problems and delays developed. For example, a modified computer didn't arrive until 21 June and its erratic operation prompted test personnel to term the offset performance of the fire-control system unsatisfactory. Even more serious was the aircraft's failure to reach Air Force profile standards.\*<sup>40</sup> The AC-119G had to sustain a 200-foot-per-minute rate of climb with one engine feathered during hot-day conditions at a gross weight of 62,000 pounds. Minimum loiter time was specified as 4 hours out of total sortie time of 5 hours and 40 minutes.

(S) Test personnel saw that the AC-119G's combat configuration would go over the 62,000 weight, forcing a cutback in fuel load and in turn loiter time.<sup>41</sup> On 21 June WRAMA proposed reducing the single-engine rate-of-climb requirement to 100 feet-per-minute but

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\*The Seventh Air Force typical day/night mission profile went like this: start engines, lift off, and climb to 3,000 feet MSL; cruise 5 minutes to orbit start; loiter 4 hours at 130 KIAS (knots indicated air speed); climb to 5,000 feet MSL; 40-NM dash at 180 KIAS to target area; 1 hour in attack mode, including descent to 3,500 feet MSL, expend ammunition and flares; climb to 5,000 feet and cruise 60 NM to home base; land with 1,000 pounds of fuel reserve. [Ltr (C), Col William S. Underwood, 7th AF Dir/Programs, to DPL, subj: AC-119G Performance Improvement Conference, 13 Aug 68.]

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this was turned down<sup>42</sup> and tests on the SEA mission profile capabilities continued. The final test report recommended that AFLC conduct a weight-reduction program.<sup>43</sup> On 1 July TAC informed Headquarters USAF that tests confirmed "weight, performance, and capability problems exist in the AC-119G."<sup>44</sup> On 11 July Gen. Gabriel P. Disosway, TAC Commander, reported to Gen. John P. McConnell, Air Force Chief of Staff, on a meeting he had on the subject with commanders\* and other key Air Force officers. General Disosway said: "We are in agreement that the AC-119G as presently configured will not provide the desired SEA combat capability. We strongly recommend the deployment be delayed until the deficiencies are corrected."<sup>45</sup>

Headquarters USAF directed a conference be convened at Warner-Robins AFB "to discuss alternatives for improving the aircraft performance in order to meet mission requirements."<sup>46</sup> For the conference Air Force Headquarters asked: (1) WRAMA to identify nonessential items for removal to reduce the AC-119G's weight,<sup>+</sup> (2) PACAF and Seventh Air Force to review mission requirements and recommend removal of specific equipment items and/or reduction of the 200-foot-per-minute rate-of-climb standard, and (3) TAC to brief results of the AC-119G's Category III test and suggest any improvements.<sup>47</sup> The disappointing AC-119G test results and this call for a weight-reduction conference shattered optimism about meeting the deployment goals.<sup>48</sup>

On 26 July 1968 WRAMA hosted the 2-day AC-119 weight-reduction and performance-improvement conference at the Fairchild-Hiller plant, St. Augustine, Fla., rather than at Warner-Robins AFB. In attendance were representatives from Headquarters USAF, PACAF, TAC, AFLC, Seventh Air Force, and the contractor. The

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\*Gen. George S. Brown who assumed command of Seventh Air Force on 7 August 1968; Gen. James Ferguson, Commander, Air Force Systems Command; Gen. Jack G. Merrell, Commander, Air Force Logistics Command; and Gen. Joseph J. Nazzaro, Commander in Chief, Pacific Air Forces.

<sup>+</sup>The AC-119G's weight problem had arisen because many components being installed proved heavier than expected. Also, PACAF had drawn up the mission profile after modifications had begun and performance standards were more stringent than the engineers anticipated.

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conferees determined the G model's total weight when ready for takeoff was 66,282 pounds--3,350 pounds excess.\*<sup>49</sup> In the course of lengthy discussions over 30 items<sup>+</sup> were listed for removal, weighing a total of 3,277 pounds.<sup>50</sup> Nearly 1,500 pounds of such equipment would be removed in Southeast Asia. Removing the rest of the excess weight would be up to Fairchild-Hiller or WRAMA.<sup>†51</sup>

The conferees believed PACAF and Seventh Air Force needed to adopt the weight-reduction recommendation and at the same time relax the single-engine climb-rate standard from 200 to 100 feet-per-minute. (They emphasized that 100 feet-per-minute was standard for the AC-47.) The only alternative would be to strip an additional 3,500 pounds from the AC-119. This would of necessity be gunship peculiar equipment such as sensors and guns, thereby degrading gunship capabilities.<sup>52</sup> Headquarters USAF pondered these recommendations then let PACAF know the SEA mission profile could be met by adopting the conference's initial weight-reduction recommendation together with lowering the single-engine rate-of-climb standard to 100 feet-per-minute. Air Force Headquarters stressed that the lower standard of performance afforded "adequate operational safety." Moreover, the AC-119 would be given a pilot-operated jettisonable flare launcher, weighing about 1,100 pounds

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\*The empty airframe weighed 51,284 pounds; 7.62-mm ammunition and flares--3,195 pounds; crew, crew equipment, and oil-3,246 pounds; fuel to fly a 5 1/2-hour mission--8,557 pounds. [Figures on the excess weight vary widely.] Lt. Col. Harold E. Mitchell, gunship officer, 14th SOWg, reported an excess of 4,800 pounds. [Ltr (S), Lt. Col. Harold E. Mitchell to DCO, 14th SOWg, subj: AC-119G Trip Report (ca Aug 1968).]

<sup>+</sup>The items included: heaters, armorplating, oxygen bottles, fire extinguishers, inboard fuel tanks, engine dust covers, troop-seat brackets, winches, certain types of wiring, static lines and fittings, some electronic equipment, shackles, and loading-jacks and brackets.

<sup>†</sup>There had been some disenchantment with Fairchild-Hiller's management ability over the months of modification. WRAMA officials found the company not only slow in developing a satisfactory smoke-evacuation system but inadequate in its reliability/maintainability program, weak in quality control, and poor in control over vendors. [WRAMA Historical Study 18 (S), AC-119G/K Gunship Program, 1967-1970 (Project Combat Hornet) (WRAMA, Mar 1971), pp 34-37.]

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with flares. Jettisoning the launcher in an emergency would boost the single-engine rate of climb to around 150 feet-per-minute.\*53

On 15 August 1968 PACAF replied it would lower the rate-of-climb criterion to 100 feet-per-minute. It urged "comprehensive flight testing before deployment" after the gunship's weight had been reduced. The command conveyed concern over armorplate removal, thinking it would make the gunship unsatisfactory for day missions.<sup>54</sup>

The Air Force looked for the best way to accomplish the weight-reduction program, expecting it to require some 350 man-hours. On 24 August WRAMA suggested the aircraft be cycled through the contractor's St. Augustine plant rather than having contract/depot field teams attempt the job. WRAMA assumed weight-reduction engineering could be completed by 20 September, engineering for other deficiencies by 27 September. It forecast the first aircraft entering recycling on 1 November with a flow time of 15 days for each aircraft. The estimated cost of the program was \$664,000.<sup>55</sup> The Air Staff accepted the plan and Fairchild-Hiller reworked the AC-119G aircraft.

The slow resolution of the theater headroom problem softened the jolt of the weight-reduction program to the SEA deployment schedule. For almost 6 months after Deputy Defense Secretary Nitze's approval of the AC-119's in February 1968, work had focused on fitting the force under the headroom ceiling by trade-offs in other areas. One way had always been to replace AC-47's with AC-119's. On 13 July 1968, however, Headquarters USAF urged CINCPACAF to "exhaust all other possibilities" before considering this action.<sup>56</sup> Other courses had proven most difficult as General Momyer, Seventh Air Force Commander, commented: "We have no room for maneuver on these directed programs. MACV is confronted with deficits they consider of more importance than these service interest programs." General Momyer saw the answer in taking AC-119's on a one-for-one trade with the AC-47's. Even then, this would require 337 more spaces which Momyer "agreed to dig...out of my hide." He reported to Gen. Bruce K. Holloway, Air Force

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\*An experienced C-119 pilot said survival in an emergency at 100 foot-per-minute rate of climb on one engine demanded perfect crew performance. A minute was a long time to a pilot trying to reach an altitude not much higher than good-sized trees. [Intvw (U), author with Col Joe T. Pound, Asst for Res Affairs (AFR), Dir/Aerosp Prgms, 27 Jun 72 (Colonel Pound commanded the 930th Tactical Airlift Group (TAGp), (CAC), when it was mobilized to form the 71st SOSq).]

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Vice Chief of Staff, that General Abrams, MACV Commander, favored this one-for-one trade and was receptive to a message to CINCPAC and the JCS along these lines. General Momyer restated his concern with the "operational deficiencies" of the AC-119 which he felt made it "less desirable than the AC-47 in many respects." He cautioned that if at all possible "we not go for a complete replacement of the 32 AC-47s."<sup>57</sup>

During the AC-119's modification, Seventh Air Force had doubted the gunship's capabilities--especially that of the G model. On 20 July it predicted trouble, noting the AC-119G was "not suited for night operations over heavily canopied jungles or rugged mountainous terrain where targets are not easily identified." Seventh similarly scored the AC-119G as inflexible because it had but one sensor, the night observation device.<sup>58</sup> In mid-1968 the Seventh Air Force ad hoc Program Review Committee (cost-review panel) addressed the question: "Should the AC-119 Gunship force programmed for introduction into the theater be deferred as a cost-savings measure?" The panel reported that the AC-119G was so "underpowered with a full fuel load and ordnance that on station time will be sacrificed for ordnance capability or vice versa." It likewise criticized the 7.62-mm minigun's "hitting power." The gun's top slant-range effectiveness of 5,500 feet would be potent against personnel but do scant damage to buildings, bunkers, or trenches. The cost-reduction panel viewed the AC-119K in a more favorable light due to that gunship's auxiliary jet engines and 20-mm guns. Despite anxiety over the AC-119G's anticipated performance, the panel rejected a deferment of the two AC-119 squadron deployment.<sup>59</sup> Headquarters USAF tried to reassure Seventh Air Force regarding the AC-119G. "The Air Staff," it advised "is well aware of these deficiencies in its current configuration and its shortcomings as a combat aircraft. We are endeavoring to assure correction of these deficiencies that are correctable."<sup>60</sup>

At one time hope had existed that all AC-119G's could be configured into AC-119K's thus ridding the G model of deficiencies that disturbed commanders in Southeast Asia. After study the Air Staff gave up the idea because: (1) converting 26 AC-119G's into K's would slip AC-119G deployment 4 or 5 months; and (2) expanding AC-119K's beyond one squadron would demand more J-85 jet engines, seriously hurting the C-123K modification and maybe other programs. In short, configuring all AC-119's to the K model

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was clearly advantageous but the Air Staff didn't think it practical to do in a fairly short time.<sup>61</sup>

### Readying AC-119G Deployment

(C) With the approach of autumn, the several-times-delayed deployment of the AC-119's came closer to reality. On 11 October 1968 the Air Force had officially accepted the last of the 26 AC-119G's as it ended modification and IRAN. On the other hand, only the first aircraft had gone through all test phases and begun its weight-reduction at Fairchild-Hiller's St. Augustine plant.<sup>62</sup>

(U) Production delays stretched the time for readying support equipment and refining supply procedures. On 20 September 1968 the Air Force contracted logistic support from Fairchild-Hiller. The agreement called for the company to keep men around the clock at main support bases in SEA. Initially, they would perform "depot overhaul and depot supply" services for contractor-furnished equipment and modified government-furnished parts. Various civilian specialists would remain in SEA for 6 months. AFLC used normal budget channels to fund the contract.<sup>63</sup>

(U) As weight-trimming of the AC-119's moved forward, the support equipment was collected and shipped to combat-theater locations. In October 1968 the stock level of various support items ranged from 77 percent for common AGE to 92 percent for common spare parts. Equipment peculiar to the AC-119G was to be delivered from December 1968 to June 1969 by Fairchild-Hiller. WRAMA dispatched a 9-man rapid area supply support team to Southeast Asia on 8 November to smooth out the receipt, identification, and storage of spare parts and support items.<sup>64</sup>

(U) The late arrival of the AC-119G's in South Vietnam also allowed extra time for completion of the base support facilities. At Tan Son Nhut AB, for example, the programmed revetment area and operations/maintenance facility slipped months beyond completion dates in the Seventh Air Force program.<sup>65</sup> Back in May 1968, the 14th Air Commando Wing had alerted Seventh Air Force Headquarters that Red Horse (engineering/construction units) resources were "not sufficient to accomplish assigned Combat Hornet projects within required time frames."<sup>66</sup> The Gunship III\* deployment slippage undoubtedly eliminated some severe crowding problems that loomed with the original mid-1968 goal.<sup>67</sup>

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\*Gunship III--A term denoting the AC-119G (call sign Shadow) and/or the AC-119K (call sign Stinger).

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Composition of the AC-119G unit added one more deployment complication. To keep abreast of the Gunship III timetable, the Air Force had decided in early 1968 to take both C-119G aircraft and personnel from the Air Force Reserve.\*68 On 13 May 1968 the 930th Tactical Airlift Group (CAC), a C-119 Reserve unit based at Bakalar AFB, Ind., was called up for 24 months active service with the Tactical Air Command.69 The 930th's 71st Tactical Airlift Squadron was redesignated the 71st Special Operations Squadron and TAC beefed it up with 930th Group resources, including over 300 of the 383 personnel mobilized.+ During 1-15 June 1968, TAC moved the 71st Squadron from Bakalar to Lockbourne AFB, where its personnel formed the bulk of the first AC-119G training classes. Most of the 71st's men were experienced and qualified in C-119 crew and support positions, so the training stressed equipment and procedures peculiar to the gunship. The C-119G's of the 71st SOSq were gradually sent to St. Augustine for IRAN/modification or to other units as replacements for their commitment to the modification program. The Air Staff ordered men from various USAF sources to fully man the 71st Special Operations Squadron,70 which was scheduled to depart for SEA on 27 July 1968.71 Delays in the departure ensued however.

With the 71st Special Operations Squadron composed of many reservists ordered to active duty, concern grew over the future release of this force to inactive duty. On 4 September 1968, as the 71st Squadron awaited deployment to SEA, TAC hosted a conference on the matter. A proposal emerged calling for these actions: (1) deploy the 71st SOSq with the AC-119G's between November 1968 and January 1969 (based on aircraft availability), (2) exchange AC-119G's for SEA AC-47's one for one, (3) gear training of AC-119K

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\*The C-119 had been out of the Regular Air Force inventory since 1956.

+All elements of the 930th TAGp were initially included in the mobilization order and personnel given a 30-day notice. On 8 May 1968--barely 5 days before the mobilization--the Air Force deferred mobilization of certain support elements (930th Supply Squadron, 930th Tactical Hospital, 930th Combat Support Squadron, and 930th Communications Flight). This triggered personal problems and rearrangement of personal affairs for men in the deferred units--creating morale headaches. [Msg (U), CSAF to CAC, MAC, TAC, AFLC, AFCS, HQ Comd, Chief National Guard Bureau, USAFMPC, HQ AWS, subj: Mobilization of Air Reserve Forces Units, 082023Z May 68.]

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personnel to aircraft deliveries and deploy in the fourth quarter of fiscal year 1969, (4) return the 71st SOSq to the United States in the fourth quarter of fiscal 1969 in a one-for-one trade of AC-119K's for AC-119G's, and (5) inactivate the 71st SOSq in the fourth quarter of fiscal 1969. The conferees expected that the AC-119K's could begin deployment and commence the trade with the AC-119G's thusly: three in April 1969, seven in May, and eight in June. (This would equip a squadron of 16 AC-119K's and allow 2 AC-119K's for attrition.)<sup>72</sup>

In its initial review of the TAC conference proposal, Headquarters USAF noted that with AC-119K crew training beginning in October 1968, the April 1969 deployment would impose some personal hardships. It also cautioned that the trade-off for AC-47's--with their possible transfer to Vietnamese, Thai, or Laotian Air Forces--might have to exceed one for one, to tuck the increased AC-119 squadron personnel under the theater manpower ceiling.<sup>73</sup> The Air Staff received more favorably the conference's suggestion that the Reserve personnel be demobilized in the fourth quarter of fiscal year 1969. It oriented planning toward this goal.

Adoption of the foregoing proposal would have shaped a gunship posture in South Vietnam of one 16-aircraft AC-47 squadron and one 16-aircraft AC-119K squadron. General Brown, Seventh Air Force Commander, thought this unsatisfactory and reiterated that AC-119G's and AC-119K's should be deployed as additive forces--a squadron of AC-119G's and one of AC-119K's as originally approved. Seventh Air Force plans rested on a four-gunship-squadron concept and the General resisted any basic alteration to them.<sup>\*74</sup> As for the headroom problem, he felt that the proposed move of the ABCCC to Thailand and new personnel accounting procedures might offer possible spaces.<sup>75</sup>

General Nazzaro, Commander in Chief, Pacific Air Forces, chose the middle ground on the deployment/headroom issue. He notified General McConnell, Chief of Staff, on 25 September 1968 that the enemy's stepped-up infiltration and attacks on populated areas and military installations proved the need for two AC-119 squadrons. Nevertheless, by reason of manpower ceilings and possible disruptive effects of a short-term AC-119G deployment, the

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\*These plans were embodied in Programmed Action Directive (PAD) 68-115, 6 June 1968.

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PACAF commander recommended: (1) retention of two AC-47 squadrons, (2) holding the 71st Special Operations Squadron in the United States, and (3) earliest possible deployment of the one AC-119K squadron. He figured that a complete AC-119K squadron would need 662 manpower spaces. These could be covered by 454 spaces coming available from the move of the ABCCC from Da Nang, South Vietnam, to Udorn, Thailand, and over 300 spaces by other actions. General Nazzaro judged the alternatives entailing AC-47 trade-offs least desirable. Even so, he outlined how more AC-47's could be turned over to South Vietnam, Laos, or Thailand should such trade-offs be required.<sup>76</sup>

Debate over the headroom spaces and the AC-119 deployment extended into November. Air Force Headquarters dismissed the idea of inactivating the 71st SOSq with its replacement by AC-119K's. It likewise rejected PACAF's recommendation for holding the AC-119G squadron in the United States. The search quickened for ways to shoehorn Gunship III manpower within the Vietnam headroom ceiling. In October the Air Staff approved 301 spaces for AC-119G/AC-47 trade-off actions.\* When these spaces were combined with those gained from accounting adjustments and the contemplated move of the ABCCC to Thailand, enough headroom would exist for deployment of one AC-119 squadron. Even then, the Ranch Hand trade-off awaited CINCPAC and MACV approval and there was a question on the counting of transients in personnel strength figures. As of 10 October 1968, Seventh Air Force was razor-close to its ceiling--just 82 under (including the transients) and leaving no room for an AC-119 unit.<sup>77</sup> The 662 spaces wanted for the AC-119K squadron presented yet another headache but one less time-pressing.<sup>+</sup> All the same, PACAF reported by November it could allow deployment of three AC-119G's in November, seven in December, and eight in January.<sup>78</sup> These aircraft would be additions to the AC-47's in SEA.

Deputy Defense Secretary Nitze approved on 27 November 1968 the deployment to South Vietnam of the 71st Special Operations

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\*It obtained 187 of these spaces by withdrawing certain Ranch Hand (defoliation) personnel and the rest from various other Air Force-operated activities.

<sup>+</sup>In October Seventh Air Force saw the only way to fit this squadron in was to cut the tactical fighter force or the remainder of the Ranch Hand mission.

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Squadron (the AC-119G unit). He coupled the approval to a request for restudy of the need for the AC-47's. Deputy Secretary Nitze asserted: "I am not convinced we need to retain the two AC-47 squadrons in the U.S. force in South Vietnam." He proposed consideration of these points: "(1) the requirement for additional gunships as opposed to deletion of the AC-47's, (2) the acceleration of the turnover of AC-47s to RVNAF, and (3) retention of the four gunship squadrons and withdrawal of two tactical fighter squadrons." Mr. Nitze wanted this analysis ahead of any deployment request for the second AC-119 squadron.<sup>79</sup>

(8) The approval by Deputy Secretary Nitze roughly coincided with the completion of the 71st Special Operations Squadron's training. The reservists, augmented by active duty members, had progressed through the 4413th CCT Squadron's program at Lockbourne AFB and were considered ready for the combat-theater commitment in November. Most of these men had crewed the C-119 Flying Boxcar but they now transitioned from paradrops to side-firing passes. The instruction climaxed with day- and night-firing on the range at Camp Atterbury, Ind.<sup>80</sup> The combat crews\* had been hampered and delayed in their training by such problems as inoperable fire-control-system computers in the first four aircraft<sup>81</sup> but were now prepared to ferry the AC-119G's to South Vietnam and start theater familiarization.<sup>82</sup>

(9) A WRAMA conference of 4 November 1968 went into the ferrying of the AC-119G's to South Vietnam. The conferees agreed to remove four guns (960 pounds) and their mounts (328 pounds) and to install a 500-gallon rubberized tank for extra fuel load. The aircraft would fly in pairs<sup>+</sup> from St. Augustine to Nha Trang via: McClellan AFB, Calif.; McChord AFB, Wash.; Elmendorf AFB, Alaska; Adak; Midway; Wake; Kadena AB, Okinawa; and Clark AB, Philippines. The guns and mounts would be shipped to Nha Trang so as to arrive at the same time as the aircraft.<sup>83</sup>

(10) Later in November, Seventh Air Force questioned 14th Special Operations Wing plans for employing AC-119G's in armed reconnaissance and interdiction roles. It told the Wing that General Brown desired Phase I of the AC-119G combat evaluation

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\*Each crew comprised two pilots, two navigators (one a NOD operator), one flight engineer, two gunners, and one load-master.

<sup>+</sup>The aircraft actually deployed singly.

to center on a comparison of AC-119G and AC-47 capabilities in the AC-47's current role. The specified priorities were:

<u>Priority</u>	<u>Mission</u>
1	Close fire support of friendly troops in contact with the enemy.
2	Close fire support of U.S. and friendly military installations including forts and outposts.
3	Close fire support of strategic hamlets, villages, and district towns.
4	Preplanned armed reconnaissance and interdiction of hostile areas and infiltration routes.
5	Search and rescue support.
6	Night armed escort for road and close offshore convoys.
7	Illumination for night fighter strikes.
8	Harassment and interdiction.

Seventh Air Force said that the evaluation of armed reconnaissance and interdiction should be deferred until the later phases of the combat test.\*84

AC-119G Testing and Combat Evaluation

The advance elements of the 71st Special Operations Squadron were in place at Nha Trang by mid-December 1968.<sup>85</sup>

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\*An AC-119 mission statement eventually emerged: "To search out enemy infiltration routes, installations and destroy his means to wage war, respond with fire power and illumination in close support of strategic hamlets under night hostile attacks, supplement strike aircraft in defense of friendly forces, provide harassing interdicting fire support, to provide escort for convoys and to respond as directed in support of defense of friendly forces." [Hist (S), 14th SOWg, 1 Jan-30 Mar 69.]

The first two AC-119G's left Lockbourne AFB on 5 December and touched down at Nha Trang on 27 December--a total of four AC-119G's arriving there by the end of the month. TAC and PACAF maintenance personnel set to work at once. They reinstalled and adjusted the miniguns, removed the special ferry fuel tanks, and in general got the aircraft operationally ready. This proved a stiffer job than expected. The first AC-119G arrived with a broken gunsight, hard nosewheel steering, poorly functioning hydraulic system, inoperative spark advance on one engine, and a faulty illuminating device.<sup>86</sup>

Seventh Air Force plans called for the 71st Special Operations Squadron to furnish air support mainly in the southern portion of the Republic of Vietnam. The AC-119K unit (designated the 18th Special Operations Squadron) would be assigned to the northern portion. Nha Trang, Headquarters of the present 14th Special Operations Wing, would serve as the main support base for the 71st SOSq as well as the location for five AC-119G's. Forward operating locations were to be established at Phan Rang AB (OLAA)--six AC-119G's; and at Tan Son Nhut AB (OLAB)--five AC-119G's.<sup>87</sup> The first AC-119G's would fly combat missions out of Nha Trang.

The AC-119G (now called the Shadow)\* began operational sorties and its combat evaluation.<sup>+</sup> From 5 January<sup>‡</sup> to 8 March 1969 (date of the last evaluation combat sortie), the evaluation team analyzed the Shadow gunship's performance in: combat air patrol for base and hamlet defense, interdiction, armed reconnaissance,

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\*Initially, the call sign "Creep" had been authorized for the AC-119G. A howl of indignation arose from the 71st SOSq over this selection and a change of the call sign to Shadow was requested, to be effective 1 December 1968. [Msg (C), 14th CSGp to 7th AF, subj: 14th SOW Aircraft Call Sign, 21 Oct 68.]

<sup>+</sup>The evaluation (labeled Combat Guard) was conducted by a TAC Task Force, commanded by Maj. Darrell D. Wood of TAC's 1st Special Operations Wing. The evaluation team had been in place at Nha Trang since 2 December 1968.

<sup>‡</sup>Lt. Col. Donald Beyl flew the first combat flight in Shadow 41 (aircraft no. 905, mission no. 4576). He took off at 2226 and landed at 0254 on 6 January 1969, after expending 1,300 rounds of 7.62-mm ammunition. [Hist (S), 14th SOWg, 1 Jan-31 Mar 69, p 33.]

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AC-119G

forward air controlling, and close air support missions. The evaluation report revealed that the weapon system performed all missions satisfactorily except forward air controlling. The aircraft was rather slow, hard to maneuver, and vulnerable to enemy fire--hence not well-suited to the forward air control role.\* Four of the five main subsystems--the NOD, side-firing guns, semi-automatic flare launcher, and fire-control system--demonstrated "acceptable reliability and effective operation." The illuminator worked well until maintenance problems made it unreliable. As

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\*Col. Conrad S. Allman, 14th Special Operations Wing Commander (18 Mar 68-5 Mar 69) supported the negative conclusion on forward air controlling. In his End of Tour Report he noted the size and speed of the AC-119G made it impossible to maintain either a constant target acquisition or constant visual contact with the fighters--both essential to properly and safely direct a fighter strike and adjust ordnance delivery. He flatly recommended discontinuance of the AC-119G's use as a FAC. [Kott, The Role of USAF Gunships in SEASIA, p 23.]

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expected, the AC-119G had decided limitations: Its gross weight usually held mission flying time to not more than 6 hours. The miniguns were of limited value against vehicular traffic. Lack of an all-weather capability crippled its operation in fog and haze. All the evaluation missions took place in undefended or lightly defended areas. The evaluators recommended the aircraft not be used in a high-threat environment.<sup>88</sup>

(●) Throughout the combat evaluation, the bulk of the targets (371 of 589) turned up during the harassment- and interdiction-type missions. Such missions commonly grew out of armed reconnaissance operations. A Shadow gunship would be assigned to patrol a "box"--an area bounded by precise coordinates.\* To and within the box area it navigated by TACAN with ground-radar backup. Shadow kept a terrain clearance of 500 feet within 5 miles as it pressed an unrestricted search for the target with the NOD or visually by means of the flares/illuminator. When a target was identified, the gunship plotted the coordinates and called the controlling agency for clearance to fire. (Often it dropped Mk-6 flares (marker logs) to pinpoint the target's position.) Upon receipt of firing clearance, Shadow climbed to 3,500 feet AGL,<sup>+</sup> selected usually a semiautomatic firing mode, banked into the left orbit, and fired. Sometimes, the gunship dropped flares to illuminate the areas and operated 1 or 2 guns, often at a slow rate (3,000 rounds-per-minute).<sup>89</sup>

(●) The evaluators had less trouble in assessing the results of the close air support missions than the harassment and interdiction strikes. The Gunship III used its illuminator and flares many times to assist troops in contact with the enemy. One Shadow was directed to an outpost near Dak To and the ground unit asked for flares and/or use of the illuminator. The enemy had lobbed mortar rounds on the outpost and probed its perimeter but withdrew when the gunship lit up the area. AC-119G firepower was even more

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\*Many of the boxes were located west of the cities of Kontum and Pleiku where Cambodia, Laos, and South Vietnam converged.

<sup>+</sup>Shadow's guns were boresighted for 2,500 feet AGL and 3,500 feet AGL. Weather and the degree of threat from ground fire dictated the altitude. At times it varied from a low of 2,500 feet AGL to a high of 5,000 feet AGL. Most firing was from 3,500 feet AGL.

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telling. A Shadow attack on a suspected enemy troop concentration and storage area north of Pleiku AB touched off 80 secondary explosions. Another Shadow out of Nha Trang aided a U.S. Army unit pinned down by the enemy. The call of the ground unit's radio operator showed that the AC-119G had tilted the balance: "Thanks a lot, Shadow, you made my trip home possible."<sup>90</sup> The evaluators concluded that the close air support role was the "most effective" one for the AC-119G.<sup>91</sup>

Shadow attacks in the course of the combat evaluation recorded noteworthy statistics, including 6 enemy killed and another 184 estimated killed. The AC-119G's silenced five .50-caliber gun positions and destroyed or damaged 31 trucks. Many secondary explosions triggered by attacks on ammunition/fuel dumps, vehicles, and base camps were confirmed. Shadow maintained an operational readiness rate of 78.8 percent over the evaluation period.<sup>92</sup>

Up to 8 March 1969, the AC-119G Shadows had reported 86 instances of ground fire but suffered only 1 hit. A Shadow was flying an interdiction mission near Da Nang when fire from an unknown type of small-arms weapon damaged the right wingtip. On several Shadow flights, fighter escort suppressed AA fire.<sup>93</sup>

As the combat evaluation progressed more aircraft and crews came to South Vietnam. By 1 March 1969 all 18 aircraft\* of the 71st Special Operations Squadron<sup>+</sup> were in the combat theater.<sup>94</sup> The squadron gained combat-ready status (rated C-1) on 11 March 1969.<sup>95</sup> The complete deployment of this unit, commanded by Lt. Col. James E. Pyle, and the promising combat debut of the AC-119G --called a "flying anachronism" by one authority<sup>96</sup>--marked the fruition of the months of arduous development and sharp debate over the gunship force.

#### AC-119K Progress and Problems

Meantime, work on the AC-119K's went on. WRAMA told AFLC on 13 August 1968 that the modification pace was slowed by adjustments on the cockpit configuration and by nonreceipt of the AN/AAD-4 FLIR and the 20-mm gun system.<sup>97</sup> The holdup of the FLIR's from Texas Instruments created the more acute problem.

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\*This included 16 unit-equipment aircraft plus two not operationally active.

<sup>+</sup>Later designated 17th Special Operations Squadron.

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In June 1968 WRAMA had proposed fixing aircraft schedules to the availability of the infrared system and delivery of the first few AC-119K's to TAC and PACAF without FLIR's. These aircraft would be fitted with the FLIR in the field later.<sup>98</sup> In August WRAMA remained confident that four K models, minus the delayed FLIR's, would be ready in November for deployment to Southeast Asia.<sup>99</sup>

### AC-119K FUSELAGE - GENERAL ARRANGEMENT

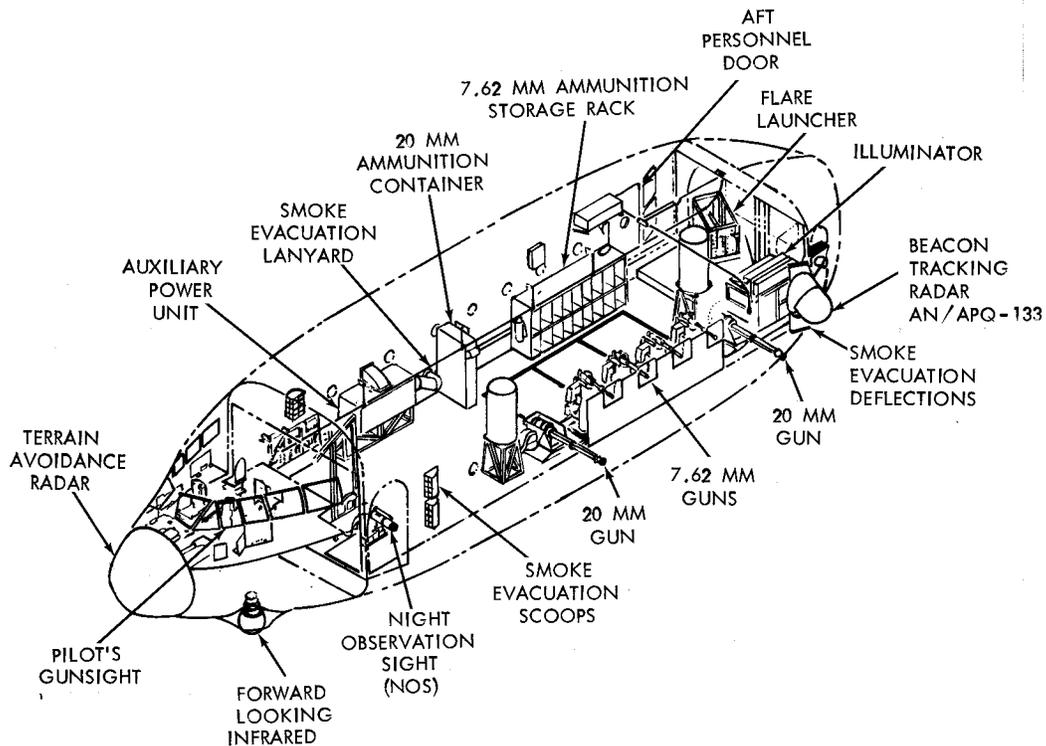


Fig. 30 (U)

(U) The FLIR delivery problems were not so easily nor quickly resolved. Fall came and Texas Instruments let WRAMA know it could not meet FLIR schedule deadlines. The priority afforded the installation of the first eight FLIR's in the AC-130A's drew out the delivery delay. By the first few days of October 1968, it was clear the first 18 AC-119K's coming out of

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modification would have simply the basic components to accommodate and support the infrared sensor. \*100

(U) Frustrated by the delays in the mission-essential FLIR, WRAMA complained that Texas Instruments had vastly "over committed" itself in agreeing to the delivery schedule. It thought of canceling Fairchild-Hiller's subcontract with the Texas firm but dropped the idea upon realizing Texas Instruments was the one company capable of filling the order within a reasonable time. Hughes Aircraft, the only serious competitor, was at least a year away from delivery of a comparable system.<sup>101</sup>

(U) To expedite the FLIR delivery, a WRAMA Tiger Team<sup>+</sup> went to the Texas Instruments plant on 2 December 1968. A revised schedule for FLIR-equipped AC-119K's resulted:

	FY 1969					FY 1970		
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
TAC	1	2	1	0	0	0	1	3
PACAF	0	0	4	4	5	4	1	0

WRAMA estimated that the sensor could be installed in the AC-119K in the field within 1 day, if necessary, utilizing 32 man-hours (four men, 8 hours each).<sup>102</sup>

(U) Despite the new schedule, doubt persisted about FLIR deliveries. It was by no means certain that Texas Instruments had the "bugs" out of the equipment. This became a fact when the company notified the Air Force on 24 January 1969 it was suspending production of the sensors until design problems were licked and the production line changed. In February 1969 the firm reported it might require 18 months to complete the contract and

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\*The items or parts needed to support, secure, interconnect, or accommodate the equipment are termed "Group A" components. The operating unit itself is classed "Group B." The Group A components of the AC-119K FLIR (installation brackets and wiring) would be completed but the sensor (Group B) would not be available.

<sup>+</sup>A team that specialized in studying and recommending solutions to contractor production problems.

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need an additional \$5 million to cover costs. The Air Force had no choice but to extend the letter contract with Texas Instruments and to push any necessary reengineering, production, and delivery.<sup>103</sup>

Texas Instruments' production difficulties impeded the AC-130 and AC-119K programs. Troubles beset the air conditioning of the FLIR's in the AC-130's. Early versions of the FLIR's proved hard to maintain, operated below standard, and failed often. In the opening months of 1969, a dearth of spare parts made supply and maintenance marginal for the higher-priority AC-130's. To lessen these support problems, AFSC proposed a redistribution of the FLIR assets. It would first replace the AC-130 FLIR systems in SEA and equip the other AC-130's being readied for deployment. AFLC, PACAF, TAC, and the Air Staff approved this plan even though it would further delay the training and deployment of the AC-119K's. An ASD/contractor team visited Southeast Asia in February 1969 and identified what modifications would improve the FLIR operation and maintenance. These changes were then embodied in Texas Instruments' production models of the sensor.<sup>104</sup>

The first FLIR, originally due at Fairchild-Hiller in June 1968, did not arrive until 3 May 1969.<sup>105</sup> Installed in an aircraft, it underwent initial airborne tests on 20 May 1969.<sup>106</sup> The Air Force received the last FLIR in April 1970--nearly a year later. With this long delay and despite a lengthy hold on AC-119K deployment, three K models reached SEA without the FLIR installation. They flew G-model mission profiles until the sensors arrived.<sup>107</sup>

The AC-119K's excessive weight also plagued its modification program and deployment. Even before the first roll-out ceremony for the AC-119K (24 September 1968), the aircraft's estimated weight raised ripples of concern. On 8 August 1968 TAC suggested the weight problem be tackled at an AC-119K Performance Improvement Conference, similar to the one held for the AC-119G. TAC believed "an early meeting would reduce impact upon aircraft modification/deliveries as well as crew training and deployment."<sup>108</sup> WRAMA, however, evaluated the weight problem without recourse to a formal meeting. On 23 August it informed AFLC that "total weight of K model components increased 6946 pounds over initial estimates, thereby decreasing mission duration."<sup>109</sup> One of the PACAF

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\*Of this total, 2,825 pounds was common to the AC-119G while 4,121 pounds was equipment peculiar to the AC-119K.

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mission profiles--belatedly sent to WRAMA--showed that in addition to the expected use of the AC-119K's jet engines during takeoff and climb, they were used in the attack phase. This would require 950 pounds of added fuel. WRAMA established a weight-reduction goal of 5,070 pounds, of which 1,525 pounds could be cut via the same route as the AC-119G's weight reduction. It mounted an all-out effort to trim the remaining 3,554 pounds.<sup>109</sup>

WRAMA sought to slim down the AC-119K by means other than stripping it of selected items. One possibility was a carburetor modification to permit operation of the R-3350 engines at a lean mixture during higher power settings. A structural analysis of the landing gear/nacelle was undertaken to determine if the ground limit of 77,000 pounds could be scaled upward to the inflight limit of 83,000 pounds. As a last resort, WRAMA would recommend to PACAF a cutback in loiter-time requirements from 4 to 3 hours and/or elimination of gunship items such as armorplating.<sup>110</sup> Removal of armorplating had been previously avoided because PACAF wanted the AC-119K's to fly interdiction missions which exposed them to a larger-caliber ground fire.\*

On 27 September 1968 WRAMA reported a solution to the AC-119K weight problem (see Table 5). With it WRAMA believed the aircraft could fly the most demanding SEA combat-mission profile and yet return to base with 1,050 pounds of fuel. To drop the weight outlined, the first few production aircraft would recycle. The majority still in modification/IRAN would do it at St. Augustine.<sup>111</sup>

#### Preparation for AC-119K Deployment

(U) Moves to organize the AC-119K squadron paralleled the modification, recycling, and testing of the AC-119K aircraft. Unlike the 71st Special Operations Squadron, the new unit would have many aircraft before activation.<sup>112</sup> A deployment conference in mid-December 1968 agreed to retain production aircraft 9 through 13 at

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\*CINCPACAF stated on 15 August 1968 the "primary role of [the] AC-119K is night interdiction of lines of communication (LOCS) to destroy wheeled or tracked vehicular traffic on roads as well as sampans and other small maritime traffic in the canals." [Msg (S), CINCPACAF to CSAF, TAC, AFLC, 152344Z Aug 68, subj: Combat Hornet (U).]

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AC-119K

St. Augustine awaiting the 18th Special Operations Squadron's activation. TAC said it lacked the people on station to maintain these five extra aircraft until the Squadron was formed. A TAC conference at Lockbourne AFB on 13 January 1969 discussed activation of the 18th SOSq and the slow aircraft deliveries.\*113 The 18th Special Operations Squadron first operated at Lockbourne in late January. For several months it concentrated on crew training, aircraft familiarization, and development of mission procedures.<sup>+</sup>

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\*Representatives from AFLC, WRAMA, 1st SOWg, 4413th CCT Sq, 71st SOSq, 840th Air Div, and 317th TAWg attended this conference.

<sup>+</sup>By 3 November 1968 TAC instructor aircrews had executed a total of 10 takeoffs and landings in the AC-119K as part of their preparation as instructor cadre. [WRAMA Historical Study 18 (S), AC-119G/K Gunship Program, 1969-1970 (Project Combat Hornet) (WRAMA, Mar 1971), p xxix.]

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TABLE 5

## WRAMA SOLUTION TO THE AC-119 WEIGHT PROBLEM

<u>Action</u>	<u>Pounds Saved</u>
Remove AC-119G weight-reduction items applicable to the AC-119K.	1,630.5
Remove armor in the area of the 20-mm guns* . . . . .	783.0
Raise the maximum gross ramp (ground) weight from 77,000 to 80,400 pounds with minor ground-handling precautions . . .	3,400.0
	<hr/>
Total . . . . .	5,813.5

\*Agreed to after Fairchild-Hiller reported gunners would spend little time at the 20-mm guns and thus could stay in more protected areas.

<u>AC-119K weight after above savings</u>	<u>Pounds</u>
Maximum ramp (ground) weight . . . . .	80,400.0
Loaded AC-119K less fuel:	
Basic AC-119K weight . . . . .	57,864.0
Crew and oil . . . . .	3,068.0
Ammunition and flares . . . . .	<u>4,947.0</u>
Total . . . . .	65,879.0
Fuel capacity . . . . .	14,521.0

SOURCE: Msg (C), WRAMA to AFLC, CSAF, TAC, CINCPACAF, 7AF, USAFSOF,  
subj: AC-119K Weight Reduction, 271400Z Sep 68.

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The late delivery of AC-119K's hampered combat crew training. At one time, the first combat crews were to enter phase 1 training at Clinton County AFB, Ohio, on 3 October and complete the phase in December 1968.<sup>114</sup> A shortage of aircraft, however, delayed entry dates and created problems for classes moving from one training phase to the next. Moreover, the first AC-119K's were without FLIR's which further weakened training. TAC finally had to draw upon its AC-130 experience and take special measures to train FLIR operators. The training program nonetheless planned to ready five crews each month, February through May, and four in June 1969.<sup>115</sup> The 10-man crew of the AC-119K consisted of an aircraft commander, pilot, navigator/safety officer, FLIR/radar operator (navigator), NOD operator (navigator), flight engineer, three gunners, and an IO. Plans envisioned air-crew manning at a 1.5 ratio per assigned aircraft.<sup>116</sup> The experiences of the 71st SOSq guided the 18th SOSq's training and deployment (see Appendix 1).

In mid-March 1969 WRAMA personnel met with those of TAC, 18th SOSq and 4440th Air Delivery Group to finalize the AC-119K ferry configuration. The group picked the same route used in deploying the AC-119G's (except for substituting Malmstrom AFB, Mont., for McClellan AFB) and readied a logistic plan for enroute support.\* Three 500-gallon rubberized fuel tanks would be installed in each aircraft, requiring the temporary removal of cockpit/cargo armor, 7.62-mm and 20-mm gun installations, the APQ-133 radar, and the flare launchers. In May 1969 WRAMA advised AFLC that final preparations for the ferry/deployment configuration were over.<sup>117</sup> On 20 May it closed out its AC-119 Gunship Program Office and assigned further management of the gunship program to the Cargo Aircraft Systems Management Division.<sup>118</sup>

In the spring of 1969, the deployment of the 18th Special Operations Squadron appeared near at hand but several factors held

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\*To support the ferrying of the AC-119K's: Three built-up R-3350 engines, two built-up props, two built-up J-85 engines, and a war readiness kit were prepositioned at McClellan AFB (but later at Malmstrom AFB) to support the aircraft in the United States. A built-up engine, a built-up prop, and a war readiness kit were prepositioned at Clark AB and a war readiness kit located at Hickam AFB, to support the aircraft in the PACAF theater.

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it up. Finding headroom for the AC-119K squadron plagued planners in early 1969. The transfer of the AC-47's to the VNAF enabled Seventh Air Force to eke out enough manpower spaces by the end of April. At that time, however, the Secretary of Defense had not approved the Deployment Adjustment Request.<sup>119</sup> More serious in holding up deployment was the slow production of the FLIR's. WRAMA reported on 12 March 1969 that further slippage would result in this delivery/installation schedule:

	FY 1969			FY 1970					
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
FLIR's delivered	1	1	2	6	7	8	3		
FLIR's installed			1	0	3	5	8	7	2

Headquarters USAF proposed a possible May-June deployment without FLIR's. CINCPACAF suggested a squadron deployment in September 1969--without FLIR's if production so dictated. TAC favored an August-September deployment. On 22 April 1969, after weighing the command responses, Air Force Headquarters set an early September 1969 target date for deployment with an initial operating capability in Southeast Asia by 30 September. The Air Staff knew the FLIR installation was the pacing factor but assumed some AC-119K's could be entirely equipped by that time. TAC projected in May that the 18th SOSq would have 2 complete aircraft in October, 10 in November, 17 in December, and 18 in January 1970.<sup>120</sup>

Another problem came to light during TAC's Category III test of the AC-119K in April, May, and June. The aircraft's flux-gate compass fed inputs to the fire-control system computer that were up to 40° in error after flying a firing circle. This plus a known error in the computer enlarged the overall error to 1,000 meters at 1,000 meters in an offset mode.<sup>121</sup> On 22 May 1969 TAC notified the Air Staff and AFLC that the tests verified the AC-119K's current configuration did not "possess a reliable offset-fire capability." TAC said it could not "in good conscience recommend employment of the existing AC-119K in the offset-mode in close air support role."<sup>122</sup> New tests revealed that replacement of the flux-gate compass with a two-axis gyro system could shrink the error to 400 meters at a 1,000-meter offset. This in turn could be cut to 50 meters at the same offset by giving the AC-119K a "complete solution" analog computer. AFLC recommended retrofitting the whole AC-119 fleet with the new compass and computer at

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an approximate cost of \$4.5 million.<sup>123</sup> TAC agreed if 50-meter accuracy would result.<sup>124</sup> Previous to the AC-119K deployment, the Air Staff assented to the installation of the two items. When the two-axis-gyro modifications were through, a recheck termed the offset system satisfactory.<sup>125</sup> WRAMA teams would fit the AC-119's with the analog computer in SEA during June 1970.

#### The AC-119K's Deploy

Not until 21 October 1969 did the 18th Special Operations Squadron's first six AC-119K gunships depart Lockbourne AFB for South Vietnam.\* Lt. Col. Ernest E. Johnson, the squadron commander, and the rest of the advance party reached Phan Rang AB on the 11th of October. The first AC-119K arrived there on 3 November<sup>126</sup> and by the close of the year 12 AC-119K's were in the theater. The final contingent of 6 aircraft deployed on 27 December, the 18th--and last--AC-119K ending its transpacific flight on 25 January 1970.<sup>127</sup> All aircraft were combat-configured by 4 February 1970.<sup>128</sup>

(U) The deployment of the 18th SOSq signaled the close of Combat Hornet, the AC-119G/K development program. Over 2 1/2 years had gone by from the moment Secretary Brown decided to use the C-119 as a gunship to the arrival in South Vietnam of the 18th SOSq's last AC-119K. A long arduous project, it had been riddled with indecision, controversy, technical/engineering problems, contractor/subcontractor equipment-development delays, and competition with higher-priority weapon systems.<sup>129</sup>

(U) In addition, the Combat Hornet program had met with stiff cost overruns. On 18 June 1969 Headquarters USAF singled out the AC-119 program to AFLC as a prime example of an undesirable cost-overrun trend.<sup>130</sup> These costs caught the eye of economy-conscious Senator William Proxmire, Chairman of the Subcommittee on Economy in Government. On 3 February 1970 he asked Philip N. Whittaker, Assistant Secretary of the Air Force (Installations and Logistics) why the 26-aircraft program's estimated costs began at \$50 million and climbed to \$158 million. "I wonder if you would verify these facts and explain why there has been such a large increase in the modification costs," said the Senator.<sup>131</sup>

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\*Labeled Coronet Keen, the deployment was governed by TAC Operations Plan 52-69.

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The Air Force replied that the 52 AC-119G/K modification program was first pegged at \$81.2 million with a new estimate of \$141.4 million. It attributed this sizable rise to numerous changes in design and equipment and a greater quantity of spares.<sup>132</sup> Not offered in rebuttal to Senator Proxmire were the delays in contract definitization and the premium overtime pay dictated by the project's urgency. Inflation, too, appeared to have played a part.<sup>133</sup>

~~167~~ The long-delayed arrival of the AC-119K's wound up a major realignment of gunship forces in South Vietnam. The Nha Trang Proposal, approved earlier in the year, had called for the relocation from Nha Trang to Phan Rang of the 14th Special Operations Wing Headquarters, the 71st Special Operations Squadron and the 18th Special Operations Squadron (yet to arrive).<sup>134</sup> When the 18th SOSq left the United States, it went direct to Phan Rang AB. The 71st SOSq suffered more turmoil. It not only moved its headquarters to Phan Rang\* and its Flight A to Tuy Hoa AB but underwent a major reorganization as well. The 17th Special Operations Squadron, activated on 1 June, replaced the 71st SOSq which returned<sup>135</sup> to Bakalar AFB, Ind., for inactivation.<sup>136</sup> The 17th Squadron absorbed about two-thirds of the 71st's personnel. The remainder were reservists<sup>+</sup> who departed South Vietnam for the United States on 6 June and reverted to inactive status by 18 June 1969.<sup>137</sup> This drain of skilled men imposed stringent training demands. Nevertheless, by the end of June the 17th SOSq, commanded by Lt. Col. Richard E. Knie, had trained replacements and reestablished routine operations.<sup>‡</sup> With the two AC-119 squadrons in place, the Air Force inactivated the 3d and 4th SOSq's and

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\*The squadron staff completed the move to Phan Rang on 21 August 1969.

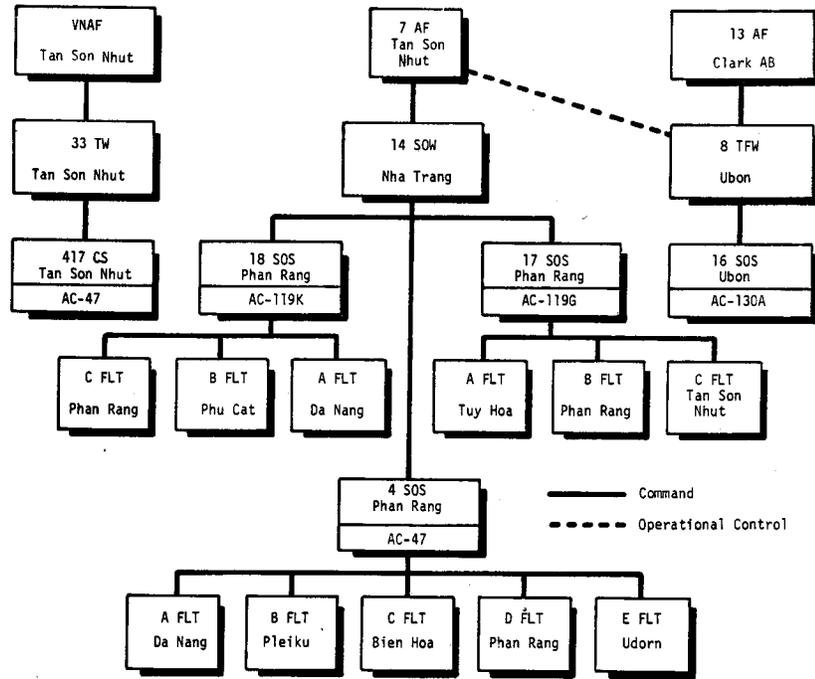
<sup>+</sup>The following personnel returned to the United States: 27 pilots, 16 navigators, 17 flight engineers, 18 illuminator operators, 151 support personnel for a total of 229 (44 officers, 185 airmen).

<sup>‡</sup>All 17th SOSq flights were short flight engineers. Six crewmen on TDY from the 4413th CCT Sq at Lockbourne AFB gave temporary relief. [Hist (S), 14th SOWg, 1 Apr-30 Jun 69, p 35.] AC-47 gunners transferred in from the inactivated Spooky squadrons took care of the 17th SOSq's gunner shortage. [Hist (S), 14th SOWg, 1 Oct-31 Dec 69, p 12.]

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transferred their AC-47's to the VNAF or RLAF.\* Thus the AC-119 units became the sole USAF gunship force based in South Vietnam.

### ORGANIZATION & DISPERSAL OF GUNSHIPS



NOTE: 1. VNAF and USAF gunship effort in-country coordinated in 7AF TACC.  
 2. USAF gunship effort out-country coordinated in 7AF Command Center (BLUE CHIP).

Fig. 31 (U)

At the close of 1969, the AC-119's were deployed as follows:

	<u>Aircraft Assigned</u>	<u>Aircraft Planned</u>
<u>17th Special Operations Squadron</u>		
A Flight, Tuy Hoa Air Base <sup>+</sup>	4 AC-119G	6
B Flight, Phan Rang Air Base (Main Support Base)	7 AC-119G	6
C Flight, Tan Son Nhut Air Base	5 AC-119G	6
<u>18th Special Operations Squadron</u>		
A Flight, Da Nang Air Base	6 AC-119K	6
B Flight, Phu Cat Air Base	3 AC-119K	6
C Flight, Phan Rang Air Base (Main Support Base)	3 AC-119K	6

\*See Chapter II. One small group of USAF AC-47's was in Thailand at years end.

<sup>+</sup>A Flight finished the move from Nha Trang AB to Tuy Hoa AB on 10 August 1969. [Hist (S), 14th SOWg, 1 Jul-30 Sep 69.]

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The first three AC-119K's arrived at the Da Nang FOL on 29 November, the first three at the Phu Cat FOL on 29 December.<sup>138</sup>

The distribution of AC-119 aircraft reflected early gunship concepts and experience and an effort to respond rapidly to Army close air support needs. Its soundness would be open to question should the AC-119K be largely used for interdiction in the Steel Tiger area of Laos. This seemed to be the case for the Da Nang and Phu Cat FOL's of the 18th SOSq were already heavily out-country oriented. Their aircraft were daily fragged by Seventh Air Force against vehicle traffic on the Laotian roads.<sup>139</sup> CINCPAC had told the JCS that 12 AC-119K's of the 18th Squadron would supplement other self-contained night attack systems in Laos.<sup>140</sup> These facts and concern over keeping the more sophisticated AC-119K at a number of FOL's impelled the 14th Special Operations Wing to propose another look at AC-119K deployment.\* The Wing recommended that Seventh Air Force locate 12 AC-119K's at Da Nang and 6 at Ubon RTAFB. This would put the AC-119K's closer to the target area and let them use the special maintenance equipment at Ubon--equipment common to both AC-130's and AC-119K's.<sup>141</sup> Seventh Air Force rejected the proposal in the main but on 17 February 1970 activated Flight D at Udorn RTAFB with three AC-119K' and four aircrews taken from Flight B at Phu Cat AB.<sup>142</sup>

#### AC-119K Combat Operations/Evaluation

The 18th SOSq's combat operations commenced side by side with the AC-119K's combat evaluation (known as Combat King). The initial cadre of the 18th Squadron entered training and theater indoctrination with the 17th SOSq.<sup>+</sup> On 13 November 1969--barely 10 days after the first AC-119K's arrived--aircraft 53-3156 flew the first combat mission.<sup>143</sup> During the combat evaluation (3 November 1969-28 February 1970), 18 AC-119K's flew a total of 778 of the 865 sorties scheduled--a 90 percent rate. The type of sorties ranged from armed reconnaissance to check flights (see Table 6). On 1 February the 18th Special Operations Squadron began flying the full

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\*Often referred to as the "beddown."

<sup>+</sup>Some aircrews had to attend the PACAF Jungle Survival School (fondly called the "Snake School") at Clark AB, Philippines, prior to completing in-country checkout.

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frag rate of 10 sorties a day as directed by Seventh Air Force.<sup>144</sup> After all this activity, the Combat King evaluators concluded that "the AC-119K effectively supported the PACAF mission requirements by flying its assigned combat missions. It was capable of destroying trucks and attacking targets as assigned."<sup>145</sup> By the end of 1969, MACV had judged the AC-119K a successful system.<sup>146</sup>

(C) The nearly 4-month combat evaluation of the AC-119K did disclose certain deficiencies. Maintenance manning, made difficult by decentralization, was found inadequate to properly support the FOL's. Likewise, squadron manning did not provide for a commander and operations officer at the FOL's so full-time crewmembers had to discharge these duties. Aerospace ground equipment was short at the FOL's and logistic support in general needed reevaluation. The AN/AAD-4 forward-looking infrared, rated an essential and effective sensor, was kept operational only through contractor maintenance support.\* The final evaluation report recommended the four 7.62-mm miniguns be removed and one additional 20-mm gun be installed. As currently configured, the AC-119K needed to carry

\*Contractor support kept a number of systems operational:

<u>System</u>	<u>Number of Personnel</u>	<u>Contractor</u>
Aircraft general	3	Fairchild-Hiller
AN/AAD-4	8	Texas Instruments
AN/APQ-136	1	Texas Instruments
Fire-Control	1	Fairchild-Hiller
AN/APQ-133	1	Motorola
Armament	1	General Electric
Illuminator	1	Electrical Optics Systems Company

WRAMA said: "The support problems for the AN/AAD-4 FLIR and AN/APQ-136 Forward Looking Radar are not totally unanticipated," since technical troubles with both systems caused "late provisioning and AGE identification." WRAMA forecasted "April 1970 for the AN/AAD-4 FLIR and June 1970 for the AN/APQ-136 radar before full routine support is attained." [Talking paper (S), Maj Gen Harry E. Goldworthy, Commander, ASD, subj: Item of Interest, AC-119K Logistics Support in SEAsia, Dec 1969.]

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TABLE 6

COMBAT EVALUATION OF THE AC-119K  
(3 November 1969-28 February 1970)

<u>Attacks on</u>	<u>Number</u>	<u>Destroyed</u>	<u>Damaged</u>
Suspected enemy locations	144		
Known enemy locations	137		
Trucks	1,290	302	271
Sampans	27	26	1
Storage areas	42		
Bridges	4		
Other targets	23		

.....  
Positive target results: 538 secondary explosions and 186 secondary fires.

Target illumination: 178.1 hours with illuminator; 115 Mk-24 flares expended.

Rounds of ammunition fired: 1,354,846 of 7.62-mm and 595,519 of 20-mm.

Flying time: 2,417.2 hours of which 2,117.3 were combat hours.

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<u>Type of sortie</u>	<u>Number</u>
Armed reconnaissance in support of U.S. and other friendly ground forces or against LOC's along major enemy land/waterway supply routes	638*
Support . . . . .	85 <sup>+</sup>
Check flights . . . . .	36
Training . . . . .	<u>19</u>
Total . . . . .	778

\*410 flown outside and 228 inside South Vietnam.

<sup>+</sup>52 for troops in contact with the enemy.

SOURCE: TAC OPlan 120 (S) subj: Final Report Combat Introduction/Evaluation AC-119K Gunship III (U) (Combat King), Aug 1970, pp 41-61.

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more 20-mm ammunition since it expended an average of 655 rounds on each truck. Furthermore, the high failure rate of the 20-mm system, due chiefly to the ammunition-feed system, created concern. The AN/APQ-133 beacon-tracking radar was not evaluated because of little utilization during the test period.<sup>147</sup>

The AC-119K had been into the combat evaluation almost a month when it received a new call sign and thus a new nickname. The 18th Special Operations Squadron reviewed a list of available calls including Gun Shy, Poor Boy, and Charlie Brown. The men of the squadron dejectedly picked Charlie Brown as the "least of these evils" but strongly asserted they deserved better. It turned out later the 366th Tactical Fighter Wing at Da Nang had an unused tactical voice call sign--Stinger. The 18th SOSq, backed by the 14th Special Operations Wing, put in a claim for it. The 18th saw Stinger as slightly off the gunship tradition but a satisfactory compromise--a sign around which unit pride could be built and a continuation of the "S" alliteration of gunship call signs.<sup>148</sup> Seventh Air Force approved the call-sign transfer and the AC-119K became Stinger on 1 December 1969.<sup>149</sup> Stinger now joined Spectre in armed reconnaissance of enemy supply lines in Laos and Shadow in a variety of missions in South Vietnam. Spooky was also around, carrying the flag of allied nations.

#### 1969 Operations

The AC-119G's were in combat virtually a year before the AC-119K's. The AC-119G squadron solidly buttressed the 1969 war effort although bedeviled by aircraft corrosion/equipment problems,<sup>\*150</sup> redeployment and reorganization, and ceaseless retraining of aircrew/support personnel. At the time its designation switched to the "17th Special Operations Squadron" (1 June 1969), the 71st SOSq had flown 1,209 fragged missions (1,516 sorties) and 6,251 combat hours; fired 14,555,150 rounds of 7.62-mm ammunition; dropped 10,281 flares; killed 682 enemy troops (1,104 probables); and destroyed 43 vehicles (eight probables).<sup>151</sup> From June through December 1969, the 17th SOSq's performance exceeded: 2,000 sorties and 8,000 combat hours flown; 20 million rounds of ammunition fired; 12,000 flares expended; 800 enemy killed; 150 sampans destroyed; and 800 secondary explosions recorded.<sup>152</sup> The 14th Special Operations Wing still proudly claimed that no allied outpost had been overrun while the gunships were overhead.

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\*Some labeled the C-119 a "maintenance nightmare." [Hist (S), 14th SOWg, 1 Jan-31 Mar 69, p 34.]

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During 1969 the NOD and computerized fire-control system of the AC-119G Shadow enabled it to edge ever closer to offensive missions. The AC-47 Spooky largely reacted to enemy strikes but the Shadow actively sought out enemy supply convoys and troop concentrations.<sup>153</sup> The AC-119K Stinger's more sophisticated gear supplied the stronger punch for even more offensive missions.

An attempt to capitalize on Shadow's see-in-the-dark capability occurred in February 1969. Since October 1968, observers had sighted unidentified flying objects (UFO's) of helicopter speed and altitude in the Duc Co area of western II Corps. The matter aroused operational interest because the enemy might be transporting men and equipment by helicopter from Cambodia to strategic locations in South Vietnam. Seventh Air Force committed Shadows to joint surveillance with the Army Hawk radar element, counter-mortar radar, and Cobra helicopters. On several missions into the area, the AC-119G's saw UFO's but couldn't identify and/or intercept them.<sup>154</sup>

Shadow gunships at first joined the AC-47's in protecting friendly outposts, Special Forces camps, district towns, or other fixed military positions under enemy assault. The Spooky count became the Spooky/Shadow count. The two gunship types defended 1,296 friendly positions in the first 3 months of 1969. Not one position fell while the gunships circled above. By December the Shadows had entirely replaced the USAF Spookies.<sup>155</sup>

Cooperation between Shadow crews and ground personnel during support missions steadily improved. Allied troops and DASC agencies became more familiar with the AC-119G and what it could do.<sup>156</sup> A typical ground-support episode unfolded on 7 June 1969. Enemy forces tried to overrun 25th Infantry Division fire-support base "Crook," which nestled near an enemy route into Tay Ninh Province. AC-119G/AC-47 gunships and USAF tactical fighters answered the call for assistance. To help turn back the enemy attack, the gunships used flares and miniguns, the fighters napalm and bombs. A sweep of the area afterwards counted 323 enemy killed. The few prisoners questioned told how the aerial fire-power surprised and overwhelmed them.<sup>157</sup>

Very early the AC-119G had a small role in an effort to improve air support of ground forces. In September 1968 Air Force

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Headquarters had directed TAC to employ Shadow in two evaluations-- Combat Cover and Combat Rendezvous.<sup>158</sup> In Combat Cover an OV-10A armed FAC joined the AC-119G in sustaining a USAF strike presence over an Army unit. The aim was to slash response time to Army requests for air support. Combat Cover's first phase shaped FAC/gunship mission profiles and the second phase rated reaction times. The FAC response averaged 2.4 minutes, the gunship 5 minutes from notification to target area and 3.4 minutes to swing into firing position. TAC evaluators considered the concept feasible but pointed to the discomfort and extra workload of the OV-10A pilot and the "debatable use of the gunship in the close air support role."<sup>159</sup>

General Momyer, TAC Commander, informed Air Force Headquarters that Combat Cover revealed: no marked improvement in reaction time, the armed FAC (perhaps compromising the FAC role) had little firepower to apply, the OV-10 was too noisy for the strike role, and the gunship was vulnerable to anything larger than .30-caliber fire. The General recommended cancellation of an evaluation of the concept in SEA. Other organizations did not share these negative views and the Air Staff set the SEA tests for mid-1969.<sup>160</sup> TAC nevertheless went on record as opposed to the allocation of gunships to Army Divisions as well as use of the gunship in a phased-response concept.<sup>161</sup> The chief upshot of Combat Cover was the arming of the OV-10's. As to Combat Rendezvous, AC-119's and AC-130's participated in the test at Hurlburt Field, Fla., from 18 to 22 November 1968.<sup>162</sup> The evaluation centered on close air support by means of offset firing, utilizing a ground force's beacon or transponder as a reference point. Combat Rendezvous uncovered concept/equipment potential but also a need for further development.

Arranged visits between gunship crewmembers and U.S. Army unit commanders sought to strengthen air/ground coordination. The visits were designed to widen perspectives and pinpoint requirements for effective operations. Crewmembers of the 17th Special Operations Squadron visited the Americal Division in the last quarter of 1969. A written guide for aiding Army commanders on gunship-employment techniques grew out of these exchange visits.<sup>163</sup>

(U) Shadow flew a far different mission early in 1969. A friendly compound lost electric power during a Vietcong attack. At

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## COMBAT RENDEZVOUS (AC-119/AC-130)

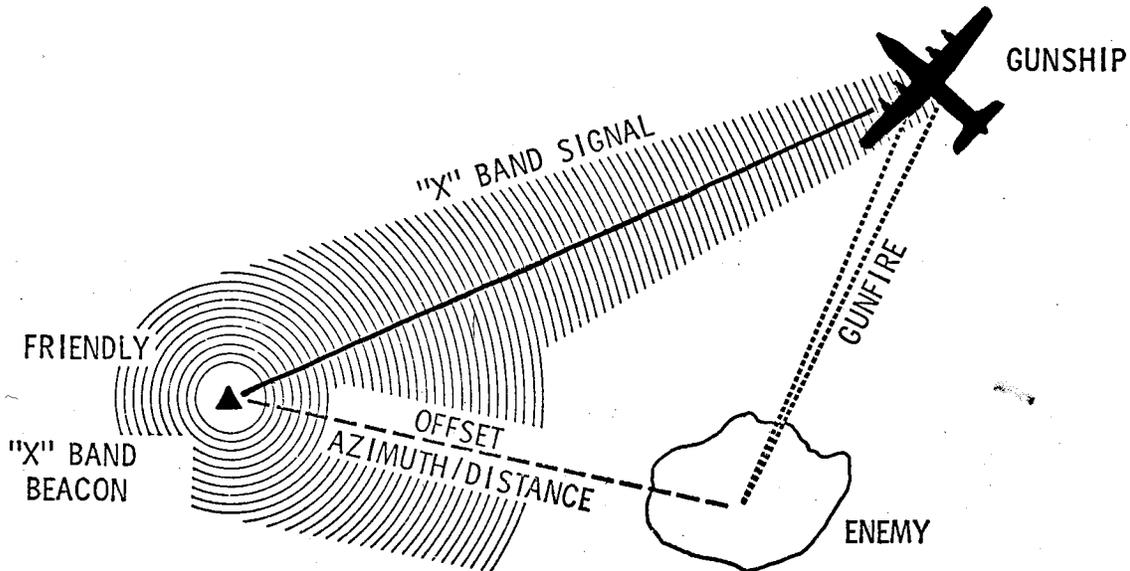


Fig. 32 (S)

that time a doctor was performing a delicate operation on a wounded Vietnamese soldier. Responding to the call for help, an AC-119G from the 71st SOSq hovered over the compound, its 1-million-candlepower illuminator pouring light over doctor and patient. Lt. Col. Burl C. Campbell and his crew held the aircraft in a tightly controlled orbit despite the bright beam's marking the gunship for enemy gunners. The Vietnamese trooper lived--his operation and Shadow's a success.<sup>164</sup>

In the last half of August 1969, the 17th Special Operations Squadron put in for relief from at least one AC-119G mission per night due to the strain on aircraft maintenance. Four Shadows incurred battle damage and on 6 August one more took .50-caliber hits in the fuselage and one engine, producing an engine fire and extensive damage. Corrosion-control work,\* maintenance inspections, and disruptions in parts supply (owing to unit movements under the Nha Trang Proposal) aggravated the aircraft problems.<sup>165</sup>

\*Four aircraft were sent to Kadena AB, Okinawa, for this work.

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The 17th SOSq lost its first aircraft on 11 October: Shadow 76 crashed upon takeoff for a mission from the FOL at Tan Son Nhut AB. Six crewmembers were killed and the aircraft was destroyed.<sup>166</sup> Another AC-119G sustained severe damage on 10 November when its right gear collapsed on landing at Chu Lai AB.<sup>167</sup>

(S) The drop in squadron fragging, a decline of enemy activity, and worsening weather slightly altered the "seek and destroy" concept of the first half of 1969 to a "combat air patrol" operation.<sup>168</sup> By mid-December most of the problems afflicting the AC-119G's had eased and the squadron posture strengthened.<sup>169</sup>

### 1970 Operations

(S) January 1970 ushered in the second year of Shadow operations. Enemy action had so dwindled within South Vietnam that many missions were directed to border areas with more interdiction targets.<sup>170</sup> Specific strike zones (Shadow Boxes) were designated for armed reconnaissance. Intelligence officers determined each afternoon which boxes would likely prove most lucrative. A box would be assigned to a Shadow for the night mission. Enroute, the navigator secured artillery ("arty") clearances that often required a roundabout approach to the area and a great deal more time to reach the target.\* The aircraft commonly flew a TACAN radial to a prominent landmark in the box. It acquired the landmark with the NOD and dropped a Mk-6 ground marker for positive positioning. The Shadow descended to 3,500 feet AGL for the target search. If the aircraft detected a vehicle, for example, it might drop another ground marker for better reference as the attack began. Through study and briefings, the aircrews had to know all roads and trails in the box so Shadow could reconnoiter any new parallel routes.<sup>171</sup> These missions yielded few enemy vehicles destroyed because the AC-119G lacked the weapons punch needed.

(S) The Shadows were at their best in defense of the CIDG Special Forces Camps at Dak Seang and Dak Pek. Aided by Stingers,

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\*To allow Shadow direct flight when responding to a call from troops in contact with the enemy, a request for "shut down" of artillery would be made. [Intvw (U), author with Lt Col Boris C. Chaleff, Plans & Prgms Div, Chief/AF Res, 7 Jul 72; Lt Col Daniel B. Smoak, Maj Alan M. Patterson, and MSgt Owen D. Stickles, "AC-119G," information handout, in hist (S), 14th SOWg, 1 Oct-31 Dec 69.]

the Shadows flew one or two sorties a night to constantly cover the besieged posts during the hours of darkness. From 1 April to 22 May 1970, the AC-119 gunships flew 147 sorties and used up 2,380,161 rounds of 7.62-mm ammunition and 21,796 rounds of 20-mm in defense of the 2 camps. In addition, the Shadows were called upon to illuminate a drop zone while C-7A Caribous tried to resupply the defenders by air. Three C-7A's had been downed in previous tries. Gunship/Caribou teamwork evolved whereby the gunship would orbit the posts and provide fire support until the Caribou reached the initial point for its drop. At that instant the gunship turned on the illuminator.\* The cargo away--and upon signal from the C-7A--Shadow switched off the illuminator and the Caribou escaped in the darkness. This tactic worked in a total of 68 drops (6 April-1 May) without a Caribou being hit.<sup>172</sup>

(S) Meantime, Shadows joined in the Duffel Bag Unit Systems Evaluation of new airborne equipment that monitored signals from ground sensors. From 3 April to 31 May, AC-119G's from C Flight at Tan Son Nhut AB, carried a portable UHF receiver (AN/USQ-42). It could receive, decode, and display the sensor signals and audio transmission. Shadow 77 picked up signals on 18 April that signified movement in a sensor field. The gunship fired nearly 6,000 rounds of 7.62-mm ammunition into the area and 28,500 rounds the next night after again detecting the movement. Shadow further assisted an airstrike into the region. A later ground sweep of the zone discovered 150 enemy dead and netted 17 prisoners, plus 9 crew-served weapons as well as 67 individual ones. The final assessment (Evaluation Report AC-119G/Portable June 1970) recommended the new equipment be permanently placed in the AC-119.<sup>173</sup>

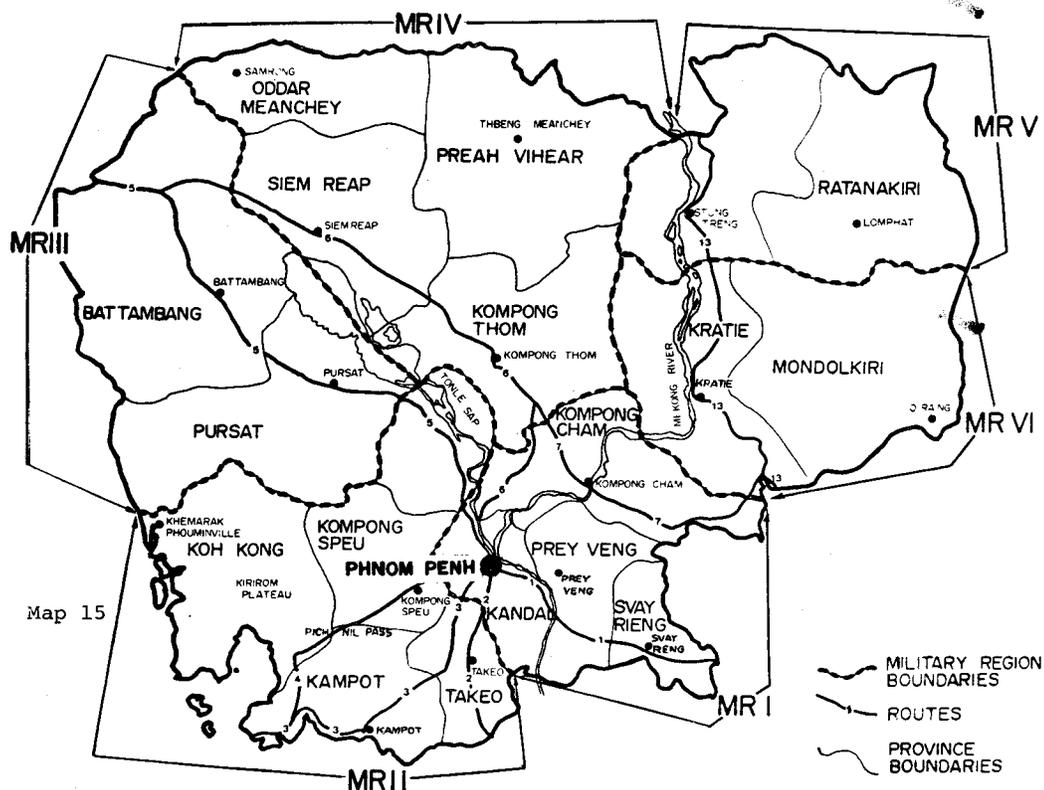
### Cambodia

(S) On 1 May 1970 United States and South Vietnamese forces crossed the border into Cambodia with a dual objective. They were to (1) shore up the weak Cambodian army struggling with North Vietnamese units, and (2) destroy the enemy forces and the supplies

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\*The illuminator was rated at 425,000 lumens. (A lumen is a unit of luminous flux equal to the light emitted in a unit solid angle by a uniform point source of one candle.)

CAMBODIA



long cached in numerous border base camps. AC-119 gunships flew many missions in close support of this big offensive. In anticipation of support requirements, particularly in the Parrot's Beak\* area, gunships had been shifted to Tan Son Nhut and Phan Rang on 3 May. These AC-119's soon returned to their permanent bases because the ground force met light enemy resistance.<sup>174</sup>

The Air Force gave first mission priority to support of troops in contact with the enemy in Cambodia, followed in turn by convoy escort and armed reconnaissance. On a number of occasions, the AC-119G's competently supported friendly units under night attack. At times the assaults were broken off when Shadow appeared overhead. Obtaining a count of enemy dead was difficult due to the fluid offensive. Furthermore, the friendly forces were reluctant to sweep battle areas before daylight, allowing the enemy time to dispose of those killed or wounded.<sup>175</sup>

\*The tip of the Cambodian salient west of Saigon.

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(S) At the height of Cambodian activity, new artillery clearance procedures speeded up gunship flights to the aid of ground units. The Air Force coordinated artillery clearances from Phan Rang AB to the Cambodian border with the Army before the gunship took off. Formerly, the gunships had secured clearances when airborne which meant more course alterations to avoid guns not shut down. This change slashed reaction time and afforded the gunships more time-over-target.<sup>176</sup>

(S) Both river and road convoy escort missions assumed an early importance because of a critical petroleum shortage in Phnom Penh, the Cambodian capital. Seventh Air Force controlled an air-cover package of aircraft from three services, put together for armed escort of Navy convoys plying the Mekong River. The Navy generally gave a 3-day advanced-planning notice for their river convoys. An AC-119G would circle the convoy for 24 hours at 3,500 feet. An Army light fire team\* flew coverage at 1,500 feet during daylight. The helicopters cycled between the convoy and their base at Chi Lang for refueling. The Navy employed two UH-1B's and two OV-10's for low-altitude coverage at night. These planes cycled from their command-and-control vessel anchored in the Mekong River at Tan Chau, across the border in South Vietnam.<sup>177</sup>

(S) Shadows escorted road convoys in Cambodia either alone or with a FAC aircraft. When paired, the FAC searched for enemy ambush preparations along the convoy's route while the AC-119G flew in a large elliptical orbit overhead.<sup>+</sup> An excellent example of a successful convoy-escort mission occurred a year later when the enemy was aggressively attacking convoys. On 30 June 1971 a 51-truck convoy left Phnom Penh headed southwest on Route 4 for Kompong Som. An escort FAC detected enemy movement north of Route 4 and suspected an ambush in the making. The FAC requested strike aircraft and a diverted AC-119G arrived. A recheck of the area confirming his suspicions, the FAC cleared the Shadow for attack. The gunship poured 7.62-mm fire on the clusters of troops who then answered with ground fire. The AC-119G raked the enemy position until the last truck had rolled safely by the planned ambush site. The Shadow had expended 31,500 rounds in a mission of 5.3 hours.<sup>178</sup>

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\*The team contained one command-and-control helicopter, two Cobra helicopter gunships, and two light observation helicopters.

<sup>+</sup>The Cambodians often upset convoy-escort planning. They scheduled their own convoys and failed to coordinate the air cover.

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(S) Cambodian armed reconnaissance missions zeroed in on trucks and river sampans. The AC-119G's 7.62-mm miniguns could do little against these targets and far less when the enemy armored the sampans. In July 1970 the AC-119K's with their 20-mm cannons undertook this role. Even the Stinger had to use 20-mm armor-piercing incendiaries to sink the armored sampans when 20-mm high-explosive incendiary rounds could not. The AC-119G picked up punch when it tried a few 7.62-mm armor-piercing incendiaries from the U.S. Army against vehicles and watercraft. Additionally, the sparkle of the armor-piercing rounds upon impact helped the pilot gauge his firing accuracy.<sup>179</sup>

(S) This short span of Cambodian operations (5 May-30 June 1970) saw the AC-119 gunships fly 178 sorties, fire 1,412,028 rounds of 7.62-mm ammunition and 7,500 rounds of 20-mm, and drop 1,463 flares.<sup>180</sup> The U.S. ground operations in Cambodia quickly closed but the gunship continued supporting Cambodian and Vietnamese troops. Over 9 months (July 1970-March 1971) the Shadows and Stingers destroyed or damaged 609 vehicles, destroyed 237 sampans and damaged 494, and killed 3,151 of the enemy.<sup>181</sup>

(S) Fortunately, the gunships found the Cambodian area lightly defended. The small-caliber enemy fire inflicted no aircraft losses. On 1 August 1970 the AC-119G's, joined by a few AC-119K's, started daytime air interdiction--a further reflection of feeble enemy AA fire.<sup>182</sup>

(S) On 28 April 1970 the 17th Special Operations Squadron did lose another aircraft--AC-119G (no. 53-8155). The gunship lost an engine on takeoff from Tan Son Nhut AB, crashed, and killed six of the eight crewmembers. The Air Force then trimmed the AC-119G's maximum gross takeoff weight by cutting fuel/ammunition loads to achieve a 150-foot-per-minute rate of climb on a single engine.<sup>183</sup>

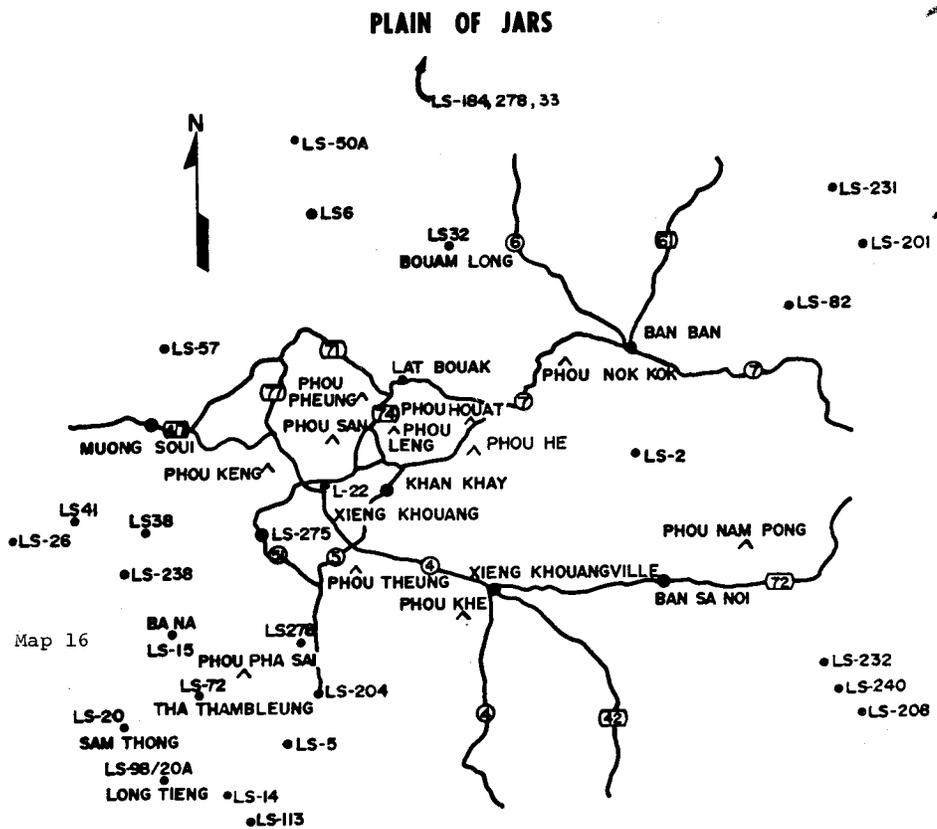
### Laos

(S) While the Cambodian Offensive opened a new war area for the gunships, especially the AC-119G's, operations progressed in the panhandle and Barrel Roll areas of Laos. As 1970 began, an enemy offensive alarmingly succeeded against General Vang Pao's forces in northern Laos. With PACAF's permission, Seventh Air Force directed a trial deployment of AC-119K's to

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Udorn RTAFB in support of Barrel Roll during February's high moon phase. On 5 February Seventh ordered an operational test during 17-27 February from Udorn.<sup>184</sup> On 15 February 3 AC-119K's, 4 crews, and 30 maintenance men deployed to that base from Phu Cat AB. The AC-119K's main mission was armed reconnaissance along Routes 7 and 61 in Barrel Roll and secondarily the support of Lima Sites under attack. The first Stinger mission was flown out of Udorn on 17 February.<sup>185</sup>

About this time the enemy's offensive crested. The North Vietnamese and Pathet Lao forces captured the Xieng Khouang airfield then rolled west and overran the Royal Laotian Air Force T-28 base at Muong Soui. The key Lima Site 22 gave way after a 2 1/2-hour nighttime assault when no gunship support was scheduled. By 24 February 1970 the enemy again possessed the Plain of Jars with pro-government forces clinging to a defensive perimeter west and south of the Plain.<sup>186</sup> The AC-119K operations intensified to meet the crisis. As the end of Stinger's 10-day operational test neared, Seventh Air Force stretched its stay at Udorn to 2 July 1970 with reevaluation set at that time.<sup>187</sup>



(S) The Stingers significantly strengthened the effort in Northern Laos. In view of the AC-47's anticipated release, the AC-119K's ongoing role in Barrel Roll operations seemed essential.<sup>188</sup> On 21 March 1970 the Thai-based detachment's strength rose to four aircraft, seven crews, and 47 support personnel.<sup>189</sup> The total aircraft dropped to three (five crews) on 20 May as bad weather slowed ground operations.<sup>190</sup> In June, Seventh Air Force asked CINCPACAF to keep the AC-119K's at Udorn another 120 days, explaining the "AC-119K had been the number one truck killer in Barrel Roll, accounting for 70 percent of all trucks destroyed."<sup>191</sup>

(S) Although Barrel Roll occupied part of the 18th's aircraft, the squadron was chiefly charged with interdiction in Steel Tiger and the adjacent A Shau Valley area. The AC-119K's shared with the AC-130's a heavy commitment to stop every enemy truck they could. The last Stinger contingent had reached South Vietnam in February 1970. Shortly thereafter, estimates of tonnage trucked by the North Vietnamese through Laos toward Vietnam soared. Pressure on truck-killing paralleled this surge of traffic. Mission reports disclosed 2,321 trucks were destroyed during 1 month--2,125 of them in Steel Tiger. Gunships claimed 60 percent of these kills.<sup>192</sup> Da Nang-based Stingers flew four sorties per night against heavy truck traffic on Routes 92 and 922.<sup>193</sup> The AC-119K's at Phu Cat went from two missions a night on 1 January to 5 a night by 1 February.<sup>194</sup> Over the first quarter of 1970, Stingers claimed 406 trucks destroyed and 607 damaged. On 25 April 1970 the 18th Special Operations Squadron operating location at Da Nang--focal point for most squadron interdiction missions--claimed its 1,000th disabled truck. On 6 May the claimed truck kills for the entire squadron hit 1,000.<sup>195</sup>

(S) In spite of the 18th Special Operations Squadron's truck record, Seventh Air Force closely studied AC-119K interdiction performance in mid-February 1970. It compared AC-119K/AC-130 statistics and discovered that Stinger had far fewer truck-sightings than Spectre. The AC-130's superior endurance and armament appeared to account for its better record. Careful weighing of the data on total trucks sighted per time on target placed the AC-119K alongside the AC-130 in performance.<sup>196</sup>

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Support problems and the demand for greater time-over-target soon spurred a further adjustment in 18th Special Operations Squadron basing. The first few interdiction missions from Phu Cat clearly proved that FOL unsuitable for such out-country sorties. Phu Cat's distance from the target area and the AC-119K's fuel load confined Stinger operations to certain areas in Laos.<sup>197</sup> Even to the closest areas, the Stingers had trouble getting 1 1/2 hours on target. On 3 March 1970 CINCPACAF suggested Seventh Air Force reappraise the entire 18th SOSq concept if the Udorn operation continued. CINCPACAF felt the current logistical/maintenance headaches pointed up the need to consolidate FOL's.<sup>198</sup>

On 16 March, Seventh Air Force began planning for re-deploying the 18th Special Operations Squadron, tailored to the new tactical situation and support requirements. The 14th Special Operations Wing proposed moving B Flight's remaining assets from Phu Cat AB to Da Nang AB, expanding the AC-119K's there from six to nine. Timed with this move, the A Flight of the 17th SOSq would depart Tuy Hoa AB and occupy the vacated 18th SOSq facilities at Phu Cat. This latter change would permit programmed base-closure actions at Tuy Hoa to progress and at the same time assure a faster gunship response to I Corps support requests.<sup>199</sup> The plan was approved and Seventh Air Force authorized the Da Nang buildup on 5 April. It was completed on 23 April 1970.<sup>200</sup> The A Flight of the 17th SOSq accomplished its move from Tuy Hoa to Phu Cat on 12 April 1970.<sup>201</sup>

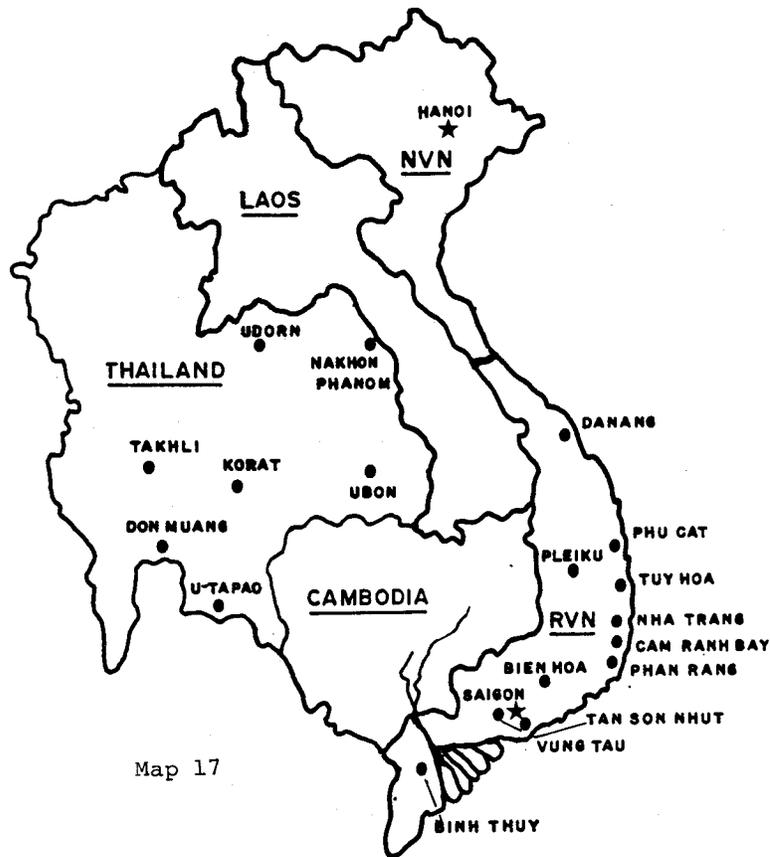
Fresh study in June of Stinger's time-over-target led the 14th Special Operations Wing\* to urge a beddown of 12 AC-119K's at Da Nang and 6 at Ubon. This would bring the Stinger force closer to the armed reconnaissance areas. The Commander, 14th SOWg, told the Seventh Air Force Commander that in 1,395 hours of TOT the AC-119K had destroyed/damaged 1,712 trucks--an average of 1.23 trucks disabled per hour of TOT. "Since there is a direct relationship between TOT and truck kills, increased TOT appears the most readily available potential to exploit in improving effectiveness," he said. The 14th Wing Commander offered deployment of the AC-119K force to Da Nang and Ubon as the best way to capitalize on greater target time.<sup>202</sup> He also advocated setting up

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\*The 14th SOWg was dubbed the Fighting Conglomerate.

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SOUTHEAST ASIA



Map 17

the main support base for the AC-119K's at Da Nang and removing Stinger's APQ-133 beacon-tracking radar to reduce weight and allow a greater fuel load. 203

Seventh Air Force replied it favored a move from Udorn to Nakhon Phanom RTAFB rather than to Ubon. Seventh reasoned that the Nakhon Phanom location would add flexibility to both Steel Tiger and Barrel Roll operations. Then too, the projected force cuts at Nakhon Phanom would open up facilities there. 204

Planning for executing a move to Nakhon Phanom pushed ahead but at mid-1970 the AC-119 basing stood as follows: 205

<u>Location</u>	<u>Aircraft assigned</u>
Phan Rang AB, RVN	7 AC-119G/4 AC-119K
Phu Cat AB, RVN	5 AC-119G
Tan Son Nhut AB, RVN	5 AC-119G
Da Nang AB, RVN	9 AC-119K
Udorn RTAFB, Thailand	3 AC-119K

Beacon-Tracking Radar (APQ-133)

☛ The APQ-133 beacon-tracking radar figured in discussions on AC-119K basing because its extra weight chopped 20 to 30 minutes off the time-over-target. The AC-119K's accordingly flew without the APQ-133 during the early days at Da Nang and Phu Cat. Fashioned for close support of ground troops, the system was deemed nonessential for interdiction missions.<sup>206</sup> Furthermore, the lack of test equipment at the FOL's hampered APQ-133 maintenance.

☛ In January 1970 Seventh Air Force received a requirement to support a special operations team (equipped with transponders) to be inserted into Laos. A maintenance team from Phan Rang AB visited the operating locations and installed the APQ-133 in all AC-119K's.<sup>207</sup>

☛ Equipping the Stingers with beacon-tracking radar opened the way to test their offset-firing. The earlier Combat Rendezvous tests in the United States had pointed to the offset-firing system's potential but development of the concept and equipment had lagged. In February 1970 the Army Limited War Laboratory offered mini-ponders (5 watt and 400 watt) to the U.S. Army in Vietnam for SEA evaluation.<sup>208</sup> The 14th Special Operations Wing sent Seventh Air Force a proposed test order on 21 February. The test (Combat Rendezvous--Phase II) would introduce an all-weather close-support capability for all gunships fitted with the APQ-133 beacon-tracking radar.<sup>209</sup>

☛ In the spring of 1970, a ground beacon was placed at Dak Seang under the auspices of the Seventh Air Force Tactical Air Control Office and the II Direct Air Support Center. Using a Stinger from Da Nang, the test firings yielded excellent results. A later demonstration for Army commanders proved less impressive as the firing was against Army-placed point targets in lieu of the more advantageous area ones. Some all-weather firing, with the APQ-133 cued on a ground transponder, fared well at Bung Lung, Cambodia. In spite of favorable tests, the ground force commanders did not formally accept the offset-firing system. It was nevertheless used in selected high-risk tactical situations where the ground troops had transponders.<sup>210</sup>

Vulnerability of the AC-119K's

(S) The heavy demand for AC-119K support of ground operations and interdiction of the enemy's dry-season supply effort contributed to some early losses. The first occurred on 19 February 1970 when Stinger number 53-3156 crashed short of the Da Nang runway while returning from a combat mission. The final approach had gone normally until the landing gear and flaps went down about 2 miles out at 500- to 600-foot altitude. A sudden power loss in the jet and reciprocating engines on the left side--apparently due to fuel starvation--prevented the pilot from maintaining either directional control or altitude. The crash demolished the aircraft but the crewmembers escaped with only minor injuries.<sup>211</sup> Another AC-119K (no. 53-3826) was nearly lost when a 37-mm round shattered the nose section as the aircraft worked a few miles north of Ban Bak, Laos. The crew nursed the Stinger back to Da Nang but damage was extensive.<sup>212</sup>

(S) Concern about AC-119K vulnerability to AA fire--especially to fire encountered over the Laotian trail and road system--led to use of fighter escorts as developed in AC-130 operations. F-4 Phantoms from the 366th Tactical Fighter Wing at Da Nang flew constant escort and AA suppression for all Stinger armed reconnaissance flights. At the height of the truck-hunting season the 366th TFWg averaged six escort sorties per night.<sup>213</sup>

(S) The 18th Special Operations Squadron lost a second aircraft on the night of 6 June 1970. Shortly after Stinger number 52-5935 took off from Da Nang, its left-engine propeller went out of control. The pilot tried to head back to base but the situation deteriorated and the crew bailed out over the South China Sea just east of Da Nang. The empty aircraft kept on seaward, creating a momentary flurry of excitement since it seemed headed for China's Hainan Island. The Stinger crashed at an undetermined spot. All crewmembers but one were safely recovered.<sup>214</sup>

(U) The night of 8 May 1970 witnessed an extraordinary display of airmanship when AC-119K (no. 53-7883)\* from Udorn

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\*The AC-119K's crew consisted of: Capt. Alan D. Milacek, pilot; Capt. Brent C. O'Brien, copilot; Capt. James A. Russell, FLIR operator; Capt. Ronald C. Jones, NOD operator; Capt. Roger E. Clancy, navigator; TSgt. Albert A. Nash, flight engineer; SSgt Ronald R. Wilson, aerial gunner; SSgt Adolfo Lopez, Jr., IO; SSgt. Kenneth E. Firestone, aerial gunner; and Sgt. Donnell H. Cofer, aerial gunner.

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was heavily damaged by AA fire:<sup>215</sup>

Capt. Alan D. Milacek and his nine-man crew had been reconnoitering a heavily defended road section near Ban Ban, Laos, when they discovered, attacked and destroyed two trucks. Capt. James A. Russell and Capt. Ronald C. Jones, the sensor operators, located three more trucks. As the aircraft banked into attack orbit, six enemy positions opened up with a barrage of AA fire. The copilot Capt. Brent C. O'Brien, cleared the fighter escort for attack and the gunship circled as the F-4's worked to suppress the AA fire. Amid the heavy enemy fire, Captain Milacek resumed the attack and killed another truck. At 0100, just about 2 hours into the mission, "the whole cargo compartment lit up" as enemy rounds tore into the Stinger's right wing. A "sickening right dive of the aircraft" ensued and Milacek called "Mayday, Mayday, we're going in." He shouted orders to SSgt Adolfo Lopez, Jr., the IO, to jettison the flare launcher.

Captain Milacek directed the entire crew to get ready for instant bailout. As the gunship dropped about 1,000 feet within a few seconds, Captains Milacek and O'Brien pooled their strength to pull the aircraft out of its dive. By using full-left rudder, full-left aileron, and maximum power on the two right engines, they regained stabilized flight. The full-engine power fueled 2- to 3-foot flames-- torchlights for enemy gunners as the crippled Stinger desperately headed for friendly territory. The navigator Capt. Roger E. Clancy gave the correct heading but warned they were too low to clear a range of mountains towering between them and safety. What's more, the crew discovered that fuel consumption would likely mean dry tanks before reaching base.

The crew tossed out every possible item to lighten the load and the aircraft slowly climbed to 10,000 feet. TSgt Albert A. Nash, the flight engineer, reported the fuel-consumption rate had fallen. Captain Milacek elected to land the damaged plane and when he approached the base area he ran a careful check of controls. He found that almost full-left rudder and aileron would allow him to keep control. With uncertain flap damage,

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Milacek chose a no-flap landing approach at 150 knots (normally 117 knots). Utilizing every bit of pilot skill he landed the plane. Upon leaving the Stinger, the crew saw about one-third of the right wing (a 14-foot section and aileron) had been torn off.

(U) Captain Milacek and crew received the Mackay Trophy for "the most meritorious flight of the year." General Ryan, Chief of Staff, presented the trophy on 5 August 1971\* during a Pentagon ceremony.<sup>216</sup>

#### Gunship Operations Expand

(S) In the latter half of 1970, AC-119 gunship operations continued to expand in Cambodia. AC-119G's from Tan Son Nhut AB interdicted Communist supply lines, joined by AC-119K's at the end of July. In addition, Shadows and Stingers were the chief defenders of Kompong Cham, Kompong Thom, Skoun, and Phnom Penh. Protection of these towns was crucial since they were control points on key highways.<sup>217</sup> The commander of Cambodian forces at Kompong Thom (north of Phnom Penh) reported that 17th Special Operations Squadron gunships played a prominent role in lifting the enemy siege of that provincial capital. From 12 to 15 December 1970, a typical ground-support action took place at Prey Totung. Thirty-two Shadow missions supported the town's defenders, expending 555,800 rounds of 7.62-mm ammunition and 128 flares.<sup>218</sup> AC-119 Cambodian sorties in October were credited with killing 1,400 of the enemy.<sup>219</sup> As the main air interdiction force in Cambodia, the AC-119's were seen as a big reason why Cambodian population centers stayed in the hands of friendly forces.<sup>220</sup>

(S) In August 1970 representatives from the FAC group operating in Cambodia and the 17th Special Operations Squadron met at Bien Hoa AB to refine coordination and procedures for joint operations in Cambodia. They agreed to schedule day-and-night missions and to try a new concept that mated a FAC and 17th/18th SOSq aircraft as a hunter-killer team on selected interdiction missions. AC-119K's were frugged as a separate sortie in a night truck/sampan hunter-killer effort. On 2 September 1970, to further refine coordination in Cambodia, an EC-121 served an extension of the tactical air control center. This aircraft furnished better

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\*The trophy was first won by 2d. Lt. Henry H. Arnold in 1912.

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control of aircraft separation, sharpened airstrike coordination, and speeded up firing clearances. French interpreters went along on night gunship missions to help with air-to-ground communication and to gather intelligence.<sup>221</sup>

On 7 December 1970 the 17th Special Operations Squadron was ordered to fly night support for Laotian forces on the Bolovens Plateau. Three aircraft and four crews accordingly moved from Phan Rang to Phu Cat.<sup>222</sup> Several Lima Sites were surrounded and the situation was deteriorating. Even so, U.S. and RLAFF gunship support by night and other attack aircraft by day enabled the Lima Sites to reset their outer defenses in about 5 days.<sup>223</sup>

AC-119K interdiction operations picked up markedly in December 1970 after a longer-than-usual wet season. On 16 December a Stinger (call sign Lad) set a new high for truck-kills by a single AC-119 aircraft in 1 night--29 trucks destroyed and 6 others damaged along Route 92 near Ban Bak, Laos.<sup>224</sup> Collectively, the Stingers recorded 312 trucks destroyed and 196 damaged in the last 3 months of 1970<sup>225</sup> and 1,845 destroyed/damaged in the first quarter of 1971.<sup>226</sup> The AC-119K's were also pitted against North Vietnamese tanks as the Stingers shouldered heavy support commitments growing out of the South Vietnamese offensive into Laos (Lam Son 719). On 28 February Stinger destroyed eight PT-76 tanks.<sup>227</sup> The AC-119K's compiled their interdiction record despite bad weather early in the hunting season and diversions for emergency support of Lima Sites and troops in contact with the enemy.

The AC-119K's truck-killing record rested in part on a mix of 20-mm rounds--armor-piercing incendiary (API) and high-explosive incendiary (HEI). First tested on 18 November 1970,<sup>228</sup> the mixed rounds fully demonstrated their worth against tanks in Lam Son 719.<sup>229</sup> Another plus was the reworking of the 20-mm guns, including new gun barrels. Also, a concentrated maintenance effort eased the maintenance/operational headaches from these guns over the months of Stinger operations. Moreover, the removal of the APQ-133 beacon-tracking radar had been approved which stretched Stinger's TOT up to 30 more minutes. The AC-119K had tested a more advanced fire-control computer\* in late 1970 but problems prevented its quick use for Stinger operations.<sup>230</sup>

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\*The AYK-9 computer borrowed from the AC-130 program.

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AC-119 Force Changes

(S) The AC-119 force deployment adjusted to new tactical needs. Seventh Air Force's recommended shift of the 18th SOSq's D Flight from Udorn to Nakhon Phanom was carried out from 26 to 29 October 1970 with practically no break in mission plans. During 10 October-27 November the 17th SOSq moved more aircraft to Tan Son Nhut from Phu Cat and Phan Rang to satisfy operational demands in Cambodia. On 29 December A Flight of the 17th SOSq was inactivated at Phu Cat, its personnel and aircraft assigned to B Flight at Phan Rang.<sup>231</sup> As 1970 closed, the AC-119's were spread over four bases--Phan Rang (7 AC-119G's), Tan Son Nhut (9 AC-119G's), Phan Rang (3 AC-119K's), Da Nang (7 AC-119K's) and Nakhon Phanom (6 AC-119K's).<sup>232</sup>

(S) Amid expanding AC-119 operations, plans were afoot to turn over the AC-119G's to the Vietnamese Air Force, consistent with the Nixon administration push for Vietnamization of the war. This spawned proposals for a bigger and better VNAF gunship capability. A plan emerged (VNAF AC-119G Plan 70-52) to activate the VNAF 819th Combat Squadron at Tan Son Nhut AB on 1 September 1971.<sup>233</sup> On that date the 17th SOSq would turn over the AC-119G's and specified maintenance and supply support equipment. The VNAF would then frag all AC-119G missions.<sup>234</sup> VNAF/USAF Joint Programmed Directive 71-106, 30 November 1970, charged the 17th Squadron with VNAF combat crew training in the AC-119G. In Phase I at Clinton County AFB the VNAF pilots were checked out in the C-119. Phase II aircrew training would take place at Phan Rang: three crews to enter training on 1 February 1971; seven, 3 April; seven, 18 May; and the last seven, 25 June.<sup>235</sup> The goal called for the VNAF squadron having 24 crews operationally ready by 1 May 1972.<sup>236</sup> Thus as 1971 began, the 17th SOSq got ready to transition from a combat squadron to a training one.

(U) In Southeast Asian combat the AC-119G/K gunships had proven a worthy follow-on for the AC-47. Indeed, the G and K models each had distinct capabilities that assured a far more flexible gunship force. The Shadows could do Spooky's job in South Vietnam and Barrel Roll. Stingers could ably help Spectre interdict enemy supply lines. The AC-119's occupied the middle ground in development and operations between the AC-47 (the "model T" of gunships) and the AC-130E (the ever more sophisticated and potent "Cadillac").

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(U) The AC-119's were thrust into the Southeast Asian conflict at a time when the war moved in new directions. Hostilities had spilled over into Cambodia (a whole new arena for the gunships) and had quickened in the Barrel Roll and Steel Tiger sectors of Laos. AC-119 operations steadily spread over a larger and larger geographic area. Attention fixed more on gunship offensive operations outside South Vietnam than on defensive missions within. These shifts of emphasis forced AC-119 deployment to constantly adjust. In addition, Vietnamization grew in importance, accompanied by the turnover of AC-119G's to the VNAF and a downturn in U.S. strength. Despite the new operational demands, the AC-119's did well. They built up their own "Shadow Count," saved Lima Sites from capture, flew cover for troops and convoys, and destroyed enemy trucks and sampans bearing supplies.

(U) The AC-119's road to combat twisted through long-delayed, costly, and difficult development. The aircraft started out in a climate of skepticism and opposition. It endured the higher priority of the AC-130 program. It was overweight. Production of its subsystems lagged. Even when ready for deployment, the AC-119 ran into SEA headroom problems. Yet with all these troubles, the AC-119G/K gunships played a significant and successful role in the war.

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## VI. GUNSHIPS FOR ALLIES--CONCLUSION

(U) While USAF fixed-wing gunships grew more sophisticated and potent, the simplicity of the early gunships, such as the AC-47, appealed to other nations threatened or confronted with guerrilla warfare. The gunship held many advantages for small, less-developed nations struggling to maintain an effective air force. The side-firing weapon system could supply several hours of heavy but accurate airborne firepower even in remote or other inaccessible areas. Guerrillas normally liked to attack and move supplies under the cover of darkness. Hence the gunship's night ability to support points under assault and to interdict the insurgent's supplies kindled keen interest. Few of the world's air forces were effective in night air operations. Moreover, the gunship's combat advantages came at a bargain price. Most nations had the aircraft and ordnance suitable for easy conversion to a simple gunship. Gunship tactics and techniques required relatively little training for crews. Existing facilities and the skill-level of support personnel could usually handle gunship maintenance and ground support. All this spelled "economy" with a capital "E." In addition, the speed of gunship conversion pointed to unusual aircraft flexibility. It was possible, for example, to quickly reconvert the gunship to a transport.

Because of these reasons, several Latin American countries early showed interest in the gunship concept. In January 1966 representatives from 16 Latin American air forces attended an Inter-American Air Force Counterinsurgency Symposium hosted by the USAF Special Air Warfare Center at Hurlburt Field, Fla.<sup>1</sup> At such meetings, the gunship concept information conveyed to these countries triggered further inquiries. In September 1966, for example, Chile asked the USAF Southern Command (USAFSO) for drawings, specifications, and cost information on installation of machineguns in C-47 aircraft.<sup>2</sup>

The Air Staff pondered various ways for catering to Latin American interest in gunships. SAWC proposed sending to Chile an AC-47 mobile training team (MTT) that included one of the finest AC-47 crews. The MTT could furnish facts on machine-gun installation and turn Chile's fully-qualified C-47 pilots into AC-47 pilots after 10 flying hours and expenditure of 4,000 rounds of ammunition per pilot.<sup>3</sup> On the other hand, USAFSO wanted its own AC-47's for demonstration and gunship training of Latin American air forces.<sup>4</sup>

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In January 1967 the Southern Command studied its requirements for AC-47 aircraft. The conversion of the C-47 into a potent counterinsurgency strike aircraft offered high promise for meeting Latin American needs, especially after Congress passed legislation in 1968 prohibiting U.S. sales of high performance aircraft to countries south of the border to slow an arms race under way there. Furthermore, the simple modification of transports would tend to forestall pressure from other countries for more sophisticated aircraft. Southern Command hoped to install SUU-11A miniguns or .50-caliber machineguns in the C-47 --a dim prospect in view of Vietnam War demands on funds and equipment. Nevertheless, USAFSO later asked the Air Staff to support a project for equipping a C-47 with a .30-caliber machinegun, gunsight, and associated wiring. USAFSO felt this modification well-suited as a demonstration gunship since most Latin American nations had .30-caliber guns on T-6's and other aircraft.<sup>5</sup> The year ended without action on these ideas however.

In January 1968 Southern Command restated a requirement for C-47's equipped with three .50-caliber machineguns. The Command wanted a configuration so simple the Latin American countries could modify their own aircraft with materials at hand. To render the aircraft more flexible, pallet gun mounts were recommended. The mounts would contain azimuth/elevation vernier adjustments allowing for fine boresight corrections. The mount's elevation scale would cover 10° above to 30° below level to compensate for the extremes in Latin American terrain.<sup>6</sup> Headquarters USAF asked TAC to tap SAWC and 1st Combat Application Group resources to develop, test, and deliver two machinegun kits to USAFSO together with plans and technical data for additional installations.<sup>7</sup>

TAC Test Number 68-201, 9 May 1968, ordered three .50-caliber machineguns placed on pallet mounts built of simple materials available in Latin America.<sup>8</sup> The idea of putting machineguns on pallets led TAC to consider also pallet-mounting of the semi-automatic flare launchers and the emergency ram-air smoke-removal system. Even a palletized day/night target-acquisition system (incorporating a computer and sighting device for gunship application) was investigated.<sup>9</sup> Meanwhile, the 1st Combat Application Group reported in July that flight-testing of the prototype machinegun installation had been successful on the England AFB range and that contract modification was proceeding. Delivery of the guns to the Canal Zone was estimated in the latter half of August.<sup>10</sup>

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Headquarters USAF authorized four AC-47's in early 1969 toward satisfying Southern Command's long-standing requirement. Two reasons partly prompted this action: (1) to fill a void left by the withdrawal of Southern Command's A-26's in 1968, and (2) to help counter moves by U.S. Army forces in the Canal Zone aimed at usurping close air support and training roles assigned to USAFSO.<sup>11</sup> After many years of trying, Southern Command would get its demonstration/training gunships.

(U) Although neglecting but not forgetting Latin American gunship development, the Air Force greatly stressed a gunship capability for allied nations in Southeast Asia. It first focused on supplying AC-47's to the Vietnamese Air Force but in time put gunships in the hands of the Laotians as well.

(U) The Vietnamese Air Force began on 1 July 1955 with 32 old planes inherited from the French. In May 1956 the U.S. Air Force first took over French Air Force advisory functions and a modest program of modernizing the VNAF got under way almost at once. Improvement of the VNAF accelerated as the war in Southeast Asia intensified, and it later became a major program in the Nixon administration policy of Vietnamization.\* At first, U.S. aid emphasized equipping the VNAF as a war ally but the Nixon program shifted to preparing the Vietnamese to go it alone.

By 1964 the VNAF had two squadrons of C-47's (each with 17 aircraft) and thus were quite familiar with the old Gooney Bird. Furthermore, VNAF C-47's shared the night flare mission role with USAF C-123's in 1964 because of a sharp rise in June 1963 of Vietcong night attacks on both outposts and "new life" rural villages.<sup>+12</sup> It was not until 1967, however, that a program emerged to give the VNAF a gunship squadron. The program called for converting 10 C-47's of the VNAF's 417th Transport Squadron to gunships by 1 September 1967 and 6 more by 1 January 1968. Seventh Air Force submitted SEAOR 89 in May 1967 for equipping 16 AC-47's with

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\*Vietnamization of the war had two phases. Phase I emphasized the Vietnamese in the ground role. Phase II stepped up the use of armored equipment, improved logistics, and began air support. The transfer of gunships fell in Phase II.

<sup>+</sup>See Chapter II.

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SUU-11A guns. Since USAF AC-47's had new MXU-470/A gun modules, the SUU-11 guns being replaced were expected to be used in the VNAF conversion.<sup>13</sup>

In September 1967 the USAF Advisory Group in South Vietnam urged Headquarters to prod the lagging Air Force coordination of the VNAF AC-47 conversion program: "It would materially aid in coordinating and obtaining the necessary 7AF support including training of the Vietnamese cadre if an expected date of Air Staff approval could be obtained" as "an early VNAF AC-47 capability is desired." The Advisory Group figured it would take about 2 1/2 months to train the Vietnamese instructor cadre.<sup>\*14</sup> In the meantime, the Advisory Group and the 14th Air Commando Wing drew up a memorandum of understanding in December 1967 regarding the conduct of VNAF training.<sup>15</sup>

Plans for a VNAF AC-47 squadron nonetheless went awry for several reasons. First, strong enemy attacks on U.S. airbases in 1967 imposed a heavier airbase-defense commitment on the Spookies and in turn generated requests for more USAF AC-47's.<sup>+</sup> Uncertainty arose whether guns and related equipment would be ample for USAF needs. Second, the Air Force suspended the VNAF conversion in early 1968 when it seemed the SUU-11 pods on hand would be needed for the AC-119 program.<sup>‡</sup> This hold order was brief but such actions delayed execution of VNAF plans. Moreover, USAF officials stayed troubled over the supply of new 7.62-mm miniguns.

The problem of accommodating gunship personnel of the AC-119G deployment under the SEA manpower ceiling fueled fresh effort toward establishing a VNAF gunship squadron. In December 1968 General Brown, Seventh Air Force Commander, ordered a study on the transfer of AC-47's to the VNAF. He wanted quick action with consideration of an "optimum schedule from the VNAF side, even though it results in some degradation of the Seventh Air Force capabilities." From the study Seventh Air Force concluded the VNAF had the capability and desire to accept the AC-47's.<sup>16</sup> Provisions were again made for a VNAF gunship squadron.

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\*In late 1967 the 14th Air Commando Wing submitted a proposal for training VNAF aircrews in the AC-47. [14th ACWg Training Proposal (S), Dec 1967.]

+See Chapter II.

‡See page 245 of Chapter V.

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Following months of preparing and aircrew training, the VNAF received the first five AC-47 gunships on 2 July 1969 and the 16th and last on 20 August.<sup>17</sup> The VNAF 817th Combat Squadron, popularly known as Fire Dragon, earned a combat-ready (C-1) rating on 31 August--1 month ahead of schedule.<sup>18</sup> That squadron's AC-47's based at Tan Son Nhut comprised the complete VNAF gunship force until AC-119G's were turned over to the Vietnamese in September 1971.

The U.S. Advisory Group eyed VNAF combat operations intently inasmuch as the AC-47's were to supply the main support for an expanding Regional Forces/Popular Forces program.<sup>19</sup> The VNAF Fire Dragons would likewise supplement USAF gunships in a number of in-country roles for quite some time. Much hinged on the VNAF success.

The Vietnamese AC-47 squadron swiftly won the praise of USAF advisers and commanders. As 1969 closed, the Vietnamese were flying all gunship support for the IV Corps Zone. The VNAF put two or three AC-47's on airborne alert from sunset to sunrise while six stood ground alert at Binh Thuy and Tan Son Nhut.<sup>20</sup> One adviser reported the VNAF gunship had "never failed to meet a target commitment."<sup>21</sup> Another, the evaluator of the VNAF unit, declared: "This squadron is better than any USAF AC-47 squadron that was ever over here."

Crew experience was the key ingredient of Vietnamese success. In late 1969 the average Fire Dragon pilot had flown over 6,000 hours with some having logged over 12,000 hours in the C-47.\* This contrasted with USAF crews logging 800 AC-47 hours throughout a 1-year tour. What's more, the VNAF crews knew the Vietnamese terrain and could generally spot more on the ground.<sup>22</sup> Deficient night/poor-weather operational capability tempered the high experience level of Vietnamese crews.<sup>22</sup> This was gradually overcome leading a USAF colonel to comment, "The Vietnamese seem to be able to acquire the target much faster at night"<sup>24</sup> than the Americans.

An instance of the VNAF's operational progress was an AC-47 mission on 17 October 1969 commanded by Capt. Huynh Van Tong. While on airborne alert over Binh Thuy AB, Captain Tong was directed to a Vietnamese Army outpost at Phung Hiep under

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\*Some VNAF pilots had flown C-47's since 1958.

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attack. The VNAF AC-47 fired 63,000 minigun rounds and dropped 150 flares in support of the defenders. Extra air support was requested and Captain Tong acted as FAC, directing the strikes of USAF F-100's that responded. Captain Tong and his crew flew three sorties in defense of the outpost, returning to Binh Thuy to replenish ammunition and flares. The attack on the outpost was repulsed.<sup>25</sup>

By 31 December 1969 the VNAF gunships had demonstrated a firm grasp of all facets of their mission to include acting as FAC for USAF strikes. At year's end they had flown over 28 percent of the total gunship effort in South Vietnam. The Chief of the USAF Advisory Group reported the VNAF's killed-by-air (KBA) figures were at least equal to a USAF gunship squadron's.<sup>26</sup>

The VNAF gunship squadron had some problems in maintaining the MXU 470/A gun module which were resolved by degrees with greater experience. Overall AC-47 maintenance proved surprisingly good, reflecting the long acquaintance of VNAF maintenance men with the C-47. The VNAF's rapid expansion, however, caused constant concern. It was obvious the South Vietnamese would have to withdraw some of their best people from the established squadrons to man new units being activated.<sup>27</sup>

Step by step the VNAF took over more of the gunship missions. They extended their AC-47 operations into all four military regions, eventually covering the entire country. The 817th Combat Squadron deployed alert aircraft to Da Nang, Pleiku, and Binh Thuy Air Bases.<sup>28</sup> At the same time, preparations commenced for the VNAF AC-119G squadron.\* In the first quarter of 1971, the 17th

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\*At Dr. McLucas's request, the Air Staff examined in August 1969 the possibility of converting excess EC-121 aircraft into gunships for the VNAF. The Air Staff recommended against considering the C-121 because: A previous study of the airframe had rejected it for gunship use (scoring poorly on maneuverability, vulnerability, maneuvering load factor, crew-egress capability, and a suspected tail-section twist resulting from firing of guns in the aft section of the aircraft); high operating/modification costs; the aircraft was sophisticated beyond VNAF capability; VNAF AC-47's were considered adequate; and the long leadtime required for modification. The report concluded: " In the event it becomes necessary to expand the VNAF gunship fleet, recommend the AC-119G's be given to the VNAF." [Ltr (S), Gen John C. Meyer, Vice Chief of Staff to SAFUS (Dr. McLucas), subj: Conversion of EC-121s to Gunships (U), 30 Aug 69.]

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Special Operations Squadron, 14th SOWg, set about training the VNAF aircrews in the AC-119G. The three-phase program consisted of a week's ground school, then basic flying training with stress on instrument/emergency procedures, and ending with a concentration on combat tactics.<sup>29</sup> In late April 1971, Vice President Nguyen Cao Ky attended a graduation ceremony at Phan Rang AB for the 18-member first class of AC-119G crewmen. The graduates--pilots, navigators, flight engineers, gunners, and illuminator operators--would form the cadre of the VNAF's AC-119G unit, the 819th Combat Squadron.<sup>30</sup>

(U) On 24 September 1971 the Air Force announced that the AC-119G Shadow gunships of the 17th Special Operations Squadron had been turned over to the VNAF.<sup>\*31</sup> Another big milestone in the VNAF Improvement and Modernization Program had been reached. The Vietnamese were able to shoulder even more of the gunship-mission load within their country and free additional USAF gunships for interdiction.<sup>+</sup>

(S) Gunships were provided for the Laotians as well as the South Vietnamese. In 1968 the American Embassy in Vientiane believed the Royal Laotian Air Force desperately needed to improve its C-47 operations. Specifically, the Americans wanted to give the RLAf some night and "weather" capability, sharpen C-47 maintenance, and broaden the training of selected RLAf personnel. The goal was a self-sufficient RLAf with an AC-47 tactical capability.<sup>32</sup> In December 1968 CINCPAC approved and submitted to the Secretary of Defense a request from the JUSMAG<sup>‡</sup> Deputy Chief in Thailand to convert four RLAf C-47's to gunships by installing .50-caliber machineguns.<sup>33</sup> Almost simultaneously, the Deputy Chief of the advisory team asked that a C-47 mobile training team (MTT) come to Udorn RTAFB and conduct the required RLAf training.<sup>34</sup>

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\*See Chapter V.

<sup>+</sup>Air Force gunship personnel not only trained Vietnamese crewmen but joined actively in a Civic Action program to aid South Vietnamese civilians and communities near their bases. They assisted orphanages, gave scholarships to students, and improved schools, sanitary facilities, and community buildings. Similar Civic Action projects were pursued in Thailand.

<sup>‡</sup>Joint United States Military Advisory Group.

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After top-level agreement in Washington, the Air Staff levied the requirement for an AC-47 MTT at Udorn on TAC's Special Operations Force (SOF). In February 1969 a team of 5 officers and 19 enlisted men ended its planning at England AFB and left for Thailand.\*<sup>35</sup> The team's first increment reached Udorn on 24 February and the second on 2 March 1969. Eighteen Laotians entered training on 8 March utilizing 4 C-47's from the Military Assistance Program, Laos. Though no AC-47 was on hand for gunship training, the RLAf was nevertheless told to choose men for loadmaster and gunner training. A request for instructors to conduct this special training went to the Special Operations Force. Two SOF loadmaster instructors got to Udorn on 20 June. Three days later, the RLAf personnel began loadmaster instruction after which they would receive gunner training if an AC-47 was available. On 12 July two instructor gunners came and the 14th SOWg loaned a Spooky for the gunship-training phase. The training, completed on 31 July, formed a small nucleus for a RLAf gunship cadre.<sup>36</sup>

The training made headway<sup>+</sup> but efforts to supply the RLAf with gunships mired down. On 28 March 1969 the Chief of Staff refused funding of the earlier-requested .50-caliber gun modification, due to its relatively low priority and a "critical shortage of FY 69 modification funds." Instead, the Air Staff offered in April eight C-47's and a like number of 7.62-mm gun kits to come from VNAF excess. Air Force Headquarters believed an extra three aircraft already modified to the gunship configuration, might be turned over to the RLAf in May and June of 1969.<sup>37</sup>

In early June 1969, the Air Force decided the three gunship-configured aircraft would remain in Vietnam but the eight

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\*The MTT went to Udorn in a TDY status. Later, Ambassador Sullivan in the Laotian capital reacted negatively to reports that the MTT was to become a permanent organization at Udorn. He argued that the job could be better done by SOF volunteers who were properly motivated to endure the advisory-training frustrations. [Msg (S), Ambassador Sullivan to General McConnell, subj: C-47 Mobile Assistance Team (no DTG).]

<sup>+</sup>Success of the MTT training brought a follow-on MTT request for the next two training periods. RLAf crews from the first class would augment the follow-on MTT. (A factor in sending the MTT in a TDY status was avoidance of trade-offs that seemed necessary to squeeze under the SEA manpower ceiling.) [Hist (TS) Dir/Ops, 1 Jan-30 Jun 69, p 347.]

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VNAF C-47's, together with 7.62-mm SUU-11 gun kits, would be transferred to "MAP Laos on an expedited basis." The first five aircraft were delivered on 5 July and the last one on 2 October 1969. Only five complete gun kits were furnished from VNAF excess, however. The remainder would have to come from AFLC sources. By the end of September, the U. S. Air Force had modified five of the C-47's as gunships. The American Embassy at Vientiane reported on 7 October 1969 that after the first few operational flights the guns had "hopelessly jammed." U.S. officials asserted the gun kits "were unserviceable and should have been salvaged and/or overhauled prior to delivery." They definitely felt the "tactical position in-country could be enhanced greatly with good serviceable gunships" but they had not gotten them.<sup>38</sup>

In response to RLAFF gunship difficulties, Headquarters USAF next directed that gun pods and parts be sent from the United States to the Laotians. It specified that a technician to help in their installation arrive at Udorn by 14 October 1969. Meantime, the Deputy Chief, JUSMAG, Thailand learned of the impending inactivation of the 4th SOSq which would render AC-47's equipped with MXU-470/A gun pods excess to the Seventh Air Force. The JUSMAG Deputy Chief asked CINCPAC on 31 October 1969 for immediate transfer of eight AC-47's to MAP Laos (at no cost to MAP) "to replace present SUU-11A RLAFF equipped C-47 acft." On 4 November CINCPACAF suggested just the SUU-11A guns of the RLAFF be traded for the MXU-470 ones. Notwithstanding, after phoning Headquarters CINCPAC on 7 November, G. McMurtrie Godley, American Ambassador to Laos, concluded that CINCPAC could justify the substitution of USAF AC-47's for RLAFF-possessed C/AC-47 aircraft and urged the exchange be made.<sup>39</sup>

On 14 November, PACAF agreed to trade eight 4th SOSq AC-47's (with MXU-470/A gun pods) for five RLAFF AC-47's (with SUU-11 guns) and three standard-cargo C-47's. PACAF proposed to reassign three of the 4th SOSq AC-47's to the 432d TRWg at Udorn for ongoing support of Lima Sites and troops in contact with the enemy and three to the VNAF as advanced attrition. PACAF would return the RLAFF C/AC-47's to the United States for storage. CINCPAC concurred in this redistribution plan on 18 November commenting "the one-for-one swap appears the most economically feasible solution." On 4 December 1969 the Chief of Staff approved the CINCPACAF plan. He also authorized retention of the eight RLAFF C/AC-47's but stipulated that no more of these aircraft be modified into gunships. Directives were issued specifying delivery of the eight AC-47's to the RLAFF by 5 January 1970--expanding

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the RLAFF gunship inventory to 13.<sup>40</sup>

Unfortunately, development of an RLAFF gunship force experienced continued difficulties. RLAFF maintenance capability fell short of the self-sufficiency goals. The Air Force Section of JUSMAG, Thailand informed Headquarters USAF in June 1970 that "Phase inspections, IRANS, drop-in maintenance and TCTOs are still accomplished under contract by Thai-Bangkok." In addition, delivery of gunships to the RLAFF had fallen behind schedule. The three AC-47's (with MXU-470A guns), turned over to the RLAFF in June 1970, raised their total to only nine with but eight then operational.<sup>41</sup> The Royal Laotian Air Force did in truth have a gunship capability. Nonetheless, its small base of experience with air operations made expansion and progress painfully slow in the face of deeper enemy penetration into the country.

The foregoing spotlighted the gunship's added value to the U.S. Military Assistance Programs for other nations. The gunship held clear advantages chiefly as a counterinsurgency weapon system. The need for such a weapon system in Latin America, Southeast Asia, or similar world areas fanned interest in a "Mini Gunship."<sup>42</sup> In this regard, the 1971 program (Credible Chase) sought to acquire and test a side-armed, light, short-takeoff-and-landing (STOL) aircraft. This proposed gunship would be equipped with a NOD/night gunsight and a pintle-mounted XM-197 side-firing 20-mm cannon. The pintle mount would accept the M-2 (.50-caliber) and XM-93 (7.62-mm) machineguns. The Mini Gunship would be capable of intelligence collection, sensor readout, air interdiction, air support, and infiltration/exfiltration of raiding parties. It was hoped such capability would enable the VNAF to execute their own counter-infiltration operations. A combat evaluation of the STOL aircraft was planned for the fiscal year 1972 dry season in Vietnam.\* Obviously as the Air Force satisfied its own gunship needs, it turned more to establishing or improving the gunship capability of allied nations.

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\*Maj Gordon L. Ellis reported in a June 1967 Air Command and Staff College thesis, "Advanced Aircraft for the Forward Air Controller": "Two O-1's in Vietnam were equipped for a test with the M-60 machine gun firing out the left side similar to the AC-47 Dragon ships . . . .A most significant advantage of Little Puff will come . . . .in saving downed pilots."

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(U) Other countries worked on their own to fit the side-firing concept to their express demands. An Israel Aircraft Industries gunship version of a military transport--displayed at the Hanover Air Show in Germany--afforded a case in point.\* The aircraft had .50-caliber machinegun pods on each side of the fuselage in addition to a rear-mounted machinegun and forward-firing guns and rockets.<sup>43</sup> Clearly the United States could no longer claim the gunship concept as its exclusive property.

Despite world interest in the gunship and the steady improvement of the U.S. gunship force, the weapon system was accepted within definite and somewhat narrow limits. In the extended Southeast Asian war, burdened with many indecisive qualities, the gunship proved a most useful but certainly not a major factor in resolving the conflict. The gunship's chief achievements lay in interdiction, hamlet/outpost defense, airbase defense, close ground-force support, and convoy escort. Yet even within these mission categories, the enemy got supplies through, ambused troops, bombarded bases, and overran positions. Furthermore, the gunships occupied only a thin band in the wide spectrum of SEA air activity. U.S. air operations--supplemented more and more by those of the VNAF and RLAFF--had grown infinitely complex with a great number and variety of missions, munitions, aircraft, and tactics. At their 1969 peak, however, the gunships totaled only 53 of over 1,800 U.S. aircraft being employed in the war theater.<sup>44</sup>

Also in comparison of sortie totals, the gunship number stood relatively low. The highest monthly average for USAF gunship attack sorties in South Vietnam crested at 368 during fiscal year 1969. This contrasted sharply with a monthly average of 9,797 USAF fixed-wing tactical air sorties over the same period. In the fixed-wing attack sorties over Laos, the gunship monthly average climbed to 348 in fiscal year 1971, compared to 4,945 for other tactical air sorties.<sup>45</sup>

At one time or another, the gunship virtually ranged the entire war area except North Vietnam, yet was continually confined to less well-defended enemy-held areas. The aircraft always needed friendly control of the skies and even with the flak suppression of a jet-fighter escort--its vulnerability remained a nagging worry. In summary, the gunship was a limited weapon even in a limited war.<sup>46</sup>

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\*Discussed in Aviation Week & Space Technology, May 1972.

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(U) Nevertheless, the gunship carved a niche for itself in SEA air operations and possibly in the post-SEA force. Almost from its first flights over enemy supply routes, the aircraft became the preeminent truck-destroyer--particularly at night. Gunship truck-kill claims were criticized and at times discounted. All the same the gunship was assuredly the most cost-effective aircraft performing interdiction. There was plenty of justified acclaim for its role as an aerial defender of villages, Lima Sites, fortified posts, and troops fighting off enemy attacks. The Spooky Count, the number of times the enemy broke off the assault, the reports of gratitude from ground units--these were facts of record. The gunship's presence exerted both a psychological and material impact. Its versatility stretched from the most sophisticated self-contained capability for target search of any USAF aircraft to such diverse tasks as illuminating a life-saving surgical operation. Its varied weapons could saturate an area or concentrate fire on a point. In short, the weapon fully displayed in combat the qualities expected of it by its early promoters. General McConnell's 1964 reply to General Sweeney's expressed opposition to the gunship rang hauntingly true: "it certainly is in the Air Force interests to run the program rather than to sit on the sideline commenting."<sup>47</sup>

The gunship had firmly established its role and importance in the Southeast Asian war and in the Military Assistance Programs for other nations. It likewise earned a place in the USAF plans for postwar tactical forces. In September 1970 Tactical Air Command reported on its "in-depth review" of post-SEA gunships as requested by Headquarters USAF. TAC concluded that a "self-contained all weather/night attack (SCANA) system" capable of destroying mobile surface targets was required. The system would pressure the enemy at all times and keep him from moving men and equipment during darkness and bad weather. "Of many weapon systems developed to accomplish this high priority mission in SEA Asia, one, the AC-130A Surprise Package Gunship, has been singularly successful," said the Command. The Gunship II, then, supplied the "initial evolutionary" stages of a SCANA capability to meet this post-SEA need. TAC believed the AC-130A projected to be left over from SEA operations would take care of gunship force needs to about 1980. TAC cautioned, however, that "past emphasis on gunship development had been stimulated by the AC-130 success and the existence of a favorable environment for employment." Bearing in mind that "Cargo type aircraft are

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suiting for low level conflict situations which require a low national involvement profile," TAC preferred to view the post-SEA gunships as "transitional" until development of an attack-experimental (A-X) aircraft.<sup>18</sup>

Transitional or not, the gunship had definitely met a combat air operations need, albeit in a "limited war." The aircraft had fulfilled its assigned missions better than any other available weapon system. As General Momyer, TAC Commander (and former Seventh Air Force Commander) put it: "with its multiple sensors, I think it is the best weapon for either air or ground support of a night engagement."<sup>49</sup> Considerable evidence points to "wars of national liberation" (Vietnam-type wars) as being the most acceptable level of conflict by enemy nations in the future. If so, the side-firing concept would continue to be advantageous. John Paul Vann\* remarked in the early years of U.S. involvement in Southeast Asia: "This is a political war and it calls for discrimination in killing. The best weapon of killing would be a knife."<sup>50</sup> The side-firing gunship and the helicopter gunship were probably the closest air power could come to Vann's knife. Even when the Southeast Asian war erupted into more conventional battles, the gunship dealt surprisingly well with tanks and other heavy enemy weapons. General Ryan, Chief of Staff, asserted in the fall of 1971 that "One of the most successful developments arising from our experience in Southeast Asia is the gunship," and "we intend to keep this capability to deliver a tremendous volume of sustained accurate firepower in the tactical force."<sup>51</sup>

(U) In reviewing the course of the gunship's evolution from painful birth to an accepted, unique, and potent weapon system, certain significant points stand out. First, resourceful, persistent and imaginative men conceived and developed a new aerial weapons concept. They did it in the face of formidable obstacles and almost stifling opposition. Second, the constant growth in gunship effectiveness came from an unusually high art of improvisation, skillful borrowing, and use of available equipment. Ten years of experience with limited war had disclosed that modifying existing aircraft was surely the best way to secure new weapon-system capabilities from the standpoint of both time and money. Third, the innovative management of dedicated men--given free rein within target costs to do whatever was needed to get the job done--developed and produced the more advanced AC-130 gunships on schedule and below the projected expense. This was a miracle in time of

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\*Perhaps one of the most knowledgeable and respected of American advisers in Vietnam until his death in 1972.

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notable cost overruns and production delays.\* Fourth, remarkably close relations between gunship developers and the combat-zone users strengthened application of state-of-the-art equipment to combat needs. Fifth, the gunship developers constantly sought to keep ahead of the enemy and his defenses. They extended the range and quality of sensors/weapons and worked on electronic counter-measures. This dictated pressure-packed modification of gunships in the United States during the summer months (the SEA wet season), so the aircraft could return to combat by the time the dry hunting season began. Sixth, the gunship's combat successes in SEA, especially in night operations, generated demands for more gunships and their use in a greater variety of missions. This touched off much top-level debate over the "optimum" gunship force and its place in a "balanced" air force. Seventh, gunship tactics changed from strikes by a single aircraft on armed reconnaissance missions to a complex team effort of many aircraft, particularly fighter escort. Fitted with heavier armament like the 40-mm gun and the 105-mm howitzer, the gunship became virtually an escorted aerial artillery platform somewhat analogous to a Navy battleship with a protective screen of destroyers. Proposals and tests even emerged to tie the gunship with such aircraft as the B-52. The relatively small gunship program had surprising impact in many areas--ranging from combat to management of airpower resources.

(U) Considering the gunship's history, liberally sprinkled with advancement against great odds, it seems plausible that the fixed-wing, side-firing gunship--or some derivative thereof--would influence the aerospace force of the future. The Southeast Asian war continued, accompanied by steady gunship improvements. Looking farther ahead, some imaginative men foresaw a wide range of possibilities. At one end of the spectrum was a much-improved, quiet, STOL Mini Gunship suitable for the lowest level of conflict. At the other were powerful lasers and rockets that extended the side-firing concept to aerospace vehicles hovering outside the earth's atmosphere--heralding a true Buck Rogers/Flash Gordon era.

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\*On 12 August 1971 Gen. George S. Brown, AFSC Commander, addressed a DOD/NSIA Symposium on Major Defense Systems Acquisition: "As a creative innovation, the first experimental gunships were delivered to combat units in Southeast Asia in record time. They were so successful that it was decided to make this a regular Air Force program--and it was put into the formal acquisition system. Then, as the Secretary [Packard] pointed out, he found it would take two years to get more gunships to the theater. So we took the program out of the formal system, turned it back to the original small project group, and got them out in six months."

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## APPENDIX 1

Lessons Learned from 71st Special Operations Squadron Deployment\*

1. See that crews attain and maintain high proficiency in flying TACAN radials and arcs. TACAN is the primary aid in SEA for navigating, vectoring around friendly artillery fire, and locating targets.
2. Have crews fly practice missions that simulate armed reconnaissance search boxes.
3. Develop crew proficiency in acquiring targets on ridgelines and in valleys.
4. Schedule at least one live-firing mission a week for each crew. (The 71st SOSq crews complained their checkout in SEA was hampered because their live-firing consisted of only 1,500 rounds from combat crew training to theater arrival.)
5. Make certain pilots know how to keep constant flare/illuminator light over troops in contact with the enemy.
6. Simulate combat aircraft loads during practice missions.
7. Be sure navigators know their radio equipment well. (Most 71st SOSq navigators discovered they had to monitor several radios--obtaining friendly artillery clearances, contacting ground forces, and securing target information. Previously, the pilot handled much of the radio communicating.<sup>a)</sup>)

a. Intvw (U), author with Col. Boris C. Chaleff, Hq USAF (former navigator in the 71st SOSq), 7 Jul 72; hist (S), 14th SOWg, 1 Jan-31 Mar 69, p 23. The first AC-119G navigators could perform both as the NOD operator and as mission navigator--some navigators alternated in these positions. Toward the end of 1969, however, navigator graduates from the combat crew training at Lockbourne AFB arrived trained separately as NOD operators and mission navigators. The 14th SOWg believed this to be over-specialization and cited the experience of the AC-119G squadron as proof a navigator could be proficient in both positions. (See hist (S), 14th SOWg, 1 Oct-31 Dec 69.)

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\*Ltr (C), 7th AF Dep Comdr/Ops to 7th AF Dir/Ops Spt, subj: Lessons Learned from 71st SOS Deployment to SEA, 5 Apr 69.

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8. Stress job training of maintenance men and other specialists.
9. In the first increment deployed, include supervisors such as the squadron commander, operations officer, and flight commanders. (This was not the case with the 71st SOSq deployment.)
10. Exert every effort to obtain technical manuals prior to deployment.
11. Carry in each aircraft the extra clamps, hoses, and other items which maintenance men know will be needed.

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## APPENDIX 2

Gunship Types: Components and Characteristics\*Spooky Components and Characteristics

Gunship	Spooky
Aircraft	AC-47
Mission	Area defense
Area/Target	In-country and out-country/ troops-in-contact
Armament	3 x 7.62-mm miniguns (MXU-470/A) Fast: 6,000 rds/min Slow: 3,000 rds/min
Armor	
Ordnance	21,000 rds <sup>a</sup>
Fire-control system	None--gunsight: fixed reticle
Target acquisition	Visual
Illumination	24-56 flares <sup>a</sup> manually dispensed
Reaction airspeed	130K TAS
Operating altitude	3,000 ft AGL (optimum)
Fuel duration	7/00
Turnaround	30 min
Escorts	None

a. Varies according to mission

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\* Maj Richard K. Kott, The Role of USAF Gunships in SEA (S)  
(HQ PACAF, Project CHECO, 30 Aug 69), pp 59-62.

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Aircrew	2 pilots, 1 navigator, 2 gunners, 1 loadmaster, 1 flight engineer
One engine out	Unsatisfactory at combat gross weight

Shadow G Components and Characteristics

Gunship III	Shadow
Aircraft	AC-119G
Mission	Armed recce
Area/Target	In-country/troops-in- contact, mover, etc.
Armament	4 x 7.62-mm miniguns Fast: 6,000 rds/min Slow: 3,000 rds/min
Armor	2,000 lbs
Ordnance	31,500 rds
Fire control	Computerized fire-control system incorporating semi- automatic, manual-firing, offset-capable
Target acquisition (sensor)	Night observation sight (NOS)
Illumination	Illuminator 1.5 million candlepower with 20-40 DPG variable beam (20-kw) 24 flares dispensed from launcher
Reaction airspeed	180K TAS
Operating altitude	3,500 feet AGL
Fuel duration	6/30

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Turnaround	30 min
Escorts	None
Aircrew	2 pilots, 2 navigators (table navigator and NOS operator), 1 illuminator operator, 2 gunners, 1 flight engineer
One engine out	Unsatisfactory at combat gross weight

Shadow K Components and Characteristics

Gunship III	Stinger or Shadow K
Aircraft	AC-119K
Mission	Armed recce/interdiction
Area/Target	In-country/troops-in-contact, movers, etc., and out- country/trucks, LOC's
Armament	4 x 7.62-mm miniguns Fast: 6,000 rds/min Slow: 3,000 rds/min  2 x 20-mm cannon 2,500 rds/min
Armor	2,000 lbs
Ordnance	31,500 rds 7.62-mm 4,500 rds 20-mm
Fire control	Computerized fire-control system incorporating fully automatic, manual-firing, offset-capable

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Target acquisition (sensors)	Night observation sight (NOS) Infrared Side-looking radar
Illumination	Illuminator 1.5 million candlepower; pencil beam (20-kw); 24 flares dispensed from launcher
Reaction airspeed	180K TAS
Altitude	3,500 ft AGL (optimum)
Fuel duration	5/00
Turnaround	30 min
Escorts	None
Aircrew	2 pilots, 3 navigators (table navigator, NOS operator and radar/IR operator), 1 illuminator operator, 3 gunners, 1 flight engineer
One engine out	500 feet-per-minute climb

Spectre Components and Characteristics

Gunship II	Spectre
Aircraft	AC-130
Mission	Armed recce/interdiction
Area/Target	Out-country/trucks, LOC's
Armament	4 x 7.62-mm miniguns High: 6,000 rds/min Low: 3,000 rds/min  4x20-mm cannon 2,500 rds/min
Armor	5,000 lbs

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Ordnance	15,000 rds 7.62-mm 8,000 rds 20-mm
Fire control	Computerized fire-control system incorporating fully automatic, semiautomatic, manual-firing offset-capable
Target acquisition (sensors)	Night observation device (NOD) Infrared (IR) Side-looking radar Ignition detection
Illumination	Illuminator 1.5 million candlepower with 20-40 DFG variable beam (20 kw) and IR filter capability; 24 flares dispensed from launcher
Reaction airspeed	200K TAS
Operating altitude	5,500 ft AGL (optimum)
Fuel duration	6/30
Turnaround	1/30
Escorts	1xF-4 (of 3 rotating to tanker)
Aircrew	2 pilots, 3 navigators (table navigator, NOD operator, and radar/IR operator), 1 illuminator operator, 3 gunners, 1 flight engineer. (crew members added later: fire control officer, electronic warfare officer, two additional gunners.)
One engine out	400 feet-per-minute climb

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## APPENDIX 3

Pave Spectre Subsystems Configuration\*Sensors

LLLTV<sup>a</sup>  
 GMTI processor (APN-59 radar)<sup>a</sup>  
 IR set (AAD-7)<sup>a</sup>  
 Black Crow<sup>a</sup>  
 APQ-150<sup>a</sup>

Fire-Control System

Digital fire-control computer  
 inertial measuring unit (IMU)  
 heads-up display (gunsight)  
 fire-control display  
 slave select interface unit (SSIU)  
 boresight box<sup>a</sup>  
 fire-control teleprinter  
 moving-map display  
 air-data system  
 sensor slaving unit (SSU)<sup>a</sup>  
 two-gyro platform

Other

helmet sight<sup>a</sup>  
 laser-ranger designator  
 2-kw illuminator<sup>a</sup>  
 BDA airborne recorder<sup>a</sup>  
 APR-36/37  
 TRIM-7A<sup>a</sup>  
 survivability package  
 40-mm (2)  
 20-mm (2)<sup>a</sup>  
 7.62-mm (2)<sup>a</sup>  
 AIC-18/25a  
 sensor and light angle display (SLAD)<sup>a</sup>  
 LAU-74 flare launcher<sup>a</sup>  
 ARN-92

a. Items common to Pave Pronto.

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\*Capt James L. Cole, Jr., Fixed Wing Gunships in SEA  
(Jul 69-Jul 71) (S) (HQ PACAF, Project CHECO, 30 Nov 71), p 103.

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## SOURCES AND NOTES

Source material for this study falls into four general categories: official records (largely Air Force); manuscript histories; information derived from interviews and other direct personal contacts; and various published works.

Official Records

Messages and papers generated by the Joint Chiefs of Staff (JCS) proved particularly enlightening with respect to strategy, force deployments, and other high-level decisions--touching at times on foreign relations. Most current JCS documents relating to gunship matters were in the files of the Directorate of Plans, Headquarters USAF. Non-current JCS material, plus a limited number of Military Assistance Command Vietnam (MACV) records pertaining to gunships are retired at National Federal Records Center, Suitland, Maryland, and were examined there.

By far the largest portion of the author's research involved Air Force records. These were voluminous but uneven in quality. The papers of the Secretary of the Air Force (mostly at the Pentagon but non-current ones at the Suitland Records Center) afford valuable insights into the decision-making process and the rationale behind certain decisions. These papers frequently include memos and letters from and to the Secretary of Defense.

Records produced or held by the Air Staff were consulted at the Pentagon and the Suitland Records Center. The Pentagon office charged with gunship/special operations under the DCS/Plans and Operations possessed the richest lode of documents. Messages, letters, and miscellaneous correspondence (involving major commands and other organizations below Headquarters USAF) were obtained from the Air Force archives at The Albert F. Simpson Historical Research Center, Maxwell AFB, Alabama, or directly from the unit. The Gunship Program Office, Aeronautical Systems Division, Air Force Systems Command, Wright-Patterson AFB, Ohio, proved an especially worthwhile source of materials relating to gunship research and development. The Air Force archives at Maxwell AFB holds important operational records of the gunship squadrons, the 14th Special Operations Wing, Seventh Air Force, and other commands in Southeast Asia or the Pacific.

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Quite often, the more significant records were appended to various command or unit histories as supporting documentation.

#### Manuscript Histories

Project CHECO (Contemporary Historical Examination of Current Operations) Reports--first narratives written during the war by Air Force historians in the field--have greatly simplified and aided research into Southeast Asia combat operations. The following have been most valuable: First Test and Combat Use of AC-47, The Role of USAF Gunships in SEAsia, and Fixed Wing Gunships in SEA (Jul 69-Jul 71). Others can be noted in the citations. Likewise, Project Corona Harvest Reports, studies, and evaluations relating to the Southeast Asia war supplied gunship data and "lessons-learned" material. Fortunately, both Projects CHECO and Corona Harvest collected, compiled, and preserved supporting documentation--much of which is now on microfilm. These sources are available either at the Office of Air Force History or the Maxwell AFB archives.

Also helpful were the semiannual histories of Headquarters USAF directorates, the major commands (chiefly Pacific Air Forces, Tactical Air Command, Air Force Logistics Command, and Air Force Systems Command), plus relevant air force, wing, and squadron histories. Warner-Robins Air Materiel Area historical studies and accompanying documents set the background for the trials and tribulations growing out of the AC-119G/K modifications. Histories of the Commander in Chief, Pacific Command (CINCPAC), and MACV offered rich detail and a deeper insight into the broader aspects of the SEA war--strategic plans, objectives, and armed services/Allied country roles and missions. Most of the above histories are in the Office of Air Force History. Those below major command level (air force, division, wing, squadron, and detachment) are in the Air Force archives. Squadron or detachment histories were usually incorporated into wing semiannual histories. Unit history quality varies considerably according to the writer's training and dedication.

Other history manuscripts consulted included monographs, commonly called "bluebooks" or "blue covers," prepared by the Office of Air Force History personnel. These studies cover a wide range of subjects. The series on Headquarters USAF Plans

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and Policies and those on different aspects of the Southeast Asia war proved most profitable to this work.

#### Personal Contacts

Considerable background material, particularly concerning the origin and early trials of the gunship concept, was obtained by personal interviews. The author visited Wright-Patterson AFB, Ohio; Eglin AFB, Florida; the Air Force Academy, Colorado; and Maxwell AFB, Alabama, to discuss gunship development and operations with men who played key roles in the gunship's evolution. The tapes and transcripts of these interviews are in the Office of Air Force History. In addition, the oral history branch of the Maxwell AFB archives has conducted interviews, the transcripts of which supplement those by the author.

While at Eglin AFB, the author flew with an AC-119K crew on a live-firing, night training mission over the Eglin-Hurlburt Field range. This flight provided a first-hand look at crew coordination and gunship operations.

#### Published Works

Published works reviewed were chiefly of a general nature, bearing on opinions and perceptions about the Southeast Asia war or the strategic/tactical setting for gunship operations. For example, David Halberstam's The Making of a Quagmire offers a striking portrait of the deteriorating military situation in the early 1960's and the increasingly desperate need for a gunship capability. Similarly, The Pentagon Papers provide the author greater understanding of the political considerations affecting the waging of the war. The periodicals, newspapers, and Congressional publications (appropriation hearings) used can be found in the study's notes. A number of official manuals, RAND studies, and Air War College or Air Command and Staff College theses contributed data or differing viewpoints on subjects usually more narrow in scope. Most of the above published material may be found in the Air Force Studies and Analysis Library and the Pentagon's Army Library. The theses are in the Air University Library at Maxwell AFB.

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## NOTES

Chapter I

1. Ltr (U), Ralph E. Flexman, Asst Ch Engr, Sys Spt Dept, Bell Aerosystems Co, Div of Bell Aerospace Corp, to Dr. Gordon A. Eckstrand, Ch/Tng Rsch Br, Behavioral Sci Lab, WPAFB, Ohio, 27 Dec 62.
2. Col John A. McCann, "The Ugly Duckling of Air Power," The Air Power Historian, V (Jan 1958), 54-61.
3. Wings of Praise and Prayer (Los Angeles), May 1953; Martin Cole, "The Ingenious Handiwork of Nate Saint, MAF Pilot," Journal of the American Aviation Historical Society, 17 (Summer, 1972), 96-98.
4. Intvw (U), author with Ralph E. Flexman, Wash, DC, 7 Sep 71.
5. Ltr (U), 1st Lt G. C. MacDonald, 95th Coast Artillery (AA), to National Inventors Council, Wash, DC, 21 Apr 42.
6. Ltr (U), Capt G. C. MacDonald, Ord Dept to R&D Svc Sub-Ofc (Rocket), Dover Army AB, Dover, Del, subj: Transverse Firing of Rockets from Liaison Type Aircraft, 2 May 45.
7. Memo (U), Lt Col G. C. MacDonald to Limited War Committee, subj: Transverse Firing of Rockets and Guns, 14 Sep 61. MacDonald turned in a number of other ideas to the Limited War Committee at this time in response to an Air Force-wide call for ideas on counterinsurgency warfare.
8. Suggestion (U), Lt Col G. C. MacDonald to Tac Warf Application Proj, subj: Transverse Firing from Aircraft, 19 Sep 61.
9. Intvw (U), author with Gilmour C. MacDonald, Eglin AFB, Fla, 27 Sep 71.
10. Intvw (U), author with Ralph E. Flexman, Wash, DC, 7 Sep 71; "Side-Firing C-47 Conceived by AF Psychologist," Dayton Daily News (Dayton, Ohio), 29 Nov 65.
11. Ltr (U), Ralph E. Flexman to Capt John Simons, Engrg Psych Lab, WPAFB, Ohio, 16 Apr 63.

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12. Intvw (U), author with Lt Col John C. Simons, AMRL, WPAFB, Ohio, 2 Mar 71.

13. Memo (U), Telephone Conversation between Ralph E. Flexman and Captain John Simons, 29 Apr 63.

14. Handwritten note on DD Form 95 (Memo Routing Slip) (U), Capt John C. Simons, Ch/Crew Stns Br, Human Enrgy Div, 6570th AMRL, WPAFB, Ohio, to Dr. Julien M. Christensen, Ch/Human Enrgy Div [undated].

15. Telecon/Trip Report (U), Ralph E. Flexman, 29 Apr 63.

16. Ltr (U), Stuart M. Schram, Jr., Asst Ch/Avionics Div, Dir/Def & Trnsp Sys Enrg, ASD, WPAFB, Ohio, to Capt John C. Simons, subj: Evaluation of Bell Aerosystems Company Proposal (16 Apr 63), 8 May 63.

17. Encl, Ballistics of Laterally Fired Weapons, to ltr (U), Ralph E. Flexman to Capt John C. Simons, Enrgy Psych Lab [sic], WPAFB, Ohio, 16 Apr 63.

18. Narrative (U), Recommendation for awarding the Distinguished Service Medal to Captain John C. Simons, in AF Form 642 (Recommendation for Decoration), 6570th AMRL (MRHEU), WPAFB, Ohio [undated]; intvw (U), author with Lt Col John C. Simons, AMRL, WPAFB, Ohio, 2 Mar 71.

19. Simons intvw (U), 2 Mar 71.

20. Ltr (U), Capt John C. Simons, Ch/Crew Stns Br, Human Enrg Div, to Dep/Enrgy, ASD, subj: Request for Support of Limited War Study, 20 May 63.

21. Simons intvw (U), 2 Mar 71.

22. Lt Col John C. Simons, Sgt Estell P. Bunch, Ralph Flexman, and Lt Col T. E. Rickelman, Project Tailchaser: Development of a Lateral Firing Concept, AMRL-TR-66-202 (U) (AMRL, WPAFB, Ohio, Nov 1967); Lt Col John C. Simons and B.C. Dixon, Long-Line Loiter: Improvement of Some Free-Fall and Circling-Line Techniques, ASD-TR-69-95 (U) (ASD, WPAFB, Ohio, Sep 1969), I, 1.

23. See note above.

24. Memo (U), Capt John C. Simons, Ch/Crew Stns Br, Human Enrg Div, to Dr. Julien M. Christensen, Ch/Human Enrg Div, subj: Lateral Sighting Study [ca 2 Jul 63].

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25. Memo (U), Dr. Julien M. Christensen, Ch/Human Engrg Div, ASD, to Lt Col Parris, Ch/Behavioral Sci Lab, and Dr. Walter F. Grether, Tech Dir, Behavioral Sci Lab, 2 Jul 63.
26. Simons intvw (U), 2 Mar 71.
27. Simons, et al, Project Tailchaser: Development of a Lateral Firing Concept, AMRL-TR-66-202, pp 12-14.
28. Ibid.
29. Memo (U), Simons to Christensen [ca 2 Jul 63].
30. Ind (U), Lt Col J. L. Hight, Ch/Pers Subsys Div, Dir/Crew Subsys Engrg, to 6570th AMRL, 3 Jul 63.
31. Flight Test Plan ASNM-63-1 (U), Project Tailchaser--Lateral Sighting Study, 28 Oct 63.
32. Ibid.
33. Msg (U), Capt John C. Simons to Ralph E. Flexman, subj: Lateral Gun Firing Program, 11 Nov 63.
34. Narrative (U), Recommendation for awarding the Distinguished Service Medal to Captain John C. Simons [undated]; Simons intvw (U), 2 Mar 71.
35. Memo (U) attached to file material.
36. Simons intvw (U), 2 Mar 71; narrative (U), Recommendation for awarding the Distinguished Service Medal to Captain John C. Simons [undated].
37. See note above.
38. The team was headed by Brig Gen David M. Jones. See AFSC COIN R&D Past, Present, Future (S), 23 Sep 64, pp 1-10.
39. Intvw (U), author with Lt Col Ronald W. Terry, Gunship Prgm Dir, ASD, WPAFB, Ohio, 1 Mar 71.
40. Ibid.
41. Simons intvw (U), 2 Mar 71.
42. Flight Test Plan ASNM 63-1 (Addendum 1) (U), Project Tailchaser--Lateral Sighting Study, 29 Aug 64.

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43. Hist (S), APGC, 1 Jan-30 Jun 65, I, 61-73. The prototype SUU-11A gun pods (length 84" and diameter 12") averaged 325 pounds when fully loaded with 1,500 rounds of 7.62-mm ammunition.

44. Intvw (U), author with MSgt Estell P. Bunch, Gunship Prgm Ofc, ASD, WPAFB, Ohio, 3 Mar 71.

45. Simons, et al, Project Tailchaser: Development of a Lateral Firing Concept, AMRL-TR-66-202, pp 14-15.

46. Ibid.

47. Terry intvw (U), 1 Mar 71.

48. Ibid.

49. Simons, et al, Project Tailchaser: Development of a Lateral Firing Concept, AMRL-TR-66-202, p 16.

50. Ibid., pp 16-17. Simons suggested some ancillary advantages of a loitering-type aircraft such as: enhanced air-to-ground visual communication, improved aerial-delivery possibilities, using long-line technique to suppress flak or SAM installations by remote TV guidance, illuminating targets by sliding flares along a line, and suspending speakers at a fixed height on a long line. Flexman suggested also the idea of "sonar dipping" by long-line, loitering technique in antisubmarine operations.

51. Terry intvw (U), 1 Mar 71.

52. Ibid.

53. Memo (U), telephone rpt from Lt Edwin Sasaki to Walter F. Grether, Tech Dir/Behavioral Sci Lab, AMRL, 2 Nov 64.

54. Jacob Van Staaveren, USAF Plans and Policies in South Vietnam and Laos, 1964 (TS) (USAF Hist Div Liaison Ofc, Dec 1965), pp 15, 22, 36.

55. Interestingly, "An ad hoc committee was formed at Detachment 2 Alpha [Second ADVON] in early 1962 to recommend the features of a ground support aircraft/weapons system optimized to the South Vietnam environment." [Hist (S), 2d ADVON, 15 Nov 61-8 Oct 62, p 138.]

56. Msg (S), CSAF (Dir/Ops) to PACAF, AFXOP 86983, 031944Z Sep 64; Kenneth Sams, First Test and Combat Use of AC-47 (S) (HQ PACAF, Project CHECO, 8 Dec 65), pp 1-2.

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57. Msg (S), MACV to CINCPAC, MAC JRATA 9858, 180911Z Sep 64.
58. Ltr (S), Lt Gen James Ferguson, DCS/R&D, to Maj Gen Joseph H. Moore, Comdr, 2d Air Div, 12 Nov 64.
59. Ibid.
60. Msg (S), 2d Air Div to 34th TAC Gp, Bien Hoa AB, 1 Dec 64.
61. Msg (S), CINCPACAF to 13th AF, C00012, 092142Z Nov 64. General Sweeney cautioned that Vietnam combat tests might "appear to be successful due to several reasons resulting in a lack of accurate, concentrated enemy ground fire during the test." [Sams, First Test and Combat Use of AC-47, p 2.]
62. Msg (S), CINCPACAF to 2d Air Div, AFCVO 97373, 142350Z Dec 64; Sams, First Test and Combat Use of AC-47, p 3.
63. Msg (S), MACV to CSAF, MAC JRATA 18669, 290955Z Dec 64; hist (S), 2d Air Div, Jun-Dec 1964, II, Doc 10. The crew for the first series of flights out of Bien Hoa included: Capt. Ronald W. Terry and Sgt. Thomas Ritter of ASD; 1st Lt. Edwin H. Sasaki and Sgt. Estell P. Bunch of AMRL; and 1st Lt. Ralph D. Kimberlin, A1C. James H. Schmeisser, and A1C. Allan W. Sims of Eglin AFB.
64. Hist (TS), MACV, 1965, Annex K, pp 439, 442.
65. Hist (S), 13th AF, 1964, I, 119.
66. Msg (S), MACV to CSAF, MAC JRATA 18669, 290955Z Dec 64; hist (S), 2d Air Div, Jun-Dec 1964, II, Doc 10.
67. Bunch intvw (U), 3 Mar 71.
68. To avoid confusion, the designation was revised to AC-47 in late November 1965. [Hist (S), ASD, Jan-Dec 1965, 1-A (Narrative), 26; Terry intvw (U), 1 Mar 71.]
69. Terry intvw (U), 1 Mar 71.
70. Lt Col T. E. Rickelman, "Overseas Firing Tests," App II, Project Tailchaser: Development of a Lateral Firing Concept, AMRL-TR-66-202, Nov 1967. Lt Col Rickelman was with the 1st ACSq, Bien Hoa AB, Vietnam.
71. Ibid.

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72. Ibid.
73. PACAF Tactics and Techniques Bulletin 56 (U), 13 Feb 67.
74. Robert F. Futrell, Chronology of Significant Airpower Events in Southeast Asia, 1954-1967 (S) (USAF Hist Div, ASI, Dec 1967), p 49.
75. Terry intvw (U), 1 Mar 71.
76. SAMS, First Test and Combat Use of AC-47, pp 4-5.
77. Extract (S) from 2d Air Div U-55 Report, DC 00932, 23-24 Dec 64, Report 55, in Lawrence J. Hickey, Night Close Air Support in RVN (1961-1966) (S) (HQ PACAF, Project CHECO, 15 Mar 67), p 36.
78. Terry intvw (U), 1 Mar 71.
79. Hist (S), 2d Air Div, Jan-Jun 1964, V, 6. At this time the pacification plan was referred to as the "strategic hamlet" plan, the "oil stain" concept, or "new life" village program.
80. Ibid., p 7; Hickey, Night Close Air Support in RVN (1961-1966), p 32.
81. Futrell, Chronology of Significant Airpower Events in Southeast Asia, 1954-1967, p 25; Hickey, Night Close Air Support in RVN (1961-1966), p 32.
82. "No Vietnamese outpost which was supported by aerial flares dropped from a C-47 at night was even over-run by the Viet Cong guerrillas during the period. Whether or not the strike aircraft arrived in time to punish the guerrilla, the presence of the C-47 flare ship, as in the case of the unarmed L-19 convoy escort aircraft, intimidated the Viet Cong and kept him from gaining a victory." [Hist (S), 2d ADVON, 15 Nov 61-8 Oct 62, p 150.]
83. Maj James R. Wolverton, "Gunships and Guerrilla Warfare," USAF TAWC Quarterly Report, Sep 1970, p 24.
84. Msg (S), MACV to CSAF, MAC JRATA 18669, 290955Z Dec 64; hist (S), 13th AF, 1964, I, 119.
85. Ibid.

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86. MR (S), JRATA, subj: Night Mission in Side-Firing FC-47, 29 Dec 64; Sams, First Test and Combat Use of AC-47.

87. Extract (S) from 2d Air Div U-55 Report, DC 0483, 8 Feb 65, Report 65-6, in Hickey, Night Close Air Support in RVN (1961-1966), p 38. This successful mission was later referred to in message (S), AFSC to CSAF, SCGV 14747, 231338Z February 65, which urged certain gunship development actions.

88. Rickelman, "Overseas Firing Tests," App II, AMRL-TR-66-202, Nov 1967.

89. MR (S), JRATA, 29 Dec 64.

90. Rickelman, "Overseas Firing Tests," App II, AMRL-TR-66-202, Nov 1967.

91. Ibid.

92. Ibid.

93. Terry intvw (U), 1 Mar 71.

94. Ibid.

95. MR (S), JRATA, 29 Dec 64.

96. Terry intvw (U), 1 Mar 71; Sams, First Test and Combat Use of AC-47, p 6.

97. Msg (S), PACAF to 2d Air Div, DO 50059, 150004Z Jan 65.

98. Msg (S), PACAF to 2d Air Div, DORQ 00052, 272259Z Jan 65. This was information given 2d Air Div from a CINCPACAF to CSAF message. [Sams, First Test and Combat Use of AC-47.] The figure cited was based on "four pods for outpost/hamlet defense were expected to have four pods, others two. Spares requirements were based upon 1,500 sorties per month with 100-percent fire from two pods per sortie.

99. See note 97.

100. Msg (S), CSAF (DCS/Prgms & Resources) to PACAF, AFODC RQ 81937, 012049Z Feb 65.

101. JRATA Proj 3T-753.0 (C), Final Report Evaluation of Side Firing Capability in C-47 Type Aircraft, 2 Aug 65.

102. Terry intvw (U), 1 Mar 71.

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103. JRATA Proj 3T-753.0 (C), 2 Aug 65.
104. Terry intvw (U), 1 Mar 71.
105. Msg (S), AFSC to CSAF, TAC, PACAF, SCG V14747, 231338Z Feb 65.
106. Ibid.
107. AFLC Historical Study 374 (S), AFLC Support of Forces in Southeast Asia: Special Aircraft Projects, 1965-1968 (AFLC, Feb 1971), p 36.
108. Lt Col Terry says that even during these early tests they thought about equipping a future gunship with sensors, armor, and heavier armament. [JRATA Proj 3T-753.0], 2 Aug 65.]
109. Msg (S), CINCPACAF to CSAF, VC 30673, subj: Side-firing Aircraft Requirements, 20 Mar 65.
110. Document CH 0001708 (S), FC-47, AF Archives, Maxwell AFB, Ala.
111. Msg (S), CSAF (Dir/Opl Rqmts & Dev Plans) to AFLC, AFRDQ RA-2 71840, 12 May 65.
112. Msg (S), CINCPACAF to CSAF, DOP 31024, 180117Z Jun 65.
113. Document CH 0001708 (S), FC-47, AF Archives, Maxwell AFB, Ala.
114. Ibid.

## Chapter II

1. Leonard Bridgman, ed & compiler, Jane's All the World's Aircraft, 1947 (London, 1947), p 221C.
2. Illustrating the adaptability of the C-47's to the Vietnam conflict was the statement of Gen. Emmett O'Donnell, Jr., PACAF Commander, to CINCPAC on 21 February 1962: "SVN has, or will soon have, more than 150 airstrips of varying capability.... It is estimated that C-47s could operate in and out of about 60 of these airstrips."
3. Hist (S), 2d Air Div, Jan-Jun 1965, II, 27-28.
4. Terry intvw (U), 1 Mar 71.

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5. Hist (S), WRAMA, 1 Jan 65-31 Mar 68, III, 2.
6. AFLC Historical Study 374 (S), Feb 1971, pp 37-38.
7. Ibid., pp 45-46.
8. MR 1445 (FS-1729/C-47) (U), Dir/Op1 Rqmts & Dev Plans, Modification Requirement for C-47 Aircraft, 17 Jul 65; hist (S), Dir/Op1 Rqmts & Dev Plans, 1 Jul-31 Dec 65, p 51.
9. See note 5 and Chapter I of this study.
10. See note 5 and Chapter I of this study.
11. The 12 August amendment listed this equipment: AN/ARC-44 VHF/FM radio, AN/ARC-XXX VHF radio (Wilcox 807), AN/AIC-10A interphone, AN/APX-6 IFF, AN/ARN-18 glide slope receiver, AN/APN-70 Ioran, HF-103 (618T-3 single sideband transceiver), AN/ARA-31 homing adapter, AN/ARC-27 UHF radio, AN/ARN-6 radio compass, AN/ARN-14 VOR, AN/ARN-21 TACAN, marker beacon. [AFLC Historical Study 374 (S), Feb 1971, p 39; MR 1445-1 (FS-1729/C-47) (U), Dir/Op1 Rqmts & Dev Plans, Amendment to a Modification Requirement for C-47 Aircraft, 12 Aug 65.]
12. See note 5.
13. Msg (S), CSAF (Dir/Ops) to TAC, AFXOPF 86010, 121326Z Jul 65, subj: Additional Air Force Unit Deployment to SVN.
14. Hist (S), USAFSAWC, 1 Jul-31 Dec 65, pp 44-45.
15. Msg (S), TAC to SAWC, DORF-SW 30555, 132131Z Jul 65, subj: Additional Auxiliary Field Requirement.
16. Msg (S), SAWC to TAC, DOTR 00412, 162200Z Jul 65, subj: FC-47 Squadron for SEA; msg (S), SAWC to TAC, DOTR-AT 00427, 211630Z Jul 65, subj: Deployment of Additional AF Units to SVN; msg (C), SAWC to TAC, DOTR-AT 00434, 271645Z Jul 65, subj: Deployment of Additional AF Units to SVN.
17. Msg (S), TAC to SAWC, DPLPR 37748, 272145Z Jul 65, subj: Training Location for New SAW Units.
18. Hist (S), USAFSAWC, 1 Jul-31 Dec 65, p 112.
19. Ibid., pp 14, 50.
20. SAWC OpOrd 16-65 (S), Appendix 1-Annex N, subj: Personnel Requirements-Det 8 - 1 ACW, Jun 65.

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21. Msg (S), CSAF (Dir/Ops) to TAC, AFXOPF 90290, 311629Z Jul 65, subj: ANG U-10 Instructor Pilots; hist (S), USAFSAWC, 1 Jul-31 Dec 65, p 51. The code name "Big Shoot" was often coupled with "Quick Speak" (psychological warfare training, using U-10's and C-47's) which occurred simultaneously.
22. Hist (S), USAFSAWC, 1 Jul-31 Dec 65, pp 15, 52.
23. Activity Reports, Det 8, 1st ACWg.
24. Hist (S), USAFSAWC, 1 Jul-31 Dec 65, p 53.
25. Msg (U), USAFSAWC to TAC and WRAMA, DMM 22370, 221230Z Sep 65, subj: Deficiencies of FC-47D, Serial Nos 45-0919 and 43-49124; hist (S), USAFSAWC, 1 Jul-31 Dec 65, pp 91-92.
26. Msg (S), Det 8, 1st ACWg, to TAC and SAWC, subj: Survival Equipment Shortages, 5 Oct 65; msg (S), OOAMA to TAC, subj: Cal .30 MG Ammo for FC-47 Training at Forbes, 27 Aug 65.
27. Hist (S), USAFSAWC, 1 Jul-31 Dec 65, p 52.
28. Ibid., p 53.
29. Msg (S), 4440th Acft Delivery Gp to SAWC, DPL 06007, 062030Z Aug 65, subj: Movement Directive for Four C-47's, Hurlburt AFB, Florida, to Nha Trang AB, Vietnam; msg (C), 4440th Acft Delivery Gp to TAC, DPL 06969, 202022Z Oct 65, subj: Sixteen Buck-Big Shoot.
30. Hist (S), ASD, Jan-Dec 1965, I-A, 47.
31. Msg (S), 6251st TFWg (Bien Hoa AB) to CSAF, subj: Red Sea: Marriage of Forward Looking IR Set with the FC-47 Side-Fire System, 18 Sep 65; hist (S), USAFSAWC, 1 Jul-31 Dec 65, pp 79-80.
32. Hist (S), ASD, Jan-Dec 1965, I-A, 48-49.
33. Gen John D. Ryan, "Airpower in Southeast Asia," Air Force Policy Letter for Commanders (U), 1 Mar 71.
34. Hist (S), 2d Air Div, Jul-Dec 1965, I, 5-6.
35. Hickey, Night Close Air Support in RVN (1961-1966), p 55.

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36. Msg (U), CSAF (Ofc of Info) to TAC and AFSC, SAF-OIPC 93843, 222304Z Nov 65, subj: Release of Story on AC-47. It was assumed at this time the Vietcong and North Vietnamese knew of the gunship.

37. Hist (TS), PACAF, Jan-Dec 1966, pp 354-55.

38. Hist (S), 6250th CSGp, 1 Jul-31 Dec 65, I, 15-16. Upon its arrival in Vietnam, the 4th Air Commando Squadron was assigned to the 6250th Combat Support Group. The 6250th CSGp (formerly the 33d Tactical Group) was organized 8 July 1965.

39. Hist (TS), PACAF, Jan-Dec 1966, p 354.

40. It was May 1966 before each of the Squadron's aircraft had its three guns installed. [Hist (TS), PACAF, Jan-Dec 1966, p 354.]

41. Hist (S), 14th ACWg, 1 Jul-30 Sep 66, p 47.

42. Hist (S), 6250th CSGp, 1 Jul-31 Dec 1965, I, 17.

43. Msg (C), CINCPACAF to TAC, DPL 52276, 040004Z Aug 65, subj: Additional AF Deployments to SVN; msg (C), CINCPACAF to CSAF and TAC, OPL 52265, 290312Z, Jul 65, subj: Psychological Operations Augmentation.

44. Warren A. Trest, Control of Air Strikes in SEA, 1961-1966 (TS-NOFORN) (HQ PACAF, Project CHECO, 1 Mar 67), p 68

45. See note 42.

46. Memo (S), Maj Cline, 7th AF (DOPR-PL), to Gen Momyer, subj: AC-47 Aircraft [undated]; Maj Richard F. Kott, The Role of USAF Gunships in SEASIA (S) (HQ PACAF, Project CHECO, 30 Aug 69), p 77.

47. Ibid.

48. Jacob Van Staaveren, USAF Deployment Planning for Southeast Asia, 1966 (TS) (USAF Hist Div Liaison Ofc, Jun 1967), p 1.

49. The Headquarters of the 4th Air Commando Squadron was inactivated on 31 May at Tan Son Nhut and activated 1 June at Nha Trang. [Hist (S), 4th ACSq 1 Jan-30 Jun 66.]

50. Hist (TS), PACAF, Jan-Dec 1966, p 355.

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51. Hickey, Night Close Air Support in RVN (1961-1966), p 57.
52. Hist (S), 4th ACSq, 1 Jan-30 Jun 66, p 16.
53. Hickey, Night Close Air Support in RVN (1961-1966), p 68.
54. Ibid., p 69.
55. Warren A. Trest and SSgt Dale E. Hammons, Air Operations Thailand, 1966 (TS-NOFORN) (HQ PACAF, Project CHECO, 31 Oct 67), pp 88-89.
56. Hist (S), 4th ACSq, 1 Jan-30 Jun 66, p 20.
57. Hist (S), 14th ACWg, 1 Jul-30 Sep 66, pp 54-57.
58. Ibid.
59. Ibid.
60. Ibid.
61. Ibid.; memo (S), Maj Cline, 7th AF (DOPR-PL), to Gen Momyer, subj: AC-47 Aircraft [undated]. For the Army report on the AC-47 support see: After Action Report - The Battle for A Shau (C), Detachment C-1, 5th Special Forces Group (Abn), 1st Special Forces, 28 March 1966.
62. Kenneth Sams, The Fall of A Shau (S) (HQ PACAF, Project CHECO, 18 Apr 66), pp 3-4.
63. Hist (S), 14th ACWg, 1 Jul-30 Sep 66, pp 59-60. During this attack on A Shau, Maj Bernard F. Fisher became the first USAF individual honored with the Medal of Honor. He landed an A-1E on the pot-holed runway during an attack, rescuing a downed airman. For an interesting account of the AC-47 being downed in defense of A Shau see: Jim G. Lucas, Dateline: Vietnam (New York, 1966) pages 302-04.
64. Hist (S), 4th ACSq, 1 Jan-30 Jun 66, p 17.
65. Ibid.
66. Hist (S), 14th ACWg, 1 Jul-30 Sep 66, p 50.
67. Ibid.

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68. Hickey, Night Close Air Support in RVN (1961-1966), pp 62-63.
69. Ltr of Commendation from Comdr, 2d Bn, 35th Inf, 25 Inf Div, to Comdr, 4th ACSq, 22 Oct 66.
70. Hists (S), 14th ACWg: 1 Jan-30 Jun 66, p 60; 1-31 Oct 66, p 19.
71. Hist (S), 14th ACWg, 1 Nov-31 Dec 66, I, 25.
72. Hist (TS), MACV, 1965, p 445.
73. Hickey, Night Close Air Support in RVN (1961-1966), p 58.
74. Futrell, Chronology of Significant Airpower Events in Southeast Asia, 1954-1967, p 117.
75. Hist (S), 4th ACSq, 1 Jan-30 Jun 66, p 18.
76. Maj Gordon L. Eells, Advanced Aircraft for the Forward Air Controller (U), ACSC thesis, Jun 1967, p 20. Major Eells assesses the AC-47 as a FAC aircraft this way: "The area between the two pilots is too cramped, visibility is very poor for the FAC due to the small cockpit, the wing blocks the target area most of the time, and since there is no radio jack for the FAC, he cannot use the aircraft radios."
77. Hist (S), 4th ACSq, 1 Jan-30 Jun 66, p 2.
78. Melvin F. Porter, Night Interdiction in Southeast Asia (TS-NOFORN) (HQ PACAF, Project CHECO, 9 Sep 66), pp 44-45.
79. Hist (TS), PACAF, Jan-Dec 1966, p 356.
80. Ibid; Porter, Night Interdiction in Southeast Asia, p 45. Some AC-47's based at Pleiku flew armed reconnaissance missions in support of Tiger Hound. [Trest, Control of Air Strikes in SEA, 1961-1966, p 68.]
81. Hist (S), 4th ACSq, 1 Jan-30 Jun 66, p 19.
82. Ltr (C), Lt Col Frederick A. Roll, 7th AF Chief/Strike Plans Br, to Col Horne, Current Ops Div, 7th AF, subj: Flare/Gunship Support, 15 Jul 66.
83. Trest, Control of Air Strikes in SEA, 1961-1966, p 69.

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84. Intvw (S), Kenneth Sams with Col John F. Groom, Dir/Tiger Hound TF, 29 May 66, quoted in Kenneth Sams, AC-47 Operations, 1 Jan-30 Jun 66 [undated], p 8 [Project CHECO report draft].
85. Hist (S), 4th ACSq, 1 Jan-30 Jun 66, p 21.
86. Trest & Hammons, Air Operations Thailand, 1966, pp 104, 110.
87. See note 83.
88. Memo (S), Maj Cline, 7th AF (DOPR-PL), to Gen Momyer, subj: AC-47 Aircraft [undated]; Sams, AC-47 Operations, 1 Jan-30 Jun 66 [undated], p 1 [Project CHECO report draft]. With the two losses in late 1965, the total now stood at six.
89. Hist (TS), PACAF, Jan-Dec 1966, p 357.
90. Msg (C), 7th AF to PACAF, DO 08195, 15 Jun 66.
91. Hist (S), 14th ACWg, 1 Jul-30 Sep 66, pp 48-49.
92. See note 89.
93. Msg (S), CSAF to PACAF, AFCCS 91575, 18 Feb 66.
94. Hist (S), PACAF, Jan-Dec 1966, p 359.
95. Trest, Control of Air Strikes in SEA, 1961-1966, p 69; hist (S), 315th Air Div (Combat Cargo), 1 Jul-31 Dec 65, pp 42, 58. The 4th Air Commando Squadron had six C-47 aircraft assigned as flareships.
96. Hist (TS), CINCPAC, 1966, II, 540.
97. Msg (S), CSAF (Dir/Aerosp Prgms) to CINCPACAF, AFOAPBB 91752, 251950Z May 66, subj: AC-47 Aircraft.
98. Ibid.
99. Hist (S), Dir/Op1 Rqmts & Dev Plans, 1 Jan-30 Jun 66, p 66.
100. Msg (S), 7th AF to CINCPACAF, DPL 73417, 7 Sep 66; Msgs (S), 7th AF to PACAF: PL 73730, 9 Oct 66 and PL 74066, 23 Nov 66; msg (S), 7th AF to CSAF, PL 199, 31 Oct 66.
101. Msg (C), CINCPAC to JCS, 220554Z Oct 66.

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102. Msg (C), JCS to CSAF, JCS 2000, 22 Dec 66.
103. Hist (S), 14th ACWg, 1 Jul-30 Sep 66, p 49.
104. Msg (S), CSAF to PACAF, subj: Deployment of USAF Units to Thailand, 1 Jul 66. To comply with Ambassador Sullivan's desires, PACAF requested in February 1966 the addition of eight AC-47's to the "Lucky Tiger" Squadron for night armed reconnaissance in Laos. [Data Book (TS), VCS, USAF, Conference--CINCPACAF, 25-26 Apr 66.]
105. AFLC Historical Study 374 (S), Feb 1971, p 81.
106. Ibid., p 85.
107. Porter, Night Interdiction in Southeast Asia, App 5.
108. Hist (S), 14th ACWg, 1 Nov-31 Dec 66, I, 21, 32.
109. Ibid., p 35.
110. Hist (S), 4th ACSq, 30 Jun-30 Sep 66, p 1.
111. Ibid., p 2.
112. Ltr (S), ALO/Tay Ninh Province to 14th ACWg, subj: Close Air Support by AC-47s, 11 Nov 66.
113. Hist (S), 14th ACWg, 1 Nov-31 Dec 66, I, 35.
114. Two replacement aircraft were received in May and two more in July. [Memo (S), Maj Cline, 7th AF (DOPR-PL), to General Momyer, subj: AC-47 Aircraft [undated].]
115. Hist (S), 14th ACWg, 1 Jul-30 Sep 66, p 59; hist (S), 4th ACSq, 30 Jun-30 Sep 66, p 5. Lt Col Max F. Barker discusses this in his End of Tour Report.
116. Hist (S), 14th ACWg, 1-31 Oct 66, p 19.
117. Ibid., pp 27-28.
118. Hist (S), 4th ACSq, 1 Jan-30 Jun 66, p 9.
119. Hist (S), 14th ACWg, 1-31 Oct 66, p 28.
120. Hists (S), 14th ACWg: 1 Jan-30 Jun 66, pp 46-49; 1 Jul-30 Sep 66, p 98.

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121. Hist (S), 4th ACSq, 30 Jun-30 Sep 66, p 8: ltr (U), Capt Russel R. Young, Armt Off, 4th ACSq, to Mr. Kenneth K. Cobb, Dir/Armt Dev, Eglin AFB, Fla, subj: Armament Memo Report 65-36, 26 Oct 65.

122. Rprt (U), Ballistics Div, AFATL, Ballistics [undated].

123. Hist (S), 14th ACWg, 1 Jan-30 Jun 66, p 46. With the 12° declination the aircraft bank angle on a standard firing pass was 30°.

124. Hist (S), 4th ACSq, 1 Jan-30 Jun 66, p 9.

125. Ibid., p 10. Having given some attention to the safety of flare operations, WRAMA recommended in March 1966 that pneumatic mechanisms then used in launchers be eliminated. WRAMA contended this would reduce the lanyard length from 42 inches to 10 inches and would require only manual-pulling while the flare was in the launch tube. The SAWC recognized that this was a simpler procedure. It nevertheless objected to the WRAMA proposal, believing safety might be sacrificed if a malfunction occurred while the flares were still in the tubes. [AFLC Historical Study 374 (S), Feb 1971, p 47.]

126. Hist (S), 4th ACSq, 1 Jan-30 Jun 66, p 3.

127. Hist (S), 14th ACWg, 1 Jan-31 Mar 67, pp 13-15.

128. Ibid., p 15.

129. Ibid., p 16.

130. Msg (U), Lt Gen Robert Cushman, Jr, CG, III Marine Amph Force, to 4th ACSq, 26 Sep 67.

131. Hist (S), 14th ACWg, 1 Jan-31 Mar 67, p 14.

132. Hist (S), 14th ACWg, 1 Apr-30 Jun 67, p 18.

133. Msg (U), COMUSMACV to Comdr, 14th ACWg, 7 Sep 67.

134. Hist (TS), PACAF, 1 Jan-31 Dec 67, Annex 1, Chronology, p 15.

135. Hist (TS), MACV, 1967, I, 416.

136. Ltr (S), Lt Col Francis E. Wilkie, Dir/SP, 7th AF, to Dir/Ops, 7th AF, subj: 26 Feb 67 Attack on Da Nang Air Base, 4 Mar 67.

137. Ibid.

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138. Msg (S), CSAF (Dir/Ops) to CINCPACAF, AFXOPFI 88928, 282157Z Feb 67.

139. Msg (S), CINCPACAF to CSAF, DO 31430, 082147Z Mar 67.

140. Msg (S), 7th AF to PACAF, DPLG 82642, 200630Z Mar 67. This message noted that an increase of 15 AC-47's was previously submitted in the CINCPAC CY 66/67 requirements document as line number HO 110, but was disapproved by SECDEF Program 4.

141. Ibid.

142. Staff Summary Sheet (S), Ch/Current Plans, 7th AF, Flare Support of 7AF Bases, 11 Mar 67.

143. Msg (TS), CINCPACAF to CSAF, PPL 50052, 070325Z Apr 67.

144. Msg (S), CINCPAC to JCS, 080715Z Apr 67.

145. Msg (S), CINCPACAF to CSAF, DOP 52148, 130319Z Apr 67.

146. Hist (TS), MACV, 1967, I, 416-17.

147. Msg (S), COMUSMACV to CINCPAC, 210223Z May 67; hist (TS), PACAF, Jan-Dec 1967, p 475.

148. Hist (TS), MACV, 1967, I, 417.

149. Msg (S), CINCPACAF to CSAF, 242025Z May 67, subj: Increased AC-47s for Air Base Defense.

150. Staff Summary Sheet (S), 7th AF, Base Defense Seminar, 27 May 67.

151. Ibid.

152. Staff Summary Sheet (S), 7th AF, Increased AC-47s for Air Base Defense, 31 May 67.

153. Msg (C), CSAF (Dir/Ops) to CINCPACAF, AFXOPF 89998, 031434Z Jun 67, subj: Increased AC-47s for Base Defense.

154. Msg (C), TAC to CSAF, 081450Z Jun 67, subj: Increased AC-47s for Base Defense.

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155. Msg (C), CSAF (Dir/Ops) to TAC, AFXOPF 91872, 132030Z Jun 67, subj: Increased AC-47s for Base Defense; msg (S), CSAF (Dir/Ops) to CINCPACAF, 242242Z Jun 67, subj: Increased AC-47s for Air Base Defense.

156. Msg (C), CINCPACAF to CSAF, DMM 47006, 300148Z Jun 67, subj: Increased AC-47s for Base Defense.

157. Futrell, Chronology of Significant Airpower Events in Southeast Asia, 1954-1967, p 138.

158. A change to USAF Program Document 69-3 accomplished the unit realignment. [Msg (S), CINCPACAF to 7th AF, 062128Z Sep 67, subj: Change to USAF PD 69-3.]

159. Msg (S), CSAF (Dir/Maint Engrg) to AFLC, 091446Z Sep 67.

160. Msg (S), CSAF (Dir/Ops) to PACAF, 9 Sep 67.

161. Staff Summary Sheet (S), 7th AF, AC-47 Realignment, 16 Sep 67.

162. On 19 August 1967, the 14th Air Commando Wing Commander had recommended establishment of a gunship FOL for air-base defense support. [Ltr (S), Comdr, 14th ACWg, to 7th AF (DCO), subj: Airborne Base Defense Support, 19 Aug 67.] Establishment of a FOL at Da Nang would require construction of billeting for 24 officers and 71 airmen at an estimated cost of \$140,000. A target date for FOL operation was Feb 1968. [Staff Summary Sheet (S), 7th AF, Da Nang Beddown, 10 Oct 67.]

163. Staff Summary Sheet (S), 7th AF, AC-47 Realignment, 16 Sep 67.

164. Ibid.

165. Msg (S), 7th AF to PACAF, subj: SEA Deployment AC-47, 18 Sep 67.

166. Hist (S), 7th AF, 1 Jul-31 Dec 67, I, XV.

167. The MACV History declared that at the end of 1967 the Gunship II evaluation indicated a threefold improvement over the AC-47. [Hist (TS), MACV, 1967, I, 11.]

168. Hist (S), 14th ACWg, 1 Jan-31 Mar 67, p 13.

169. Ibid., pp 20-21.

170. Ibid., p 13.

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171. Final Report (S), 14th ACWg, Evaluation of AC-47 Mini-Gun Problems, 30 Sep 67.
172. Hist (S), 14th ACWg, 1 Apr-30 Jun 67, p 14.
173. AFLC Historical Study 374 (S), Feb 1971, pp 47-48.
174. Hist (S), 14th ACWg, 1 Jul-30 Sep 67, p 20. Six explosions--apparently due to hangfires or cookoffs--took place during July minigun operations with injury to crewmen.
175. Hist (S), 14th ACWg, 1 Oct-31 Dec 67, p 22.
176. Hist (S), 14th ACWg, 1 Jul-30 Sep 67, p 19.
177. Hists (S), 14th ACWg: 1 Jan-31 Mar 67, p 15;  
1 Apr-30 Jun 67, p 16.
178. Jacob Van Staaveren, The Air Force in Southeast Asia: Toward a Bombing Halt, 1968 (TS) (Ofc/AF Hist, Sep 1970), p 7.
179. Ibid., p 14.
180. Ibid.
181. Ltr (U), Col Paul C. Watson, Comdr, 366th TFWg, to Comdr, 14th ACWg, subj: Defense of Da Nang, 14 Mar 68.
182. Hist (S), 14th ACSq, 1 Jan-31-Mar 68, pp 48-50.
183. The Air Commando, 15 Mar 68; hist (S), 14th ACWg, 1 Jan-31 Mar 68, pp 27-28.
184. Ibid.
185. Ibid.
186. Hist (S), 14th SOWg, 1 Jul-30 Sep 68, p 23.
187. Taped intvw (S) of participants at Duc Lap; hist (S), 14th SOWg (formerly 14th ACWg), 1 Jul-30 Sep 68. The New York Times, 2 September 1968, told of the gunship role in the battle at Duc Lap. The heading was "Spooky the Plane Hailed in Vietnam."
188. DAF SØ GB-260 (U), 13 Jun 68.
189. Newspaper clippings in hist (S), 14th ACWg, 1 Apr-30 Jun 68, I, atch 3.
190. Ibid.

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191. Msg (U), CINCPACAF to 7th AF, subj: Redesignation of 14th Air Commando Squadron, 21 Mar 68.

192. Hist (S), 14th SOWg, 1 Jul-30 Sep 68, p 3.

193. Msg (S), 14th SOWg to DASC Victor Hue Phu Bai, I DASC Da Nang, II DASC Pleiku, III DASC Bien Hoa, IV DASC Can Tho, subj: Spooky Operations, 3 Sep 68.

194. Ltr (C), 4th SOSq to 14th SOWg, subj: Night Hawk Mission Report, 25 Sep 68.

195. Ibid. Paragraph VI of the report contained this comment: "Some investigation could be warranted as to the feasibility of using a night observation device in conjunction with the AC-47 pilot gunship. This capability would allow a more direct approach to the basic mission outlined in the concept of operations." At this same time, of course, Gunship II was so equipped and the Gunship III's would include this capability.

196. Msg (S), USAFSAWC to TAC, 012204Z Mar 68, subj: Semi-Automatic Flare Launcher and Eraser System.

197. Msg (S), 7th AF to PACAF, subj: SEAOR 152 FY 68 Class V Mod-Installation of Special Equipment in AC-47 Gunship, 22 Oct 68. Air Force Systems Command considered still another palletized fire-control system for test in the latter half of 1968. A company had developed a computerized day/night fire-control system which appeared to offer advantages in quick conversion of cargo aircraft into gunships. In July AFSC proposed to TAC that a joint test be arranged. [Msg (C), AFSC to TAC, subj: Evaluation of Palletized Day/Night Fire Control System for AC-47 and other Applications, 19 Jul 68.]

198. Msg (S), 7th AF/13th AF to 7th AF, subj: AC-47 Gunship Employment in Barrel Roll, 15 May 69; Kott, The Role of USAF Gunships in SEASIA, p 16.

199. Msg (S), 7th AF to PACAF, 131230Z Mar 69, subj: AC-47 Deployment.

200. Briefings (S), Col William H. Ginn, Jr., Dep Comdr/Ops, 14th SOWg, to SAF Robert C. Seamans, Jr., subj: [Defense of Lima Sites] [undated].

201. Msg (S), CINCPACAF to CINCPAC, 152125Z Mar 69, subj: AC-47 Gunship Operations. This became Detachment E, 4th SOSq.

202. Kott, The Role of USAF Gunships in SEASIA, p 17.

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203. Ltr (S), 4802d JLD to 7th/13th AF, subj: "Spooky" BDA, 19 Mar 69.
204. Hist (S), SOWg, 1 Jan-31 Mar 69, p 26.
205. The Air Attache's congratulatory remarks are quoted in message (S), 7th AF to 14th SOWg, 130230Z May 1969, subject: AC-47 Gunship in Barrel Roll.
206. Hist (S), 14th SOWg, 1 Jan-31 Mar 69, p 26.
207. Msg (S), 7th AF/13th AF to 7th AF, subj: AC-47 Deployment, 8 May 69.
208. Ibid.
209. Msg (S), CINCPACAF to 7th AF, 010320Z Jul 69, subj: Gunship Support in Barrel Roll.
210. Hist (S), 14th SOWg, 1 Apr-30 Jun 69, p 24 and p 1 of Gunship Operations.
211. Hist (TS), CINCPAC, 1969, p 208.
212. Kott, The Role of USAF Gunships in SEASIA, p 19. The transfer of AC-47's to VNAF was contained in VNAF Conversion Plan 69-15. [Msg (S), 7th AF to 14th SOWg, subj: AC-47 Transfer, 6 Jun 69.]
213. Hist (S), 14th SOWg, 1 Apr-30 Jun 69, p 3.
214. Hist (S), 14th SOWg, 1 Jul-30 Sep 69, p 13.
215. Hist (TS), CINCPAC, 1969, III, 209.
216. Hist (S), 14th SOWg, 1 Jul-30 Sep 69, p 1 of Gunship Operations. Briefly in 1969, the 4th SOSq was given supervision of the Seventh Air Force C-47 Theater Indoctrination School. When the 4th SOSq was later inactivated the school was transferred to the 9th SOSq.
217. This was done by PACAF Movement Order 26, 10 July 1969. Also, see: History (S), 14th SOWg, 1 October-31 December 1969. A total of 32 tons of equipment, 4 aircraft, and 90 personnel were involved in the move.
218. Hist (S), 14th SOWg, 1 Jul-30 Sep 69, p 3 of Gunship Operations. On 12 October the 4th SOSq acquired two C-47 Moonshine aircraft (one each from the 5th and 9th SOSqs) and began using them on flaeship missions out of Bien Hoa and Pleiku
219. Hist (S), 14th SOWg, 1 Jan-31 Mar 69, p 31.

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220. Ibid., p 2; hist (S), 14th SOWg, 1 Apr-30 Jun 69, p 2.
221. Msg (S), 14th SOWg to 7th AF, 18 Jan 69.
222. Hist (S), 14th SOWg, 1 Jan-31 Mar 69, p 1. The 14th SOWg had become the largest fighting wing in Vietnam. It was unusual in flying 9 types of aircraft from 11 operating locations. On 8 March the 14th Wing ended its third year in the Southeast Asian war.
223. For a fast-moving detailed account of this gunship episode, see Capt Gary A. Guimond, "Hot Flare! Hot Flare!" Airman XIV (June 1970), 28-30.
224. Ibid.; A1C Levitow became the lowest ranking airman ever to receive the Medal of Honor.
225. Hist (S), 14th SOWg, 1 Oct-31 Dec 69.
226. Hists (S), 14th SOWg: 1 Apr-30 Jun 69, p 22; 1 Jul-30 Sep 69, p 3. Action was again taken in September to economize on ammunition by minimizing its expenditure.
227. Hist (S), 14th SOWg, 1 Jan-31 Mar 69, p 21.
228. Ibid.
229. Hist (S), 14th SOWg, 1 Apr-30 Jun 69, p 18. In 18 months of operation, the 3d SOSq had to give in-country indoctrination and training to over 400 combat crewmembers. This illustrates the magnitude of the continuous training problem. [Ltr (U), 14th SOWg to 7th AF, subj: Recommendation for Award of Unit Decoration, 21 May 69.]
230. Hist (S), 14th SOWg, 1 Jan-31 Mar 69, p 19. In December 1968 General Brown, Seventh Air Force Commander, proposed to PACAF that Nha Trang AB be returned to the VNAF and USAF units be relocated. Many messages passed between PACAF and Air Force Headquarters before approval was given. [Hist (TS), PACAF, 1 Jan-30 Jun 69, pp 43-49.]
231. Msg (S), CINCPAC to 7th AF, subj: Clearance for AC-47 Aircraft, 22 Oct 69.
232. Hist (S), 14th SOWg, 1 Jul-30 Sep 69, p 2 of Gunship Operations.
233. Msg (S), 14th SOWg to 7th AF, subj: AC-47/AC-119G Deployment, 24 Oct 69.
234. See note 232.

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235. Hist (S), 14th SOWg, 1 Oct-31 Dec 69, p 18.
236. Hist (S), 14th SOWg, 1 Oct-31 Dec 69, pp 4-6.  
Inactivation of the 4th SOSq was effective 15 December 1969.
237. ROC PACAF-6-69 (S), PACAF, subj: Gunship Program for Air Base Defense, 7 Apr 69.
238. Ibid.
239. Hist (S), WRAMA, 1 Jul 69-30 Jun 70, part II, 44; Hearings before the House Subcommittee of the Committee on Appropriations, 92d Cong, 1st sess, 6 Apr 71, p 661. A cost figure of \$5.3 million was stated in these Hearings.

Chapter III

1. Proj Little Brother Planning Doc (S), Dir/Alft Planning, Dep/Adv Sys Planning, ASD, 1 Jul 66.
2. Maj Ronald W. Terry and Capt Terry R. Jorris, "Gunship II, A Study of In-House Response to a Unique Operational Requirement," Proceedings of the 1968 Air Force Science and Engineering Symposium (C), USAFA, 30-31 Oct to 1 Nov 68, IV, U-10.
3. Memo (S), Dr. V. V. McRae to Dr. Donald F. Hornig, subj: Case Study for the Vietnam Development Group: Night Vision for Aircraft Systems, 13 Dec 67.
4. Ibid.
5. Ibid.; memo (S), Sp Asst to the Pres on Sci & Tech, Dr Lee DuBridge, to SAF Robert C. Seamans, Jr., 1 Jul 69.
6. Hist (S), Dir/Dev, 1 Jul-31 Dec 66, pp 93-98; Herman S. Wolk, USAF Plans and Policies R&D for Southeast Asia, 1965-1967 (TS) (Ofc/AF Hist, Jun 1969), pp 59-61.
7. Ibid.
8. This title had a definite nautical sound and was evidently chosen to distinguish it from Army armed helicopters. [Terry intvw (U), 1 Mar 71.]
9. Ltr (S), Dir/Dev (AFRDD-S) to AFSC, TAC, AFLC, ATC, PACAF, subj: Shed Light Guidance, 17 Nov 66.
10. Hist (S), Dir/Dev, 1 Jul-31 Dec 66, pp 76-77.
11. See note 9.

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12. Hist (S), Dir/Dev, 1 Jan-30 Jun 67, p 98.
13. Ibid., p 80.
14. Terry and Jorris, "Gunship II, A Study of In-House Response to a Unique Operational Requirement," p 118.
15. Hist (S), Dir/Dev, 1 Jan-30 Jun 67, p 80.
16. AFLC Historical Study 374 (S), Feb 1971, pp 92-93; hist (S), ASD, Jul 1968-Jun 1969, I, 132.
17. Hist (S), ASD, Jul 1968-Jun 1969, I, 132.
18. Hist (S), Dir/Ops, 1 Jan-30 Jun 67, p 219.
19. Hist (S), Dir/Dev, 1 Jan-30 Jun 67, p 81.
20. Hist (S), Dir/Dev, 1 Jul-31 Dec 67, p 180.
21. Hist (TS), MACV, 1967, II, 871.
22. Hist (S), Dir/Dev, 1 Jul-31 Dec 67, p 181.
23. Hist (S), ASD, Jul 1968-Jun 1969, I, 132. Headquarters AFLC assigned the nickname Loggy Stinger with a precedence rating of 1-7 to the program to aid in its support. [AFLC Historical Study 374 (S), Feb 1971, p 93.]
24. Terry and Jorris, "Gunship II, A study of In-House Response to a Unique Operational Requirement," p U-26.
25. Ibid., p U-28.
26. Hist (S), 7th AF, 1 Jul-31 Dec 67, I, 135-36. Page XV of this history's Chronology indicates that the prototype arrived at Nha Trang AB on 26 September 1967.
27. Kott, The Role of USAF Gunships in SEASIA, p 25.
28. TAC OPlan 6 (S), Final Report Gunship II, Feb 1968.
29. Hist (S), 7th AF, 1 Jul-31 Dec 67, I, 136.
30. Gunship II Flight Test and Combat Evaluation Interim Report (S), TAC, 11 Dec 67, p 3.
31. Ltr (C), USA Vietnam (AVHGC-DST), to Dep CG, USA Vietnam, subj: Letter Report - Army Evaluation of USAF Gunship II (U), 10 Jan 68, p 9.

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32. Ltr (C), USA Vietnam to CG, USA Combat Development Command, Fort Belvoir, Va, subj: Army Evaluation of USAF Gunship II (U), 15 Jan 68.
33. Hist (S), 7th AF, 1 Jul-31 Dec 67, I, 53.
34. Hist (S), Gunship II Proj Div, ASD, 1 Jul-31 Dec 68, p 4.
35. Release (U), ASD, 16 Aug 68.
36. AFLC Historical Study 374 (S), Feb 1971, pp 93-94.
37. Terry intvw (U), 1 Mar 71.
38. Hist (S), Gunship II Proj Div, ASD, 1 Jul-31 Dec 68, p 4. There were also: 13 secondary fires, 23 secondary explosions, 3 gunsites destroyed, and an average of 94 flying hours per month. Of the total 53 missions (94 sorties) flown, 20 missions supported friendly forces engaging the enemy.
39. Hist (TS), MACV, 1967, I, 11.
40. Kott, The Role of USAF Gunships in SEASIA, pp 25-26.
41. Hist (S), 7th AF, 1 Jul-31 Dec 67, I, 136.
42. MR (TS), Lt Gen William D. Momyer, Comdr 7th AF, subj: CHC Meeting (2 Dec 67), 3 Dec 67.
43. Hist (S), ASD, Jul 1968-Jun 1969, I, 133. To expedite the prototype's return, the original TAC/AFSC task force was to return with the aircraft for temporary duty of 179 days. Permanent crew replacements were expected in SEA by March 1968. At this time the task force personnel would return to the United States to assist in the follow-on gunship development and training. [Msg (S), CSAF to CINCPACAF, TAC, AFSC, ASD, USAFMPC, 102046Z Jan 68, subj: Gunship II Deployment (U).]
44. Terry intvw (U), 1 Mar 71.
45. The Detachment 2 Commander was Lt Col Ross E. Hamlin. [Hist (S), 14th ACWg, 1 Jan-31 Mar 68, pp 23-25.]
46. Hist (S), 14th ACWg, 1 Jan-31 Mar 68, p 23.

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47. Hist (S), Gunship II Proj Div, ASD, 1 Jul-31 Dec 68, p 4. On 19 March 1968 General Momyer passed along to the 14th ACWg the following message from General Westmoreland: "Have noted with pleasure the continuing impressive accomplishments of Gunship II." General Momyer added: "I deeply appreciate the spectacular accomplishments of Gunship II." [Msg (C), 7th AF to 14th ACWg, subj: Congratulatory Message, General Momyer to Col Patton, 19 Mar 68.]

48. Staff Summary Sheet (S), 7th AF, Employment of AC-130 (Gunship II) (U), 15 Jun 68.

49. Staff Summary Sheet (S), 7th AF (DPLG), AC-130 Gunship II (U), 19 Jun 68; ltr (S), 7th AF to 14th ACWg, subj: Gunship II (AC-130) Temporary Deployment (U), 19 Jun 68.

50. Kott, The Role of USAF Gunships in SEASIA, p 27.

51. Staff Summary Sheet (S), 7th AF (DPLG), AC-130 Gunship II, 19 Jun 68. The execution order was message (S), 7th AF to 834th Air Div, 14th ACWg, 8th TFWg, 460th TRWg, 377th CSGp, 210355Z June 1968, subject: Employment of AC-130 (Gunship II).

52. Hist (S), 14th SOWg, 1 Jul-30 Sep 68, p 12.

53. Hist (S), Gunship II Proj Div, ASD, 1 Jul-31 Dec 68, p 4. Ammunition expenditures for February through November were: 565,900 rounds of 20-mm and 423,400 rounds of 7.62-mm. A total of 1,610 illumination flares and 66 marker flares were used.

54. Kott, The Role of USAF Gunships in SEASIA, p 27.

55. Hist (S), Gunship II Proj Div, ASD, 1 Jul-31 Dec 68, p 3; hist (S), Dir/Dev, 1 Jul-31 Dec 68, p 166.

56. The 14th ACWg strongly urged the prototype be returned to the United States with the substitution of production models. [Msg (S), 14th ACWg to 7th AF, 240641Z Apr 68, subj: AC-130 Gunship; msg (S), 7th AF to CINCPACAF, 120220Z Sep 68; subj: Gunship II Prototype Replacement; msg (S), 14th SOWg to 7th AF, 070947Z Sep 68; subj: AC-130 Aircraft Transfer.] The extent of the prototype's equipment problems was revealed by message (S), 7th AF to CINCPACAF, 200200Z September 1968, subj: Gunship II and message (S), TAC to AFSC, AFLC, CSAF, 011805Z October 1968, subj: Gunship II. The items with difficulties included: APS-42 radar, doppler radar, weather-avoidance radar, flare launcher, illuminator, fire-control safety display, and infrared target acquisition.

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57. The Directorate of Development at Air Force Headquarters reported different cost figures. It listed total cost of the prototype program as \$3,701,222; average cost per operating hour, \$3,459; and average cost per kill, \$5,676. [Hist (S), Dir/Dev, 1 Jul-31 Dec 68, p 167.]
58. Air Staff Summary Sheet (S), Use of C-130s in Shed Light Program, 24 Oct 67.
59. Memo (S), SAF Harold Brown to Chief of Staff, subj: Use of C-130's in Shed Light Program, 7 Nov 67.
60. Msg (C), CSAF (Dir/Ops) to CINCPACAF and TAC, AFXOPF 84039, 6 May 67. This message asked the addressees to submit comments on a follow-on gunship aircraft by 10 May 1967.
61. Msg (S), CSAF to CINCPACAF, subj: Follow-on Aircraft for AC-47 and SEAOR 50/Hunter/Gunship, 8 Jun 67.
62. Memo (S), SAF to Vice Chief of Staff, subj: C-119 G/K Gunship Phase-In, 8 Jun 67.
63. Msg (S), CSAF to CINCPACAF, subj: Follow-on Aircraft for AC-47, 24 Jun 67; hist (S), Dir/Ops, 1 Jan-30 Jun 67, p 291.
64. Msg (S), Gen Momyer, Comdr, 7th AF, to Gen Ryan, CINCPACAF, subj: Follow-on Aircraft for AC-47, 30 Jun 67. In a handwritten note, General Momyer commented: "We have too many worn out aircraft in the theater now. For the future, we should seek quality improvements."
65. See note 61.
66. Msg (C), CSAF (Dir/Dev) to AFSC, AFRDDH 81350, 1 Aug 67. This message noted that "7AF and TAC prefer the AC-130 for the Gunship II role while DOD and SECAF actions indicate selection of the C-119K." Later, the message reported: "Results of the 60-to 90-day combat evaluation of Gunship II starting in September 1967 may have some influence on future replacement aircraft." This was a hint that the matter might be reconsidered.
67. Hist (S), Dir/Dev, 1 Jul-31 Dec 67, p 182.
68. Gunship II Flight Test and Combat Evaluation Interim Report (S), 11 Dec 67.
69. Ltr (S), Gen John P. McConnell, Chief of Staff, to SAF, subj: Additional Gunship II Aircraft for Night Operations, 13 Dec 67.

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70. Memo (S), Gen John P. McConnell, Chief of Staff, to SAF Harold Brown, subj: Gunship II Aircraft, 13 Dec 67. General McConnell added a postscript to his memo: "It should turn out to be highly complementary to Muscle Shoals concept."

71. See note 69.

72. Memo (C), SAF Harold Brown to Chief of Staff, subj: Gunship Aircraft 20 Dec 67. As a corollary to the Gunship II development, the self-contained night attack (SCNA) aircraft program (AP-2H) was canceled on 11 December 1967. The Black Spot, Gunship, and Tropic Moon programs seemed to offer more immediate operational capability. [Hist (S), Dir/Dev, 1 Jan-30 Jun 68, pp 168-170.]

73. Ibid.

74. Msg (S), 7th AF to CINCPACAF, DPL 3920, 26 Dec 67, subj: Mixed Force fo Gunships in SEA (S); Kott, The Role of USAF Gunships in SEASIA, pp 4-5.

75. Msg (S), 7th AF to CINCPACAF, 180318Z Nov 67.

76. Msg (S), 7th AF to CINCPACAF, 310815Z Dec 67, subj: Gunship II Requirements; hist (S), 7th AF, 1 Jul-31 Dec 67, I, 143.

77. Msg (S), PACAF to 7th AF, 150030Z Dec 67.

78. Msg (S), 7th AF to CINCPACAF, 310815Z Dec 67, subj: Gunship II Requirements.

79. Msg (S), Gen Ryan, CINCPACAF, to Gen McConnell, CSAF, subj: Gunship II Requirements, 12 Feb 68; Kott, The Role of USAF Gunships in SEASIA, p 26.

80. Ltr (C), CSAF to SAF, subj: Gunship Aircraft, 5 Jan 68; Air Staff working paper, subj: Gunship Aircraft, 5 Jan 68, in Doc 220, AFLC Historical Study 374 (S), Feb 1971.

81. Ibid.

82. Memo (C) Dep SECDEF Paul H. Nitze to SAF, subj: AC-119 Gunship Force, 24 Feb 68. Secretary of the Air Force Brown informed the Secretary of Defense on 1 February 1968 of plans for BIAS/Hunter aircraft: 8 AC-130's, 16 AC-119G's, and 16 AC-119K's. He added: "I believe we should make these forces additive to the AC-47s already in SEA..." [Memo (S), SAF Harold Brown to SECDEF, subj: AC-130 Gunship II and C-130 BIAS/Hunter Aircraft, 17 Feb 68.]

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83. Msg (S), TAC to CINCPACAF, AFSC, USAFTAWC, USAFSAWC, ASD, AFLC, subj: Gunship II Follow-on Aircraft, 6 Feb 68.
84. Msg (C), CINCPACAF to TAC, 200538Z Feb 68, subj: Gunship II Follow-on Aircraft.
85. Msg (S), CSAF to AFLC, TAC, AFSC, ATC, CAC, PACAF, 251854Z Mar 68.
86. Hist (S), Dir/Dev, 1 Jan-30 Jun 68, p 168.
87. Msg (S), AFLC to CINCPACAF, 151440Z Jan 68; msg (S), CINCPACAF to CSAF, 202035Z Jan 68, subj: Gunship Program.
88. Air Staff Summary Sheet (S), Maj Gen Andrew J. Evans, Jr., Dir/Dev, Third Study "Increased Gunship Force," 22 Apr 68.
89. Ibid.
90. Ibid.
91. Memo (S), SAF to CSAF, subj: Increased Gunship Force, 29 Apr 68.
92. Seventh Air Force was especially concerned about a reported cost study of 208 gunships including possibly C-97 aircraft. [Msg (S), 7th AF (DPL) to CINCPACAF, subj: Mixed Gunship Force for SEA, 5 Apr 68; Kott, The Role of USAF Gunships in SEASIA, p 5.] The Seventh Air Force reaction can be found in Staff Summary Sheet, 7th AF (DPLR) Gunship Force, 15 Apr 68.
93. Ltr (S), 7th AF Dir/Manpower & Orgn, to 7th AF DCS/Ops, DCS/Plans, DCS/Personnel, subj: AC-130 Gunships, 28 Jul 68.
94. Staff Summary Sheet (S), 7th AF (DPLR) Gunship Force (U), 15 Apr 68.
95. Hist (S), Gunship II Proj Div, ASD, 1 Jul-31 Dec 68, p 1.
96. Memo (S), Hugh E. Witt, Dep/Sup & Main, Asst SAF (Instls & Logs), to Robert H. Charles, Asst SAF (Instls & Logs), subj: Estimated Cost to Destroy/Damage a Truck in Laos, 2 May 68.
97. Hist (S), Dir/Dev, 1 Jul-31 Dec 68, pp 167-68.
98. Hist (S), Gunship II Proj Div, ASD, 1 Jul-31 Dec 68, p 1.
99. Hist (S), Dir/Dev, 1 Jul-31 Dec 68, pp 168-69. This reference contains the statement: "The Air Force will continue its efforts to secure the concurrence of OSD in modifying additional Gunship aircraft when the new political administration comes into office."

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100. Staff Summary Sheet (S), 7th AF (DPLG) AC-119 Gunships, 9 Jul 68; Kott, The Role of USAF Gunships in SEASIA, p 7.
101. Msg (S), Gen W. W. Momyer, 7th AF Comdr, to Gen B. K. Holloway, VCS, USAF, subj: AC-119 Gunships, 10 Jul 68; Kott, The Role of USAF Gunships in SEASIA, p 7.
102. Msg (S), 7th AF C/S to CINCPACAF DCS/Plans, subj: Gunship Force Adjustments, 11 Sep 68.
103. Modification Program Directive 1885 (FS-2209/JC-130A) (C), Dir/Opl Rqmts & Dev Plans, 14 Dec 67; hist (S), ASD, Jul 1968-Jun 1969, I, 135-36.
104. Modification Program Directive 1885-1 (FS-2209/JC-130A) (C), Dir/Opl Rqmts & Dev Plans, Install Gunship Equipment in JC-130 Aircraft, 13 Feb 68.
105. Study (U), AFSC, Gunship II Program Management: A Study of Its Management Success, [undated], p 2.
106. AFLC Historical Study 374 (S), Feb 1971, p 95.
107. Msg (C), CSAF to AFSC and AFLC, 060135Z Jan 68, subj: Gunship Programs.
108. See note 106.
109. Trip report (S), Mr. Louis A. Benavides, HQ AFLC (Visit to LTVE, Greenville, Tex., 10-13 Jan 68), Gunship II/BIAS/Hunter I, 23 Jan 68; AFLC Historical Study 374 (S), Feb 1971, p 98.
110. Because of support problems, AFLC very early recommended that the prototype be modified into contractor-modified Gunship II configuration. [AFLC Historical Study 374 (S), Feb 1971, p 100.]
111. Msg (C), ASD to CINCPACAF, 13th AF, subj: Gunship II Logistic Support in SEA, 12 Feb 68.
112. Msg (U), CINCPACAF to CSAF, 8 May 68.
113. Msg (C), AFLC to CSAF, subj: Logistic Support of AC-130A Gunship II Program, 10 May 68.
114. AFLC Historical Study 374 (S), Feb 1971, p 102.
115. Hist (S), Gunship II Proj Div, ASD, 1 Jul-31 Dec 68, p 10.

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116. AFLC Historical Study 374 (S), Feb 1971, p 103.
117. Ibid., pp 106-09. Too often the extent of the logistical effort remains in the background and is not fully appreciated.
118. See note 116.
119. Hist (S), ASD, Jul 1968-Jun 1969, I, 137.
120. AFLC Historical Study 374 (S), Feb 1971, pp 103-4.
121. Ibid.
122. Amendment to Modification Program Directive 1885-2 (FS-2209/JC-130A) (C), Dir/Opl Rqmts & Dev Plans, Install Gunship Equipment in JC-130 Aircraft, 5 Mar 68.
123. AFLC Historical Study 374 (S), Feb 1971, pp 104-6. CINCPACAF proposed use of aircraft 1, 2, and 3 for initial training and delivery of 4, 5, 6, and 7 to PACAF. [Msg (S), CINCPACAF to CSAF, 091921Z Sep 68, subj: AC-130 Gunships.] Despite logistic problems, TAC insisted on using aircraft number 4. [Msg (S) TAC to AFLC, subj: Revised AC-130 Delivery Schedule and Proposed Deployment, 26 Jun 68.]
124. Hist (S), Dir/Opl Rqmts & Dev Plans, 1 Jul-31 Dec 67, p 51.
125. Msg (C), ASD to AFSC, TAC, 212309Z Jun 68, subj: Gunship II Delivery Schedule. Monitoring of LTVE's effort by Gunship II Project Division personnel had led to a belief LTVE was "unrealistic."
126. Msg (S), TAC to CINCPACAF, 122316Z Apr 68, subj: AC-130 Gunship Training/Development.
127. AFLC Historical Study 374 (S), Feb 1971, p 106.
128. Ibid., p 109.
129. Hist (S), ASD, Jul 1968-Jun 1969, I, 136.
130. AFLC Historical Study 374 (S), Feb 1971, p 99; Modification Program Directive 1885-1 (FS-2209/JC-130A) (C), Dir/Opl Rqmts & Dev Plans, Install Gunship Equipment in JC-130 Aircraft, 13 Feb 68.
131. Hist (S), ASD, Jul 1968-Jun 1969, I, 137.
132. Ibid., p 138.

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133. AFLC Historical Study 374 (S), Feb 1971, pp 110-111; hist (S), 8th TFWg, Jan-Mar 1969, p 24.
134. Hist (S), Gunship II Proj Div, ASD, 1 Jul-31 Dec 68, p 12.
135. AFLC Historical Study 374 (S), Feb 1971, pp 111-12.
136. End of Tour Report(S), Col William M. Fagan, Comdr, Det 6, ASD (AFSC) (AFSC-LO), 10 Nov 69.
137. Ibid.; AFLC Historical Study 374 (S), Feb 1971, p 112.
138. Hist (S), Dir/Dev, 1 Jan-30 Jun 69, p 188. Amendment to MR 1885 (FS-2209/JC-130A), 23 June 1969, revised total cost upward from \$37,728,835 to \$47,069,555. [Hist (S), Dir/Op1 Rqmts & Dev Plans, 1 Jan-30 Jun 69, p 245.]
139. Ltr (S), 14th ACWg to 7th AF, subj: Command Relationship Thailand Based AC-130 Gunships (S), 17 Jul 68.
140. Ltr (S), 7th AF to 14th ACWg, subj: Command Relationship Thailand Based AC-130 Gunships (S), 30 Jul 68. USAF Program Document (PD 70-2) called for the 16th ACSq to be assigned to the 8th TFWg. The problems involving the Royal Thailand Government were also expressed to General Momyer in message (S), CINCPACAF to 7th AF, 130327Z June 1968.
141. Ibid.
142. Although proposing it control all gunships, the 14th Air Commando Wing urged in August that the transfer of command and control to the 8th Tactical Fighter Wing be expedited rather than drag on. Seventh Air Force said expediting was impossible since the transfer required PACAF, PACOM, and State Department approval. In October the 14th Special Operations Wing (formerly Air Commando Wing) reiterated its original position that it control the AC-130's. [Msg (S), 14th SOWg to 7th AF, subj: Bed-down and Operational Control of AC-130 Aircraft, 10 Oct 68.]
143. Kott, The Role of USAF Gunships in SEASIA, p 27. Even the one aircraft was in South Vietnam at the time.
144. 7th AF OpOrd 543-69 (C), Jul 1968, p 1.
145. Ibid., pp 2-3.
146. Hist (S), 8th TFWg, Jan-Mar 1969, p 15.
147. Msg (S), 8th TFWg to 7th AF, subj: On 13 Dec an AC-130 was diverted by ABCCC, 26 Dec 68; Kott, The Role of USAF Gunship in SEASIA, p 29.

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148. Rprt 69-4 (S), The Interdiction Campaign 1 April-31 October 1968, ASI, Jul 69, p 22.

149. Major Louis Seig, Impact of Geography on Air Operations in SEA (S) (HQ PACAF, Project CHECO, 11 Jun 70). The following sentence from a message report of prototype operations reflects the effect of terrain and vegetation: "It must be pointed out that due to terrain, forest canopy, etc., we quite often get only one shot at a target before we lose his precise location." [Msg (S), Det 2, 14th ACWg, to 14th ACWg, 2 Apr 68.]

150. Seig, Impact of Geography on Air Operations in SEA, pp 2-9.

151. Scientific Advisory Group Working Paper 16-67 (C), CINCPAC, Evaluation of Laos Interdiction Program October 1965 through June 1967, 5 Sep 67, p 2.

152. Trends, Indicators, and Analyses (S), Dir/Ops, Aug 1968, p 2-12.

153. Rprt 69-3 (S), Air Operations in Southeast Asia, August 1967-January 1969, ASI, Jul 69, p 22. The 388th TFWg at Korat RTAFB, Thailand, commented on this point: "Repairing interdicted roads most certainly indicates that the enemy repairing is well prepared to cope with our more or less stereotyped system of interdiction, i.e., road repair crew base camps at strategic locations based on our repeated bombing of specified targets." [Msg (S), 388th TFWg to 7th AF, 131145Z Aug 68.]

154. In 1967 an analysis of the interdiction effort contained this statement: "Overall trend indicates daytime oriented strike sorties and predominantly nighttime Roadwatch reported truck movements." [Scientific Advisory Group Working Paper 16-67 (C), CINCPAC, Evaluation of Laos Interdiction Program October 1965 through June 1967 (U), 5 Sep 67, p 29.]

155. Rprt 69-5 (S), The Interdiction Campaign 1 April-31 October 1968, ASI, Jul 69, p 2.

156. Rprt 70-14 (S), Development of All-Weather and Night Truck Kill Capability, ASI, Jan 70, p 12.

157. Ibid., pp 12-17. There was high-level interest in the interdiction effort. At midyear the Military Aircraft Panel of the President's Scientific Advisory Committee reported its concern with the development of a "truck interdiction plan for the fall of 1968." The Panel wanted to see the integrated use of such development as Igloo White sensors, gunships, and aerial-delivered mines. It pointed to the urgent necessity for limiting

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truck-flow through Laos in the critical October-April period. On 12 July 1968 Clark Clifford (Secretary of Defense), Paul H. Nitze (Deputy Secretary of Defense), Dr. John S. Foster, Jr. (Director of Defense Research and Engineering), and Dr. Donald F. Hornig (Special Assistant to the President for Science and Technology), met to discuss anti-infiltration systems and a truck-killing campaign. This concern was in turn passed to Seventh Air Force by Gen. Creighton W. Abrams, Jr., MACV Commander. He requested a study of the "entire truck infiltration problem" with a report of findings by 31 August. [Msg (S), COMUSMACV to 7th AF, 300238Z Jul 68, subj: Anti-Truck Infiltration (U).] Also, the Air Force Chief of Staff had requested --on 20 July 1968 through Air Force channels--the development of an intensified truck-interdiction plan. [Msg (S), CSAF to CINCPACAF, 201449Z Jul 68.] In response to General Abrams' request for a report by 31 August 1968, Seventh Air Force briefed him on Commando Hunt plans. The MACV Commander had reservations about the force commitment, allocation of Igloo White sensors (the Marines needed some on the DMZ), and command and control. He refused to commit a fixed level of force, saying it would have to come under continuous review depending on the tactical situation. Further, General Abrams was greatly concerned about the effect on operations by the review authority of Ambassador Sullivan in Laos. General Brown, Seventh Air Force Commander, told General Nazzaro, PACAF Commander, that he had detected an "air of suspicion" in his discussions of Commando Hunt with General Abrams and the MACV senior staff. General Brown suggested that--with the "clarity of hindsight"--the requirement for planning the interdiction effort "might better have been levied on MACV by the JCS." This would have made it General Abrams' plan and assured his unqualified indorsement. [Msg (S), Gen Brown, 7th AF Comdr, to Gen Nazzaro, CINCPACAF, 311130Z Aug 68.] The Air Force's desire to control the Commando Hunt planning stemmed from a fear it might develop into a joint operation and thereby threaten the Tactical Air Control System. [Ltr (S), Maj Gen George B. Simler, Dir/Ops, USAF, to Maj Gen Gordon F. Blood, 7th AF DCS/Ops, 26 Jul 68.]

158. Wolk, USAF Plans and Policies R&D for Southeast Asia 1965-1967, p 78.

159. Rprt 69-7 (S), Air Interdiction Campaign, 1 Nov 68-31 May 69, ASI, Dec 69. Interdiction points were sometimes called "choke points" or "traffic control points."

160. Rprt 70-14 (S), Development of All-Weather and Night Truck Kill Capability, pp 14-16. The emphasis on interdiction points "down-graded the previous technique of 'armed reconnaissance,' wherein strike aircraft sought out and attacked targets of opportunity although this technique was still authorized." [Hist (TS), MACV, 1968, I, 409.]

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161. Hist (TS), MACV, 1968, I, 409. This included more than 20 B-52 strikes.

162. Msg (S), 7th AF to CSAF, CINCPACAF, CINCSAC, TAC, 140930Z Nov 68, subj: Impact of 7AF Summer Interdiction Campaign--14 July through 31 October 1968.

163. Msg (S), 7th AF to PACAF, 191055Z Nov 68, subj: AC-130 Gunship Employment.

164. Ibid; 7th AF OpOrd 543-69 (S), Gunship II (AC-130), Aug 1968.

165. Rprt 69-7 (S), Air Interdiction Campaign, 1 Nov 68-31 May 69, p 6.

166. Msg (S), 7th AF to 14th ACWg, 317th TAWg, 261415Z Feb 69, subj: FAC Schooling for C-130 Gunship Crews.

167. 7th AF OpOrd 543-69 (S), Aug 1968.

168. This mission narrative is taken from AC-130 Mission Report (S), Mission 1316/17 Detachment 2, 14th ACWg, 30 December 1968.

169. Rprt 70-14 (S), Development of All-Weather and Night Truck Kill Capability, p 14.

170. Hist (S), 8th TFWg, Apr-Jun 1969, III, 12.

171. Ibid., 16-18.

172. Ibid., 18-20.

173. Ibid., 20-23.

174. Air Staff Summary Sheet (S), AFRDP, Use of C-130s in Shed Light Program, 24 Oct 67.

175. Ibid.

176. Msg (S), 14th ACWg to 7th AF, 221009Z Jun 68, subj: Gunship II.

177. Lt Col Monte D. Wright, USAF Tactics Against Air Ground Defense in SEA November 68-May 70 (S) (HQ PACAF, Project CHECO, 25 Sep 70), pp 4, 10.

178. Msg (S), CSAF to CINCPACAF, 171941Z Jun 68, subj: Gunship II.

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179. Msg (S), Det 2, 14th ACWg to HQ USAF, AFSC, TAC, ASD, TAWC, SAWC, AFATL, 7th AF, 14th ACWg, PACAF, 211001Z Mar 68, subj: Gunship II Report of Operations 22 Feb thru 20 Mar 68.

180. Wright, USAF Tactics Against Air Ground Defense in SEA November 68-May 70, p 38. The distance is stated as "six or seven miles" in Kott, The Role of USAF Gunships in SEASIA, page 40.

181. See note 179.

182. See note 180.

183. Msg (S), 14th ACWg to 7th AF, 221009Z Jun 68, subj: Gunship II.

184. Ltr (S), 7th AF Dir/Cmbt Ops to 7th AF Air Ops Div, subj: Suggested Fragging and Operational Procedures for AC-130 Gunship, 22 Jun 69.

185. Report of Project Moonwatch (S), 16th SOSq, Jun 69, pp 2-3.

186. "Enlisted Fliers Tell of Combat," Air Force Times, 17 Mar 71, p 20.

187. Capt James L. Cole, Jr., Fixed Wing Gunships in SEA (Jul 69-Jul 71) (S) (HQ PACAF, Project CHECO, 30 Nov 71), p44.

188. DOA Working Paper 68/18 (S), Dir/Tac Analys, 7th AF, Flax Suppression with F-4's for AC-130 Missions Against Trucks, 10 Dec 68.

189. Hist (S), 8th TFWg, Oct-Dec 1968, p 35.

190. Hist (S), 8th TFWg, Jan-Mar 1969, p 23.

191. Wright, USAF Tactics Against Air Ground Defense in SEA November 68-May 70, pp 38-39; End of Tour Report (S), Col Wendell L. Bevan, Jr., Comdr, 432d TRWg (3 Sep 68-7 Jun 69); Kott, The Role of USAF Gunships in SEASIA, pp 41-42.

192. Ibid.

193. Kott, The Role of USAF Gunships in SEASIA, p 41.

194. Ibid., p 31.

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195. Egan End of Tour Report (S), 10 Nov 69, p 4.
196. Ibid., p 6.
197. Ibid., p 3.
198. Ibid., p 6.
199. Msg (S), USAFTAWC to TAC, 052150Z Feb 68, subj:  
Gun Ship Roman 2.
200. AFSC recommended larger caliber guns in August 1968.  
[Msg (S), AFSC to CSAF, 011815Z Aug 68, subj: Gunship II.]
201. Hist (S), 8th TFWg, Jan-Mar 1969, p 16.
202. Msg (S), 8th TFWg to 13th AF, 251041Z May 69, subj:  
AC-130 Battle Damage Accident, 24 May 69; AC-130 Mission Report  
(C), 16th SOSq, 24 May 69.
203. Ibid.
204. Ibid.
205. Intvw (U), author with J.T. Graves, Test, Deployment  
& Training, Gunship Prgm Ofc, ASD, 1 Mar 71. An account of the  
flight and the actions of crewmember Sgt. Edward Marrero in  
assisting the wounded illuminator operator is in "Night in the  
Stew Pot," Airman, February 1971, pp 40-43.
206. Kott, The Role of USAF Gunships in SEASIA, p 31.
207. Gunship II Program Management: A Study of Its Manage-  
ment Success, AFSC, undated, p 2.
208. Kott, The Role of USAF Gunships in SEASIA, figs 18,20.
209. Msg (S), 7th AF to 8th TFWg, 080425Z May 69, subj:  
Spectre Operations.
210. Ibid.
211. Msg (S), American Emb, Laos, to Secy of State, subj:  
Critique of Effectiveness of AC-130 Gunship Against Enemy Trucks,  
6 May 69.
212. Msg (S), Gen Brown, Comdr, 7th AF, to 8th TFWg,  
090207Z Jun 69.
213. Memo (S), Air Ops Div, 7th AF/13th AF, to Dep Comdr,  
7th AF/13th AF, subj: AC-130 Gunship II Support in Barrel Roll,  
10 Jan 69.

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214. Msg (S), Maj Gen Seith, 7th AF/13th AF Dep Comdr, to Maj Gen Jones, 7th AF DCS/Ops, subj: Night Coverage in Barrel Roll, 5 Mar 69; Kott, The Role of USAF Gunships in SEASIA, pp 33-34.

215. Hist (S), 8th TFWg, Apr-Jun 1969, pp 30-31.

#### Chapter IV

1. Msg (S), CINCPACAF to AFSC, 260608Z Jun 68.
2. Msg (S), AFSC to CSAF, 011815Z Aug 68, subj: Gunship II.
3. Msg (C), CSAF to CINCPACAF, 051417Z Sep 68.
4. Memo (S), SAF Robert C. Seamans, Jr., to SECDEF Melvin Laird, subj: Far East Trip (19-31 May 69), 2 Jun 69.
5. Nomination for USAF Harold Brown Award, General Technical Area: Improvement for Combat Operations (S), [ca Jan 1970].
6. Ibid.
7. Ibid. C-130A (56-490) had completed IRAN at LTVE, Greenville, Tex., and was delivered to Wright-Patterson AFB on 10 May 1969. [Hist (C), Gunship Proj Br, ASD, 1 Jan-30 Jun 69, p 2.]
8. AFSC Activity Input . . . on AFSC Support to Southeast Asia, 1 April 1968-31 December 1969 (S), ASI, Case Hist 5, p 54.
9. See note 5.
10. Msg (S), CINCPACAF to AFSC, 140347Z Aug 69, subj: Surprise Package. On 4 August 1969 General Momyer, TAC Commander, indicated he supported General Ferguson. On 14 August 1969 TAC alerted the Special Operations Forces at Eglin AFB to identify AC-130 qualified aircrew personnel for possible use in the project. [Msg (S), TAC to USAFSOF, Eglin AFB, 141317 Aug 69, subj: Project Surprise Package.]
11. Combat Evaluation Surprise Package (S), 7th AF, Jun 1970, p 2.
12. Msg (S), CSAF to AFSC, 022058Z Sep 69, subj: Project Surprise Package.
13. See note 5.

(This page is Unclassified)

14. See note 5.
15. See note 5.
16. The presentation was made at a ceremony in Washington, D.C. on 17 September 1970. [Release 70-244 (U), ASD Info Ofc, 17 Sep 70.]
17. Hist (S), TAC, Jul 1969-Jun 1970, p 356.
18. See note 5.
19. Hist (S), Dir/Ops, 1 Jul-31 Dec 69, p 298.
20. Tech rpt TAC OPlan 132 (S), Final Report Combat Introduction/Evaluation (Coronet Surprise), Aug 1970, p i.
21. Ibid., p iii; hist (S), 8th TFWg, 1 Oct-31 Dec 69, p 32. See final report for a list of key task force participants.
22. Hist (S), 8th TFWg, 1 Oct-31 Dec 69, p 32.
23. Tech rpt TAC OPlan 132 (S), Aug 1970, pp iii, 24.
24. Ibid.
25. Combat Evaluation Surprise Package (S), 7th AF, Jun 1970, p A-1. AFSC Activity Input . . . on AFSC Support to South-east Asia, 1 April 1968-31 December 1969 (S) lists 680 trucks destroyed and 256 damaged.
26. Unfortunately, statistics vary on comparisons of aircraft effectiveness. Page 52, The Air War in Vietnam, 1968-1969, puts the average trucks destroyed or damaged per sortie at 5.4 for Surprise Package, 2.62 for Spectre, and .36 for tactical fighters. [Kenneth Sams, et al, The Air War in Vietnam, 1968-1969 (S) (HQ PACAF, Project CHECO, 1 Apr 70.) Commando Hunt III Report (S), Seventh Air Force, May 1970, states the Surprise Package record was 7.34 trucks destroyed or damaged per sortie compared to 4.34 for Spectre. Also see: Combat Evaluation Surprise Package (S), 7th AF, June 1970.
27. AFSC Activity Input . . . on AFSC Support to South-east Asia, 1 April 1968-31 December 1969 (S), p 443.
28. Combat Evaluation Surprise Package (S), 7th AF, Jun 1970, pp iii, 7.
29. Maj James R. Wolverton, Maj Richard E. Willes, and Lt Col Bradford W. Parkinson, The Genesis and Development of Gunship II (S), ASD/USAF, [undated working copy], pp 15-19.

30. Hist (S), 8th TFWg, 1 Jan-31 Mar 70, pp 3-4.
31. Msg (S), CSAF to CINCPACAF, 022236Z Aug 69, subj: Gunship II.
32. Msg (S), 7th AF to CSAF, AFLC, CINCPACAF, TAC, AFSC, 210410Z Aug 69, subj: Black Crow for Blindbat.
33. Hist (S), 8th TFWg, 1 Oct-31 Dec 69, pp 32-33.
34. Msg (S), TAC to USAFSOF, USAFSOC, 082330Z Dec 69, subj: TAC Test 69-222 (Black Crow).
35. R. B. Murrow, Gunship Truck Interdiction Results: AC-130A Surprise Package Initial Operations (S), Rand Study WN-7369-PR, Jul 1971, pp vi-vii.
36. Cole, Fixed Wing Gunships in SEA (Jul 69-Jul 71), p 70.
37. Ibid., pp 77-78. In 1965-66 the development of a LLLTV camera led to the use of such equipment on aircraft to aid reconnaissance, navigation, and strike missions under low-light-level conditions. The Air Force began experiments with LLLTV on aircraft in early 1967 with Project Tropic Moon.
38. Tech rpt TAC OPlan 132 (S), Aug 1970, pp 4, 9.
39. Hist (S), 8th TFWg, Apr-Jun 1969, III, 3, 38-39.
40. Msg (S), 8th TFWg to 13th AF, subj: AAD-4 Update (Forward Looking Infrared) for AC-130A, 1 Jun 69.
41. Msg (S), 8th TFWg to CINCPACAF, 7th AF, subj: FLIR Performance in AC-130, 29 Aug 69.
42. See note 36.
43. Rand Study WN-7369-PR (S), Jul 1971, pp vi-vii.
44. Cole, Fixed Wing Gunships in SEA (Jul 69-Jul 71), pp 64, 75.
45. Hist (S), 16th SOSq, Jun-Sep 1970, App A.
46. Hist (S), 8th TFWg, Jan-Mar 1969, p 33. Col. Charles C. Pattillo, 8th Tactical Fighter Wing Commander, saw promise in a ECM pod modification proposed by his Wing. [End of Tour Report, (S), Col Charles C. Pattillo, 5 Jul 68-8 May 69.]

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47. Msg (S), ASD to ADTC, ASJT, WRAMA, 061918Z Jan 69, subj: Gunship II ECM Test Request.
48. Msg (S), CSAF to AFLC, 222059Z Apr 69, subj: TRIM-7 for Gunship II.
49. Msg (S), TAC to CSAF, CINCPACAF, 251829Z Jun 69, subj: TRIM-7 for AC-130 Aircraft.
50. Hist (S), 8th TFWg, Oct-Dec 1969, p 31.
51. MR (TS), Lt Gen William W. Momyer, 7th AF Comdr, subj: CHC Meeting (2 December 1967), 3 Dec 67.
52. Msg (S), Det 2, 14th ACWg, to 14th ACWg [ca 3 Apr 68].
53. Msg (C), 8th TFWg to 7th AF, 160400Z Mar 70, subj: AC-123K/AC-130 Bomb Damage Assessment.
54. Bevan End of Tour Report (S), (3 Sep 68-7 Jun 69).
55. Intvw (U), author with Lt Col Charles F. Spicka, Dir/Ops, 13 Mar 72. Colonel Spicka was a member of the 16th SOSq at this time.
56. See note 54.
57. Msg (S), 7th AF to 7 ABCCC, 8th TFWg, 432d TRWg, 101120Z May 69, subj: Documentation of AC-130 Truck Kills by RF-4C Night Recon; hist (S), 8th TFWg, Apr-Jun 1969, p 37.
58. See note 54.
59. Hist (S), Dir/Op1 Rqmts & Dev Plans, 1 Jan-30 Jun 69, p 254.
60. Spicka intvw (U), 13 Mar 72.
61. Hist (S), 8th TFWg, Apr-Jun 1969, I, 32.
62. Hist (S), 8th TFWg, Apr-Jun 1969, III, 37-38.
63. See note 61.
64. See note 62.
65. Cole, Fixed Wing Gunships in SEA (Jul 69-Jul 71), p 68; Spicka intvw (S), 13 Mar 72.
66. Msg (C), 7th AF to CINCPACAF, 100550Z Mar 70, subj: SEAOR 180.

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67. Hist (S), 8th TFWg, Apr-Jun 1969, III, 19-20.
68. Ibid., 34.
69. Ibid., 19-20.
70. Hist (S), 8th TFWg, 1 Jul-30 Sep 69, Doc 7.
71. Ibid., p 21.
72. Msg (S), 7th AF to PACAF, 031114Z Aug 69, subj: Offset Firing with AC-130.
73. Intvw (U), author with Lt Col Bradford W. Parkinson, USAFA, 5 May 71. Col Roger R. Bate, Professor and Head of the Department of Astronautics and Computer Science, confirmed on 17 November 1969 the continued participation of Air Force Academy personnel in gunship development. He did this with an informal statement, "Support for ASD on Project Surprise Package." Lt Col Bradford W. Parkinson was designated as "gunship project officer for the Department of Astronautics, USAFA."
74. Hist (S), Dir/Opl Rqmts & Dev Plans, 1 Jan-30 Jun 69, p 246.
75. Hist (S), Dir/Opl Rqmts & Dev Plans, 1 Jul-31 Dec 69, p 209.
76. Tech rprt TAC OPlan 132 (S), Aug 1970, p 10.
77. Combat Evaluation Surprise Package (S), 7th AF, Jun 1970, p B-2.
78. Tech rprt TAC OPlan 132 (S), Aug 1970, p 3.
79. Combat Evaluation Surprise Package (S), 7th AF, Jun 1970, p 7.
80. Tech rprt TAC OPlan 132 (S), Aug 1970, p iii.
81. Ibid., pp 6-7, 24. In the 169 events where the Surprise Package fired during its combat test, "108 had the IR as the fire control sensor; 23 used the LLLTV; 38 used a combination of TV or BC and IR." [p 24.]
82. Hist (S), 8th TFWg, Oct-Dec 1969, p 10. On 17 May 1969 the 16th SOSq formally requested a change from three to five 462X0 weapons mechanics per crew. [Ltr (C), 16th SOSq to 8th TFWg, subj: Gunship A462X) Requirements, 17 May 69.]
83. Spicka intvw (U), 13 Mar 73; ltr (S), PACAF to HQ USAF, subj: Request for Aircrew Composition Change, 4 Jun 70; ltr (S), PACAF to HQ USAF, subj: Request for Aircrew Composition Change (AC-130 EWOs), 6 Jul 70.

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84. Ibid.
85. Memo (S), Col W. Y. Smith, Mil Asst to SAF, to Asst AF VCS, subj: Gunship Truck Kills, 17 Mar 70.
86. Ltr (S), Lt Gen John W. Carpenter III, Asst AF VCS, to SAF, subj: Gunship Truck Kills, 25 Mar 70.
87. Hist (S), Dir/Op1 Rqmts & Dev Plans, 1 Jan-30 Jun 70, p 207.
88. Msg (S), ASD/ASG to AFSC, 012144Z May 70.
89. Msg (S), 7th AF to PACAF, 060800Z May 70.
90. Msg (S), PACAF to CSAF, 200670Z May 70.
91. Msg (S), CSAF (Dir/Dev & Acq, Dir/Op1 Rqmts & Dev Plans) to AFSC, AFLC, PACAF, 211358Z May 70.
92. Memo (S), SAF Robert C. Seamans, Jr., to SECDEF, subj: Trip Report, Far East Trip--(10-21 January 1970), 23 Jan 70.
93. Chronology (S), 16th SOSq, 1 Jan-31 Mar 70, in hist (S), 8th TFWg, 1 Jan-31 Mar 70, III, 3.
94. Hist (S), Dir/Op1 Rqmts & Dev Plans, 1 Jan-30 Jun 70, p 204.
95. Memo (C), Under SAF to CSAF, subj: Surprise Package, 19 Jan 70.
96. See note 92.
97. Msg (S), 7th AF to CSAF, 190730Z Jan 70.
98. Hist (S), TAC, Jul 1969-Jun 1970, I, 354-55.
99. Ibid.
100. Ltr (S), Lee A. DuBridge, Science Adviser to the President, to SECDEF Melvin R. Laird, 26 Jun 69.
101. Air Staff Summary Sheet (S), Maj Gen Sam J. Byerley, Dir/Ops, Increased Use of Gunships, 14 Aug 69.
102. Memo (S), Col W. Y. Smith, Mil Asst to SAF, to Col Robert E. Pursely, Mil Asst to SECDEF Melvin R. Laird, subj: Status of Gunships in SEASIA, 29 Jul 69.
103. Ltr (S), AF VCS to SAF, subj: Status of Gunship Program 23 Jul 69. This letter responded to Dr. McLucas's 15 July 1969 request for the status of gunship procurement.

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104. Ltr (S), Gen John D. Ryan, AF VCS, to AFSC, subj: Additional Gunship II Aircraft, 28 Jul 69.

105. Memo (S), Col W. Y. Smith, Mil Asst to SAF, to AF Asst VCS, subj: Gunships, 5 Aug 69.

106. Memo (S), SAF Robert C. Seamans, Jr., to SECDEF, subj: Increased Use of Gunships, 9 Oct 69.

107. JCS 2344/157-13 (Memo) (TS), subj: Aircraft for Laos, 27 Jan 70; Dr. Elizabeth H. Hartsook, The Air Force in Southeast Asia: The Role of Air Power Grows, 1970 (TS) (Ofc/AF Hist, Sep 1972), p 56.

108. Memo (S), Dep SECDEF David Packard to SAF, subj: Gunship Plans for the 1970's, 3 Dec 69.

109. Memo (S), SAF Robert C. Seamans, Jr., to Dep SECDEF, subj: Gunship Plans for the 1970's, 13 Feb 70.

110. Msg (S), CSAF (Dir/Main Engrg, Dir/Opl Rqmts & Dev Plans) to AFSC, AFLC, 221515Z Jan 70; hist (S), Dir/Opl Rqmts & Dev Plans, 1 Jan-30 Jun 70, p 205.

111. Hist (S), ASD Gunship Prgm Ofc, 1 Jan-31 Dec 70, p 8.

112. Ibid., p 5.

113. Msg (S), TAC to CSAF, 240921Z Feb 70, subj: Surprise Package.

114. Hist (S), Dir/Opl Rqmts & Dev Plans, 1 Jan-30 Jun 70, p 205.

115. Msg (S), CSAF (VCS) to PACAF, TAC, 292341Z Jan 70. General Meyer, Vice Chief of Staff, notified the Air Force Secretary in a 29 January memo that more information was needed from PACAF. [Ltr (S), Gen Meyer to SAF, subj: Surprise Package, 2 Mar 70.]

116. Msg (S), PACAF to CSAF, 171200Z Feb 70, subj: Surprise Package.

117. Hist (S), Dir/Opl Rqmts & Dev Plans, 1 Jan-30 Jun 70, p 206.

118. Hist (TS), Dir/Ops, 1 Jan-30 Jun 70, p 285.

119. Hist (S), ASD Gunship Prgm Ofc, 1 Jan-31 Dec 70, p 7.

120. Hist (TS), Dir/Ops, 1 Jan-30 Jun 70, p 285.

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121. Ltr (S), Gen Meyer, AF VCS, to SAF, subj: Surprise Package Gunships, 11 May 70. Maj Gen A. J. Beck, WRAMA Commander, pressed strongly for in-house modification at WRAMA. [WRAMA Historical Study 25 (S), The AC-130E Aircraft (Gunship) (Project Pave Spectre), 1970-1971 (WRAMA, Jan 1972), I, 12.]

122. Air Force Council Decision AFC4/140 (S), 30 Apr 70.

123. Msg (S), CSAF (Dir/Main Engrg, Dir/Opl Rqmts & Dev Plans, Dir/Dev & Acq) to AFSC, AFLC, 071249Z May 70. AFSC Program Direction 0000-1-70-300, 17 Jun 70, implemented the program.

124. Memo (S), Lee A. DuBridg, Science Adviser to the President, to SAF, 1 May 70.

125. Air Staff Summary Sheet (S), Maj Gen Joseph J. Kruz, Dep Dir/Ops, 11 May 70; Hartsook, The Air Force in Southeast Asia: The Role of Air Power Grows, 1970, p 57.

126. PACAF called attention to these factors when it was evaluating requirements for new AC-130's. [Msg (S), CINCPACAF to CSAF, 171200Z Feb 70, subj: Surprise Package.]

127. Memorandum on Briefing to the Secretary of the Air Force (S), subj: Surprise Package, 14 May 70.

128. Ibid.; hist (S), Dir/Opl Rqmts & Dev Plans, 1 Jan-30 Jun 70, p 206.

129. Msg (S), CSAF to TAC, 172138Z Jun 70, subj: Post-SEASIA Gunship Force Structure.

130. Memo (TS), SECDEF to Chairman, JCS, subj: Interdiction of NVN Supplies, 20 May 70.

131. Commando Hunt III Report (S), 7th AF, May 1970; hist (S), MACV, 1970, I, Annex A, VI-95, VI-96.

132. Ibid.

133. JCSM-232-70 (TS) to SECDEF, 15 Jun 70.

134. Memo (C), Under SAF John L. McLucas to SAF Seamans, subj: Secretary Packard's Call on Gunships and Laser-Guided Weapons, 17 Jun 70.

135. Memo (S), Under SAF John L. McLucas to SAF Seamans, subj: PSAC and Surprise Package, 12 Jun 70.

136. Ibid.

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137. MR (S), Ofc/Under SAF, subj: Meeting on Gunships and Laser-Guided Bombs, 19 Jun 70.

138. Air Staff Summary Sheet (S), Dep Dir/Ops, Additional AC-130 Gunships for the CY 70-71 Dry Season, 2 Jul 70.

139. Msg (S), Dir/Mat Mgt, Robins AFB, Ga., to AFLC, 252220Z Jun 70, subj: Additional AC-130 Gunships.

140. Msg (S), Gen Momyer to Lt Gen Robbins (513th TAWg (RAF), Mildenhall, England, to TAC), 111700Z May 70.

141. Memo (S), SAF to Dep SECDEF, subj: Additional AC-130 Gunships for CY 70-71 Dry Season, 2 Jul 70.

142. Memo (S), SAF to Dep SECDEF, subj: Acquisition of Additional Gunships, 10 Jul 70.

143. Msg (S), CSAF to AFSC, AFLC, TAC, ATC, ASD, USAFMPC, WRAMA, CINCPACAF, 7th AF, 13th AF, 141731Z Jul 70, subj: Additional AC-130A Gunships.

144. Hist (S), ASD Prgm Ofc, 1 Jan-31 Dec 70, p 11. Crew ratio was established as 2.0:1, frag rate 1.0, and utilization rate 135 hours/month.

145. MR (S), ASD, subj: Pave Pronto Conference (22-25 July 1970), 25 Jul 70.

146. Hist (S), ASD Gunship Prgm Ofc, 1 Jan-31 Dec 70, p 11.

147. See note 145.

148. Hist (S), Dir/Dev & Acq, 1 Jan-30 Jun 70, p 160.

149. Memo (S), Dep SECDEF to SAF, SECNAV, CJCS, 11 Jul 70.

150. Memo (TS), SECDEF to Assistant to the President for National Security Affairs, 23 Jul 70.

151. Ltr (S), CSAF to SAF [forwarding AF reply to Dep SECDEF], 29 Jul 70.

152. Memo (TS), CJCS to Chairman, Vietnam Special Studies Group, subj: Air Activity in SEA Study, 30 Jul 70.

153. Memo (TS), CJCS to SECDEF, subj: JCSM-367-70, 30 Jul 70.

154. Gunship Weekly Status Report to Secretary of the Air Force (S), 6 Aug 70.

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155. Hist (S), ASD Gunship Prgm Ofc, 1 Jan-31 Dec 70,  
p 6.
156. Ibid.
157. Ibid., Pave Pronto Conference Report, 22-25 Jul 70,  
ASD, 25 Jul 70, p 5.
158. Ibid., p 7.
159. See note 154.
160. Hist (TS), Dir/Ops, 1 Jan-31 Jun 71, pp 294-96.
161. Ninth Gunship Weekly Status Report to the Secretary  
of the Air Force (S), 1 Oct 70.
162. Hist (S), 8th TFWg, 1 Jul-30 Sep 70.
163. See note 161. Another report indicated that seven  
out of nine bombs were direct-hits or near-misses.
164. Results of Surprise Package, AC-130A #490 Functional  
Check and Training at Eglin AFB, Fla (S), TAC, [ca 7 Oct 70].
165. Seventh Gunship Weekly Activity Report to the Secre-  
tary of the Air Force (S), 10 Sep 70.
166. See note 164.
167. Air Staff Summary Sheet (C), Dep Dir/Ops, SAF Visit  
to Ling-Temco-Vought Electrosystems, 9 Sep 70.
168. Air Staff Summary Sheet (S), Dep Dir/Ops, Demonstration  
of Surprise Package Aircraft for SAF, 3 Sep 70.
169. Minutes of Meeting 70-22 SAF Program Reviews (S), Pro-  
gram Reviews (Gunship, Program 647, F-111, B-1), 22 Sep 70.
170. Memo (S), SAF to Dep SECDEF, subj: Acquisition of  
Additional Gunships, 1 Oct 70. Consideration had been given to  
contracting the optional aircraft with Hayes Aircraft Company or  
Fairchild-Hiller. [Memo (S), Philip N. Whittaker, Asst SAF  
(Instls & Logs), to SAF Seamans, 2 Oct 70.]
171. Hist (S), Gunship Prgm Ofc, ASD, 1 Jan-31 Dec 70, p 8.
172. Ibid.
173. See note 169.
174. WRAMA Historical Study 25 (S), Jan 1972, I, 20.

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175. Ibid., p 22. A total of \$14,859,525 was approved for modification of the prototypes.
176. Fifteenth Gunship Weekly Status Report to Secretary of the Air Force (S), 20 Nov 70.
177. WRAMA Historical Study 25 (S), Jan 1972, I, 21.
178. Ibid., p 34.
179. Twelfth Gunship Weekly Status Report to Secretary of the Air Force (S), 28 Oct 70; hist (S), 8th TFWg, 1 Jul-30 Sep 70.
180. Ltr (S), CSAF to SAF, subj: Twentieth Gunship Weekly Status Report, 28 Dec 70.
181. Cole, Fixed Wing Gunships in SEA, pp 51-52; Air Operations Review (S), Dir/Ops, 1971, Vol 7, 1-5 to 1-8.
182. Twelfth Gunship Weekly Status Report to Secretary of the Air Force (S), 28 Oct 70.
183. Ibid.
184. Trends, Indicators, and Analyses (S), Dir/Ops, Dec 1970, p 1-4.
185. Memo (S) to SECDEF, subj: AC-130 Gunship Program Status, 4 Jan 71.
186. Seventeenth Gunship Weekly Status Report to Secretary of the Air Force, 3 Dec 70.
187. Memo (S), SAF to SECDEF, subj: AC-130 Gunship Program Status, 4 Jan 71.
188. Msg (S), TAC to CSAF, 240921Z Feb 70, subj: Surprise Package.
189. Hist (S), 8th TFWg, 1 Jul-30 Sep 70. To compensate for the absence of the AC-130's from Ubon, the 374th TAWg, Naha AFB, loaned two C-130A's to the 16th SOSq for pilot proficiency training.
190. Ltr (S), Gen John D. Ryan, CSAF, to SAF, subj: Twentieth Weekly Status Report, 28 Dec 70.
191. Ibid.
192. See note 184.

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193. Memo (S), SAF to SECDEF, subj: AC-130 Gunship Program Status, 4 Jan 71.
194. Sixth Gunship Weekly Status Report to Secretary of the Air Force (S), 2 Sep 70.
195. Hist (S), ASD Gunship Prgm Ofc, 1 Jan-31 Dec 70, p 11.
196. Daily Staff Digest 8 (C), HQ USAF, 13 Jan 71.
197. Col Bradford W. Parkinson, Significant Concepts from the USAF AC-130 Gunship Program (S), Naval War College thesis, 28 Jan 72, p 63.
198. Ibid.
199. AFSC Newsreview XVI (March 1972), 4.
200. Ibid.
201. Hist (S), MACV, 1970, I, Annex A, VI-105
202. Ibid., VI-95.
203. Memo (S), SAF to SECDEF, subj: Far East Trip (29 October-11 November 1970), 19 Nov 70.
204. Cole, Fixed Wing Gunships in SEA, p 47. It was pointed out that this mission was exceptional and not typical inasmuch as conditions were nearly ideal, crew experienced, and all sensors operating well.
205. OPREP-5 (Commando Hunt/Igloo White) (S).
206. USAF Management Summary Southeast Asia (S), 18 Aug 71, p SEA 23.
207. Ibid.; USAF Management Summary Southeast Asia, 21 May 71, p SEA 21.
208. Air Operations Review (S), Dir/Ops, 1971 (thru Aug 71), Vol 8, 2-10. Deputy Secretary of Defense David Packard told a press briefing that the "gunships are getting 80 percent of the trucks" in the interdiction campaign in Laos. [Air Force Policy Letter for Commanders (U), 15 Apr 71.]
209. Cole, Fixed Wing Gunships in SEA, p 47.
210. Air Operations Review (S), Dir/Ops, 1971, Vol 9, 2-10. These are peak figures.

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211. Ibid., p 2-12.
212. Air Force Magazine, Feb 1972, p 9.
213. Air Operations Review (S), Dir/Ops, 1971, Vol 9, 2-7.
214. The Baltimore Sun, 24 Feb 71, pp 1-2.
215. MR (S), Spec Ops Div, Dep Dir/Strike Forces, Dir/Ops, subj: [regarding briefing for Dir/DIA], 7 Apr 71.
216. Cole, Fixed Wing Gunships in SEA, pp 55-60.
217. See note 215. Revelations concerning the 1969 National Security Study Memorandum 1 in the April 1972 newspapers bared a long-standing split between optimistic and pessimistic groups on the effectiveness of SEA policies. The U.S. Embassy, the Military Command in Saigon, and the JCS held the more positive views; some DOD offices, the CIA, and the State Department appeared more skeptical. This division of views--or outlook--was apparent on the matter of enemy infiltration and the interdiction of supplies. [The Baltimore Sun, 27 Apr 72, p A1.]
218. USAF Management Summary Southeast Asia (S), 18 Aug 71, p SEA 23.
219. Ibid.
220. Col J. F. Loye, Jr., et al, Lam Son 719: The South Vietnamese Incursion Into Laos, 30 Jan 71-24 Mar 71 (S) (HQ PACAF, Project CHECO, 24 Mar 71), p 15.
221. Ibid., p 20.
222. Ltr (S), Gen L. D. Clay, Jr., 7th AF Comdr, to CSAF, subj: Lam Son 719 Operations: Lessons Learned, 13 May 71, p 12.
223. Loye, et al, Lam Son 719: The South Vietnamese Incursion Into Laos, 30 Jan 71-24 Mar 71, p 15.
224. Ibid., pp 51-52.
225. Ibid., p 105. The number of sorties flown in support of ground troops in contact with the enemy helped generate renewed interest in the gunship offset-firing capability. A meeting on the subject was held at PACAF Headquarters in July 1971. The conferees agreed that the gunship offset-firing system was accurate and when properly maintained could provide dependable night, adverse weather, close air support. [Minutes of Offset-Firing Capability Meeting, 20-22 Jul 71 (S).] The Air Force established Project Combat Rendezvous in August 1968 to support U.S. Army tests and evaluations of ground transponders for use by Air Force gunships. Ironically, this project had been placed

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in a hold status in December 1970 after receipt of an Army letter stating they had no requirement for transponders in SEA. The project was canceled on 9 March 1971. [Hist (TS), Dir/Ops, 1 Jan-30 Jun 71, p 313.]

226. Cole, Fixed Wing Gunships in SEA, pp 49-50.

227. Commando Hunt V Report (S), 7th AF, May 71, pp 93, 181-82. Col Bradford W. Parkinson points out some defensive advantages of position, velocity, and acceleration resulting from the firing orbit of the gunship. At the AC-130 operating altitude, slant range of 10,000 to 14,000 feet, the AA gunner must lead the gunship up to 1/2 mile. "This is a formidable problem, especially when it is realized that the gunship is a target roughly 10 mils by 1 mil at 10,000 feet." The continuous turn (accelerated flight) would cause fire-control computers to be in error because of positioning based on an assumption of constant velocity. Multiple orbits would allow a ground gunner to adjust his fire, however. [Parkinson, Significant Concepts from the USAF AC-130 Gunship Program (S), 28 Jan 72.]

228. Msg (S), CINCPACAF to HQ USAF, 200105Z May 71; hist (TS), Dir/Ops, 1 Jan-30 Jul 71, p 197.

229. MR (S), Spec Ops Div, Dep Dir/Strike Forces, Dir/Ops, subj: Air Staff Gunship Review, 26 Feb 71.

230. WRAMA Historical Study 25 (S), Jan 1972, I, 82.

231. Chief of Staff Decision Letter (S), subj: Additional AC-130E Gunships (U), 22 Mar 71.

232. WRAMA Historical Study 25 (S), Jan 1972, I, 82-83.

233. WRAMA on 6 Apr 71 before the House Subcommittee of the Committee on Appropriations, Department of Defense Appropriations for 1972, 92d Cong, 1st sess, pt 2, pp 659-665.

234. See note 229.

235. Msg (U), CSAF to TAC, 221901Z Apr 71, subj: DAF Movement Directive (415 SOTSQ); hist (TS), Dir/Ops, 1 Jan-30 Jun 71, p 98.

236. Memo (TS), SECDEF to the President, subj: Gunships in Southeast Asia, 10 Mar 71.

237. Msg (S), 7th AF to CSAF, 031100Z Mar 71, subj: AC-130 Gunships.

238. Hist (TS), Dir/Ops, 1 Jan-30 Jun 71, pp 98-99.

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239. Msg (S), CSAF to AFSC, ASD, 201912Z Aug 71, subj: Improved ECM for Gunships (CROC 6-71).

240. Msg (S), CSAF to AFSC, ASD, 091617Z Jul 71, subj: QRC 72-2 Chaff Cartridge.

241. Air Operations Review (S), Dir/Ops, Jan 1972, I, 1-4, Aircraft 54-1626 was used as the test bed.

242. Intvw (S), author with Capt John J. Russel, Dep/Engrg Mechanics, USAFA, 6 May 71.

243. Msg (S), CSAF to AFSC, 192249Z Nov 71, subj: 105 mm Cannon for AC-130 Gunships.

244. Air Operations Review (S), Dir/Ops, Jan 1972, I, 1-2.

#### Chapter V

1. Requirements Action Directive 7-2108-(1) (S), Dir/Opl Rqmts & Dev Plans, C-119G/K Gunship Program, 28 Jun 67; AFLC Historical Study 374 (S), Feb 1971, pp 122-23.

2. Ibid.

3. Msg (C), CSAF to CINCPACAF, TAC, CAC, AFLC, WRAMA, SAWC, 7th AF, USAFMPC, 222107Z Aug 67, subj: Follow-on Aircraft for AC-47.

4. Msg (S), CSAF (Dir/Ops) to CINCPACAF, AFXOPF 85469, 22 Aug 67; WRAMA Historical Study 18 (S), AC-119G/K Gunship Program, 1967-1970, (Project Combat Hornet) (WRAMA, Mar 1971), pp 6-7.

5. AFLC Historical Study 374 (S), Feb 1971, p 125.

6. Modification Program Directive 1851 (FS 2150/C-119G) (S), Dir/Opl Rqmts & Dev Plans, 20 Oct 67; WRAMA Historical Study 18 (S), Mar 1971, pp 10-14.

7. Ibid.

8. Air Staff Working Paper (S), subj: Gunship Aircraft, 5 Jan 68; ltr (C), CSAF to SAF, subj: Gunship Aircraft, 26 Jan 68.

9. Ltr (S), Gen J. P. McConnell, CSAF, to SAF, subj: Gunship Aircraft, 26 Jan 68.

10. Memo (S), SAF to CSAF, subj: Gunship Aircraft, 2 Feb 68.

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11. Memo (S), SAF to SECDEF, subj: AC-119 Gunship Force, 8 Feb 68. Secretary Brown commented: "Events in SVN during the past few days have dramatically emphasized the requirement for enhancing our gunship posture to cope with increased enemy infiltration and attacks at night against population centers and military installations."
12. Msg (S), CSAF to AFLC, 100058Z Feb 68, subj: AC-119 Gunship Program.
13. AFLC Historical Study 374 (S), Feb 1971, pp 129-130; msg (C), WRAMA to AFLC, 091600Z Feb 68.
14. Msg (C), WRAMA to AFLC, 111730Z Feb 68. The AC-130 program had a 1-6 precedence rating.
15. Msg (C), WRAMA to AFLC, 150111 Feb 68, subj: Gunship Program.
16. Msg (C), WRAMA to AFLC, 091600Z Feb 68.
17. AFLC Historical Study 374 (S), Feb 1971, pp 130-31.
18. Msg (C), CSAF to AFLC, 212007Z Feb 68. WRAMA had recommended Dragon II for the AC-119G and Dragon III for the AC-119K. [WRAMA Historical Study 18 (S), Mar 1971, pp 30-31.]
19. Ibid.
20. WRAMA Historical Study 18 (S), Mar 1971, p 31.
21. Memo (S), Dep SECDEF to SAF, subj: AC-119 Gunship Force, 24 Feb 68.
22. Msg (TS), CINCPAC to JCS, 032255Z Mar 68.
23. Msg (S), CSAF to CINCPACAF, 251647Z Apr 68, subj: Deployment of Mixed Gunship Force to SEA.
24. Ibid.
25. Hist (TS), Dir/Plans, Jan-Jun 1968, pp 81-82.
26. AFLC Historical Study 374 (S), Feb 1971, p 130.
27. Msg (S), CAC to TAC, 162200Z Feb 68.
28. AFLC Historical Study 374 (S), Feb 1971, p 130; hist (S), TAC, Jul 1969-Jun 1970, I, 339.

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29. Hist (S), Dir/Dev, 1 Jan-30 Jun 68, p 169.
30. AFLC Historical Study 374 (S), Feb 1971, pp 132-34.
31. Ibid., pp 134-38; msg (C), CSAF to PACAF, AFLC, 202022Z Feb 68, subj: SUU-11 Assets.
32. Msg (U), WRAMA to AFLC, 122321Z Mar 68, subj: Combat Hornet. Earlier, there had been hope of borrowing guns from the Army but negotiations were necessary before approval was secured.
33. Msg (C), WRAMA to CINCPACAF, 181800Z Mar 68, subj: SUU-11A Assets.
34. AFLC Historical Study 374 (S), Feb 1971, p 138.
35. WRAMA Historical Study 18 (S), Mar 1971, pp 104-111.
36. Ibid., pp 138-141.
37. Ibid., p 141.
38. Hist (S), TAC, Jul 1969-Jun 1970, I, 340.
39. Hist (S), SAWC, 1 Jan-30 Jun 68, pp 16-17.
40. Ibid., p 33.
41. Msg (S), 1st Cmbt Applications Gp to TAC, 162130Z Jun 68, subj: Combat Hornet Progress Report Number One. The reduction was to 3.5 or lower.
42. Msg (S), 7th AF to 1st Cmbt Applications Gp, 200900Z Jul 68, subj: Combat Hornet. Seventh Air Force stated: "This headquarters feels it is necessary to maintain the specified 200 feet/minute rate of climb capability at 103 degrees, 80 per cent humidity."
43. Hist (S), USAFSOF, 1 Jul-31 Dec 68, pp 33-34.
44. Msg (S), TAC to CSAF, 012143Z Jul 68, subj: Combat Hornet.
45. Msg (S), TAC to CSAF, 112115Z Jul 68, subj: AC-119G; hist (S), TAC, Jul 1969-Jun 1970, I, 341.
46. Msg (S), CSAF to TAC, CINCPACAF, AFLC, WRAMA, 162213Z July 68, subj: AC-119G Operational Test.
47. Ibid.

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48. AFLC Historical Study 374, Feb 1971, p 142.
49. Msg (S), WRAMA to AFLC, 232015Z Aug 68.
50. Minutes (S), AC-119G Weight Reduction/Increased Performance Conference, WRAMA, 30 Jul 68.
51. AFLC Historical Study 374 (S), Feb 1971, pp 143-45.
52. See note 50.
53. Msg (S), CSAF to TAC, AFLC, CINCPACAF, WRAMA, 021448Z Aug 68.
54. Msg (S), CINCPACAF to CSAF, TAC, AFLC, 152344Z Aug 68, subj: Combat Hornet.
55. Msg (S), WRAMA to AFLC, 232015Z Aug 68.
56. Msg (S), CSAF to CINCPACAF, 7th AF, TAC, 131614Z Jul 68, subj: AC-119 Deployments.
57. Msg (S), 7th AF to CSAF, 171913Z Jul 68, subj: AC-119 Gunships.
58. Msg (S), 7th AF to 1st Cmbt Applications Gp, 200900Z Jul 68, subj: Combat Hornet.
59. Cost Reduction Review (S), 7th AF, AC-119 Gunship Force, 10 Jul 68.
60. Msg (S), CSAF to CINCPACAF, 7th AF, TAC, 131641Z Jul 68, subj: AC-119 Deployments.
61. Increased Gunship Force, Feasibility Study, Supplemental and Summary Report (S), Dir/Ops, Apr 1968.
62. AFLC Historical Study 374, Feb 1971, pp 151-52.
63. Ibid., pp 150-51; contract AF 096303-69-C-0144.
64. Ibid., p 152.
65. Hist (S), 14th SOWg, 1 Oct-31 Dec 68, II.
66. Msg (S), 14th ACWg to 7th AF, 110635Z May 68.
67. Hist (S), 14th SOWg 1 Jul-30 Sep 68, p 59.
68. Hist (S), 14 SOWg, 1 Jan-31 Mar 69, p 34.

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69. Msg (U), CSAF to MAC, TAC, CAC, AFLC, USAFMPC, AFSC, AFCS, USAFSS, ATC, HQ COMD, NGB, 120025Z Apr 68, subj: Mobilization of Air Reserve Forces Units.

70. Intvw (U), author with Col Joe T. Pound, Dir/Aerosp Prgms, 27 Jun 72. Colonel Pound commanded the 930th TAGp (CAC) at the time of mobilization. He reported that 250,000 pounds of equipment was moved, largely in war readiness kits and valued at about \$3 million. Also, see: WRAMA Historical Study 18 (S), March 1971, pages 43 and 44; history (S), SAWC, 1 January-30 June 1968, page 17.

71. Msg (S), CSAF to CAC, MAC, TAC, AFLC, AFSC, HQ COMD, NG-AF, USAFMPC, AWS, 092217Z May 68, subj: Mobilization of Reserve Forces.

72. Msg (S), CSAF to CINCPACAF, 161327Z Sep 68, subj: AC-119 Deployment.

73. Ibid.

74. Staff Summary Sheet (S), 7th AF (DPLG), AC-119 Deployment, 17 Sep 68.

75. Msg (S), 7th AF to CINCPACAF, subj: Gunship Force Adjustment [ca 17 Sep 68.]

76. Msg (S), CINCPACAF to CSAF, 250545Z Sep 68, subj: AC-119 Deployment.

77. Staff Summary Sheet (S), 7th AF (DPLG), Combat Hornet (AC-119G) Deployment, 16 Oct 68. COMUSMACV reported to the JCS on 12 October 1968 that the total Air Force strength in RVN was 61,435 (U.S. military strength: 538,876). [Msg (C), COMUSMACV to JCS, 1206040Z Oct 68, subj: Weekly Strength Report.]

78. Staff Visit Notebook (S), Lt Gen Robert G. Ruegg, DCS/Sys & Logs, Nov 1968.

79. Memo (S), Paul H. Nitze, Dep SECDEF, to SAF and Chairman of the JCS, subj: Deployment Adjustment Request (AF-68-123), 27 Nov 68. Change 41 of CINCPAC plans reflected the Deputy SECDEF's approval for deployment of the 71st SOSq. [Hist (TS), CINCPAC, 1969, III, 18.]

80. WRAMA Historical Study 18, Mar 1971, p 44.

81. Msg (C), USAFSAWC to TAC, 032235Z Jul 68, subj: AC-119G Fire Control System Computers.

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82. See article on "Hoosier" reservists of the 71st SOSq. [The Air Reservist, Apr 1969, pp 6, 7.]

83. Msg (S), TAC to WRAMA, 122119 Nov 68, subj: AC-119G Ferry.

84. Msg (S), 7th AF to 14th SOWg, 200940Z Nov 68, subj: AC-119G Employment. The basic operations document for the deployment and employment of AC-119G's in SEA was 7th AF Operation Order 538-69 (S).

85. AFLC Historical Study 374 (S), Feb 1971, p 153.

86. WRAMA Historical Study 18 (S), Mar 1971, pp xxxi-xxxii; TAC OPlan 120 (S), Final Report Combat Introduction Evaluation AC-119G Gunship III (Combat King), Aug 1970.

87. PAD 68-115 (S), 7th AF, 6 Jun 68.

88. TAC OPlan 118 (S), Report of Gunship G Deployment and Combat Evaluation-Combat Guard, 22 Mar 69. In addition to assessing combat-mission effectiveness, considerable data was collected on the operational readiness rate, sorties flown versus sorties scheduled, maintenance on special equipment and subsystem operation, and aircraft maintenance.

89. TAC OPlan 118 (S), 22 Mar 69.

90. Kott, The Role of USAF Gunships in SEASIA, p 24.

91. TAC OPlan 118 (S), 22 Mar 69. This judgment was reinforced by the 7.62-mm armament's greater effectiveness against personnel than vehicles or storage areas.

92. Hist (S), Dir/Ops, 1 Jan-30 Jun 69, p 281.

93. Ibid.

94. WRAMA Historical Study 18 (S), Mar 1971, p xxxiv. The 18th and last aircraft arrived 1 March 1969.

95. Hist (S), 14th SOWg, 1 Jan-31 Mar 69, pp 1, 21. To be rated fully combat ready (C-1), a unit had to possess at least 85 percent of its authorized aircraft with 71 percent combat ready and 90 percent of its authorized personnel with 85 percent combat ready.

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96. SSgt Robert J. Lessels, Jr., "Shadow," Air Force, Nov 1971, pp 38-40. Other names associated with the C-119 were: Pregnant P-38, Dollar Nineteen, Gun-Toting Guppy, and USAF's Flying Battleship. Some of these were carryovers from C-119 days. [Maj William R. Casey, "AC-119: USAF's Flying Battleship," Air Force/Space Digest, Feb 1970, pp 48-50.]
97. WRAMA Historical Study 18 (S), Mar 1971, p xxv.
98. Msg (S), WRAMA to AFLC, TAC, CINCPACAF, 071515Z Jun 68, subj: Combat Hornet Schedules.
99. See note 97.
100. AFLC Historical Study 374 (S), Feb 1971, pp 147-48.
101. Ibid., p 148.
102. Ibid.
103. AFLC Historical Study 374 (S), Feb 1971, p 149.
104. Ltr (S), Dir/Main Engrg to DCS/Sys & Logs, subj: Personal Summary, 3 Jul 69.
105. WRAMA Historical Study 18 (S), Mar 1971, p 112.
106. Hist (S), Dir/Main Engrg, 1 Jan-30 Jun 69, p ix.
107. AFLC Historical Study 374 (S), Feb 1971, p 149.
108. Msg (S), TAC to CSAF, 081945Z Aug 68, subj: Combat Hornet.
109. Msg (S), WRAMA to AFLC, 232015Z Aug 68. Figures on some of the weights vary somewhat. AFLC Historical Study 374 lists 5,124 pounds as the excess weight.
110. Ibid.
111. Msg (C), WRAMA to AFLC, CSAF, TAC, CINCPACAF, 7th AF, USAFSOF, 271400Z Sep 68, subj: AC-119K Weight Reduction.
112. WRAMA Historical Study 18 (S), Mar 1971, p 48.
113. Ibid., p xxxiii.
114. Hist (S), 14th SOWg, 1 Jul-30 Sep 68, p 19.
115. Msg (S), TAC to CSAF, subj: Combat Hornet [ca 15 Oct 68].

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116. TAC OPlan 120 (S), Final Report Combat Introduction/Evaluation AC-119K Gunship III (Combat King), Aug 1970, p 103.

117. WRAMA Historical Study 18 (S), Mar 1971, pp 50-51.

118. Ibid., p xxxv.

119. Ltr (S), 7th AF to 17th SOWg, 3d, 31st, 35th, 37th, & 366th TFWg's, 460th TRWg, 1st CEG, AFAG, subj: 7AF PAD 68-115, Gunships, Progress Report, 30 Apr 69.

120. Msg (S), TAC to CSAF, CINCPACAF, AFLC, 082214Z May 69, subj: AC-119K Deployment.

121. Msg (S), TAC to CSAF, AFLC, ASD, 222331Z May 69, subj: AC-119K Deficiencies.

122. Hist (S), USAFSOF, 1 Jan-30 Jun 69, pp 40-41; msg (S), AFLC to TAC, 061936Z Jun 69.

123. Msg (S), TAC to CSAF, 131943Z Jun 69, subj: Gunship Offset Fire Deficiencies.

124. Hist (S), Dir/Ops, 1 Jul-31 Dec 69, pp 147-48; TAC TR-68-209, SOC 15-28, (S), AC-119K Operational Test and Evaluation (Combat Hornet K), Supplemental Report, Jan 1970.

125. Ltr (S), Dir/Main Engrg to DCS/Sys & Logs, subj: Personal Summary, 12 Dec 69.

126. Hist (S), 14th SOWg, 1 Jul-30 Sep 69; Movement Order 20 (S), TAC, 5 Aug 69. Approximate strength was 125 officers and 441 airmen.

127. TAC OPlan 120 (S), Aug 1970, p 70. One AC-119K damaged the right landing gear while landing at Malmstrom AFB, Mont. TAC reported the brakes locked on the right side, the right tires blew, and the right main gear scissor-swiveled. Since the gear required depot repair, a replacement AC-119K departed Lockbourne AFB on 22 October.

128. Ibid., p 36.

129. WRAMA Historical Study 18 (S), Mar 1971, p 156.

130. Ibid., p 68.

131. Ltr (U), Senator William Proxmire, Chairman, Subcommittee on Economy in Government, to Philip N. Whittaker, Asst SAF (Instls & Logs), 3 Feb 70.

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132. Ltr (U), Philip N. Whittaker, Asst SAF (Instls & Logs), to Senator William Proxmire, Chairman, Subcommittee on Economy in Government, 2 Mar 70. Secretary Whittaker reported the cost of spares alone "resulted in an increase of \$20.9 million."

133. WRAMA Historical Study 18 (S), Mar 1971, p 196.

134. PAD 69-101 (S), 7th AF. See Chapter II for more discussion on Nha Trang Proposal.

135. PACAF Movement Order 16 (S), 27 Mar 69. Also governed by PACAF PAD 69-6 (S), ANG/AFRES/USAF Deployment, Dec 1968.

136. Hist (S), 14th SOWg, 1 Apr-30 Jun 69, pp 34-35.

137. Ibid., pp 20, 34-35. The number included 27 pilots, 16 navigators, 17 flight engineers, 18 illuminator operators, and 151 other personnel [p 20]. Hist (S), Dir/Ops, 1 Jan-30 Jun 69, p 344.

138. Hist (S), 14th SOWg, 1 Oct-31 Dec 69. Some 166 aircrew personnel had arrived. The governing plan for the deployment was 7th AF PAD 68-115 (revised)

139. Hist (S), 14th SOWg, 1 Oct-31 Dec 69.

140. Msg (TS), CINCPAC to JCS, 010130Z Jan 70, subj: Aircraft for Laos, hist (S), Dir/Ops, 1 Jul-31 Dec 69, p 297.

141. See note 139.

142. TAC OPlan 120 (S), Aug 1970, pp 36-37.

143. See note 139.

144. TAC OPlan 120 (S), Aug 1970, pp 41-61.

145. Ibid., p iii. The Combat King Task Force Commander was Lt Col R. W. McCartan.

146. Hist (TS), MACV, 1969, III, XII-12.

147. TAC OPlan 120 (S), Aug 1970, pp 64-69.

148. Msg (S), 14th SOWg to 7th AF, 200730Z Nov 69, subj: Command Assistance (Request for Tactical Voice Call Sign, Gen Brown from Col Cheney).

149. Msg (S), 7th AF to 14th SOWg, 230755Z Nov 69, subj: Change in VCS Assignment.

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150. Hist (S), 14th SOWg, 1 Apr-30 Jun 69, p 67. Extensive corrosion damage was found on the underside of the fuselage, on hydraulic plumbing, and on many other areas of the aircraft. "The reciprocating power plant and the propeller system caused the majority of the AC-119 aborts."
151. Hist (S), 14th SOWg, 1 Apr-30 Jun 69, p 3.
152. Hist (S), 14th SOWg, 1 Jul-30 Sep 69; hist (S), 14th SOWg, 1 Oct-31 Dec 69.
153. Hist (S), 14th SOWg, 1 Jan-31 Mar 69, p 22.
154. Ibid., p 24.
155. Ibid., pp 2-3. For a description of an AC-119G mission, see: Capt. Robert P. Everett, "Just a Shadow of Its Former Self," Airman, XIV (February 1970), 11-14.
156. Hist (S), 14th SOWg, 1 Apr-30 Jun 69, p 33.
157. Elizabeth H. Hartsook, The Air Force in Southeast Asia: The Administration Emphasizes Air Power, 1969 (TS) (Ofc/AF Hist, Nov 1971), p 38.
158. Msg (C), TAC to WRAMA, 162252Z Sep 68, subj: Combat Hornet.
159. Hist (S), TAC, Jul 1968-Jun 1969, I, 186-87; Hartsook, The Air Force in Southeast Asia: The Administration Emphasizes Air Power, 1969, p 45.
160. Ibid.
161. Ibid.
162. Hist (S), USAFSOF, 1 Jul-31 Dec 68.
163. Hist (S), 14th SOWg, 1 Oct-31 Dec 69.
164. "To Help An Ally," The Air Reservist, Jun 1969, p 15. Lieutenant Colonel Campbell's crew consisted of: Lt. Col. James H. Kirke, Maj. Harold R. Crawford (navigator); Capt. John I. Parish (copilot); MSgt. Ronald E. Wheeler (flight engineer); SSgt. Robert C. Johnson (illuminator operator); Sgt. Robert Baum and Sgt. James R. Boyd (aerial gunners). One author declared the illuminator of a Shadow flying at 5,000 feet could provide sufficient light to "read Stars and Stripes easily on the darkest night." The illuminator's beam adjusted from 20 to 40 degrees. [Maj William R. Casey, "AC-119: USAF's Flying Battleship," Air Force/Space Digest, Feb 1970, pp 48-50.]
165. Hist (S), 14th SOWg, 1 Jul-30 Sep 69.

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166. Hist (S), 14th SOWg, 1 Oct-31 Dec 69, p 8. A replacement for the lost aircraft was requested. [Ltr (S), 14th SOWg to 7th AF, subj: Acquisition of Replacement Aircraft, 23 Oct 69.]
167. Ibid.
168. Hist (S), 17th SOSq, in Hist (S), 14th SOWg, 1 Jul-30 Sep 69.
169. Hist (S), 14th SOWg, 1 Oct-31 Dec 69, p 19.
170. Hist (S), 14th SOWg, 1 Jan-31 Mar 70, p 10.
171. AC-119G Gunship Tactics (U), in Hist (S), 14th SOWg, 1 Apr-30 Jun 69.
172. Hist (S), 14th SOWg, 1 Apr-30 Jun 70, p 13. AC-119G's flew 135 sorties and AC-119K's 12.
173. Hist (S), 14th SOWg, 1 Apr-30 Jun 70.
174. Ibid., p 14.
175. Cole, Fixed Wing Gunships in SEA (Jul 69-Jul 71), p 22.
176. Hist (S), 14th SOWg, 1 Apr-30 Jun 70, p 14.
177. Cole, Fixed Wing Gunships in SEA (Jul 69-Jul 71), p 20.
178. Ibid., pp 21-22.
179. Ibid., pp 19, 23.
180. Hist (S), 14th SOWg, 1 Apr-30 Jun 70, p 14.
181. Cole, Fixed Wing Gunships in SEA (Jul 69-Jul 71), pp 22-23.
182. Hist (S), 14th SOWg, 1 Jul-30 Sep 70, p 2. AC-119G's were based at Tan Son Nhut AB. Some AC-119K's were sent there as weather severely limited Barrel Roll and Steel Tiger missions.
183. Hist (S), 14th SOWg, 1 Apr-30 Jun 70, p 23.
184. Msg (S), 7th AF to CINCPACAF, 051405Z Feb 70, subj: AC-119K Temporary Forward Operating Location.
185. Hist (S), 14th SOWg, 1 Jan-31 Mar 70, Chronology.
186. Ltr (S), Maj Gen Ernest C. Hardin, Jr., DCS/Ops, PACAF, to Maj Gen Sam J. Byerley, Dir/Ops, USAF, 17 Mar 70.

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187. Msg (S), 7th AF to 14th SOWg, 161250Z Mar 70.
188. Hist (S), 14th SOWg, 1 Jan-31 Mar 70, p 4.
189. Ibid., Chronology. "The military situation in the Barrel Roll area, as reviewed at the meeting at Udorn on 20 Mar, required the augmentation of the AC-119K FOL at Udorn with a fourth aircraft as soon as possible to support Laotian forces." [Msg (S), 7th AF to PACAF, 221100Z Mar 70, subj: AC-119K FOL.]
190. Hist (S), SOWg, 1 Apr-30 Jun 70, p 13.
191. Msg (S), 7th AF to CINCPACAF, 210945Z Jun 70, subj: AC-119K FOL.
192. See note 186.
193. Hist (S), 366th TFWg, Jan-Mar 1970, I, 17.
194. Atch to 18th SOSq hist (S), in hist (S), 14th SOWg, 1 Jan-31 Mar 70.
195. Hist (S), 14th SOWg, 1 Apr-30 Jun 70, Gunship Operations section.
196. Ibid., p 11.
197. Ibid., p 10.
198. Msg (S), CINCPACAF to 7th AF, 032147Z Mar 70, subj: AC-119K Temporary FOL.
199. Hist (S), 14th SOWg, 1 Apr-30 Jun 70, p 9.
200. Ibid., Gunship Operations section.
201. Ibid., Chronology.
202. Ltr (S), Comdr, 14th SOWg, to Comdr, 7th AF, subj: Improving AC-119K Gunship Effectiveness, 26 Jun 70.
203. Ibid.; hist (S), 14th SOWg, 1 Apr-30 Jun 70, p 16.
204. Msg (S), 7th AF, to CINCPACAF, 210945Z, Jun 70, subj: AC-119K FOL; hist (S), 14th SOWg, 1 Apr-30 Jun 70, Gunship Operations section.
205. Hist (S), 14th SOWg, 1 Apr-30 Jun 70, p 16.
206. See note 202.
207. Hist (S), 14th SOWg, 1 Jan-31 Mar 70, Gunship Operations section.

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208. Hist (S), Dir/Ops, 1 Jan-30 Jun 70, pp 168-170. The Air Force urged action in the testing since leadtimes for the gunship AN/APQ-133 beacon-tracking radar would require early procurement action.
209. Hist (S), 14th SOWg, 1 Jan-31 Mar 70, pp 9-10.
210. Hist (S), 14th SOWg, 1 Apr-30 Jun 70, Gunship Operations section.
211. Hist (S), 14th SOWg, 1 Jan-31 Mar 70, Gunship Operations section.
212. Ibid.
213. Hist (S), 366th TFWg, Jan-Mar 1970, I, 17.
214. Hist (S), 14th SOWg, 1 Apr-30 Jun 70, p 24.
215. 1970 Mackay Trophy Award citation; release 7-6-71-447 (U), Air Force News Service, 6 Jul 71; intvw (U), author with Capt Alan D. Milacek and crew, 5 Aug 71.
216. Release 629-71 (U), Ofc/Asst SECDEF (Public Affairs), 20 Jul 71.
217. Hist (S), 14th SOW, 1 Jul-30 Sep 70, 18th SOSq historical data, p 2.
218. Ibid.
219. Hist (S), 14th SOWg, 1 Oct-31 Dec 70, chap III, p 5.
220. Ibid., Gunship Operation section.
221. Hist (S), 14th SOWg, 1 Oct-31 Dec 70, 17th SOSq section.
222. Hist (S), 14th SOWg, 1 Oct-31 Dec 70, pp 6-7.
223. Ibid., p 7.
224. Hist (S), 14th SOWg, 1 Oct-31 Dec 70, p 8.
225. Ibid.
226. Cole, Fixed Wing Gunships in SEA (Jul 69-Jul 71), p 32.
227. Ibid.
228. Hist (S), 14th SOWg, 1 Oct-31 Dec 70, p 9.
229. See note 226.

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230. Hist (S), 14th SOWg, 1 Oct-31 Dec 70, p 9.
231. Ibid., p 7 and Wing Plans section.
232. Ltr (S), Maj Gen C. M. Talbott, Dir/Ops, to CSAF, subj: Response to Gunship Questions Asked by Gen Ryan, 11 Feb 71.
233. Cole, Fixed Wing Gunship in SEA (Jul 69-Jul 71), p 24.
234. Hist (S), 14th SOWg, 1 Apr-30 Jun 70, p 9.
235. Hist (S), 14th SOWg, 1 Oct-31 Dec 70, Wing Plans section; Cole, Fixed Wing Gunships in SEA (Jul 69-Jul 71), p 25.
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2. Msg (C), USAFSAWC to TAC, DOTR-AT 00542, 071930Z Sep 66.
3. Ibid.
4. Hist (S), USAFSAWC, 1 Jan-30 Jun 68, pp 33-34.
5. Msg (C), USAFSAWC to CSAF, subj: Install SUU-11 and .50 cal. Machine Guns, C-47 Aircraft, 10 Jul 67.
6. Hist (S), USAFSAWC, 1 Jan-30 Jun 68, pp 33-34.
7. Msg (C), CSAF to TAC, 132042Z Jan 68.
8. TAC Test 68-201 (C), 1st Cmbt Applications Gp (TAC), TAC Test Order: Side Fire C-47 Machine Gun Installation, 9 May 68.
9. Hist (S), TAC, Jul 1969-Jun 1970, I, 337.
10. Msg (C), 1st Cmbt Applications Gp to USAFSAWC, subj: Status Report, C-47 Machine Gun Installation, 4 Jul 68.
11. Hist (TS), Dir/Ops, 1 Jan-30 Jun 69, pp 359-360. USAF Program Guidance (PG)-71-1 reflected programming action which revised USAFSAWC's 24th SOWg force authorization effective third quarter, fiscal year 1969, as follows: three UH-1's and four AC-47's authorized in the Special Forces program; and two Special Operations Squadrons (vice one) authorized in the 24th SOWg.

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12. Hist (S), 2d Air Div, Jan-Jun 1964, pp 7-10.  
History of the 2d Air Division, 15 November 1961-8 October 1962, states that the best available information places the first VNAF night flaredrop on 5 February 1962.
13. Hist (S), Dir/Op1 Rqmts & Dev Plans, 1 Jul-31 Dec 69.
14. Msg (S), AF Advisory Gp, Tan Son Nhut AB, to CSAF, 16 Sep 67.
15. Memo of Understanding (S), 14th ACWg and AF Advisory Gp, Dec 1967, AC-47 Acft (VHAF) file, AF Archives.
16. Kott, The Role of USAF Gunships in SEASIA, p 7.
17. Ibid. PACAF reassigned the following AC-47D aircraft from the 14th SOWg to MAP Vietnam effective 30 Jun 69: SN's 45-0919, 44-76722, 43-48801, 43-48701, and 43-49770. [Msg (S), CINCPACAF to 7th AF, AFLC, 14th SOWg 281920Z Jun 69.]
18. Cole, Fixed Wing Gunships in SEA (Jul 69-Jul 71), p 5.
19. James T. Bear, VNAF Improvement and Modernization Program (S) (HQ PACAF, Project CHECO, 5 Feb 70), p 78.
20. Ibid., p 79.
21. See note 18.
22. Bear, VNAF Improvement and Modernization Program, p 79.
23. John L. Frisbee, "USAF's Changing Role in Vietnam," Air Force, Sep 1971, p 44.
24. See note 22.
25. Cole, Fixed Wing Gunships in SEA (Jul 69-Jul 71), pp 6-7.
26. Bear, VNAF Improvement and Modernization Program, p 82.
27. Ibid.
28. Cole, Fixed Wing Gunships in SEA (Jul 69-Jul 71), p 6.
29. See comments on the training program in Air Force Times, 31 March 1971, page 20.
30. Air Force Times, 28 Apr 71, p 20.

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31. Release 9-24-71-614 (U), Air Force News Service, "Air Force 'Shadows' transferred to VNAF," 24 Sep 71. The VNAF renamed the AC-119's Hac Long or Black Dragons.
32. Rprt (S), Det 1 Comdr, 56th SOWg/C-47 MTT, to Dep Ch, JUSMAG, Thailand, subj: C-47 MTT Final Report, 10 Aug 69.
33. Hist (TS), CINCPAC, 1969, III, 208; hist (S), Dir/Opl Rqmts & Dev Plans, 1 Jan-30 Jun 69, pp 246-47.
34. See note 32.
35. The deployment of a USAFSOF C-47 MTT was labeled Combat Wombat. [Hist (TS), Dir/Ops, 1 Jan-30 Jun 69, p 347.]
36. See note 32. The 56th SOWg supervised the MTT since that Wing's mission was to create a reasonably self-sufficient Laotian air arm. Also, see: Bevan End of Tour Report (S), 3 September 1968-7 June 1969.
37. Hist (TS), CINCPAC, 1969, III, 208.
38. Ibid., 209.
39. Ibid., 210.
40. Ibid.
41. Ltr (S), Dep Ch, JUSMAG, Thailand, to CSAF, subj: Military Assistance Program Report, 27 Jun 70.
42. PMD P-2P049(1)/64708F(S), Dir/Dev & Acq, PE 64708F Project 1559, Task 327, Credible Chase Concept Test [undated].
43. Aviation Week & Space Technology, 1 May 72, p 17.
44. USAF Management Summary Southeast Asia (S), 9 Jul 69, p 28.
45. USAF Management Summary Southeast Asia (S), 22 Feb 72, pp 47-48.
46. Ibid.
47. Quote referred to in message (S), CINCPACAF to 2d Air Div, 142357Z, December 1964.
48. Final rprt (S), TAC, Gunships Post-SEAsia, An In-Depth Review, 1 Sep 70.

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49. Address (U), Gen William W. Momyer, TAC Commander, to students of Army Command and General Staff College, Ft Leavenworth, Kans., 13 Oct 71.

50. David Halberstam, The Making of a Quagmire (New York, 1964), p 167.

51. Gen John D. Ryan, "Transitional Adjustments in Air Force Structure," Aerospace Commentary, III (Fall 1971), 11.

52. Robert C. Seamans, Jr., "Development Flexibility and Cost Discipline," Air Force, May 1972, p 47.

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## GLOSSARY OF TERMS AND ABBREVIATIONS

AC-47	The C-47 transport converted into a gunship by adding the General Electric SUU-11A minigun; the AC-47 had several nicknames: Puff the Magic Dragon, Dragon Ship, and Spooky
AA	antiaircraft
AB	airbase
ABCCC	airborne battlefield command and control center
abn	airborne
ac	alternating current
accelerometer	An instrument for measuring acceleration or for detecting and measuring vibrations
acft	aircraft
acq	acquisition
ACSC	Air Command and Staff College
ACSq	Air Commando Squadron
actg	acting
activate	To put a unit into existence (that has been previously constituted by name and number) so it can be organized to function in its assigned capacity
acty	activity
ACWg	Air Commando Wing
ADF	Automatic direction finder; it automatically and continuously measures the direction of arrival of the received signal; data are usually displayed visually
Adm	Admiral
ADTC	Armament Development and Test Center
adv	advance, advanced, advancement
ADVON	advanced echelon
aerosp	aerospace
AF	Air Force
AFAG	Air Force advisory group
AFAL	Air Force Avionics Laboratory
AFATL	Air Force Amament Laboratory

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AFB	Air Force base
AFCS	Air Force Communications Service
AFLC	Air Force Logistics Command
AFML	Air Force Materials Laboratory
AFOAP	Dir/Aerospace Programs, DCS/Programs & Resources, USAF
AFOAPP	Program Development & Integration Division, Dir/Aerospace Programs, DCS/Programs & Resources, USAF
AFODC	DCS/Programs & Resources, USAF
AFRDQ	Dir/Operational Requirements & Development Plans, DCS/Research & Development, USAF
AFSC	Air Force Systems Command
AFSDC	DCS/Systems & Logistics, USAF
AFSME	Dir/Maintenance Engineering, DCS/Systems & Logistics, USAF
AFXDC	DCS/Plans & Operations, USAF
AFXOP	Dir/Operations, DCS/Plans & Operations, USAF
AFXOSO	Special Operations Division, Dep Dir/Strike Forces, Dir/Operations, DCS/Plans & Operations, USAF
AGE	aerospace ground equipment
AGL	above ground level
AGMTIP	air-to-ground moving target indicator processor
air commando	An Air Force member engaged in counter-insurgency operations
AIC	Airman First Class
alft	airlift
Alleycat	The C-130 ABCCC at night in Barrel Roll
ALO	air liaison officer
AM	Amplitude modulation; modulation in which the amplitude of a carrier is varied
Ambassador Sullivan's Air Force	Informal reference to the 56th SOWg, Nakhon Phanom, Thailand; only Ambassador to Laos William H. Sullivan could approve targets in Laos; since the 56th struck approved targets, hence the term

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Ambassador's War, The	The war in Laos; Ambassador William H. Sullivan was Ambassador to Laos and approved all targets in Laos, hence the term
AmEmb	American Embassy
amph	amphibious
amplitude	Maximum displacement from the zero position of an alternating current or any other periodic phenomenon
AMRL	Aerospace Medical Research Laboratory
analys	analysis
ANG	Air National Guard
AOC	air operations center
APGC	Air Proving Ground Center
API	armor-piercing incendiary
app	appendix
Arc Light	(S) B-52 operations in SEA; initially, missions were flown from Anderson AFB, Guam; Kadena AB, Okinawa, and U-Tapao RTAFB, Thailand; later, all Arc Light missions were flown from U-Tapao
armt	armament
ARPA	Advanced Research Project Agency
arty	artillery
ARVN	Army of Republic of Vietnam
ASD	Aeronautical Systems Division
ASG	Aeronautical Standards Group
ASI	Aerospace Studies Institute
ASOC	air support operations center
asst	assistant
ATC	Air Training Command
atch	attachment
AU	Air University
AWS	Air Weather Service

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Barrel Roll ~~(S)~~ Interdiction and close air support operations in eastern Laos (beginning 14 Dec 64), later reduced to the area of northern Laos (3 Apr 65); the operations were under 2d Air Division and later, Seventh Air Force control; most recently, Barrel Roll refers to strikes against personnel and equipment from North Vietnam

bd board  
BDA Bomb Damage assessment; the term encompasses the determination of the effect of all air attacks on targets (e.g., bombs, rockets, or strafe); also referred to as "battle damage assessment"

beddown A unit's deployment  
BIAS battlefield illumination airborne system  
Bias Hunter ~~(S)~~ C-130 aircraft equipped with a BIAS and other sensor equipment (e.g., infrared devices) to locate the enemy

Black Crow ~~(S)~~ An ignition system detection sensor used on AC-130 and AC-123 Black Spot aircraft

Black Spot ~~(S)~~ Converted C-123 transport (AC-123) equipped with FLR, LLLTV, forward-looking IR detector, laser ranger, advanced navigation system, weapon release computer, and weapon dispensers (CBU's)

Blindbat Nickname of C-130 FAC/flaeship aircraft operating in Southern Laos; eventually Blindbat became the nickname for all C-130 flare missions [see Lamplighter]

Blue Chip The Seventh AF command and control center (7AFCCC) which controlled out-country combat operations

bn battalion

~~SECRET~~

boresight line	An optical reference line used in harmonizing guns, rockets, and other weapon launchers
br	branch
brainstorm	To practice a conference technique by which a group tries to find a solution to a specific problem by amassing all of the ideas spontaneously contributed by its members
breadboard equipment	Equipment put together for test purposes (often on rather crude mountings) to detect trouble spots before final engineering design
Brig Gen	Brigadier General
Bronco	Nickname of OV-10 aircraft
B-scope	Radar display in which the signal appears as a bright spot, with bearing as the horizontal coordinate and range as the vertical coordinate
bul	bulletin
C-119	Twin-boom transport nicknamed Flying Boxcar; modified into AC-119G Shadow and AC-119K Stinger gunships
C-123	Fairchild Provider transport used in airlift and as a FAC/flareship; call sign Candlestick used in latter mission
C-130	Multiengine transport developed for the Air Force by Lockheed; nicknamed Hercules
C	Confidential
ca (circa)	about
CAC	Continental Air Command
Canberra	The B-57 strike aircraft
Candlestick	<del>(S)</del> The call sign for the C-123 FAC/flare aircraft in Laos
CAP	combat air patrol

~~SECRET~~

Capt	Captain
CCT	combat crew training
CEA	circular error average
CEG	Combat Evaluation Group
cen	center
centimeter	.39 inch
CEP	circular error probable
CG	Commanding General
ch	chief
chaff	Radar confusion reflectors consisting of thin, narrow, metallic strips of various lengths and frequency responses, used to reflect echoes for confusion purposes
chap	chapter
CIDG	Headquarters, Civilian Irregular Defense Group, at Duc Lap compound, South Vietnam
CINCPAC	Commander in Chief, Pacific Command
CINCPACAF	Commander in Chief, Pacific Air Forces
CINCPACFLT	Commander in Chief, Pacific Fleet
CJCS	The Chairman, Joint Chiefs of Staff
class	classification
clean configuration or clean aircraft	An aircraft without extra fuel tanks, ordnance, and other external stores
clock-code position	Position of a target in relation to an aircraft or ship; dead-ahead position is considered 12 o'clock
cmbt	combat
co	company
COIN	counterinsurgency
Col	Colonel
comdr	commander
Commando Bolt	<del>37</del> Task Force Alpha-controlled airstrikes on moving trucks in a specified area, using sensor activations

~~SECRET~~

Commando Hunt I, III, V	<p>(S) Air interdiction campaigns directed against the flow of supplies from North Vietnam to Vietcong and North Vietnam forces in South Vietnam and Cambodia; these campaigns in southern Laos (Steel Tiger area of operations) bore numerical designations that changed with the semiannual monsoonal shift; the three northeast monsoon, or dry-season campaigns, took place in 1968/1969, 1969/1970, and 1970/1971, and covered roughly the period from October through April</p>
COMSEVENTHFLT COMUSMACV	<p>Commander, Seventh Fleet Commander, United States Military Assistance Command, Vietnam</p>
conf constitute	<p>conference To provide the legal authority for the existence of a new unit of the armed services; the new unit is designated and listed but has no specific existence until it is activated</p>
cookoff	<p>Ammunition firing as a result of being allowed to rest in the chamber of an overheated weapon</p>
corp cost effectiveness	<p>corporation A comparative evaluation derived from analyses of alternatives (actions, methods, approaches, equipment, weapon systems, support systems, force combinations, etc.) in terms of the inter-related influences of cost and effectiveness in accomplishing a specific mission</p>
counterinsurgency	<p>Those military, paramilitary, political, economic, psychological, and civic actions taken by a government to defeat subversive insurgency</p>
Covey	<p>(●) Call sign of 0-2 and 0V-10 FAC's of the 20th TASSq operating in North and South Vietnam and Laos</p>
CRC	<p>control and reporting center</p>

~~SECRET~~

Cricket	(S) Operations in Laos of O-1E and AC-47 FAC aircraft and the C-130 ABCCC
CROC cross the fence	combat required operational capability To cross the Mekong River separating Thailand and Laos
C/S	Chief of Staff
CSAF	Chief of Staff, United States Air Force
CSGp	combat support group
CTZ	corps tactical zone
CY	calendar year
DAF	Department of the Air Force
DAR	Deployment adjustment request; it enabled OSD to monitor force changes with regard to theater force ceilings
DASC	direct air support center
DC	Deputy Commander, Seventh Air Force
dc	direct current
DCS	Deputy Chief of Staff
D/D	destroyed or damaged
DDR&E	Director, Defense Research and Engineering, Office of the Secretary of Defense
def	defense
dep	deputy
dept	department
det	detachment
dev	development
DF	direction finder
dir	director
direction finding	The procedure for obtaining bearings of radio frequency emitters with the use of a highly directional antenna and a display unit on an intercept receiver of ancillary equipment
div	division
DMZ	demilitarized zone
DO	DCS/Operations, Pacific Air Forces; also DCS/Operations, Seventh Air Force

~~SECRET~~

DOA	Dir/Tactical Analysis, DCS/Operations, Seventh Air Force
doc	document
DOCO	Air Operations Division, Dir/Combat Operations, DCS/Operations, Seventh Air Force
DOCT	Tiger Hound/Tally Ho Division, Dir/Combat Operations, DCS/Operations, Seventh Air Force
DOD	Department of Defense
DOOS	Operations Security Division, Dir/Operations Support, DCS/Operations, Seventh Air Force
doppler radar	A radar system that differentiates between fixed and moving targets by detecting the apparent change in frequency of the reflected wave due to motion of the target or observer
DOPR	Reconnaissance/Electronic Warfare Division, Dir/Operations Plans, DCS/Operations, Seventh Air Force
DP	DCS/Personnel, Seventh Air Force
DPL	DCS/Plans, Pacific Air Forces; also DCS/ Plans, Seventh Air Force
DPLG	Dir/Programs, DCS/Plans, Seventh Air Force
DPLP	Dir/Plans & Programs, DCS/Operations, Pacific Air Forces; also Dir/Plans, DCS/Plans, Seventh Air Force
dtd	dated
DTG	date-time group
ECM	electronic countermeasures
Emb	Embassy
encl	enclosure
enr	engineer
engrg	engineering
ETA	estimated time of arrival

~~SECRET~~

<u>et al</u> ( <u>et alii</u> )	and others
ETR	Eastern Test Range
eval	evaluation
EW	electronic warfare
EWO	electronic warfare officer
F-4	Strike aircraft nicknamed Phantom
FAC	forward air controller
FACP	forward air control post
FAG	forward air guide
Farm Gate	A detachment of USAF air commandos from the Special Air Warfare Center, Eglin AFB, Fla., which entered South Vietnam in November 1961 at President Diem's request; its twofold mission was training and combat operations
FE	fuze extender
fig	figure
fire arrow	Could be made of many materials; metal gas cans filled with gasoline-soaked sand were often used; ignited it was easy to see at night; hamlet defenders relayed to flare/strike aircraft the enemy's position with reference to the fire arrow
1st Lt	First Lieutenant
flak	Bursting shells fired from AA guns
flak-suppression fire	Fire used to suppress AA fire immediately prior to and during an air attack on enemy positions
flare	To drop flares
fleschette	small steel dart
FLIR	forward-looking infrared
FLR	forward-looking radar
Flying Boxcar	Nickname of the C-119 twin-boom transport
FM	frequency modulation
FOB	forward operating base
FOL	forward operating location

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fr	from
frag	Fragmentation operations order; the daily supplement to standard operations order governing the conduct of the air war in South-east Asia; it contained mission number and function, type of ordnance, time on target, and other instructions; "to frag" means to issue a fragmentation operations order covering the details of a single mission
FSO	fire support officer (U.S. Army)
ft	foot, feet, fort
ftr	fighter
FY	fiscal year
Gen	General
Gooney Bird	Nickname of the C-47 aircraft
GP	general purpose
gp	group
ground return	Reflection from the terrain as displayed and/or recorded as an image
gun kit	The wiring, gun, pilot's sight, and other equipment needed to convert a cargo aircraft to a weapon system
gunship	Any of several modified fixed-wing transport aircraft equipped with side-firing machineguns and/or cannons; the fixed-wing side-firing aircraft of the U.S. Air Force
Gunships I, II, III	Specially modified USAF transport aircraft equipped with side-firing machineguns and/or cannons: Gunship I (AC-47's called Spooky); Gunship II (AC-130's called Spectre); Gunship III (AC-119G's called Shadow and AC-119K's called Stinger)

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hangfire A delay in the explosion of the charge of a gun after the primer has been fired; the temporary failure of a primer or igniter

Have Auger ~~(C)~~ An electro-optical sensor installed in the Surprise Package aircraft

headroom Availability of spaces under manpower ceilings

HEI high-explosive incendiary

helmet sight A complex instrument, the helmet sight incorporated an eyepiece with illuminated reticle into a crewmember's helmet

HF high frequency

hist history, historical

homing The technique of tracking along a position line towards the point of origin of a radio, radar, or other navigation aid

hot-day conditions 100° Fahrenheit, 80 percent dewpoint, and 450-foot-pressure altitude--the worst Southeast Asia climatic conditions in which the aircraft could safely conduct operations

HQ headquarters

HQ COMD Headquarters Command

IAS Indicated airspeed, i. e., airspeed read from the face of the indicator in the aircraft's cockpit

ibid. in the same place

IFF Identification, friend or foe; a method for determining the friendly or unfriendly character of aircraft and ships by other aircraft or ships, and by ground forces using electronic detection equipment and associated IFF units

Igloo White A surveillance system consisting of hand-implanted and air-delivered sensors, relay aircraft, and an infiltration surveillance center; Igloo White was formerly Muscle Shoals

~~CONFIDENTIAL~~

ILS	Instrument landing system; a radio-navigation system which provides aircraft with horizontal and vertical guidance just before and during landing; at certain fixed points, it indicates the distance to the reference point of landing
IMU	inertial measuring unit
"	inches
incl	inclosure, include
in-country	That part of the Southeast Asia conflict within South Vietnam
inf	infantry
info	information
INS	inertial navigation system
instl	installation
interdict	To prevent or hinder (by any means) enemy use of an area or route
interdiction boxes	Refers to four specified strike zones on the main routes and passes from North Vietnam into Laos; the Air Force allocated intensive sorties against these boxes during Commando Hunt V
intvw	interview
IO	illuminator operator
IP	Initial point--a well-defined point, easily distinguished visually and/or electronically, used as a starting point for the bomb run to the target
IR	infrared
IRAN	inspection and repair as necessary
ISC	Infiltration surveillance center; operated by Task Force Alpha to monitor, display, and evaluate sensor data
JAOC	joint air operations center
JRATA	Joint Research and Test Activity; the Commander, JRATA, advised COMUSMACV on research development, testing, and evaluation

(This page is Unclassified)

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JCS	Joint Chiefs of Staff
JOC	joint operations center
JSIPS	Joint Continental Defense Systems Integration Planning Staff
JTCG	Joint Technical Coordinating Group
JUSMAG	Joint United States Military Advisory Group
KC-135	Tanker aircraft used for air refueling
karst	A limestone region marked by sinks and interspersed with abrupt ridges, irregular protuberant rocks, caverns, and underground streams
KBA	killed by air
KCAS	knots, calibrated airspeed
KIA	killed in action
KIAS	knots, indicated airspeed
kicker	A gunship/flaeship crewmember charged with dropping the flares
knot	A speed of 1 nautical mile an hour (a nautical mile equals 6,076.115 feet or 1,852 meters)
kw	Kilowatt; a unit of power equal to 1,000 watts
lab	laboratory
Lamplighter	Nickname of C-130 aircraft operating in Northern Laos; eventually Blindbat became the nickname for all C-130 flare missions
laser	Light amplification by stimulated emission of radiation; laser light is most often invisible and infrared; it differs from ordinary light in that its individual light rays are all the same wave length and all are in step; hence its energy is not dissipated as the beam spreads out--thus permitting an intense concentration of light energy

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letter contract	A written preliminary instrument to get work under way immediately; it is later confirmed by a formal contract
LF	low frequency
LIMA Site	Aircraft landing sites (dirt strips) in Laos used as resupply points
LLLTV	low-light-level television
LO	liaison office, liaison officer
LOC	line of communication
log	Logistic; also a ground flare used by FAC aircraft to create a reference point during night strikes
loran	Long-range electronic navigation system that uses the time divergence of pulse-type transmissions from two or more fixed stations; also called long-range navigation
loran C	Extremely accurate long-range system of navigation similar to loran, giving accuracy within a few hundred feet for up to 1,000 miles out to sea
loran D	Tactical loran system that uses the coordinate coverter of low-frequency loran C and can operate independently of ground facilities and without radiating radio-frequency (RF) energy that could reveal the aircraft's location
LOS	Line-of-sight, i. e., the line between the target and the aiming reference
lower route packages	The southern route packages in North Vietnam
Lt Col	Lieutenant Colonel
LTD	Laser target designator; laser target designator is the use of a laser to direct a light beam onto the target so the appropriate sensors can track or home on the reflected energy
Lt Gen	Lieutenant General
ltr	letter

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LTVE	Ling-Temco-Vought/Electrosystems, Greenville, Tex.
lumen	A unit of luminous flux equal to the light emitted in a unit solid angle by a uniform point source of one candle
Mk-6	White flare marker-marker log used to mark ground targets
Mk-24	Parachute flare that could also be rigged as a ground target marker; dropped at 5- or 10-second intervals the Mk-24 illuminated an area 1/2-mile across for 3 minutes
MAAC-V	Military Advisory Assistance Command, Vietnam
MAAG-V	Military Assistance Advisory Group, Vietnam
MAC	Military Airlift Command
MACV	Military Assistance Command, Vietnam
MACV Subsector Headquarters	Located in compound at Duc Lap, South Vietnam
maint	maintenance
Maj	Major
Maj Gen	Major General
MAP	Military Assistance Program
marker/marker log	A flare dropped from an aircraft to mark targets on the ground
mat	material, materiel
M-Day	mobilization day
megahertz	One million hertz (a hertz is a unit of frequency equal to one cycle per second)
memo	memorandum
Meo	An aboriginal people of China inhabiting South-west China and the northern parts of Vietnam, Laos, and Thailand
meter	39.37 inches
mgt	management
MHz	megahertz

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mil	1/6400 of 360 <sup>o</sup>
Military Assistance Program	The U.S. program for providing military assistance under the Foreign Assistance Act of 1969, as amended, as distinct from Economic Aid and other programs authorized by the Act; includes the furnishing of defense articles and defense services through Grant Aid or Military Sales to eligible Allies, as specified by Congress
miniponder	Small (5 watt and 40 watt) portable transponder carried by ground troops; used with the AC-119K's beacon-tracking radar to provide offset-firing ground support
Misch-metal	Resembling cigarette flints, Mish-metal was highly pyrophoric (spark-producing) on impact; the Naval Weapons Laboratory, Dahlgren, Va., developed Misch-metal
Mk	ordnance designation
mm	millimeter (s)
MOB	main operating base
mobilize	Assemble and organize personnel, supplies, and material for active military service
monsoon	A season wind in Southeast Asia which blows from the southwest from April to October and from the northeast during the rest of the year
movers	moving enemy vehicle
mph	miles-per-hour
MR	memorandum for record, modification requirement
msg	message
MSgt	Master Sergeant
MSL	Mean seal level; the average height of the surface of the sea for all stages of the tide (used as a reference for elevations)
MSQ	mobile search special

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MTI	Moving target indicator; a radar presentation which shows only targets in motion; signals from stationary targets are subtracted out of the return signal by the output of a suitable memory circuit
MTT	mobile training team
Nail	Call sign of OV-2 and OV-10 FAC's of 23d TASq
nape	napalm
NG	National Guard
NGB	National Guard Bureau
Nha Trang Proposal	Approved by CINCPACAF and CSAF between 15-18 January 1969, COMUSMACV 6 February 1969, CINCPAC 19 February 1969, and the JCS 26 February 1969; the 14th SOWg and other units left Nha Trang and that base was returned to the Vietnamese
NM	nautical mile
no	number
NOA	nonoperational aircraft
NOD	Night observation device; an image intensifier using reflected light from the stars or moonlight to identify targets
NOS	night observation sight
no-show target	A target not showing up on the aircraft's radar
NSC	National Security Council
NVN	North Vietnam
O-2	FAC aircraft; civilian nickname, Skymaster
OV-10	FAC aircraft nicknamed Bronco
OASD	Office of the Assistant Secretary of Defense
OCAMA	Oklahoma City Air Materiel Area
ofc	office
off	officer
offset firing	A firing procedure employing a reference or aiming point other than the actual target

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OMO	Dir/Manpower & Organization, Seventh Air Force
OOAMA	Ogden Air Materiel Area
opl	operational
OPlan	Operations Plan
OpOrd	Operations Order
OPREP	commander's operational reporting system
OPREP's 0-5	Operations Reports: 0 (Consolidation of Target Request); 1 (Daily Submission of Intent to Fly Missions); 2 (Launch Report); 3 (Interim Report of Unusual (Noteworthy) Occurrences); 4 (Comprehensive Mission Accomplishment); 5 (Weekly Summary of Mission Accomplishments)
ops	operations
ord	ordnance
organize	To assign personnel to a unit and make it operational
orgn	organization
OSAF	Office of the Secretary of the Air Force
OSD	Office of the Secretary of Defense
OT&E	operational test and evaluation
out-country	That part of Southeast Asia conflict outside South Vietnam, i. e., Laos and North Vietnam
p	page
PACAF	Pacific Air Forces
PACOM	Pacific Command
PAD	program action directive
para	paragraph
paradrop	Delivery by parachute of personnel or cargo from an aircraft in flight
Parrot's Beak	The tip of the Cambodian salient west of Saigon, South Vietnam
Pathet Lao	A Laotian Communist military force or person
Pathfinder	Two or more aircraft using the lead aircraft's loran for navigation

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Pave Mace                    (S) An offset beacon capability with Black Crow on AC-130A gunships

Pave Phantom  
Pave Sword                    The loran-equipped F-4 aircraft  
The F-4's laser-seeker pod; it detected the laser beam from a gunship's laser target designator (LTD), giving the fighter pilot steering information to the laser cone ("basket") for release of a laser-guided bomb

Pave Way                    (S) The F-4 aircraft using various guidance devices: Pave Way I (laser); Pave Way II (electro-optical); Pave Way III (infrared)

payload                    The sum of the weight of the passengers and cargo that an aircraft can carry

PCS                    permanent change of station  
PE                    program element  
pers                    personnel  
Phantom                    F-4 tactical aircraft  
pickle                    To release a bomb or expend ordnance by depressing a button (pickle)

pintle                    A usually upright pivot pin (as of a hinge or rudder) on which another part turns

pipper                    The center or bead of a gunsight  
Plain Jane                    An unmodified AC-130A gunship  
PMD                    program management directive  
pp                    pages  
pres                    president, presentation  
prgm                    program  
probable                    An almost certainly destroyed aircraft, ship, gun, vehicle, or other object of attack

proj                    project  
Project                    A study of the effects of lunar illumination on combat operations; conducted by the 16th SOSq from 1 February to 31 May 1969  
    Moon Watch

PSAC                    President's Science Advisory Committee  
psych                    psychology

~~SECRET~~

pylon turn	An aircraft turn around an object or reference point on the ground
RAF	Royal Air Force (UK)
R&D	Research and Development
RASS	rapid area supply support
rd	round
RDT&E	research, development, test and evaluation
real time	The absence of delay, except for the time required for the transmission by electromagnetic energy, between the occurrence of an event or reception of the data at some other location
recce	Reconnaissance, to reconnoiter
recip	reciprocating engine aircraft
recon	reconnaissance
Red Horse	Rapid engineering deployment and heavy operational repair squadron, engineering; the Red Horse squadrons handled engineering/ construction projects in Southeast Asia
ref	reference
reg	regulation
rept	report
reticle	A system of lines, dots, crosshairs, or wires in the focus of an optical instrument
RF	radio frequency
RHAW	radar homing and warning
RLAF	Royal Laotian Air Force
RLG	Royal Laotian Government
ROC	required operational capability
ROK	Republic of Korea
Rolling Thunder	Nickname assigned to airstrikes against selected targets and lines of communication in North Vietnam (Mar 1965-Oct 1968)

(This page is Unclassified)

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route packages	(S) Numbered areas (I, II, III, IV, V, VIA, VIB) in North Vietnam, designated by CINCPAC to facilitate assignment of interdiction responsibilities to CINCPACAF, COMSEVENTHFLT, and COMUSMACV, and for other operational purposes, e. g., Rolling Thunder
RP	Route Package
rprr	report
rqmts	requirements
rsch	research
RTAFB	Royal Thai Air Force base
rules of engagement	Directives issued by competent military authority delineating the circumstances under which U.S. forces will begin and/or continue combat engagement with other forces met
RVN	Republic of Vietnam
SUU-11A	Minigun used on the AC-47 gunship
SUU-25/A	A modified LAU-10 "Zuni" rocket launcher; it carried eight Mk-24 flares, two in each of its four tubes
S	Secret
SAAMA	San Antonio Air Materiel Area
SAC	Strategic Air Command
SAF	Secretary of the Air Force
SAM	surface-to-air missile
SAWC	Special Air Warfare Center
SCANA	self-contained all weather/night attack
scenario	An outline plan of the action to be undertaken during a projected exercise or maneuver
sci	science
SCNA	self-contained night attack
SEA	Southeast Asia
SEAOR	Southeast Asia Operational Requirement
sec	section
SECDEF	Secretary of Defense
SECNAV	Secretary of the Navy
2d Lt	Second Lieutenant

~~SECRET~~

secondary electron	Electron emitted as a result of bombardment of a material by electrons or cathode rays, or by collision of a charge particle against a surface
secy	secretary
Sgt	Sergeant
Shadow	Call sign of AC-119G gunship
shadow boxes	A number of specific strike zones designated throughout South Vietnam for AC-119 operations
Shed Light	The overall USAF program to improve night attack/interdiction capability
short rounds	Inadvertent or accidental delivery of ordnance, sometimes resulting in death or injury to friendly forces or noncombatants
SIF/IFF	selective identification feature/identification, friend or foe
single-source contract	A contract let with a single firm without competitive bidding or under circumstances that dictate the contract be given to a single firm
SLAD	sensor and light angle display
slant range	The line-of-sight distance between two points not at the same elevation
SLAR	side-looking airborne radar
SLR	side-looking radar
SN	service number
SO	special order
SOF	special operation force
sortie	One aircraft making one takeoff and landing to conduct the mission for which it was scheduled
SOSq	Special Operations Squadron
SOWg	Special Operations Wing
SP	Security Police
sp	special

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Special Forces	Military personnel with cross-training in basic and specialized military skills, organized into small multiple-purpose detachments with the mission to train, organize, supply, direct, and control indigenous forces in guerrilla warfare and counterinsurgency operations, and to conduct unconventional warfare operations
special operations	Secondary or supporting operations which may be adjuncts to various other operations, and for which no one Service is assigned primary responsibility
special operations forces	USAF forces specifically organized, trained, and equipped to conduct special operations
Spectre	Call sign of AC-130 gunship
Spectre Shuttle	The two-three refuelings of F-4 Phantoms from a KC-135 tanker, required while flying escort for the AC-130 Spectre
Spooky	Call sign of AC-47 gunship
Spooky Count	Running totals kept by the 4th Air Commando Squadron of its successes in defending outposts/hamlets
spt	support
sq	squadron
SSgt	Staff Sergeant
SSIU	slave select interface unit
starlight scope	An image intensifier using reflected light from the stars or moonlight to identify targets
Steel Tiger	<del>(S)</del> The geographic area in Southern Laos designated by Seventh Air Force to facilitate planning and operations; the term also referred to strikes in Southern Laos against personnel and equipment from North Vietnam
stf	staff
Stinger	Call sign of AC-119K gunship
stn	station
STOL	short takeoff and landing

~~SECRET~~

strobe light	A light that produces short intense flashes
subj	subject
subsys	subsystem
sup	supply
Super Chicken	A nickname applied to Surprise Package by some crewmembers
Surprise Package	An enhanced AC-130A gunship aircraft with improved offensive and survival capabilities due to the addition of special ASD equipment; the aircraft became a test bed for improved techniques and equipment
survivability	The probability an aircraft would not be lost if hit
svc	service
SVN	South Vietnam
sys	system
TRIM-7	A (transmit-receive-inverse-modulation) ECM system; simply stated, TRIM-7 gave enemy radar a much-magnified false target signal which the radar would move to--thus leaving the weaker signal of the actual target behind
tac	tactical
TAC	Tactical Air Command
TAC Air	A term used in Southeast Asia to encompass all aircraft sorties other than B-52 and strategic airlift
TACAN	A tactical air navigation system consisting of short-range UHF radio stations; in the form of a readout on the instrument panel the pilot continuously receives accurate distance and bearing information from the particular station tuned
TACC	tactical air control center
TACLO	Tactical Air Command liaison officer

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TACS	tactical aircontrol system
TAGp	Tactical Airlift Group
TAOR	Tactical area of responsibility; a defined area of land for which responsibility is specifically assigned to the commander of the area to control assigned forces and coordinate support
target acquisition	Detection, identification, and location of a target in sufficient detail to permit the effective employment of weapons
TAS	true airspeed
Task Force Alpha (TFA)	(S) A filter point for sensor information received under the Igloo White/Commando Hunt concept; it was organized in 1967 under command of Seventh Air Force at Tan Son Nhut AB, South Vietnam, and deployed to Nakhon Phanom AB, Thailand
TASq	Tactical Airlift Squadron
TASSq	Tactical Air Support Squadron
TAWC	Tactical Air Warfare Center
TAWg	Tactical Airlift Wing
TCGp	Tactical Control Group
TCTO	time compliance technical orders
TDY	temporary duty
tech	technical
telecon	telephone conversation
telemetry	The radio link between an aerospace vehicle and a ground station used to transmit information
TEMIG	(S) A ground-based beacon used in Pave Mace
test bed	A stand at which some mechanism or engine is tested out
Tet	The Lunar New Year holiday observed in Vietnam and other Asian countries; it occurs early in the Julian year

~~SECRET~~

Tet Offensive . A sudden attack by the North Vietnamese and Vietcong in the early hours of 30 January 1968 on Saigon, many other cities and towns, as well as numerous South Vietnamese and American military bases and airfields; it took the U.S. and South Vietnamese forces several weeks to control this offensive

TF task force  
 TFR Terrain-following radar; this radar provides a display of terrain ahead of a low-flying aircraft to permit manual control, or signals for automatic control, to maintain constant altitude above the ground

TFSq tactical fighter squadron  
 TFWg tactical fighter wing  
 through-put Something put through a system; normally applied to movement of supplies and equipment

TIARA Nickname for a chemi-luminescent material which the U.S. Army tested for possible use in bombs or mortar projectiles; when released in the air, TIARA glows rather than flames and gives off little light; since tests proved TIARA undependable, the Army did not put it in bombs or other projectiles

TIC troops-in-contact (with the enemy)  
 Tiger/Tiger Hound (S) Southern Steel Tiger south of 17° north latitude, for FAC employment (1965-1968)

tng training  
 TOT time-over-target  
 Trail Ho Chi Minh Trail  
 transponder Radio transmitter-receiver which transmits identifiable signals automatically when the proper interrogation is received

trnsp transport, transportation  
 Tropic Moon I Night-strike A-1E aircraft using LLLTV and CBU or napalm munitions (1968)

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Tropic Moon II  
Tropic Moon III

Westinghouse LLLTV in the B-57 (1968)  
Follow-on B-57 program for night attacks  
in high-threat areas, forerunner to the B-57G

truck park

A localized area within which trucks were concealed, unloaded, repaired, serviced, and loaded; supplies were stored and personnel obtained food, rest, and medical attention; truck parks were typically located under dense jungle foliage, within villages, or in caves; they were often extensively camouflaged and reveted

TRWg  
TS  
TSgt

Tactical Reconnaissance Wing  
Top Secret  
Technical Sergeant

U  
UE  
UFO  
UHF  
UK  
USA  
USAF  
USAFA  
USAFMPC  
USAFSAWC  
USAFSO  
USAFSOC  
USAFSOF  
USAFSS  
USAF TAWC  
USMC

Unclassified  
unit equipment  
unidentified flying object  
ultra high frequency  
United Kingdom  
United States Army  
United States Air Force  
United States Air Force Academy  
United States Air Force Military Personnel Center  
United States Air Force Special Air Warfare Center  
United States Air Force Southern Command  
United States Air Force Special Operations Center  
United States Air Force Special Operations Force  
United States Air Force Security Service  
United States Air Force Tactical Air Warfare Center  
United States Marine Corps

VC  
VCS  
VHF

Vietnamese Communists  
Vice Chief of Staff  
very high frequency

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vidicon Camera tube in which a charge-density pattern is formed by photoconduction and stored on that surface of the photoconductor which is scanned by an electron beam, usually of low-velocity electrons

VNAF Vietnamese Air Force  
vol volume  
VOR VHF omnirange  
VSSG Vietnam Special Studies Group  
vulnerability The probability an aircraft would be hit when fired upon

walk-in fire adjustment A step-by-step adjustment of fire by the FAC until the gunship had zeroed in on the target

warf warfare  
wet fuel tanks Unprotected fuel tanks in contrast to those which are foam-filled and explosion-proof

wg wing  
Wolf Call sign of the F-4 FAC's of the 8th Tactical Fighter Wing, Ubon RTAFB, Thailand

WPAFB Wright-Patterson AFB  
WRAMA Warner Robins Air Materiel Area

xenon A heavy colorless inert gaseous element used in specialized electric lamps

Z Zulu Time (Greenwich Mean Time)

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