



An Electronic Warfare Tour In Vietnam

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In early 1969 I was a senior lieutenant colonel assigned to the Air Force Systems Command's Space and Missile Organization, SAMSO, in Los Angeles, California. I was a program manager directing the integration of the TITAN III Space Launch Vehicle. My governmental/industrial team had accomplished the effort that successfully placed 34 military satellites into their proper orbits, and we were working on the project to place the two NASA Viking spacecraft onto the surface of Mars with a TITAN IIID. Previous to this assignment, I had spent seven years in the Strategic Air Command (SAC) as a B-36 navigator/bombardier with over 4,000 hours flying time on a bomber crew "fighting" the Cold War.

The war was raging in Vietnam, and I got the news that I was being called back to the cockpit. There was such a critical shortage of air crewmen, they were now calling up lieutenant colonels to fly combat. Since I was a navigator, there were not too many choices: cargo aircraft operating out of Taiwan with an 18-month tour, gunship, psychological warfare, or electronic warfare in C-47s with a one-year tour, or as a "back-seater" weapons officer in an F-4 fighter plane. A fellow officer in the Program Office had just returned from a tour in Vietnam as a navigator on electronic warfare EC-47s. He said it was the best navigator job in Vietnam, as the navigator ran the mission and stateside training was only six weeks. I confirmed this and made that my choice.

I started talking to the navigator assignment officer at Air Force Personnel Headquarters who would be making my assignment. When I told him about my present assignment at SAMSO, he was upset to hear that I had several highly classified security clearances. He said I couldn't be sent to a combat zone for a year after I had been debriefed, which messed up his assignment plans. He negotiated with the SAMSO security people, and it was agreed that if I was debriefed

for the intelligence programs, I could go to Vietnam after six months. That meant I would be in country in October 1969.

We trained in C-47s at England AFB in Alexandria, Louisiana. The training was mostly for the pilots. Because of the highly classified nature of the mission, the aircraft did not have the secret equipment we were to use in Vietnam to locate and identify enemy electronic emitters. The principal navigation device in the Vietnam configuration was a Doppler radar and computer which, when tied to the extremely accurate gyro-stabilized compass and a high-speed printer, would accurately identify your position and provide bearings to the electronic signal you were monitoring. This Doppler system had to be updated to a reference point on the ground below every eight to ten minutes. This reference point was called a "dop-set" point. The navigator selected an accurately surveyed point on his map, such as a crossroad or the point where a bridge crosses a river bank. The navigator would direct the pilot to fly over the point using a drift meter as a bombsight and update the position in the Doppler computer. None of this equipment was available for us to train on at England AFB.



A Douglas EC-47 over Vietnam.



A drift meter was a precise optical device, pointed straight down, which the navigator used to view the path of the aircraft over the ground. The navigator aligned the drift meter with objects on the ground that passed underneath the aircraft and obtained the drift of the aircraft as it flew. The path/course of the aircraft over the ground was not necessarily in the same direction that the aircraft was pointing, due to the wind. The difference in the compass direction that the aircraft was pointing and the direction of the path over the earth is "drift." The only navigation equipment we had on these training C-47s was a standard drift meter used on most transport aircraft. Our aircraft in Vietnam used a more accurate gyro-stabilized drift meter that had a forward-looking capability.

The navigator training in the States was to work with the pilot directing him over a dop-set point with the drift meter. After five or six of these, both the pilot and the navigator had it down pat. That's one hour of training in the air. We did hundreds of them to fill the flying time for the missions we flew in six weeks. The aircraft commanders were mostly senior majors and lieutenant colonels with a lot of time in C-47s. The copilots were second lieutenants right out of flight school. The copilots, for the most part, had only flown jet aircraft that had tricycle landing gear. They had to be taught to fly a 25-year old airplane that had propellers and whose tail "dragged" on the ground.

When I got to my squadron in Vietnam, I learned that the policy was to give the copilots as much experience as possible. The purpose was to train them so they were checked out and flying combat missions as aircraft commanders before they returned to the States. I flew many combat missions with the new aircraft commanders. They were good.

In early September I reported to the embarkation port at Travis AFB, California. I only spent a day or two there while processing and waiting for my flight.

My training wasn't over yet. The first leg of my journey to Vietnam was to Clark Field in the Philippines for three weeks of Jungle Survival School. September is the rainy season there. We had a typhoon blow through while we were there, so they had to cut the training short.

I arrived in Vietnam at Tan Son Nhut Air Base at Saigon in late September 1969 to begin my one-year tour. I was assigned to the 360th Electronic Warfare (EW) Squadron, which was part of the 460th Reconnaissance Wing. Our squadron insignia was a grizzly old tiger piloting a C-47, wearing goggles, helmet, and a white scarf, with the title "Antique Airlines" (to preserve the classification of our mission). While I was there General Abrams, CINC,



Lt Col Cameron with one of his Squadron's EC-47s.

Military Assistance Command, Vietnam, called the electronics products gathered by the EC-47s the most important and useful reconnaissance produced in Vietnam.

Because the 360th Squadron flew a highly classified mission, the officers were quartered in what had been a French officer's barracks. This was in a secure compound surrounded by strings of fences and one guarded entrance, requiring a special badge for access. I was told that a Vietcong rocket had hit the building during the Tet Offensive in February 1968.

While I was there, the Vietcong launched a number of rocket attacks—one or two rockets at a time—but our building was never hit. The rockets usually caused minor damage for they were launching from about ten miles away, and the rockets had no on-board guidance systems.

When I reported in to the squadron, I was told that I would replace the chief navigator who was rotating back to the States in about six weeks. I was assigned to a crew and flew several combat missions to be checked out. My instructor, a major, was a navigator I knew as a lieutenant in my squadron in Puerto Rico. This truly was a navigator's mission—the navigator ran the show. Only a pilot is allowed to be called "aircraft commander," so the powers-to-be designated the navigator as "mission director." The EC-47 crew consisted of pilot, copilot, navigator, and enlisted flight engineer, plus three to four enlisted signal intelligence specialists. After I took over as chief navigator, I told the operations people to schedule me for as many combat missions as the rest of the navigators. I flew over 127.

The navigator station on the aircraft was in what had been



the passenger compartment. It consisted of a large drafting-type table with a stool. The navigator's equipment and instruments were mounted onto the table. The large table afforded the navigator plenty of room to do his plotting.

The EC-47 was loaded with electronic equipment to detect and locate enemy communications. The navigation equipment was built around the Doppler radar and a very high-speed printer that recorded, almost simultaneously, the aircraft heading from a very accurate, gyro-stabilized compass, the read-out of the Doppler computer, and the bearing to the signal being located. This bearing was called a line of position (LOP) to the target signal. The signal intelligence equipment operated by the specialists consisted of stacks of radio receivers to detect the signals. The navigator was continuously in contact with the specialists using a private intercom. The pilots and engineer did not have access to this intercom since they were not cleared for this portion of the mission. There was a door between the pilot's compartment and the rest of the aircraft, and they were not allowed near us when we were working signals. There was also a normal intercom system for the pilots and navigator to communicate with each other.

The signal intelligence technicians were a different breed. We thought of them as "soldiers of fortune." They lived off base and did not communicate very much with us except to do the job. They showed up for the mission, flew it, went to their own debriefing, and left. They were all senior sergeants and had been stationed all over the world. They knew several foreign languages and could decipher the dots and dashes of several languages. They could even identify the signature of different operators by the rhythm of the signals they sent with their keys.

The navigator had to monitor and use four different communication channels at the same time: To the ground Tactical Control Command, which controlled all air operations in our theater; the Army Artillery firing bases, to avoid being hit by one of our own artillery shells when they were firing; the "Guard" channel, which everybody in the air monitored and was used for emergencies or to warn of some hazardous condition; and to the signal of interest the specialists were working. The panel also included the two intercom channels. In the beginning it was very confusing, but in a short period of time I was able to sort it out, and it all started to make sense. The North Vietnamese had employed a very sophisticated radio communication system between their headquarters and all elements of their Army and the Vietcong, throughout South Vietnam. They used "high frequency" (which is really very low frequency) radio signals that can, with very little power, transmit over long distances. They transmitted by dots and dashes signals which contained

their messages. The radio signals we were attempting to find and locate were very low power—only four watts. Their standard radio transmitter was very small. They were human powered by a generator with bicycle pedals pumped by a person lying on his back. The antenna was a wire about 100-feet long that was strung between two trees. These were very mobile and were continually moved.

The EC-47 was configured to pick up these weak signals. There were long metal whip antennas installed vertically near both wing tips and on the fuselage. A weather radar antenna was installed in the nose. This was the most identifiable characteristic of the aircraft—a black nose. They installed bigger engines and larger generators to supply the electricity for all the electronic equipment. The aircraft was required to be able to lose one of the two engines on takeoff and still climb to a safe altitude and land. This limited the fuel supply available to us to reduce the weight at takeoff. As a result all missions were limited to a maximum of seven hours. We had to fly at relatively low altitudes to pick up our signals and at relatively low speeds to conserve our fuel, but still maintain a speed of at least 100 knots to maintain the accuracy of the Doppler system. This put us within the capabilities of small-arms fire from the ground, and we occasionally picked up some holes. Their 37mm anti-aircraft could be devastating.

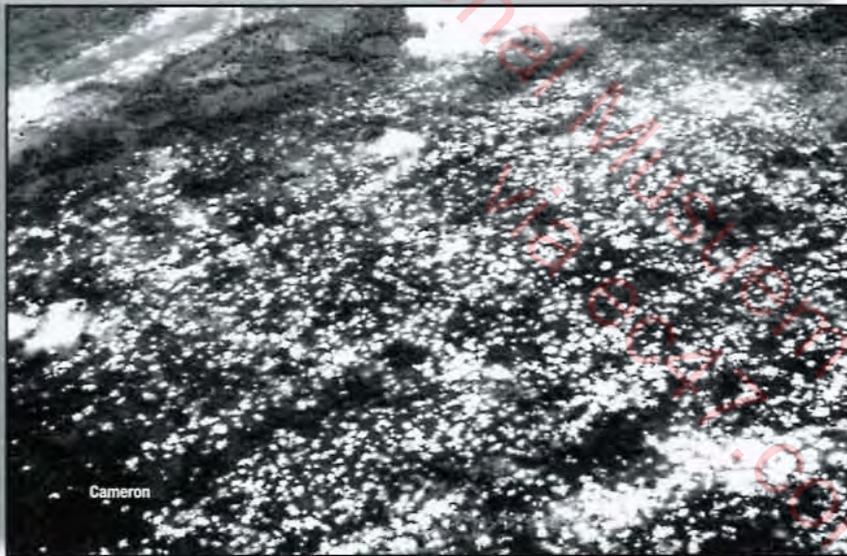
The 360th Squadron patrolled the most southern area of the Vietnam theater, which included the Mekong River Delta area and an area which extended 75 miles north from Saigon. We also operated out of Nakhon Phanom (NKP) Royal Thai AFB. On the other side of the river was Laos and the town of Thahek, not far from the Ho Chi Minh Trail. These areas were broken into patrol areas for reconnaissance. A crew would be assigned an area to patrol and a time to stay on station. The navigator would select several points on the ground that covered the patrol area upon which to dop-set on. When the aircraft arrived on station, we would troll for signals for almost seven hours.

When a signal was detected by a specialist, the navigator would direct the pilot to maneuver the aircraft to locate the source of the signal on the ground. The navigator would plot the LOPs from the computer readout and provide the geographic coordinates of the intersection of these LOPs. It took at least three LOPs 60 degrees apart to pinpoint the location of the emitter. These locations had to be accurate within 200 meters to be useful for the specialists. The specialist would combine the location with the signal properties and the contents of the translated message and report it directly by secure radio to the appropriate intelligence agency. Sometimes all the way back to the National Security Service Agency at Fort Meade, Maryland.



In that way we located the enemy units, their command and control centers, and the traffic they were sending. The powers-to-be would then take the appropriate actions against the targets. Sometimes they would just send an infantry patrol to check it out. Other times they sent a Forward Air Control aircraft, also patrolling in the area, to check it out and bring in air strikes. If it was a high-priority target, they would often hit it with a cell of three or four B-52s (each carrying 108-500 lb bombs) that would carpet bomb the target area. On an average mission we might find six targets; on a really good day, as many as ten or twelve. We received a certain amount of job satisfaction when we picked up a very high priority target, called it in, and saw way up in the sky the contrails of a flight of B-52s at 35,000 feet, on their bomb run to our target.

The 360th Squadron had a detachment at Nakhon Phanom (NKP), Thailand, which was just across the Mekong River from Laos. Laos was a very spooky place. The Ho Chi Minh trail wound through that part of Laos. It was the main supply route from North Vietnam to the south. It was heavily defended by the enemy with anti-aircraft guns and SAMs, which they continually moved around to avoid destruction. Our job was to locate their communication centers, which were usually adjacent to their weapons. To do this we were continually exposed to their ground fire. Our squadron rotated crews and their airplanes from Tan Son Nhut to NKP. NKP was called the worst base in Thailand, but the best base in Vietnam. I flew a number of missions out of NKP. It was very quiet and peaceful and quite comfortable; however, working the Ho Chi Minh trail could be a bit exciting.



The results of a B-52 Strike. Each white dot is a bomb crater.

The powers-to-be decided that the only way we were going to win this war was for the South Vietnamese to do more of the fighting. As a result they started to train the South Vietnamese Air Force to take a more active role in missions the U.S. had been flying, including ours. We didn't feel comfortable with that, knowing that you never knew who to trust amongst the Vietnamese, and our mission and equipment were so highly classified. They started to turn over our aircraft to them for training. The result was that they were going to shorten our tours. Instead of leaving in October, I would be leaving in August 1970, but that's another story. 🇺🇸

The night missions were the most difficult because of the darkness, but that could be the time when there was the most radio activity. We usually used lighted objects on the ground that we could see through our drift meters for our dop-set points. Many of the road intersections were lighted, and many of the bridges had lights underneath their spans to light up the river below and detect any traffic passing underneath or someone putting explosives in place to blow it up. These made excellent dop-set points.

I remember one night we were flying over a rather desolate area, and I only had one lit bridge to use. I made several runs on the bridge over the course of the patrol and then noticed, if I expanded my field of view, I could see flashes of lights. They were shooting at us! We chose another area to work. Later in my assignment, they installed drift meters with "starlight amplification" and we could see the ground just as well at night as during the day.

Col Robert M. Cameron, USAF (Ret) flew over 127 missions in Vietnam. He experienced a diversified Air Force career as a SAC navigator/bombardier, a manager of missile and space development programs, and as deputy commander of a SAC refueling wing. He retired from the Air Force as the Deputy Director of Space at Hq USAF in 1977 to accept a management position in the Boeing Aerospace Co. He resides in Redmond, Washington.

