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Nha Trang Air Base, South Vietnam

Capt. Miller 1967

THE AIRCRAFT & THE MISSION

The Million Dollar Gooney Bird — Project Phyllis Ann

Aircraft # 37; Tail number 00665

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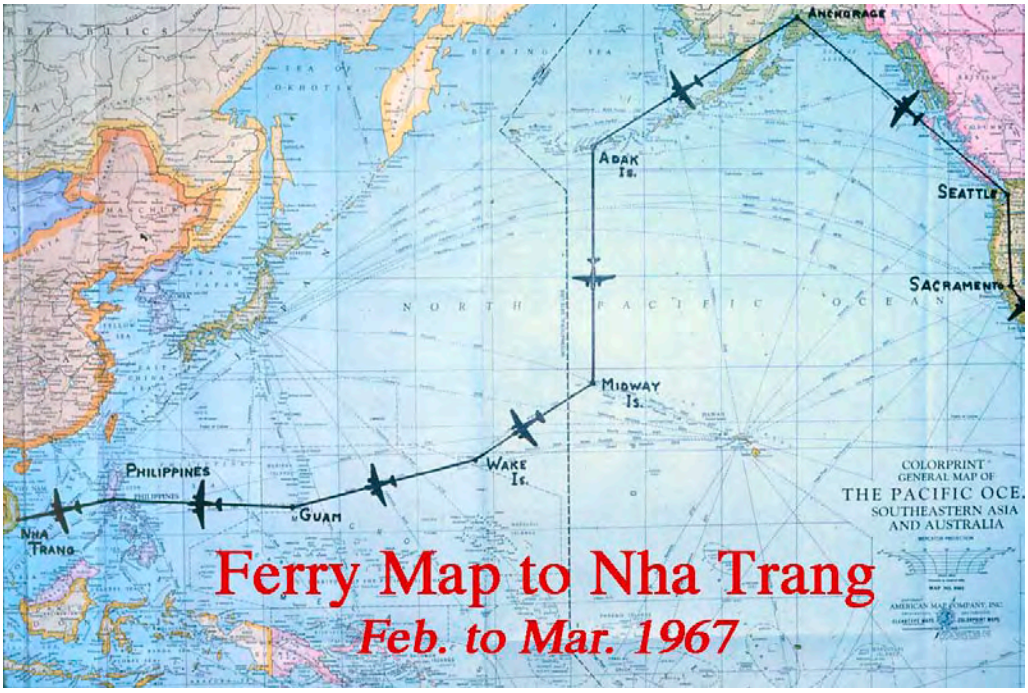
THE FERRY FLIGHT

I arrived in “beautiful Nha Trang” on 12 March, 1967 after ferrying one of the “new” Phyllis Ann EC-47Ns, tail number 00665, from New Hampshire. We departed on the ferry flight from the eastern U.S. seaboard (Grenier Field, Manchester, N.H.) on 19 February 1967 with an undetermined destination in Vietnam. Our itinerary was to take us across the U.S. *on a route of our own choosing* to McChord AFB near Seattle, Washington. Our only route criteria were that we must land only at military facilities where we could obtain mandatory round-the-clock security for the Top Secret "Phyllis Ann" aircraft. From McChord AFB we were to proceed north to Elmendorf AFB, (Anchorage) Alaska. From there we continued southwest down the Aleutian Islands for about 1000 n.m. (1 nautical mile = 1.15 statute miles) to a US Naval Air Station at Adak Island, navigating over the frigid Bering Sea. Then our route took us 1400 n.m. south to Midway Island Naval Air Station followed by island hopping through Wake Island AFB, Andersen AFB on Guam, Clark AFB in the Philippines and into Vietnam. There were several other aircraft that left on the same route in the days just preceding and following us, so we would have familiar faces along the way. We passed some of these aircraft, as they delayed at different stops for mechanical problems. Others "leap-frogged" us as we made our required fuel and maintenance stops on our way across the Pacific. (See Map below).



The aircraft, prior to the ferry flight, had been stripped of the classified Phyllis Ann ARDF electronics equipment and antennas, which were shipped separately to the end destination. Yet the ferry mission was still classified as TOP SECRET and this required that we arrange for a security point- guard to provide 24-hour controlled access to the gutted aircraft at all stops enroute (though all were U.S. military bases). Amazingly, once we arrived at Nha Trang and the aircraft were re-equipped with all their mission equipment, the planes were parked in the open, with doors and access unguarded and unlocked on a darkened flightline on a VNAF airfield that employed hundreds of local Vietnamese to provide all manner of services on the base and flightline.

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EC-47 Inflight Electrical Fire & System Failure!

Our first bit of excitement on the trip occurred after we departed Elmendorf AFB, Alaska for Adak Island, a US Naval Air Base of WWII vintage near the western end of the Aleutian Island chain. The weather on departure from Elmendorf was typical for February with sub-zero temperatures, scattered-to-broken clouds with bases at about 3000 ft and tops about 7000 ft. We had filed IFR (instrument flight rules) at 8000 ft. and were initially on top in clear sunny skies with a broken-to-solid undercast below our altitude. The mission had a flight plan duration of slightly over nine hours against a prevailing headwind and a planned arrival after dark in the short arctic days of late February. Arrival weather was forecast to also be typical arctic island conditions with ceilings and visibility near IFR minimums (500 foot ceilings and visibility of 1/2 mile) in blowing snow and winter sea fog. The runways at Adak lay near sea level in a valley surrounded by mountainous foothills to elevations of about 1500 feet, which when combined with variable ocean winds caused turbulence, cross winds and difficult radar approaches.

It was my leg to fly the left seat. About five hours out of Elmendorf, I was hand-flying (no auto-pilot in these aircraft) from the left seat, and I detected an odor resembling burning cellophane. I asked my acting co-pilot, Maj. Chuck Foreman, who had been smoking, if he had inadvertently set some cigarette pack materials on fire in his ashtray. He checked and replied, "No". I turned and glanced over my right shoulder into the aft of the aircraft to discover the aft portion of the cabin rapidly filling with smoke. Out of the corner of my eye, a red light caught my attention in the center of the electrical service panel, which was on the bulkhead just behind the cockpit emergency exit door, about 24 inches behind the main bulkhead that separated the pilot's seats from the aft cabin and radio equipment racks. A closer look revealed that this light was labeled "A.C. Inverter Failure".

With what seemed in retrospect like an impossible contortion, I managed to reach around my seat back and associated bulkhead, and flipped the A.C. Main Inverter switch to "Off". With that action, I suddenly found myself with all the gyro instruments showing "Off Flags", my electrical compass system disabled, all navigation equipment off-line, and all but our limited range primary UHF transceiver disabled. As described in the "The Million Dollar Gooney Bird — Project Phyllis Ann" section above, the EC-47 was an all-electric instrumented aircraft — all the vacuum systems and gyros had been deleted and replaced with sophisticated (for that period) A.C. electrically powered equipment.

In the meantime, our Flight Mechanic, SSgt. Jim Gavin, and 3rd Pilot, Lt. Dave Dollahite had been sleeping in the front of the cabin, while the Navigator, Lt. John Hansen was engrossed in his nav charts. With the thickening smoke, Sgt. Gavin donned the smoke mask and hustled aft to the latrine in the tail, with fire extinguisher in hand, where the inverters were located. The fire was quickly extinguished with the inverter turned off, but it took over 30 minutes for the smoke to clear completely so he could make an initial assessment of fire and wiring damage. The source of the fire proved to be the D.C. motor on the main inverter, which had apparently overheated and burst into flames, even though it was still successfully driving its integrated A.C. alternator. Adding to our concern, however, was the fact that the system design engineers had equipped the aircraft with an "Alternate Inverter" of matching size and specification as the "Main Inverter", but had mounted it immediately above the Main Inverter and had used a common electrical bus (wiring) forward to the Electrical Service Panel, behind the cockpit. This raised the potential that the Alternate Inverter, the bus control relay and/or the common bus cable might have been damaged by the flames and high temperatures caused by the fire in the lower-mounted Main Inverter.

For the next half-hour, we were obligated to maintain heading and attitude with "needle, ball, and airspeed" aided by the oil-filled magnetic "whiskey compass" and outside visual reference, while contemplating our possible options. We had already passed the "point of no return" fuel state for returning to Elmendorf. The thought of having to make a "no-gyro" approach into Adak's

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hilly terrain at night, in IFR minimum conditions and in turbulence didn't sound too inviting, but the thought of possibly ditching into the Bering Sea in the middle of February with limited arctic survival equipment and no radio contact was even less enticing to contemplate.

After the seeming interminable half-hour passed and the damage assessment was completed, Sgt. Gavin suggested that we attempt to activate the Alternate Inverter to see if it would pick up the load. Fortunately, it came on line and worked fine for the duration of the flight, making the approach and landing at Adak NAS a routine operation.

Ferry Crew
SSgt Jim Gavin, Flt. Mech.; Lt John Hansen, Nav.; Lt. Dave Dollahite. CoPilot
Capt. Chuck Miller, 1st Pilot (Maj. Chuck Foreman, A/C, taking photo)

Dead Reckoning in the Soup Over the Pacific!

Our ferry flight saga continued after a 5-day lay-over at Adak Naval Air Station awaiting a replacement inverter from the mainland. Our next leg was to be from Adak straight south for approximately 1400 n.m. to a tiny little rock in the middle of the Pacific called Midway Island. This would be a true challenge for our newly graduated navigator, Lt. Hanson and was the longest leg of our journey.

The sophisticated navigational equipment on our bird left much to be desired. We had established on the six previous legs that the new compass system was highly accurate; that was a plus. But the Doppler navigation system proved to be intermittent and unreliable (apparent cold solder connections in the cabling), and the LORAN-C was inoperative (due to lack of 3-phase electrical power from the inverters). This left us with three remaining systems of navigational back-up devices to aid the Navigator with his dead reckoning (DR) which was based solely on the accuracy of the forecast winds over the route. The first, and primary aid was the hand aimed sextant mounted in the overhead dome of the cabin which required visual sighting of celestial bodies for calculation of position. The second was "pressure pattern" navigation, which made use of the gyro stabilized drift meter, which required visual conditions to the surface below the aircraft.

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The final tool was the ADF (low frequency airborne direction finding equipment) which was notoriously inaccurate until you got within 50 miles or so of the AM station or beacon and which was virtually useless if there were electrical storms in the area — something fairly common in the mid-Pacific tropics.

Our Command Headquarters was pressuring us to depart ASAP from Adak and continue our journey to Vietnam where the Phyllis Ann aircraft were urgently needed. After four days we finally received our replacement inverter, but the departure weather was below minimums and we were delayed another day. Finally, the weather improved marginally for departure and we were off on our journey. We departed in conditions that normally would never have been approved. The takeoff conditions were such that had we encountered an emergency immediately after take-off we would have had weather conditions that were below approach minimums and we would have had nowhere else to go — an accident looking for a place to happen! Once airborne, we tried several altitudes, but were not able to find an opening out of the clouds, either above or below our cruise altitude. This eliminated the opportunity to use either celestial or pressure pattern navigation. The Doppler was never on-line long enough at departure to fix our departure position, and once the "set point" was lost the Doppler system would never be of any use unless we found another visual set point along the way over open ocean. As for the ADF, we were over 1200 miles from being able to anticipate acceptable signal reception from the Midway radio beacon (normally receivable at only about 200 n.m., at our 8000 foot altitude).

Our aircraft commander, Major Chuck Foreman, fortunately, was a seasoned overwater pilot, and he gave our Nav one of the best pieces of overwater dead reckoning advice I ever heard. He said, "Whatever you do, DO NOT navigate directly to Midway, but rather aim for a point abeam of Midway, but about 50 n.m. up-wind of the fix". That way — if we never get a positive ADF or radar pick-up — when your DR estimated time enroute (ETE) runs out and should there be no fix in sight, you will at least have a good idea which way to turn to try and find the island".

The flight took over twelve hours, of which over seven hours were "in the soup". But again we obviously had a higher force watching over us and we were able to pick up the Midway ADF beacon over 450 miles out — though at that range it was varying plus or minus 15 degrees off of the nose. By the time we reached Midway, the weather had turned to routine tropical VFR conditions with scattered-to-broken clouds ranging up to about 6000 ft. And with scattered low clouds below us casting shadows on the water, we had a bit of difficulty defining what was shadow and what was landfall. Boy was that little rock in the middle of a huge ocean a welcome sight!

Midway Atoll (Sand Island) on left; abandoned Eastern Island 1.5 miles on right.

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Midway (Sand) Island, circa 1967

We spent three days at Midway waiting for adverse headwinds to die off. It was a small island — so small that one could walk around the entire perimeter in about 4 hours. It housed maybe 300 Navy personnel who maintained and operated the airfield, the seaport and the communications facilities there. It had two main attractions.

Midway was a major battle site during World War II. And here, twenty-five years later, it was still strewn with the wreckage and debris from the battle with the Japanese. Military truck axles, wrecked aircraft engines and fuselages, and other identifiable derelicts were still lying in the surf just off the runway where they had been bulldozed during the conflict. Beaches still had fortifications, pillboxes, and naval cannon emplacements scattered around the perimeter. There was the hulk of a grounded transport ship rusting on the reef about half a mile off shore. It was like stepping back into history and hearing the sounds of the attacks, and fighting. And the base itself was marked with many Naval monuments — artillery pieces, white-painted anchors, and memorial plaques and markers.

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WWII Debris in surf
(Note derelict radial engine in center)

WWII Battle Monuments

Secondly, Midway Island is the only breeding ground in the world for the Albatross, a huge sea-bird with a 6-foot wingspan that glides over the mid-Pacific seemingly for miles without ever flapping its wings. This bird was affectionately referred to as the Gooney Bird – the namesake of our C-47 – based upon its less-than graceful antics when landing on hard surfaces. The Albatross breeds once every two years, at which time it comes to Midway to lay its eggs and hatch its young. The rest of the time it spends at sea. When it returns to land and glides in for a landing on terra firma, it touches down as if at sea and then tumbles head over heels for several flips. Then when it decides to return to flight, it will head into the wind and run as hard as it can while flapping its huge wings. When it thinks it has enough lift, after running for ten feet or more, it will "retract its landing gear". If the lift is insufficient, it will either crumple and role like a big ball, or it will lower its feet and run a little faster to get to flying speed. It is hilarious to watch.

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Gooney Bird" trying to get airborne

When we were at Midway, the island was covered everywhere with Gooney Birds and hatchlings. There was a nest nearly every five feet of open ground and it sounded like we were in a huge birdcage. Dave Dollahite and I photographed the Gooney's take-offs and landings, their ritual mating dances and their hatchlings. We observed the beautiful markings of the Gooneys, resembling their smaller gray and white seagull cousins. And we observed their much less friendly black species on the less inhabited side of the island.

"Gooney Bird" Mating Dance

On To Wake Island

From Midway we had an uneventful flight to Wake Island. Wake is a tropical coral atoll about 10 miles in diameter in the Pacific 1,030 n.m. west southwest of Midway. Only the outer rim of the atoll is above the sea. When we arrived, it seemed that more than half of the wishbone shaped island was covered by the 10,000 foot runway, and the majority of the rest was covered with a huge tidal lagoon. Wake, too, had been a major battle site of World War II, but had none of the visible remnants of Midway, except for a few battle monuments. At this time it consisted of a small contingent of maybe 100 personnel, most of which were civilian government communications and FAA employees with a handful of military support people.

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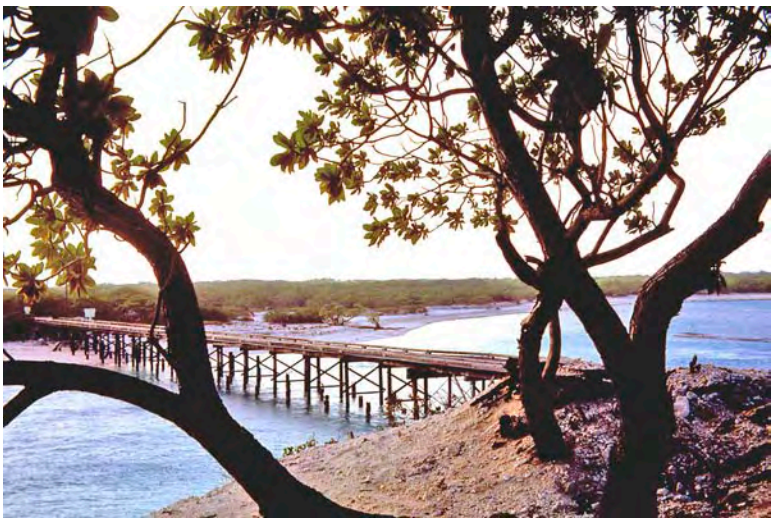
Approach to Wake Island
(Runway left of center)

Most notable about the island was that it was bounded by a coral reef that formed a barrier to the large tidal lagoon that separated the runway leg of the "wishbone" from the area where our temporary quarters were. There was a small wooden Officer's Club on the beach of Peale Island (right-center above) of the lagoon that overlooked a stilt bridge that crossed over to the lower leg of the wishbone. *As I swam in the lagoon with my borrowed snorkel mask and swim fins, I swam near the bridge pilings and observed the jagged rusted steel stilts from the original bridge that had spanned this causeway during the war. These jagged out-croppings were extending about three feet above and below the water's surface and were aligned with the new cement pilings of the existing bridge. Suddenly, I was caught by the tidal current and was swept out of the lagoon toward the open sea.*



Stilt Bridge to the Left of the O'Club

I realized that my main concern was to avoid being raked over the rusty jagged stumps and to ride it out until the channel widened to a point where the current would become lighter and I could swim to shore.

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O'Club on Peale Island (2nd building from right) and Beach

Later, Dave and I were exploring on the beaches with our cameras, and we noted that there were some stone fortifications on the opposite side of the bridge. We thought there might be some historic sites to view so we hiked down to the beach to look at the stone walls.

Wake WWII Fortifications

Then we climbed the walls and crossed into the dense tropical foliage. As we wandered deeper into the woods (knowing that they couldn't be more than half a mile across) we came upon some ruins of old barracks. The only thing remaining were the block foundations outlining the buildings, an occasional toilet bowl, or a latrine sink. The jungle had grown up into mature trees right where a cement staircase had once been constructed. It was amazing to see how completely the tropical growth had reclaimed the site of the battle in slightly over 20 years. As we continued to probe deeper, we came onto the road, which led to the active Radio Communications facility, and walked the road back toward the main base and runway. As we walked along the road, we were startled to see the numerous "Off Limits" signs surrounding the area we had just explored, cautioning of "Unexploded Ordinance" in that area!

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On To Guam

After two days at Wake, we proceeded westbound for 1300 n.m. to the island of Guam and landed at Andersen AFB. Guam is a U.S. protectorate (much like Puerto Rico and the Philippines). The island of Guam was large compared to our other two island stops and had two major US airfields on it. The island stood tall out of the surrounding waters with the end of the runway at Andersen AFB being on a cliff three hundred feet above sea level. Several thousand natives, large civilian communities, and U.S. personnel inhabited the island of Guam. Andersen AFB was a huge SAC base from which the majority of the B-52 fleet launched their bombing raids over Vietnam. While crew-resting at Andersen, we received a guided tour of the B-52 area, the bomb dumps and the loading areas. It was amazing to see the acres and acres of land covered with stacks of thousands of 500 pound bombs awaiting their loading onto the B-52s for the regular "Arc Light" formations to Vietnam over 2000 miles to the west. *It was often joked that with only a few more B-52s on the island that Guam would sink into the sea.*

Twelve B-52Ds on Guam (25% of the total)

500-Pound Bomb Storage (for the B-52s)

To The Philippines and Nha Trang

After our short stay in Guam, we made our second-longest leg (1380 n.m.) west into Clark AFB in the Philippines. The flying was in clear skies over tropical waters with visibilities for as far as the eye could see. The route was spotted with small white cotton-puff clouds below us that cast

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dark shadows on the waters below. There were numerous tiny uninhabited islands along our route and we never felt really very far out of sight of land — unlike the long flight from Adak to Midway — but often we couldn't be sure if we saw islands or just cloud shadows on the surface. We were amazed when arriving at Clark to see the ramp crowded with military aircraft of all kinds.

F-100s on Clark Ramp

This was the main launch and recovery point for numerous cargo and fighter aircraft involved in the war in Vietnam. Upon arrival, we received notification that our next stop was to be Nha Trang on the eastern coast of Vietnam, some 700 n.m. distant from Clark AFB and the final destination of our journey. We later discovered that we were initially destined for Plieku AB in the northern highlands, but had been diverted enroute to replace an EC-47 (See Tide 86 at <www.ec47.com>) from Nha Trang that had just been confirmed as a combat loss while we were at Clark. We spent three days at Clark enjoying the tropical environment, the Philippine people with their talent for mimicking popular American music, and the wood carving souvenirs that proliferated there. Knowing that the "war zone" was our next stop, we were not all too anxious to make that final leg into the unknown hazards of combat operations. Finally, 28 days after we departed McChord AFB near Seattle, we began our last leg into Nha Trang for a total distance of nearly 8,200 n.m. from McChord AFB, WA. — approximately 11,500 n.m. from Grenier Field, NH.

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THE BASE AT NHA TRANG
and the Impressions of War

Approaching Nha Trang (in the hazy valley ahead) from overwater (Hon Tre Island on the right)

Around to the opposite runway (Hon Tre Island and the City to the left)

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On the ramp in front of the Control Tower

Rules of Engagement (ROE)

The Vietnam War became identified as a politically micro-managed “fiasco” that was controlled by politicians who had no idea about how to win a war, and who were unconcerned about ROE that would tie the military’s hands so they couldn’t win it either. You have no doubt heard many reports of some of the rules and regulations we had to operate under. Here are some more that you may find unbelievable, but nevertheless they are true.

• Before any artillery or airstrike bombardment could be carried out, the "rules of engagement" required that the local village chief approve the action. (Was he friend, or foe? No-one knew for sure). Once his approval was obtained it was then necessary for the “psy-op” birds to fly over the location and either drop leaflets and/or broadcast a loudspeaker message announcing that the location had been determined to be harboring enemy VC or NVA, and that a bombardment was scheduled for a specific time. The inhabitants were then informed that, if they were not part of the enemy force, they should leave before the bombardment began! (Who do you think left??)

• During the build-up to the 1968 Tet invasion by the enemy, there was a clamp-down made by senior U.S. Commanders to restrict the availability of side-arms and small arms by U.S. Forces living off base. At that time about 50% of the U.S. military personnel at Nha Trang lived in town in villas rented from VNAF officers. An official policy statement was made by the Base and Wing Commanders that no personal small arms were to leave the base. Then as the Congressional Inquiries and complaints began to increase, the policy was revised to state that only the most senior officer or NCO in any given villa was permitted to carry a side arm off base and he was not permitted to pass it down to the next most senior, or to leave it off base when he returned to base. The stated rationale for the restriction was that our Politically Correct infected leaders feared that a trigger happy off-base resident might accidentally shoot a non-hostile native and cause an incident.

• Aircrew members were provisioned with either personal handguns or M-16s to be carried aboard the aircraft during missions for personal survival protection. During this Tet invasion clampdown on weapons, it was decreed that the weapons would not be retained by the aircrew members, but would be stored on a locked metal chest bolted inside the aircraft. Weapons loading rules required that weapons must be loaded only at sand filled barrels that were designated for this purpose and which were located away from the aircraft on the edge of the ramp near the squadron

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buildings, and control tower. This would necessitate that the crew go to the aircraft, unlock the storage box, retrieve their weapons, return to the squadron area to load them and then return to the aircraft again in time for the required preflight and take-off. The logistics of transportation and time required between mission briefings and engine start caused by this policy became impossible. The reply from Headquarters was a statement that no ammunition would be issued for the weapons, since if the aircraft went down and crewmembers were to use their weapons against the enemy it would only make them mad and the crewmembers would more likely perish at the enemy's hands. Instead the sole purpose of the weapons was to be used as barter for assistance in returning to friendly hands!

This was a war full of frustrations and ridiculous rules you wanted to forget! But the people and the experiences were to be long remembered.

An Impression of the Environment—

The Base …

For a combat zone, the Base at Nha Trang was modern, attractive and comfortable. The Base was actually owned by the South Vietnamese Air Force (VNAF), which turned over its use and development to the US. It was the headquarters location for the U.S. Army's Fifth Special Forces (Green Berets), and the 14th Air Commando Wing, which shared the facilities with many other "tenant" organizations such as ours, the 361st TEWS. Many new facilities and structures had been built and were ongoing during my tour.

The 361st Squadron Building was located right on the edge of the flight line. It was functional, but certainly not fancy, nor air-conditioned.

361st TEWS (Tactical Electronic Warfare Squadron) Building

The City …

A large percentage of the USAF people lived in Nha Trang city in Vietnamese villas that were rented to them by the VNAF officers who possessed them as part of the benefits of their military service. They would be rented, by the room, typically somewhere between $40 and $80 a month, per person, depending on their size, newness, and the number of bedrooms available.

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Giant five story Buddha Monument on mountain in center of Nha Trang city

The Nha Trang Beach (looking south)

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NhaTrang River Harbor

The on-base barracks for the majority of the troops were two-story concrete open-bay structures…

On-Base Officers Quarters (BOQ)

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with a common center-of-the-floor eight man latrine and washing/shower area. The open bay sleeping areas were partitioned off into small cubicles, with free-standing 6 foot plywood screens, painted a light celery green. Each cubicle contained bunks for two to four individuals, a metal locker for each occupant and a shared desk and chair.

My first Cubicle in the BOQ

Since the climate was temperate year round — a cold overnight temperature being in the upper fifties to low sixties and a hot day being in the low nineties, with lots of tropical humidity — there was no glass in the large windows. Instead they were screened and covered on the outside for privacy and shade with bamboo slatted roll-ups. This provided lots of cross ventilation, and most cubicles were provided with a ceiling fan and most bunks were generally draped with mosquito netting.

Two Views of My senior Second Shared Cubicle

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My Tape Deck Cabinet with Headset and Locking Door (a converted shipping crate)

Community, Advanced Security Bunker

The base also sported a new Chapel, an Officer's Club, an Open-Air Theater, a Base Exchange compound including cafeteria, an NCO Club, and other standard base amenities.

Chapel

O'Club

The balmy climate, plush tropical plants and white sandy beaches clustered around Vietnamese villas, and overshadowed by a 5-story Buddha on a hilltop in the middle of town made Nha Trang a beautiful resort-like locale when seen in photographs. It was reported to be an R&R (rest and recuperation) site for “Charlie” (the nickname for the Viet Cong enemy), and referred to as the “Riviera of Southeast Asia”. I’m sure in any event, that "Charlie" extracted a fair amount of “taxes” from the locals to clandestinely support their operations. However the true reality of Nha Trang’s beauty included dust from the vehicle traffic over sandy streets, the smell of rotting tropical vegetation, garbage and open sewers, the on-base round-the-clock din of the many diesel-powered generators, random firing of the 5th Special Forces mortars and 105 mm Howitzers, and continuous round-the-clock roar of aircraft operations.

The water on base was so heavily chlorinated for protection from microbes that it was unpalatable unless chilled to near freezing and doctored with instant ice tea or powdered fruit drink (Tang). Laundry left in the tap water would be bleached almost immediately as though soaked in straight Clorox. And “Happiness is a dry fart” was the slogan of many a soldier or airman. In town it was not unusual at the fisherman’s wharf to see Mama-san at the foot of the concrete steps

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leading into the water cleaning a fresh caught fish while Kiddy-san was seen at the bottom of the opposite steps skinny-dipping and defecating or urinating into the same water.

During the early spring monsoon season, when the wind pattern reversed and came out of the east — on-shore — the beaches were closed due to all the sewage and garbage that was blown back on shore from the two rivers that surrounded Nha Trang and dumped into the sea.

A real treat was to receive a “CARE” package from home containing a bottle of my favorite salad dressing to substitute for the never ending supply of French dressing (made from equal parts of ketchup and mayonnaise) at the O'Club, and some home baked cookies, letters and audio-tapes, and photos.

Mortar Attacks and Friendly Fire!

The city of Nha Trang and its surroundings really were quite lush and tropical with white sand beaches worthy “to write home about”, and except for the smell of decaying vegetation and open sewers, it really was a beautiful location. For the first several months of 1967, we were all lulled into a feeling of complacency regarding our safety from the enemy while on the ground. However, this solitude from war was not to last.

The Base Commander was obsessed with winning the "Most Beautiful Base" award and concentrated the resources and local manpower on building white picket fences around the barracks and clubs while the warehouses held the unused materials for the revetments that were supposed to be constructed to protect the hundreds of aircraft on the ramp. Several valuable special mission aircraft were lost to mortar fire before this priority was reversed and the flightline revetment construction was initiated.

When the base perimeter would come under small arms attack, there was a surreal air about the place. Military members, clad in their off-duty shorts, T-shirts, and sandals would clamor up onto the roof-tops over the concrete stairs of the barracks and seek a location where they could watch the action, with little concern for their own personal safety.

After about August of that year (1967) we began to come under mortar barrage from the VC exactly once a month, and always at about fifteen minutes after midnight, as though “Charlie” was waiting for the Armed Forces Radio and TV station to sign-off the air first. For the most part, “Charlie’s” aim was lousy and very little damage was done, other than to our sense of security. Although one night they succeeded in making a direct hit on a “black” special mission C-130 on the ramp, reducing it to smoldering ashes. And several times we found shrapnel damage and unexploded dud mortar rounds in the revetments with our EC-47s.

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Mortared Special Ops C-130

Nha Trang was also the home of the 5th Special Forces (Green Berets) and was protected by several batteries of 105 mm Howitzers that were integrated with one of the first counter-mortar radar systems in-country. With this system, the Howitzers could return very accurate and deadly fire on a mortar tube within a reported one minute of the first round hitting the ground. As a result "Charlie" soon learned that all he could get off would be about three rounds per tube before the tube was obliterated with 105 mm counter-fire. So we seldom got more than about 27 to 30 mortar rounds (from a barrage out of 9 or 10 mortar tubes). So within 30 minutes of the initiation of an attack, we would generally receive the "all-clear" and we could return from the bunkers to our barracks for the rest of the night (and the next 30 days).

During the TET invasion of Feb 1968 however the hostilities were getting a lot closer to home and the city of Nha Trang was attacked and partially overrun by VC and NVA. The tension on base was thick enough to cut with a knife and many of the military that lived in town were now temporarily staying on base.

True to the pattern, but about 2:00 AM (rather than midnight), the sound of incoming rounds was heard followed by the warning sirens and small arms fire. We all headed for the bunkers between the barracks and listened as the barrage continued and became more intense. Unlike our previous experience, the incoming rounds did not stop after the first several minutes, but continued unabated for well over 30 minutes. Rumors were rampant that the base must be under threat of being overrun and we felt like "sitting ducks" un-armed in the bunkers. The sound of the incoming rounds was getting closer and ever more frightening.

Then, still in the midst of the sound of incoming shells, a runner arrived at our bunker proclaiming that it was "all clear" and only a false alarm. It seems that apparently with the usual communications confusion, the US Navy had a "friendly" Cruiser in the bay that was shelling enemy positions around the opposite perimeter of the base and that is what we were experiencing.

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Hit the Silk

As the end of 1967 drew near, it became widely known by Intelligence that the jungle-covered mountain just to the south of Nha Trang was infested with VC. That was where most of the nighttime mortar attacks originated, as well as some from Hon Tre Island in the bay alongside the final approach to the westbound runway. As hostilities escalated, the “friendlies” decided it might be prudent to keep the mountainside illuminated at night to help the friendly patrols and to force Charlie to "keep his head down".

Trying to sleep under the constant yet random report of the friendly Howitzers and mortars firing magnesium parachute flares all night became quite a challenge, but it was a small price to pay for the extra security from mortar attack.

It was amazing to look up into the mountainside in the morning to see it polka-dotted with parachute canopies from the flares of the previous night. It was equally fascinating to notice that by mid-day the majority of the parachute silk had disappeared.

Obviously, some enterprising Howitzer commander realized that Charlie was enjoying the spoils of hundreds or thousands of yards of nylon parachute material each day and decided to put an end to these donations to the enemy. At first light, this Howitzer unit commander had ordered his men to zero in on selected canopies lying in the tree tops and to monitor them continuously with binoculars. When the canopy was seen to disappear, there was a fire command given and a 105 mm shell followed the canopy out of the treetops. After a few days of this counter-offensive action, Charlie lost interest in salvaging parachute flare canopies!

ROUTINE OPERATIONS

Daily Operations

Our routine for the one-year tour was pretty predictable. Each crew flew approximately every other day, week after week. Some missions were flown during daylight hours and some after dark. So you might fly anytime of the day to provide the higher-headquarters-directed area coverage. The mission configured EC-47 carried the standard wing fuel loading of 800 gallons spread among four tanks. The typical fuel consumption at cruise was approximately 100 gallons per hour, so allowing for takeoff and climb, the aircraft endurance to dry tanks was about 7 hours and 40 minutes. Most missions were flown for 7 hours total plus or minus 15 minutes. So a typical crewmember’s flying schedule, minus down time for medical reasons, R&R and other special activities added up to over 1000 hours for the year for most people. On off-days one might pull “duty crew” (flight related administrative and supervisory duties), or additional duties around the Squadron, or just have personal time off to explore the city, work on hobbies (photography, audio taping music at the tape club, working in the shops) writing home, sunning on the beautiful beaches, or just loafing. I also volunteered for additional duty as Squadron Flying Safety Officer, since I had served in that capacity at O'Hare in my previous assignment, and knew the ropes.

About the middle of my tour in 1967, the first round of crews — those that had been the initial group in-country with the EC-47, and who had formed the Nha Trang 361st TEWS (Tactical Electronic Warfare Squadron) as a split off from the 360th TEWS in Saigon — had completed their one-year tour and rotated stateside. The replacements were drawn from the corps of senior Reserve officers and desk pilots who had previous C-47 time. We ended up with a large percentage of Lt. Colonels and senior Majors as pilots and co-pilots. Now this made life difficult for these senior officers, particularly those who were hoping to continue upward progression in their careers. How could anyone justify a high rated OER (Officer Effectiveness Report) necessary for highly competitive promotion slots when all they could site was Pilot or, worse yet, Co-Pilot in a C-47.

This dilemma gave rise to some real gamesmanship. The new Operations Officer (second most senior officer in the squadron, one of only a few Bird-Colonels) established a questionable policy

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that OER ratings would hinge around an aircraft commander's performance in maximizing "inflight time on station" plus meeting scheduled take-off times. Those that took off early and flew the longest would be ranked high. Those that took off on schedule and flew the "frag order" duration would be considered average. Those that were late to take off and early to return would be rated below average. This gave rise to aircraft commanders who would put pressure on their crews to hustle and take off five or ten minutes early and then to fly the aircraft down to fuel states that were below safe reserves should weather or runway delays occur.

Other of these senior pilots would generate make-work positions for themselves with grandiose titles as additional duties and get all absorbed in getting assigned a personal "brick" — a two way hand held radio — so they could appear to have some urgent responsibility or authority.

Hard Bounce Landing!

As a Captain assigned to a squadron that, at one point, had over 70% of its pilots as aging Majors and senior Lt. Colonels, I also was faced with significant career challenges. Even though I had over 2500 hours currency in the aircraft and had an Instructor Pilot rating, the Squadron Commander could not justify officially designating me, and several other similarly qualified Captains, as aircraft commanders over a Lt. Col. or Major as our co-pilots. Such a reversal in rank and the related inversion of command authority just didn't bode well in most military organizations of that period. So I was taken aside by the Squadron Commander and told that, in acknowledgement of my experience, he was going to assign me as co-pilot to one of the more worrisome aircraft commanders. (Gee, thanks a lot!). This aircraft commander was a senior (51 year old) Major who was a Korean War recall who had accumulated over 10,000 hours of DC-3 and C-47 time over a combined career in the Air Force and in airline service. He was referred to by many of the squadron personnel and the "back-end" Intelligence Specialists of the 6994th Security Squadron as "Shakey Joe". His weakness was, however, that he was recalled after a several year absence from the cockpit, and he was about 120 pounds "ringing wet", because his primary caloric intake was in the form of gin and vodka! In fact I observed him on more than one occasion to be flying on a mission with a bad hang-over and still "under the influence".

One mid-afternoon, at the end of a seven hour reconnaissance mission, we were on final approach to Nha Trang in VFR (visual approach) conditions. The tower had cleared us to land and advised us that there was an Army Caribou (a high-wing twin engine cargo aircraft of similar size as the C-47, but with STOL — Short Takeoff and Landing — capabilities) on the roll-out about two-thirds of the way down the 6800 foot runway. Old "Shakey Joe" was proficient in airline-type operations and was making a normal power-on final approach on a standard, 3-degree glide path. The Army bird didn't seem too concerned (or aware) of our landing clearance and was making a very leisurely exit from the active runway. After we touched down — at about 70 knots, tail still in the air, and speed gradually decreasing —"Shakey Joe" observed our rapid overtake of the pokey Caribou and commented, "Well I guess I better get on the brakes and slow this bird down". Based on my previous O'Hare experience, (a high speed approach and landing) I expected him to get on the "binders" with the tail still in the air, but instead, the next thing I knew he was trying to "put the tail on the ground first" by applying back stick pressure! As you may appreciate, when an aircraft is still about 20 knots above the stall speed and you apply back stick pressure, the tail certainly goes down, but the main gear had no intention of staying on the ground! Then Maj. Joe realized the throttles were still cracked open about 3/8ths of an inch, and pulled them to idle. Instinctively, when an experienced tail-dragger pilot bounces a "gooney bird" landing, the normal recovery is to relax back pressure, bringing the pitch back to level and waiting for the airplane to settle in — and that is what I was expecting him to do. But the next thing I realized was that he was sucking the control column back into his gut, as the airspeed was decaying rapidly below 60

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knots, the nose was headed toward 10 degrees nose up and 20 degrees off runway centerline, and the airplane was climbing past 20 feet.

My almost immediate reaction was that ***we were going to crash*** and that I had better get the airplane out of this precarious attitude. I grabbed the control wheel with both hands and stiff-armed the yoke toward the instrument panel. The aircraft flew what seemed like a zero-G parabola and the aircraft slammed into the ground with the pitch so steep that I was sure that we had impacted the prop tips. At that point I was "walking" the rudder pedals from stop to stop trying to keep the aircraft on the runway. Our landing was so violent that the Tower queried us to see if we were OK. As we shut down the aircraft and deplaned, the Maj. and I were still in a state of near shock, but I took the time to write the aircraft up for a hard bounce landing inspection.

A couple days later, the CO approached us in the orderly room and asked the Maj. about the hard bounce landing. His reply was, "Oh I just had a bit of a bounce and was going for the full-stall three-pointer, but ole Chuck got excited and pushed the nose over". "Why do you ask? Was there anything wrong with the airplane?" The CO replied, "No, but Maintenance spent 350 man-hours doing a landing gear inspection!" The CO then called me into his office and quizzed me in detail about the circumstances. He asked why, if I was so concerned, hadn't I just applied max power and done a go-around. I answered his question by describing my power-on stall-induced snap roll experience (at my previous O'Hare assignment), and explained that I had no desire to repeat that experience, particularly so close to the ground!

A Most Important Mission Target

One of the most significant targets that my crew discovered and worked was one that had high-level message traffic. We were flying near the coast when we picked up the strong signal and went into our usual flight arc to try and fly around it for several triangulation plots. We soon discovered that no matter how far we flew perpendicular to the target, we were getting very little swing of the ARDF needle and concluded the target was far away, well out to sea.

The next day we picked up the same target again and were able to define that he was now closer to shore, but still too far out to accurately fix his position. We followed his progress for several days until finally the U.S. Navy was able to intercept him in Vietnam waters. An intelligence report later reported that it was a freighter carrying replacement weapons and ammunition for a battalion size enemy force. The ship was forced aground on the beach and captured. His weapons never reached their intended users. This event earned the crew Distinguished Flying Crosses (DFC).

THE HAZARDS OF COMBAT FLYING

"The biggest flight hazard in the South Vietnam War was having a mid-air collision with other friendly aircraft or being downed by friendly ordinance."

Bombed by a B-52

On one of my 115 EC-47 missions we were tasked to do ARDF (airborne radio direction finding) on enemy targets in eastern Laos, near the Vietnam DMZ. This area was outside of our normal ground radar (GCI) flight following, so we were required to check in every 30 minutes with a status report with the airborne command and control center (ABCCC), a C-130 aircraft, call sign "Hillsboro". Upon arrival into the target area we checked in with Hillsboro and asked if there was any artillery or ordinance advisories for our area of operations. They replied in the negative.

As we were flying our random orbit at 9000' over Laos looking for enemy transmitters to pinpoint, we were suddenly rocked by a wave of concussions. Looking out of the left side of the aircraft, I saw at about half a mile away a line of ground concussions that created two rows of

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craters like railroad tracks that continued to erupt at a rate of about two explosions per second for nearly sixty seconds of devastation.

B-52D Jettisoning 108, 500 lb. bombs over Laos

As we banked quickly away to the right we contacted Hillsboro, who rather sheepishly confirmed that a B-52 on an Arc Light sortie over Vietnam had missed his primary target opportunity and was jettisoning his load of 108 five-hundred pound bombs on a “secondary target of opportunity” in Laos. With his altitude being in excess of 40,000’ the B-52 was as invisible to us as we were to him, but the continuous concussion of his bombs for nearly sixty long seconds gave us a ride of a lifetime hoping and praying that there were not more B-52s dropping bombs through our altitude from over our head! Once again, our biggest recurring threat seemed to be from friendly ordinance, if not mid-air collisions with friendly aircraft.

Attacked by a US Navy Cruiser!

Flying an unpressurized, aircraft over the mountainous terrain of South Vietnam could be hazardous from enemy ground fire and anti-aircraft guns. With terrain varying from sea level to 8000 feet and our altitude capped by lack of oxygen at 10,000 to 12,000 feet, we could easily come within range of even small arms fire — in fact one of the squadron’s aircraft and crew had been lost to ground fire just a day or two before we arrived in country in the EC-47 we had ferried from the U.S. (See details on Tide 86 at www.ec47.com).

Our reconnaissance mission area from Nha Trang, covered northern South Vietnam in sections ranging from the central highlands abeam of Nha Trang all the way north to the DMZ. Our mission target orders directed us to spend maximum time on station, which became limited by the aircraft’s maximum (nominal) endurance of a little over 7 hours minus whatever time it took to get to-and-from the particular target area for that mission. For maximum aircraft security, we were directed to fly to-and-from our specific mission target areas “feet wet”, meaning "off shore" over water and out of harm’s way from enemy ground fire.

There was no such thing as IFR separation in the combat zone and weather patterns in SEA provided a wide variety of both IMC (instrument meteorological conditions) and VMC (visual) flight conditions. Policy was to maintain radio monitoring and contact with the U.S. controlled GCI (Ground Controlled Intercept) radar sites who would provide radar flight following and advisories on friendly aircraft and friendly artillery firing zones. In many cases we might find ourselves well below the ballistic trajectory of high flying "friendly" artillery shells.

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One afternoon I was returning southbound with my aircraft and crew of eight to Nha Trang at about 6500 feet and “feet wet” down the coast from the area of the DMZ. We were in visual weather conditions, but had checked in with “Water Boy”, a GCI radar site on the coast at Qui Nhon (“Kwee Nyon”), a few minutes earlier. I had asked about friendly naval artillery and they had reported none on our route. I was flying about half a mile off-shore as we came upon a big “boat” lying just a few hundred yards further offshore than our flight path. As I flew abeam, I rolled the aircraft over in a shallow left bank to get a better look at the ship. As I did so, I was greeted with the view of looking down the 8-inch muzzles of a US Navy Cruiser just as she let go a three round salvo. Although I never saw the bucket-sized projectiles, we did see where they impacted several seconds later about a two miles on-shore. Quick mental approximation put these projectiles in a trajectory well above our 6500 foot altitude!

US Navy Cruiser USS St. Paul

After taking appropriate evasive action, I contacted Water Boy and advised him of the position of the naval artillery and the approximate relationship (bearing and distance) from a nearby TACAN navigation radio site for the impacting shells. Not 10-minutes later, we heard another USAF bird report “feet wet” and heard Water Boy advising him, "negative naval artillery". I contacted the GCI site and asked him what he thought it was that I had just reported. He stated that my transmission was not considered as being from an “authorized source” and he therefore could not relay it to other aircraft. With that information, I transmitted to the other aircraft directly and suggested he stay further offshore than that big boat that was lying along his route!

Potential Mid-Air

While orbiting looking for radio targets one afternoon in an area over the central highlands, the skies were almost clear of clouds and the visibility was better than 30 miles. We were cruising southbound at 8,500 feet msl about 10-miles inland from the coast. As we often did, we were watching for various signs of firefights, smoke and other activities on the surface.

We saw a flight of three F-100 Super Sabres working with an O-2 FAC aircraft (Forward Air Controller) conducting an air strike against some “unfriendlies” a few miles from our orbit. The F-100s were flying tail chase trail formation with about 1-mile separation, diving in from above our altitude and dropping their ordinance on the smoke rockets fired by the FAC. The F-100s were operating between the surface and probably 10,000 feet and flying a wide attack orbit of maybe 5 miles radius.

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As the F-100 lead pulled off his attack, he climbed directly through our altitude on a northerly swing of his orbit that put him head on to us and passed over our heads with maybe 500 to 800 feet of clearance. Number two, a mile behind the lead passed through our course climbing at about 500 feet below us and number three passed beneath us at maybe 1000 feet.

F-100 Super Sabre coming right through you altitude and passing overhead, with eyes looking elsewhere!

This was all the more chilling an experience recognizing that probably none of the F-100 flight ever saw us, as they had a rate of closure on us in excess of 500 knots and their leader's visual attention was likely locked onto the FAC, while two and three were focused on their Leader.

Potential Mid-Air 2

In the skies over SEA at altitudes below 18,000 feet there was no such thing as air traffic control or an IFR clearance, regardless of the weather conditions. Over Vietnam it was the policy to fly in "Tactical VFR" which consisted of flying when and where your mission dictated, day or night with radar flight following from GCI Radar sites that covered the area (as previously described). These radar sites depended on the aircrews to report in to them when entering their area and to have a radar transponder on board that the GCI site could interrogate and monitor along with all other aircraft in the area.

Often, however, there were VNAF, or Army, or Air America, or other aircraft that either didn't have transponders, or didn't make use of the GCI sites for this service. Without a transponder aboard, it was virtually impossible to track the hundreds of "radar skin paints", much less know who they were, what radio frequency they were on and at what altitudes they were flying.

On more than one occasion, we would pop out of a towering cumuliform cloud in scattered or broken cloud conditions, only to see another C-47, Caribou, C-123, or A-1 aircraft at our same altitude on an opposing or crossing course. Who knows how many aircraft we passed while in the clouds?

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A-1E "Sandy" A friendly site except when seen on a collision course!

OCCASIONALY THE THREAT WAS FROM THE ENEMY

Fired Upon by Sampans

In over 1500 hours of EC-47 flying time and a year's tour at Nha Trang, I was only aware of two incidents where my aircraft was fired upon by the enemy. The first was upon return to base at night after completing a mission. We were on an ILS final approach over the bay (landing to the west) at an altitude of maybe 500 feet, descending on the glideslope. We had our landing lights and normal night running lights illuminated. Suddenly we observed two streams of 50 Cal. machinegun tracer-fire arcing their red hose-like spray from below and either side of the nose. The tracers were arcing to an altitude maybe 50 feet below our height and a couple hundred yards in front of our path, but definitely coming from the water.

I quickly doused all the lights and leveled off to initiate a go-around. We came back around the second time with the lights blacked out and flying a high angle visual approach. This time we saw no firing and assumed our report of the incident to the tower had initiated a search action by the Navy patrol boats that had put the bad guys under cover once again.

Captured VC Sampan Gunboat

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Anti-Aircraft Fire

The second incident I am aware of was similarly unsuccessful for the enemy and again occurred at night. We were flying a random orbit in the northern highlands when we noticed what looked like a flash bulb at approximately our altitude and maybe half a mile away. It was far enough distant that no noise was heard nor concussion felt. We saw several repeats of the airburst flashes and assumed that if it was anti-aircraft fire it must be targeted on something other than us.

As a precaution, we adjusted our orbit away from where we had seen the flashes. As we watched the area, we saw no further activity. After about an hour out of the area, we once again flew back closer to where we had seen the flashes. We again saw two flashes just below our altitude and about a half a mile or so away. We decided that Charlie was firing at the sound of our engines and decided not to press our luck. So we turned away and departed the area.

Friendly Ground Fire

Since our ARDF mission was in support of locating any and all enemy ground forces of sufficient size to have radio communications, we often were tasked to work in areas that encompassed friendly fire support and artillery sites. Our preflight intelligence briefings would identify the general area of these locations and provide us with an Army FM radio frequency that could be used to contact these sites when entering their area of fire. Since our operating altitude was restricted to below 12,000 feet msl (no pressurization or onboard oxygen) and the terrain varied anywhere from sea level to 8,000 feet, we were often in potential range at only two or three thousand feet above the local terrain.

Our limited knowledge of artillery operations made us aware that when an artillery battery computed their point of target impact, they calculated the direction and elevation height that the shell would traverse to hit distant or close-in targets. But we were never sure if they converted their data to mean sea level (msl) datum or calculated solely in height above their terrain.

This forced us, on many occasions to worry when we were flying above say 4,000 foot terrain and they reported firing to altitudes of 6.000 feet. If we were at 8,000 feet, did this mean that their artillery projectiles were arcing to 2,000 feet below our altitude (to 6,000 feet msl) or to 2,000 feet above our altitude (6,000 feet above the 4,000 foot terrain). We were sensitive to the fact that their firing might be life critical to the support of friendly ground forces under attack, but occasionally we would have to request that they cease fire until we exited their territory.

Another problem that compounded this problem was that they would generally report their position relative to a fire support base whose position we did not have, or to map coordinates that were encoded Army surface maps, not compatible with our aviation maps.

Danger from Enemy Aircraft

One consolation was that the US had virtually total “air superiority” over South Vietnam. Being connected to the military intelligence gathering operation, our air crews received daily briefings on significant combat activities, before we flew. Althought there were occassional enemy thrusts from Migs off Hainan Island and Hanoi, I never heard of any that actually crossed the DMZ, or launched any attacks on aircraft or ground targets in the South.

EC-47 Epilogue

Years after the war was over and after I had retired from the USAF, mission details and accomplishments of the EC-47 operations were declassified. In the final tally, the EC-47 mission was credited with providing in excess of 85% of all intelligence that lead to the airstrikes, artillery fire and ground actions against the Viet Cong and the Communist North Vietnamese troops. This

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World War II aircraft, updated with modern electronics, again proved its invaluable contribution to the freedom of the world.

These are just some of the most significant memories of my tour in EC-47s at Nha Trang. I hope you enjoyed them and that they give you a more rounded picture of one aspect of combat life in the Southeast Asia war.

For more information and the perspectives and photos of other crewmembers covering the span of the war from the mid-1960s to the last USAF flight of the EC-47 in May of 1974 visit the EC-47 Association History Site at < http://www.ec47.com>

About the Author

—Chuck Miller, Lt. Col. USAF (Ret) —
(UPT Reunion Photo, 2001)

Chuck Miller graduated as an Aeronautical Engineer (BS) from the University of Illinois in January 1961 and received an AFROTC commission upon graduation. He entered Undergraduate Pilot Training (UPT) in April of '61, training in the T-37 and T-33 jet trainers as a part of Class 62G in Valdosta, GA (Moody AFB).

His first assignment was flying the TC-47 Navigation Trainer at O'Hare International Airport, Chicago, in support of Air Force Reserves where he spent 5 years and logged nearly 2000 hours of flight time. He was then assigned to Vietnam in the EC-47, after ferrying an EC-47 from the US to Vietnam, island hopping across the Pacific. He served in Vietnam from March '67 to February '68, where he logged another 1000 hours flying 115 combat reconnaissance missions. During his EC-47 assignment he was awarded the Distinguished Flying Cross, seven Air Medals, and the AF Commendation Medal.

After completion of his EC-47 assignment, he joined SAC as a KC-135Q tanker pilot at Beale AFB near Sacramento, CA, supporting the SR-71 "Blackbird" special operations. He continued his career progression in this capacity, for 5-years ultimately becoming Chief Tanker Instructor Pilot for the base and then Bomb Wing Chief of Safety.

He was then selected for a special category (SPECAT) assignment to HQ USAF on a NATO Exchange posting with the Canadian Armed Forces where his mission was to develop the Canadian inflight refueling role with modified Boeing 707-320C aircraft and two 15-aircraft squadrons of CF-5 fighters. He spent 3-years in this position, successfully bringing the inflight refueling capability for the Canadians into full maturity and reliability.

He then was reassigned to the Oklahoma City Air Logistics Center (OCALC) in the C/KC-135 Logistics Management unit where he ultimately rose to the position of Weapon System [Logistic] Manager for the fleet of 750 aircraft plus the Presidential VC-135 and 707 fleet. In that capacity he was responsible for the C/KC-135 Structural Integrity Program, Wing Reskin, played a principal role in the KC-135R re-engining program and was the architect of the KC-135E re-engining program using refurbished commercial 707 engines and components for over 160 KC-135Es, that played a critical mission role in the Gulf War of the 1990s. He retired from the USAF in 1981 at the rank of Lt. Colonel. He can be contact at av8or@eos.net.

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