

A HISTORY OF MARINE FIGHTER ATTACK SQUADRON 531



HISTORY AND MUSEUMS DIVISION
HEADQUARTERS, U.S. MARINE CORPS
WASHINGTON, D.C.

An F/A-18A from VMFA-531 joins two other Marine Hornets in a flight over California's majestic Mount Whitney.
(Photo courtesy of VMFA-531 Archives)

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by
Colonel Charles J. Quilter II, USMCR (Ret)
and
Captain John C. Chapin, USMCR (Ret)



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Foreword

This history traces a half century of active service by Marine Fighter Attack Squadron 531. It was a unique squadron because its history demonstrates the complete evolution from night fighter to all-weather fighter to fighter-attack. Its earliest days placed the Marine Corps as the pioneer of all the military Services in night fighting.

From the primitive converted civilian airliner, the PV-1, to the most modern Marine Corps fighter, the F/A-18, the "Grey Ghosts" evolved as their tactics changed. Their service covered the globe: Cherry Point on the East Coast, Texas, El Toro on the West Coast, the Southwest Pacific, Iwakuni in Japan, Cubi Point in the Philippines, Korea, Vietnam, the Indian Ocean, and the Caribbean.

Colonel Charles J. Quilter II provided a large majority of the text. He retired from the Marine Corps Reserve in 1994 after 34 years of service. He studied in Japan and graduated from the University of California, Berkeley, with a degree in East Asian History. Commissioned in June 1964, he gained his aviator wings in November 1965.

He then joined Marine Fighter Attack Squadron 531 (VMFA-531) at Cherry Point, North Carolina, as an F4-B Phantom pilot and deployed to Puerto Rico at the end of the Dominican Republic crisis in 1966. He flew 252 combat missions with VMFA-323 from Chu Lai, Vietnam, in 1967-68 serving as a flight commander. He did a second tour with the "Grey Ghosts" of VMFA-531 as its operations officer at El Toro, California, in 1968-70, where he was also designated as one of the Marine Corps' first dissimilar air combat training instructors, flying as an adversary pilot in A-4 aircraft.

His assignments in the Reserve included command of VMFA-134 at El Toro in 1984-86 and Mobilization Training Unit (History) DC-7 in 1989-93 at the Marine Corps Historical Center in Washington, D.C. In 1990, he led a detachment to Southwest Asia during the Persian Gulf Conflict of 1990-91, and served as Command Historian of the I Marine Expeditionary Force in charge of the Corps' historical collection effort. He was coincidentally the senior Marine reservist present at the liberation of Kuwait. In 1994, he served with Marine aviation units at Aviano, Italy, which were flying combat support missions for United Nations forces in Bosnia and Herzegovina. He has written a number of articles and histories about the Marine Corps. The present work was first written in draft from 1986-90.

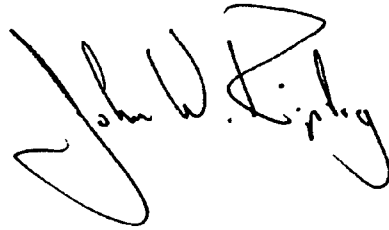
Colonel Quilter's decorations include the Legion of Merit, the Meritorious Service Medal, 17 Air Medals, the Combat Action Ribbon, and Presidential and Navy Unit Citations. In civilian life, he is a captain for Delta Airlines. Married with two children, he resides in Laguna Beach, California.

Captain John C. Chapin earned a bachelor of arts degree with honors in history from Yale University in 1942 and was commissioned later that year. He served as a rifle-platoon leader in the 24th Marines, 4th Marine Division, and was wounded in action during assault landings on Roi-Namur and Saipan during World War II.

Transferred to duty at the Historical Division, Headquarters Marine Corps, he wrote the first official histories of the 4th and 5th Marine Divisions. Moving to Reserve status at the end of war, he earned a Master's Degree in history at George Washington University with a thesis on "The Marine Occupation of Haiti, 1915-1922."

As part of the Historical Center's series of monographs commemorating the 50th anniversary of major Marine actions in World War II, and with the support of the Marine Corps Heritage Foundation, Captain Chapin researched and wrote accounts of operations in the Marshall Islands, on Saipan and Bougainville, and Marine aviation in the Philippines. Then, as part of the Historical Center's series on the 50th anniversary of the Korean War, he wrote the account of Marine operations in the Pusan Perimeter.

The History and Museums Division welcomes any comments on the narrative or additional information on VMFA-531.

A handwritten signature in black ink, reading "John W. Ripley". The signature is written in a cursive style with a large, sweeping initial "J" and "R".

J.W. RIPLEY
Colonel, U.S. Marine Corps (Retired)
Director of Marine Corps History and Museums

Preface

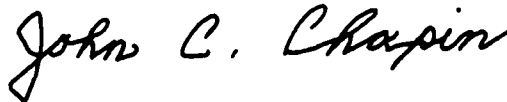
This is an operational narrative of one of the Marine Corps' most unusual aviation squadrons moving, as noted in the Foreword, through three successive and different fighter roles during 50 years of continuous service. It was a pioneer in several ways, and the superior quality of its performance was marked by numerous awards.

Information for this history was drawn from primary sources in command diaries and chronologies and from interviews, base newspapers, published historical works, and valuable information from the files and helpful personnel of the Reference Section at the Marine Corps Historical Center.

In addition, Major William Henson and First Lieutenant Wesley Johnson, two squadron "alumni" who have been active in the "Grey Ghosts," contributed information and essential photographs. We express our appreciation to all those who contributed to this history.



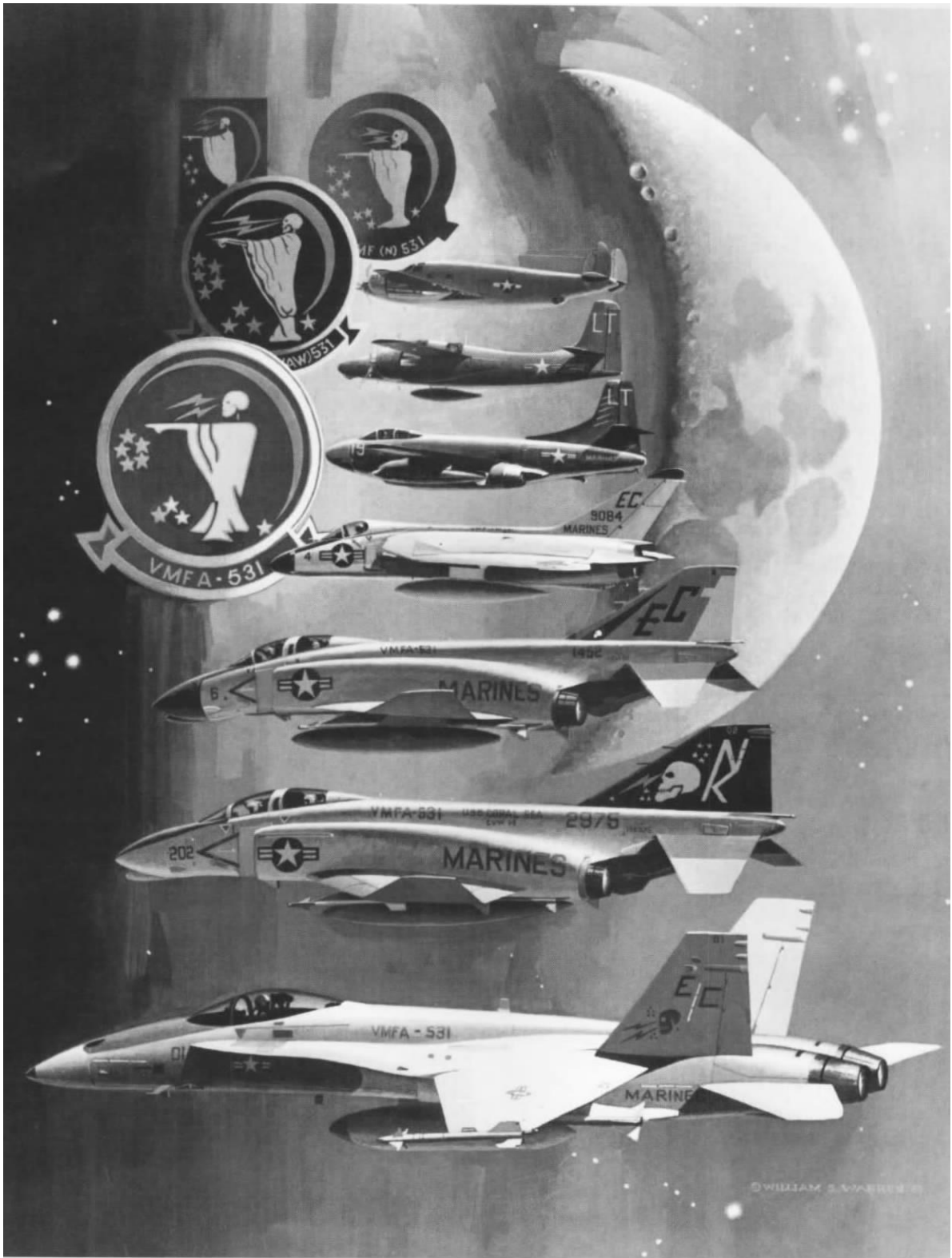
CHARLES J. QUILTER II
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Painting courtesy of Hughes Aircraft Company
Painting by William S. Warren of the insignia and aircraft used by VMF(N), VMF(AW), and VMFA-531 down through the decades.

A History of Marine Fighter Attack Squadron 531

Facing the Problem

A half century of distinguished service with multiple unit awards, the pioneer of night/all-weather tactics and combat, this is the record of Marine Fighter Attack Squadron 531 (VMFA-531). While that was its final designation, it began its career as VMF(N)-531, the Marine Corps' first night fighter squadron. It scored the first Marine night victory in 1943; it had the first close contact of the F4B(N) Phantom with MiG fighter planes during the Cuban Missile Crisis of 1963; it was the first American Phantom jet fighter attack squadron in Vietnam in 1965; and it spent 102 days at sea in 1979-80 on board a carrier during the Iranian Hostage Crisis.

These operational achievements came out of a humble, bare-bones origin. In the beginning there were no planes, no pilots, no American precedents, very little recognition of the need for night fighters, and extremely primitive equipment for locating enemy planes. Thus, the squadron, when formed, had to work its way through all these problems and grapple with the development and complexities of radar—the scientific breakthrough that would enable it to find and destroy enemy targets at night or in all-weather conditions. (“Radar” was the American acronym for radio detection and ranging.) When a Marine operator in the early years peered into a screen as the radar array slowly revolved, aircraft would appear as spikes or “blips” on the screen. (Unfortunately, so would weather, terrain, shipping, etc.)

American efforts to use and then develop radar further had their genesis in the intensive British effort to create and perfect this new science. From the mid-1930s the British Royal Air Force (RAF), in conjunction with civilian scientific researchers, had concentrated on fashioning a radar that would give accurate locations of approaching enemy aircraft. This was to be a crucial tool during the air Battle of Britain.

With World War II raging in Europe, there was

concern about the preparedness of American military forces. Recognizing the need for air defense of landing forces, the Commandant of the Marine Corps, Major General Thomas Holcomb, sent Captain E. Colston Dyer to Britain in mid-1941 to learn all he could about the RAF radar system and fighter direction. The trip made painfully clear to Dyer that neither the Marine Corps nor any other U.S. Armed Service had anything like the British system of using radar to control fighter plane missions, much less the ability to deal with a night threat.

This perilous gap led to further action by the Commandant. Another officer was detailed to Britain. He was Major Frank H. Schwable, who had recently served in the Navy's Bureau of Aeronautics. Schwable was directed to:

Look into the question of night fighters In general, get all the information you can on the organization and operations of night fighting squadrons, paying particular attention to the operational routine, squadron training, gunnery, and tactical doctrine. . . . We would also like to get your opinion on single engine, single seat operations vs. other types for Marine Corps operations.¹

Schwable spent the next two months at that task and was soon convinced the RAF system could meet Marine needs. The RAF used multi-engine, multi-crewed aircraft equipped with aircraft interception (AI) radar. The planes were guided into position by ground controllers using a new type of radar screen, a circular map-like display (called Plan Position Indicator or PPI) which permitted the controller to assess target information easily, and effectively direct the fighter crew. The controllers were able to determine aircraft altitude on a separate screen which also displayed “Identification Friend or Foe” (IFF) information.

Schwable, now well aware of the many prob-

lems ahead, returned home in May 1942 to become the father of Marine night fighter aviation, while Dyer fought for aircraft and personnel on the Washington front. It would be an effective combination.

*1942: Getting Started—
Washington and Cherry Point*

Schwable and Dyer now set about building a night fighter program which did not rate a very high priority in mid-1942, even though Marine aviation was rapidly expanding its day forces as part of an overall Navy Department effort to procure and allocate 27,500 aircraft. Navy planners, however, conceded the need for night fighters, and were working to develop their own program with a modified version of the Chance Vought F4U-2 Corsair.

The Marines found themselves in March 1942 authorized for eight night fighter squadrons of 12 aircraft, each to be commissioned successively through 30 June 1945, but with the stipulation that “no aircraft units now earmarked for the various naval activities shall be diverted to meet this supplementary requirement.”²

Dyer and Schwable now began to scramble to put something together in the face of this impossible edict. The Commandant was persuaded by 12 June to recommend to the Chief of Naval Operations that “the dates for the formation of the Marine Corps night fighter squadrons be advanced to the period of 1 January-30 June 1943.”³

The Chief of the Navy’s Bureau of Aeronautics, in his all-important endorsement of 3 July, approved of the advance commissioning of a single squadron, but refused to budge on the matter of newer aircraft, noting that the Navy’s F4U-2 and the Army’s purpose-built Northrop P-61—both well behind schedule—would not likely become operational until mid- and late 1943 respectively. As a substitute, he reluctantly recommended that the unit receive “six SBD-3 Dauntlesses equipped with radar and one PV-1 Ventura. . . . The SBD type planes must necessarily be a diversion from other urgent requirements.”⁴ This endorsement had been wrought from a number of conferences that Dyer and Schwable had with the Bureau, and on 25 July, the Vice Chief of Naval Operations finally approved six PV-1s with F4U-2s as an alternative.⁵ The Lockheed Vega PV-1 was a weak second choice, but it was the only choice, and the

Ventura would emerge as the Marine Corps’ first night fighter.

While Dyer was waging the bureaucratic battle in Washington, Schwable moved on to organizational matters. On 27 July, he wrote to the Marine Corps’ Director of Aviation and proposed that personnel and equipment be assembled beginning 1 October in order to meet a 1 January 1943 commissioning date. The site chosen was to be the Corps’ newest and most modern air station, just being completed in a remote, swampy area called Cherry Point, North Carolina. He also recommended that he be given command of the first night fighter squadron, which was now designated VMF(N)-531. These recommendations were approved.⁶

The situation at Cherry Point was a stern test of Schwable’s organizing abilities. He later described the problems:

We started with nothing. In fact, we were the first combat squadron to move in one of the new hangars down there. . . . When I moved into the office, there were about three packing boxes around there. That was our desk and that was our chair. . . .

So there was a question of getting our facilities ready; we had to get all the squadron equipment, including jeeps and trucks, and, well, everything that an outfit needs. . . . And with the radar, there was nobody, excepting a few men in my squadron, that had been to a Navy radar school.

Then there were the problems that stemmed from being on a new base with an orphan airplane and unknown radar complexities. Schwable continued:

We had never built anything like the GCI [ground controlled interception] station. It was just like when you walked in and [they] said, “Okay, build a squadron.” The supply department down there at Cherry Point was fairly new, and [there were] all kinds of spare parts they did not have. They had practically nothing for the PV because ours were the only ones the Marine Corps had ever had, and the Navy hadn’t had them [equipped with interception radar].⁷

Nevertheless, Schwable forged ahead. He now

Brigadier General Frank H. Schwable

Brigadier General Frank H. Schwable was born in 1908, graduated from the U.S. Naval Academy in 1929, and commissioned in the Marine Corps that same year. Quickly moving to a career in aviation, he won his wings in 1931.

The following year, he was detailed for duty in Nicaragua with an aircraft squadron of the 2d Marine Brigade. While there, he was awarded the Nicaraguan Cross of Valor for hazardous attacks on "armed bandits."

Returning to the United States, he served at different bases until ordered to the Bureau of Aeronautics in the Navy Department, Washington, D.C., in 1939. This led to an assignment, in November 1941, to the American Embassy in London as Special Naval Observer.

Schwable crossed the Pacific and got as far as Cairo, Egypt, when the Japanese struck Pearl Harbor. Summoned back to Headquarters Marine Corps and promoted to lieutenant colonel, he was sent to form up and command the first Marine night fighter squadron, VMF(N)-531, in 1942.

Scoring four kills, he led his squadron in the Southwest Pacific in developing the brand-new tactics for night fighter planes, resulting in the award of both a Distinguished Flying Cross and a Legion of Merit for his actions from September 1943 to February 1944.

Leaving his squadron after 72 night combat missions, he moved to Commanding Officer, Strike Command, in March 1944, and his performance there was recognized by a second award of the Legion of Merit. Returning from overseas in November 1944 and now a colonel, he began a sequence of multiple peacetime assignments to Chief of Naval Operations, Headquarters Marine Corps, National War College, Marine Aircraft Group-12, and Commander in Chief, Pacific.

The war in Korea brought him to Chief of Staff, 1st Marine Aircraft Wing, in May 1952. During the next few weeks his "exceptionally meritorious achievement" was noted in the award of his third Legion of Merit.

On 8 July 1952, however, his plane was shot



Department of Defense Photo (USMC) 68297
Then LtCol Frank H. Schwable.

down, and Schwable became a prisoner of war until 6 September 1953. During this time, as a senior officer, he was forced to make radio broadcasts of Chinese Communists propaganda. Upon his return to the United States, a court of inquiry was held. It recognized that Schwable's "confession" was very damaging. It concluded, in April 1954, that his conduct was "excusable on the ground that it was the result of mental torture of such severity and such compelling nature as to constitute an excuse for his acts."

Limited assignments followed at Headquarters in Washington and at Aircraft, Fleet Marine Force Atlantic, in Virginia. On 30 June 1959, he retired to Round Hill, Virginia, with a promotion to brigadier general for his heroism in World War II. His other awards included a total of three more Distinguished Flying Crosses and 11 Air Medals. He died on 28 October 1988.

wrote the first table of organization for a VMF(N) squadron which included its own GCI radar section, and he sent a barrage of requests to man and equip it. In the meantime, he worked on the basics of the operational mission.

First were the problems of instrument and night flying. Marine aviators were required to have instrument ratings after 1938, but were taught a crude method which was just about good enough to get them out of an unplanned weather situation. Indeed, many aviators of the period felt instrument flying was an emergency procedure rather than a means to an end. Deliberate flight in cloud, if not actually prohibited, was considered foolhardy, even though from 1938 on, tactical aircraft had an artificial horizon, a gyroscopic compass, and a two-way radio.

To improve his own instrument skills and qualify on large twin-engine planes, Schwable went to Fort Worth, Texas, in September 1942 to attend a school under pioneer instrument flyer and holder of the Navy Cross, Major (later Lieutenant General) Karl Day, USMCR. There he flew ex-airline Douglas DC-3s, which the Navy had impressed as the R4D-3, and learned "attitude instrument flight," using the artificial horizon as the primary instrument, an improved system Day had developed to short-cut the traditional methods which used cruder instruments. Ability to fly on instruments was essential for night fighter pilots who needed to keep spatially oriented at night or in clouds, before they could hope to have success in combat. Instrument flying had been so neglected and underdeveloped in all the Services that one Marine night fighter pilot sent to Britain in early 1943 was moved to remark, "Without Karl Day's school, I would have died on my first flight in England."⁸

On his return, Schwable found enough people and equipment in place at Cherry Point by mid-October to commence operations for night and instrument training. Spurred by reports of frequent night air attacks at Guadalcanal, he requested that the commissioning date be moved up again.⁹ This was approved. On 15 November 1942. He notified Headquarters Marine Corps:¹⁰ "Marine Night Fighter Squadron 531 commissioned this date. LtCol F. H. Schwable Commanding."¹¹

Major (later Brigadier General) John D. Harshberger, a tough and fiery former aviation cadet, was appointed executive officer (XO). A veteran pilot with more than 2,400 hours of flight

time, he would play a large role in the success of the new unit. Three other officers and 46 enlisted men were detailed to flesh out the squadron's ranks.

The task was now to forge a cohesive chain of man and machine: equip the PVs with radar and armament; train pilots to fight at night in multi-engine aircraft; become competent in AI radar and gunnery; and create a GCI system using an untried radio communication technology—pioneer work all.

Growing Pains at Cherry Point

Flight operations began humbly enough in a pair of North American SNJ-4s that were wheeled out of the Navy in late October, along with the use of the station Curtiss SNC-1 trainers.¹² Link instrument trainers—the earliest flight simulators—were set up as well in a corner of the squadron's unheated, unlighted hangar.

Within a week, pilots began practicing night landings, using just runway lights to see by rather than the usual floodlights or wing landing lights. (Floodlit airfields in the combat zone would be an invitation to enemy bombing.) By 1 December, they were practicing night tracking by following blacked-out target planes, a skill that would be important since identification and gun attacks had to be done visually.

Personnel now began arriving in significant numbers. Their training ranged from formal schools to none at all. Except for a few old hands, most pilots came straight from flight training via Karl Day's school. The first newly-designated aviator to report on board was Second Lieutenant Duane R. Jenkins, USMCR. He would gain the squadron's first night victory within a year. The ground radar program got a boost on 18 December when the squadron's first GCI controller, First Lieutenant William D. Felder, Jr., arrived from Orlando where he had trained in RAF techniques at the Army Air Forces School of Advanced Tactics. The next day, two Army officers and eight civilian engineers arrived to install the GCI equipment, a Canadian copy of the British set. It was a non-portable system, but it was a start.

¹²The North American SNJ was the principal advanced trainer of the war: single Pratt and Whitney R-1340 550 hp engine, constant speed propeller, retractable gear and flaps.



Photo from VMF(N)-531 War Diary, 1942-1944

Built by Vega Aircraft Corporation, which later became known simply as Lockheed Plant A-1, the squadron's first gun- and radar-equipped PV-1s were delivered in the spring of 1943.

However, the lack of airplanes was of major concern. As 1942 drew to a close, it seemed that the deliveries of the PVs and the SBDs would be delayed indefinitely, and without more airplanes none of the GCI controllers now assigned to the squadron could be trained—let alone the pilots. Schwable and Dyer scratched around some more, and in a familiar way, found some planes the Navy did not want.

In 1940, the Netherlands government had ordered 162 Brewster Model 340 Buccaneer scout bombers.* Once described as “one of the least

successful combat aircraft put into production in the USA” during the war, a number of the ungainly, single-engine planes were gathering dust when the U.S. Navy “repossessed” them, labeled them SB2A-4s, and transferred them to the squadron.¹³ The squadron's pilots were dismayed to discover the Brewsters had metric cockpits with placards in Dutch. They gave trouble from the start.

At the end of 1942, Schwable formed a small task force to be sent to England to learn the night fighting trade at the working level. This probably grew out of an urgent message from the Commander South Pacific, Admiral William F. Halsey, who made a plea for a minimum of six radar-equipped night fighters to be sent [at the earliest [possible] time].¹⁴ Hardly possible, since they did not exist then.

The team was led to England by Lieutenant

*The SB2A-4 Buccaneer was built by the Brewster Aeronautical Corporation, and was powered by a Wright R-2600-8 of 1,700 hp with a Curtiss electric propeller. It was armed with eight small .30-caliber machine guns, and had a top speed of 200 knots.

Colonel Edward A. Montgomery and consisted of pilots, radar operators (ROs), and GCI controllers—18 officers and men in all. When they returned in the late spring of 1943, they formed the backbone of the operational training effort for VMF(N)-531 and night fighter squadrons yet to come. On New Year's Eve of 1943, Schwable noted in his diary that the squadron now had 11 officers, 1 warrant officer, and 78 enlisted men on board, and that its pilots had logged 250.7 hours.

January was a disastrous month of bad weather, Brewster problems, and accidents. Even though the pilots were by far the most qualified instrument pilots in the Marine Corps at the time, they were by no means "all-weather." In addition to the continuing problems of instrument flying, visual navigation itself at night presented a big enough challenge to the new pilots, who seemed to get lost with depressing regularity.

Operations with the Brewsters quickly turned into a shambles: the contact points of the Curtiss electrically controlled propellers began burning out; a plane lost a tail wheel locking pin and a ground loop was narrowly averted; and the rudder pedals disconnected on another flight necessitating a "semi-emergency" landing. Then a pilot had his landing gear stick halfway and got them down by an emergency procedure. Another had a hydraulic failure. And all this in the first two weeks! As a result, Schwable had to limit them to day flights, until "a few more of the little 'bugs'" were ironed out.

In January, Schwable went to Norfolk, Virginia, to check on the progress of the armament installation of the squadron's first PV-1. The installation consisted of six fixed .50-caliber machine guns, two more in an electric upper turret, and two .30-caliber flexible guns in a bottom tail position. In the meantime, arrangements were underway for the installation of the SCR-540 aircraft interception radar at the Naval Air Station, Quonset Point, Rhode Island. This was a copy of the first operational British AI radar called Mark IV.

After some frantic activity with the Curtiss technical representative, the Brewsters got back into the air. In February, a green second lieutenant overshot on landing while solo and wrecked his SB2A-4. Four days later, another lieutenant ground-looped an SNJ. Accidents such as these were common in all Services throughout the war and reflected the very low average experience of the pilots.

On 15 February, the squadron got its first look at a PV-1 Ventura (equipped with radar but no guns) when one was ferried in. Like many wartime aircraft, the PV had a curious ancestry. Derived from the Lockheed Lodestar airliner, then built to a British specification, and subsequently ordered by the Army Air Forces (AAF) as the B-34, the first batch of Navy PV-1s, including -531's, came from the AAF allocation.

Pilots found the large and heavy machine relatively fast. It could do perhaps 257 knots all out at sea level (with drop tanks).^{*} But the plane was demanding to fly. Although its "service ceiling" was listed as 26,300 feet, it was really designed for low altitudes, with limited performance above 15,000 feet. In case of an engine failure, the pilot had to execute immediately an intricate sequence of actions. There were eight fuel tanks which required careful management. In addition, due to masking by the unusual instrument panel night lighting system, the altimeter could not be read below 2,000 feet, "a rather important range in night landings," Schwable acidly observed.

The electrical systems, air intercept radar, and guns gave constant trouble at the beginning, and there were innumerable ferries to Norfolk and Quonset to try to correct the problems. Batteries were so scarce, for example, that a pilot actually had to fly to Raleigh to remove one from a crashed PV. In the meantime, the Marine Corps' first successful airborne test of "Very High Frequency" radio was carried out by another squadron pilot in an SB2A-4 on 25 February.

On 27 February, the squadron's radar department made its first "real" interception after many months of "patient and arduous instruction." This may well have been the first GCI/AI interception conducted by an operational unit in the United States. Another capability of radar was demonstrated on 6 March, when a pair of aircraft were "steered" home when weather closed in.

At this time members of the squadron became involved in "Project 88." This was the Marine Corps' first program to train its own GCI controllers and operators (using RAF and AAF trained instructors). The project formulated Marine doctrine for GCI and night fighter control which would first be practiced in combat by VMF(N)-531. It was a system which used radar, a con-

^{*}Powered by Pratt and Whitney R-2800-31 engines with 2,000 horsepower and single stage superchargers.

troller, and several operators to direct fighters.*

The GCI radar set the squadron would take into combat was now just coming into production by General Electric, and Major Robert O. Bisson and two men were sent up to Schenectady, New York, to learn the system.** This new set known as the SCR-527A was a copy of the original British GCI with the virtue of portability, compared to the previous set which demanded a fixed site installation.

Even though availability of the sole radar-equipped PV-1 was sporadic, the airborne training of the radar operators now commenced in earnest. After fine-tuning a welter of knobs, they would gaze intently at the two cathode ray tubes of the Mark IV radar, hoping to pick out a target from the interference "noise" on the scope. On the AI radar, energy reflected from the earth's surface flooded the scope at a range equal to the height above the ground. Detecting an aircraft in or beyond this clutter was impossible and was the radar's greatest limitation. Thus, the radar operator had to form a mental picture of the intercept from elevation and heading scales that were anything but precise. Estimating closure rate had to be done by eye. He then passed verbal directions to the pilot by interphone.

The pitfalls were many: failing to slow down closure rate could result in overrunning the target, and failing to assess the target's heading could result in a series of ever-diverging turns until the target was lost. But when done right, the radar operator talked the pilot into a position about 600 feet astern and slightly below the target, for a visual identification and attack. Like GCI controlling, there was much art in the airborne radar trade.

In the ordnance area, the training of "radar gunners" proceeded as well. The gunners attend-

ed a brief course, living in tents, and practiced firing at sleeves towed by squadron SNJs (an unenviable duty for the pilots involved). Then they were checked out in the roomy, electrically-operated turret of the PV and fired air-to-air on sleeves. Later the squadron made a field modification on the turrets to align them with the nose guns, so that all eight .50-caliber machine guns could be aimed by the pilot. At the time this was the largest array of machine guns in any Allied fighter.¹⁵

From 13 March on, air-to-air gunnery was carried on by pilots in SNJs with .30-caliber machine gun installations firing through the propeller arc. Major Harshberger made the first gunnery flight, and Schwable was very pleased with the ordnance crew "because the prop came back without holes!"

Despite continuing problems with spares and crashes, intensive flight operations resulted in the squadron's 25 pilots logging 834 hours in February and 1,203 in March. No one deserved a nickname more than "Iron John" Harshberger who outflew everyone from the New Year on.

But Schwable in Cherry Point and Dyer in Washington continued to face a seemingly endless flow of problems. There were radio limitations, radar calibration delays, poor results with the plane radar, parts shortages in numerous critical categories, and delayed or improper installation of equipment on planes sent to other bases for service.

On 1 April 1943, the Marine Corps' night fighter organization expanded with the commissioning of Marine Night Fighter Group 53 (MAG[N]-53), along with Headquarters Squadron 53, Service Squadron 53, and a new fighter squadron, VMF(N)-532. Schwable became the MAG's first commanding officer, and Harshberger moved up to command VMF(N)-531. (MAG-53 would eventually train eight night fighter squadrons and send seven into combat.)¹⁶ Due to the uniqueness of -531, Headquarters Marine Corps ordered that, until ready for tactical deployment, the squadron would be considered a "Fleet Marine Force organization" directly under the Commandant.

The squadron transferred all its Brewsters and SNJs to VMF(N)-532 on 20 April, even though fully equipped PVs were slow in coming. By 2 June, -531 still had only three complete aircraft on hand. This would be the overriding reason for the squadron's deployment to combat in three phases.

*They used different radars for early warning, for plan position indications for control, and to determine altitude and correlate IFF returns. The controller, an air-ground officer, directed the fighter by voice radio, and was assisted by a team of enlisted operators who plotted tracks, derived altitudes, and checked airspeeds. Controlling was more art than science in this era, and required a facile mind in order to place a fighter less than two miles astern, slightly below the target, and at a compatible airspeed.

**Major Bisson, a brilliant radar specialist of modest demeanor, would become the officer-in-charge of the squadron's radar section in the Solomons, later direct the highly successful air defense of Okinawa in 1945 as Commander, Marine Aircraft Group (MAG) 43, and retire as a major general.

Schwable summarized his deep concerns in a 28 May memorandum to Dyer:

If it is the desire of the Bureau to have this unit [MAG(N)-53] proceed to the combat zone in an airplane that is admittedly makeshift for the job, with guns that may or may not all fire, and with instruments that are difficult to read, and with radar that so far has an average of one out of three working, this unit will plan accordingly and accept, without comment, the experimental installations furnished.¹⁷

In the meantime, Bisson, now a lieutenant colonel, had departed in May with a small detachment to set up the new GCI radar at Marine Corps Air Station (MCAS), El Centro, California. In June, the ground crew section under a captain proceeded by rail, followed by the flight section of six fully-equipped black PVs under Schwable—now a colonel and back in command of the squadron as of 1 June.

At El Centro, ground, radar, and flight sections were reunited in the fearsome desert heat for a final three-week shakedown, with the primary

goal of getting the controllers comfortable with the new GCI radar. Then the ground troops embarked on the *President Polk* (AP 103) on 16 July for Noumea, New Caledonia, and the radar section plus all material sailed on the *Hammondsport* (AKV 2) for Espiritu Santo, New Hebrides, on 30 July.

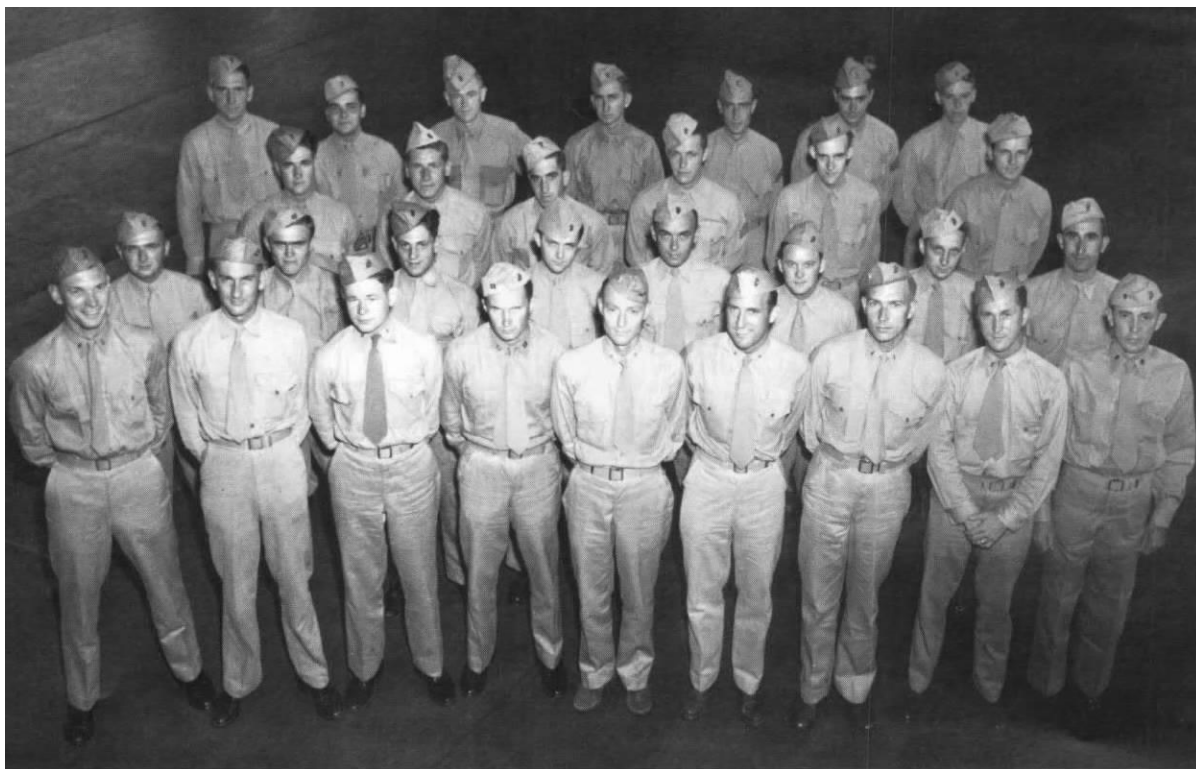
Schwable now wrote a long, frank report on the squadron's readiness. After noting the good qualities in personnel and equipment, he pointed out that 60 percent of the ground crews were "very new to the service." They could be trained, but a continuing problem was and would continue to be the severe limitations of his PVs:

45 to 55 minutes to climb to 20,000 feet. Very little maneuverability . . . above 15,000 feet. Very slow acceleration in level flight above 10,000 feet. . . . In view of the foregoing . . . the undersigned cannot view the possibility of successful night fighter operations with the PV-1 . . . unless the enemy operates below 15,000 feet.¹⁸

It was to be the squadron's good fortune that the enemy did!

Squadron members gather on the USS Long Island's deck shortly after leaving San Diego bound for Pearl Harbor.

Photo courtesy of BGen Frank H. Schwable, USMC (Ret)



To the Solomons and War

On 1 August, the six PVs were loaded on board the *Long Island* (CVE 1) at North Island, San Diego, bound for Pearl Harbor, accompanied by the flight crews (nine officers and 21 men). Enroute, Schwable conducted a vigorous PV weight reduction program and ordered every non-essential item removed. A sizable pile of brackets, de-icer gear, ventral guns, and even range receivers grew on the deck, and all was alleged to have been thrown overboard despite dire predictions of what the Bureau of Aeronautics would do—if they ever found out.¹⁹

The aircraft were lifted off ship at Ford Island, Pearl Harbor, and flown to nearby MCAS Ewa on 9 August to prepare for the long ferry trip 10 days later. The route was via six successive islands, with a longest leg of five hours, which did not tax the range of the Ventura. Arriving at Espiritu Santo in the New Hebrides Islands on 25 August, Schwable and Harshberger quickly flew to Henderson Field, Guadalcanal, and two days later up to Banika, one of the Russell Islands, to survey the situation.

The main threat still emanated from Japan's "Fortress Rabaul," with its well-protected Simpson Harbor, five surrounding airfields, strong anti-air defenses, and an excellent radar network. However, with the evacuation of Guadalcanal by the Japanese on 7 February, the Allied forces—composed of Royal New Zealand Air Force and Army units, now took the initiative. Successful landings by Army and Marine units in the Russells, at Segi Point on New Georgia with the seizure of Munda Airfield, and then Barakoma Beach, Vella Lavella, were quickly followed with airfields constructed by Seabees and Army engineers to increase pressure on the Japanese. Strikes on Rabaul and a wide variety of enemy airfields could now be made.

Japanese night raids nevertheless continued unabated, and Schwable and Harshberger were surprised to find an Army night fighter presence already at Guadalcanal. The 6th Night Fighter Squadron with its Douglas P-70 planes had already scored the first U.S. night victory in the Pacific, but the P-70s' poor altitude performance would limit their effectiveness.

Meanwhile, VMF(N)-531 came under control of the Commander, Aircraft, Solomons, the remarkable combined command that had grown out of the hodgepodge of Marine, Navy, Army, and New

Zealand aviation units from the early days of Guadalcanal. ComAirSols was Major General Nathan F. Twining, USA, who would be succeeded by Major General Ralph J. Mitchell, USMC, on 20 November. All planes were organized by 24 October into type commands such as Strike, Bomber, and Fighter. Fighter Command also was responsible for land-based "information centers, fighter direction centers, radar nets and AA [at] airfields."²⁰ VMF(N)-531 would soon discover that control of planes from a ship would be another matter entirely.

To adjust their radar to the squadron's new operating area, Bisson had the equipment set up with water as a reflective surface, since it was clear that GCI sites would necessarily be sited near water in the combat zone. These tests flew in the face of warnings in the British manuals of the impossibility of calibration due to changing tides. Bisson then conducted a series of innovative experiments in which he found that beach sitting could actually be superior. He next derived a simple set of altitude corrections for tides and greatly streamlined the lengthy calibration process itself. The correction was 100 feet per mile per foot of tide and was simply crayoned over the chart at the radar operator's position. It was a ground-breaking achievement; it produced a brilliant, yet simple, solution to a very complex problem which paid off many times later, since accurate altitude information was essential for a successful interception.

On 11 September, five PVs and their aircrews, plus 16 ground crewmen brought up from Noumea, New Caledonia, flew to Banika in the Russell Islands to commence combat flights (without GCI). Three days later, Schwable and Harshberger flew the first night combat air patrols.

On 16 September, Schwable and another plane piloted by Lieutenant John E. Mason with radar operator Staff Sergeant Ralph W. Emerson and gunner Corporal John J. Burkett took off from Banika to work with the pioneer GCI site. An enemy threat at Guadalcanal postponed the GCI work, so Schwable took a vector course for Russell and radioed Mason. Then all radar and radio communications with Mason ceased suddenly. Although a massive air search was undertaken the next day covering over 4,000 square miles, no trace of Mason's aircraft was ever found.

There were six scrambles against hostile bogies (Japanese planes) in September—all without



Photo courtesy of Maj William Henson, USMC (Ret)

A PV-1 parked on the crude airstrip of a Pacific island.

result due to the inability of the controller to get meaningful altitude information or quick plots out of the ineffective radar there. The eager pilots felt extremely frustrated.

In the meantime, realizing that shipboard control would soon be used on combat air patrols, Schwable had embarked on the *Lardner* (DD 247). He made the first try at a night ship-controlled intercept, "but there were many other planes in the air, and the attempt had to be put off," which did not augur well for the future. On the other hand, the radio communication was reported as "highly satisfactory."

Three PVs flew up to Munda, on New Georgia Island, late in September. Schwable stood the first night alert there on 5 October, and a few unusual rules of engagement were worked out: Marine night fighters were to take all bogies below 15,000 feet and Navy F4U-2 Corsair night fighters all those above. All night fighters were to remain outside the anti-aircraft and searchlight zone, and

all night fighters were to remain grounded if Air Force P-38Js were up for searchlight interception. The six F4U-2s were the Navy's first deployment of radar night fighters.²¹ However, the ships they were intended to protect were never really able to provide adequate night fighter control during the campaign. Further, the Army controllers at Munda decided only one night fighter could be controlled at a time, so the Navy and Marines were supposed to alternate nights. When VMF(N)-531 was ready to bring in its own GCI equipment, it was blocked by an Army officer.

Thus it was a relief to the squadron to move its own GCI to Vella Lavella in late October to cover the forthcoming landing of the 3d Marine Division on Bougainville, scheduled for 1 November. Schwable now had his hands full as a commanding officer with GCI and planes on Vella Lavella, while also using Munda, with the squadron's maintenance base back on Russell. The operational situation was characterized by many

patrols, many bogies, and no AI or visual contacts of enemy aircraft. From 14 September to 27 October, the squadron flew 47 night combat missions—including eight scrambles—and attempted to close on 17 bogies. The principal reasons for failure were the absence of precise control and inexperienced controllers who were unused to the requirements of night fighters.

Nevertheless, VMF(N)-531 was now approaching a time and place where its true value would be confirmed. The assault on Bougainville would bring the greatest challenges yet to the Marine night fighters. The island's commanding position made it the logical location for airfields from which the final reduction of Rabaul by airpower rather than amphibious assault could take place. The landing there would lead to some of the biggest day air battles of the Pacific and—finally—prove the concept of night fighters.

VMF(N)-531 would come under the operational control of Brigadier General Field Harris, USMC, Commander, Aircraft, Northern Solomons. The squadron's main mission would be night air defense in the amphibious operating area. Only a handful of amphibious ships—including four vital AKA transports—were available for the landing and the loss of even one would seriously compromise the assault.

The night preceding the landing (31 October) saw naval aviation's first night victory when VMF(N)-531's GCI guided a Navy F4U-2 onto a Japanese "Betty" bomber which fell in flames.* This was followed on the night of 13-14 November by a Marine sortie by Captain Duane R. Jenkins and his two-man crew. Flying in ideal conditions with moonlight, he was skillfully vectored (directed) to a single bogey. His subsequent combat report related:

The bogey appeared at 4,000' [range] on the scopes, going from right to left. A moment later the bogey came into sight . . . a Betty. He turned . . . on its tail at 0418. At 1,500' [range] he saw exhaust flames. . . . At 800' he gave a 4 second burst from below the slip stream of the enemy.

*"Betty" was the code name given to the Mitsubishi G4M-2 torpedo bomber. Its twin engines were each rated at 1,350 hp at 10,000 feet altitude. With a crew of 6-7, it could carry a bomb load up to 4,840 lbs. Armed with two 20mm cannons and four 7.7mm machine guns, it had a speed of 235 mph at sea level.



Photo courtesy of 1stLt Wesley Johnson, USMC
LtCol Frank H. Schwable confers with his plane captain, TSgt John Barna, who not only managed to keep his skipper's plane flying, but also managed to "go along for the ride" on 68 flights.

The starboard engine nacelle of the Betty started flaming, and it went into a shallow dive to about 4,000', during which the fighter caught it again with a short burst into the port wing root. He gave a third burst and the turret gunner gave it a two second burst in the fuselage, as the fighter passed from left to right. The Betty went into a steep dive flaming, and was seen to explode as it hit the water at 0420.

During the Bougainville campaign, the squadron managed to fly an average of three combat patrols per night and a similar number of administrative and transport flights. This stretched crews and planes to the absolute limit. A 6,000-mile supply line resulted in chronic parts shortages, and planes began to be operated in marginally airworthy status; Harshberger's aircraft, for example, flew around with a cracked tailwheel assembly for months for lack of a replacement.

Maintenance crews began performing minor miracles in what would have been depot level repairs stateside—if they had been attempted at

all. Tubes and rings which had cracked in the tropical saltwater environment were expediently repaired with tape and shellac. A fractured wing spar was repaired by carefully welding metal straps around it. Much later, an entire nose section including radar and guns was grafted onto a PV-1 bomber by an ad hoc team of Marines and sailors to create virtually another precious night fighter in the combat zone.²² Adaptors for carrying bombs or drop tanks with a cockpit release switch were fabricated from scratch.²³

These activities—particularly those involving other Services—did not occur in a vacuum, and an intricate system of barter using beer, whiskey, and medicinal brandy as currency evolved (as well as surreptitious “acquisitions”). A plane was pressed into duty to go to Sydney, Australia, more than once to procure alcoholic lubrication for essential parts and services. The unofficial suppliers of PV-1 parts were Navy and New Zealand squadrons, while radar parts came from the Army Air Force.

When, at odd hours, the squadron’s ground echelon found themselves denied rations from an Army-run mess, due to the squadron’s round-the-clock maintenance operation, the enterprising Marines first located desirable cases of rations with field glasses by day, and then appropriated them by night. Even grander examples of the art were the acquisitions of actual aircraft: an abandoned Grumman F4F-4 Wildcat and, later, an F6F-3 Hellcat. (The latter would later play a role in an interesting experiment in night attack.) These aircraft were maintained by the squadron and operated as AI targets and for administrative and search-and-rescue flights.

About this time there arose considerable discussion as to the proper employment of night fighters over the conquered area of Bougainville. Both ground and task unit commanders preferred to pull the night fighters away from approaching enemy aircraft so that anti-aircraft guns alone could deal with the threat. The explanation for this was twofold: a belief in the efficacy of anti-aircraft fire, even though it had not been especially effective, and a belief that a lot of such gunfire—which could be seen and heard—would help keep up morale. Schwable would devote much effort on a personal and written level to convince the higher powers otherwise, and, in the end, he would be proven correct.²⁴

The squadron’s airplane and aircrew situation saw a great improvement on 1 December when



Photo courtesy of TSgt Charles Budd, USMC (Ret)
The “Coral Princess,” piloted by Lt John E. Mason, was the squadron’s first loss, the aircraft disappearing while on a training mission in the vicinity of Guadalcanal on 16 September 1943.

three Venturas with six pilots, six radar operators, and three mechanics arrived in the long delayed second echelon. Two nights later they had to face the squadron’s first combat loss. The squadron’s War Diary entry related:

Captain Jenkins took off to cover a task group and destroyer squadron . . . [which] underwent an air attack by fifteen to twenty-five [enemy] planes. . . . They made continuous bombing and torpedo attacks. . . . A plane was seen shot down in flames by another plane seven miles east of the [ship] formation. The PV-1 was the only friendly plane in the area at the time. Afterwards, the plane still flying showed friendly (by IFF), and flew east for about one minute where it was lost. . . . Nothing further was heard from the PV-1 and the plane did not return to base.²⁵

Captain Jenkins, Technical Sergeant Charles H. Stout, and Sergeant Thomas J. Glennon were declared missing-in-action after an extensive air search. Jenkins was credited with a kill—believed to have been a “Betty”—based on the visual and radar evidence.

Three nights later, Harshberger with co-pilot First Lieutenant Wilbur E. Birdsall and his regular crew, radar operator Technical Sergeant James S. Kinne and gunner Staff Sergeant Walter E. Tiedeman, took off to patrol over Bougainville. The ground controller was the squadron’s own Captain Owen M. Hines. Shortly after midnight,

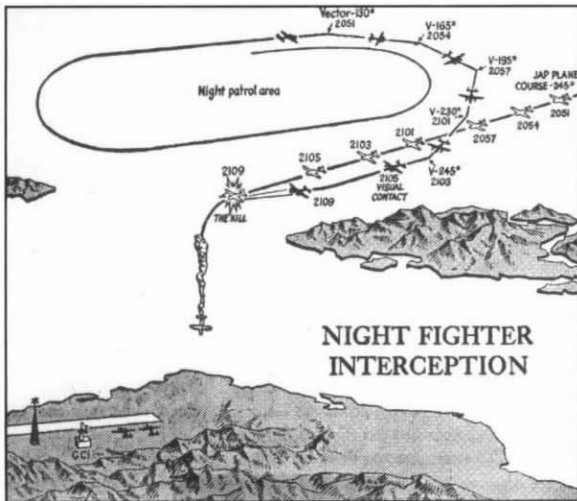


Diagram of a typical flight pattern of a VMF(N)-531 plane working its way into position for a kill.

Kinne captured a bogey on his scope. Harshberger slowed to 130 knots, and closed to 2,500 feet range when he saw a twin float plane, an Aichi E13A "Jake," silhouetted in the moonlight, gently weaving, and making about 110-115 knots.*

At 800 feet, he and Tiedeman both burst from slightly below. Almost immediately, the "plane fell off the right wing, burning," and Tiedeman saw an object "similar to a parachute drifting away as it fell." Shortly, he saw "the plane in the water, looking like a ball of fire." Hines radioed Harshberger that ground personnel had also seen the falling "Jake." All the frustration had finally paid off; an all-VMF(N)-531 team, air and ground, had successfully defeated a night intruder in support of Marines on a beachhead.

The squadron now embarked on yet another sideline, brought on by the fact that the Japanese had to rely on nocturnal shipping to supply their forces on Bougainville. The Japanese Navy used hundreds of self-propelled barges in this effort. On the night of 7-8 December, Harshberger flew the first two bombing and strafing missions against the enemy's barges.

Most of the night patrols now saw the PV-1s armed with a pair of 100-pound bombs rigged with instantaneous fuses, which could be

*"Jake," the Aichi E13A1, was a Japanese Navy reconnaissance float plane. With two engines and a crew of three, its 1,080 hp gave it a speed of 234 mph at 7,155 feet altitude. Armed with 3-4 machine guns, it had a bomb load capacity of 550 lbs.

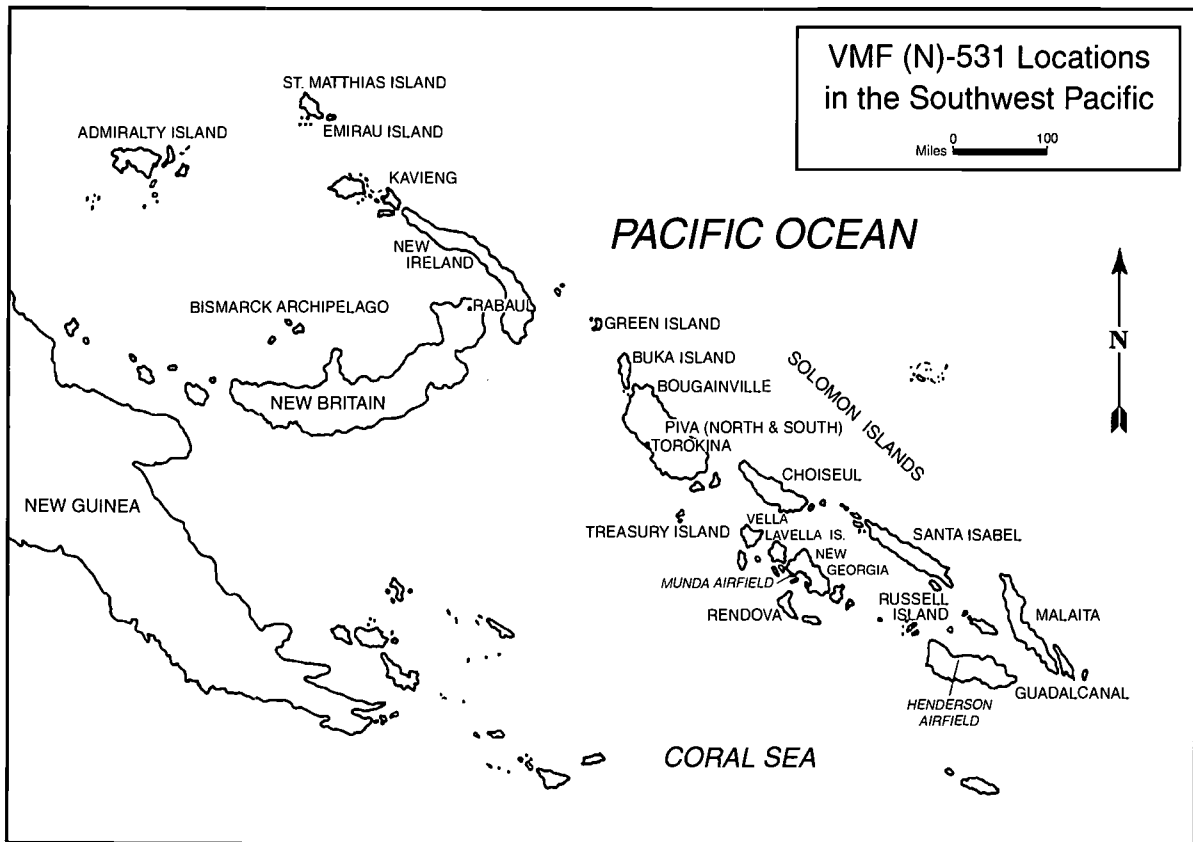
dropped on enemy positions beyond the Bougainville ground perimeter or in the neighboring Shortland Islands. Faisi Island came in for particular attention. On 11 December, Schwable dropped two bombs in the dock and ramp area on the west shore of Faisi, and watched in amazement as "the second bomb hit [with] a large explosion . . . followed by a series of explosions which covered half the width of the islands in flames." Photos taken during the day revealed a 200' x 200' burned area believed to have been a fuel dump. Schwable remained adamant that, while results of nuisance bombing and harassing attacks were gratifying, "night fighting is the principal business of the PV-1s." Harshberger, on the other hand, "enjoyed fighting his own little war" with night bombing.

The priority was clear when ComAirSols Fighter Command continued to assign a mission of "night harassing over enemy bases," well into 1944—probably because there simply were not very many suitable planes with night-experienced crews available, apart from the few AAF P-70s and some B-25s.²⁶ In the meantime, the Navy's F4U-2 Corsairs would enjoy their greatest successes. They totaled seven victories before leaving in May 1944, with three of their interceptions conducted by VMF(N)-531 controllers.²⁷

The objective of the Bougainville landings had been higher ground inland where two large parallel bomber strips (Piva Yoke and Piva Uncle) were built. These would play a key role in the final air offensive against Rabaul. The squadron's operations moved to Piva Uncle on 9 January 1944, and Schwable immediately flew the first mission.

On 12 January, Schwable was airborne from Piva with his regular crew, radar operator Staff Sergeant Robert I. Ward and gunner Sergeant William J. Fletcher. They were vectored by -531's own Captain Thompson S. Baker controlling a total of five intercept attempts which yielded two contacts. As Schwable tried to close in on the second contact, Fletcher sighted a single engine monoplane with retractable landing gear (probably a "Kate") at 3,000 feet range.* At 500 feet range, the pilot and gunner fired on it simultaneously, and "immediately the . . . plane exploded

*The Nakajima B5N, called "Kate," was a single-engine torpedo bomber, armed with 3-4 machine guns. Its 700 hp engine gave it a speed of 205 mph at sea level. Bomb load was 1,100 lbs.



The zone of operations for VMF(N)-531 during its tour of duty in the Southwest Pacific area in 1944.

and burst into flames. In order to avoid the wreckage, the pilot swung hard left and felt a scorching heat as his right wing just cleared the flaming mass.” The crew watched the plane explode again just before it hit the water; the crash was also seen from the shore 35 miles away. Schwable reported, “It had taken just 9 minutes from start to finish.”²⁸

February 1944 Climax

January 1944 saw several operational developments. The squadron’s radar intercept section was moved from Vella Lavella to the Treasury Islands, where it could better cover a portion of the shipping routes. An 11-man detachment was sent to a fighter direction unit established by the Navy, which was now fully convinced of the value of such an asset to amphibious forces. The Marines would train the naval personnel in radar operations for the forthcoming landings on Green Island, which was to be another link in the Allied chain surrounding Fortress Rabaul. Major Thomas E. Hicks, Jr., in the meantime, spent three weeks on board assorted destroyers with fighter direc-

tion capabilities to instruct their crews further in the subtleties of night fighter control. In addition, the old hands were heartened by the arrival of the third and last echelon of five PV-1s and six pilots on 30 January. For the first time in seven months, the flight section was finally reunited.

February would see the climax of Japanese air attacks and the height of the squadron’s successes. The groundwork was laid when, on 2 February, Hicks and Captain Kenneth J. Mudie, Bisson’s chief technical assistant, were landed on Green Island to conduct a reconnaissance for potential radar intercept sites.

Clashes with the enemy planes began on the night of 5-6 February when Schwable and his regular crew took off from Piva and were vectored by the Army onto a bogey estimated at 15,000 feet. Scrambling for altitude, Staff Sergeant Ward, the radar operator, was able to make a radar contact at 12,000 feet, but the PV had to close to a range of 700 feet before Schwable could identify it as another “Betty.” Pilot and gunner opened fire simultaneously and incendiary rounds were seen striking the “Betty’s” fuselage which “wavered and slowly turned to starboard . . . and

[after another burst] . . . fell off into a vertical spiral or spin." The next day, wreckage and a fuel slick were found in the area which seemed to confirm the kill.

On 8 February, Colonel Schwable took on a second hat as Air Operations, Vella Lavella. The squadron's radar section was now controlling from its vantage point in the Treasuries, while the PVs also began to stage there from Stirling Island. At last the squadron had sufficient aircraft to operate in multiple areas.

The night of 9-10 February would see the most exciting night combat yet, but it would be marred by the tragic loss of First Lieutenant Clifford W. Watson and his crew, radar operator Sergeant Jack H. Shirk, and gunner Sergeant George E. Brogna. Watson took off "in heavy weather," and after a

few moments, the Ventura was observed crashing into the water and bursting into flames. A crash boat was unable to recover the crew.

Later that same night, Harshberger took off from Piva. Eventually, Technical Sergeant Kinne made a radar contact at a range of 12,000 feet, near the PV-1's maximum combat altitude of 15,000 feet. As they struggled to close to within 4,000 feet, the large contact split into two blips on Kinne's scopes. Then closing in to 2,500 feet, Technical Sergeant Tiedeman identified two "Betty's" flying in formation.

Harshberger pressed into 1,500-2,000-foot range when the right-hand bomber opened fire with its 20mm tail cannon, followed immediately by its wingman on the left. Targeting the "Betty" on the left, Harshberger bored in still closer and

VMF(N)-531 staff and pilots pictured in the Russell Islands: front row, left to right: Capt Jack Plunkett, LtCol John D. Harshberger, Col Frank H. Schwable, Capt Duane R. Jenkins; second row: 1stLt Clifford W. Watson, WO William F. Lane, 2dLt Robert A. Carvell, 1stLt Frank Abegg, Jr.; third row: Lt Thomas V. Finch (MC), Capt Robert Barry, Capt Howard P. Cross, Capt Harold O. Torgerson, and Capt Thompson S. Baker. Capt Jenkins, 1stLt Watson, and Capt Torgerson were later killed on operational or combat missions.

VMF(N)-531 War Diary, 1942-1944



Brigadier General John D. Harshberger

Brigadier General John D. Harshberger was born in 1911, received a bachelor of science degree from the California Institute of Technology in 1934, and two years later, entered the Marine Corps.

Eager to be a flyer, he trained at Pensacola, Florida, received his commission, and joined Marine Bomber Squadron 6 at Quantico, Virginia, in 1936. The next four years saw him gain experience in a series of different squadrons.

By 1943, now a lieutenant colonel, he received a critical assignment as executive officer of VMF(N)-531, the first Marine night fighter squadron. When it deployed to the Southwest Pacific, Harshberger proved to be a fiercely motivated pilot, chalking up four kills of Japanese planes, and moving up to squadron commander. His outstanding record from 11 September 1943 to 25 March 1944 resulted in the award of a Distinguished Flying Cross. His citation included references to "extraordinary achievement . . . 90 night combat missions . . . pioneer in the development of night fighters tactics."

His subsequent career symbolized the varied duties of Marine aviation; in China, Hawaii, and the United States, he held multiple senior billets in a number of Marine Aircraft groups and wings, with a Legion of Merit awarded to him



Department of Defense Photo (USMC) 68321
Then LtCol John P. Harshberger.

for his leadership as commanding officer of MAG-11 in 1953.

On 1 November 1959, he retired and was advanced to the rank of brigadier general. He died on 11 November 1999.

opened fire with his six nose guns. The squadron war diary for that night recorded the next minute:

At this point the PV-1 was hit [with the white explosion of an HE shell] in the nose, putting five of the six guns out of commission. LtCol Harshberger continued to fire with the remaining gun. Sgt Tiedeman put one burst into the tail gunner of the "Betty" on the right [which then peeled off right out of range]. He then swung back on the bogey to the left and [fired] three bursts into the bogey . . . [then] the "Betty" . . . [which] had started to glow internally . . . [taking] on the appearance of a brightly lighted sieve

. . . lazed off into a steep nose dive.

A chase of the other "Betty" proved fruitless. With damage from the enemy's fire and fuel supply nearly gone, it was time to go home. Their radio had been knocked out and, approaching the home airfield, searchlights blazed on, followed by an anti-aircraft barrage aimed at them. They finally were able to land, and Harshberger summarized the mission: "Never had so much fun in my life!"²⁹

On the night of 14-15 February, while the Green Island amphibious task force moved into position, the squadron flew eight covering patrols, a new record. Schwable, as commanding officer, and Harshberger, as executive officer, flew

two each. Schwable's second patrol bore fruit. He was covering the first echelon on the attack force under the control of a Navy lieutenant on board a destroyer. When a bogey was spotted, the lieutenant put Schwable onto a tailchase, as the enemy began to head towards Rabaul. Ward got radar contact and at 2,000 feet, Schwable made out the unmistakable shape of a twin-float Aichi E13A "Jake." At 700 feet he fired a 13-round burst from each of his lower four nose guns and the "Jake's" engine caught fire. As the "Jake" slowed, gunner Fletcher fired so close at it, he thought he "could have hit the [pilot] over the head with his gun butt." Destroyer crews watched as "the flaming mass hit the water."

At dawn 15 February, troops from the 3d New Zealand Division landed on one of the Green Islands, a mere 120 nautical miles from Rabaul. Included among them was a detachment from VMF(N)-531 under Captain Hines. Within 36 hours, even before the Japanese garrison had been defeated, it was on the air providing, for the first time, radar protection for a landing force from the very start of an amphibious operation. The results were immediately obvious: two shoot-downs on the first night.

On the night of 16-17 February, as the new Green Island radar team commenced its first watch, the squadron put up patrols over the atoll. Schwable and his crew had the third patrol. Hines and his radar crew quickly located a bogey for them, which was then acquired on the plane's radar at a range of 5,000 feet. Staff Sergeant Ward, the radar operator, smoothly worked Schwable into a visual at 2,000 feet which "at first looked like a bright star moving slowly across the sky." The poor exhaust flame damping of Japanese aircraft was usually night fighter crews' first visual clue, and this time was no different: it was a "Jake."

At 300 feet, Schwable fired eight rounds each from the lower four guns, as did Sergeant Fletcher. "Instantaneously the ["Jake"] flamed and the wings flew up and back as if they had been jerked."³⁰ It was to be Colonel Schwable's last combat flight in the PV. With four victories, he was then the Allies' leading combat night fighter pilot in the Pacific.

A later patrol that night was flown by another veteran crew, First Lieutenant Jack M. Plunkett, with his RO and gunner, Staff Sergeants Floyd M. Pulham and Michael J. Cipkala. Hines vectored Plunkett after a bogey, and then Pulham got radar

contact at 4,000-foot range. At 400 feet, Plunkett saw a "Jake" making violent S-turns and he fired several bursts at the gyrating "Jake" from 350 feet. Later, Plunkett recalled seeing rounds strike the "Jake" without seeming effect, until suddenly "it nosed down into a vertical dive bursting into flames on the water."³¹

When Schwable arrived back at Vella Lavella, General Mitchell told him that he had made his last night combat flight, and he was ordered to report for further duty with ComAirSols. Mitchell had recommended him for the Navy Cross, but was overridden and he was given the Legion of Merit for his pioneer work and leadership of the squadron, in addition to the Distinguished Flying Cross for his combat actions.³² Looking back years later, he would characterize his night combat experiences as "hairy, scary—and very satisfactory." He had flown 269 hours of combat in 72 missions for a total of 421 hours in the combat zone.³³

On 18 February, Schwable again handed over the squadron to Harshberger. The Schwable-Harshberger commanding officer-executive officer relationship was a fascinating study in contrasts: two strong, highly intelligent men who both had exceptional experience and ability as aviators, plus an unusual degree of technical knowledge in the rapidly developing field of radar warfare. Of totally different temperaments, their relationship was durable and effective.

Schwable was the more cerebral of the pair, with a firm vision of what was needed, and to this end he produced a number of lengthy classified letters with very wide distribution. These carefully and clearly outlined all the aspects and problems of night fighting.* They would greatly influence the conduct of future night fighting campaigns, as well as the later development of new weapons systems for "all-weather" fighting. He was an inspiration to his subordinates and personally charming, a skill he used to good effect in influencing others about this type of arcane warfare.

Harshberger, on the other hand, was driven, even obsessed, with bringing destruction to the enemy. He seemed oblivious to any obstacle and pushed himself well beyond what others believed to be normal limits. His courage and aggressiveness, coupled with a compelling sense of duty,

*For an example of Schwable's analysis, see Appendix A.

were greatly admired. The other side of this coin, however, was that he did not suffer fools gladly, which led occasionally to his nickname being inverted to "Harsh John Ironberger."

Both men flew an extraordinary amount during their tours, consistently more than any of the other pilots. Schwable alone averaged more than 84 hours per month, exceeded only by "Iron John." Each flew virtually every day—sometimes as many as five flights—and reputedly neither ever took a rest in the combat zone. Incredibly, neither was involved in any flying mishap in their hazardous flying environment. It is difficult to imagine the successful introduction of night fighting to the Marine Corps without the leadership of these two remarkable officers.

With Harshberger now commanding officer, he made sure that everyone in the squadron was kept busy. On 19 February, he departed Piva and, with a vector from Captain Hines on the ground, Technical Sergeant Kinne, the radar operator in the plane, made a radar contact. Harshberger stalked in to 300 feet and fired. "The fuselage of the 'Jake' instantly burst into flames as if it had been made of gas . . . [and] dropped off to the left into a steep vertical dive" into the water where it burned.³⁴

Landing back at Bougainville, Harshberger was informed that First Lieutenant Thaddeus M. Banks and his crew, radar operator Staff Sergeant Burnell C. Bowers and turret gunner Sergeant Gilbert Jones, were missing on a barge search and strafe mission. He immediately refueled and took off on a five-hour search. He found no trace of Banks' plane or crew, but the following day, a pilot spotted a PV-1 wheel, cabin tank, and parachute.

The final week of February confirmed a dramatic elimination of the threat from hostile bogies. Fortress Rabaul had been effectively neutralized by air power in an unprecedented combined effort of American Marine, Army, and Navy, and New Zealand and Australian air forces. So Harshberger began complaining, "This squadron is hoping to be moved to some area where there will be more business. The [Japanese] seem to get the word when Night Fighters get into an area and they stay away at night."³⁵

Flight operations would continue in the theater until the end of July, albeit with a sense of increasing anticlimax, laced with a few triumphs and losses. Harshberger flew the unit's first night patrol around Rabaul itself late on 29 February.

In the months to come, the squadron would have a standing dusk and dawn "freelance" patrol over Rabaul, without GCI control. While Rabaul put up no countering aircraft, its conventional anti-aircraft defenses would remain potent.

The Japanese still supplied their isolated forces on Bougainville with barges, and First Lieutenant Francis E. Pierce, Jr., departed Piva on 3 March to do a search using flares. Harshberger came up an hour later and found five barges which Kinne illuminated with flares and which "conveniently held all in a straight line while being strafed," sinking three and possibly four in the process.³⁶

On 13 March, Harshberger and his crew left the Torokina strip on Bougainville to patrol Empress Augusta Bay. After 45 minutes there was a head-on contact, and at a range of 8,000 feet, Kinne made radar contact, and at 1,500 feet they saw a twin float plane that looked "altogether different" from the now familiar Aichi E13A "Jake." Whatever it was, it was obviously Japanese, and Harshberger closed to 300 feet, fired, and ". . . almost instantly the . . . plane blew up . . . Sgt Tiedeman claiming the turret was momentarily enveloped in white, green and yellow flames." The plane fell in "hundreds of pieces."³⁷

The crew later identified it as a "No. 14 Experimental Reconnaissance Seaplane" from captured photographs. It almost certainly was an Aichi E16A1—so new that no Allied code name had been yet assigned to it. (Later, it would be designated "Paul.")

On 21 March, the squadron would suffer the greatest tragedy of its history. The war diary entry reads:

Lt [Marvin E.] Notestine took off from Torokina at 0520 and patrolled until 0630 and then started home to Barakoma [Vella Lavella]. He was joined by Lts Pierce and Birdsall and they flew formation towards Vella Lavella. About 0650 Lt Pierce's wing clipped Lt Birdsall's wing. [Pierce's PV] burst into flames. Lt Birdsall's plane went into a spin. Lt Notestine barely avoided collision with Lt Pierce's flaming plane. Both the PV(N)s crashed into the sea . . . Lt Notestine circled low about the place . . . but saw no one afloat . . . nine lives were lost in the accident. No one was recovered.

Harshberger led the search effort in an F6F, assisted by First Lieutenant James H. Wehmer in an F4F,

and the squadron commander would fly an incredible 15 hours in the next 24, with 12 at night—but to no avail.

There would be no hostile contacts in April, and Harshberger began “a decided movement . . . to return the squadron to the United States for reforming and reequipping.” ComAirSols, Army Brigadier General Earl W. Barnes, concurred, and went on to praise the squadron’s “envious record,” noting that the dramatic reduction in enemy night air activity “has been largely due to the successful efforts of VMF-531 . . . with antiquated equipment . . . and an abundance of personal effort and ability of all members of the organization.”

On 6 May, Harshberger handed the squadron over to Captain Wehmer and then started home with seven pilots, three ground officers, 68 men, and all but three of the radar controllers. Harshberger’s record was remarkable: he had flown 756 hours in the theater, 433 hours in combat, and 100 combat missions. He would later receive the Distinguished Flying Cross for his combat actions and leadership. Along with Schwable, he was the Pacific’s leading Allied night fighter pilot with four confirmed victories.³⁸

In the squadron’s waning days in the South Pacific there was one last triumph. On 11 May, First Lieutenant Notestine, and his radar operator Sergeant Edward H. Benintende, and turret gunner Corporal Walter M. Kinn made a contact while “freelancing” over the St. George Channel. Notestine saw a plane pass opposite about 200 feet below them, with its running lights on. He racked the PV around and chased it into the naval base anchorage at Rabaul’s Simpson Harbor. It appeared that the bogey—a “Jake”—was preparing to land, and Notestine fired at 400-foot range. The bogey “burst into flame and hit the water” and the crew watched it burn for a short time and sink.³⁹ It was the squadron’s twelfth and final victory and the only one without use of radar. Notestine would later receive the Air Medal for his achievement.

The last combat mission was flown by First Lieutenant Arnold B. Loken, a dusk patrol over Rabaul on 14 July. The next day, combat flight operations were secured, and the squadron prepared to leave the South Pacific. One sergeant, John Barnes, remembered the haphazard way in which the squadron personnel were returned home:

Coming home from Bouganville, we left

on an LCI to Guadalcanal to get a ship. . . . We waited for days for a ship to arrive. One day we were put on Higgins boats to get to a ship in the harbor. When we were halfway to the ship, the ship took off, and we returned to Guadalcanal. No one spoke for three days.

Sgt James, our parachute rigger, had three foot lockers full of Japanese souvenirs that he had acquired by trading whiskey with the troops on the frontline. Sgt James made a deal with the Beachmaster, by giving him a few souvenirs, to get us home any way possible. I was lucky. I got aboard the General Polk and arrived in San Diego after 14 days. The rest of the men were put on three LSTs at different times and took over 20 days to reach the States. We were scattered all over the Pacific.⁴⁰

On 2 August, five PV-1s left Piva for Oahu. Three others were “condemned by naval authorities as overage and unfit for flying.” The rest were turned in at Hawaii. On 3 September, the ground echelon of six officers and 155 enlisted men left Bougainville and arrived in San Francisco. A young Reserve officer who was acting commanding officer, Captain Robert R. Finch, forwarded all records and equipment to Cherry Point and then disbanded the squadron that same day, “by telephonic order from Headquarters, U.S. Marine Corps.”

VMF(N)-531 would rise again to pioneer a brand new aircraft: Grumman’s fast and potent twin-engine F7F Tigercat. This would be a welcome change from the obsolete plane the squadron’s pilots had had to use. The Commanding Officer, Marine Aircraft, South Pacific, had made urgently clear the need for a major upgrade when, in his endorsement of Schwable’s historical summary, *Combat Experiences of VMF(N)-531*, he wrote:

The PV-1 airplane has been entirely unsatisfactory as a night fighter due to its low performance and other deficiencies. . . . It is recognized that the PV-1 was the only twin engine aircraft available for night fighter work at the time VMF(N)-531 was organized, and that single-engine aircraft were later converted to use as night fighters for the same reason.

All Marine Corps pilots who observed



Department of Defense Photo (USMC) 226616

Squadron F7F Tigercats sit on the ramp in front of one of three former Japanese hangars at Nan Yuan Field in Peiping, China, in December 1945.

and trained with night fighting units in England expressed the opinion that single-engined aircraft would never be entirely satisfactory as night fighters. They strongly recommended that a suitable twin-engined type be adopted. The operations of night fighter aircraft in this area have borne out this contention, and it is believed that no single-engined aircraft will ever be as satisfactory or give as good results as a twin-engined airplane designed for the purpose.⁴¹

Tigercats in Texas and China

The returning members of VMF(N)-531 took justifiable pride in the unit's achievements. It had been the most successful American night fighter squadron to date with an unequalled number of victories in the Pacific, while using an unsuitable aircraft and obsolete radar in demanding circumstances. The effective teamwork of Marine night fighter crews and ground controllers—born through much practice—had vividly demonstrated a new form of aerial warfare ahead of the other Services in the Pacific. The ability to defend amphibious forces ashore at night was a crucial innovation, whose value had been proven and would be again in the future. There was a price

however, the memory of the 20 men in the squadron who had died in the Solomons.

While it was temporarily disbanded, VMF(N)-531 nevertheless had brought home an Asiatic Pacific Campaign Streamer with four Bronze Stars for its operations in:

New Georgia	11 Sep - 16 Oct 43
Treasury-Bougainville	27 Oct - 15 Dec 43
Bismarck Archipelago	16 Dec - 1 May 44
Northern Solomons	13 May - 9 Aug 44

On 13 October 1944, the squadron was reformed with Lieutenant Colonel Radford C. West as commanding officer and Captain James H. Wehmer as adjutant. The status for the time being was "replacement training squadron." The 9th Marine Aircraft Wing (MAW) at Cherry Point had directed MAG-53—including the squadron—to move to MCAS Eagle Mountain Lake, Texas, on 29 November. Harshberger, as the new commanding officer of parent Marine Night Fighter Group 53, would be able to keep an eye on his former unit.

Four officers and 237 men were joined from the group, in addition to the seven personnel already on board. Lieutenant Colonel West was detached for overseas duty on 11 November and was succeeded by Major Edward V. Mendenhall,



Department of Defense Photo (USMC) A135007

This F7F-3 Tigercat was on a training flight from Cherry Point in April 1950.

Jr., who in turn departed six days later. Thus, Captain Finch found himself once again “temporary” commanding officer.

On 14 December, seven Douglas SBD-5 Dauntless dive bombers joined the squadron. The real purpose of the SBDs was as target bogies for the United States’ newest operational fighter, the Grumman F7F-2N Tigercat twin-engine night fighter.* VMF(N)-531 would be the first squadron to fly the hot, new plane.

How the Tigercat became a Marine night fighter was another familiar story of the Corps acquiring unwanted Navy airplanes. The F7F was originally designed to be flown from the new 45,000 ton Midway-class carriers. However, the problem of landing it with an engine out on the deck of a carrier proved insurmountable, and it became surplus to the Navy’s needs.

Here was the answer to Colonel Schwable’s pleas for a capable twin-engine, twin crew night fighter! There were minor limitations, but most pilots found it exhilarating to fly—it could be looped with ease, and the danger of redline at 430 knots could be quickly exceeded in a slight dive if the pilot was not careful. The novel and very stable tricycle landing gear made the ground

loops of conventional tailwheel aircraft a thing of the past.

On 17 January 1945, the first F7F-2N was ferried in, followed by 13 more by the end of February. The radar system, a Navy set called APS-6, was new, more powerful, and much easier to interpret than the old set. The same radar was used in Marine Corps’ single-seat night fighter, the Gruman F6F-3N and -5N Hellcat.

Because Marine aviation had expanded so quickly over the past three years, skilled technicians and experienced aviators were scarce. For this reason, all flight and maintenance operations in early 1945 were conducted at the group rather than squadron level. Thus, squadron identities tended to blur somewhat until the arrival on 24 February of the first large contingent of trained Tigercat pilots led by Major (later Lieutenant General) Robert P. Keller. In the next five weeks, 36 new warrant officer ROs would join VMF(N)-531, including Walter E. Tiedeman of Solomons fame. The Marine Corps had finally acknowledged the importance of the ROs’ role by elevating them to warrant rank.

On 10 April, Major Keller assumed command of the squadron from Major Alfred N. Gordon, who had had it for a brief 25 days (such was the rapid changeovers of commanders in those days). He led a gunnery detachment to Beaumont, Texas, where the four 20mm wing guns were fired. Each pilot received a week of gunnery practice.

*The F7F-2N was a very clean design built around two Pratt and Whitney R-2800-22W engines of 2,100 horsepower which gave a flashing 343 knots at sea level. Its initial climb rate was over 4,700 feet per minute and its service ceiling was near 41,000 feet.

The tempo of operations of this time was extremely high; in May alone, the pilots totaled 2,105 hours in 1,642 flights. Early reports from the Okinawa campaign spurred the squadron on, and it was believed by all that the final invasion of the Japanese home islands would require the greatest night fighter effort yet.

Combat looked more imminent when, on 9 June 1945, Major Keller led the first cadre of 140 personnel with 17 F7F-2N planes (and 12 SBDs) west to California. From there the detachment went on to Okinawa on 14 August, arriving in the wake of the nuclear attack on Hiroshima and Nagasaki a week earlier. Here the men took over the designation of VMF(N)-533, a night fighter squadron which had a record 35 victories during the Okinawa campaign. The next day, the Japanese ceased all hostilities, but -533 would fly patrols until the formal surrender on 2 September.

It then moved to Nan Yuan Airfield, Peiping, China, on 6 October as part of the occupation of North China. There it flew missions along the main rail lines—and was frequently fired upon—in an effort to bring security to the countryside. This was doomed by the rising civil war, and its last detachment left China on 1 May 1947.⁴²

Back at Eagle Mountain Lake, Texas, once again as VMF(N)-531, the squadron continued its role as a training unit with Captain James H. Wehmer once more in command. Three F7F-3 day fighters were taken on board for evaluation in late June 1945, in preparation for the coming transition to the -3N night fighter version. V-J Day was celebrated with a two-day standdown on 15-16 August, but round-the-clock training then resumed unabated, with the squadron flying 1,229 hours in 940 sorties with 29 aircraft in the last month of the war, to get ready for the much improved two-seat F7F-3N.⁴³ The first of these new models to go to an operational squadron was delivered on 25 September to VMF(N)-531, followed by five more by the end of the month.

*This featured more powerful Pratt and Whitney R2800-34W engines, elimination of the .50-caliber nose guns, a larger vertical fin for better single-engine control, and a long-awaited, totally new—to the naval service at any rate—radar. The SCR-720, the outstanding AI radar of the war for aircraft interception, was a joint American-British development. It had good low altitude capability with ranges of 4-5 miles. At higher altitudes, a 12-mile range permitted skilled ROs to find a target head-on, and then swing around to its stern for final attack, thus lessening dependence on GCI for the crucial final vectors.

But the new equipment came just as the squadron which would use it was being radically downsized. Wehmer oversaw the first post-war demobilization on 3-4 October, as the Marine Corps adopted the Army “point” system to determine discharge dates. He was succeeded by Lieutenant Colonel Alfred N. Gordon as commanding officer on the 22d. Altogether 88 men would be discharged that month, and Gordon noted the “loss has been a severe blow, since many of the most experienced men are among those transferred. Very few replacements have been received.”

The squadron now began an inexorable decline to its nadir as the nation dismantled its military establishment. On 28 December, still another new commanding officer, Major Harold G. Schlendering, assumed command and had to oversee the continuing loss of men and planes as 1945 ended. Plans then had to be made for the skeleton squadron to move back to its birthplace, where it would remain, except for deployments, for the next 22 years.

Postwar Survival at Cherry Point

Arriving back at Cherry Point in February 1946, the remaining personnel of the squadron struggled on with training through the spring and summer. By 15 April, VMF(N)-531 had been pared to an even dozen F7F-3N planes.

Possibly to give Marine aviation more visibility, the squadron began participating in air shows; six Tigercats went to Birmingham, Alabama, on 31 May, and another three to Schenectady on 18 June. The visit to New York state was led by a colorful new commander, Major Joseph H. Reinburg, a Pacific fighter ace who had taken over on 7 June. At the popular Cleveland Air Races that September, he gave a dazzling solo airshow four days running, with loops off the deck, vertical rolls, split-S's and single engine slow rolls toward the dead engine—altogether a remarkable performance for a multi-engine aircraft.

Back at Cherry Point, Reinburg faced a disheartening requirement. He was forced to preside as the unit assumed “paper status” on 1 July with only himself, a clerk, and a dozen Tigercats. A massive reduction was taking place throughout the Marine Corps, but it was particularly acute in Marine aviation which shrunk remarkably from 145 squadrons in September 1944 to 27 tactical squadrons in June 1946.⁴⁴

Colonel Paul A. Noel was a junior officer in -531 in those summer days of 1946. He still remembers the handicaps under which they worked:

MCAS Eagle Mountain Lake had been decommissioned and MAG-53 shifted to MCAS Cherry Point. Shortly thereafter NAS Vero Beach (center of night fighter operational training) ceased flight operations, and most of the Marine instructors and aviation maintenance personnel were transferred to VMF(N)-531 at Cherry Point.

The problem was how to keep the aviators occupied when there was a shortage of flight hours available. This was solved by dividing the company-grade officers into three "wings" and rotating daily duties. One group was on the flight schedule, day and/or night; one group worked at their secondary ground assignments; and the third group was assigned to the "bull gang."

I remember setting up bunks in the enlisted barracks, moving furniture in the squadron offices, and most vividly cutting grass with a push lawnmower next to public works personnel on a rider mower. I think we wore flight suits, but it may have been dungarees. At any rate, in NC in June, July, and August it was *hot* and *miserable* duty. I also have a vivid memory of the senior captain, Henry A. McCartney, assigned in charge of the gangs, standing in the shade in spiffy khakis, as we were drenched in sweat.

In addition, each company grade officer had to turn in one correspondence course lesson per week minimum, for recording and mailing. These could be studied and prepared in the squadron area during normal work hours. Course subject was optional, but most of us enrolled in Marine Corps Schools, Quantico.⁴⁵

On 1 November 1946, in spite of earlier problems, Reinburg set about rebuilding with 12 F7F-3Ns and 153 newly reported—and mostly fresh from boot camp—regulars in addition to two Reserve aviators. Flying was routine re-familiarization until 17 February 1947 when the squadron entered into formal "syllabus" training, including rocket firing for the first time on 11 March.

On 31 May, further consolidation of Marine

night fighters took place. MAG-53 was decommissioned. Its commanding officer had been Lieutenant Colonel Peter D. Lambrecht, previously the highly regarded combat skipper of VMF(N)-541 and one of the select group of officers who had been sent to Britain in 1943 to study English night fighting. He now became commanding officer of VMF(N)-531 on 1 June, bringing with him six F6F-5N Hellcats.

The Grumman F6Fs were earmarked for carrier duty for which they were well suited. The Hellcat was the easiest fighter of its day to fly, if not the fastest (228 knots at 23,400 feet), and it was very stable on instruments and during carrier approaches.⁴⁶ They would remain with the squadron until 4 September, while -531 was temporarily under the operational control of AirFMFLant.

In the meantime, the Marine Corps set about giving its night fighters some badly needed all-weather navigation capability. During the war, naval aviation had inexplicably lagged in the development of on-board navigation aids. The F7F-2N, for example, could not use radar beacons. Often a night fighter became completely dependent upon ground control radio for radar vectors to home base, even though those controllers sometimes lost radar and radio contact with aircraft. Now, however, the F7F-3N's radar had a provision for radar beacon reception. It worked up to 150 miles, depending upon altitude, and was quite reliable. But still better technology was on the way.

In May 1947, squadron pilots began training in a new type of blind approach system. It was called ground controlled approach (GCA) and used two scanning radar beams, one for glide-slope and one for runway alignment. The aircraft would be positioned in the beams and then "talked down" by the controller using a format that would not change for the next 40 years:

Love Tare Zero Three, this is your final controller, how do you read, over Check landing gear down, acknowledge, over. . . . You are five miles from touchdown, approaching glidepath . . . begin descent. Slightly below . . . up and on glidepath. . . . Slightly right of course, come port now to heading one three eight degrees . . . on glidepath . . . four miles to touchdown, on course, come starboard to one four two degrees. . . . Cherry Point Tower clears

you to land . . . approaching minimums . . . at minimums, take over and land visually.⁴⁷

By 1 July, 75 percent of the squadron's pilots were "GCA qualified," and they would soon be tested. The night fighting capability of the Corps, and VMF(N)-531 in particular, were evaluated in three formal intercept exercises, using GCI, beginning on 24 July 1947. In the first exercise, 17 raids were flown, resulting in only six "splashes." The second test was a high-altitude exercise of 12 raids. There were only two "splashes." The last exercise was at low altitude with eight raids and three "splashes."

While the squadron's performance was officially rated as "good," the percentage of missed intercepts was of great concern to the new commanding officer, Lieutenant Colonel Andrew G. Smith, Jr. Taking charge on 1 August, he saw that the student RO and GCI controller mistakes could be rectified by training, but there was no getting around limitations like radios with only ten channels. Even more worrisome was the lack of speed in the F7F-3N: only 210 knots at 20,000 feet. Bison, a vital member of -531 during the war and the exercise evaluator, made the pithy observation, "If the night fighter . . . is slower than the expected . . . opposition, it remains of little value."⁴⁸

In the fall of 1947, squadron pilots were getting in dive bombing practice just off Harkers Island, North Carolina. The target was located on a small sand spit. Years later, a story from -531's newsletter exemplified how rugged the F7F was:

On this occasion -531 Tigercats were dropping water-sand fills. Lt Foster rolled into his dive and as he started to pull out of his dive he found that the stick was frozen—no elevator control. After what seemed like eons in his dive toward the target and eternity, the stick suddenly moved and his Tigercat started to react and come out of the dive, but too late. However, the F7F munched out, struck the target, and skipped back into the air.

The prop on one engine, badly bent, had to be feathered, but Foster was able to gain a little altitude and to fly single engine to a landing at Cherry Point.⁴⁹

The days of planes like the F7F, however, would have to end when the United States took

note of the technological advances developed during World War II. Given the German's European successes in night fighter shootdowns using their jet planes, it was now clear that the United States needed a jet for such missions. Accordingly, the Bureau of Aeronautics issued a requirement for a carrier fighter able "to detect enemy aircraft 125 miles away, while flying at 40,000 feet and 500 mph."⁵⁰ Unfortunately, the Tigercats would have to carry on for seven long years before an aircraft reached the fleet that could even partially meet those specifications.

Lieutenant Colonel Smith oversaw the transfer of his squadron back to the 2d MAW at Cherry Point in October 1947.* Then, in February and March of 1948, VMF(N)-531 participated in the first of the many Caribbean training exercises to come over the next 20 years. Six F7Fs were flown in stages to NAS Roosevelt Roads on the east coast of Puerto Rico. Once there, things went badly. The nighttime capabilities of the squadron were underused. One pilot was vectored aimlessly about without any navigation aids until he was thoroughly lost. He finally extricated himself in deteriorating visibility and "let down on the San Juan beam and flew back to base using radar." It was then discovered that the ship's radar was obsolete and in bad repair with a limited range. In fact, virtually every electronic system necessary for the night defense of the amphibious task force was unsatisfactory, a recipe for disaster in actual combat.⁵¹ In years to come air defense of such task forces would be one of the knottiest problems facing Navy/Marine operations.

On 15 July, Lieutenant Nathan D. Post, Jr., reported in as the new commanding officer.**

*A story from a -531 reunion many years later could refer to any one of the three commanding officers who led the squadron in 1947 when the pilots were proud possessors of 13 F7F-3Ns: "One of them—the skipper's bird—was selected for refit with four bladed, reversible props It seems the commanding officer became enamored with the tactical possibilities offered by taxiing backwards, an exercise ripe for a disaster of sorts. One such day, as -531's leader was practicing his newly discovered capability, he lingered in reverse a bit too long; the skitterish Tigercat picked up speed. Alertly, the Skipper jumped on the binder [brakes]. Alas, he'd forgotten about the tricycle [landing] gear; the bird sat back on its tail with catastrophic results. O&R [Overhaul and Repair] became custodian of the now-unusual airframe."

**An later commander of -531 reported on squadron "sea stories" that told of Post staying very late at the Officers Club and "then getting up the following morning, bright-eyed and bushy-tailed, to the detriment of junior officers not fit to fly."

Then, in the fall of 1948, there was a change of terminology which marked the increasing recognition of radar's value in every adverse meteorological condition. Some squadrons were classed on 14 October as "all-weather" fighters. It was now VMF(AW)-531.

In 1949, fleet air defense was evidently taken to heart by the Navy. During another deployment to "Rosey Roads," -531 acted as part of a "Maneuver Enemy Fighter Aircraft Group." For eight days beginning 27 February, the squadron performed simulated daylight bombing, strafing, and rocket "attacks" on five separate Navy task forces, while escorting Navy patrol bombers, some of whom engaged in "atom bomb attacks." Significantly, no night attacks were scheduled.

The squadron, commanded as of 13 June by Lieutenant Colonel Joseph W. Kean, Jr., had its annual operational readiness inspection on 5-6 October 1949.* Aircraft availability was 100 percent throughout, with only one radio and two radar failures. As part of the inspection, the first exercise was a simulated bomb and rocket attack against enemy troops at Camp Lejeune. The last exercise completed 53 hours of flying in 12 hours; it had been a grueling test.

On the eve of 1950, the concept of Marine all-weather and night fighters was well established. Five of the Corps' 12 active tactical squadrons were assigned that specialized mission. VMF(AW)s -531, -533, -144 were in MAG 24, and -542 and -513 were also VMF(AW) squadrons.

The first half of 1950 saw two major inspections; the first, an AirFMFLant material inspection found readiness to be "excellent," and -531 "ready for war within the minimum prescribed time."⁵² The second was an unexpected Efficiency Trophy Inspection by the 2d MAW. The commanding general of the wing praised the unit for being "number one of all tactical squadrons inspected."⁵³

As gratifying as this was to Lieutenant Colonel Kean, there were two large concerns for him and his successor, Major John R. Spooner, who arrived 16 June 1950. The first problem was a pilot turnover of 50 percent in the past six months. The second was a serious lack of trained airborne

interception officers (AIOs), and this was compounded by manpower drains for routine base duties. Worse yet, designation as an AIO was deemed at the time to be an additional, rather than primary, military occupational specialty (MOS).

In April the burden of training AIOs was shifted to a formal AIO School at MAG-24, now designated an "All-Weather Group." The syllabus included ground school and flight hours, but for pilots and AIOs alike, the all-weather fighter trade was—and would remain—a very complex series of skills usually taking years, not months, to master. This would be reflected in -531's first serious accident to occur in more than four years.

The squadron's outstanding post-war safety record was marred during a cross-country flight on 21 June 1950, when Technical Sergeant Joseph J. Quinn led his wingman, Corporal Thomas E. Sims, Jr., into a thunderstorm.* Shortly thereafter, Quinn saw his altimeter winding down below 300 feet and radioed a frantic warning for Sims to pull up. He then watched in horror as his wingman's Tigercat crashed into the ground killing Sims and his crewman.⁵⁴

Four days later, the North Korean Army rolled across the 38th parallel into the Republic of Korea, and the Marine Corps found itself once again committed to combat. On 1 August—as the enemy noose was being tightened around the shrinking Pusan perimeter—the squadron was alerted for overseas duty and began packing and crating for embarkation. Three days later, the move was "postponed indefinitely." VMF(AW)-531 would not participate in combat in Korea.

While many former members of the squadron would play dramatic roles in Korea, -531 itself was reluctantly relegated to a training role, participating in large-scale exercises, and developing new night close air support (CAS) techniques. By December, 44 percent of all its enlisted men were recalled Reserves, and they had been completely integrated into the unit and were working at "a level of high efficiency." But the turnover of officers—mostly pilots being refreshed and sent to

*Also remembered in these tales was Kean "who persisted in carrying a swagger stick," and was called behind his back "Joe Kean, the model Marine." The accuracy of these "sea stories" cannot be vouched for, but they indicate that life in -531 could be colorful.

*Enlisted pilots were called naval aviation pilots (NAPs). In this era, some NAPs had gone through flight training as enlisted men and others, such as former Aviation Cadets with Reserve commissions, accepted reversion to enlisted status to remain on active duty. Some NAPs accumulated well over 10,000 hours of flight time, two to three times as much as average commissioned pilots.

Korea—was so high that the squadron had to report that “a state of reorganization [existed] in nearly every department.”

A Navy/Marine exercise in November had -531 again defending the fleet—this time with much better results in communications. Ominously, however, attempts at dusk intercepts with “enemy” jets were not satisfactory. As Major Spooner stated, “Without complete air superiority . . . the F7F-3N . . . should be limited to missions during hours of darkness and . . . inclement weather.”

The early reports from Korea showed the need for adequate night close air support, but, as Colonel Schwable had discovered seven years earlier, there were severe obstacles to achieving it. The problem of target identification alone was daunting, but, beginning in 1951, two new approaches were tried.

The first involved precision ground tracking radar, operated by Marine Tactical Air Control Squadron 1 in Korea. The bomber was picked up in the narrow radar beam, over a visual checkpoint, at a precise altitude, and then vectored toward the target, whose location was plotted exactly. Given the number of variables, this radar could not assure the pin-point accuracy that true close air support required, but as a method for attacking larger target areas, it was excellent.⁵⁵

A second technique practiced by -531 was ordnance delivery with night illumination. Flares were said to have had “remarkable results” in Korea, and the pilots found using them to be valuable training.

The squadron followed the Korean air war closely, in order to properly prepare its aircrews for combat. Reports from Korea showed that the night air defense mission was shifted aside while the night fighters provided close air support, beginning in September 1950 with the Inchon landing.

Night air defense again became important during the summer of 1951 when Russian-built biplanes began night harassing attacks. Two were shot down by Marine Tigercats, one on 1 July and another on 23 September. The AIO on the second was Master Sergeant Thomas H. Ullom, a former -531 RO in the Pacific who had returned to active duty and refreshed with the squadron at Cherry Point.⁵⁶

VMF(AW)-531—now augmented by 10 F7F-3 non-radar fighter/bombers to go with its 14 F7F-

3Ns—worked hard to tailor its training to the needs of Korea, while meeting a heavy load of tactical exercise commitments. There were a dozen in 1951 alone. Certainly no other American aviation unit had such a diversity of missions.

One of these was a six-week deployment to the primitive Bogue airfield near Cherry Point, beginning 7 May. There the squadron practiced day and night rocket, gun, and bomb attacks, with emphasis on night close air support and use of flares. These night bomb and rocket attacks used ground radar in conjunction with GCI and AI radar intercepts. Sadly, on the night of 10 May, First Lieutenant Frederick M. Fahrion experienced a rough running left engine which failed shortly after a “wave-off” from landing at Bogue Field. The airplane crashed in a wooded area killing the pilot. The AIO escaped with minor injuries.

On 24 July, Major Fred J. Gilhuly became an interim commanding officer. His successor on 29 July, was Lieutenant Colonel Boyd C. McElhany, Jr., who faced another aspect of the continuing night CAS problem. This emerged when the squadron flew in a joint air support weapons evaluation test at Fort Bragg, North Carolina. Air-ground coordination was initially reported to have been poor, and a debriefing of the pilots revealed that there were two non-Marine forward air controllers (FACs) for each mission, one on the ground and one in the flare plane. Neither could seem to agree on target location and designation, hence the confusion.

The test pointed out the crucial importance of FACs and pilots communicating effectively. The alternative was potential disaster when operating close to friendly troops. The Marine Corps had long understood this, and from the beginning had assigned aviators as FACs. Aviators not only spoke a common standardized language, but they also understood better than anyone else what was possible or not, thus helping ground commanders get the most from this unique supporting arm.

The year 1951 saw the last full year of F7F operations. The aging squadron Tigercats had flown an even 11,000 hours in 5,636 sorties (2,162 at night), with pilots averaging about 30 hours per month. Towards the end of the year, McElhany began sending men off to technical schools to learn the secrets of the world's first purpose-built, all-weather, jet fighter, the much-awaited Douglas F3D-2 Skyknight.

Enter the Jets: The Skyknight

The F3D, affectionately known as "Willie the Whale," was a conservative design suitable for use on carriers, and featured the largest radar (the APQ-36) ever put in a fighter. It was an aircraft with immaculate handling qualities, featuring hydraulically boosted ailerons and spoilers for high speed roll control, and "speed retarder brakes" (or panels) which could be extended out of the fuselage to help slow down the plane when making an approach for a carrier landing.*⁵⁷

On 12 February 1952, Major Lowell D. Grow took over as commanding officer and accepted the first Skyknight, an F3D-1 of the first production batch, on 28 February. This was followed by three more by April. A single F3D-2 was delivered in May, and this would be the model operated in the coming years. At year's end there would be 20 on board.

Aircrews promptly got busy familiarizing themselves with their new charges. The side-by-side cockpit was spacious and had the vital amenity of pressurization for high altitude flight, as well as air conditioning of sorts. Radio equipment was elaborate with ten channels of very high frequency, a receiver, identification friend or foe (IFF), a radio altimeter, radar beacon reception up to 200 miles, and a long-awaited radio-compass. The heart of the F3D was the complex weapons system which consisted of three separate radars.

One searched on a scope left and right and in broad elevation from down to up. A single target could be selectively tracked. This track-while-scan capability would prove to be very effective. Although the "desired" acquisition range of the radar against a bomber target was 125 miles, in practice airborne radar operators found maximum ranges to be little more than 20 miles. Even so, it was enough to operate independently of ground control on some types of escort missions.

For protection against stern attacks, a second radar radiated rearwards in a conical search pattern with a range of about two miles. When a tar-

get was detected, an appropriate rear quadrant warning light came on. The third radar set was the gun aiming radar for the pilot, which was activated when his radar operator tracked a target. A primitive "ballistics computer" produced an aiming dot on the scope inside of 4,000 yards and the pilot maneuvered that into crosshairs, firing his four nose-mounted 20mm cannon when in range. It was now technically possible for the first time for a fighter to shoot down another aircraft sight unseen.

While transitioning to the Skyknights, -531 continued to churn out replacement aircrews for Korea at a steady rate during the first half of 1952.* It also worked to develop day escort tactics for the Marine Corps' revolutionary new aviation asset, the helicopter, beginning in January. They settled onto a left-handed "racetrack" pattern in column on both sides, one thousand feet above the helo formation. This permitted optimum coverage of potential ground targets at all times, and the helicopter leader could be assured of getting fire on his target within seconds.

The squadron would be a prime supplier of aircrews to the Corps' sole remaining night squadron in Korea for the rest of that conflict. The successes of these pilots and radar operators there reflected the excellence of their home training. It would be in the night escort role that the Marine F3Ds unexpectedly showed great capability in Korea. USAF B-29s had been forced into night bomber "stream" tactics because of the Communist air defenses and MiG fighter plane attacks. On 3 November 1952, history's first jet-to-jet night kill was made by a former -531 team, and this was followed by another "alumni" kill five nights later. Then five more enemy planes were brought down in superbly coordinated and executed missions, and the Marines had reached the peak of the world's night fighter forces by demonstrating a remarkable capability: no bomber escorted by a Marine F3D was ever successfully attacked in Korea thereafter.⁵⁸

Meanwhile, at Cherry Point on 1 December 1952, the Commandant assigned the squadron a new task: "to maintain capability to operate from aircraft carriers."⁵⁹ This would be the first such mission for Marine all-weather jets. To this end,

*The 3,400 pounds, thrust in each engine in the production version of the F3D-2 gave a top speed of 460 knots at sea level. With drop tanks, the speed dropped 25-40 knots. Maximum ceiling ranged from 35,000 to 45,000 feet, depending upon weight. Low power made for tense takeoffs on the short runways of the day, however. Even a moderately loaded F3D needed more than a mile of pavement to get airborne on a summer day at 86 degrees.

*Similarly, there was a succession of short-tenure commanders from January 1952 to July 1953: Lieutenant Colonel Gelon H. Doswell; Major Lowell D. Grow; and Major Arthur R. Boag.



Photo courtesy of Col Robert Foxworth, USMC

This F3D-2 Skyknight was the personal plane of the squadron commander, LtCol Gordon E. Gray, in late 1957. The folded wings were designed for carrier duty, but the plane proved unsuitable for that use.

two pilots, Captains William J. A. Barbanes and William L. Hall, were sent to a Navy squadron to conduct field carrier landing practice. There, on 2-6 March 1953, they became the first Marines to qualify for carrier operation in the F3D, landing on board the *Franklin D. Roosevelt* (CVB 42).

The two pilots discovered that there were serious problems with the Skyknight at sea. This was the era of the violent hydraulic catapult, the landing signals officer with his hard-to-see guidance paddles, and, above all, the straight carrier deck itself which allowed no possibility of a go-around or “wave-off,” once the throttles were cut for landing. If the arresting wires were missed, a crash into a web barrier was inevitable. If a “wave-off” was not prompt—and the F3D’s engines required up to 15 agonizing seconds to go from idle to 100 percent power—there was danger of imminent collision with aircraft parked forward on the flight deck.

Indeed, the F3D-1’s poor showing in carrier suitability tests was the primary reason the Marine Corps received the Skyknight. There were too many problems in the plane for effective night carrier service: its shallow approach angle, its poor visibility for the pilot, and its radar equipment failures at sea.⁶⁰ At the time of the Korean

Armistice, on 27 July 1953, VMF(AW)-531 had 24 F3D-2s on board, flown by 35 pilots with 23 radar operators.

Twelve pilots and 16 men—mostly radar operators—had been sent to Korea by the end of June. Six former members of -531 returning from combat were presented Air Medals by the Commanding General, 2d MAF, Major General Clayton C. Jerome, on 27 June.

As had happened after World War II, the contingency focus of the squadron now reverted to Europe, as well as keeping the carrier mission alive. In late August, VMF(AW)-531 sent an F3D to the Naval Aviation Test Center at Patuxent River for a catapult test.

A new squadron commander, Lieutenant Colonel Ernest R. Hemingway, took charge on 30 July.* It was obvious that, if Marine all-weather fighters were to be involved in Europe, there would have to be practice for transatlantic flight. The F3D-2 was suited for such a mission, with two engines, good navigation/communication aids, a range of about 1,400 nautical miles with its

*Hemingway, as a major, had been commanding officer of -531 for two weeks in July 1946. Now, seven years later, he had returned.

two 150-gallon drop tanks, and crews experienced in instrument flying.

The projected route was the traditional North Atlantic one, by way of Goose Bay, Labrador, Greenland, Iceland and Scotland. The longest leg was only 888 miles, and each stop had good facilities with long runways, ground control equipment, and radio and radar beacons.

But problems would abort the planned flight of four F3D Skyknights at Goose Bay on 16-19 November, due to shortages of critical equipment for a winter-time trans-oceanic flight. Nonetheless, Hemingway felt "that mass flights to the European Theatre with F3D aircraft in winter are entirely feasible and practical [and] could be made under weather minimums somewhat less stringent than [USAF] Ferry Flights."⁶¹

The period after the Korean truce saw another massive drain of personnel, with 127 men being separated or discharged by year's end. But even after the armistice, VMF(N)-531 continued to send trained people to Korea and later Japan, including some seven pilots and 34 men in the last half of 1953, almost none of whom were replaced. One positive note occurred in the area of aircraft communications and navigation, as the end of 1953 saw the conversion of all F3Ds to a radically improved ultra high frequency (UHF) radio.⁶²

The year 1954 brought a more immediate focus to the squadron. On 15 June, a new commanding officer, Lieutenant Colonel Roscoe C. Cline, Jr., took charge, and on 8 July he led F3D's first Caribbean deployment with jets to Roosevelt Roads. This was a two-month stint involving MAG-24 and the 8th Marines. Although the unit would perform all manner of aviation tasks in the exercise, Cline's primary goal was to carry out live interceptions and cannon firing under completely blind conditions. As far as is known, this had never been done by any Marine squadron before, since gunnery traditionally had always been done visually.

Four daily flights of four F3Ds were scheduled, each to get four or five runs per sortie. The target was a standard gunnery "banner" with a radar

reflector attached to several miles of cable towed by another F3D. Each fighter began its run head-on to the towing F3D. The radar operator acquired the target on his search scope, then "locked-on" the radar to the banner. He then gave the pilot, at the precise moment, a tight pursuit turn into the target. After the towing pilot gave clearance to fire, the hooded pilot now concentrated on his gun-laying radar scope, trying to keep the jittering aiming dot in the cross-hairs. As the range fell below 400-500 yards, he opened fire.

The task demanded so much precision that it took about four weeks to register the first hit. After that, each crew slowly worked up to one to three hits per flight. Even though an actual aircraft would be easier to hit with all four guns, it became obvious that firing completely blind was only a marginally practical procedure.⁶³

The balance of the Skyknight years to mid-1958 were spent in fairly routine fashion at Cherry Point, enlivened by annual two-month deployments to NAS Roosevelt Roads, and, more frequently, two week deployments to NAS Key West.* The latter involved much ground controlled training, culminating in periodic Air Defense Command/NORAD sponsored air-to-air weapons exercises.⁶⁴

Outside of VMF(AW)-531, it was a time of great changes in air defense, and these would bring the squadron a dramatic new plane.

Skyrays to WestPac

The focus of U.S. military aviation in the 1950s was the development of offensive nuclear capability, and, correspondingly, the ability to defend against nuclear attack. The Marine Corps would do both.

The U.S. Navy realized its ship formations were vulnerable and embarked on its own line of air defense development. By 1956, it had three planes as its mainstay. Two were the McDonnell F3H-2N and -2M Demon. The third was of a

*The old radio set with 10 separate crystals for 10 channels had become much too inflexible. The new ARC-27 used a synthesizing technique that gave 1,750 possible frequencies with 20 pre-selected for convenience. It was also possible simultaneously to guard the emergency frequency, and a homing adapter permitted the crew to track to any UHF transmitter.

*There was a succession of commanding officers during these years: Lieutenant Colonels Alexander M. Hearn, Walter W. Turner, and Donald S. Bush; Major Earl W. Johnson; followed on 20 August 1957 by Lieutenant Colonel Gordon E. Gray.

**NORAD was the North American Air Defense system, an integrated Canadian-U.S. command established on 12 September 1957 with air defense the major U.S. component.

much more radical nature and would be the next VMF(AW)-531 all-weather fighter.

This was the Douglas F4D-1 Skyray, a graceful, tailless, delta-wing fighter designed to meet a challenging specification: climb to 40,000 feet within five minutes to intercept a bomber before it reached its target.* On 25 February 1958, Lieutenant Colonel Gordon E. Gray was the first squadron pilot to transition to the Skyray. Like others to follow, he was very conscious that the "F4D was the hottest plane we had at the time."⁶⁵ Acceleration and climb were breathtaking. Without external stores, a clean "Ford" (as it was quickly dubbed) could be climbed initially at 540 knots at 70 degrees nose up angle. The climb requirement meant a thicker, less loaded wing; thus, level top speed was limited. Pitch and roll was done through unconventional "elevons," but the Skyray had none of the traditional flaps for reducing speed. Slow flight was helped by free moving, leading-edge slats.⁶⁶

The fire control system with its Westinghouse APQ-50 radar was designed to use unguided 2.75-inch rockets. This was -531's first regular use of a single-seat aircraft, and the fire control system necessarily had to be simple to use (although its 600 vacuum tubes would be a maintenance headache). Single targets could be locked onto from up to 25 miles, but actual detection ranges were perhaps half that against another F4D. In theory, the system's analog computer would guide the pilot to a lead-collision firing position slightly forward of the target's beam. Then:

At the last instant, a few seconds before a midair collision (about 900-2,000 foot range), when catastrophe appeared inevitable and as the radar scope flashed collapsing circles . . . the pilot mashed a trigger, hurling [up to four 19 shot pods worth of] fiery rockets off ahead . . . however, if the pilot missed on any little angle, speed, or course adjustment, or if the radar was a wee bit out of alignment . . . the rockets would go all for hell and gone.⁶⁷

With these limitations in the late 1950s, two dozen Navy and Marine squadrons would have to make do with F4Ds in this configuration.

*A prototype XF4D-1 had captured the world absolute speed record of 752.9 mph (642 knots) on 3 October 1953.

On the positive side, there were many other important innovations in the Skyray. The radar system was mounted on rails for a single, easy removal. One hundred percent oxygen was now required at all times and was provided via a five-liter liquid oxygen system. There were provisions for a partial pressure suit for flights above 50,000 feet where a pilot could die if pressurization was lost.

A selective identification feature was now incorporated into the plane's IFF set. The pilot could select any one of 64 discrete codes which were sent out in answer when his IFF was interrogated, and his unit and plane number could also be transmitted. The set was "turned on" for U.S.-based radars on 1 February 1959, and it was now possible for controllers instantly to identify individual cooperating aircraft.⁶⁸

Possibly the best innovation from the pilots' perspective was a new Navy-developed navigation aid called TACAN.* It gave a very accurate magnetic bearing, as well as distance, in a single system. Pilots, at last, had an instantaneous picture of their position, without having to resort to tedious calculations or confusing sound signals.

The engine was powerful, with 16,000 pounds of thrust on afterburner.** Finally, there was a Martin-Baker ejection seat. Provided the pilot was above 120 knots and 50 feet altitude, pulling a D-ring between his legs initiated an automatic sequence of canopy release, seat firing by explosive charge (with a frequent concomitant compression fracture of the spine), and a parachute deployment.⁶⁹ It was a vast improvement over the F3D in which the crew had to collapse the pilot's seat, grab a bar, and swing out of a belly escape hatch.

By July, transition training was in full swing, using new F4D-1s fresh off the production line. After logging more than 48,000 hours in service with -531, the old F3D Skyknights departed in mid-year along with their radar operators. On 1 August, Gray was succeeded by Lieutenant Colonel (later Brigadier General) Henry W. Hise,

*TACAN (tactical air navigation) was a line-of-sight aid with 126 channels and a bearing accuracy of better than one degree. Distance was accurate to 600 feet at close ranges and within two percent at long range.

**This generated additional thrust by injection of fuel just aft of the last turbine stage. In the Pratt and Whitney J57-P-8 engine, its use quadrupled fuel flow while increasing thrust from 10,200 pounds to 16,000 pounds.



Photo courtesy of Maj William Henson, USMC

The distinctive wing shape of the F4D Skyray is prominent as a pilot of VMF(AW)-531 takes off from a carrier deck. The squadron had four "carquals" in less than two years: September 1959 to August 1961.

who would lead the squadron for the next two years, including the first unit carrier qualifications and the first overseas deployment in 14 years. Hise was a veteran of the early Guadalcanal battles and had commanded six other squadrons, including three in combat. Confronted with the somewhat scary reputation of the F4D, he knew better than most "what had to be done to keep my pilots alive to fight in combat." He instituted a rigorous regimen of flight discipline: lots of night flying; practice instrument letdowns on every flight; mandatory field arrestments using the new gear at night or in weather; and strict adherence to procedures.⁷⁰ His leadership paid off: there was not an aircraft accident or loss of a pilot in the first three years of Skyray operation, although there were some close calls. On at least two occasions, pilots had to make emergency landings on alternate fields that had runways technically much too short for the F4Ds.

The squadron worked up for its forthcoming 15-month deployment to the Western Pacific by mastering the complexities of single pilot all-weather interceptions, invariably using each other alternately as bogies under Marine ground control. The current emphasis on defense against nuclear air threats by Marine all-weather squadrons led to the near demise of attack missions. Perhaps only five percent of the flights were devoted to air-ground attack, all of it strafing and rocketry on target ranges. There was no close air support practice.

The squadron personnel departed Cherry Point (without aircraft) for California in late March 1959.

From there, they endured a marathon three-stop, 33-hour flight to Tokyo. Their final destination was NAS Atsugi, a former Imperial Japanese Navy Airfield 30 miles southwest of Tokyo. There -531 relieved VMF(AW)-115 of their spaces, equipment, and Skyrays after arriving on 21 April.⁷¹

The squadron almost immediately began standing the night and all-weather alert "hot-pad" for the air defense of Japan. For the first time -531 entered the missile age. In addition to cannon and rockets, the Atsugi Skyrays were fitted with a pair of Navy-designed heat-seeking AIM-9B Sidewinder missiles.* This weapon was visually fired at about one-half to two-and-one-half miles range in the target's aft quadrant. Once the pilot determined he was within range (by radar or visually), he listened for a buzzy growl in his headphones. This meant the missile's seeker head had detected an infrared signal which hopefully was not that of the sun, clouds, or warm areas on the ground, all of which could confound proper guidance of these early Sidewinders.

Even with these limitations, the Sidewinder was a cheap (under \$5,000 each), reliable, easy-to-use weapon that was very effective against non-maneuvering targets. Most of the pilots felt it

*The Sidewinder was a simple, low-cost missile with twice the speed of sound (Mach 2). About nine feet long and five inches in diameter, the 165-pound missile homed onto the infrared exhaust emissions of the target's engines. Over the next four decades, it was destined to become the most successful air-to-air missile ever made. More than a dozen versions were produced by the U.S. and it was copied by the Soviet Union and China.



Department of Defense Photo (USMC) A182350

A squadron Douglas F4D Skyray makes a “run-up” on the new aluminum planked expeditionary airfield during Operation Blue Star on Taiwan in 1960.

was a distinct improvement over the unguided 2.75” rockets and 20mm guns.

In late September 1959, -531 deployed to NAF Naha on Okinawa for its first unit carrier qualifications (“carquals”) on aboard the *Lexington* (CV 16). Hise was particularly impressed with four innovations that had recently revolutionized jet carrier operations and reduced the accident rate by over half: the powerful and smooth steam catapult; the angled-deck which allowed successful go-arounds if an arresting wire was missed in a “bolter” landing; the angle-of-attack indicator; and the mirror optical landing system.

Instead of a flat approach begun at 250 feet altitude, the Skyray started down from 600 feet on a fixed glide path that the pilot tracked by use of a reflected beam of light. To overcome the swept wing jets’ poor low-speed handling and slow engine response from idle, the pilot flew the approach with power in a constant landing attitude—at 132-137 knots or about 1.17 times stalling speed—by using his angle-of-attack indicator rather than airspeed. The Skyray was flown firmly onto the deck without changing power, and this stabilized approach to touchdown

proved to be the key to successful carrier landings with high performance aircraft.⁷²

Twenty-three of 24 squadron pilots would complete their day “carquals” of 10 landing traps each. This was followed in early October with live Sidewinder firings, and yet more “carquals” on the *Midway* (CVA 41) in December.

While there were numerous “hot pad” scrambles during that tour, the closest approach to a potentially hostile aircraft was by the squadron’s executive officer, Major (later Colonel) Emmons S. Maloney.* Unlike the USAF, Marine all-weather interceptors had no particular weather minimums to launch in, and Maloney later described the night of 19 December 1959:

It was atrocious weather, raining like hell, with cloud tops above 40,000 feet. We were called by the . . . GCI site to see if anyone would volunteer for a hot bogey track coming south out of Russia. I took off and got vectored. . . . I looked into my scope—and

*Maloney would later serve as temporary commanding officer of -531 from 30Jun-5Jul60.



2d MAW Photo, 616A

Squadron pilots take time for rest and relaxation between missions at Cherry Point in the 1960s.

to my complete surprise—there was a target at 80 miles range, by far the longest contact I had ever gotten on the Ford's radar. I closed down to 50 miles when it suddenly turned around. . . . I think he may have been alerted by his own GCI. We thought it must have been a "Badger" [the large twin-jet Tupelov 16 bomber] and he was at 30,000 feet.⁷³

On 18 January 1960, VMF(AW)-531 deployed for training to NAS Cubi Point on Subic Bay in the Philippines, after a fuel stop at Kadena AFB on Okinawa. Then, on 12 March, the squadron flew to southern Taiwan to participate in a large amphibious exercise. This deployment involved a scenario with a brigade-sized Marine force reinforcing Chinese Nationalist forces after a hypothetical Chinese Communist assault of the Nationalist-held islands of Quemoy and Matsu located just off the mainland. The squadron lived under canvas in wet monsoon weather, and was visited by numerous dignitaries including Chiang Kai-shek, president of the Republic of China.

The highlight of the exercise was the erection, in only 48 hours, of a Short Airfield for Tactical Support (SATS), using a new type of aluminum

planking called AM-2. The Marine Corps had always been concerned about getting support for its fixed-wing planes closer to the battlefield without relying on carriers offshore. This had now led to the experimental SATS expeditionary airfield and the application of carrier operating principles such as arrested landings. Carrier practice paid off as Hise made the first arrested landing by a fighter on a SATS strip under a low ceiling on 26 March 1960. Takeoff was another matter, since there was as yet no catapult system. Only a lightly loaded F4D could get off (by using afterburner) in under 2,000 feet, the length of the first experimental matting.

As the Far East tour of 15 months without dependents drew to a close, one observer later remarked that during "significant fractions of any day in the week, the entire air defense capability of FECom [Far East Command] consisted of Hank Hise or one of his troops alone in a 'Ford' with a scope."⁷⁴

On 5 July 1960, the VMF(AW)-531 colors were finally taken down at Atsugi, and all its members were dispersed to new assignments. The same day at Cherry Point, an all-new -531 was formed. For the third time in its history it was a start from scratch. The new commander, as of 6 July, would be Lieutenant Colonel George J. "Ripper" Collins, a night fighter veteran with two victories at Okinawa and a combat tour in Korea.* Collins' task was to work the new squadron members up for another Far East deployment. Happily, they would be among the first to benefit from the Marine Corps' new 13-month "unaccompanied" tour policy. The old 15-month tours had strained nearly all marriages and ended some altogether.

Starting anew with untried personnel also put a strain on safety. The unit's first fatal accident in 10 years occurred on 4 October when First Lieutenant James C. Norton crashed four miles from the field, after a "routine ordnance training mission." Collins himself would be forced to eject instantly three months later when his Skyray exploded just after takeoff; his was the first squadron life to be saved by a Martin-Baker ejection seat.

*When he became commanding officer, he took his wife, Elaine Collins, on a tour of the base. In one of the hangers, the tails of the squadron's planes were being painted with its call letters, Echo Charlie, "EC." Elaine Collins thought for months her husband had been very romantic when he told her the initials were for her!

The training pace stepped up considerably on the night of the squadron's 18th birthday, 15 November, with a recall exercise that started a "round-the-clock" flight schedule. Captain James S. Gahagan recorded that "the boom of our after-burners was heard well into the small hours of the morning, as we crammed sorties into every hour of the day and night. The harder we worked, the greater our unity and oneness of purpose became."⁷⁵

Perhaps mindful of his own recent ejection and near miss with death in the icy waters of the Neuse River, Collins had all his pilots undergo the ordeal of "poopy suit drill" in the same estuarial river. The rubber anti-exposure suits were uncomfortable to wear and could be debilitating without ventilation, but they had proven to be lifesavers in winter water survival situations.

By 20 March 1961, 18 pilots had qualified for their F4D all-weather fighter pilot MOS. Training was capped with "carquals" on board the small deck of the venerable *Intrepid* (CVA 11), where 31 officers and 122 men embarked on 21-26 April.

Another Collins-inspired exercise was night live missile firings of Sidewinders. Mindful of his own wartime experiences, Collins knew of the importance of having his young pilots actually experience the sensation of firing their weapons at night. The operations officer, Major (later major general) William B. Fleming, later recalled how it was done. A target was towed by a tractor F4D and reeled out on 18,500 feet of thin cable. The shooter aircraft was vectored head-on to the tractor, and then took over the intercept from ground control inside of about 20 miles range. The pilot then maneuvered to maintain a 110-120 degree lead-collision bearing. At 12 miles and when two targets were clearly seen on the radar, the interceptor converted to a stern Sidewinder attack on the target.⁷⁶

On 19 June, with a new commanding officer, Lieutenant Colonel John N. Swartley, VMF(AW)-531 departed for NAS Atsugi where it once again took over VMF(AW)-115's spaces and aircraft on 1 July 1961. Simultaneously, Collins returned to take command.

The next 12 months would be a reprise of the previous two years. There were more "carquals" beginning on 13 August from NAF Naha, Okinawa, on board the *Hancock* (CVA 19). In September and October, the squadron matched wits electronically at MCAS Iwakuni, Japan, with the electronic countermeasures operators of

Marine Composite Reconnaissance Squadron (VMCJ) 1. The goal was to be able to carry out successful interceptions against a target which could spoof its radar image using a variety of deception techniques.

In November there were joint air defense exercises with the Fifth Air Force, and 1961 was rounded off in December with three weeks of air-to-air ordnance qualifications out of Okinawa. At year's end, -531 pilots had accumulated from 312 to 632 hours in the F4D, and the least experienced lieutenant had 749 total flight hours. They were now fully qualified in all of the squadron's assigned missions, and squadron members spent the balance of the deployment honing their skills at a variety of locations.

After operating from Iwakuni in January 1962, the tour's closest support yet of an amphibious operation began on 12 March. The squadron's men and materiel were loaded on board the *Okanogan* (APA 220) and the *Union* (AKA 106), bound for field exercises out of NAS Cubi Point in the Philippines. This included a full scale administrative landing, living and operating out of tents, carrier re-qualifications on the *Midway* (CVA 41), night missile firings against targets towed by Navy jets, and jungle survival training in the nearby dense forests with Negrito mountain tribesmen.

The squadron returned to Atsugi on 22 April and continued practice with ground controllers, moved again at Iwakuni in May, and then flew in an anti-air warfare exercise in June. There VMF(AW)-531 flew its last sorties in the F4D-1 Skyray.

On 1 July 1962, tactical and administrative control was passed to MAG-24 at Cherry Point, and members of the squadron headed back home for reassignment. The two-year work-up and deployment period had been very successful; indeed, it had been an archetypical Western Pacific (WestPac) cycle for a Marine squadron of the pre-Vietnam era.

For VMF(AW)-531, the four-year Skyray era was a brief one. All-weather fighter design had moved rapidly in the 1950s, and the Ford's lack of a usable aerial refueling system to use with the KC-130F tanker plane then coming into service, minimal air-ground capability, and its inability to shoot down aircraft head-on doomed it to a short service life in the Marine Corps. Moreover, the all-weather mission itself placed extremely high demands on the single pilot who had to fly on instruments at sonic speeds, while simultaneously

operating and interpreting a radar scope. It was time for a new, more versatile plane.

Phantoms and MiGs Over the Florida Straits

As the last VMF(AW)-531 Skyray flights were being flown in Japan, training was underway for a new generation of the squadron's pilots in the F4H-1 Phantom II at NAS Oceana, Virginia. The Skyray's successor, the Phantom, would become the preeminent fighter attack aircraft of its generation, and would remain with -531 for more than 20 years. And, during these years, the squadron would be increasingly referred to by its nickname: the Grey Ghosts.*

The first squadron pilot to fly the Phantom was the senior officer of the first cadre which would form the future -531 squadron. He was then-Captain (later Lieutenant General) Keith A. Smith, a Reserve officer on extended active duty and former Korean-era AD-5 Skyraider pilot. After a half dozen simulator flights in a trainer, he was checked out on 28 March 1962 in the world's fastest operational fighter.**77

The angular Phantom with its bent-up wing tips, bent-down stabilators, and squeezed-in fuselage could hardly be termed esthetic, but these features were necessary to achieve stable flight at better than mach two. This speed was due to the thrust of two General Electric J79-8 engines of 17,000 pounds thrust each with four-stage afterburning. All primary flight controls were powered directly by hydraulics and control feel had to be artificially produced. The Phantom was dynamically unstable in pitch above about 300 knots, so an electronic stability augmentation system was also necessary.

McDonnell had designed the Phantom II as a very high speed, fleet area defense interceptor, carrying six Sparrow radar-homing missiles that could engage targets head-on up to 10 miles away. The plane's weapons system known as AERO-1A used state-of-the-art technology centered on a powerful APQ-72 Westinghouse radar with an analog attack computer—all run by a rear cockpit crewmember designated as the radar

intercept officer (RIO), who wore the wings of a naval aviation observer.

About half of the squadron's RIOs were former F3D radar operators, all warrant or limited-duty officers; the rest were brand new warrant officers from various aviation fields who had gone through rigorous training. After 17 weeks at Quantico for basic courses and warrant officer screening, they had received four weeks of pre-flight training at Pensacola; then a 16-week naval aviation observer course; and finally a nine-week practical application course at NAS Glynco, Georgia.

The flight training of Smith's cadre at Oceana included radar intercepts, as well as day and night carrier qualifications, but no air-ground work since no ordnance racks were then available. For radar intercepts, acquisition ranges at medium and high altitudes were the highest ever achieved by a fighter to date; 50-mile contacts against fighters and 75 against bombers were not unusual. Against very high altitude targets, intercepts could be made at 63,000 feet and higher. After the target was locked on, the attack computer constantly calculated closure rate and missile range. A separate transmitter in the nose of the Phantom "illuminated" the target, and the reflected waves were what the Sparrows homed onto. Once the complex Sparrow was in service, however, it was realized that a simpler alternative weapon would be necessary, and four Sidewinder missiles were then installed on rails above the wing Sparrow stations.

After 1 August 1962, the production F-4B began to be delivered from the factory to Cherry Point.* With an El Toro squadron, VMF(AW)-531 was the Corps' first Phantom operator.

The maintenance side of training was overseen by Captain Robert P. "Ole Gray Fox" O'Neal, who would remain with the unit for the next six years. Along with Captain Smith, these two were primarily responsible for introducing a new computerized system for the more efficient coordination of personnel and maintenance operations. They also processed through the squadron a number of F4s for delivery to the USAF. This may have been the first time that Marines supplied the U.S. Air Force with planes.

*See Appendix H.

**The F4H-1 then held numerous world's records, including those for absolute speed of 1,606.3 mph, maximum sea-level speed of 902.8 mph, maximum sustained altitude of 66,443 feet, and time-to-climb from start to 49,212 feet in 114.5 seconds.

*Naval aircraft designations were changed in late 1962 to conform with the USAF system. The F4H-1 became the F-4A. The production version first operated by VMF(AW)-531 was the F-4B.

O'Neal and Smith soon realized that the Phantom was the most labor-intensive aircraft that had ever been in Marine Corps inventory. This also troubled the new commander of the Grey Ghosts, who had taken over on 15 July 1962. Lieutenant Colonel Robert F. "Foxy" Foxworth, a former Royal Canadian Air Force sergeant pilot and Marine aviator in two wars, would now lead -531 into a very exciting period.⁷⁸

He discovered it took some 60-90 maintenance man-hours to produce one flight hour. One example was the fact that flight above 50,000 feet required a full pressure space suit for life support. This necessitated a specially trained crew to maintain it. The aircrews themselves needed a week of training in the suit, culminating in a solo ride in a special low-pressure chamber which was explosively decompressed to 72,000 feet. A beaker of red-colored water that had been placed in front of the crewmember immediately went into a boil, presumably to remind him of what would happen to his organs if the suit failed. The hapless pilot or RIO inside looked out at faces pressed against the outside viewing ports, and his invariable thought was: this must be what dying in a gas chamber is like.

The first squadron pilots qualified in the F-4 on 25 September 1962, in a time of increasing military tension. Events were now developing into what would become known as the Cuban Missile Crisis. The Soviet Union had supplied Castro with surface-to-air missiles, some 40 MiG-15s and -17s, 42 Mach 2 MiG-21 fighters armed with Sidewinder copies, and 42 unassembled Il-28 medium jet bombers.

A series of daring reconnaissance flights in August-October uncovered the gravest threat of all: nuclear-capable ballistic missiles supported by some of the 22,000 Soviet troops and technicians believed to be in Cuba. On 22 October, President John F. Kennedy decided on a "quarantine" blockade. The strains between the two greatest powers on earth were now at the highest in history. Finally, after dramatic negotiations, 42 ballistic missiles were removed to the USSR on 11 November, followed shortly by 42 Il-28s. Kennedy then ended the quarantine, but tension would persist well into 1963.

In November 1962, Foxworth welcomed on board an all-weather crew from the Royal Air Force, Flight Lieutenants James Sawyer and Ian B. Hamilton. They were carrying on the more-or-

less continuous tradition begun by the original -531 squadron in 1943 of having a Marine and RAF night and all-weather crew on exchange duty. At least two pilots from -531 had been on RAF duty themselves.

Shortly after Foxworth greeted the visitors, he was forced to eject from his Phantom when it went out of control with a complete electrical failure. With the loss of power, a wild series of oscillations ensued. He and his RIO, Captain Daniel J. Benn, finally ejected. Benn was wearing his pressure suit when he came to earth in rural North Carolina. He trudged to a farmhouse in his space suit and inquired where he might be. The incredulous inhabitant replied, "Why, man, you're in the United States of America!" Foxworth, meanwhile, landed with a broken leg.⁷⁹

In the continuing tension with Castro in 1963, NORAD found itself in difficulty. It had to try to cope with a tactical jet threat from Cuba, and the Air Defense Command had planned to rely on F-102 and F-104 aircraft for the mission. Unfortunately, the F-104 was basically a high-speed, day, clear-air-mass interceptor, while the F-102's radar missiles had neither much range nor maneuvering ability against a MiG threat.⁸⁰ Into this breach was placed an unproven squadron in an unproven aircraft: VMF(AW)-531 with its 18 Sparrow and Sidewinder-equipped F4Bs.

Foxworth led his squadron to NAS Key West (only 100 miles from Havana) on 22-23 January 1963, relieving part of an F-104 squadron. They would be vectored by a USAF aircraft control and warning squadron—call sign "Brownstone"—also based at Key West. No firing of weapons was permitted unless fired upon or specifically authorized by ground controllers.

The crews were divided into three flights. The first 24-hour block was spent on alert, the second was for training missions, and the third day was free. Normally, the primary alert crew could be airborne within 150 seconds after the alarm bell rang. The usual weapons configuration of the aircraft was two Sidewinders, two Sparrows, with no other external tanks or stores. This meant the pilots could operate to the full limits of the airframe of 750 knots, 2.1 Mach.⁸¹

There would be many scrambles, practice and real. Most of the former were off-course airliners and private planes. Some were against hostile aircraft. On 20 February, Captain Robert J. "Smoke" Divoky, a 21-year Marine veteran and former

enlisted pilot, and his RIO, Chief Warrant Officer Zac C. Tomlin, were scrambled and vectored south.* He was followed by his wingman, Captain Ray L. Hanle with Chief Warrant Officer Frank H. Schwarz, Jr., who settled into a trail position. Tomlin got a radar contact which developed into a MiG-15 and a MiG-17. The USAF "Brownstone" controller instructed Divoky to escort the MiGs southward. As Divoky corralled the two MiGs, who appeared to be setting up in a race-track attack pattern, Hanle closed in and spotted two more brownish MiG-15s rolling onto his own rear. Schwarz—who up to that time had not seen much air combat maneuvering performed—quickly exclaimed to Hanle, "Do some of that pilot "stuff!" Hanle, reacting quickly, lit his afterburners and broke hard right into the pair, passing them canopy-to-canopy. The MiGs failed to counter aggressively, and Hanle then ruddered around onto their tails into firing position with Sparrows tuned and "Sidewinders growling."⁸²

Now Hanle's MiGs dipped, and he saw bright flashes of fire and smoke as they fired their cannons.** Thinking they were firing on Divoky, Hanle barked out a radio call to "Brownstone" which calmly instructed him to hold his fire while a decision was bucked up the chain of command. Now Divoky picked up yet another fighter—a silver MiG-17—off to Hanle's right, and he turned to defend his wingman by engaging that MiG-17 in a scissors move. The criss-crossing scissors should have favored the nimble MiG, but Divoky, as a 43-year old veteran pilot, masterfully worked his Phantom to the limit. At the third reversal, the MiG-17 stalled and began to spin down.

The Marines could not tell if it crashed or not, but Hanle now noticed that the object of the MiGs' attack was a shrimp boat dead in the water, and Divoky reported large splashes pocketing the water about the vessel. With their attack thwarted and being in imminent danger of having Marine Sidewinders fired up their tailpipes, the MiGs now turned away southwards. Despite the unmistakably hostile nature of the attacks by the MiGs in international waters, it took several long

minutes for the final decision to be made on the ground. It must have seemed like an eternity to the crews as they swirled around with the MiGs, but the decision was; "Do not fire!"

Divoky and Hanle then circled the boat, as more -531 flight sections raced in, followed by Navy F-8 Crusaders, but it was all over. Both crews felt cheated of victories, but they were reassured shortly after landing by a phone call from General Maxwell D. Taylor, Chairman of the Joint Chiefs of Staff, who commended them for their forbearance in not shooting. There was also a call from the presidential press secretary to confirm that they had fired no weapons. He asked the pilots to make no statements but to keep their eyes on the newspapers.⁸³ The next day the squadron read that President Kennedy had been outraged by the MiG attack on a disabled boat.* One newspaper headline read, "Next Time Shoot, JFK Says."⁸⁴

Despite the lack of formal air combat maneuvering training in the Phantom, both crews and aircraft had responded very well in an outnumbered situation with two of them versus five opponents in this first F-4 versus MiG engagement. There were more to come. On 7 March, Divoky and Tomlin were scrambled again, this time against a "hot track" which originated from Cuba. Divoky's wingman was forced to abort, and "Brownstone" ordered the now solo F-4B to go "gate at angels 35" (maximum power to 35,000 feet). Tomlin got a radar contact just as Divoky spotted the fastest moving contrail that he had ever seen. It seemed impossible to attempt an intercept with a 2,000-knot closure rate between the two planes. But then Divoky and Tomlin got sucked behind the collision bearing, to wind up one and one-half miles in trail of the bogey.

Divoky worked his speed up to nearly Mach 1.8 to close with a grayish fighter with red Cuban markings doing Mach 1.6 at 35-36,000 feet. It was the Soviet bloc's fastest aircraft, a MiG-21 about whose actual performance very little was then known.** Despite being sometimes over Cuba, "Brownstone" instructed Divoky to continue. One reason may have been that his RIO carried a

*Both Divoky and Tomlin were Korean-era F7F and F3D veterans of -531.

**The MiG-15s and -17s were equipped with three cannons each: two 23mm and one huge 37mm. Both were subsonic at about .88 Mach with a maximum low altitude speed in the 450-500 knot range, but they had exceptional turning rates and high ceilings of up to 55,000 feet.

*A grateful shrimp company sent -531 a bushel of huge golden shrimp.

**The MiG-21F-13 carried one 30mm cannon and two Sidewinder-type K-13 (R-3S) missiles. A single Tumansky R-11 F-300 engine gave it a top speed of about Mach 1.8 at altitude and about 620 knots at low altitudes.

government-issued Leica camera, and here was a rare opportunity for a close-up photo.

Improbably, the MiG-21 pilot at first seemed unaware of the Marines' presence as they flew close together at Mach 1.6. After Tomlin snapped the MiG's underside, Divoky flew up along the left side, and then rolled upside down canopy-to-canopy, while Tomlin got a remarkable plan view shot while "hanging from his straps." The MiG then went to Havana, while Divoky and Tomlin scooted home with valuable film. The intelligence officers professed to be delighted.

Another scramble came some weeks later when a bogey was detected. Captain (later Major General) Michael P. "Lancer" Sullivan, recently returned from duty with the RAF in England, and his RIO, Chief Warrant Officer Charles C. Taylor, along with his wingman, First Lieutenant James D. Gilliard, roared off in poor weather and found themselves tail-chasing a target. By using their afterburners, they quickly accelerated to Mach 1.1 (about 740 knots) at 800 feet altitude. Ground control had just cleared the flight to fire, using new streamlined rules of engagement, when their radio began fading. Sullivan sent Gilliard higher to regain communication, while he pursued a bogey Taylor had acquired on his scope at 10 miles distance. At less than a mile and with a dangerous overtaking speed of 470 knots, Sullivan came up on two MiG-17s, and, to avoid disaster, he was forced to roll around them with the plane's speedbrakes out and his throttles at idle. At that point, Gilliard relayed further ground instructions to hold fire now and remain five miles in trail.

As he rolled out astern of the MiGs, Sullivan noted that the MiG wingman "was wobbling around like a flight student." He then concluded that the MiG intrusion was a training flight gone astray from a base near Havana. The MiG-17s waffled home, apparently oblivious to the fact they had nearly become the first Marine aerial victories in a decade. Sullivan turned his flight for home, staying low to avoid the surface-to-air missile threat, and landed 22 minutes after takeoff.⁸⁵

Sometimes the intercepts of Soviet-made aircraft were more benign. Hanle recalled being scrambled to escort a northbound Ilyushin 18 to the Key West municipal airport during May, as tensions slowly wound down. He thought it had something to do with the forthcoming Bay of Pigs prisoner exchange.⁸⁶

Presumably, the corresponding flights to that one were the ones that then-Major Orey E. Cory

later remembered when "Brownstone" called for a highly classified mission by four aircraft. The mission was of such a sensitive nature that flight crews were not to be briefed. As the flight leader, he was personally informed at "Brownstone's" Center. The mission involved escorting a passenger aircraft to Havana, circling the Havana Airfield while personnel were offloaded and other personnel were loaded, then escorting the aircraft back to Key West. Cory described what happened next:

Although the Jeep trip back from "Brownstone" was fast, I was dismayed to see the planes launched by "Brownstone" before I had returned. But, not to worry, the mission, as all others, was executed by -531 professionals. It was disturbing to be ordered to withhold disclosure of any details, even after completion of the mission, and then to read all about the prisoner exchange in the next morning's local newspaper.⁸⁷

In between scrambles, training proceeded apace. One of the more dramatic exercises involved practice interceptions of high-flying Lockheed U-2 planes as they exited Cuban airspace. This required donning the Mark 4 pressure suit. After take-off, the Phantom would be climbed to 45-50,000 feet at .90 Mach, followed by a series of gentle dives to about 36,500 feet to build up speed near Mach 2. As the U-2 was acquired on radar, the RIO attempted to establish a pure head-on intercept. The F-4 was held at about 50,000 feet, and as Sparrow missile launch range approached, the pilot quickly pulled up the plane's nose to place it in a lead-collision firing attitude.

Sometimes, the pilot might have to recover from the unusual nose-high attitude caused by pulling up excessively. Thus, more than one pilot found himself nearly vertical or on his back above 65,000 feet, when his afterburners usually blew out and when his engines were prone to overheating or flameout.⁸⁸ Sometimes, -531 pilots found themselves as high as 82,000 feet. The only thing to do then was to neutralize the controls as the aircraft floated skyward or tail slid backwards, until enough air pressure was exerted on the controls for the aircraft's natural stability to take over and get it pointed in the proper downward direction.

First Lieutenant Wesley D. Johnson recalled that there was more to the squadron's activities than flying:

The squadron's reputation was negatively enhanced, and its history embellished, by a feisty group of ground personnel. Morale was extremely high, matched by the outstanding performance of all hands. The proficiency of one group in applying stenciled Grey Ghosts to just about any object not in motion gave the troops plenty of laughs, and gave command plenty of headaches. The Grey Ghost appeared on a submarine at the naval station, on other squadrons' aircraft, including a Grey Ghosted Blue Angel plane. Skipper Foxworth can attest to the fact that the squadron was eventually prohibited from displaying the -531 insignia in any fashion!⁸⁹

After having spent five months on the hottest "alert pad" of any American interceptor squadron, the tour now came to an end. The performance of -531 at Key West had been beyond all expectation, and a plaque signed by Major General Thomas J. Gent, Jr., USAF, Commander, 32d NORAD Region, was given to the squadron. It read: "To the Officers and Men of VMF(AW)-531 for outstanding contributions to the defense of the United States during the period 1 February 1963 to 15 June 1963." In addition, a commendatory letter from General Gent was placed in each squadron member's record.

Phantoms to WestPac

The Grey Ghosts redeployed home to Cherry Point on 15 June 1963, and then on 2 July Foxworth was formally relieved by Lieutenant Colonel William C. "Quick Draw" McGraw, Jr., a former test pilot who held several current world's records in the Phantom. The warm and gentlemanly Foxworth had seen the Ghosts through the critical formative stages, including a flawless deployment in near-combat conditions to Key West. In addition, in the 1963 2d Marine Aircraft Wing competitive evaluation exercises, -531 was awarded the Commanding General's trophy for the highest overall score of any squadron. "Top Gun" awards went to six individual Ghosts.

McGraw would now lead the squadron for the next two years through its first unit carrier quali-

fications with the Phantom, then on to WestPac and the Ghosts' first combat tour in 21 years. The officers and men he commanded would, for the most part, serve together continuously for an unprecedented 39 months. Such stability would give -531 a high degree of cohesion, mission proficiency, and a strong sense of unity.

On 1 August 1963, the squadron was redesignated Marine Fighter Attack Squadron 531 (VMFA-531). Although the primary mission remained "to intercept and destroy enemy aircraft and missiles under all weather conditions," there was now a secondary mission assigned: "to attack and destroy surface targets and such other air operations as may be directed."⁹⁰ This would remain the mission of Marine Phantoms and the follow-on F/A-18 Hornets into the 1990s. For the moment, however, this new mission would remain theoretical, until conventional external ordnance racks were delivered in early 1964.

From November 1963 through February 1964, the squadron returned sizable detachments to man the U.S. Navy's "hot pad" in Key West. Tensions cooled during 1964, and so the focus shifted to training.

Sadly the squadron would also see its first fatal accident in four years. First Lieutenant Frederick A. Libkie and his warrant officer RIO, Kent D. Ashmore, were engaging in low-altitude day-intercept practice off Key West on 18 January 1964 when smoke was observed coming out of the engine. The aircraft settled down closer to the water, then pitched upward in a stall, and impacted upside down. The crew and aircraft were lost at sea.

In March, the squadron concentrated on field carrier landing practice in preparation for its first carrier work with the Phantom. From the 19th to the 24th, it operated on board the *Forrestal* (CVA 59) off the Virginia coast in adverse weather. All 22 pilot/RIO teams qualified with at least 10 traps and 10 catapult shots each, including some at night, plus two carrier controlled approaches (CCA).⁹¹

Although the F-4B approached the flight deck at speeds (132 to 138 knots) similar to the Skyray, pilots considered it a better carrier aircraft, primarily due to the rapid response of its large J79 engines. And, of course, the Phantom never lacked for power.

The carrier controlled system for landings was a talk down approach like the familiar ground controlled system. The pilot would position his



Photo courtesy of 1stLt Wesley Johnson, USMC

An F-4B with 1stLt James D. "Diz" Gilliard and RIO, CWO-2 Wesley D. "Wes" Johnson, provides a very close escort for an Russian Tu-16 "Badger."

plane at a "marshal point," usually on the reciprocal of the ship's course. At an exact time—and the desired standard was to the second—the pilot pushed over at 250 knots and at 4,000 feet per minute descent rate. He then reported his position, completed his landing checks, and reported again. The radar controller then gave him headings to align the aircraft with the angle deck, while the pilot descended at 500-700 feet per minute to arrive at one half mile to touchdown at 300 feet above sea level (or about 240 feet above the deck). Then he reported a final time.

The last seconds were flown visually under the watchful eye of the landing signal officer. After final adjustments to correct for line-up and a pitching deck, the pilot came on in. When he felt the jolt of the landing, he immediately mashed his throttles to full "military" power (maximum with-

out afterburner) for a "go-around" in case his hook skipped a wire.

If it all went well, the third of the four wires was snagged, and the 34,000 pound Phantom snaked to a smooth and sudden stop with engines roaring. Such was the challenge of all-weather naval aviation.*92

The next two months of final training included day and night air-ground ordnance delivery. Bombing and rocketry was done using 30 degree dives from 7-8,000 feet, releasing at 3,000 feet,

*LtGen Keith Smith later recalled that a "saga unfolded one dark and stormy night as the [plane] recoveries got underway. After this one Phantom touched down, perhaps a little hot, an excited voice was heard to say, 'We're going off the end!' and a calm voice from the same Phantom replied, 'Relax! There's no sense dying all clutched up!'"

with a minimum pullout altitude of 1,500 feet. Napalm was released in low-altitude lay-down runs. Ordnance was carried on triple and six-store multiple ejector racks.

One feature of the Phantom became immediately obvious: it could carry an enormous ordnance load even on the hottest day—up to twenty-four 500-pound bombs (twice the load of the famed B-17 Flying Fortress in World War II!). Furthermore, it was very stable in dives, as the RIO assisted with call outs of dive angles, speeds, altitudes, and release calls. With practice, most pilots could get their bombing scores well inside 100 feet and, with rockets, perhaps half that.

On 16 June 1964, the squadron's 15 planes took off consecutively for a non-stop flight to MCAS El Toro, California, refueling enroute from Marine KC-130F refueler transports. This mass aerial refueling was excellent practice for the long ocean flight to come.

One of the first transpacific flights of Phantoms was set for 22-28 June. The route to be flown was rich in Marine aviation history: MCAS Kaneohe, Hawaii; over Midway Island; refueling at Wake; and on to NAS Atsugi, Japan. To be a successful movement, it would be necessary to overcome difficult circumstances that involved leapfrogging four cargo/transport and also eight tanker KC-130Fs to support the F-4B fighters.

Eleven F-4Bs departed El Toro on 22 June. They were followed by the remaining four the next day, as a provision to pick up any possible aborts. There were no aborts, which was a fine testimony to Captain O'Neal's maintenance effort. Refueling was conducted about a third of the way across, which gave a pilot the option to land in Hawaii or return to El Toro if he could not take on fuel. Refueling was done in level flight at about 200-205 knots at 20,000 feet, but this led to a higher than planned amount of fuel being transferred. This caused a problem because the maximum speed of the KC-130 was close to the stalling speed of an F-4B, and the Phantom then wallowed around trying to hang onto the refueling drogue. Another difficulty was that the extended refueling probe was just behind the pilot's head. The solution on later legs was to refuel the fighters only partially to keep them light and maneuverable, and top off just before drogue drop-off.

Another problem was that the KC-130's radio interrogator could only receive the F-4B's signal at about 60 miles, instead of the usual 150. Thus the

lead KC-130F's radar/radio operator had only a critically short time to position the tanker fleet, which was closing in on the fighters head-on at 14 miles per minute. This intercept-in-reverse involved a very precisely timed sweeping turn of the tankers, so that the descending Phantoms would arrive at the proper fueling position astern the tankers.

In a transoceanic flight like this, it was very strange that the F-4B was totally unequipped for long-range navigation. The aircrews had to use the same dead reckoning techniques that Lindbergh had used two generations earlier. Marine Phantom crews thought it a scandalous omission, noting that even the USAF—which did little overwater flying—had equipped its F-4s with inertial navigation systems that could reliably navigate a thousand miles or more with only a mile or two of error.

The Ghost fighters landed at Kaneohe with their fuel levels comfortably above the prescribed reserve of 10 percent. The flights had averaged only 4.8 hours enroute. Using the same leapfrog tactic, 11 F-4Bs left Hawaii on the 25th for the four-and-a-half-hour flight to Wake, refueling near Midway. The other four came on the next day. At Wake they learned of a threatening typhoon, so the next day all 15 hastily departed within two and a half hours. Happily, they were able to reach Atsugi and ended their long flight safely.

The carefully planned and precisely executed prototype F-4B "TransPac" had come off without a hitch to the credit of all concerned—a clear demonstration of the ability to deploy Phantoms halfway around the world. The flight would become the model for all subsequent such moves.⁹³

The first Atsugi missions involved fighter cover for a naval task force operating in the Sea of Japan. This body of water is nearly landlocked by Japan, Korea, and Russia, and contained the Soviet Union's strategic Pacific naval base, Vladivostok. American naval activity in the Sea of Japan was of great interest to the Soviet Air Forces, as Captain George F. R. "Bob" Hanke recorded:

The Russians came through with daily overflights by Tu-16 Badgers, and in this caper we again proved our capability to provide around-the-clock availability and lightning intercepts. Camera-wielding RIOs brought back photographs that showed the

part in Ivan's hair and the rivets in his aircraft.*⁹⁴

The interest in photography was mutual. On the squadron's very first interception, First Lieutenant James D. Gilliard, his RIO, CWO-2 Wesley D. "Wes" Johnson, and a wingman closed in on a Russian Tu-16 Badger bomber, and the RIO of Gilliard's wingman took a famous photograph of the two planes that would later appear in magazines and was put up on officers' club walls. On a subsequent intercept, the irrepressible "Diz" Gilliard did indeed "ease the nose of his aircraft practically into the Badger's tail gunner's compartment, which caused the tail gunner to react in a very disturbed manner—probably fearing for his life!"

It was on yet another intercept of another "Badger" that Gilliard and Johnson pulled up very close to the Tu-16 and saw its tail-gunner raise a camera to photograph this newest plane in the Corps' arsenal. The Marines signaled him to wait, then flew in closer, removed their oxygen masks and visors and proceeded to mug shamelessly for the bemused Russian.⁹⁵

On 31 July, Hanke and CWO Frank H. Schwarz, Jr., his RIO, would have a close brush with death. Taking off from Atsugi, their plane was climbing through 1,500 feet when both engines failed, and the F-4B began to fall rapidly. Unable to restart the engines, Hanke rapped the side of his canopy (in the standard signal to eject) and Schwarz got out, breaking his tailbone.

Hanke saw a city right under his nose and recalled a terrible incident earlier when a crippled Navy fighter had crashed into a factory near Atsugi, killing 14 persons. Without a second thought for his own safety, he now steered his Phantom away from the city. The turn used up precious airspeed and his plane began to stall. At 200 or 300 feet, with the aircraft wrapped in a vertical bank with a "huge sink rate," Hanke pulled his ejection handle and thought, "Oh hell, the seat didn't work!"

It did, but only barely. An explosive charge blew his seat out sideways, and his parachute was just opening as he struck the ground near his crashed Phantom. He suffered a compression neck and back fracture. For his courageous deci-

sion to stay with the aircraft, he was awarded the Navy and Marine Corps Medal.⁹⁶

On 14 September, the Ghosts deployed to NAS Cubi Point for air-ground ordnance training and carrier qualifications on board the *Constellation* (CVA 64). After returning to Atsugi in November, they turned around and moved to Kadena Air Force Base, Okinawa, for a fire power demonstration for a delegation of dignitaries.

Most of the crews were cynical about such displays, but the Ghosts got to make a number of maximum ordnance load sorties carrying twenty-four 500-pound bombs each, and also work out some of the bugs in the large five-inch Zuni rockets. Both completely devastated the appointed target, and a highly pleased Commanding General, 1st MAW, Major General Paul J. Fontana, commended them for "a job well done by Marines!" Then, on 27 December, the squadron flew down again to Cubi for another month of training, including carrier qualifications on the *Ranger* (CVA 61), followed by a Sparrow missile "shoot" against small jet drones.

On 5 January 1965, Captain Ray L. Hanle and his RIO, Chief Warrant Officer David D. Fuller, had a close call on lift-off when their Phantom, loaded with bombs and rockets, pitched up unexpectedly, followed by an uncontrolled drop of the right wing. Fuller was able to eject with the plane in a vertical right bank with a 20 degree nose-up attitude; he suffered the usual compression fracture of the back. Hanle then tried to eject himself, but his seat failed to fire. So he began wrestling with his plane, nearly striking the Cubi Point Officers Club, and finally gaining control. A shaken Hanle got back safely on the ground, hoping his seat would not now decide to fire.⁹⁷

Returning to Atsugi on 20 January, the squadron resumed air defense alerts, this time from a "hot pad" at nearby Yokota AFB under USAF control. Compared to Key West it was distinctly quiet duty until a foggy night on 19 February. The Hanke/Schwarz crew were scrambled to chase down, on top of the overcast, a USAF C-130 transport which was short on fuel and had lost all communication and navigation aids. Schwarz got Hanke rendezvoused by radar and motioned the Hercules pilot to follow, but the transport pilot did not understand standard fighter hand signals. Hanke flew as slowly as he dared, while the lumbering turboprop clung grimly onto his wing as they let down through the fog on GCA at Yokota. Down practically to zero feet,

*The Tupolev Tu-16 was a 150,000 lb, swept-wing bomber with two huge engines of 20,950 lbs thrust each.

they glimpsed the runway. The GCA controller had positioned the Phantom all right, but the C-130 was too far off to one side. Gingerly, the pair went around for another try. This one was successful, and the lives of all on board were saved. The USAF awarded Hanke a Distinguished Flying Cross and Schwarz the Air Medal for their fine efforts.⁹⁸

Combat in Vietnam

Although the WestPac tour had so far been routine, events had been unfolding in Southeast Asia which would ultimately involve the Grey Ghosts in combat for the first time in nearly 20 years.

Marines had become progressively more and more involved in Vietnam since arriving in 1962 as a helicopter task force and a contingent of advisers. In March 1965 a battalion landing team (BLT) was sent ashore at Da Nang, the principal city in the northern part of the Republic of Vietnam (RVN).

Speculation around the squadron reached high pitch in late March when Lieutenant General Victor H. Krulak, the commander of Fleet Marine Forces, Pacific, made an extended visit to Ghost spaces at Atsugi. The guess work ended on 10 April 1965, when Major General Paul J. Fontana telephoned McGraw and ordered him to deploy VMFA-531 to Da Nang.⁹⁹ It would be the first Phantom squadron in Vietnam.

Why was VMFA-531 selected to be first? At this early stage of the war, the air defense of American enclaves against the unknown attack capability of the fledgling Democratic Republic of Vietnam (DRV) Air Force was always in the minds of planners. Strikes from airfields in the North would be simple to launch, with the potential of disrupting ship-to-shore operations. The superior air-to-air and air-ground capability of the Ghost F-4Bs could deal conclusively with that problem. Finally, there was the strong desire of General Krulak that Marines be the "first to fight."¹⁰⁰

Within three hours of receiving orders, four F-4Bs led by McGraw were airborne for a direct five-and-a-half-hour flight, using one aerial refueling southwest of Okinawa. Two hours later, all 11 other Ghost Phantoms had taken off for Vietnam, with fueling stops at Naha and Cubi. This immediate readiness was a tribute to the superior efforts of the Maintenance Department. Next, squadron personnel and equipment were loaded on 10 KC-130F Hercules, and they began



Department of Defense Photo (USMC) A185086
BGen Frederick J. Karch, left, is happy to see LtCol McGraw as he brings VMFA-531 into Da Nang—the first Marine fixed wing tactical squadron to arrive in Vietnam in 1965.

arriving at Da Nang throughout the night. (Another 71 men and the heavy gear had boarded the *Snobomish County* [LST 1126] earlier.)

After 700 miles of dead reckoning over the South China Sea on the last leg of the 2,500-mile flight, the lead crews were relieved to pick up the welcome signals of the Da Nang TACAN which led them to the airfield and the only jet-capable runway north of Saigon.

Da Nang was the headquarters of the I Corps Tactical Zone (ICTZ) and was only some 90 miles southeast of the Demilitarized Zone (DMZ). Fewer than 60 miles to the west was Laos with its collection of dirt roads and paths, known collectively as the Ho Chi Minh Trail, by which the indigenous enemy was supplied from the north.

All of the squadron's aircrews were acutely aware and proud that this was the first deployment of a Marine Corps jet squadron to a combat zone since the Korean War. Many also recognized that the missions they were likely to fly would be attack, rather than the interception role for which they had so assiduously trained. Nevertheless, to their credit, the Grey Ghosts would effectively pioneer most of the types of attack missions flown in Vietnam for which Marine air would become renowned over the next seven long years: close air support, interdiction/deep air support, helicopter escort (in which it would be the first fixed-wing squadron to

give landing zone preparation and support for tactical combat operations), radar-directed bombing, rescue, combat air patrol, and flak suppression, with some attack missions flown at night.

The day after arrival, all 15 aircraft were being uploaded with ordnance. All spare hands were engaged in setting up work areas on the side of the perimeter, erecting a tent camp about two and a half miles away, and constructing utilities. Everyone tried to get used to the oppressive heat and humidity.

General Fontana was highly pleased with the "splendid demonstration of operation and coordination" of the movement, and sent his congratulations on the "fine professional performance . . . [which] can serve as a goal for the remainder of this command."¹⁰¹ McGraw and his squadron were placed under the operational control of the Commanding General, 9th Marine Expeditionary Brigade (9th MEB), Brigadier General Frederick J. Karch.

Sixty-nine hours after departing Japan, the first combat missions were flown. McGraw led a huge flight of 12 Phantoms which fired a large number of 2.75-inch rockets under the direction of a forward air controller (FAC) in a spotter plane. The targets were Viet Cong positions in the contested mountainous jungle terrain of "Happy Valley," 17 miles southwest of Da Nang (and site of some of the earliest Marine ground combat). The results were "unobserved."¹⁰² That same evening, Captain James R. Sherman, leading a flight of four, was diverted to a rocket attack on a coastal hamlet 20 miles northwest of Hue, where a new Marine BLT had been making landings.

The squadron now settled into an around-the-clock operation, but it was not easy. The Ghosts found transportation between their tent and work areas to be a continual problem, and meals and showers at first required an eight-mile round trip. Ordnance loading was done by time-consuming Marine muscle power alone, and the Ghost loading crews looked with envy at the low slung, self-

propelled loaders of the neighboring USAF squadron. Two of these were borrowed, and an order was placed to get some for the squadron. The loaders could do the job in a fraction of the time with much greater safety, but they frequently broke down in hard service, so much of the ordnance uploading in years to come would still be done the traditional way by "Marine power."

On 15 April, two large bombing strikes of eight aircraft each were led by McGraw and now-Major Keith Smith on a long, 600 nautical mile, round trip flight to the Vietnam-Cambodia border zone. The area was one of the many end-points of the Ho Chi Minh Trail system that traversed Laos and Cambodia under a heavy jungle canopy. The squadron's mission would be one of many frustrating efforts to strangle the Viet Cong (VC) supply lines. McGraw commented afterwards on the difficulties of large attack formations: confusion in coordinating attacks, the liability of breakdown of radio discipline, plus wasted fuel and pilot energy in station keeping. As a result, most missions would now be flown as sections of two aircraft or divisions of four.

The next morning, McGraw led a division back to the same area, and that afternoon, the executive officer, Major John J. Metzko and his RIO, Warrant Officer Charles A. L. Lawrence, led four F-4s some 690 miles on the furthest strike yet. The target was a VC weapons depot and liaison post 18 miles south of Saigon on the edge of the Mekong River delta.

Several logistics problems of a serious nature now manifested themselves. First was the prodigious appetite of the Phantom for JP-4 jet fuel, 52,675 gallons of it alone on the 15th.* Far more troubling was a "critical shortage of all iron bombs." On these missions, each aircraft had carried either six 250-pound bombs, or a fewer number of 500-pounders or 1,000-pounders.** America's Vietnam buildup had caused shortages

*In contrast to other Services, Marine Corps fixed-wing aircrews rarely self-reported their battle damage assessments (BDAs) during the Vietnam war, unless strike results were relayed by FACs or ground observers. Most Marine flyers felt that accurate BDA from a fast-moving aircraft was difficult, if not impossible, to determine. Neither was there pressure from above to self-report BDA, for fear that such claims might rise to fulfill expectations, and thus possibly give a distorted picture compared to actual results.

*JP-4 was a naphtha-based jet fuel. Normally, USMC aircraft used the much less flammable kerosene-based JP-5, which the Navy specified for use on board ship. While at Da Nang, VMFA-531 would use only JP-4 in common with USAF units. The squadron typically used 25,000 - 55,000 gallons per day.

**This was possibly the first use in combat of the long-lived, versatile MK 80 series of low drag bombs. The MK 81 was a 250-pound bomb, the MK 82 500-pound, MK 83 1,000, and the MK 84 was 2,000 pounds. The MK 81 and 82 could be fitted with selectable high drag fins ("Snake-eyes") for lay-down delivery. Either electrical or mechanical fuses could be used. Laser guidance became an option in the 1970s.



VMFA-531 Far East Cruise, 1964-1965

LtCol William C. McGraw, Jr., the squadron's commanding officer, briefs -531 pilots prior to a close air support mission in Vietnam.

of all types of conventional ordnance, and manufacturing companies struggled to catch up. So McGraw requested that the Bureau of Weapons approve the use of the USAF's 750-pound MK 117 general purpose bomb on the F-4B. Eventually it was approved.

On the 17th four 4-plane strikes were flown. Two were to the rugged highlands about 10 miles west of Kontum, another to Happy Valley, and the last against the southern end of the A Shau Valley, a logistics funnel for the Communists.

The following day, however, VMFA-531 was able to go to work in the specialty of offensive Marine aviation: close air support. Eight Phantoms came on target south of Da Nang in support of a joint USMC/ARVN (Army of the Republic of Vietnam) operation involving elements of a Marine battalion and two South Vietnamese battalions. Each aircraft carried six 250-pound bombs, delivered in 30 degree dives under the direction of an airborne forward air controller or FAC(A). The "target area was saturated with bombs." Major John J. Metzko and Captain Daniel Prudhomme had led the Corps'

first combat close air support (CAS) mission in 12 years. Later, on the 18th, eight more Ghost F-4Bs attacked fortified positions 32 miles south of Da Nang with 2.75-inch and 5-inch Zuni rockets which sent enemy troops fleeing.

The Ghosts were part of a supporting arms system that had been carefully worked out between aviation and ground Marines in the years beginning in the 1920s in Nicaragua and Haiti and perfected in the Pacific. It involved requests for close air support by FACs relayed to a direct air support center (DASC), and from there to a tactical air direction center (TADC), which would then scramble the flight. Once airborne, the pilots checked in with all three, and usually a small spotter plane or helicopter pinpointed the target. Then the pilots made their bombing run.*

On the 19th, 10 specialists were flown in from Iwakuni. They brought with them arresting gear for the runways. This equipment was vital to

*For a detailed account of how this Marine specialty was carried out, see Appendix C.



Department of Defense Photo (USMC) A185087

F-4B Phantom jet of VMFA-531 parked on the Da Nang airfield in April 1965.

stopping a Phantom safely should its complex utility hydraulic system be damaged in combat, or for stopping on a wet runway.

The most significant mission that day was the first helicopter escort mission of the war, led by Major Keith Smith and Chief Warrant Officer-2 Kenneth E. Strayhorn with First Lieutenant James A. Gress and Chief Warrant Officer-1 John D. Cummings. They picked up their helicopters and escorted the small green Sikorsky UH-34Ds in the racetrack pattern developed back in Cherry Point in 1952, flying at 300 or 350 knots to the helos' 90 to 100. At the western reaches of Happy Valley, they saturated the landing zone with 2.75-inch rockets. Helo escorts and landing zone preparations—LZ Preps—would become a hallmark of Marine fixed wing aviation in Vietnam.

On the 20th, 24 sorties were flown to the Que Son Valley from dawn to mid-afternoon. At least a dozen of them were fired upon by "light, .50-cal automatic weapons" as they made their rocket

and bombing runs. This was one of the first times VC forces had ever been under a close air support attack by jets, and they would soon learn not to shoot at the small spotter planes for fear of what might come next. Their small arms fire failed to connect, probably due to their failure to allow enough lead for Phantoms making 500 knots while pulling out at four Gs. The ordnance loads were relatively light due to shortages—typically a pair of 19 shot 2.75-inch rocket pods, plus a four-shot Zuni pod, or a pair of 250-pound bombs.

The next day, McGraw led an afternoon six-plane rocket strike on a wooded trail network within a thousand meters of the Laotian border, at a point just five miles north of Cambodia. The VC and NVA (North Vietnamese Army) were no respectors of international boundaries, and, by year's end, Marine jets would be striking into Laos itself in missions to interdict the Ho Chi Minh Trail.

The *Snobomish County* finally arrived after an 11-day voyage and disembarked 70 men and 650,000 pounds of cargo. VMFA-531's in-country strength now stood at 46 officers and 364 enlisted men, plus a Navy doctor, two medical corpsmen, and two McDonnell technical representatives.

By the 22d, the ordnance shortage reached crisis stage, and General Karch was forced to order temporary suspension of most of the unit's flight operations. However, two days later, the 9th MEB commissioned a CAS alert "hot pad," as ordnance to arm it now began trickling in.

On 25 April, the MEB launched Captain Don K. Hanna and Chief Warrant Officer-1 John L. Wenrich, Jr., and Captain Ronald J. Dusse and Chief Warrant Officer-2 James H. Stowell on the first CAS scramble, to attack VC snipers along a ridgeline west of Da Nang. A second scramble, led by Hanke and Schwarz, was told by the ground FAC that their rocket firing was so good that the VC refused to fire on the Marine patrol while the planes were overhead. The third section expended nothing in their hour and 20 minutes on station, since their mere presence "effectively suppressed all VC ground fire." From now on, as long as Marine jets were in Vietnam, ground Marines could depend upon a CAS "hot pad" on ready alert for help.

Another landmark mission was flown on 27 April, when Gilliard and Johnson, along with First Lieutenant John R. Gowell and Chief Warrant Officer-2 John T. Favaron, flew the first radar-directed bombing flights of the war. They were controlled by Marine Air Support Squadron 2, using the computerized precision guidance of a new radar, the TPQ-10, which had recently come into the inventory. As had been seen in the two previous wars, precision night attack was an extremely difficult proposition at best, and the TPQ-10 was developed by the Marine Corps to help close the gap.

From the aircrews' perspective, it was a simple operation which involved flying exact headings, altitude, and airspeeds. After the controller locked the Phantom into the radar's narrow tracking beam, he relayed computer-derived headings, instructed them to arm their weapons, followed by the command: "Standby, standby . . . Mark!" whereupon the pilot pressed his bomb button. Provided the winds aloft were known, the system's accuracy was quite good: within a few hundred feet.

By the 29th, two 2-plane "hot pads" were in

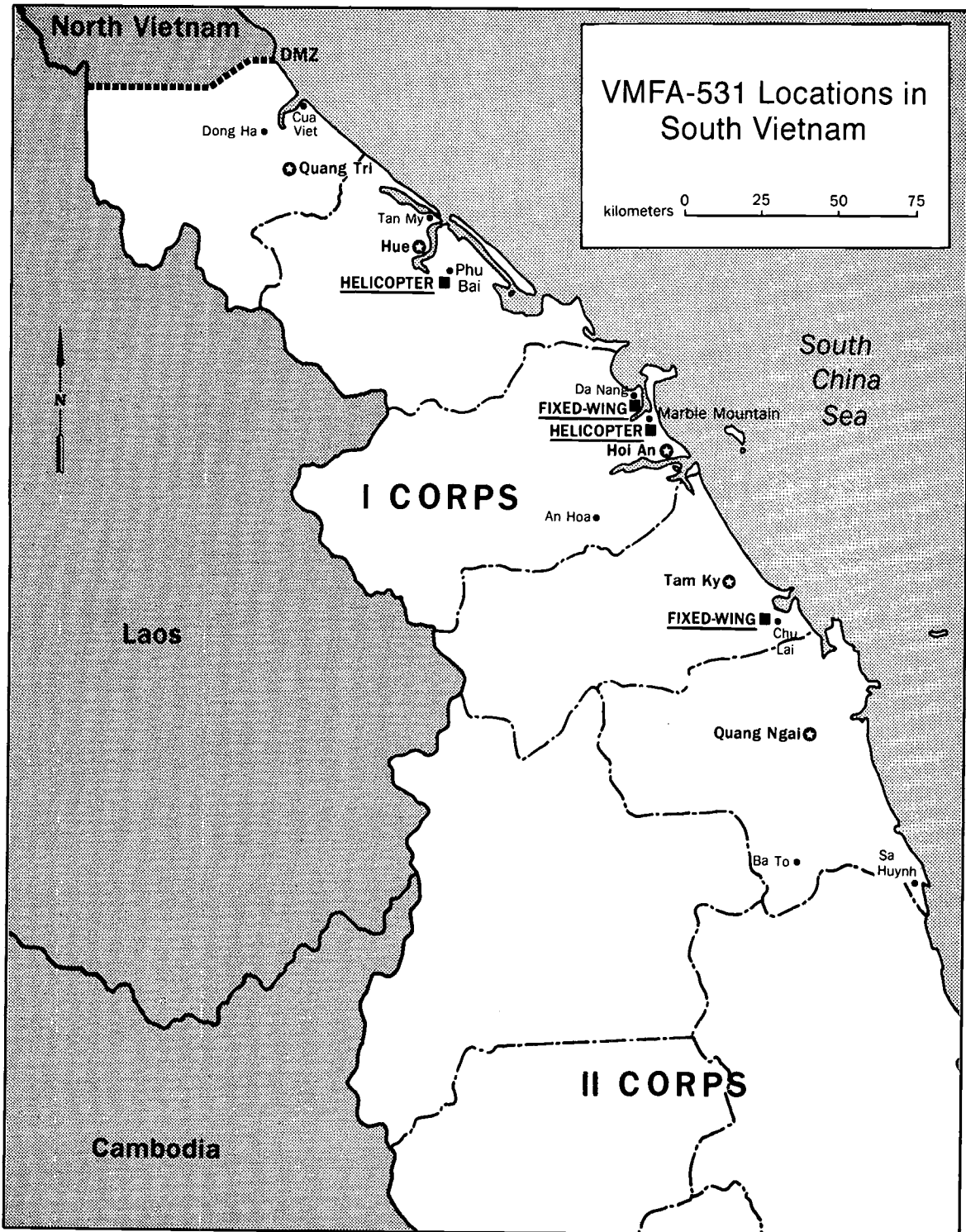
effect, one for the 9th MEB and one for I Corps in general, with ordnance loads creeping up slightly to 4-6 bombs per aircraft plus rockets. The next day Captain Michael P. Sullivan and his RIO from Key West days, CWO Charles C. Taylor, along with Captain John K. Cochran and Warrant Officer-1 Roy E. Simolin, flew the first air-to-air sorties. These were practice GCI/AI radar intercepts, under the control of a USAF radar site. The first Marine GCI unit, Marine Air Control Squadron 7 (MACS-7) would arrive shortly with better gear.

At the end of April, McGraw looked at the accomplishments of VMFA-531 to date: 233 combat sorties flown in 280 hours. Forty-two of the sorties were flown in support of Marines, the rest were for the 2d Air Division, the major USAF command in Vietnam at that time. In the ICTZ alone, the Ghosts were credited with 225 structures destroyed, two caves blocked, two "secondary explosions," and one bridge destroyed. The efficacy of helo escorts had also been clearly shown: "It is readily apparent that the VC will not fire on helos or ground patrols when fixed wing air is overhead." The repeated praise of FACs concerning the Ghosts' accuracy on target was "due to the teamwork of the RIO/Pilot."¹⁰²

On 3 May, south of Quang Ngai a Communist concentration was discovered and pounced on by three Ghost divisions. The weather was "very poor," which necessitated shallow bombing runs, with the result that one F-4B acquired a dented drop tank and a foot long gash in a flap from bomb fragments. When the damage to the enemy was totaled up by the district chief, he credited the Ghosts with 22 structures destroyed, 11 VC killed by air, 27 VC wounded by air, and 1500 kilograms of Viet Cong rice destroyed, along with four of their rice storage houses.* Ninety-two refugees returned to government control, bringing 100 head of cattle with them. Only forty 250-pound bombs had been expended.

After nine helo escort sorties near Da Nang on 5 May, two divisions struck a VC stronghold about 15 miles west of Chu Lai, where Marine landings were scheduled two days later. Captain Daniel Prudhomme with Major William E. Henson led the first division, followed by the executive officer, Major Metzko, and Warrant Officer-1 Harold

*Killed by air (KBA) and wounded by air (WBA) were the standard terms in Vietnam to describe casualties caused by air strikes.



W. Frazier, with the second division.* Each aircraft carried only two or three bombs.

*Major "Willie" Henson was the senior RIO along with Major Austin O. Gandy. This was his third war and third -531 tour. The F-4B was his third Ghost aircraft after the F7F-3N and F3D-2.

A post-attack intelligence report stated that the Ghosts had bombed a VC armory and training base with startling accuracy: 41 VC troops and 62 "VC draftees" were KBA with their weapons. Also destroyed were two .30-caliber machine guns and three automatic rifles. Other destruction included a rice mill with its machinery, 36,000 kilos of rice,

and two workshops. The report went on to state that the damage was so severe the VC were looking for an informer, since no outsider could have known the location of this tightly controlled area.¹⁰³ If the report was true (and such informer reports had to be taken with a grain of salt), it is possible that these missions helped keep the Marine landings at Chu Lai two days later free from enemy interference.

The 6th was equally interesting, because the squadron made its first strikes into North Vietnam. A USAF jet had been shot down about five miles north of the DMZ. Two Ghost sections were scrambled, and direct hits were reported on the enemy anti-aircraft guns. The debrief noted, "Moderate to heavy Flak of 37 and 57 mm, radar-controlled, [was] encountered . . . at . . . 10,000 [down] to 3,000 feet." The area—soon to be code-named "Tally Ho"—became notorious as a flak trap which brought down a number of Marine flyers over the years.*

The 7th was D-Day at Chu Lai, and the Ghosts flew four sorties to attack the Viet Cong 10 miles west of the landings. They carried the heaviest loads yet: six bombs and four rocket packs per plane. Chu Lai would soon become the largest Marine air base in Asia. That same day, III Marine Amphibious Force was established at Da Nang. The squadron also welcomed a Sparrow missile team to keep the Ghosts ready for any eventuality on the air-to-air side of any mission.

Ten sorties were flown around Chu Lai on the 10th, and the first night missions of the war were flown beginning at 2200, when bombs were dropped on a concrete bunker complex southwest of Da Nang using TPQ-10 radar. Night harassment and interdiction using TPQ-10 would become a regular feature of Marine air in Vietnam over the next seven years.

The 13th was notable on two counts. The first was the squadron's initial use in combat of napalm, three 1,000 pound tanks expended along with bombs and rockets on the Laotian border. Secondly, the first night CAS of the war was carried out west of Chu Lai, when troops of BLT 4, as well as a transport helicopter, were fired on by automatic weapons and small arms. Two Ghost F4Bs were scrambled to their defense a half hour

*The commanding officer of another VMFA squadron later commented: "it was only a 'flak trap' if you made too many wrong runs." Losses occurred, he felt, "by making multiple passes . . . in the daytime."

after dark in restricted visibility. To complicate matters further, no flares were available, but somehow they were able to locate their targets in the dark. The BLT's commanding officer subsequently sent a message stating that "the fast reaction and can-do spirit demonstrated by [the flight] made this mission a complete success. The target was destroyed. My appreciation for a job well done."¹⁰⁴

More dramatic CAS action came the next day when a Marine patrol got pinned down by intense fire from a wooded ridgeline northwest of Da Nang. Two "med-evac" helos were chased off and called for help. Eight -531 Phantoms were promptly scrambled. The first attacks silenced two dug-in automatic weapons positions with direct hits and gave the patrol freedom of movement. Now the Ghosts began working close in to the patrol itself—sometimes to within 60 - 80 feet of its position—sweeping west to east, killing several Viet Cong and "driving the others out of their entrenchments into [the patrol's] line of fire," in the words of the company's grateful commanding officer.

He and his patrol leader visited the squadron the next day to thank the Ghosts personally, and wrote that the "prompt and accurate close air support flown by the Phantoms of VMFA-531" was the "factor enabling my patrols to withdraw successfully with a minimum of casualties . . . [and] clearly demonstrated the outstanding effectiveness of the Marine air ground team."¹⁰⁵ The Ghosts flew a record 25 sorties that day.

On the 15th, the squadron was placed under the operational control of the 1st MAW which, in view of the continuing ordnance shortage, immediately authorized aircraft to land with unexpended ordnance. Actually, the squadron had been doing this all along, unofficially. Moreover, critically scarce rockets were only to be expended in support of Marines. For their own local defense, the Ghosts had established a ground defense company two weeks earlier. Even if he spent his day turning a wrench, a Marine was still a Marine, and all Ghosts knew the business end of the M-14 rifle.

A pace of about 18 sorties a day continued through the end of May, but the wear and tear of combat began to tell on the equipment. Even so, the hard-working maintenance troops usually kept 13 of 15 F-4s airworthy, a remarkable average.

Battalion Landing Team 4 again sent thanks for

some timely night close air support on the evening of 17 May, when Captain Michael P. Sullivan led a division against entrenched Viet Cong a few miles west of Chu Lai. Without flares and in poor visibility, they suppressed all fire, destroyed three structures, got two secondary explosions, and left with 13 fires raging on the ground. For their trouble they were fired upon during landing approach back to Da Nang.¹⁰⁶

Three days later, McGraw and Major Austin O. Gandy led another division 19 miles west of Chu Lai under the control of I Corps' senior air liaison officer, a USAF lieutenant colonel. He radioed back that it was the best bombing he had seen in Vietnam.

One squadron mission on 26 May managed to expend no ordnance at all as they made multiple non-firing passes over a trapped Marine patrol 10 miles southwest of Da Nang. The noise and smoke from the F-4Bs "effectively prevented the VC units from bringing . . . fire to bear on the patrol and evacuation helos by keeping their heads down!" The Commanding General, 3d Marine Division, Major General Lewis W. Walt, sent a "well done" praising the "high degree of professionalism . . . [in] a commendable example of the ability of dissimilar commands to operate in close harmony."¹⁰⁷

The next day, two Ghost flights were singled out for praise by the commander of HMM-163. Lieutenant Colonel Norman G. Ewers was leading his helo squadron's and HMM-161's landing of two infantry battalions involving some 900 troops. Ewers wrote: "Timing and precision of attack by fighter aircraft were of critical importance to the assault landing. The fire support delivered by the pilots of VMFA-531 was superb." He went on to describe a multi-squadron assault near An Hoa, the largest yet attempted in ICTZ. The simultaneous LZ Preps commenced exactly as the helos departed their initial point, and continued up to the last possible moment before touchdown, completely neutralizing the area.¹⁰⁸

In years to come, most -531 aircrews would recall the action from 30 May to 4 June near the Ba Gia outpost (10 miles west of Quang Ngai) as their most memorable action. The Ghosts called it the "Battle for Quang Ngai" in their debriefs. Taking advantage of monsoon-like weather, the 1st VC Regiment ambushed the 1st Battalion, 51st ARVN Regiment, which had been dispersed in a pacification program. For six days and nights, VMFA-531 ran mission after mission of CAS,

unloading 250 and 500-pound bombs, Zuni missiles, and 2.75-inch rockets in a rain of fire on the Viet Cong. In spite of this concentrated effort, only 65 of 500 South Vietnamese soldiers, with three American advisors, were able to make it through the lines to safety, while leaving virtually all their weapons behind.

Finally, by 3 June, the constant air pounding helped to drive the 1st Viet Cong Regiment on the run westward. That night a sizable body of Viet Cong were located in a river bed. Two Ghost sections attacked with Zunis and 500-pound bombs under the light of flares. The Special Forces' FAC(A) reported back that the Ghost night strike had "resulted in 168 Viet Cong KBA/WBA, 30 civilian ammo bearers KBA/WBA, and 100 [more] deserted." This was the most deadly attack ever made by VMFA-531.

The Ghost's reputation in night close air support was now very high; up to this time they had evidently been the sole practitioners of this difficult and dangerous art in Vietnam. However, the end of -531's combat tour now loomed. Part of the squadron departed 4-6 June for Atsugi. Nonetheless, a full schedule was kept up, including the longest missions of the tour. These were six sorties scrambled to the Mekong Delta area 30 miles southeast of Saigon. The 700-mile round trip of one hour and 50 minutes, while carrying 3,000 pounds of ordnance per aircraft, was a clear example of the combat radius of the F-4B without aerial refueling.

Beginning on 11 June, the remaining VMFA-531 aircraft were ferried out to Atsugi. The last day of combat operations was 14 June, with missions which included helo escorts, an attack on pillboxes and bunkers, and a strike against three Viet Cong battalions. Transferred to MAG-11 at Atsugi, the squadron was relieved by VMFA-115, and at 2400 on 30 June 1965 one of the most memorable periods of -531 history came to a close.

The Ghost record in Vietnam was impressive and equaled that of some squadrons yet to come which had much longer tours. It flew 970 combat sorties in 1,232 hours in 333 missions. Two hundred and seventy-five sorties were in support of their fellow Marines, mostly close air support and helo escort, as well as some TPQ-10 radar-directed bombing missions. The rest were in general support of the USAF 2d Air Division. Some types of missions were flown for the first time in Vietnam such as helicopter escort, on-call