US MARINE CORPS FIGHTER SQUADRONS OF WORLD WAR II

• BARRETT TILLMAN •

AUTHOR OF

Whirlwind and *Clash of the Carriers*

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Dedicated to honored friends, wings now folded:

Bill Cantrell (VMF-123)
Marion Carl (VMF-221 and VMF-223)
Jeff DeBlanc (VMF-112 and VMF-422)
Jeff Dorroh (VMF-323)
Joe Foss (VMF-121 and VMF-115)
Bob Galer (VMF-224)
Hap Langstaff (VMF-215)
Bruce Porter (VMF-121 and VMF-542)
Jim Swett (VMF-221)
Ken Walsh (VMF-124)

CONTENTS

Prologue 8
The Fighters 10
Armament 20
US Marine Corps Fighter Aviation in World War II - An Overview 23
Us Marine Corps Fighter Squadrons Deployed During World War II 86
Biographies 154
Medal of Honor Citations 186
Who is the Leading Marine Ace? 191
The Combat Strategy and Tactics of Maj Gregory Boyington 193
Wartime Interview with Capt J. J. Foss 200
List of Illustrations 213
Appendices 226
- Top 20 US Marine Corps Fighting Squadrons 226
- Top Squadrons by Aircraft 227
- US Marine Corps Medal of Honor Fighter Pilots 228
- The Aces 229
- Aces per Squadron 234
- US Marine Corps Double Aces 235
- First 25 US Marine Corps Aces 236

Leading US Marine Corps Aces 237
US Marine Corps Aces in a Day 237
Carrier Fighter Squadron Victory Totals 238
Top-Scoring US Marine Corps Carrier Pilots 238
US Marine Corps Aces who Died in World War II 239
Aces by Aircraft Type 239
Leading US Marine Corps Pilots by Aircraft Type 240
US Marine Corps Nightfighter Squadron Scores 241
Top US Marine Corps Nightfighter Pilots 241
Highest Daily Fighter Claims 242
Highest Squadron Daily Claims 242
Miscellany 243
US Marine Corps Fighter Squadrons deployed during World War II (six-month intervals) 245
Deployed US Marine Corps Fighter Squadrons of World War II 258
Non-deployed US Marine Corps Fighter Squadrons of World War II 260
Current US Marine Fighter and Attack Squadrons with World War II Heritage 261
Selected World War II Aviation Airfields 262
Selected Sources 264
Index 267

PROLOGUE

During the World War II, 50 US Marine Corps fighter squadrons designated VMF (for heavier than air Marine fighter) were deployed outside the Continental United States (ConUS). This number included seven nightfighter units. A further 23 squadrons provided operational training, and two deployable units (VMF-514 and VMF-544) were established too late for combat. Thus, the US Marine Corps counted a total of 75 fighter squadrons, of which 67 percent deployed. That figure compares to about 160 US Navy fighting squadrons, 80 of which deployed to combat. Eight (VMF-111, VMF-114, VMF-155, VMF-231, VMF-324, VMF-331, VMF-333 and VMF-513) of the 50 VMFs west of Hawaii did not shoot down a single "bandit", with eight more failing to produce a single ace.

Based on the published work of World War II aviation historian Dr Frank Olynyk, this book recognizes 120 US Marine Corps fighter aces – individuals credited with five or more enemy aircraft destroyed in aerial combat. They contributed 966 (35 percent) of the total 2,627 victories attributed to US Marine Corps fighter squadrons. That is in line with the ratio for other services. However, attrition among "leatherneck" aces was far lower – 16 lost to all causes equaled about 13 percent, versus as high as 24 percent for the other services. Three more US Marine Corps aces died in Korea, where 1Lt John Andre added to his four World War II victories to become an ace.

In the squadron histories section of this volume, location and date of establishment (please note that air stations and ships are commissioned, but aviation units are established) are given, as well as dates of redesignations, when known. Often the changes were unsubstantial, as in assignment to carrier service (CVS), although some observation squadrons (VMOs) became VMFs.

The combat squadrons described here include three overseas scout-bomber (VMSB) units briefly redesignated bombing-fighting (VMBF) units with F4Us in late 1944.

Deployments usually list each combat tour, but because some squadrons operated from many bases in a few months, several entries merely include "Solomons" or "Marshalls." or more details please see the excellent compilation in Robert Sherrod's *History of Marine Corps Aviation in World War II*. Individual and unit combat records are accepted from the published work of Olynyk, and they sometimes differ from the official figures quoted by Sherrod in 1952.

For individuals, a pilot is considered an ace of a specific squadron if he is credited with five or more aerial victories while serving in that unit. Other listings might indicate, for example, Capt. Gyreene (5+2), indicating five victories in VMF-116 and two more in another squadron.

Wartime commanding officers are usually limited to those who served in that capacity for more than 30 days, excepting some short-term first skippers. There are some exceptions for notable individuals, such as Gregory Boyington's three-week stint with VMF-112. In cases where COs were killed, the name is followed with +.

The US Marine Corps has done a far better job than the US Navy or even the US Air Force in maintaining consistent unit designations, and where appropriate they have been noted. Today, 11 of 13 US Marine Corps strike-fighter squadrons bear the numbers of World War II VMFs, as do all six operational AV-8B Harrier II units. Where applicable, the legacy is noted in each squadron section throughout the text.

While the US Navy and US Marine Corps both "establish" squadrons, the US Navy "disestablishes" and the US Marine Corps "deactivates." Occasionally, US Marine Corps units are "reconstituted" – an unfortunate choice of words, say some veterans, given the allusion to dehydrated potatoes. In some instances I have noted those squadrons reactivated after 1945. Several notable post-World War II units have been noted here under "subsequent records", with the core of World War II squadron numbers still reminding us of a proud heritage.

Squadron nicknames often are problematical. The names cited at the head of each unit history may reflect late- or postwar monikers where none existed previously. And some units changed their names during the war. Some contradictions remain unresolved.

At this writing in July 2013 only four US Marine Corps aces are known living. The senior member of the American Fighter Aces Association is retired Brig Gen Fritz Payne, the first of that elite group to reach 100 years of age in 2011.

Distances usually are rendered in statute miles in this volume, although occasionally knots (15 percent greater) are cited for airspeeds.

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Barrett Tillman
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THE FIGHTERS

Between December 1941 and September 1945 US Marine Corps fighting squadrons flew six types of aircraft, five of them in combat. They were a very different batch of machines.

When war erupted in Europe in 1939, US Naval Aviation was caught in a time warp, transitioning from biplanes to monoplanes. The two major combatant aircraft of 1942, the Grumman F4F Wildcat and Douglas SBD Dauntless, did not reach the fleet until 1940-41. US Marine Corps fighting squadrons flew Grumman's rotund, blunt F3F-3 – a good performer for its era with 250mph speed, two-gun armament and hand-cranked landing gear. The squadron commanders and many senior pilots of the crucial 1942 period had learned the fighter trade in F3Fs.

Here are presented the US Marine Corps fighters in order of squadron service.

Brewster F2A Buffalo

The US Navy's first monoplane fighter (following the carrier-based Douglas TBD torpedo airplane and Vought SB2U scout-bomber into service) was the Brewster F2A, christened Buffalo in the name designations of October 1941. The original name proposed by the US Navy's Bureau of Aeronautics was Twister, before the alliterative system was adopted – a Brewster dive-bomber of this period was the unremarkable SB2A, called the Buccaneer.

The Brewster fighter demonstrated how quickly aviation technology evolved. When first flown in December 1937, the XF2A-1 represented a cutting-edge design. Apart from being a monoplane, it had hydraulically operated landing gear versus the manually operated wheels in the Grumman F2F/F3F series. The US Navy had long since committed to radial engines, and the Brewster received Wright's reliable R1820, rated at 950hp. The F2A's maximum rated speed of 240 knots (277mph) was not substantially better than the F3F-3 biplane's 230 knots, but the Brewster offered far greater "stretch" for future development. That promise was met with improved streamlining that worked the rotund fighter up to 265 knots.

The US Navy purchased a typical first production batch of 54 aircraft, designated F2A-1s. Armament was increased from the original single .30in. and .50in. weapons to four of the heavier machine guns. However, only 11 of the Brewsters went to the US Navy as the Roosevelt administration diverted the remainder to Finland, which was resisting Soviet aggression in the 1939-40 Winter War. Those Brewsters arrived too late for combat, but later Model 239s featured prominently in the 1941-44 Continuation War. Pound for

pound, Finnish fighter pilots were among the finest on earth, with their Brewster "Sky Pearls" establishing a claimed kill-loss ratio of 26-to-1 against the Russians – 496 victories for 19 losses in air combat.

The next production version was the F2A-2, heavier than its predecessor but possessing more power. "Dash Twos" arrived in VMF-221 in the summer of 1941, at least 28 of the 43 delivered serving in VMF-111, VMF-112, VMF-121, VMF-211, VMF-212, VMF-222, VMD-2 and VMO-251. Two were reconfigured as F2A-2P photo-planes.

In January 1941 the Bureau of Aeronautics (BuAer) ordered 108 F2A-3s, differing notably from the previous variant. The "Dash Three" was longer, its fuselage containing more fuel, armor and ammunition. Although range was improved, combat performance degraded as speed, turn rate, climb and ceiling were all affected. Moreover, the design's long, spindly landing gear proved vulnerable to the high impact forces of routine carrier landings. The situation worsened to the point that "Fighting Two", embarked in USS *Lexington* (CV-2), sidelined several of its Buffaloes in late 1941 to keep some available for contingencies.

Meanwhile, Brewster was licensed to export variants of the Buffalo to Britain (170 aircraft), the Netherlands (92) and Belgium (40 planned). Buffaloes saw combat with Australian, New Zealand and Dutch squadrons, but suffered heavily against more numerous, often better performing opponents. Many Naval Aviators enjoyed flying the Brewster, especially the lighter early models. Greg Boyington said it would "roll and turn inside a phone booth" and Marion Carl preferred it as a more agile gunnery platform to the F4F.

Buffaloes equipped VMF-211 at Palmyra Atoll, in the northern Pacific, early in the war but they remained in the backwater of the conflict. On 28 March 1942 eight Brewsters were delivered to VMF-221 on Midway by the seaplane tender USS *Curtiss* (AV-4), followed by seven Wildcats in May. Additional deliveries brought the squadron up to strength before the June battle. Of the 20 Buffaloes airborne on June 4, 1942, 14 were lost with 12 pilots killed and three wounded. Only one surviving Buffalo was able to fly again that day. Capt Phillip R. White's comment has been widely reported since 1942:

> Any commander who orders pilots out for combat in an F2A should consider the pilots as lost before leaving the ground.

However dolorous the Buffalo's record at Midway, VMF-221's overall performance requires examination. The squadron was committed to combat piecemeal, at an altitude disadvantage against generally more experienced aviators flying superior aircraft. In that regard, the battle could only could have gone one way. Given the circumstances, Marion Carl believed he would have done just as well in a Brewster as in his Wildcat.

Midway marked the effective end of the Buffalo's American career. But whatever the F2A's faults, the company's reputation for inefficiency could not have retrieved the situation. Wartime criticism of Brewster included accusations of sabotage, and it is worth noting that while the company built 735 F3A Corsairs under licence, few if any saw any combat due to poor production techniques and inadequate quality control.

Grumman F4F Wildcat

America could not have prosecuted the Pacific War in the year after Pearl Harbor without the Douglas SBD Dauntless and the Grumman F4F Wildcat. The fabric-covered Vought SB2U Vindicator proved inadequate as a scout-bomber, and the much-maligned Brewster F2A was unsuitable as a carrier aircraft. Fortunately for the US Marine Corps, Naval Aviation and the United States, the Dauntless and Wildcat were up to the task.

Designed as a biplane successor to the F3F series, the follow-on Grumman was converted on the drawing board to a mid-wing monoplane. First flown in September 1937, the prototype's performance was disappointing to the company and the customer. Consequently, Grumman reworked the XF4F-2 into the "Dash Three" model with redesigned wings and empennage. The transition was successful, and production began in early 1940. The British and French took note, ordering the type as well.

The Wildcat was a contradiction, being an important transitional design of extraordinary simplicity. Like previous Grummans, its landing gear was chain-operated with the pilot manually cranking up the wheels. But its uncomplicated design and construction paid dividends in combat, where maintenance was relatively easy.

The US Navy ordered 54 pre-production "Dash Threes" in August 1939, less than a month before the European war broke out. Production began six months later. US Navy fighting squadrons received their first F4F-3s at the end of 1940, gradually phasing out F3Fs while Brewsters remained in those units already equipped with the type.

When BuAer drew up a list of popular names for US Navy aircraft in June 1941, the F4F's original name was postulated as Comet. Because Grumman biplane fighters remained in limited use that year, the F2F was tentatively named the Lightning and the F3F the Planet. Neither moniker was officially adopted.

Contrary to prior practice, the US Marine Corps received modern aircraft alongside the US Navy when the F4F reached frontline units. VMF-111 and VMF-121 drew the service's first F4Fs at Marine Corps Base (MCB) Quantico, Virginia, in October, followed by VMF-211 at Marine Corps Air Station (MCAS) Ewa, in Hawaii.

A shortage of F4F-3s forced reliance upon -3A variants with single-stage superchargers. Thus, the interim models were slower than the standard "Dash Threes" at altitude. A folding-wing Wildcat, the XF4F-4, was flown in April 1941, adding two more .50in. machine guns in the wings. The extra lethality was requested by the Royal Navy, but the folding wing and additional weapons reduced the Wildcat's punch. Without an offsetting increase in horsepower, the "Dash Four" was about 500lb heavier than its predecessor, and therefore climbed slower. Fleet aviators were not pleased.

Throughout 1942, 21 dedicated photo-reconnaissance Wildcats were produced as unarmed F4F-7s. Besides cameras, the "Dash Sevens" possessed an enormous internal fuel load of 685 gallons – enough for nearly 3,000 statute miles. Although seldom used on operations, the "Dash Sevens" provided a path to fighter transition for reconnaissance pilots, the most notable being Joe Foss.

Grumman built 1,540 Wildcats for the US Navy and US Marine Corps, ending in May 1943 – an average of 44 aircraft per month. It was barely enough to keep up with attrition (worldwide, the US Navy and US Marine Corps wrote off 109 F4Fs in October 1942 alone.)

After Wake Island, US Marine Corps F4Fs saw limited combat for the next seven months. The exception occurred when VMF-221 committed seven F4F-3s to the defense of Midway.

Then came Guadalcanal. Wildcats flew in the Solomons for a full year – August 1942 to August 1943. Corsairs fully replaced F4Fs in US Marine Corps squadrons as of September 1943, and the Corps' last Wildcats were VMF-441's in the Central Pacific. The last aerial victory credited to an F4F in US Marine Corps service was claimed by Capt William P. Boland Jr of VMF-441 on August 8, 1943 near Funafuti, in the Ellice Islands, 1,000 miles east of Guadalcanal. He was credited with the destruction of a Mitsubishi G3M "Nell" bomber. Subsequently based at Nanomea, the squadron launched on two abortive night intercepts. At the end of November VMF-441 moved to Tafuna, in Samoa, where it exchanged its F4F-4s and FM-1s for F4U-1s.

Grumman ended F4F production in early 1943 to concentrate on the F6F Hellcat. However, Eastern Aircraft Division of General Motors Corporation took up the slack by manufacturing 900 near-identical versions of the F4F-4, designated FM-1s. A mid-war variation, the FM-2, equipped escort-carrier squadrons in both the Pacific and Atlantic Theaters. US Marine Corps squadrons never flew the FM-2. However, "the Wilder Wildcat" scored by far the best kill-loss ratio of any American piston-engined fighter – in the order of 32-to-1 during 1944-45.

Vought F4U Corsair

The F4U Corsair (originally the fighter's proposed name was Mercury) was a world beater – a cutting-edge airframe mated to one of the finest aircraft engines of all time. F4U-1s offered immense advantages over the F4F-4 – speed, climb, range and ceiling, with more ammunition for the same six .50in. guns.

Based on a US Navy proposal in early 1938, Vought Aircraft's chief designer Rex Beisel took carrier fighter design in a new direction. The big, powerful Pratt & Whitney R2800 produced 1,800hp, with the promise of more to come. Despite its size and bulk (it had an empty weight of nearly 9,000lb), the Corsair airframe was extraordinarily sleek. Vought engineers optimized every means of extracting maximum speed, most notably by joining the wings to the fuselage in the inverted gull configuration. Wind tunnel tests had proven the aerodynamic advantage of merging the wing stub at right angles. The cleanness of the design was further enhanced by placing the engine's oil coolers in the wing root.

First flown in May 1940, the new fighter endured a trying development period. In high speed dives the XF4U-1 encountered compressibility, and test pilots noted a variety of design and operating problems. High on the list were limited cockpit visibility and control flutter. Eventually the factory tested a dozen or more aileron configurations, finally producing superbly harmonized controls. In October 1940 the XF4U-1 became the first US single-engined production aircraft to clock 400mph in level flight. The US Army Air Corps' twin-engined Lockheed P-38 Lightning had reached that milestone in early 1939. Whatever its teething problems, the Vought fighter possessed exceptional speed.

However, the wing stub and center section were fairly complex structures requiring more manufacturing expertise than any previous naval fighter. Wartime deliveries began in July

1942, but unit transition took time. The first two squadrons, VF-12 at Naval Air Station (NAS) San Diego, California, and VF-17 at NAS Norfolk, Virginia, worked hard at turning the demanding Corsair into a viable carrier aircraft. Helped by Vought technical representatives, the squadrons solved the many problems (chiefly landing gear, tailhook and stall-spin characteristics), but BuAer remained skeptical. When the first two carrier squadrons deployed in 1943, they were soon replaced aboard ship by units equipped with Hellcats. Thereafter, the US Marine Corps received more Corsairs than it might have otherwise. The Corps' first F4U squadron was VMF-124 under Maj William Gise. It arrived at Guadalcanal in February 1943, and thereafter the bent-wing "U-bird" became the US Marine Corps' most iconic aircraft.

For its time the Corsair was large for a fighter, and pilots said that the absence of a cockpit floor could be disconcerting. One commented, "You never knew what was lurking down there below those rails to the rudder pedals." Maj Robert Owen G. Owens of VMF-215 wrote:

> The Corsair was a hell of a thing to fly, particularly if you'd started on a much lighter aircraft. It had so much torque that when you poured the coals to 2,800rpm, it would try to walk away from you. You had to have full rudder on there in order to keep control. The F4U had a very large cockpit, so much so that the shorter guys could not hold their rudder all the way in to counteract the torque. Some pilots used to fly with a cushion – one of my pilots, Lt Hap Langstaff, used to have two of them in order to push the rudder pedals further forward.

Most F4U pilots knew how to fight their arch enemy before deploying. In June 1942 a Mitsubishi A6M2 Zero Model 21 crashed in the Aleutians and was recovered, repaired and evaluated. Grumman test pilot Corky Meyer participated in comparative tests of the unexpected prize, and summarized American fighter performance against the Zero Model 21 in 1943. Although Corsairs largely engaged later Model 52s, the tests generally held true:

> The Zero was far inferior to the Corsair in level speeds and diving speeds at all altitudes. It fell short in climbs starting at sea level, and above 20,000ft the Zero could not stay with the Corsair in high-speed climbs. The superiority of the F4U-1 was very evident and would persist even when carrying heavier loads. In combat with the Zero, the Corsair could take full advantage of its speed along with its ability to push over and roll at high speeds if surprised. Due to its much higher wing loading, the F4U-1 had to avoid any attempt to turn with the Zero, except at high speeds, and could expect the latter to out-climb the Corsair at moderate altitudes and low speeds. In this case, the Corsair should be climbed at high speeds and on a heading that would open the distance and prevent the Zero from reaching a favorable position to attack. After reaching 19,000 or 20,000ft, the Corsair had superior performance in climb and could choose its own position for attack.

After its teething problems were solved, the Corsair became an extremely popular mount. Capt Edward Shaw, an ace of VMF-213 said, "There's a plane! It won't do acrobatics like a Jap Zero but it will outfight any Jap plane that ever got in the sky." Boyington described

the F4U as "a sweet flying baby if ever I saw one," and Marion Carl considered it "head and shoulders above its contemporaries." And upon returning from combat Ken Walsh exclaimed, "Say, if Foss had flown Corsairs he'd have got 50!"

The F4U-2 was the Corsair nightfighter of World War II. An early Air Intercept Model A (AIA) radar was mounted on the starboard wing, requiring removal of the outboard .50in. machine gun. The pilot had a 3in. scope in the cockpit, permitting non-visual tracking at a range of about two miles. A single-seat nightfighter called for extreme competence, as almost every other nightfighter had a two- or three-man crew. Flying from a carrier at night was also extremely challenging. The 'Dash Two" was flight tested in January 1943, with 34 examples produced to equip three squadrons – VF(N)-75 in the Solomons, VF(N)-101 aboard the fast carriers and VMF(N)-532. With limited opportunities in the Central Pacific, the latter unit claimed two of the type's 14 victories between late 1943 and mid 1944.

In comparing the Corsair and Ventura as nightfighters, Lt Col Frank Schwable of VMF(N)-531 declared, "The F4Us would have shot down many more bogeys had they had a radar operator to help them, just as the PV-1s would have shot down many more bogeys if they had had the F4U's performance."

Meanwhile, production spooled up with two subcontractors. Vought delivered 6,560 Corsairs during the war, Goodyear produced nearly 4,000 from early 1943 and Brewster 735 from June 1943 to July 1944. Average monthly deliveries in 1944 amounted to 222 from Vought, 176 from Goodyear and 86 from Brewster in the seven months the company was active that year. Total wartime deliveries were 11,415, plus 182 from September to December 1945.

Because US Marine Corps aviation existed largely to support the infantry, it was inevitable that F4Us would become involved in close air support (CAS). The F4U-1D and FG-1D variants included bomb racks and eventually rocket rails to provide precision ordnance delivery, often within "danger close" distances of friendly forces. So did F4U-4 models, which, postwar, became the standard piston-engined fighter for the US Navy and US Marine Corps.

In the Central Pacific F4Us flew thousands of sorties against bypassed Japanese garrisons. Corsair fighter-bombers carried up to 3,000lb of ordnance – a loadout evaluated by Charles Lindbergh in a 1944 tour of the Pacific theater.

With Marine squadrons land-based until the end of 1944, carrier equipment was unnecessary. Therefore, Goodyear produced FG-1s with non-folding wings and no tailhooks.

Seventy years later the Corsair remains the iconic US Marine Corps aircraft. Well into the 21st century, no other claimant is likely to challenge the fabled "U-bird".

Lockheed PV-1N Ventura

Only one US Marine Corps squadron flew the PV-1 Ventura in combat, but it was a noteworthy unit, being the Corps' first dedicated nightfighter squadron.

The Ventura began life as the US Army Air Force's B-34, intended for export but also used as a USAAF navigation trainer. The US Navy ordered 1,600 as PV-1s that served in

some 30 squadrons. However, several hundred were diverted to Britain, Australia, New Zealand and South Africa.

VMF(N)-531 acquired its first Ventura in February 1943, the pioneer nightfighter being operated by a four-man crew – pilot, co-pilot, radar operator and turret gunner. The nose-mounted Air Intercept Mk IV radar weighed about 180lb and, depending on altitude, optimally it could detect bombers at three miles and fighters at two. More often detection range was inside two miles.

With twin Pratt & Whitney R2800s, the Ventura cruised at 144 knots (165mph), being rated at 270 knots (312mph) maximum at 14,000ft. The mid-altitude performance was optimum for the nightfighter mission, as most Ventura interceptions were made between 7,000 and 15,000ft. Armament was six .50in. machine guns in the nose and two in the turret.

Operational tests and combat experience gradually streamlined PV-1 operations. The squadron removed excess equipment such as heaters, deicers and even some armor and bomb-bay doors. The reduced weight resulted in a marginal speed gain, but a noticeably better rate of climb. Consequently, VMF(N)-531 declared that the Ventura had "sufficiently good characteristics to accomplish its mission." Still, whatever improvements resulted from unit-level changes, the basic design was recognized as marginal. The squadron concluded, "This airplane is far too heavy, slow and unmaneuverable to be classed as a *good* nightfighter. It climbs too slowly, has a limited altitude and is a very poor instrument flying airplane."

Nevertheless, following a hasty training period VMF(N)-531 went to the Solomons in September 1943 and began flying missions almost immediately. The US Marine Corps' first radar kill was logged in mid November. Through May 1944, VMF(N)-531 downed a dozen enemy aircraft.

In its formal evaluation of the Ventura, VMF(N)-531 found the design adequate to meet the threat, which largely consisted of floatplanes harassing PT boats. Of the dozen kills, only three were confirmed as twin-engined bombers. Six of the squadron's 12 Venturas were lost during the Pacific tour, none attributable to enemy action. Upon returning to MCAS Cherry Point, North Carolina, in September 1944, the squadron had conclusively proven the concept of radar-guided nightfighters. Lockheed's follow-on design was the PV-2 Harpoon, which was never flown by US Marine Corps squadrons.

Grumman F6F Hellcat

It was probably the most demanding task an individual faced in World War II – flying single-seat nightfighters, especially from straight-deck carriers. Mosquitoes, Beaufighters, Black Widows, Bf 110s and Ju 88s, plus a handful of other types, compiled admirable nocturnal records, but they had two engines and one or two crewmen to support the pilot. US Navy and US Marine Corps night stalkers mostly flew solo.

In 1943 naval nightfighters entered combat with a variety of concepts. Land-based operations in the Solomons featured the F4U-2 Corsairs of VF(N)-75 and the PV-1N Venturas of VMF(N)-531, both of which proved largely successful. At sea the expedient "bat teams" of a radar-equipped TBF-1 Avenger guiding two standard F6F-3 Hellcats had

limited success, marred by the death of nocturnal pioneer Lt Cdr Edward "Butch" O'Hare that November. But help was on the way.

The US Navy's nightfighter program was Project *Affirm*, begun at NAS Quonset Point, Rhode Island, in early 1942. Both the human and material aspects were complex. The pilot training syllabus ran for seven months, while the early airborne radar sets, British designed but American produced, were practically hand-built.

Although the Corsair's performance commended it to nightfighting, its notorious carrier suitability problems remained an obstacle. Consequently, Hellcats were quickly identified as the best prospect. The initial Night Hellcat with APS-4 radar was designated the F6F-3E, and there were only enough to equip two small carrier squadrons. The more numerous -3N variant used the heavier but more capable APS-6 set. Both Night Hellcat versions entered combat aboard fast carriers in early 1944.

Mission-specific modifications to the Night Hellcat included placement of the radar dish in a housing on the starboard wing and shoehorning the scope into the cockpit. Additionally, a flat windscreen was installed on F6F-3 nightfighters before it became standard on the "Dash Five" model, with optimum cockpit lighting. Unlike the F4U-2, the Night Hellcats retained all six .50in. machine guns, although some late-war F6F-5Ns boasted two 20mm cannon and four .50in. weapons.

The -5N completely dominated the naval nightfighter inventory, representing nearly 95 percent of all nocturnal Hellcats produced. The 1,514 "Five Nans" included 80 provided to the Royal Navy's Fleet Air Arm as Hellcat NF II models.

Meanwhile, the US Marine Corps had established nascent nightfighter squadrons that would fly Hellcats almost exclusively. The first two, VMF(N)-533 and VMF(N)-534, stood up at MCAS Cherry Point in October 1943. By April 1944 three more were established. The first leatherneck Hellcat squadron in combat was VMF(N)-541, supporting the US Army in the Philippines from December 1944 to January 1945. However, by far the greatest nocturnal arena was Okinawa. In the spring and summer of 1945, VMF(N)-533, VMF(N)-542 and VMF(N)-543 provided the greatest portion of the Tactical Air Force's "night cap" effort, downing 93 percent of the Japanese aircraft credited to nocturnal flyers.

Nightfighters from eight Marine squadrons claimed 107 victories, day and night. Hellcats ran away with the title, accounting for 93 kills, or 86 percent of the total. Beyond that, Hellcats accounted for more than 90 percent of credited kills in Naval Aviation nightfighting generally. Although exact numbers are unknown for US Navy units owing to the integration of VF(N) teams into deployed fighter squadrons, Hellcats scored at least 250 victories of the 440 or so credited to all American night flying units in World War II – a whopping 57 percent of the US wartime total.

Shortly after VJ Day the US Marine Corps possessed some 283 Hellcats – a surprising 26 percent of all fighters known to be in operational or training squadrons.

Grumman F7F Tigercat

In late 1943 the commanding officer of VMF(N)-531 issued an objective, unflattering assessment of the Lockheed PV-1N as a nightfighter. Col Frank Schwable concluded that

the Ventura's replacement should be "a twin-engined airplane with high altitude, high-speed characteristics and with an improved AI [airborne intercept radar]." Without knowing it, he was describing the Grumman Tigercat.

A twin-engined, single-seat carrier fighter was a rare concept in 1941, let alone one with a tricycle landing gear. Grumman received the contract for the F7F that June, but wartime priorities delayed the prototype's first flight until November 1943. However, with two Pratt & Whitney R2800s – the same engine that powered the Hellcat and the Corsair – the Tigercat became known as "a scat cat." Top speed was rated at 460mph, with a 4,500ft per minute rate of climb.

Thirty-four single-seat F7F-1s were produced, but increasing emphasis on the night mission led to installation of a radar operator's cockpit in the 65 -2N models bearing the APS-6 radar set. The F7F-3 reverted to the single-seat configuration, with 189 delivered, followed by 60 -3Ns. The final variant, the -4N (13 built), included carrier equipment such as arresting hook and catapult points. However, plans to operate Tigercats off large *Midway* (CVB-41) class carriers were never fully realized.

The Tigercat was about offense. Its original armament combined four 20mm cannon with four .50in. machine guns, although eventually the Brownings were removed. The ordnance loadout was varied, from two 1,000lb bombs to a one-ton torpedo carried on the centerline. Development encountered the type of problems common to most military aircraft. They included engine cooling, longitudinal stability and a high single-engine speed to maintain minimal control. However, the US Navy's chief test pilot, Capt Frederick "Trap" Trapnell, relished the Tigercat's speed and range. He told Grumman test pilot Corky Meyer how he loved the F7F's high power to weight ratio with attendant acceleration and rate of climb. He considered the cockpit layout the finest in any fighter of the era, and with spectacular speed and climb "Trap" concluded, "It's the best damn fighter I've ever flown."

Deliveries to the US Navy began in April 1944. VMF(N)-531 welcomed the first -2N in mid January 1945. Maj Robert Keller took an advance cadre of 140 personnel with 17 aircraft to San Diego, arriving at Chimu, Okinawa, on 14 August. Here, it assumed the identity of VMF(N)-533. In October the squadron moved to Peking, China, for postwar duty, remaining here until May 1947. Meanwhile, six Stateside squadrons flew F7Fs wholly or in part – VMF-911 through VMF-914 at MCAS Cherry Point, while VMF(N)-531 and VMF(N)-532 worked up at MCAS Eagle Mountain Lake, Texas.

Marion Carl, a Patuxent River test pilot at war's end, said the Tigercat was his favorite piston aircraft for transcontinental flights owing to its range and 190-knot cruise. In fact, he favored the F7F until arrival of the F-4 Phantom II.

Although too late for combat in World War II, Tigercat nightfighters drew blood in the frosty darkness of Korea. The quartet of 20mm cannon proved lethal as VMF(N)-513 shredded two Polikarpov Po-2 biplanes in the summer of 1951, while Corsairs added two more and jet F3D Skynights claimed six kills in 1952-53.

The last F7Fs were retired by the US Navy in 1954, the type having finished its brief military career as a utility aircraft. A handful of surplus Tigercats were subsequently obtained by civilian owners including aerial firefighters and sport fliers. Postwar airshow performer and race pilot Clay Lacy called the F7F "a twin-engined bomber on steroids."

Summary

US Marine Corps fighter strength experienced dramatic growth in four years of World War II, both qualitatively and in quantity. From the 320mph Brewster Buffalo to the 450mph F4U-4, the arc of aviation progress was remarkable from 1939 to 1945. However, significant US Marine Corps air-to-air operations ended in 1945, never to return. Leatherneck squadrons claimed 13 kills in Korea and one over Vietnam. And the legacy continues. US Marine Corps aviation's prime duty, CAS, remains unchanged 70 years later.

ARMAMENT

A fighter aircraft is a highly mobile gun platform, and in World War II the standard American fighter weapon was the magnificent M2 .50in. air-cooled machine gun designed by John M. Browning. His products dominated the field of US automatic weapons, including the M1917 water-cooled and M1919 air-cooled infantry guns, as well as the squad support weapon, the Browning Automatic Rifle.

Based on a water-cooled 1918 design, the M2 emerged in World War II form in 1921, primarily intended for infantry or vehicle use. However, during the 1930s both the US Navy and US Army Air Corps (USAAC) began adapting the air-cooled weapon for fighters and bombers. The operating philosophy differed in that the USAAC used mixed fighter armament of .30in. and .50in. calibers (as in the P-39 Airacobra and early P-40 models), whereas the naval fighters employed .50in. weapons exclusively. The first monoplane carrier fighters, the Brewster F2A and Grumman F4F, were fitted with four Brownings. The F4F-3 carried 1,800 rounds of ammunition, reduced to 1,440 in the six-gun F4F-4.

Pilots appreciated the .50in.'s potency. It fired a 700-grain (1.6 ounce) projectile starting at 2,800ft per second. In comparison, the M2 .30in. caliber bullet weighed 150 grains at a similar velocity. Consequently, the .50in.'s greater mass produced far greater penetration and impact energy. A .50in. armor-piercing round could penetrate ¾in. of plate at 500 yards. And at 800 rounds per minute, a one-second burst put 13 or more heavy bullets downrange from each barrel.

Combat experience proved the utility of the four-gun armament in the F4F-4. Against Japanese aircraft, the addition of two more .50in. weapons in the F4F-4 yielded no increase in destroyed claims and reduced the quantity of ammunition available. With 450 rounds per gun (rpg) in the "Dash Three", pilots had about 30 seconds of firing time. With only 240 rpg in the F4F-4, "trigger time" was nearly cut in half. Consequently, many Wildcat pilots switched off two guns (usually the outboard pair), keeping them as "get me home insurance." The issue of ammunition supply was settled in the F6F with 400 rpg. Corsairs, with a thinner wing, carried 400 rpg inboard and 375 outboard.

Properly harmonized, six .50in. weapons could shred a single-engined aircraft. One of the most efficient kills of the war was achieved by a VMF(N)-533 pilot who dispatched a floatplane with just 62 rounds – barely ten rounds per gun in less than a one-second burst.

In late 1944 Vought began delivering 200 F4U-1Cs fitted with four Hispano 20mm cannon carrying 120 rounds each. Few squadrons were fully equipped with them, as records indicate most were scattered throughout various units. Pilot reaction varied

according to temperament and experience – some welcomed the heavier punch while others preferred the higher volume of fire provided by six .50in. machine guns. Lt Col William A. Millington recalled his experiences with both weapons in the early 1945 period:

> At that time we had the 20mm cannon which was a more effective strafing weapon than the .50 cal. gun, although they were not as reliable. They seemed to get jammed more often, and it was not uncommon to only have one of the four cannon able to fire. They were also prone to freezing at high altitude.

F6F-5N nightfighters came with the option of two 20mm cannon in place of two .50in. guns, but the combination was seldom used. The US Marine Corps' only night stalker ace, Capt Bob Baird, reported the same reliability problems as Millington, and test flew a cannon-armed aircraft five times before he fired a full load of 440 cannon rounds on the sixth test hop. That night he used the cannon/machine gun combination to deadly effect for his sixth kill, describing the result as "unbelievable." However, functioning problems persisted, and only two other US Marine Corps night kills were scored with 20mm weapons.

Bombs

Fighters flew with light bombs from the earliest days of the war, impressively demonstrated by VMF-211 which used 100 pounders to sink a Japanese destroyer off Wake Island in 1942. However, the potential for true fighter-bombers awaited the F4U and F6F, whose larger airframes better lent themselves to ordnance delivery. The Corsair was widely favored for its ultimate variety – a loadout of .50in. guns or 20mm cannon, 500lb, 1,000lb and even 2,000lb bombs and rockets.

Dive-bombing in the Corsair required training and practice, as its sleek airframe accelerated rapidly downhill, but 4th Marine Aircraft Wing (MAW) pilots in the Marshall Islands especially became adept at delivering heavy loads accurately. Charles Lindbergh personally tested F4Us with up to 3,000lb of bombs. US Marine Corps night-flying Hellcats used 500lb and 1,000lb bombs in the Philippines and Okinawa as the aircraft switched from flying defensive to offensive missions.

The mid-war AN-M64 500lb general purpose bomb actually weighed 545lb, including 264lb of TNT. Typical targets for M64s were fortifications, runways and unarmored ships. Both nose and tail fusing were possible. Apart from high explosives, bombs included napalm – a gelatinous mixture of salts of napthetic and palmitic acids. The brew was typically held in drop tanks with an external igniter as a fuse, and could be delivered from extremely low level, defenses permitting. Some of the most dramatic film footage of the Pacific War shows Peleliu-based F4Us dropping napalm on rocky outcrops, defoliating the surface to expose Japanese positions.

Rockets

Eventually F4Us and F6Fs received "zero length" rails that allowed them to launch high-velocity aerial rockets (HVARs). The rockets were produced in 3.25in. and 5in. varieties

with high explosive warheads or with ogives capable of penetrating concrete and armor. The conventional wisdom held that a fighter launching six 5in. HVARs possessed the punch of a destroyer's broadside. The heavier rocket shot off the rail at about 700ft per second – barely half the speed of the 3.25in. round – and therefore had to be fired at a closer slant range, otherwise the ballistic drop was excessive, and the standard fighter gunsight had no reliable means of compensating for the difference.

Nonetheless, HVARs were used in enormous quantities, often exceeding several thousand per month. Rockets added to the ability to customize fighter loadouts, especially for CAS missions, and set a trend that remained valid for the next five decades.

US MARINE CORPS FIGHTER AVIATION IN WORLD WAR II

AN OVERVIEW

The US Marine Corps' aviation branch entered World War II with three decades of institutional experience but almost none in conventional warfare. Serving with the Allies' Northern Bombing Group in 1918, leatherneck squadrons had flown British-designed and sometimes American-built de Havilland DH 4 two-seat biplanes. Based in France, the first three US Marine Corps squadrons began combat operations in mid October, being joined by a fourth before the 11 November armistice. A handful of Marine aviators flew Sopwith Camels in British squadrons but none of the classic dogfighters equipped US Marine Corps squadrons. The Corps emerged from the Great War with its reputation much enhanced. Hard fighting and tenacious campaigning at Belleau Wood, Soissons, and beyond popularized the Marines as "devil dogs", based on the German *Teufelhunden* appellation.

However, the postwar doldrums hit hard. By 1920 fewer than 70 US Marine Corps officers remained on aviation duty, and the figure hovered under 50 for the next four years. But opportunities arose during the Central American "banana wars" of 1919 and later, with an air-ground doctrine evolving from practical experience. Institutionally, flying leathernecks existed to support "the ground", and they did so repeatedly. Often still flying DH-4s, US Marine Corps aircrews flew in Haiti, Nicaragua and elsewhere, alternately scouting, bombing and providing supplies, as well as medical evacuation.

Administratively, US Marine Corps aviation was composed of the First Aviation Group at MCB Quantico and the Second at NAS San Diego, with detachments as far a field as Haiti and Guam.

New equipment arrived throughout the 1920s, seldom in adequate numbers. US Army Thomas-Morse MB-3s were provided to the US Marine Corps early in the decade, while captured Fokker D VIIs were absorbed as trainers.

At length the US Marine Corps received naval fighter aircraft. The Boeing FB-1, based on the US Army's PW-9 "pursuit", arrived at Quantico in 1926, eventually equipping the service's first three fighting squadrons. The next year Curtiss' F6C series was operational in three East Coast squadrons, remaining into 1932. Despite budget restrictions of the Great Depression after 1929, newer and more capable equipment arrived. Boeing's spectacular F4B-4 began replacing the F6Cs, fully equipping fighting squadrons by 1934.

The aviation organization evolved with formalization of the Fleet Marine Force (FMF). In 1935 Aircraft One, FMF, owned four squadrons at Quantico, while Aircraft Two controlled three in San Diego. A US Navy-wide redesignation in 1937 set the tone for units that would fight the next war. For example, VF-9M at Quantico became VMF-1 while VF-4M in California became VMF-2. The latter was the first US Marine Corps squadron to operate Grumman aircraft, as the F3F series set the stage for the wartime series of fighting "cats." The F4Bs were largely gone by the start of 1939.

The Marine Air Reserve program included fighters from 1930 to 1934, but thereafter the ten squadrons were exclusively observation and scouting units.

Tactics

Through the 1930s naval fighter tactics and organization had progressed little since 1918. In 1940 most US Navy and US Marine Corps fighter squadrons still flew three-plane divisions, with a leader and two wingmen, as did the Royal Air Force (RAF). The historic "vee" formation looked good during flypasts but lacked the crucial element of flexibility in three-dimensional combat. Furthermore, it reduced the amount of firepower that could be delivered, as the wingmen necessarily spent as much time watching their leader as they did scanning for the enemy. Only when division integrity was broken did pilots engage in dogfighting, an exercise that went into logbooks as "IBP" or individual battle practice.

Taking note of European events, in late 1939 the US Navy authorized a re-evaluation of fighter tactics. Initial results in Fighting Squadrons Two and Five were promising, and continued when F2Fs and F3Fs were replaced by Brewster F2A and Grumman F4F monoplanes. However, in 1940, Vice Adm William F. Halsey as Commander Aircraft Battle Force recommended against a permanent change. Nonetheless, squadron commanders were convinced of the merit of the two-plane section and continued experimenting. Halsey finally relented, and in the summer of 1941 FitRon (Fighter Squadron) organization was modified into three two-plane sections for each of three divisions, retaining the 18-plane squadron.

Naval air tactics were described in the manual USF-74, *Current Carrier Orders and Doctrine, US Fleet Aircraft,* revised in April 1941. Fighters were expected to provide close escort for dive-bombers and torpedo-planes, with high cover preferred when available. The close escort was stationed 1,500ft above and astern or on the side of the bombers. Fighters were to "sight, report and counterattack enemy planes which threaten the formation escorted."

The most enthusiastic reception for the new tactics came from Fighting Squadron Three, led by Lt Cdr John S. Thach. The USS *Saratoga* (CV-3) fighters began experimenting with two-plane sections and four-plane divisions. However, Thach was unconvinced of the

merit of a two-plane "weaver" section flying above and behind the rest of the formation. The idea originated with the RAF, which had been on the receiving end of the Luftwaffe's two-plane *Rotte* and four-plane *Schwarm*. The "tail end Charlies" were vulnerable to attack, and often served a useful purpose only when Bf 109s converted them to heat and light.

Thach tested the parameters of the four-plane division, not only offensively but defensively. The value of the new tactic was proven when pilots flying their F4Fs at half power were able to counter attacks by squadronmates flying at full power. The looser formations afforded more room to maneuver, and the resultant "beam defense" evolved into the historic Thach Weave. As Thach explained, "the left section can watch the tail of the right section and vice versa, you can protect each other by continual motion toward and away from each other, firing opposite approaches, shooting the Japs off each other's tails."

Combat experience would demonstrate the value of the two-plane section and four-plane division. When one Wildcat was attacked, it could turn into its partner, "dragging" the assailant across the other Wildcat's sights. The same procedure worked for sections within a division. Because the US Navy and US Marine Corps routinely practiced wide-angle gunnery, the beam defense rendered the technically superior A6M Zero vulnerable to the countermove.

Probably as much by hearsay as by design, US Marine Corps squadrons began adopting VF-3's tactics. Joe Foss referred to "the Thach-Flatley Weave" under the impression that Lt Cdr James Flatley had helped develop the beam defense, but he was in fact an early advocate and practitioner who gave the tactic its name.

Gunnery

Although probably not known at the time, at the beginning of World War II only two air arms trained for full-deflection aerial gunnery – the US Navy and the Finnish Air Force. Both services had arrived at the same decision: a two-plane formation could exploit a high standard of marksmanship to offset and defeat either superior numbers or opponents of greater performance.

The standard US Navy fighter armament of four .50in. Browning machine guns was lethal. A two-second burst delivered more than 100 heavy bullets converging in a cone 1,000ft ahead of the fighter. It was enough to destroy or cripple most single-engined Japanese aircraft.

Naval Aviators practiced a variety of gunnery patterns – low, level and high side, and the patented overhead approach. The latter was especially effective against bombers, and no other air force mastered it so well. Rolling inverted from a 3,000ft perch, the fighter dived vertically, lining up a full-deflection shot from above. Few if any bomber gunners could engage the attacking fighter, which had the largest possible target. It also had the advantage of preventing the fighter from getting "sucked" astern of the bomber in a side approach's pursuit curve. Gen Adolf Galland later stated that if the Luftwaffe had adopted the overhead approach, daylight bombing of Europe would have ended in 1943. However, Germany lacked the fuel, time and resources to instruct sufficient numbers of *Jagdfliegern* in the technique.

Gunnery training flights involved a drogue or sleeve target towed by a "tug" aircraft. Speeds were necessarily slow but pilots refined their technique, learning proper deflection and sight picture for each pattern. The US Navy's illuminated reflector gunsights helped pilots gauge distance and deflection, best known in the Mk VIII sight with 50- and 100-mil rings. That is, the sight reticle subtended 50 and 100ft at 1,000ft from the target.

The Wildcat's guns were harmonized or "zeroed" to converge at 1,000ft. In the six-gun F4F-4 a "pattern boresight" setting was standardized, with each pair of guns set at 200, 250 and 300 yards. Depending upon unit preference, the cone of fire covered a circle as small as five or six feet in diameter. Some expert pilots preferred as small as a three-mil convergence, since the tremendous concentration of .50in. rounds in that space virtually assured a kill. However, the pattern boresight gave an average pilot a better chance of scoring enough hits to damage a target, if not destroy it outright.

Brink of War

In 1939, the year war erupted in Europe, US Marine Corps aviation possessed 156 aircraft, mainly based at Quantico, with others based in the Virgin Islands, San Diego and Hawaii. Only seven were monoplanes. Two years later, in October 1941, the US Marine Corps fighter component included two squadrons in each group on the East Coast and West Coast/Hawaii, with a combined total of 50 F4F-3 and -3A Wildcats, 13 F2A-2 and -3 Buffaloes and 14 F3F-2 and -3 biplanes. Each of the four fighting squadrons also had one or two SNJ Texan advanced trainers.

In December 1941 US Marine Corps aviation was deployed in two wings, each with a group, and totaling 13 squadrons. The human materiel included 610 officer pilots, 49 enlisted pilots, 41 ground officers and 5,672 ground personnel for a total of 6,372 personnel. The Director of Aviation was an old hand, Col Ralph J. Mitchell, who had assumed the position in March 1939. He possessed a solid background. Although he had missed the Great War, Mitchell learned to fly in 1921 and graduated from the USAAC Tactical School, the Army Command and General Staff School and the Naval War College. He had received a Distinguished Flying Cross for service in Nicaragua. Mitchell would remain in his post until mid 1943.

Pearl Harbor and Wake Island

On the morning of December 7 six Imperial Japanese Navy (IJN) aircraft carriers launched some 340 sorties against American naval and air bases on Oahu, Territory of Hawaii. Surprise was complete, with no US Navy or US Marine Corps fighters getting airborne, and too few USAAC pursuit aircraft to matter. A6M2 Zero-sens strafed MCAS Ewa, where VMF-211 lost nine planes destroyed or damaged on the ground.

Half of Maj Paul Putnam's squadron was absent, having ridden USS *Enterprise* (CV-6) to Wake Island in November. The dozen Wildcats were responsible for the aerial defense of the garrison – far too few to accomplish the task. Powerful Japanese maritime air power was based in the Marshalls, nearly 600 nautical miles away. VMF-211 lost seven of eight fighters on the ground on Wake during the first Japanese attack on December 8, 1941

(across the International Date Line). The four airborne at the time of the attack were caught out of position, leaving them unable to intercept the enemy formation.

The IJN's 24th Air Flotilla at Roi-Namur proved persistent, sending Mitsubishi G3M (later given the Allied reporting name "Nell") bombers to attack Wake on an almost daily basis. The Wake Wildcats shot down a bomber on December 9, with 2Lt David Kliewer and TSgt John Hamilton scoring the US Marine Corps' first victory of the war.

Although lacking proper tools, Putnam's men demonstrated inspired innovation and dedication by cannibalizing wrecked F4Fs to keep a few flying. Vastly outnumbered pilots continued fighting, claiming eight planes in four more encounters. (Japanese records verify seven losses to F4Fs.) However, Putnam's men scored their greatest success on the 11th, during the initial Japanese landing attempt. Four Wildcats led by Capt Henry Elrod employed 100lb bombs to sink the destroyer *Kisaragi*, while another ship was lost to US Marine Corps shore batteries. The Japanese withdrew, marking one of the very few amphibious landings that failed in World War II.

One of Putnam's pilots was 2Lt John Kinney, a former airline mechanic. He oversaw much of the improvised maintenance and described the situation on the 15th:

> Two aircraft ready for patrol. We were running low on oxygen and had no transfer equipment. Capt Freuler devised a system where he hooked eight small bottles to a large welder's oxygen tank and was able to equalize the pressure, giving us about 1,000lb per bottle. This operation was not the safest since a random drop of oil would have caused an explosion.

However, weight of numbers made the difference. The Japanese returned on the 23rd and seized Wake. Elrod died in the ground fighting, retroactively becoming the first of 11 US Marine Corps aviators to be awarded the Medal of Honor for World War II action.

As of March 1942, US Marine Corps fighters were thinly spread. That month VMF-111 went to Samoa, where it remained for nearly two years. VMF-221 and the newly established VMF-222 had 19 Buffaloes between them at Midway, but the "Flying Deuces" soon returned to Ewa. There, VMF-212 and the remnants of VMF-211 made do with "cats and dogs" until re-supplied.

Midway

After the defense of Wake, US Marine Corps aviation's focus shifted more than 1,000 nautical miles east to another small atoll. Midway lay at the end of the Hawaiian chain, positioned to detect if not interdict further enemy moves toward Oahu. From early 1942 Midway's air defense largely consisted of VMF-221's Buffaloes, which droned above the azure lagoon for endless hours. For some pilots the boredom was too much. A young captain, Marion Carl, took to slow-rolling around the perimeter of the lagoon, much to the discomfiture of his wingman.

However, on March 10 Capt James Neefus and Gunner Robert Lee Dickey latched onto a Kawanishi H6K flying boat (later "Mavis") southwest of the base. Dickey was wounded but Neefus made the kill, and presumably Gunner Dickey's recovery was

enhanced by the congratulatory bottle of bourbon presented to him from Lt Col William Wallace, CO of Marine Air Group (MAG) 22.

In early May the US Marine Corps fliers began to suspect that something was pending. Later that month the SB2U Vindicators of VMSB-241 were reinforced with SBD Dauntlesses, and several F4F-3s augmented VMF-221's Brewsters. The US Navy contributed PBY Catalina patrol airplanes, and eventually the USAAF arrived with B-17 Flying Fortresses and B-26 Marauders. Finally, in early June, the word came down – a massive Japanese task force was en route to capture Midway. The Buffalo and Wildcat pilots sat dawn cockpit alert, ready to scramble the moment the island's radar detected inbound raiders. Just before 0600hrs on 4 June the siren sounded, pilots starting engines in a haze of oil-enriched smoke before taxiing out and taking off. Once aloft, they began clawing for altitude. Some fighters narrowly missed each other on the intersecting runways.

Vice Adm Chuichi Nagumo, who had launched the attack on Pearl Harbor, despatched more than 100 planes to destroy Midway's facilities. The US Marine Corps had 26 fighters up, separated into two groups, and they began intercepting 30 miles out. The combat quickly turned to hash. Arriving piecemeal, generally at an altitude disadvantage, Maj Floyd Parks' command was shot to pieces. In just 15 minutes his squadron was essentially destroyed.

In the limited time available VMF-221 claimed 11 kills, and got at least six. The Wildcats had the best of the situation, with Capt John F. Carey and 2Lt Clayton Canfield downing Aichi D3A (later "Val") dive-bombers, while Marion Carl definitely bagged a Zero and may have damaged two more. Brewster pilots also scored, Capt William Humberd claiming a bomber and a Zero while 2Lt Charles Kunz was credited with two "Vals", although he was wounded in the engagement. 2Lt Roy Corry claimed a Zero and a "Val". Meanwhile, Capts Francis McCarthy and Philip White logged single successes.

Typical of the F2A pilots was 2Lt William Brooks who related:

> My tabs, instruments and cockpit were shot up to quite an extent at this time, and I was intending to come in for a landing. I saw two planes dogfighting over in the east, and decided to go help my friend if at all possible. My plane was working very poorly, and my climb was slow. As I neared the fight, both planes turned on me. It was then that I realized I had been tricked into a sham battle put on by two Japs, and I failed to recognize this because of the sun in my eyes. I turned and made a fast retreat for the island, collecting a goodly number of bullets on the way. After one of these planes had been shaken, I managed to get a good burst into another as we passed head-on when I turned into him.

Brooks survived the encounter, landing at Midway with 72 holes in his airframe. He found the CO and 14 other pilots missing, with only four planes remaining operational, one having aborted.

That morning massacre ended US Marine Corps fighter combat at Midway. The scout-bombers flew successive missions on the 4th and 5th, absorbing serious losses but inflicting no substantial damage to the enemy. Nonetheless, SBDs from USS *Yorktown* (CV-5), *Enterprise* and *Hornet* (CV-8) sank all four Japanese carriers off Midway and a

battlecruiser besides. At the cost of *Yorktown* and a destroyer, the US Pacific Fleet had dramatically stopped the IJN's Pacific steamroller. Midway gave America the priceless gift of strategic initiative, and US Marine Corps aviation would ride the tip of the offensive spear.

More immediately, the Battle of Midway ended the Buffalo's combat career in American colors. Grumman was producing enough Wildcats to fill the vacancies, and that summer the Hawaii-based fighter squadrons readily adapted to the new, six-gun F4F-4, which would remain the only US Marine Corps combat fighter for more than a year.

"The Cactus Patch"

America's first offensive in World War II was Operation *Watchtower*, the occupation of Guadalcanal in the Solomon Islands in August 1942. It became the focus of US Marine Corps aviation for the next six months, and initiated the lengthy campaign that carried leatherneck airmen to the siege of Rabaul, on New Britain, well into 1944. Guadalcanal's prime asset was an incomplete Japanese airfield on the grassy northern plain. The Joint Chiefs in Washington, D.C., wanted to prevent Japanese interdiction of seaborne communication to Australia, and thus *Watchtower* was conceived and launched in context of broader strategy. After the stunning victory at Midway, the Americans sought to seize the initiative by keeping Tokyo on the defensive.

The assault troops for *Watchtower* – the 1st Marine Division (Reinforced) – assembled in New Zealand. Since the airfield was not yet finished, three Pacific Fleet carriers were assigned to the operation, providing air support for the infantry until US Marine Corps squadrons moved ashore. Initial landings at Tulagi Island and Guadalcanal itself proceeded on August 7. The Japanese reaction was predictably severe. The IJN possessed powerful land-based air power at Rabaul, 560 nautical miles to the northwest. In one frantic morning of combat on the 7th the Americans lost 16 planes from *Saratoga*, *Enterprise* and *Wasp*, depleting air strength that could not soon be replaced.

Early on August 8 a Japanese cruiser-destroyer force inflicted a major defeat on the US and Royal Australian navies in the Battle of Savo Island. Four Allied cruisers were lost in exchange for minor damage to the enemy.

Deprived of adequate surface and air assets, Vice Adm Richmond Kelly Turner's 16 transport and cargo ships lay vulnerable. The expected two-day offloading period proved excessively optimistic – the US Marine Corps still had much to learn about combat support. Consequently, the carrier commander, Vice Adm Frank Jack Fletcher, obtained permission from the theater commander to withdraw his precious flattops beyond range of Rabaul. The Marines ashore were on their own, creating the enduring legend that the US Navy "abandoned" the leathernecks at Guadalcanal. In fact, most of the problems stemmed from US Marine Corps inefficiency at loading and offloading attack transports. And since no additional carriers would be available in the Pacific for another year, Fletcher's decision to preserve his flightdecks clearly was the only one possible. Meanwhile, Rabaul-based Mitsubishi G4M "Betty" bombers attacked the beachhead unopposed during the next two weeks.

However, help was on the way. Construction crews extended the runway of the captured Japanese airfield, and rudimentary servicing equipment came ashore. Because

Guadalcanal's codename was "Cactus", the facility was dubbed "the Cactus patch" before it was officially named Henderson Field in honor of Maj Lofton Henderson, leader of VMSB-241 at Midway.

On August 20 the escort carrier USS *Long Island* (CVE-1) launched the initial installment of Guadalcanal's air power – 19 F4F-4s of Capt John L. Smith's VMF-223 and 12 SBD-3s from VMSB-232, led by Lt Col Richard C. Mangrum. The two squadrons became "plankowners" in the historic "Cactus Air Force."

Lying ten sweltering degrees below the Equator, Guadalcanal was subject to torrential rain, oppressive humidity and a variety of tropical diseases. Marines insisted that "Guadal" was the only place in the world where one could stand up to his ankles in mud and still get dust in his eyes. Nights could be surprisingly cold, and the only shelter was tents. Henderson Field was not ready for "prime time." Japanese construction had begun in early July, and by late August the Americans had graded and rolled the runway to a length of 3,700ft. However, much of it was covered with gravel, which tended to batter the aluminum skin of aircraft. Maintenance and servicing was performed in the open, refueling had to be done manually with hand-cranked pumps on 55-gallon drums and ordnance men mostly relied on muscle power to load bombs.

Dick Mangrum spoke for the entire "Cactus Air Force" when he addressed the expeditionary nature of the enterprise. He reflected, "The general concept of Marine Corps operations and training and planning envisions rough field conditions, but just how rough operations can be is sometimes a bit shocking even to Marines!" Henderson was perennially short of everything: aircraft, fuel, ordnance, accommodation – and food. The US Marine Corps scooped up large quantities of Japanese rice, which became a "Cactus" staple. In fact, they ate so much of it that 30 years later at least one aviator still banned it from his kitchen.

Flight operations were managed from a rude Japanese structure north of the runway. Dubbed "The Pagoda" for its vague resemblance to that architectural style, the building had the advantage of decent construction. However, enemy night fliers seemed to orient themselves from the reflection off the roof when they dropped flares, so the pagoda was bulldozed in October. In 1943 an open "control tower" was erected to coordinate takeoffs and landings.

While Mangrum's dozen Dauntlesses provided scouting and a limited strike capability, Smith's F4Fs represented the island's air defense force. However, the "Dash Four" Wildcat lacked the usual performance of an interceptor. With the folding wings and six .50in. machine guns, the extra weight affected its top speed and rate of climb. Consequently, while lacking radar at first, in order to gain enough altitude for a decent shot at inbound "Bettys" the Wildcats needed a good 40 minutes notice to start engines, taxi out, take off, form up and claw for altitude.

Enter the coastwatchers

A prewar organization, the coastwatchers were established by the Royal Australian Navy (RAN) to provide warning of enemy movement in the Solomons and as far afield as New Guinea. Most were Australians, but New Zealanders, civilian volunteers and friendly

natives all participated. Equipped with heavy, bulky radios, the coastwatchers led a lonely, dangerous life, often forced to move in order to avoid detection. Although officially members of the RAN Volunteer Reserve, their official rank did not always protect them from Japanese casual brutality or murder. But their contribution to the campaign was invaluable.

Wildcats were scrambled when Japanese aircraft were detected inbound. "The Pagoda" boasted a skinny flag pole that hoisted a banner to indicate "condition red," and a hand-cranked siren sent pilots and mechanics scurrying.

During the campaign Zeroes from Rabaul, New Britain, flew to Guadalcanal some 650 statute miles away. Weather permitting, Zeroes escorted "Betty" bombers routinely. In the three weeks beginning August 21, Japanese aircraft attacked the American beachhead ten times, usually committing more than 30 planes per mission.

Commanding "Cactus" air operations was Brig Gen Roy Geiger, double-hatted as CO of the 1st Aircraft Wing. Although 57 years old, he possessed a wealth of experience dating from 1917. Geiger led from the front, logging at least one mission in an SBD and reputedly flying an F4F into action as well.

At first, missions were far shorter for fighter pilots of the "Cactus Air Force." Between August and October 1942, Capt Marion Carl logged 33 combat sorties at Guadalcanal. Excepting one of unknown length (he was shot down and did not enter the duration in his logbook), his median mission time was 1 hour 20 minutes – none were longer than two hours. However, a dozen combat air patrols lasted less than an hour, including a "Betty" downed during a 45-minute scramble on September 28. Mission times notably increased with the arrival of more Wildcat squadrons in October and November. Capt Joe Foss of VMF-121 engaged Japanese aircraft on 30 or more missions with an average duration of two hours. He flew only four one-hour sorties but a dozen of three hours or longer – one stretching to an unheard of 4.5 hours with a drop tank. Marion Carl described the reality of Guadalcanal:

> The pattern began to repeat itself: nocturnal shellings and bombings, followed by daytime air attacks. We maintained standing patrols but couldn't always intercept in time, which is what happened on August 25. An estimated 21 bombers, plus fighters, came over at 23,000ft, but we lacked radar, and the coastwatchers, later so splendidly effective, weren't in position yet. I logged three frustrating hours on that mission without firing a round.

Things went better the next day, when Smith and company claimed six kills from 28 raiders. One fell to Carl, who recalled:

> I was feeling pretty good about the situation as I entered the pattern and lowered my wheels. Suddenly I was jumped by an audacious Zero pilot who apparently had trailed me back to the field. I dived for the nearest antiaircraft position, which opened fire and drove off the Zero. Meanwhile, I was busily cranking up my landing gear and shoving on full throttle. An airfield where you have to shoot down the enemy just so you can land – what more could a fighter pilot ask for?

> There wasn't much hope of catching the Zero, since he was faster and had a head start, but as we approached the coast I saw his wing come down and, sure enough, he turned back into me. He was eager to fight. Just over the beach we bored at each other head-on, but I wanted to hold my fire until I was sure he was within range. Then he pulled almost straight up into that startling climb that only Zeroes could perform. I had no choice but to try and match him, otherwise he would have a decisive altitude advantage. It had to be a snapshot, as an F4F couldn't climb with a Zero.
>
> At nearly full deflection I got my lead and fired. The Zero blew up, raining pieces down on the beach. I nosed over, checked the area and headed back for Henderson.

The Zero pilot was almost certainly Lt(jg) Junichi Sasai of the Tainan Wing, who had been engaged in combat since December 1941. He was representative of the IJN pilots opposing the "Cactus Air Force", having been credited with 27 victories in more than 70 missions.

Pilots' aircraft assignments varied throughout the campaign. With relatively few F4Fs between them, the first two fighter squadrons ashore – VMF-223 and VMF-224 – undoubtedly allowed pilots to fly "their" Wildcats more than subsequent units. Marion Carl's first aircraft, Bureau Number (BuNo) 02100, got him his first dozen victories at "Cactus". When "Black 13" was lost on September 9 he insisted on painting the same number on his replacement aircraft, BuNo 03508. He claimed his last two Guadalcanal victories in the latter on September 28 and October 3.

Bob Galer landed at Henderson Field with an unusually marked personal aircraft, distinguished by a red cowling and a red stripe beneath the fuselage star.

When VMF-121 arrived in October, more aircraft meant fewer personal mounts. Long after the war Joe Foss was amused by modelers wanting to know the markings on "his" airplane. He flew 34 Wildcats at Guadalcanal and scored in ten of them. Briefly, he had the gunsight removed from his original airplane because the mount interfered with his forward vision, and he possessed the confidence and ability to close to minimum range before shooting. However, the perennial shortage of aircraft required that the sight be reinstalled. The squadron's second-ranking ace, Bill Marontate, used seven Wildcats to score his 13 victories.

Combat became almost a daily occurrence. On August 21 – the day after landing at Henderson – John L. Smith scored his first victory, while 2Lt Eugene A. Trowbridge claimed two. With repeated opportunities, Marion Carl and John L. Smith became America's first major aces of World War II. In fact Carl was the nation's first triple ace since 1918. On August 24, during a carrier bomber raid, he became the first US Marine Corps ace when he added four kills to his initial victory at Midway. The Japanese light carrier *Ryujo* launched six Nakajima B5N "Kates" against Henderson Field, escorted by 15 Zeroes. Smith's Wildcats intercepted offshore, the Marines excitedly claiming 20 victories in exchange for three Wildcats and two pilots. In truth VMF-223 splashed seven enemy aircraft, but it was still an encouraging victory. Throughout the campaign US aerial combat claims typically ran two to four times the actual number of enemy aircraft destroyed, while Japanese claims usually exceeded that.

Late that afternoon *Saratoga's* carrier air group caught up with *Ryujo* and put her on the bottom.

In a noontime shootout on the 30th VMF-223 notched 14 more victories, three by Carl and four by the skipper. It marked the beginning of a friendly rivalry that continued for the duration of the squadron's deployment.

Conditions ashore only slowly improved. When Bob Galer landed with VMF-224 on August 30 he did not know exactly what to expect. As he later recalled, "I was on Guadalcanal three days before I could wash my hands." Although mild mannered on the ground, Galer was one of those pilots whose personality changed in the air. He was an enthusiastic fighter, posting the top score in his squadron. He was shot down twice, the first time being given up for dead. Upon returning to camp the day after his September 11 dunking, he walked into his own memorial service.

September brought some welcome gifts. Early that month electronic specialists of the 3rd Defense Battalion set up the island's first radar set. It could "paint" aircraft at 150 miles on a good day, taking some of the pressure off the coastwatchers, who could not always spot Japanese formations above the clouds. At the same time the US Navy's industrious Sea Bees got a dedicated fighter field operational a mile east of Henderson. "The Fighter Strip" (later "Fighter One") allowed consolidation of fighter operations and eased much of Henderson's congestion, aggravated by the single runway. The "cow pasture," 4,500ft long and ultimately 300ft wide, permitted multiple takeoffs or landings, which accelerated scrambles.

Meanwhile, the US Marine Corps benefited from the US Navy's misfortune. *Saratoga* had been torpedoed on August 31 and headed out of the theater for lengthy repairs. Her fighter squadron, Lt Cdr Leroy Simpler's VF-5, immediately became eligible to join the "Cactus Air Force". Two-dozen Wildcats arrived on September 11 – a most welcome addition – but attrition continued. Five weeks later only four of Simpler's original aircraft remained.

The mix-and-match nature of the "Cactus Air Force" continued throughout the campaign. Lt Col Harold "Indian Joe" Bauer's VMF-212 had provided several pilots to VMF-223 when Smith's squadron deployed, and Bauer insisted on checking on his men. Known as "The Coach," he was widely reckoned to be the finest fighter pilot in the US Marine Corps, and was well received at Henderson Field. He managed some "guest appearance" missions with Smith's squadron before VMF-212 officially moved up. It was an ironic situation in one way, as Bauer and Carl were old rivals, having first encountered one another while flying F3Fs in VMF-1 three years before. Despite the seniority difference, a competition had developed when both aviators recognized a similar talent in the other. The issue was resolved when Bauer and Carl were reunited in VMF-221 in San Diego, flying Buffaloes, in 1941. They flew inland to a space safely out of view and, in Carl's words, "went at it man to man." Neither pilot gained an advantage, with the mock dogfight ending in a draw. From that moment their rivalry blended into a warm, respectful friendship.

Bauer's best day in VMF-223 occurred on October 3 when, leading a division in Carl's eight-plane flight, "The Coach" claimed four Zeroes confirmed and another probably destroyed. Carl, who downed one plane in the fight, was almost as pleased with his friend's success as Bauer himself.

Watchtower became the ultimate example of joint operations in the year after Pearl Harbor. Land, naval and air forces from all three services relied upon one another as never

before, much as fliers at Henderson trusted infantrymen to hold the perimeter. The resident Wildcats were joined by USAAF fighters on October 7 when 11 Bell P-400 Airacobras (export P-39s) landed – the initial installment in a growing stream of USAAF aircraft. The sleek Bells lacked the altitude performance to serve as interceptors, but they alleviated the F4Fs of much responsibility for ground attack missions.

The next fighter squadron to arrive was Maj Leonard K. Davis' VMF-121. Launched from the escort carrier USS *Copahee* (CVE-12) on October 9, the fresh squadron added 24 much-needed F4Fs to the "Cactus" roster. "Duke" Davis' executive officer was to become not only the top ace of the campaign, but the US Marine Corps' leading fighter pilot of all time. Joe Foss' enthusiastic, extroverted personality won him friends and admirers for the rest of his life.

Although still crude, living facilities improved over the original expeditionary environment during VMF-121's tenure on Guadalcanal. Pilots slept in six-man tents and ate dehydrated eggs for breakfast under a tarp. One pilot brought a scratchy old gramophone to play worn-out records of popular songs, and outdated magazines were available. Bathing remained basic, usually in the nearby Lunga River. Some pilots grew short beards, as it was more convenient than shaving in cold water. However, they learned to keep the beards trimmed because facial hair could interfere with the proper fit of an oxygen mask. Contrary to the notion of exciting aerial combat, often life on "Cactus" bordered on boring – despite frequent bombing and occasional naval shelling. A born hunter, Foss and a few other hardies sometimes borrowed rifles or sub-machine guns and went stalking Japanese soldiers in the jungle. Joe Bauer put an end to that sport, noting correctly that trained aviators were almost irreplaceable.

As the new order arrived, the old order passed. Smith and Galer's squadrons left Guadalcanal in mid October, though some maintenance personnel remained into November. Upon leaving "Cactus" John L. Smith's 19 victories gave him the title of American ace of aces in World War II at that early stage of the conflict. Marion Carl was close behind with 16.5. "Duke" Davis' exec Joe Foss was quick to pick up the pace. He first scored on October 13, exclaiming, "I felt like standing up and shouting." By month's end he had nearly caught Marion Carl, one of his Pensacola instructors.

On October 16 – the day that VMF-224 officially left the island – Joe Bauer made a spectacular arrival. Japanese dive-bombers attacked shipping off Guadalcanal, concentrating on USS *McFarland* (DD-237), a 22-year-old destroyer serving as a fast transport delivering much-needed aviation fuel. As gasoline was being moved ashore, nine "Vals" got past the combat air patrol and hit the barge loaded with fuel. The resulting explosion inflicted serious damage on *McFarland,* which limped away for extensive repairs. At that moment Bauer was leading VMF-212 into "the Fighter Strip" after the long flight (640 statute miles) from Espiritu Santo. He was nearly out of fuel but, with full guns, he did not hesitate. Again "The Coach" showed his team how the game was played. He dived into the Aichis and, working his way from back to front, he flamed four in succession. Only a crucial fuel shortage prevented him from downing more.

Joe Bauer was the major personality at "Cactus" fighter operations. Not only was he a superb aviator, but his inspired leadership ignited confidence and enthusiasm throughout the command. Bauer refused to cede a moral advantage to the high-performance Zero.

He told his pilots, "Be an aggressor. You're out here to shoot down enemy planes. Have complete faith in your armor and your confidence in your ability to shoot down the enemy when you get him in your sights." Rather that the dive-and-climb, "boom and zoom" tactics that worked for many US Navy pilots, the combative Bauer insisted, "When you see Zeroes, dogfight 'em!"

Many pilots took "The Coach" at face value. On the 18th his squadron and Davis' rang up 18 victories in a running battle that extended from partway up "The Slot" to Henderson Field. Foss and Marine Gunner Henry Hamilton scored triples. Hamilton was a "Cactus" stalwart, the 33-year-old professional having been attached to Smith's squadron before rejoining VMF-212. He died in combat on October 21 with seven victories to his credit. The Japanese also sustained losses that same day when newly promoted 1Lt Frank Drury of VMF-212 claimed two Zeroes for his third and fourth victories. One was PO1c Toshio Ota, the third ranking ace of the Tainan Air Group. He was killed at 23 – the same age as Drury, but with considerably more combat experience. Since April Ota had claimed 34 American aircraft destroyed in New Guinea and the Solomons, of which at least five are verified by US records.

Joe Foss' best day was October 25, coincident with the Japanese army-navy effort to seize Henderson Field in context of the carrier battle of Santa Cruz. He flew twice that day, claiming two Zeroes in the morning and three that afternoon. Thus he became the US Marine Corps' first ace in a day,

More help was on the way. Maj Paul Fontana took VMF-112 to Guadalcanal on November 2, beginning a nine-month tenure in the Solomons. His pilots observed Armistice Day by claiming three bombers and two Zeroes. Another unit active on the 11th is often overlooked in the history of the "Cactus Air Force" – VMO-251. Although ostensibly an observation squadron, its pilots (led by Maj John Hart) flew F4F-4s as well as the "Dash Seven" photo-reconnaissance variant. On November 11 the squadron's pilots, on detached duty to "Cactus", began shooting down Japanese aircraft, the first two being a Zero and a bomber credited to Maj W. R. Campbell and 1Lt H. A. Peters.

In mid November the USAAF gifted "Cactus" with eight P-38Fs, which were a far cry from the low to medium altitude Bell P-400s (export P-39s) that the "pursuiters" had flown previously. With a top speed of nearly 400mph and a sizzling climb (nine minutes to 30,000ft) the Lightnings immediately became Guadalcanal's primary interceptors. The trouble was they were maintenance intensive, and would remain available in limited numbers until the new year. During the same period "Fighter Two" west of the Lunga River became operational, mainly supporting Airacobras.

November Climax

Beginning November 12 the Japanese launched a four-day effort to reinforce the island. Nineteen torpedo-armed "Bettys" went for US shipping unloading off Kukum Point, and the attack was broken up by 15 Wildcats plus some USAAF fighters. Seventeen of the land attack bombers, plus five Zeroes, fell to fighters (most notably from VMF-112 and VMF-121) and flak. The low-level combat cost three F4Fs but the transports continued disembarking troops. Two future Medal of Honor recipients scored in the fight, Joe Foss

claiming three kills and 2Lt Jeff DeBlanc two. Theirs was a fitting contribution to the US Marine Corps' heaviest day of aerial combat in the first year of the war.

The battle continued in Ironbottom Sound that night when an outnumbered American task force intercepted Japanese battleships and other vessels, preventing bombardment of Henderson Field. Five US Navy ships were sunk, as were two Japanese destroyers, with an imperial battleship crippled. A misty dawn on the 13th revealed the 36,000-ton *Hiei* immobilized within easy range of Henderson, which launched SBDs and TBFs to finish her off. Eight defending Zeroes were dispersed between 0630 and 0830hrs, elements of three Wildcat squadrons splashing three for the loss of an F4F whose pilot was saved. *Hiei* succumbed to repeated air attacks, the first enemy battleship sunk by US naval forces since 1898. But the Japanese were relentless. Aerial reconnaissance revealed a large reinforcement convoy en route southward. Clearly the "Cactus" climax was approaching.

The Japanese bombarded the American perimeter that night but most shells fell on "the Fighter Strip". Two F4Fs were destroyed and 15 damaged, but by dawn on the 14th "Cactus" retained 14 operational F4Fs and ten USAAF fighters. They were all needed as a strong Zero CAP was maintained over 11 troop transports bearing down "The Slot" toward Guadalcanal's northern coast. The Americans simply could not allow additional Japanese troops ashore.

Joe Bauer, now running "Cactus" Fighter Command, stood the inactivity as long as he could. Perhaps nowhere else in the Pacific did so many gifted fighter leaders work so closely as on that day. Flying alongside Bauer were "Duke" Davis and Joe Foss of VMF-121 plus Lt Cdr James Flatley of *Enterprise's* VF-10. After supervising near-constant missions taking off to defeat the enemy transports, Bauer decided to take a look for himself. That evening he attached himself to a VMF-121 division led by Foss. Pulling off a strafing attack, they were jumped by Zeroes. Foss saw Bauer splash one, then lost sight of him. When the Wildcats regrouped, Foss returned to the combat area and noted Bauer in the water, gesturing toward Guadalcanal. Foss and 2Lt T. W. "Boot" Furlow bent their throttles to race homeward. Light was fading but there was still some time to try to rescue "Colonel Joe."

Joe Foss piled into a Grumman J2F amphibian flown by Maj Joseph Renner, an operations officer at Henderson. Navigating by the fires of burning ships, they searched in vain for any sight of Bauer. But "The Coach" was gone. Eventually Bauer received a posthumous Medal of Honor. His citation said in part, "His intrepid fighting spirit and distinctive ability as a leader and an airman, exemplified in his splendid record of combat achievements, were vital factors in the successful operations in the South Pacific Area."

Seven Japanese transports were sunk or turned back in the dash for Guadalcanal. In the heaviest day of aerial activity to date, "Cactus" had launched 86 US Marine Corps, US Navy and USAAF strike sorties, plus 42 US Marine Corps and US Navy F4Fs. The cost of repelling most of the enemy reinforcement was relatively light – five SBDs and two F4Fs. The four transports that beached themselves on Guadalcanal's north coast the next morning delivered too few troops to affect the balance.

The Japanese intended another shattering naval bombardment on the night of November 14, but the US Navy intervened. In the Pacific War's first battleship engagement, USS *Washington* (BB-56) and USS *South Dakota* (BB-57) defeated IJNS *Kirishima*, sparing the airfields a pasting.